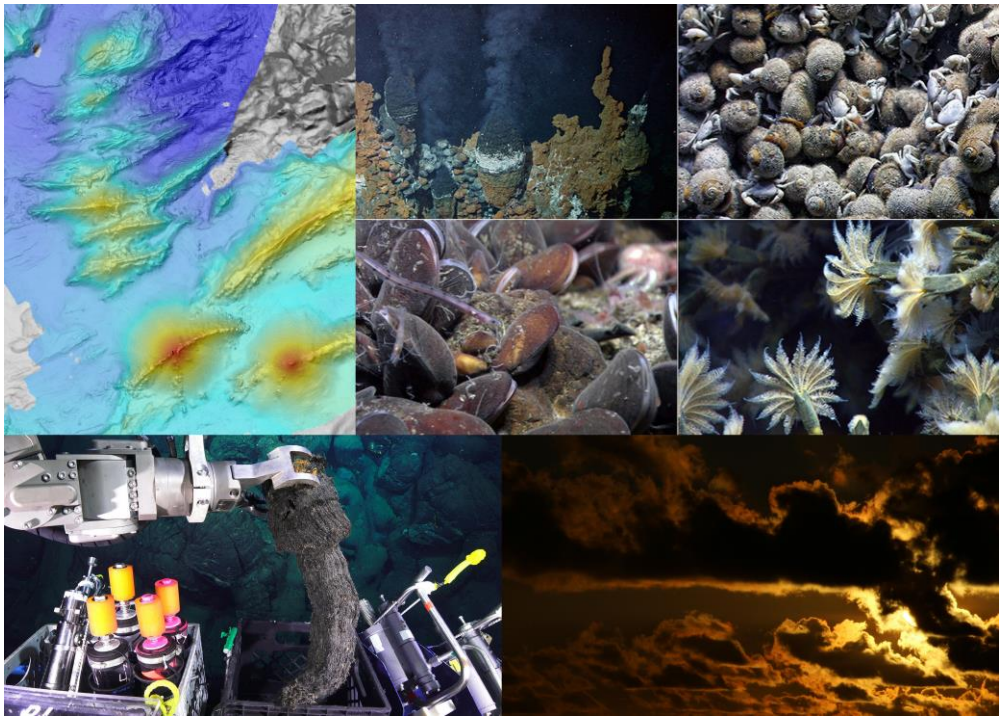
2017 NE Lau Basin Cruise Report

FK171110

R/V Falkor

November 10-December 18, 2017

SuBastian Dives S085-S105



Chief Scientist: Ken Rubin
R/V Falkor Captain: Phillip Guenther (Leg 1) and Peter Reynolds (Leg 2)
SuBastian Expedition Leader: Russell Coffield
SENTRY Expedition Leader: Sean Kelley
Cruise Report prepared by: Andra Bobbitt

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1 – NE Lau Basin 2017 Cruise Summary

Ken Rubin, Chief Scientist

Submarine volcanism is one of Earth's most fundamental processes, yet few active/recently active submarine volcanoes have been studied; even fewer have had time series observations via repeat site visits to understand volcano age, eruption frequency and volcanic duration, how the volcanoes develop/maintain hydrothermal activity, and how the activity affects benthic ecology. On FK171110, the "Underwater Fire" Expedition, we set out with our partners at Schmidt Ocean Institute to develop a detailed geological/hydrothermal/ecological understanding of an active, high-density-submarine-volcano terrain in the NE Lau basin of northern Tonga. Our study site was chosen because of the large number of closely-spaced active volcanoes in the area, revealed by our group's prior work in the area over the past decade.

The expedition was divided into two parts. On the first leg, we used the WHOI AUV Sentry to collect microbathymetry and sidescan, as well as water column sampling of volcanic emissions, and water sampling by towed CTD package. On the second leg, we used ROV SuBastian on 21 dives to observe and sample volcanic structures, hydrothermal vents and macrofaunal ecology. A range of volcanic rock and sediment, water, and macrobiological samples were collected via various sampling methods, and hundreds of samples were processed and analyzed on R/V Falkor during the expedition. A map of the primary study area (i.e., all but the sites at Tafu on the NELSC and the northern large dacite lava flow dive, S105), is on the next page. Each of these operations is described in dedicated sections of this report.

While the primary focuses of this expedition were deciphering geological histories at closely-spaced submarine volcanoes, and their impacts on hydrothermal venting and sea bed ecology, the expedition was also designed to excite the public with visually stunning images and video, very unusual rocks, and lush hydrothermal fauna. The expedition also used intelligent observation/analysis in a nested survey approach, promoted open information sharing, and employed global knowledge communication via live telepresence on YouTube and Facebook, becoming the most popular live streaming expedition for Schmidt Ocean Institute at the time, with many thousands of viewers each day.

Expedition details for the public are available at the Schmidt Ocean Institute website at https://schmidtocean.org/cruise/underwater-fire-studying-submarine-volcanoes-tonga/ , coordinated by the SOI media and outreach team. This includes a cruise log with written and video 26 entries from many of the expedition participants, made possible by the onboard media coordinator, Monika (see https://schmidtocean.org/cruise/underwater-fire-studying-submarine-volcanoes-tonga/cruise-log/).

A brief summary of some activities and findings follows, with more details in the body of the report.

FK171110 Leg 1, 8-21 November, 2018, Apia, Samoa to Apia, Samoa

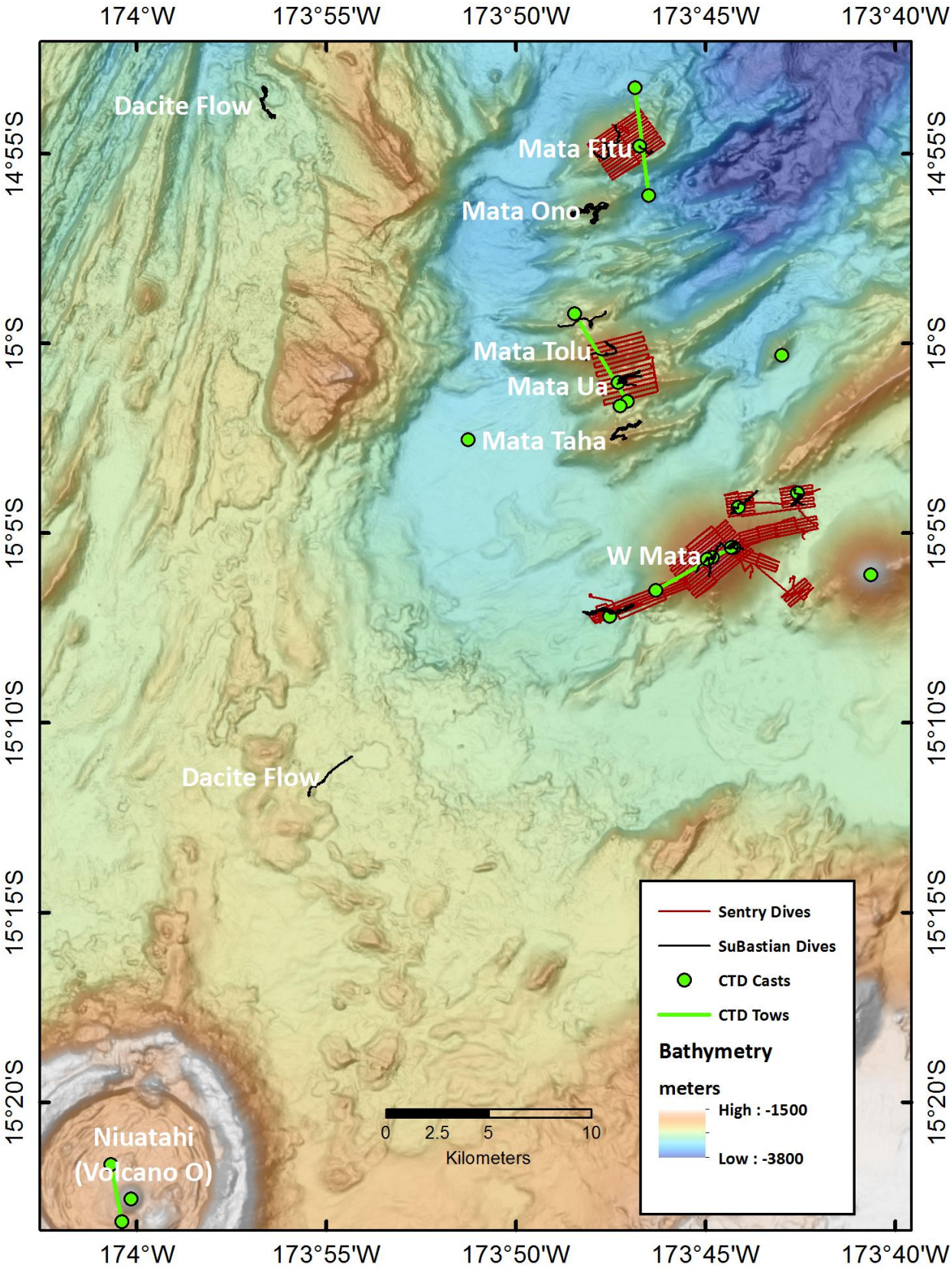
During this leg, we conducted 6 AUV Sentry Deployments with data collected, plus 1 engineering dive to test a different sonar.

a. 2 Deployments at West Mata volcano and 1 that visited east and West Mata volcanoes collected useful sonar data and some photos of the sea floor.

b. 3 other deployments had faulty or failing sonar, so there is little to no useable sea floor multibeam data. These includes deployments at Mata Fitu, Mata Ua+Mata Tolu, and the southwest base of West Mata. We do have photos from those dives.

c. an autonomous MAPR stuck on the vehicle collected some sea water properties (nephelometry, ORP) which we subsequently used to help localize sites of hydrothermal venting.

We also did multibeam sonar mapping from Falkor with the EM302 system (on both legs).



We also conduced CTD package deployments on leg 1. Two types of deployments were done

a. Vertical casts (13 of them)
b. "Toyo" casts (4 of them) where the CTD package is dragged along a horizontal track and moved up and down in the water column.3.

Preliminary results of these studies:

1. Repeat multibeam mapping uncovered a new lava flow near the summit of West Mata volcano, which formed sometime after multibeam surveys here by Falkor in early 2016. We also identified two new lava units that erupted in the past 7 years at Tafu seamount on the Northeast Lau Spreading center
2. Lava units we were able to map with Sentry at West Mata have very different shapes and textures indicating different eruption conditions
3. No new hydrothermal plumes were identified in the area, but in detail, the chemistry of existing plumes has changed to include more methane and less hydrogen at West Mata, suggesting nothing is erupting right now. Plumes at Mata Ua, Fitu, and Tolu remain strong.

FK171110 Leg 2, 27 November- 18 December, 2018, Apia, Samoa to Apia, Samoa

On this leg, ROV SuBastian was deployed 21 times, visiting 11 different submarine volcanoes (see sections 5 and 6 of this report). The vehicle generally went in the water at approximately 7 AM and returned to the ship at 7 PM each day. Ken Rubin and Bill Chadwick shared responsibility for dive planning, alternatingly producing plans to meet as many science party objectives as possible. Dive navigation was done on the ship using the SOI proprietary Green Seas system, which used real-time USBL, DBL and INS navigation streams to provide a "best estimate" vehicle position. Navigation proved to be the most problematic area of ROV operations, which Andra Bobbitt spent many hours sorting through after the expedition. Some dives have essentially no useful navigation. Instead, we estimated vehicle position from water depth and features observed as discussed elsewhere in the report. Dive logging was another issue that proved difficult initially but was worked out as the Leg progressed. The logging effort was led by Susan Merle, who trained up a handful of other cruise participants on the types of observations to log, descriptive terms, sampling nomenclature, and the like.

All dives were streamed live on YouTube and Facebook live, using capabilities of the ROV and marine tech team. Dives were narrated mostly by Ken and Bill on a spit watch system with opportunities for a handful of other cruise participants to also have time on the microphone. Real-time interaction with a handful of interested, shore-based colleagues (e.g., Embley, Shank, Clague, Carrey, Portner, Resing and the SOI shore-based outreach team of Carley and Logan) were facilitated using Slack.com. A workspace was developed for the program, with each dive getting a separate channel. Dive plans and maps were shared before the dive, and nav screen grabs and other commentary were shared during the dives. We received many helpful suggestions and discussions during the dives from this interaction that enhanced the dives.

Preliminary results of these ROV dives (see section 6 for details):

1. West Mata is the most active volcano in the area, with a significant variety in eruption.
2. Two new eruptions in the last 5 years were discovered and documented at Tafu seamount (NELSC), as well as a diffuse flow hydrothermal site at its summit
3. Focused-flow hydrothermal vent systems were studied at 4 sites, including a new active system discovered at Mata Ono. Distinct differences in chimney size, shape, number, ecology and community structure were observed at the different hydrothermal vent sites.
4. The youngest volcanism at Matas Talu and Ua was discovered to be on satellite cones near to but away from the summits. Mata Fa has a wide mixture of apparent volcanic age across several small

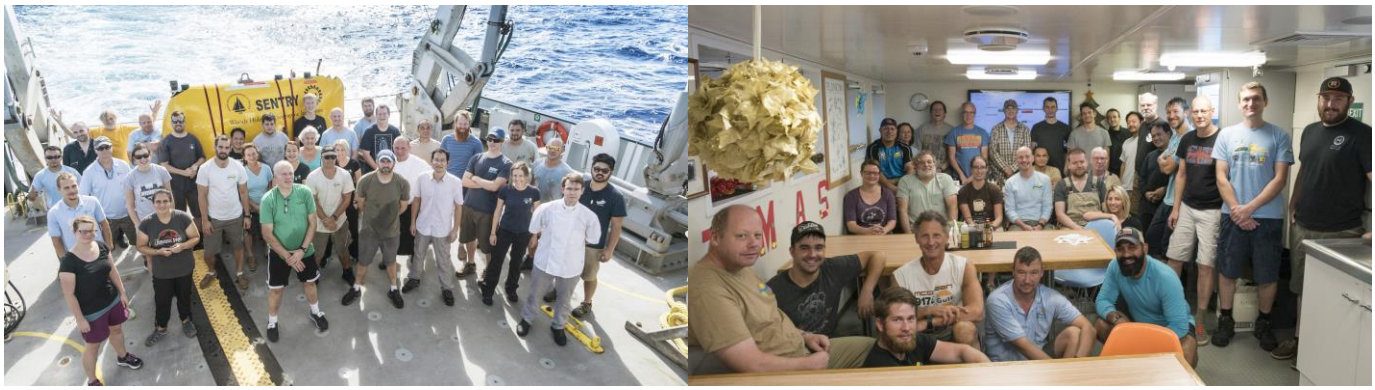
cones, Mata Taha appears to be the least active (recently) and Mata Fitu is largely tectonized, but with some young volcanism at the eastern base of the summit cone.

5. There is a large variety of lava eruption styles at most volcanoes, including pillows (as expected) but with a significant range of morphologies, as well as the co-occurrence of high flow-rate lava forms at West Mata, Mata Tolu and Mata Fitu and a magma intrusion into sediment, causing uplift, and that subsequently erupted from the base of the uplift structure at West Mata. We observed large scale production of volcanic sediments from explosive phases of volcanism at West Mata and Tafu, with lesser amounts at Tolu, Fa and the large dacite lava flows LL_B and LL_D.

2 – Science Participants

Scientist	Affiliation	Expertise
Leg 1		
Ken Rubin	University of Hawaii	Chief Scientist-Geology
Bill Chadwick	NOAA EOI	Co-Chief Geology
Susan Merle	Oregon State U.-EOI	EM302 Mapping/ROV Data manager
Tamara Baumberger	Oregon State U.-EOI	Gas Studies
Joe Resing	U. Washington-EOI	Plume Studies
Nathan Buck	U. Washington-EOI	Plume Studies
Millie Wilkinson	Oregon State U.-EOI	Gas Studies
Sharon Walker	NOAA EOI	CTD/MAPRs
Hu Wang	Tongji University	Gas Studies
Mónika Naranjo González	LUMA	Multimedia Correspondent
Leg 2		
Ken Rubin	University of Hawaii	Chief Scientist-Geology
Bill Chadwick	NOAA EOI	Co-Chief Geology
Susan Merle	Oregon State U.-EOI	EM302 Mapping/ROV Data manager
Tamara Baumberger	Oregon State U.-EOI	Gas Studies
Dave Butterfield	U. Washington-EOI	Hydrothermal Fluids
Kevin Roe	U. Washington-EOI	Hydrothermal Fluids
Val Finlayson	University of Hawaii	Geology
Terry Naumann	University of Hawaii	Geology
Christian Timm	GNS Science	Sulfide Studies
Walter Cho	Point Loma Nazarene U.	Biological Studies
Mónika Naranjo González	LUMA	Multimedia Correspondent

Leg 1 Scientists | **Leg 2 Scientist**



3 – Operations Log

3.1 Leg 1

date UTC	time UTC	date local	time local	FK171110 Leg 1 Operations
		8-Nov		Science crew (Leg 1) embarked in Apia by zodiac. Falkor anchored offshore.
		9-Nov		Still waiting offshore to get back into port to load Sentry
		9-Nov	1700	Latest news is that we may be able to get into port early 11-Nov
9-Nov	1500	10-Nov	0500	Pulled anchor - Set sail for West Mata
9-Nov	2023			CTD dunk test SW of Samoa
9-Nov	2120	10-Nov	1120	CTD at the surface
9-Nov	2125	10-Nov	1125	Moving on toward West Mata
10-Nov	0550	10-Nov	1950	XBT 1242527
10-Nov	0556	10-Nov	1956	Start logging EM302. SOL 1. Z=2483
10-Nov	0600	10-Nov	2000	EM302. SOL 2.. Start survey after XBT. Logging water column data also.
10-Nov	0705			EOL 4. End of W Mata Survey. Continuing to summit. Z=2609.
10-Nov	0826	10-Nov	2226	CTD case (V17B-01) over new cone near W Mata summit.
10-Nov	0859	10-Nov	2229	CTD case (V17B-01) back on deck
10-Nov	0925	10-Nov	2325	Only have 1 engine so will head to port now. Heading to Apia to pick up Sentry
		11-Nov	1400	Arrive at Apia. Got into port. Got Sentry and food (not enough snacks) finally!
11-Nov	0330	11-Nov	1730	Departed Apia. Headed back to West Mata ~ 12 hours.
				Did not collet multibeam for North Matas on way in because 2nd engine did not come on line in time.
		12-Nov	0636	CTD off deck. Start of tow T17B-01
		12-Nov	1100	CTD on deck. End of tow T17B-01
11-Nov	2202	12-Nov	1202	Sentry in water over W Mata summit Sentry dive 457.
12-Nov	2020	13-Nov	1020	Sentry on board. End of Sentry dive 457.
12-Nov	2032			SOL multibeam line 14 transit to Niutahi (Volcano).
12-Nov	2214			SOL 17 Survey at Niutahi.
12-Nov	2315			End of logging EM302 - west line over Niuatahi.
13-Nov	0210			CTD deployed at Niuatahi. T17B-02
				Tried to do a tow but ship had trouble staying on track so will bring CTD up and try a cast afterward.
13-Nov	0245			CTD on deck.
				SOL multibeam line 22 S to N Niutahi.
13-Nov	0428			North end of Niuatahi multibeam line 23. Stopped logging.
13-Nov	0431			SOL multibeam line 24.
13-Nov	0505			EOL 25 Stop logging Z-1757.
13-Nov	0526			CTD in the water over Niuatahi cone - 2nd CTD here after the previous CTD tow/cast that was in the wrong place. V171B-02.
13-Nov	0654			CTD on board. Will transit back to West Mata

date UTC	time UTC	date local	time local	FK171110 Leg 1 Operations
13-Nov	0700			Logging EM302 multibeam during transit back to West Mata. Line 26.
13-Nov	1000	14-Nov	0000	Sentry launch dive 458 at NE West Mata survey
13-Nov	1905			CTD cast V17B-03 over NE depth anomaly at West Mata.
13-Nov	2130			CTD on deck. Ship moving west to rejoin Sentry (was out of acoustic range for a little bit ~30 minutes.
14-Nov	0003			V17B-04. CTD cast over NE West Mata depth anomaly.
14-Nov	0220	14-Nov	1620	CTD on deck.
14-Nov	0430	14-Nov	1830	Sentry back on deck. End of dive 458.
14-Nov	0545			CTD in the water for tow-yo over Mata Tolu and Mata Ua T17B-03
		15-Nov	0100	CTD back on deck
14-Nov	1230			SOL 32. Start of multibeam survey of the northern Matas.
14-Nov	1620			EOL 42. End of North Mata Survey
		15-Nov	0711	Sentry in the water for engineering dive 459. Should be 6 hours deck to deck.
14-Nov	2220	15-nov	1220	Sentry on deck.
14-Nov	2346			Deep basin CTD cast west of West Mata. V17B-05
				During CTD cast winch had problems with level wind during ascent. Took 2 hours to resolve.
15-Nov	0322			CTD on deck.
15-Nov	0444			Sentry in the water for dive 460 - SE slope of West Mata.
15-Nov	2240	16-Nov	1240	Sentry on board. End of Sentry dive 460.
15-Nov	2245			EM302 multibeam. SOL 44 logging on way to CTD cast at Mata Fitu
15-Nov	2345			Stopped logging multibeam.
16-Nov	0003			CTD tow in the water at Mata Fitu. T17B-04
				Sentry dive delayed due to data quality issues. Switching to Reson 7125 400kHz head from Reson AUV 3 model (switching from newer to older model).
16-Nov	0920			Sentry in the water for dive 461 at Mata Fitu.
16-Nov	2319			CTD cast at Mata Fitu. V17B-06.
17-Nov	0230			CTD back on deck.
17-Nov	0230	17-Nov	1640	Updating EM302 SVP profile with data from previous CTD cast
17-Nov	0435	17-Nov	1835	Sentry on board. End of dive at Mata Fitu.
17-Nov	1048			EM302 mapping during the night. SOL 46
17-Nov	1706	18-Nov	0706	EOL at WP10. Stop EM302 multibeam mapping.
		18-Nov	1024	Delayed Sentry launch until after CTD cast at Mata Tolu.
		18-Nov	1024	Tried CTD cast to test CTD but aborted.
		18-Nov	1024	Recovered CTD. Had communications errors (like the previous night). Have to re-terminate.
18-Nov	0108			Sentry in the water for dive 462.
18-Nov	0312			CTD in the water for cast on south flank of Mata Ua. V17B-08
	0525			CTD on deck. Ship moving to next CTD site.
18-Nov	0602			V17B-09. CTD vertical cast at Mata Ua north side of ridge.

date UTC	time UTC	date local	time local	FK171110 Leg 1 Operations
18-Nov	0836			V17B-09 back on deck.
18-Nov	1750	19-Nov	0750	Sentry on board. End of dive 462
18-Nov	1805			Starting multibeam line 0 - new survey. Swapped out BSP (beam signal Processor) board from EM710 and put it in EM302. New survey (Survey 2)
18-Nov	1805			Bad data on port side now appears "gone".
18-Nov	2006			CTD cast V17B-10 over mound/depression at West Mata summit.
18-Nov	2136			CTD out of water.
18-Nov	2234			On station at East Mata.
18-Nov	2314			CTD in water for V17B-11 at East Mata.
19-Nov	0045			CTD back on deck.
19-Nov	0057			Actual new survey data starts on line 002_2017_1119_005745.
19-Nov	0205			Sentry in water for Dive 463 (SW rift of West Mata). Has original multibeam sonar.
19-Nov	0515			Breaking off to do CTD cast at summit of West Mata V17B-12.
19-Nov	0703			CTD back on board.
19-Nov	1941			CTD cast V17B-13. at West Mata deep SW rift zone during Sentry photo survey.
19-Nov	2256			CTD back on board.
20-Nov	0025			Sentry back on deck after dive 463.
20-Nov	0040			SOL 3 survey 2. Will map until reach the edge of the Tongan EEZ. Heading for Apia.
20-Nov	~0500			EOL7 Stop logging multibeam at edge of Tongan EEZ.
		21-Nov	~1000	Arrive at Apia. End of Leg 1

3.2 Leg 2

Date UTC	Time UTC	Date local	Time local	FK171110 Leg 2 Operations (Nov 27 – Dec 18 2017 local Samoan Time)
26-Nov	17:44	27-Nov	07:44	**SuBastian Dive S085 - Vehicle off Deck**
26-Nov	18:58	27-Nov	08:58	SuBastian Dive S085 - On bottom; start of dive S085 at West Mata
27-Nov	05:32	27-Nov	19:32	SuBastian Dive S085 - Off bottom; end of dive S085; 22 samples collected (2 fluid; 2 gas; 5 biology; 1 sediment; 12 rock)
27-Nov	05:55	27-Nov	19:55	SuBastian Dive S085 - Vehicle on Deck
27-Nov		27-Nov	14:00	EM302 multibeam survey between dives
27-Nov	17:11	28-Nov	07:11	**SuBastian Dive S086 - Vehicle off Deck**
27-Nov	18:33	28-Nov	08:33	SuBastian Dive S086 - On bottom; start of dive S086 at West Mata
28-Nov	04:10	28-Nov	18:10	SuBastian Dive S086 - Off bottom; end of dive S086; 21 samples collected (5 biology; 2 sediment; 14 rock)
28-Nov	04:46	28-Nov	18:46	SuBastian Dive S086 - Vehicle on Deck
28-Nov		28-Nov	14:00	EM302 multibeam survey between dives
28-Nov	17:17	29-Nov	07:17	**SuBastian Dive S087 - Vehicle off Deck**
28-Nov	18:39	29-Nov	08:39	SuBastian Dive S087 - On bottom; start of dive S087 at West Mata

Date UTC	Time UTC	Date local	Time local	FK171110 Leg 2 Operations (Nov 27 – Dec 18 2017 local Samoan Time)
29-Nov	04:10	29-Nov	18:10	SuBastian Dive S087 - Off bottom; end of dive S087; 18 samples collected (4 fluid; 3 gas; 4 biology; 2 sediment; 5 rock)
29-Nov	05:11	29-Nov	19:11	SuBastian Dive S087 - Vehicle on Deck
29-Nov		29-Nov	14:00	EM302 multibeam survey between dives
29-Nov	17:07	30-Nov	07:07	**SuBastian Dive S088 - Vehicle off Deck**
29-Nov	19:02	30-Nov	09:02	SuBastian Dive S088 - On bottom; start of dive S088 at the "Muffin"
30-Nov	04:48	30-Nov	18:48	SuBastian Dive S088 - Off bottom; end of dive S088; 18 samples collected (1 fluid; 4 sediment; 13 rock)
30-Nov	05:48	30-Nov	19:48	SuBastian Dive S088 - Vehicle on Deck
30-Nov		30-Nov	14:00	EM302 multibeam survey between dives
30-Nov	17:11	1-Dec	07:11	**SuBastian Dive S089 - Vehicle off Deck**
30-Nov	19:08	1-Dec	09:08	SuBastian Dive S089 - On bottom; start of dive S089 at Mata Ua
1-Dec	03:44	1-Dec	17:44	SuBastian Dive S089 - Off bottom; end of dive S089; 25 samples collected (4 fluid; 3 gas; 8 biology; 3 sulfide; 1 sediment; 6 rock)
1-Dec	05:42	1-Dec	19:42	SuBastian Dive S089 - Vehicle on Deck
1-Dec		1-Dec	14:00	EM302 multibeam survey between dives
1-Dec	17:06	2-Dec	07:06	**SuBastian Dive S090 - Vehicle off Deck**
1-Dec	19:00	2-Dec	09:00	SuBastian Dive S090 - On bottom; start of dive S090 at Mata Fitu
2-Dec	04:09	2-Dec	18:09	SuBastian Dive S090 - Off bottom; end of dive S090; 17 samples collected (1 sediment; 16 rock)
2-Dec	05:58	2-Dec	19:58	SuBastian Dive S090 - Vehicle on Deck
2-Dec		2-Dec	14:00	EM302 multibeam survey between dives
2-Dec	17:06	3-Dec	07:06	**SuBastian Dive S091 - Vehicle off Deck**
2-Dec	19:12	3-Dec	09:12	SuBastian Dive S091 - On bottom; start of dive S091 at Mata Tolu
3-Dec	04:38	3-Dec	18:38	SuBastian Dive S091 - Off bottom; end of dive S091; 19 samples collected (2 fluid; 2 gas; 3 biology; 3 sulfide; 1 sediment; 8 rock)
3-Dec	06:02	3-Dec	20:02	SuBastian Dive S091 - Vehicle on Deck
3-Dec		3-Dec	14:00	EM302 multibeam survey between dives
3-Dec	17:15	4-Dec	07:15	**SuBastian Dive S092 - Vehicle off Deck**
3-Dec	19:10	4-Dec	09:10	SuBastian Dive S092 - On bottom; start of dive S092 at Large Dacite Flow
4-Dec	03:46	4-Dec	17:46	SuBastian Dive S092 - Off bottom; end of dive S092; 23 samples collected (2 biology; 5 sediment; 15 rock; 1 bottle)
4-Dec	05:26	4-Dec	19:26	SuBastian Dive S092 - Vehicle on Deck
4-Dec		4-Dec	14:00	EM302 multibeam survey between dives
4-Dec	17:07	5-Dec	07:07	**SuBastian Dive S093 - Vehicle off Deck**
4-Dec	18:49	5-Dec	08:49	SuBastian Dive S093 - On bottom; start of dive S093 at base of West Mata (NE Pillow Ridge)
5-Dec	03:19	5-Dec	17:19	SuBastian Dive S093 - Off bottom; end of dive S093; 19 samples collected (5 sediment; 14 rock)
5-Dec	04:57	5-Dec	18:57	SuBastian Dive S093 - Vehicle on Deck
5-Dec		5-Dec	14:00	EM302 multibeam survey between dives
5-Dec	17:09	6-Dec	07:09	**SuBastian Dive S094 - Vehicle off Deck**

Date UTC	Time UTC	Date local	Time local	FK171110 Leg 2 Operations (Nov 27 – Dec 18 2017 local Samoan Time)
5-Dec	19:01	6-Dec	09:01	SuBastian Dive S094 - On bottom; start of dive S094 at Mata Tolu
6-Dec	03:59	6-Dec	17:59	SuBastian Dive S094 - Off bottom; end of dive S094; 25 samples collected (4 fluid; 3 gas; 7 biology; 4 sulfide; 1 sediment; 6 rock)
6-Dec	05:36	6-Dec	19:36	SuBastian Dive S094 - Vehicle on Deck
6-Dec		6-Dec	14:00	EM302 multibeam survey between dives
6-Dec	17:04	7-Dec	07:04	**SuBastian Dive S095 - Vehicle off Deck**
6-Dec	19:13	7-Dec	09:13	SuBastian Dive S095 - On bottom; start of dive S095 at SW Base of West Mata (SW Base)
7-Dec	03:43	7-Dec	17:43	SuBastian Dive S095 - Off bottom; end of dive S095; 22 samples collected (2 biology; 3 sediment; 17 rock)
7-Dec	05:54	7-Dec	19:54	SuBastian Dive S095 - Vehicle on Deck
7-Dec		7-Dec	14:00	EM302 multibeam survey between dives
7-Dec	17:08	8-Dec	07:08	**SuBastian Dive S096 - Vehicle off Deck**
7-Dec	18:50	8-Dec	08:50	SuBastian Dive S096 - On bottom; start of dive S096 at Mata Fa
8-Dec	03:33	8-Dec	17:33	SuBastian Dive S096 - Off bottom; end of dive S096; 20 samples collected (3 biology; 3 sediment; 14 rock)
8-Dec	05:12	8-Dec	19:12	SuBastian Dive S096 - Vehicle on Deck
8-Dec		8-Dec	14:00	EM302 multibeam survey between dives
8-Dec	17:06	9-Dec	07:06	**SuBastian Dive S097 - Vehicle off Deck**
8-Dec	18:50	9-Dec	08:50	SuBastian Dive S097 - On bottom; start of dive S097 at Mata Fitu
9-Dec	03:56	9-Dec	17:56	SuBastian Dive S097 - Off bottom; end of dive S097; 22 samples collected (4 fluid; 3 gas; 5 biology; 7 suldfide; 1 sediment; 2 rock)
9-Dec	05:50	9-Dec	19:50	SuBastian Dive S097 - Vehicle on Deck
9-Dec		9-Dec	14:00	EM302 multibeam survey between dives
9-Dec	17:09	10-Dec	07:09	**SuBastian Dive S098 - Vehicle off Deck**
9-Dec	18:43	10-Dec	08:43	SuBastian Dive S098 - On bottom; start of dive S098 at South Tafu
10-Dec	04:14	10-Dec	18:14	SuBastian Dive S098 - Off bottom; end of dive S098; 22 samples collected (2 fluid; 1 biology; 5 sediment; 14 rock)
10-Dec	05:29	10-Dec	19:29	SuBastian Dive S098 - Vehicle on Deck
10-Dec		10-Dec	14:00	EM302 multibeam survey between dives
10-Dec	17:05	11-Dec	07:05	**SuBastian Dive S099 - Vehicle off Deck**
10-Dec	18:34	11-Dec	08:34	SuBastian Dive S099 - On bottom; start of dive S099 at North Tafu
11-Dec	04:28	11-Dec	18:28	SuBastian Dive S099 - Off bottom; end of dive S099; 26 samples collected (4 fluid; 2 biology; 3 sediment; 17 rock)
11-Dec	05:37	11-Dec	19:37	SuBastian Dive S099 - Vehicle on Deck
11-Dec		11-Dec	14:00	EM302 multibeam survey between dives
11-Dec	17:03	12-Dec	07:03	**SuBastian Dive S0100 - Vehicle off Deck**
11-Dec	18:50	12-Dec	08:50	SuBastian Dive S0100 - On bottom; start of dive S0100 at Mata Ua (NE Flank)
12-Dec	03:52	12-Dec	17:52	SuBastian Dive S0100 - Off bottom; end of dive S0100; 28 samples collected (5 fluid; 3 gas; 6 biology; 6 sulfide; 1 sediment; 7 rock)
12-Dec	05:41	12-Dec	19:41	SuBastian Dive S0100 - Vehicle on Deck
12-Dec		12-Dec	14:00	EM302 multibeam survey between dives

Date UTC	Time UTC	Date local	Time local	FK171110 Leg 2 Operations (Nov 27 – Dec 18 2017 local Samoan Time)
12-Dec	20:10	13-Dec	10:10	**SuBastian Dive S0101 - Vehicle off Deck**
12-Dec	22:11	13-Dec	12:11	SuBastian Dive S0101 - On bottom; start of dive S0101 at Mata Ono
13-Dec	04:43	13-Dec	18:43	SuBastian Dive S0101 - Off bottom; end of dive S0101; 21 samples collected (3 fluid; 1 gas; 1 biology; 2 sulfide; 3 sediment; 11 rock)
13-Dec	06:35	13-Dec	20:35	SuBastian Dive S0101 - Vehicle on Deck
13-Dec		13-Dec	14:00	EM302 multibeam survey between dives
13-Dec	17:03	14-Dec	07:03	**SuBastian Dive S0102 - Vehicle off Deck**
13-Dec	19:00	14-Dec	09:00	SuBastian Dive S0102 - On bottom; start of dive S0102 at Mata Ono
14-Dec	04:05	14-Dec	18:05	SuBastian Dive S0102 - Off bottom; end of dive S0102; 25 samples collected (4 fluid; 3 gas; 4 biology; 3 sulfide; 2 sediment; 9 rock)
14-Dec	05:55	14-Dec	19:55	SuBastian Dive S0102 - Vehicle on Deck
14-Dec		14-Dec	14:00	EM302 multibeam survey between dives
14-Dec	17:06	15-Dec	07:06	**SuBastian Dive S0103 - Vehicle off Deck**
14-Dec	18:20	15-Dec	08:20	SuBastian Dive S0103 - On bottom; start of dive S0103 at West Mata (upper east rift)
15-Dec	04:15	15-Dec	18:15	SuBastian Dive S0103 - Off bottom; end of dive S0103; 25 samples collected (4 fluid; 3 gas; 4 biology; 3 sulfide; 2 sediment; 9 rock)
15-Dec	05:14	15-Dec	19:14	SuBastian Dive S0103 - Vehicle on Deck
15-Dec		15-Dec	14:00	EM302 multibeam survey between dives
15-Dec	17:06	16-Dec	07:06	**SuBastian Dive S0104 - Vehicle off Deck**
15-Dec	18:55	16-Dec	08:55	SuBastian Dive S0104 - On bottom; start of dive S0104 at Mata Taha
16-Dec	03:49	16-Dec	17:49	SuBastian Dive S0104 - Off bottom; end of dive S0104; 21 samples collected (2 biology; 2 sulfide; 2 sediment; 15 rock)
16-Dec	05:29	16-Dec	19:29	SuBastian Dive S0104 - Vehicle on Deck
		16-Dec	14:00	EM302 multibeam survey between dives
16-Dec	16:01:33		06:01	**SuBastian Dive S0105 - Vehicle off Deck**
16-Dec	18:00:46		08:00	SuBastian Dive S0105 - On bottom; start of dive S0105 at North Dacite Flow.
17-Dec	00:10:16		14:10	SuBastian Dive S0105 - Off bottom; end of dive S0105; 18 samples collected (1 biology; 5 sediment; 12 rock)
17-Dec	01:52:25		15:52	SuBastian Dive S0104 - Vehicle on Deck
17-Dec		17-Dec		EM302 multibeam mapping until out of Tongan waters.

4 – Discipline Summaries

4.1 Geology

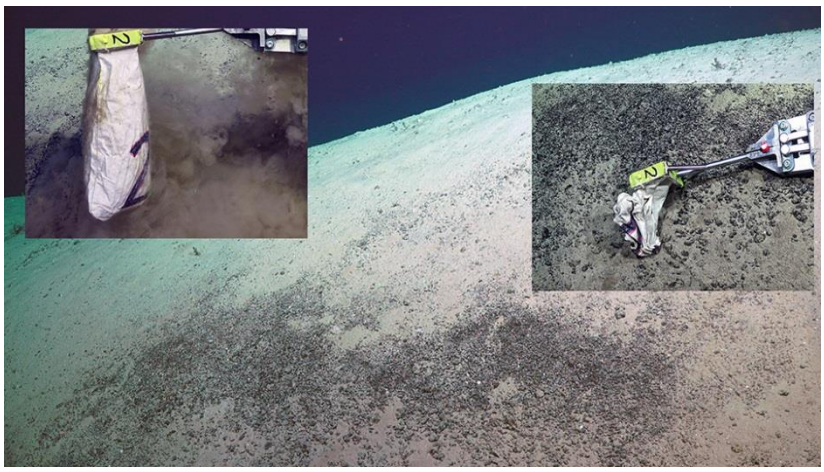
The primary focuses of this expedition were deciphering geological histories at closely-spaced submarine volcanoes, and their impacts on hydrothermal venting and sea bed ecology. Geologic observations and sampling were conducted on each of 21 ROV dives to provide direct information on the types and distribution of rocks (volcanic and hydrothermal) and sediments (primarily volcanoclastic) in the area, their relative ages, textures, mineralogy, and through pending shore-based analysis, their composition and conditions of formation. ROV dives visited and traversed geological structures (e.g., eruption deposits, faults, fissures, vent fields) as identified by ship and AUV sonar surveys, including repeat surveys, with an emphasis on longer ROV geological traverses to provide geospatial information on eruption deposit variations in space and time. We built on observations made during our group's prior expeditions in the area since 2008. Descriptions of the volcanic and hydrothermal rock collections are below.

4.1.1 – Volcanic Rock Collections

Ken Rubin

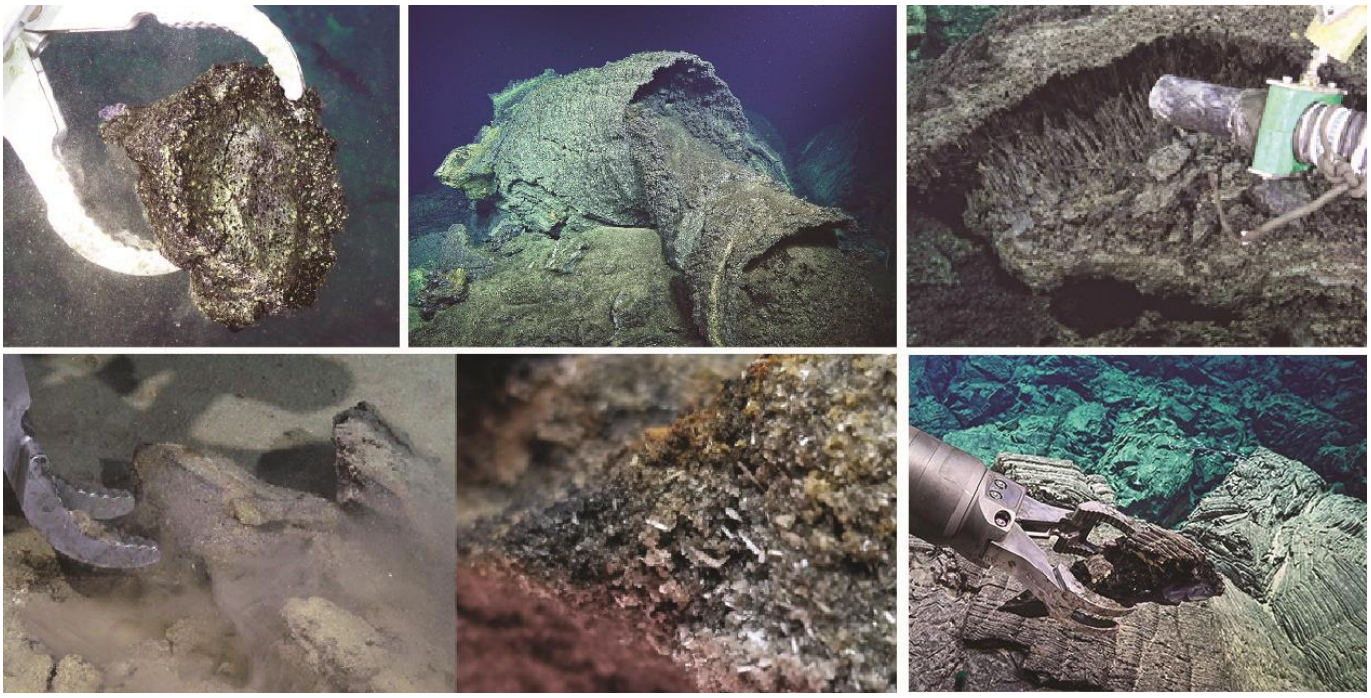
298 volcanic "rock" samples, were collected with ROV SuBastian, including 238 lava samples and 60 sediment samples, representing at least 75 distinct geological rock units (on average 3 units per dive). The textural, mineralogical and geochemical composition of these samples provide information on the conditions of magma formation, ascent, storage, eruption, and dispersal. All specimens were described, photographed (available on request), and dried on ship, and registered with unique digital identifiers (IGSN) at the System for Earth Science Registration website (geosamples.org). The table below list identifiers and some sample particulars.

In addition to collecting as much lava as possible, a particular focus of these dives was collection of volcaniclastic sediment at as many sites as it occurred, with co-located volcanic rocks, to begin to decipher the mechanisms and magnitudes of pyroclastic activity in this region. This effort was greatly enhanced by the making and refining, midway through the expedition, of several metal ring/canvas-bag scoopers by the Falkor's engineering team, based on a Hawaii Undersea Research lab design (see photo). We used these bags to collect 39 volcaniclastic sediment samples, including some with >10 cm-sized tephra and spatter fragments. Our team also employed MBARI pushcore samplers with core catchers kindly provided by Dave Clague (MBARI), plus SOI cores based on the same design, to collect 15 additional volcaniclastic sediment samples, focusing on those that were thicker and/or finer grained. 6 consolidated/lithified volcanic sediments or breccias were collected with the ROV manipulator.



Collection of dacitic tephra on dive S-92

Lava samples were collected from 3 general lithologies. The majority of the lavas collected are boninite and related lithologies (n = 183) from the Mata volcanoes, with lesser amounts of basalt (n = 30) and dacite (n = 24) from the NE Lau Spreading Center and regional large lava flows, respectively. Nearly all lava samples have volcanic glass on them, which was subsampled at sea. West Mata was by far the location with the most volcanic samples collected (111 lavas and pyroclasts).



Montage of volcanic rock samples and sampling methods. Clockwise from upper left: fresh boninite, nested boninite pillow lavas, suction sampling basalt lava drips, lithified pyroclastic deposit and close-up, "buffalo head hair texture dacite lava.

FK171110 Volcanic Rock Samples

Identifier	IGSN	Material	field ID	Dive	Site	Latitude	Longitude	Depth (m)
S85-Rock-01	KHR000246	Rock	Boninite	S85	W Mata summit	-15.098151	-173.753236	-1444
S85-Rock-02	KHR000247	Rock	Boninite	S85	W Mata summit	-15.097375	-173.752821	-1403
S85-Rock-03	KHR000248	Rock	Boninite	S85	W Mata summit	-15.097156	-173.752217	-1375
S85-Sed-04	KHR000249	sediment	Volcaniclastic	S85	W Mata summit	-15.096914	-173.751776	-1369
S85-Rock-05	KHR00024A	Rock	Boninite	S85	W Mata summit	-15.095289	-173.749657	-1232
S85-rock-14	KHR00024B	rock	Boninite	S85	W Mata summit	-15.094489	-173.746982	-1279
S85-rock-15	KHR00024C	rock	Boninite	S85	W Mata summit	-15.094415	-173.746617	-1270
S85-rock-17	KHR00024D	rock	Boninite	S85	W Mata summit	-15.093228	-173.746686	-1288
S85-rock-18	KHR00024E	rock	Boninite	S85	W Mata summit	-15.091314	-173.745501	-1347
S85-rock-19	KHR00024F	rock	Boninite	S85	W Mata summit	-15.089951	-173.745489	-1419
S85-rock-20	KHR00024G	rock	Boninite	S85	W Mata summit	-15.090295	-173.745144	-1418
S85-rock-21	KHR00024H	rock	Boninite	S85	W Mata summit	-15.090421	-173.744978	-1412
S85-rock-22	KHR00024I	rock	Boninite	S85	W Mata summit	-15.090161	-173.745007	-1422
S86-rock-01	KHR00024J	rock	Boninite	S86	W Mata Upper NE Rift	-15.090189	-173.733646	-1928
S86-rock-02	KHR00024K	rock	Boninite	S86	W Mata Upper NE Rift	-15.089918	-173.734169	-1876
S86-sed-03	KHR00024L	sediment	Volcaniclastic	S86	W Mata Upper NE Rift	-15.089962	-173.736151	-1745
S86-Rock-04	KHR00024M	Rock	Boninite	S86	W Mata Upper NE Rift	-15.090115	-173.736912	-1696
S86-Rock-05	KHR00024N	Rock	Boninite	S86	W Mata Upper NE Rift	-15.088428	-173.737816	-1592
S86-rock-06	KHR00024O	rock	Boninite	S86	W Mata Upper NE Rift	-15.089545	-173.738628	-1551
S86-rock-07	KHR00024P	rock	Boninite	S86	W Mata Upper NE Rift	-15.089694	-173.739368	-1517
S86-sed-08	KHR00024Q	sediment	Volcaniclastic	S86	W Mata Upper NE Rift	-15.089813	-173.739527	-1516
S86-rock-09	KHR00024R	rock	Boninite	S86	W Mata Upper NE Rift	-15.089361	-173.739338	-1530
S86-rock-10	KHR00024S	rock	Boninite	S86	W Mata Upper NE Rift	-15.0889824	-173.738986	-1559
S86-rock-11	KHR00024T	rock	Boninite	S86	W Mata Upper NE Rift	-15.0885452	-173.738538	-1583
S86-rock-12	KHR00024U	rock	Boninite	S86	W Mata Upper NE Rift	-15.0881764	-173.738807	-1552
S86-rock-14	KHR00024V	rock	Boninite	S86	W Mata Upper NE Rift	-15.0883336	-173.739133	-1556
S86-rock-15	KHR00024W	rock	Boninite	S86	W Mata Upper NE Rift	-15.0887242	-173.739682	-1534
S86-rock-16	KHR00024X	rock	Boninite	S86	W Mata Upper NE Rift	-15.0898402	-173.740184	-1515
S86-rock-18	KHR00024Y	rock	Boninite	S86	W Mata Upper NE Rift	-15.089515	-173.740517	-1501
S87-rock-01	KHR00024Z	rock	Boninite	S87	W Mata summit	-15.1021118	-173.748562	-1618

Identifier	IGSN	Material	field ID	Dive	Site	Latitude	Longitude	Depth (m)
S87-rock-03	KHR000250	rock	Boninite	S87	W Mata summit	-15.098339	-173.747968	-1405
S87-rock-04	KHR000251	rock	Boninite	S87	W Mata summit	-15.0965204	-173.748156	-1300
S87-rock-05	KHR000252	rock	Boninite	S87	W Mata summit	-15.0948087	-173.748691	-1199
S87-rock-13	KHR000253	rock	Boninite	S87	W Mata summit	-15.0941975	-173.748037	-1176
S87-sed-14	KHR000254	sediment	Volcaniclastic	S87	W Mata summit	-15.0949133	-173.746418	-1271
S87-sed-18	KHR000255	sediment	Volcaniclastic	S87	W Mata summit	-15.0946352	-173.746438	-1267
S88-rock-01	KHR000256	rock	Boninite	S88	W Mata NE of Base	-15.070973	-173.706457	-2674
S88-rock-02	KHR000257	rock	Boninite	S88	W Mata NE of Base	-15.0701082	-173.708654	-2674
S88-rock-03	KHR000258	rock	Boninite	S88	W Mata NE of Base	-15.0696041	-173.709078	-2676
S88-rock-04	KHR000259	rock	Boninite	S88	W Mata NE of Base	-15.0705792	-173.710498	-2674
S88-sed-05	KHR00025A	sediment	Volcaniclastic	S88	W Mata NE of Base	-15.0711963	-173.711887	-2663
S88-rock-06	KHR00025B	rock	Boninite	S88	W Mata NE of Base	-15.0714075	-173.71264	-2676
S88-rock-07	KHR00025C	rock	Boninite	S88	W Mata NE of Base	-15.070676	-173.712478	-2677
S88-rock-08	KHR00025D	rock	Boninite	S88	W Mata NE of Base	-15.069357	-173.710563	-2668
S88-sed-09	KHR00025E	sediment	pelagic+Volcaniclastic	S88	W Mata NE of Base	-15.068861	-173.710567	-2662
S88-sed-10	KHR00025F	sediment	pelagic+Volcaniclastic	S88	W Mata NE of Base	-15.068887	-173.710931	-2669
S88-rock-11	KHR00025G	rock	Boninite	S88	W Mata NE of Base	-15.067038	-173.70864	-2668
S88-rock-12	KHR00025H	rock	Boninite	S88	W Mata NE of Base	-15.066277	-173.708415	-2658
S88-rock-13	KHR00025I	rock	Boninite	S88	W Mata NE of Base	-15.066141	-173.709236	-2660
S88-sed-14	KHR00025J	sediment	volcanic ash	S88	W Mata NE of Base	-15.066141	-173.709236	-2683
S88-rock-15	KHR00025K	rock	Boninite	S88	W Mata NE of Base	-15.0659832	-173.710453	-2680
S88-rock-16	KHR00025L	rock	Boninite	S88	W Mata NE of Base	-15.064681	-173.711074	-2669
S88-rock-18	KHR00025M	rock	Boninite	S88	W Mata NE of Base	-15.06443	-173.710656	-2679
S89-rock-01	KHR00025N	rock	Boninite	S89	Mata Ua north base	-15.016325	-173.787746	-2381
S89-rock-02	KHR00025O	rock	Boninite	S89	Mata Ua north base	-15.016325	-173.787746	-2381
S89-rock-21	KHR00025P	rock	Boninite	S89	Mata Ua north flank	-15.0180612	-173.785018	-2164
S89-rock-22	KHR00025Q	rock	Boninite	S89	Mata Ua north summit	-15.0179408	-173.783528	-2118
S89-rock-23	KHR00025R	rock	Boninite	S89	Mata Ua summit valley	-15.0180825	-173.782178	-2144
S89-sed-24	KHR00025S	sediment	Volcaniclastic	S89	Mata Ua summit valley	-15.0180825	-173.782178	-2144
S89-rock-25	KHR00025T	rock	Boninite	S89	Mata Ua south summit	-15.0183239	-173.780666	-2102
S90-rock-01	KHR00025U	rock	Boninite	S90	Mata Fitu summit platform	-14.9162048	-173.798963	-2520
S90-rock-02	KHR00025V	rock	Boninite	S90	Mata Fitu summit platform	-14.9165203	-173.798524	-2521
S90-rock-03	KHR00025W	rock	Boninite	S90	Mata Fitu summit platform	-14.9177435	-173.796831	-2510
S90-rock-04	KHR00025X	rock	Boninite	S90	Mata Fitu summit platform	-14.9189424	-173.794872	-2533
S90-rock-05	KHR00025Y	rock	Boninite	S90	Mata Fitu summit platform	-14.9150658	-173.79285	-2449
S90-rock-06	KHR00025Z	rock	Boninite	S90	Mata Fitu summit platform	-14.9140812	-173.793375	-2401
S90-rock-07	KHR000260	rock	Boninite	S90	Mata Fitu summit platform	-14.9131281	-173.79402	-2379
S90-rock-08	KHR000261	rock	Boninite	S90	Mata Fitu summit platform	-14.9122213	-173.793732	-2402
S90-rock-09	KHR000262	rock	Boninite	S90	Mata Fitu summit platform	-14.912008	-173.789989	-2497
S90-rock-10	KHR000263	rock	Boninite	S90	Mata Fitu summit platform	-14.9112691	-173.787993	-2515
S90-sed-11	KHR000264	sediment	Volcaniclastic	S90	Mata Fitu summit platform	-14.9096199	-173.788438	-2459
S90-rock-12	KHR000265	rock	Boninite	S90	Mata Fitu summit platform	-14.9096199	-173.788438	-2459
S90-rock-13	KHR000266	rock	Boninite	S90	Mata Fitu summit platform	-14.9070112	-173.788323	-2490
S90-rock-14	KHR000267	rock	Boninite	S90	Mata Fitu summit platform	-14.9068511	-173.789007	-2474
S90-rock-15	KHR000268	rock	Boninite	S90	Mata Fitu summit platform	-14.9063727	-173.789151	-2490
S90-rock-16	KHR000269	rock	Boninite	S90	Mata Fitu summit platform	-14.9049163	-173.789832	-2533
S90-rock-17	KHR00026A	rock	Boninite	S90	Mata Fitu summit platform	-14.9041142	-173.789464	-2538
S91-rock-01	KHR00026B	rock	boninite	S91	Mata Tolu W Rift	-15.0073594	-173.802421	-2147
S91-rock-02	KHR00026C	rock	boninite	S91	Mata Tolu W Rift	-15.006543	-173.802429	-2113
S91-rock-04	KHR00026D	rock	boninite	S91	Mata Tolu W Rift	-15.0056644	-173.801498	-2058
S91-rock-05	KHR00026E	rock	boninite	S91	Mata Tolu W Rift	-15.004744	-173.800419	-2025
S91-rock-06	KHR00026F	rock	boninite	S91	Mata Tolu W Rift	-15.0044739	-173.799758	-2003
S91-rock-07	KHR00026G	rock	boninite	S91	Mata Tolu W Rift	-15.0042155	-173.798212	-1996
S91-sed-08	KHR00026H	sediment	volcaniclastic	S91	Mata Tolu W Rift	-15.0047675	-173.797288	-1962
S91-rock-09	KHR00026I	rock	boninite	S91	Mata Tolu W Rift	-15.0050614	-173.796259	-1926
S91-rock-10	KHR00026J	rock	boninite	S91	Mata Tolu summit	-15.0050717	-173.794759	-1862

Identifier	IGSN	Material	field ID	Dive	Site	Latitude	Longitude	Depth (m)
S92-rock-01	KHR00026K	rock	dacite	S92	Large lava Flow B	-15.1814082	-173.905114	-2565
S92-rock-02	KHR00026L	rock	dacite	S92	Large lava Flow B	-15.181953	-173.906275	-2553
S92-rock-03	KHR00026M	rock	dacite	S92	Large lava Flow B	-15.1821045	-173.906469	-2531
S92-sed-04	KHR00026N	sediment	pelagic+Volcaniclastic	S92	Large lava Flow B	-15.1827425	-173.907218	-2548
S92-rock-05	KHR00026O	rock	dacite	S92	Large lava Flow B	-15.1837684	-173.909046	-2525
S92-rock-06	KHR00026P	rock	dacite	S92	Large lava Flow B	-15.1836678	-173.908885	-2525
S92-rock-08	KHR00026Q	rock	dacite	S92	Large lava Flow B	-15.1841043	-173.909459	-2525
S92-rock-09	KHR00026R	rock	dacite	S92	Large lava Flow B	-15.1867914	-173.913127	-2538
S92-sed-10	KHR00026S	sediment	volcaniclastic	S92	Large lava Flow B	-15.1884906	-173.914804	-2523
S92-rock-11	KHR00026T	rock	dacite	S92	Large lava Flow B	-15.1894163	-173.915977	-2508
S92-rock-13	KHR00026U	rock	dacite	S92	Large lava Flow B	-15.1904939	-173.916791	-2508
S92-sed-14	KHR00026V	sediment	volcaniclastic	S92	Large lava Flow B	-15.1910994	-173.917205	-2500
S92-rock-16	KHR00026W	rock	dacite	S92	Large lava Flow B	-15.1916658	-173.917599	-2504
S92-rock-17	KHR00026X	rock	dacite	S92	Large lava Flow B	-15.192982	-173.919445	-2506
S92-rock-18	KHR00026Y	rock	dacite	S92	Large lava Flow B	-15.194209	-173.921399	-2508
S92-sed-19	KHR00026Z	sediment	volcaniclastic	S92	Large lava Flow B	-15.1950298	-173.923197	-2464
S92-rock-20	KHR000270	rock	Dacite volcaniclastic	S92	Large lava Flow B	-15.1969294	-173.924036	-2419
S92-rock-21	KHR000271	rock	welded volcanic ash	S92	Large lava Flow B	-15.1974217	-173.923905	-2418
S92-rock-22	KHR000272	rock	welded volcanic ash	S92	Large lava Flow B	-15.1981477	-173.924105	-2415
S92-sed-23	KHR000273	sediment	pelagic+Volcaniclastic	S92	Large lava Flow B	-15.1983208	-173.924169	-2415
S93-sed-01	KHR000274	sediment	volcaniclastic	S93	Large lava Flow B	-15.0648277	-173.727832	-2538
S93-rock-02	KHR000275	rock	boninite	S93	W Mata NE of Base	-15.067233	-173.729891	-2588
S93-rock-03	KHR000276	rock	boninite	S93	W Mata NE of Base	-15.0679886	-173.730958	-2597
S93-sed-04	KHR000277	sediment	volcaniclastic	S93	W Mata NE of Base	-15.068251	-173.731173	-2598
S93-rock-05	KHR000278	rock	boninite	S93	W Mata NE of Base	-15.0684445	-173.731269	-2587
S93-rock-06	KHR000279	rock	boninite	S93	W Mata NE of Base	-15.069479	-173.732583	-2508
S93-rock-07	KHR00027A	rock	boninite	S93	W Mata NE of Base	-15.0705715	-173.732931	-2526
S93-rock-08	KHR00027B	rock	boninite	S93	W Mata NE of Base	-15.0704202	-173.734173	-2498
S93-rock-09	KHR00027C	rock	boninite	S93	W Mata NE of Base	-15.0704729	-173.735398	-2516
S93-rock-10	KHR00027D	rock	boninite	S93	W Mata NE of Base	-15.0720838	-173.735895	-2422
S93-sed-11	KHR00027E	sediment	volcaniclastic	S93	W Mata NE of Base	-15.0721996	-173.735831	-2420
S93-sed-12	KHR00027F	sediment	volcaniclastic	S93	W Mata NE of Base	-15.071882	-173.737616	-2489
S93-rock-13	KHR00027G	rock	boninite	S93	W Mata NE of Base	-15.071882	-173.737616	-2490
S93-rock-14	KHR00027H	rock	boninite	S93	W Mata NE of Base	-15.0737576	-173.736979	-2380
S93-rock-15	KHR00027I	rock	boninite	S93	W Mata NE of Base	-15.0739225	-173.737988	-2377
S93-sed-16	KHR00027J	sediment	volcaniclastic	S93	W Mata NE of Base	-15.074485	-173.738824	-2370
S93-rock-17	KHR00027K	rock	boninite	S93	W Mata NE of Base	-15.0746203	-173.73886	-2370
S93-rock-18	KHR00027L	rock	boninite	S93	W Mata NE of Base	-15.0746774	-173.738611	-2372
S93-rock-19	KHR00027M	rock	boninite	S93	W Mata NE of Base	-15.07476	-173.738083	-2376
S94-rock-01	KHR00027N	rock	boninite	S94	Mata Tolu W rift	-14.9997875	-173.793716	-2151
S94-rock-02	KHR00027O	rock	boninite	S94	Mata Tolu W rift	-14.9998698	-173.793597	-2136
S94-rock-03	KHR00027P	rock	boninite	S94	Mata Tolu W rift	-15.0021224	-173.78982	-2043
S94-rock-04	KHR00027Q	rock	boninite	S94	Mata Tolu W rift	-15.0025166	-173.789531	-2051
S94-rock-05	KHR00027R	rock	boninite	S94	Mata Tolu W rift	-15.0035144	-173.789419	-1974
S94-rock-06	KHR00027S	rock	boninite	S94	Mata Tolu W rift	-15.0043754	-173.7908	-1906
S94-sed-07	KHR00027T	sediment	volcaniclastic	S94	Mata Tolu Summit	-15.0044579	-173.790753	-1906
S95-sed-01	KHR00027U	sediment	volcaniclastic	S95	W Mata lower SW rift	-15.1185553	-173.801195	-3012
S95-rock-02	KHR00027V	rock	boninite	S95	W Mata lower SW rift	-15.1185203	-173.801382	-3012
S95-rock-03	KHR00027W	rock	boninite	S95	W Mata lower SW rift	-15.119766	-173.79883	-3007
S95-rock-04	KHR00027X	rock	boninite	S95	W Mata lower SW rift	-15.1188368	-173.801176	-3008
S95-rock-05	KHR00027Y	rock	boninite	S95	W Mata lower SW rift	-15.1186467	-173.80177	-3009
S95-rock-06	KHR00027Z	rock	boninite	S95	W Mata lower SW rift	-15.1179627	-173.798989	-2953
S95-rock-07	KHR000280	rock	boninite	S95	W Mata lower SW rift	-15.1164263	-173.793999	-2955
S95-rock-08	KHR000281	rock	boninite	S95	W Mata lower SW rift	-15.1186448	-173.791287	-2895
S95-rock-09	KHR000282	rock	boninite	S95	W Mata lower SW rift	-15.1182357	-173.788809	-2878
S95-sed-10	KHR000283	sediment	volcaniclastic	S95	W Mata lower SW rift	-15.118314	-173.788999	-2889

Identifier	IGSN	Material	field ID	Dive	Site	Latitude	Longitude	Depth (m)
S95-rock-11	KHR000284	rock	boninite	S95	W Mata lower SW rift	-15.1180362	-173.789111	-2886
S95-rock-12	KHR000285	rock	boninite	S95	W Mata lower SW rift	-15.1177003	-173.787927	-2882
S95-rock-13	KHR000286	rock	boninite	S95	W Mata lower SW rift	-15.1173712	-173.787189	-2889
S95-sed-14	KHR000287	sediment	volcaniclastic	S95	W Mata lower SW rift	-15.1173628	-173.78736	-2887
S95-rock-15	KHR000288	rock	boninite	S95	W Mata lower SW rift	-15.1171825	-173.786925	-2890
S95-rock-16	KHR000289	rock	boninite	S95	W Mata lower SW rift	-15.1171687	-173.786027	-2880
S95-rock-17	KHR00028A	rock	boninite	S95	W Mata lower SW rift	-15.1171412	-173.785585	-2874
S95-rock-20	KHR00028B	rock	boninite	S95	W Mata lower SW rift	-15.1165003	-173.784619	-2804
S95-rock-21	KHR00028C	rock	boninite	S95	W Mata lower SW rift	-15.1157617	-173.78417	-2705
S95-rock-22	KHR00028D	rock	boninite	S95	W Mata lower SW rift	-15.1152072	-173.781644	-2702
S96-rock-01	KHR00028E	rock	boninite	S96	Mata Fa W rift	-14.992273	-173.814206	-2584
S96-rock-02	KHR00028F	rock	boninite	S96	Mata Fa W rift	-14.9926391	-173.813979	-2555
S96-sed-03	KHR00028G	sediment	volcaniclastic	S96	Mata Fa W rift	-14.9926455	-173.813895	-2554
S96-rock-04	KHR00028H	rock	boninite	S96	Mata Fa W rift	-14.9924849	-173.813178	-2552
S96-rock-05	KHR00028I	rock	boninite	S96	Mata Fa W rift	-14.991272	-173.807904	-2482
S96-rock-06	KHR00028J	rock	boninite	S96	Mata Fa W rift	-14.9905126	-173.807157	-2430
S96 rock-07	KHR00028K	rock	boninite	S96	Mata Fa summit	-14.9889273	-173.805432	-2394
S96-rock-08	KHR00028L	rock	boninite	S96	Mata Fa summit	-14.9891885	-173.803137	-2385
S96-rock-09	KHR00028M	rock	boninite	S96	Mata Fa summit	-14.9898825	-173.801549	-2392
S96-rock-10	KHR00028N	rock	boninite	S96	Mata Fa summit	-14.9901953	-173.801157	-2329
S96-rock-12	KHR00028O	rock	boninite	S96	Mata Fa south cone	-14.992032	-173.801012	-2376
S96-rock-13	KHR00028P	rock	boninite	S96	Mata Fa south cone	-14.9930006	-173.800602	-2329
S96-sed-14	KHR00028Q	sediment	volcaniclastic	S96	Mata Fa summit	-14.9894643	-173.799786	-2343
S96-rock-15	KHR00028R	rock	boninite	S96	Mata Fa summit	-14.9894643	-173.799786	-2342
S96-sed-17	KHR00028S	sediment	volcaniclastic	S96	Mata Fa east rift	-14.9882092	-173.797029	-2339
S96-rock-19	KHR00028T	rock	boninite	S96	Mata Fa east rift	-14.9879327	-173.796252	-2344
S96-rock-20	KHR00028U	rock	boninite	S96	Mata Fa east rift	-14.9869386	-173.794229	-2410
S97-sed-01	KHR00028V	sediment	volcaniclastic	S97	Mata Fitu south flank	-14.9159123	-173.773176	-2765
S97-rock-07	KHR00028W	rock	boninite	S97	Mata Fitu south flank	-14.9167949	-173.774818	-2741
S97-rock-12	KHR00028X	rock	boninite	S97	Mata Fitu south flank	-14.9145361	-173.777437	-2652
S98-sed-01	KHR00028Y	sediment	volcaniclastic	S98	Tafu/NELSC south rift	-15.3817075	-174.258768	-2117
S98-sed-02	KHR00028Z	sediment	volcaniclastic	S98	Tafu/NELSC south rift	-15.3822304	-174.258121	-2113
S98-rock-03	KHR000290	rock	basalt	S98	Tafu/NELSC south rift	-15.3831533	-174.25729	-2050
S98-rock-04	KHR000291	rock	basalt	S98	Tafu/NELSC south rift	-15.383682	-174.256903	-2003
S98-rock-05	KHR000292	rock	basalt	S98	Tafu/NELSC south rift	-15.3838068	-174.256748	-1962
S98-sed-06	KHR000293	sediment	volcaniclastic	S98	Tafu/NELSC south rift	-15.3843757	-174.255755	-1935
S98-rock-07	KHR000294	rock	basalt	S98	Tafu/NELSC south rift	-15.3843475	-174.25573	-1934
S98-rock-08	KHR000295	rock	basalt	S98	Tafu/NELSC south rift	-15.3850181	-174.254511	-1908
S98-rock-09	KHR000296	rock	basalt	S98	Tafu/NELSC south rift	-15.3847989	-174.252109	-1904
S98-rock-11	KHR000297	rock	basalt	S98	Tafu/NELSC south rift	-15.3814664	-174.25321	-1938
S98-rock-12	KHR000298	rock	basalt	S98	Tafu/NELSC south rift	-15.3809628	-174.249778	-1808
S98-sed-13	KHR000299	sediment	volcaniclastic	S98	Tafu/NELSC south rift	-15.379499	-174.249056	-1808
s98-rock-14	KHR00029A	rock	basalt	s98	Tafu/NELSC south rift	-15.377967	-174.248763	-1879
S98-rock-15	KHR00029B	rock	basalt	S98	Tafu/NELSC south rift	-15.377229	-174.247788	-1761
S98-sed-16	KHR00029C	sediment	volcaniclastic	S98	Tafu/NELSC south rift	-15.377475	-174.247306	-1749
S98-rock-17	KHR00029D	rock	basalt	S98	Tafu/NELSC south rift	-15.3774147	-174.247162	-1740
S98-rock-18	KHR00029E	rock	basalt breccia	S98	Tafu/NELSC south rift	-15.3773855	-174.247515	-1740
S98-rock-21	KHR00029F	rock	basalt	S98	Tafu/NELSC south rift	-15.3758783	-174.245966	-1673
S98-rock-22	KHR00029G	rock	basalt	S98	Tafu/NELSC south rift	-15.37529	-174.24498	-1659
S99-rock-01	KHR00029H	rock	basalt	S99	Tafu/NELSC north rift	-15.342953	-174.224792	-1955
S99-rock-02	KHR00029I	rock	basalt	S99	Tafu/NELSC north rift	-15.3435188	-174.225383	-1953
S99-rock-03	KHR00029J	rock	basalt	S99	Tafu/NELSC north rift	-15.3446656	-174.225856	-1999
S99-rock-04	KHR00029K	rock	basalt	S99	Tafu/NELSC north rift	-15.3447568	-174.22639	-1974
S99-rock-05	KHR00029L	rock	basalt	S99	Tafu/NELSC north rift	-15.3448187	-174.22664	-1970
S99-rock-06	KHR00029M	rock	basalt	S99	Tafu/NELSC north rift	-15.3463517	-174.226723	-1965
S99-rock-07	KHR00029N	rock	basalt	S99	Tafu/NELSC north rift	-15.347596	-174.2273	-1932

Identifier	IGSN	Material	field ID	Dive	Site	Latitude	Longitude	Depth (m)
S99-rock-08	KHR00029O	rock	basalt	S99	Tafu/NELSC north rift	-15.3479105	-174.227506	-1912
S99-sed-09	KHR00029P	sediment	volcaniclastic	S99	Tafu/NELSC north rift	-15.3488458	-174.227824	-1893
S99-rock-10	KHR00029Q	rock	basalt	S99	Tafu/NELSC north rift	-15.3494868	-174.228144	-1849
S99-rock-11	KHR00029R	rock	basalt	S99	Tafu/NELSC north rift	-15.3510343	-174.228739	-1830
S99-rock-12	KHR00029S	rock	basalt	S99	Tafu/NELSC north rift	-15.3516235	-174.2294	-1809
S99-rock-13	KHR00029T	rock	basalt	S99	Tafu/NELSC north rift	-15.3550389	-174.230906	-1763
S99-rock-14	KHR00029U	rock	basalt	S99	Tafu/NELSC north rift	-15.3566853	-174.231761	-1701
S99-sed-15	KHR00029V	sediment	volcaniclastic	S99	Tafu/NELSC north rift	-15.3574357	-174.232448	-1674
S99-rock-18	KHR00029W	rock	basalt	S99	Tafu/NELSC north rift	-15.358883	-174.233083	-1684
S99-rock-20	KHR00029X	rock	basalt	S99	Tafu/NELSC north rift	-15.3604673	-174.233652	-1620
S99-rock-21	KHR00029Y	rock	basalt	S99	Tafu/NELSC north rift	-15.3636613	-174.236523	-1490
S99-sed-25	KHR00029Z	sediment	volcaniclastic	S99	Tafu/NELSC north rift	-15.3667807	-174.238958	-1379
S99-rock-26	KHR000300	rock	basalt	S99	Tafu/NELSC north rift	-15.3667807	-174.238958	-1378
S100-rock-01	KHR000301	rock	boninite	S100	Mata Ua North Base	-15.012884	-173.780081	-2387
S100-rock-02	KHR000302	rock	boninite	S100	Mata Ua North Base	-15.013013	-173.780076	-2354
S100-rock-03	KHR000303	rock	boninite	S100	Mata Ua North Base	-15.0131041	-173.780077	-2341
S100-rock-04	KHR000304	rock	boninite	S100	Mata Ua North Base	-15.0133684	-173.779926	-2328
S100-rock-05	KHR000305	rock	boninite	S100	Mata Ua North Base	-15.0136037	-173.779825	-2267
S100-rock-06	KHR000306	rock	boninite	S100	Mata Ua North Base	-15.0143006	-173.779556	-2252
S100-sed-07	KHR000307	sediment	volcaniclastic	S100	Mata Ua North Base	-15.014828	-173.779907	-2255
S100-rock-08	KHR000308	rock	boninite	S100	Mata Ua North Base	-15.0132009	-173.781263	-2380
S101-rock-01	KHR000309	rock	boninite	S101	Mata Ono SW rift	-14.9461958	-173.800356	-2669
S101-rock-02	KHR00030A	rock	boninite	S101	Mata Ono SW rift	-14.9458298	-173.799071	-2639
S101-sed-03	KHR00030B	sediment	volcaniclastic	S101	Mata Ono SW rift	-14.945588	-173.799012	-2629
S101-rock-04	KHR00030C	rock	boninite	S101	Mata Ono SW rift	-14.945614	-173.798815	-2626
S101-rock-05	KHR00030D	rock	boninite	S101	Mata Ono SW rift	-14.9450067	-173.79875	-2602
S101-rock-06	KHR00030E	rock	boninite	S101	Mata Ono SW rift	-14.943898	-173.798373	-2588
S101-sed-07	KHR00030F	sediment	volcaniclastic	S101	Mata Ono SW rift	-14.9429548	-173.798687	-2539
S101-rock-08	KHR00030G	rock	boninite	S101	Mata Ono summit	-14.9401213	-173.795375	-2525
S101-sed-09	KHR00030H	sediment	volcaniclastic	S101	Mata Ono summit	-14.9404853	-173.793947	-2513
S101-rock-10	KHR00030I	rock	boninite	S101	Mata Ono summit	-14.9395293	-173.793475	-2465
S101-rock-11	KHR00030J	rock	boninite	S101	Mata Ono summit	-14.9384349	-173.794045	-2486
S101-rock-12	KHR00030K	rock	boninite	S101	Mata Ono summit	-14.9383062	-173.79585	-2455
S101-rock-13	KHR00030L	rock	boninite	S101	Mata Ono summit	-14.9401452	-173.798177	-2363
S101-rock-14	KHR00030M	rock	boninite	S101	Mata Ono summit	-14.940202	-173.798331	-2358
S102-rock-01	KHR00030N	rock	boninite	S102	Mata Ono NW rift	-14.9440072	-173.809198	-2681
S102-sed-02	KHR00030O	sediment	volcaniclastic	S102	Mata Ono NW rift	-14.9432782	-173.808125	-2689
S102-rock-03	KHR00030P	rock	boninite	S102	Mata Ono NW rift	-14.943141	-173.807915	-2704
S102-rock-04	KHR00030Q	rock	boninite	S102	Mata Ono NW rift	-14.9428473	-173.807626	-2689
S102-rock-05	KHR00030R	rock	boninite	S102	Mata Ono NW rift	-14.9426653	-173.807469	-2676
S102-rock-06	KHR00030S	rock	boninite	S102	Mata Ono north flank	-14.9413558	-173.804851	-2564
S102-sed-07	KHR00030T	sediment	volcaniclastic	S102	Mata Ono north flank	-14.9413243	-173.804192	-2578
S102-rock-08	KHR00030U	rock	boninite	S102	Mata Ono north flank	-14.9417867	-173.804478	-2583
S102-rock-09	KHR00030V	rock	boninite	S102	Mata Ono north flank	-14.9416663	-173.803941	-2521
S102-rock-10	KHR00030W	rock	boninite	S102	Mata Ono north flank	-14.941407	-173.80214	-2465
S102-rock-11	KHR00030X	rock	boninite	S102	Mata Ono summit	-14.9389238	-173.800298	-2428
S103-rock-01	KHR00030Y	rock	boninite	S103	W Mata Upper NE Rift	-15.088296	-173.737241	-1596
S103-sed-02	KHR00030Z	sediment	volcaniclastic	S103	W Mata Upper NE Rift	-15.088296	-173.737241	-1596
S103-rock-04	KHR000310	rock	boninite	S103	W Mata Upper NE Rift	-15.0879375	-173.738297	-1577
S103-rock-05	KHR000311	rock	boninite	S103	W Mata Upper NE Rift	-15.0885173	-173.738348	-1578
S103-sed-06	KHR000312	sediment	volcaniclastic	S103	W Mata Upper NE Rift	-15.0884275	-173.73833	-1570
S103-rock-07	KHR000313	rock	boninite	S103	W Mata Upper NE Rift	-15.0886072	-173.738617	-1557
S103-sed-08	KHR000314	sediment	volcaniclastic	S103	W Mata Upper NE Rift	-15.0891194	-173.738816	-1531
S103-rock-11	KHR000315	rock	boninite	S103	W Mata Upper NE Rift	-15.0892066	-173.739811	-1516
S103-rock-12	KHR000316	rock	boninite	S103	W Mata Upper NE Rift	-15.0898751	-173.739899	-1519
S103-rock-13	KHR000317	rock	boninite	S103	W Mata Upper NE Rift	-15.0897973	-173.740884	-1474

Identifier	IGSN	Material	field ID	Dive	Site	Latitude	Longitude	Depth (m)
S103-sed-14	KHR000318	sediment	volcaniclastic	S103	W Mata Upper NE Rift	-15.0891869	-173.741715	-1458
S103-rock-15	KHR000319	rock	boninite	S103	W Mata Upper NE Rift	-15.0880877	-173.74369	-1503
S103-rock-16	KHR00031A	rock	boninite	S103	W Mata Upper NE Rift	-15.0889055	-173.743993	-1450
S103-rock-17	KHR00031B	rock	boninite	S103	W Mata Upper NE Rift	-15.0898594	-173.745147	-1419
S103-rock-18	KHR00031C	rock	boninite	S103	W Mata Upper NE Rift	-15.0909384	-173.74534	-1349
S103-sed-19	KHR00031D	sediment	volcaniclastic	S103	W Mata Upper NE Rift	-15.0910077	-173.745362	-1349
S103-rock-20	KHR00031E	rock	boninite	S103	W Mata Upper NE Rift	-15.0917514	-173.745331	-1321
S103-sed-21	KHR00031F	sediment	volcaniclastic	S103	W Mata Upper NE Rift	-15.0921135	-173.745047	-1306
S103-rock-22	KHR00031G	rock	boninite	S103	W Mata Upper NE Rift	-15.0928636	-173.745859	-1289
S103-rock-24	KHR00031H	rock	boninite	S103	W Mata Upper NE Rift	-15.0933212	-173.746341	-1275
S104-rock-01	KHR00031I	rock	boninite	S104	Mata Taha	-15.0349054	-173.779455	-2351
S104-sed-02	KHR00031J	sediment	volcaniclastic	S104	Mata Taha	-15.0349054	-173.779455	-2352
S104-rock-03	KHR00031K	rock	boninite	S104	Mata Taha	-15.0354933	-173.779694	-2389
S104-rock-04	KHR00031L	rock	boninite	S104	Mata Taha	-15.0361934	-173.781223	-2382
S104-rock-05	KHR00031M	rock	boninite	S104	Mata Taha	-15.035867	-173.782895	-2345
S104-rock-06	KHR00031N	rock	boninite	S104	Mata Taha	-15.0362913	-173.783938	-2309
S104-rock-08	KHR00031O	rock	boninite	S104	Mata Taha	-15.0376508	-173.785257	-2262
S104-sed-09	KHR00031P	sediment	volcaniclastic	S104	Mata Taha	-15.0376508	-173.785257	-2261
S104-rock-10	KHR00031Q	rock	boninite	S104	Mata Taha	-15.0373383	-173.786255	-2260
S104-rock-11	KHR00031R	rock	boninite	S104	Mata Taha	-15.038107	-173.788889	-2222
S104-rock-12	KHR00031S	rock	boninite	S104	Mata Taha	-15.0382772	-173.78867	-2238
S104-rock-16	KHR00031T	rock	boninite	S104	Mata Taha	-15.0404438	-173.790221	-2240
S104-rock-17	KHR00031U	rock	boninite	S104	Mata Taha	-15.0420127	-173.791081	-2197
S104-rock-18	KHR00031V	rock	boninite	S104	Mata Taha	-15.0410653	-173.789049	-2248
S104-rock-19	KHR00031W	rock	boninite	S104	Mata Taha	-15.040291	-173.786037	-2198
S104-rock-20	KHR00031X	rock	boninite	S104	Mata Taha	-15.0417008	-173.785355	-2161
S104-rock-21	KHR00031Y	rock	boninite	S104	Mata Taha	-15.041793	-173.785999	-2167
S105-rock-01	KHR00031Z	rock	dacite	S105	Large lava Flow D	-14.887193	-173.946451	-2791
S105-rock-02	KHR000320	rock	dacite	S105	Large lava Flow D	-14.8879879	-173.944442	-2794
S105-rock-03	KHR000321	rock	dacite	S105	Large lava Flow D	-14.8891448	-173.943791	-2793
S105-rock-04	KHR000322	rock	dacite	S105	Large lava Flow D	-14.8891448	-173.943791	-2793
S105-sed-05	KHR000323	sediment	volcaniclastic	S105	Large lava Flow D	-14.8892748	-173.943138	-2805
S105-rock-06	KHR000324	rock	dacite	S105	Large lava Flow D	-14.889635	-173.943338	-2795
S105-sed-07	KHR000325	sediment	volcaniclastic	S105	Large lava Flow D	-14.8903206	-173.943312	-2815
S105-sed-08	KHR000326	sediment	volcaniclastic	S105	Large lava Flow D	-14.8913405	-173.943666	-2815
S105-sed-09	KHR000327	sediment	volcaniclastic	S105	Large lava Flow D	-14.8919	-173.943727	-2792
S105-rock-10	KHR000328	rock	dacite	S105	Large lava Flow D	-14.8932083	-173.945243	-2707
S105-rock-11	KHR000329	rock	dacite	S105	Large lava Flow D	-14.8961433	-173.945247	-2687
S105-rock-12	KHR00032A	rock	dacite	S105	Large lava Flow D	-14.8961066	-173.944854	-2682
S105-rock-13	KHR00032B	rock	dacite	S105	Large lava Flow D	-14.8963248	-173.944402	-2678
S105-rock-15	KHR00032C	rock	dacite	S105	Large lava Flow D	-14.8993756	-173.941585	-2676
S105-sed-16	KHR00032D	sediment	volcaniclastic	S105	Large lava Flow D	-14.8993756	-173.941585	-2676
S105-rock-17	KHR00032E	rock	dacite	S105	Large lava Flow D	-14.9006223	-173.939346	-2706
S105-rock-18	KHR00032F	rock	dacite	S105	Large lava Flow D	-14.9006223	-173.939346	-2703

4.1.2 - Sulfide Collections

31 sulfides were sampled with ROV SuBastian during the Tongan Underwater Fire expedition to the Mata volcanoes with R/V Falkor (FK171110). The mineralogy and geochemical composition of sulfides will help to understand chemical relation between vent fluids and chimney formation which form the substrate for unique biological vent communities. Isotopic analyses will furthermore allow us to determine how old hydrothermal sulfides are, thus how long these chimney field have been active. This gives valuable information about the evolution of hydrothermal vent field and were entire chimney are recovered changes of fluid flux. All samples were sent to GNS Science in New Zealand.

During the expedition, we investigated active and inactive vent fields on five of the Mata Volcanoes (Mata Ua, Tolu, Fitu, Ono and Taha). Here we provide a brief preliminary description of the sulfides collected during this expedition.

FK171110 Sulfide Samples Quick Index

Sample Identifier	Date	Dive	Site	Latitude	Longitude	Depth (m)
S89-sulfide-03	2017-11-30	S89	Mata Ua	-15.01680	-173.78764	2356.1
S89-sulfide-11	2017-11-30	S89	Mata Ua	-15.01659	-173.78767	2355.9
S89-sulfide-14	2017-11-30	S89	Mata Ua	-15.01729	-173.78805	2350.2
S91-sulfide-11	2017-12-03	S91	Mata Tolu	-15.004654	-173.793096	1836.8
S91-sulfide-12	2017-12-03	S91	Mata Tolu	-15.004782	-173.793617	1821.4
S91-sulfide-16	2017-12-03	S91	Mata Tolu	-15.004646	-173.793661	1819.4
S94-sulfide-09	2017-12-05	S94	Mata Tolu	-15.00457	-173.79389	1823.9
S94-sulfide-14*	2017-12-06	S94	Mata Tolu	-15.00482	-173.79354	1813.3
S94-sulfide-16	2017-12-06	S94	Mata Tolu	-15.00493	-173.79351	1813.1
S94-sulfide-20	2017-12-06	S94	Mata Tolu	-15.00472	-173.79365	1820.3
S94-sulfide-25	2017-12-06	S94	Mata Tolu	-15.00449	-173.79359	1821.7
S97-sulfide-02	2017-12-08	S97	Mata Fitu	-14.91559	-173.77340	2766.6
S97-sulfide-03	2017-12-08	S97	Mata Fitu	-14.91545	-173.77371	2757.8
S97-sulfide-09	2017-12-08	S97	Mata Fitu	-14.91632	-173.77546	2717.9
S97-sulfide-10	2017-12-08	S97	Mata Fitu	-14.91583	-173.77569	2708.1
S97-sulfide-11	2017-12-08	S97	Mata Fitu	-14.91584	-173.77578	2708.0
S97-sulfide-17	2017-12-09	S97	Mata Fitu	-14.91356	-173.77910	2615.9
S97-sulfide-22	2017-12-09	S97	Mata Fitu	-14.91339	-173.77910	2612.5
S100-sulfide-09	2017-12-11	S100	Mata Ua	-15.01635	-173.78672	2346.7
S100-sulfide-15	2017-12-12	S100	Mata Ua	-15.01668	-173.78693	2334.9
S100-sulfide-16	2017-12-12	S100	Mata Ua	-15.01668	-173.78693	2335.0
S100-sulfide-17	2017-12-12	S100	Mata Ua	-15.01679	-173.78695	2340.0
S100-sulfide-21	2017-12-12	S100	Mata Ua	-15.01675	-173.78597	2318.0
S100-sulfide-26	2017-12-12	S100	Mata Ua	-15.01675	-173.78597	2318.0
S101-sulfide-17	2017-12-13	S101	Mata Ono	-14.94058	-173.79956	2362.8
S101-sulfide-19	2017-12-13	S101	Mata Ono	-14.94058	-173.79956	2361.8
S101-sulfide-20**	2017-12-13	S101	Mata Ono	-14.94058	-173.79956	2354.9
S102-sulfide-17	2017-12-14	S102	Mata Ono	-14.94054	-173.79938	2353.7
S102-sulfide-22	2017-12-14	S102	Mata Ono	-14.94058	-173.79956	2360.9
S102-sulfide-25	2017-12-14	S102	Mata Ono	-14.94058	-173.79956	2366.1
S104-sulfide-13	2017-12-16	S104	Mata Taha	-15.03914	-173.78965	2261.1
S104-sulfide-15	2017-12-16	S104	Mata Taha	-15.04021	-173.79055	2254.8

*Logged as S94-bio-14 (bio & sulfide)

**Logged as S101-fluid-20 (fluid & sulfide)

Table 4.1.2-1: List of sulfide samples acquired with ROV SuBastian during FK171110

Dive S89 - Mata Ua, north-eastern flank vent field

The first dive that explored a hydrothermal vent field during FK171110 was dive S89 on Mata Ua. Three sulfide samples were recovered from a vent field is located at the lower north-eastern flank of the volcano and is characterized by many up to 7-8m tall chimneys many of them venting vigorously. During dive S89, 3 sulfide samples were recovered. The fist sample (S89-Sulfide-03) sampled a small ~1 m tall beehive-bearing chimney that actively vented black high temperature fluid with apparent flashing (phase separation) at the central chimney orifice. Golden patches of mm-thick white-golden cubic(?) sulfide minerals underlain by a hard mm-thick layer of purple-white mineral. The outer part of the sample consists of fine-grained friable greenish-grey pyrite (?). Sample S89-Sulfide-11 is a ~30 cm tall bulbous (~18 cm diameter at the bottom) chimney top from an inactive chimney. The sample is mainly composed of grey barite/anhydrate with a central mm-sized fluid-up flow zone lined with black crystals (barite/sphalerite/galena or hematite?). The outside of the sample in encrusted in white-orange-brown anhydrate? with iron oxides. S89-Sulfide-14 is a very fragile sample from an actively 'black smoke" venting chimney ~1-2m tall. The matrix of the sample is greenish-grey-golden sulfides and a white-purplish anhydrate(?) crust, similar as observed in sample S89-Sulfide-03.

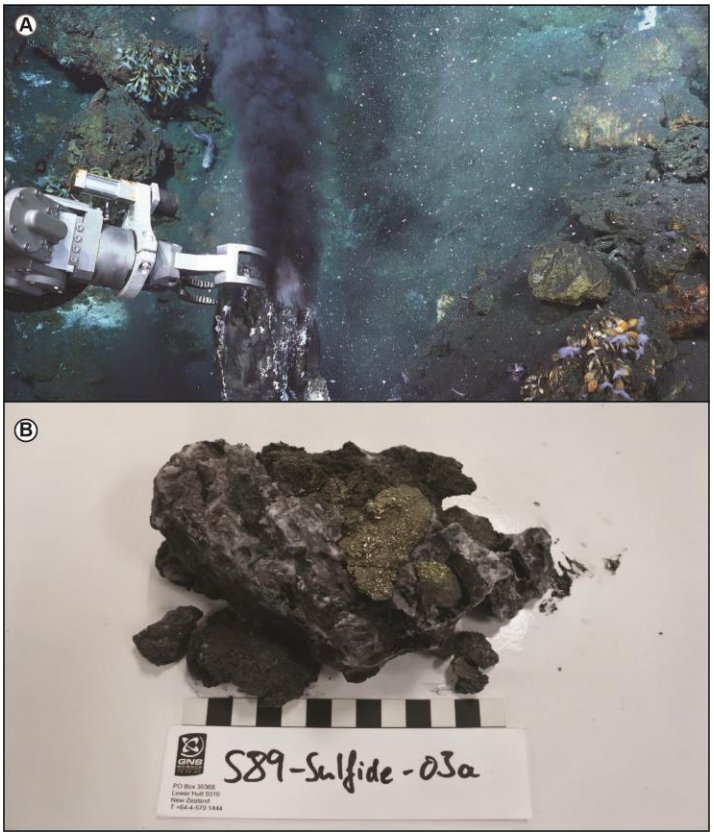


Figure 4.1.2-1 S89-03 A) Sampling sulfides at flashing vent at Mata Ua during dive S89. B) Photograph of the sample taken in A).

Dive S91- Mata Tolu, summit vent field

During dive S91 three sulfide samples were obtained from the summit vent field of Mata Tolu. These include a sample from inactive "deadwood" vent site (S91-Sulfide-11), one sample from the active "Beehive Chimney" and "Saguaro" vent sites. Sample S91-Sulfide-11 is an inactive chimney with a central fluid flow zone lined with mm sized rhombic crystals (chalcopyrite?) ~2 cm across. The chimney matrix is multi-colored (blue-purple-greenish), which is likely bornite.

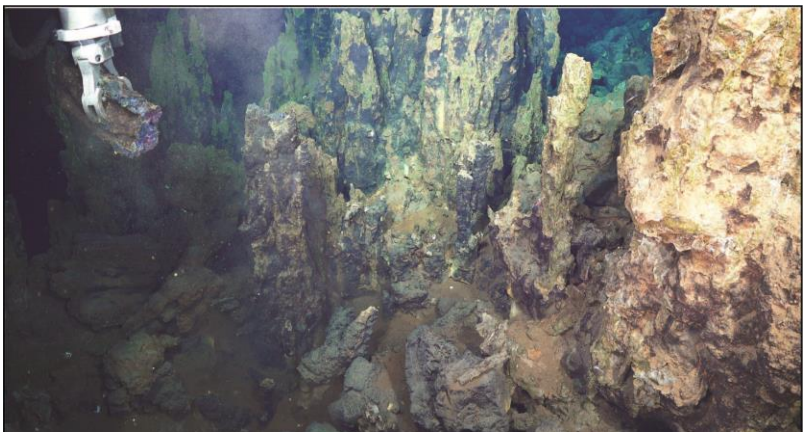


Figure 4.1.2-2 S91-11 A) Sampling of inactive multi-colored chimney top (sample S91-Sulfide-11) at Mata Tolu during dive S91.

Black-brown Mn-Fe oxides are coating the outside of the sample. Samples S91-Sulfide-12a and 12b have been recovered from the base (inactive) of the of the active "Beehive Chimney".

The sample is composited of fragile fine grained mainly greenish grey matrix (12a; pyrite/sphalerite?) containing some golden

specs (pyrite?). The outside of the sample has a mm white-orange anhydrate coat. S91-Sulfide-12b has been samples ~10 cm away from 12a and mainly consists of massive sulfide (maybe chalcopyrite?)-barite (whitish-grey mm-sized barite crystals). Sample S91-Sulfide-16 is from the active vent of the "Saguaro Chimney" site. 9 small fragile fragments were recovered from this site. The fragments have sub mm thin lining of chalcopyrite surrounded by sub-mm thin coat of white/greyish anhydrate/barite? Followed by fragile fine-grained sulfides (probably pyrite in anhydrate matrix?). Vent fluid temperature is 314˚C and both, gas and fluids, were also sampled from the same vent.

Dive S94 - Mata Tolu, summit vent field

Dive S94 returned to Mata Tolu to continue to explore the summit vent field. Five sulfide samples were collected during this dive. The first sample (S94-Sulfide-09; four fragments) has been recovered ~10 cm away from actively venting (T_{max} = 260˚C) top of the "Low Smoker" chimney (sampling of the active vent failed as too fragile). All fragments are greenish-grey (prob pyrite/sphalerite with a mm thin outer coating; very fragile. No signs of alteration, so probably young chimney sample. Sample S94-Sulfide-14 is a 6 cm chimlet from "Snail Alcove" Chimney complex, recovered during a bio-scoop (S94-Bio-14). The chimlet is white-grey-black (inactive or low-T diffuse venting) composed of mainly anhydrite and minor barite (light sample). Sample S94-Sulfide-16 is a small chimney stub-fragment from the actively venting (T_{max} =201˚C) "Snail Alcove" Chimney complex. The sample consists of a ~3cm lining of massive chalcopyrite/bornite? coated by thin layer of white to orange anhydrate. Sample S94-Sulfide-20 originally was a ~50 cm high inactive chimney ~20cm in diameter at the bottom thinning to ~15 cm across at the top. Two 10 cm slices (~50-40 cm) and (20-10 cm) were retained. The sample consists of several fluid upflow zones (up to 4 cm across) lined with chalcopyrite/pyrite/bornite? Tree-ring like growth zones of barite/anhydrate and possibly sphalerite/hematite? The outside is coated with brown-black Mn-Fe oxides. S94-Sulfide-25 is sample of the top 15 cm of an inactive side vent from the top of the "North Tall and Handsome" Chimney. The central fluid up-flow zone is lined with a mm coat of golden pyrite or chalcopyrite(?) with a sub mm coat of Mn oxide, surrounded by a thin veneer of white anhydrate. The majority of the chimney sample is composed of barite (heavy) and minor anhydrate and finely dispersed pyrite(?), and sphalerite(?). The outside is lined with a mm thin coat of oxidized light brown iron dispersed in anhydrate(?).

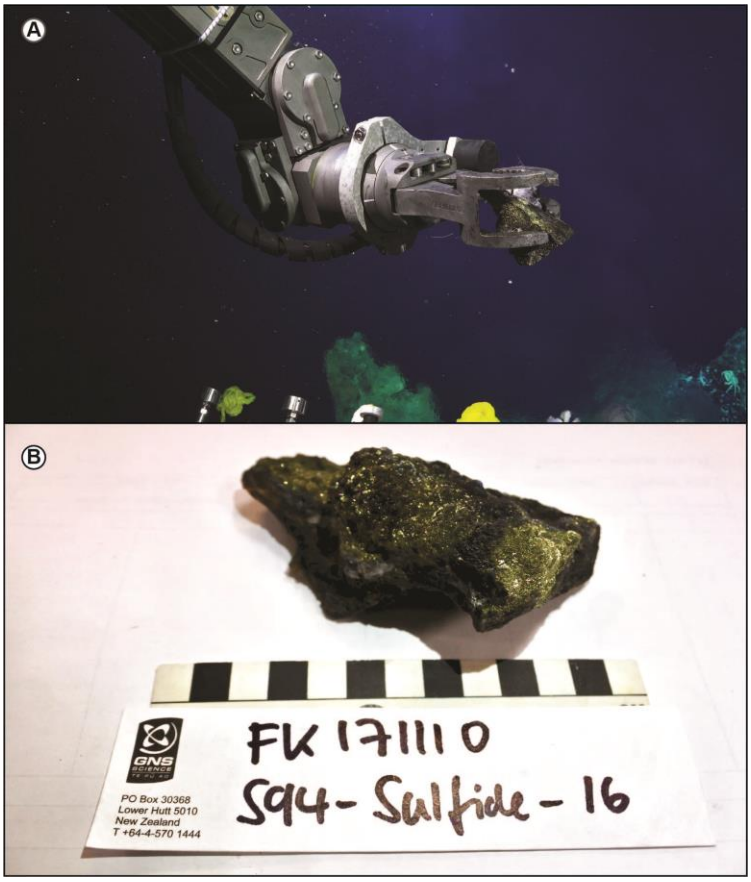


Figure 4.1.2-3 S94-16 A) Sampling sulfides from active "Snail Alcove" vent at Mata Ua during dive S94. B) Photograph of the sample taken in A).

Dive S97- Mata Fitu, southeastern flank vent fields

Dive S97 collected seven sulfide samples. The first sample was taken at ~2750 m depth from a newly discovered deep vent field. Small bump-like structures identifiable in the single multi-beam track with the AUV Sentry were chosen as first target. The first sample S97-Sulfide-02 is chunk from the ~5 m high “Leaning Tower of Pisa” chimney. The sample is mainly composed of more barite than anhydrate and black mm-sized mineral (hematite or sphalerite(?)) with thick streaks of pyrite (or bornite/chalcopyrite?). Minor (secondary (?) globular) pyrite is existent at one side and some iron oxide alteration is apparent towards the outer parts of the sample. S97-Sulfide-03 is a small fragment of up to 3 cm thick chalcopyrite/bornite/pyrite lined by a cm layer of barite and anhydrate from an active vent from the ~5m tall “Old Smokey” Chimney. The outside of the sample is coated with brown Fe-oxide in an anhydrate(?) matrix.

Figure 4.1.2-4 S97-17 A) Sampling sulfides at active vent of the “Redwood” chimney site at Mata Fitu during dive S97. B) Photograph of the sample taken in A).

S97-Sulfide-09 is a ~20 cm tall oxidized inactive chimlet (~4.5 cm in diameter) from a ~2m tall inactive chimney. The chimlet mainly consists of dark-grey to white crystals of barite and anhydrate (maybe minor sphalerite?) and is lined with brown to black Fe-Mn oxides. The central orifice is ≤1cm across. Sample S97-Sulfide-10 is about 5 cm shorter, by ~7cm wide chimlet from the same chimney complex as S97-Sulfide-09. The central ~1-2 cm wide orifice is lined with mm-thin coat of crystallised pyrite (and minor bornite ±sphalerite?). Golden pyrite also occurs as finely dispersed within the grey-white barite-anhydrate matrix. The chimlet is mantled by a mm-thin layer of Fe-hydroxide mostly covered by sub mm black Mn-oxide. S97-Sulfide-11 is a 13*11 cm, relatively heavy chunk of the basal part of an extinct chimney complex. The outside of these chimneys are relatively smooth white to black coat (pine cone-like shaped). Predominant color is of the interior of this sample and dark-grey to white (mm-sized barite and smaller? anhydrite). The outer ~5 cm contain a yellowish-brownish tint, which may represent an (Fe-) oxidation reaction of finely dispersed Fe components with the surrounding seawater. S97-Sulfide-17 is from the active vent orifice of a ~17 m tall chimney named “Redwood” because of its distinct reddish color at the base. Maximum measured vent fluid temperature at the central orifice was 295˚C. We recovered a small wall piece (~7*3 cm) of the active vent. The sample consists mainly of a mm-cm thick pyrite-bornite-chalcopyrite lining of the orifice. The central fluid up-flow zone is lined with mm-cm thick grey-white barite-anhyrdrite?. Sample S97-Sulfide-22 is a ~28cm tall inactive side-chimney (~1m away from 262˚C) vent at the top of the “K2” chimney. The sample consists of mm-sized dark-grey to dispersed light-grey to white crystals (barite-anhydrate±sphalerite?). The ≤ 2cm wide central orifice is lined with sub-mm black crystals (hematite-sphalerite-galena?). The outer cm of the chimney looks corroded with brown Fe hydroxides and white patches of anhydrate.

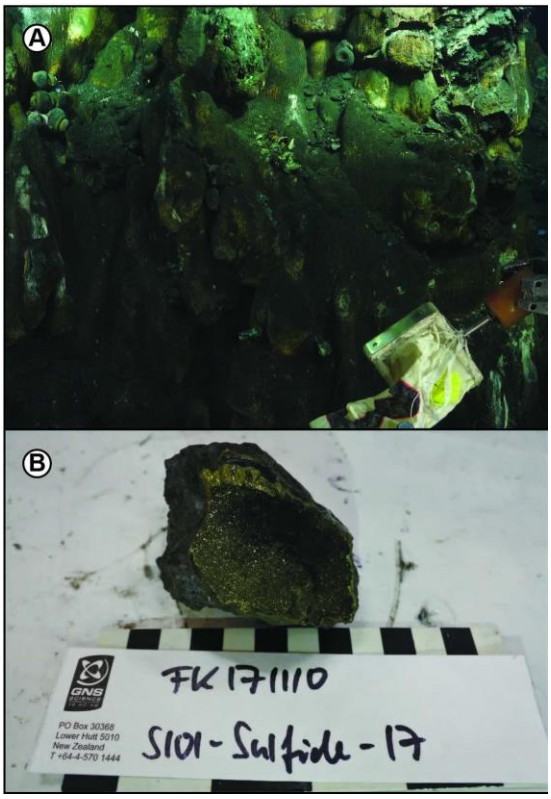
S100 - Mata Ua, northeast flank vent fields

Six sulfide samples were collected during dive S100. The first sample S100-Sulfide-09 recovered during this dive is from the top of an ~7 m tall inactive chimney in between many inactive, partly collapsed spires (dubbed “Amphitheater”). The sampled fragment is ~11*6*5 cm and consists of predominant dark-grey (likely barite with some sphalerlite?) matrix. Some minor golden shimmer (possibly pyrite-chalcopyrite) is apparent in patches within the sample marking old linings of small fluid up-flow zones. The outside of the sample is brown and

Figure 4.1.2-5 S100-21 Sampling the top of the "Big Smoke' vent site.

corroded. Sample S100-Sulfide-15 are two fragments recovered while sampling stalked barnacles (Sample S100-Bio-14) at the side of "Lau Flat-top" smoker. Maximum vent T measured at this smoker is 327˚C. Both fragments are predominantly greenish-grey with golden patches suggesting that this sample contains finely dispersed pyrite/chalcopyrite? in a barite-dominated matrix with areas of more concentrated chalcopyrite(?). Red crystals (likely oxidized hematite) line one of the fluid up-flow zones. Brownish seawater-induced oxidation products line the outer side of the sample. Sample S100-Sulfide-16 has been recovered from the top of the "Lau Flattop" chimney, ~5-10 cm away from the active main vent (vent orifice was too fragile to sample). Although slightly larger, similar color and identifiable mineral composition suggest a similar composition of S100-Sulfide-16 to S100-Sulfide-15. The exception being a slightly higher proportion of golden patches and therefore possibly higher percentage of chalcopyrite. S100-Sulfide-17 are seven partly fragile fragments recovered during 4 sampling attempts from the active vent of the "Voodoo Child" Chimney. Maximum temperature measured here is 322˚C. Two of the fragments are from the central high-T venting orifice and up to ~0.5cm thick lining of chalcopyrite-bornite-pyrite?. The predominant color of the remain fragments is greenish-grey suggesting that fine-grained pyrite (±chalcopyrite) as main constituent. Blotchy pyrite-bornite-chalcopyrite (?) is apparent in one of the fragments. S100-Sulfide-21 is a large chunk (25*30*19 cm) with two actively venting orifices (T_{max} = 324˚C) from the top of a ~14 m tall chimney dubbed "Big Smoke".

The central orifices are lined with cm thick chalcopyrite(?) and/or bornite with finely dispersed pyrite forming the bulk of the remaining sample. Underlying the chalcopyrite are a mm-thick layer of white-purple anhydrate(?) ± barite. Much of the fine-grained pyrite is friable. S100-Sulfide-21b is a broken off part of one of the fluid vent orifices. S100-Sulfide-26 has been recovered from an actively venting side vent of "Big Smoke" which broke off while storing a gastight. Most of the sample consists of friable fine grained pyrite and massive chalcopyrite(?) along fluid up-flow zones.



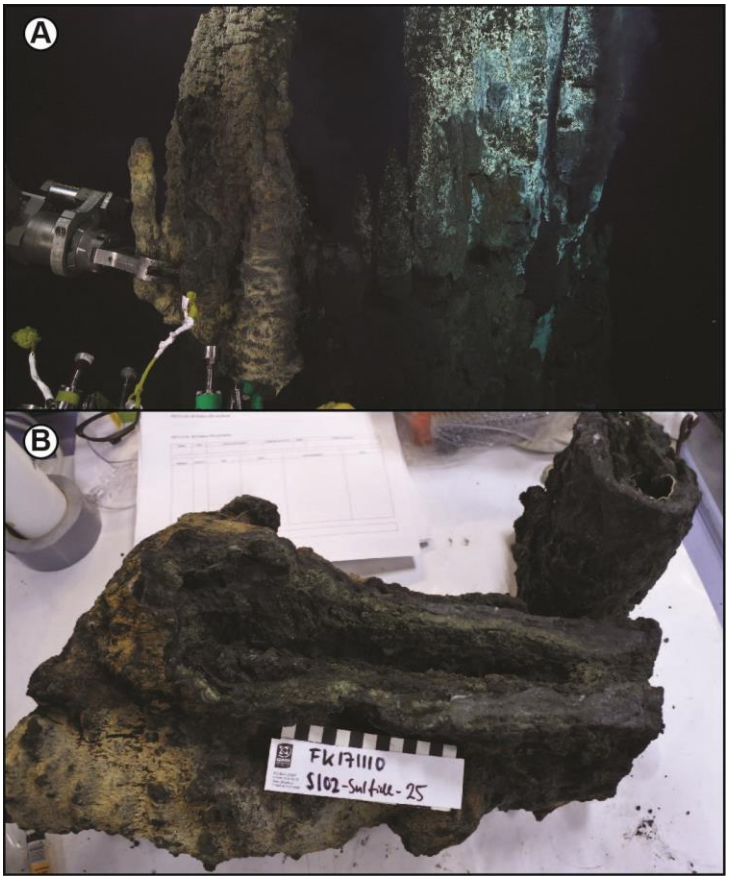
Dive S101 – Mata Ono, near summit vent field (southern side)

Three sulfide samples where recovered from a newly discovered vent field near the summit of Mata Ono. S101-Sulfide-17 and S101-Sulfide-19 from an active vent lower down on the ~10-12 m tall "Giant Beehive" chimney. Maximum temperature measured at this vent is 299˚C.

Both samples largely consist of a cm layer of golden pyrite-chalcopyrite lining the venting orifice. Parts of the golden lining has a blackish tint suggesting the presence of bornite. S101-Sulfide-20 extra has been sampled accidently ~1-2m below the vent while the ROV 'parked' on the "Giant Beehive" chimney and sampled gas and fluids. The sample is multi-colored (Greenish-grey; some minor golden specks; brown-

Figure 4.1.2-6 S101-17 A) Sampling sulfides at active vent of the "Giant Beehive" chimney site at Mata Ono during dive S101. B) Photograph of the sample taken in A).

white, black and red), suggesting the presence of pyrite (±sphalerite?), barite and anhydrate with some Fe hydroxides lining the outside.



Dive S102 – Mata Ono, near summit vent field (northern side)

During dive S102 three sulfide samples were recovered. Sample S101-Sulfide-17 is a small chimlet from ~10 cm below active top vent (T_{max} = 235˚C) of the "Rockstar" chimney. Attempts to recover a sample from the active vent failed. The chimlet is heavily corroded, very light and fragile, suggesting anhydrate as main constituent. The largest sulfide sample recovered during FK171110 was a ~70 cm large side chimney (S102-Sulfide-25) ~37 kg total weight) with a central vent orifice up to ~2 cm in diameter from the "Giant Beehive" (now dubbed "B3 – Bodacious Booming Beehive") chimney discovered the day before . The chimney was sampled while attempting to recover a much smaller side chimlet. Chalcopyrite lines several fluid up-flow zones (three, mm-cm across) with more friable fine-grained pyrite (±chalcopyrite) away from the orifices. Further constituents are massive barite and anhydrate with Fe- and Mn-oxides coating the outside of the sample. Some of the fluid-flow zones are also lined with a 'top-coat' of red hematite.

Figure4.1.2-7 S102-25 A) Sampling side-vent of the "Giant Beehive (or B3)" chimney site at Mata Fitu during dive S102. B) Photograph of the sample taken in A).

Dive S104 – Mata Taha

During dive S104 several up to 11m tall strongly altered chimneys all leaning to one side. All chimneys are covered with corals, sponges and other biota (see biology section. Two samples were recovered from two individual sites. Sample S104-Sulfide-13 is a heavy, mainly white, bulbous side chimney (12 cm across) from a ~7 m tall solitary chimney (dubbed "Leaning Chimney of Taha"). Its heavy weight suggests that this fragment is mainly composed of barite. The predominantly white color of the sample suggests that most of the sulfides are oxidized to sulfates by the surrounding seawater. In addition, rust-brown platy crystals (corroded hematite?) line the outer section of the broken off section. Brownish Fe alteration products also occur throughout the outer ±2cm. The surface is lined with a sub-mm thin back Mn-oxide coating (most of has been washed off during sample cleaning process).

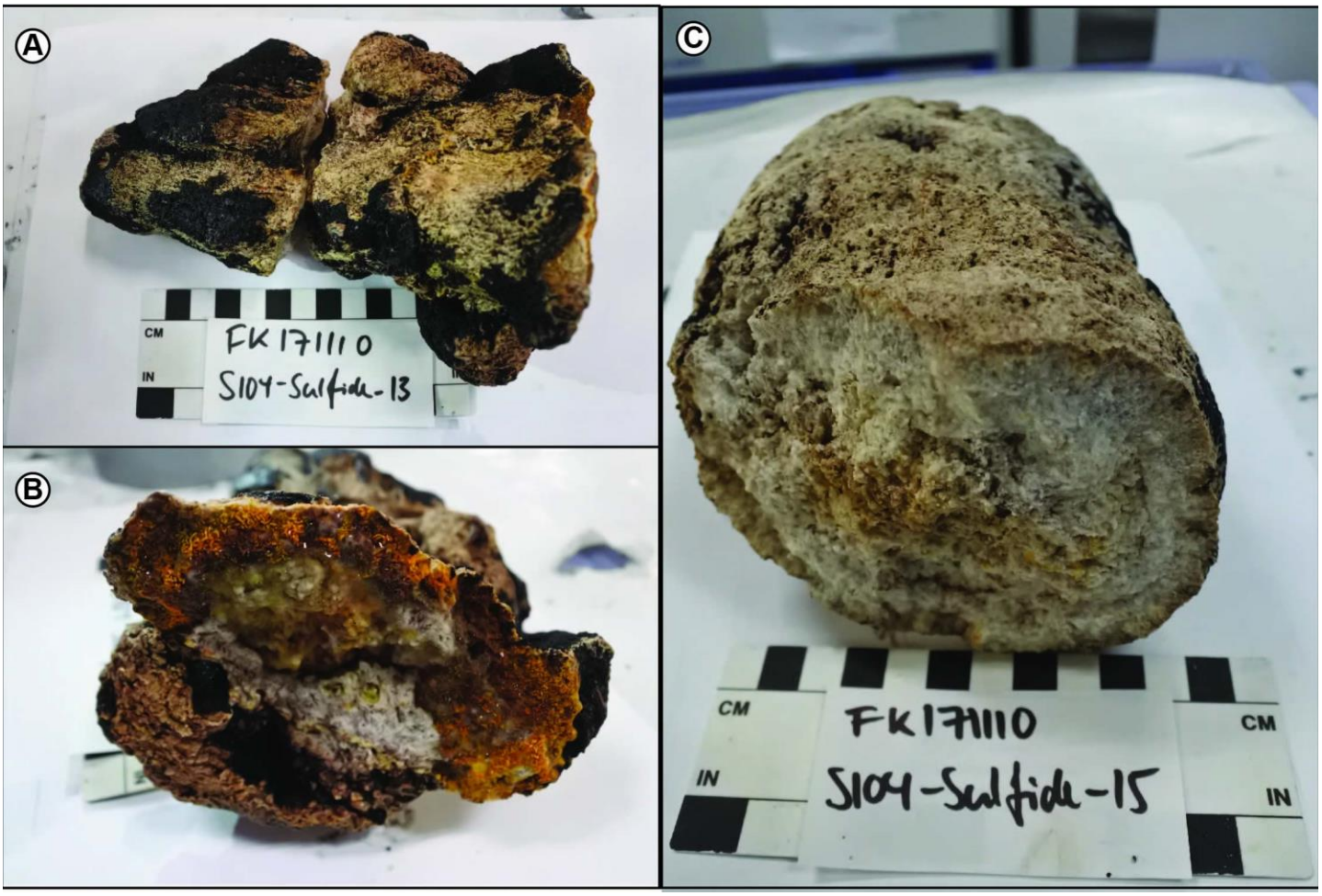


Figure 4.1.2-8 S104 A-C) Photographs of highly corroded and oxidized samples of inactive chimney material at Mata Taha).

The second samples recovered from dive S104 was a piece (S104-Sulfide-15) of a side chimney of a ~11 m tall chimney that is located along a line old inactive chimneys all leaning to one side (dubbed “Death Valley”). The sample is largely tube-shaped, heavy (mainly barite) and predominantly white. The crystal size varies from mm-sized crystals in the central ~4 cm to sub-mm crystals towards the outer sample section. A brownish Fe-alteration tint is apparent in the central and outer cm of the sample. The surface was originally covered with a sub-mm coat of MnO_2.

4.2 Hydrothermal Fluid Chemistry

David Butterfield, Kevin Roe

Our goal for the Tongan Fire expedition was to sample as many hydrothermal vents as possible to allow us to understand the character of venting on the Mata chain of boninite volcanoes. This was the second expedition (after 2012 Submarine Ring of Fire ROV Quest 4000) to sample hydrothermal vents from the northern Matas and the third expedition (after 2009 W. Mata response and 2012 SRoF) to sample W. Mata. Because of the unusual rock chemistry of the Matas, we are looking for differences in fluid chemistry compared to the nearby hydrothermal areas hosted in basaltic andesite, rhyolite and dacite. This will improve the capability of models to predict how the host rock affects hydrothermal fluid chemistry, and how that in turn affects chemosynthetic ecosystems.

Methods. For this project, we used the simple and compact technology of titanium major samplers (thanks to Geoff Wheat and David Clague for the loan) and titanium gas-tight samplers. With the focus on rock collection and the number of scientists working in the lab, we needed to keep it small and simple. We built a new sampler stand to improve ease of picking up and replacing the major samplers on the front of the ROV. This worked quite well. The ROV configuration varied depending on dive plans, but we had 2 to 4 majors and 2 to 4 gas-tights on nearly every dive. With few samples per dive, we targeted high-quality, high-temperature samples first, and tried to get one or two diffuse fluid samples per vent field to give some characterization of the chemistry of vent fauna habitat. We used ROV-mounted Niskins to sample near-bottom water and hydrothermal plumes.

In the Falkor wet lab, the SRI gas chromatograph was set up (used during the first leg for water column gas measurements). We analyzed dissolved methane and hydrogen on the major samples, unless there was obvious evidence that they leaked before we could sample them. We measured pH (at lab temperature) by glass electrode, hydrogen sulfide, ammonia and dissolved silica by spectrophotometry, and alkalinity by titration. All other chemistry will be done on shore. Samples for major element analysis were filtered through 0.2 micron syringe filters. Trace metal samples were acidified on board with ultrapure HCl stored in I-Chem HDPE bottles. Visible particles left in the major samplers were rinsed into I-Chem bottles for later analysis. Samples for nutrients were filtered, purged with nitrogen to remove excess sulfide, and frozen. Samples for DOC were filtered and frozen. Selected samples for sulfur isotope analysis were preserved with cadmium acetate in glass vials with no headspace. Thanks to Ken and Val for assistance with shipping samples back from Hawaii.

Results. We collected and processed 33 titanium major samples and 6 Niskin samples. Sample metadata, temperature and pH are listed in the table below, and also described in the full sample log. There are enough samples to get endmember compositions at all of the high-temperature sites. Sample quality appears to be good (less dilution of endmembers than the samples collected from the N Matas in 2012). We do not have enough chemistry data to compare endmembers yet, so only limited interpretation is possible now.

This expedition gave us a very good look at the vent fields on Mata Ua, Tolu, Fitu, and Ono and they are truly impressive. There are virtual forests of active chimneys covered with vent fauna that varies between sites. The large size and large number of chimneys in these fields attests to long-lived and well-developed hydrothermal systems.

The high-temperature vent fluids from Matas Ua, Tolu, Ono, and Fitu have typical chemistry acquired in high-temperature reaction zones: high dissolved silica, high H2S (3 to 9 mmol/L), and moderately low pH (3 to 4 at lab temperature). The lack of native sulfur around the vent sites, the moderately low pH values, and the low-to-moderate total gas contents based on small gas headspace in the majors (and more quantitative data from the gas-tight extractions) indicate a relatively minor role for magma degassing in the chemistry of the North Mata high-temperature vent fields. Consistent with the 2012 results, methane concentrations in Mata vent fluids measured on board Falkor are high (~300 to 1000 µmol/L) relative to most smoker-type fluids. This is the most

obvious chemical signal that sets them apart from other vent sites. High-temperature fluids from the Endeavour segment, Juan de Fuca ridge and from the Jade site in the Okinawa trough, have similar methane concentrations, attributed in those cases to a contribution from sedimentary organic material, which also generates high ammonia concentrations. At the Matas, ammonia is not elevated, and there is no indication of buried sediment in this environment. The high methane concentrations must relate to the rock composition and redox conditions in the reaction zone. The hot fluids from the North Matas have similar pH and methane content to peridotite-influenced fluids from the Mid-Atlantic Ridge (e.g. Rainbow and Logatchev), but they differ in other respects. Geochemical modeling may shed some light on how the orhthopyroxene-clinopyroxene-olivine mineralogy of boninites affects hydrothermal fluid composition and sulfide mineral formation.

With the caveat that we have not yet calculated endmembers, it appears that there are differences in the total sulfide content between the Matas. In terms of H2S concentration, Tolu > Ono ≈ Ua > Fitu (> W. Mata). There may be significant differences in salinity and sulfide-forming metal concentrations also. Laboratory analysis is underway.

Most of the seafloor surveyed at West Mata was on recent lava flows away from the summit and those young lava flows were not hydrothermally active. We took a background, near-bottom sample on the “Muffin” flow at 2710 m depth, but otherwise found nothing to sample. Weak hydrothermal venting continued around the summit of West Mata. To point out the obvious, the intensity of hydrothermal output was many orders of magnitude higher during the observed active eruption in 2009 than in either 2012 or this expedition. Fluids with the lowest pH (3.8) were sampled from Hades Pit (1294 m depth), directly over what we believe was the eruptive conduit. Total sulfide in these fluids was less than 10 µmol/L. No shrimp were observed directly in the venting fluids at this site, with very few shrimp in the surrounding area. Shrimp were present in high abundance on the ridge at ~1190 m depth, where fluid pH (4.8-6.1) and H2S concentrations were higher (>100 µmol/L). The 8 major samples collected on this expedition, combined with the 6 majors collected in 2012 and the many samples collected in 2009 when West Mata was erupting, provide an excellent time-series showing how fluid chemistry and habitat conditions change between eruptive and inter-eruptive periods.

The seafloor surveyed on two dives at Tafu on the NE Lau Spreading Center was mostly devoid of hydrothermal activity, but did show two interesting and contrasting sites. One was a miniscule site (at 1676 m depth) representing a sulfur habitat in miniature, and the other was an extensive iron-oxide deposit near the summit at 1423 m depth with active venting (5°C sampled) and essentially no vent fauna. We also sampled water from a breccia mound at 1740 m depth with shrimp and squat lobsters, with wispy filamentous microbial mat and no detectable temperature anomaly.

Overall, the vent fluid sampling on this expedition was quite successful. The total number of samples is not large, but the quality is good and the range of sites is excellent. It was truly amazing that we did not miss a single day of ROV diving on this expedition. Kudos to the Falkor and SuBastian team for making that happen!

Table 4.2-1 Hydrothermal fluid samples for FK171110. (Depths in bold-italics have been corrected to PARO depth gauge.)

Site	Date UTC	Time UTC	Sample# Dive	Sample# Lab	Sampler Type	Location Description	Latitude	Longitude	Depth m	Hdg Deg.	Temp °C	pH in lab
W Mata	11/26/2017	23:00	S85-Fluid-07	S85M3	major	SW Hades Pit	-15.09286	-173.74967	***1278***	190	17.9	4.41
W Mata	11/27/2017	0:49	S85-Fluid-12	S85M4	major	Shrimp Suburbia near Prometheus	-15.09432	-173.74828	***1181***	295	18	4.81
W Mata	11/28/2017	23:47	S87-Fluid-6	S87M1	major	Hades Pit bottom	-15.09441	-173.74909	***1283***	81	7	4.90
W Mata	11/29/2017	0:30	S87-Fluid-8	S87M2	major	Hades Pit bottom	-15.09441	-173.74909	***1284***	81	22	3.78

Site	Date UTC	Time UTC	Sample# Dive	Sample# Lab	Sampler Type	Location Description	Latitude	Longitude	Depth m	Hdg Deg.	Temp °C	pH in lab
W Mata	11/29/2017	2:10	S87-Fluid-11	S87M3	major	Shrimp Plethora summit ridge	-15.09420	-173.74804	***1176***	49	28.5	5.35
W Mata	11/29/2017	3:46	S87-Fluid-16	S87M4	major	Shrimp Canyon	-15.09461	-173.74635	***1266***	334	9	6.09
W Mata	12/1/2017	3:31	S88-Fluid-17	S88M2	major	Muffin area background	-15.06468	-173.71107	***2681***	0	2	7.77
W Mata	12/15/2017	3:18	S103-Fluid-25	S103M1	major	Minor Shrimp	-15.09374	-173.74622	1268	35	6	6.43
Mata Ua	11/30/2017	20:40	S89-Fluid-05	S89M1	major	Temple of Smoke marker 226	-15.01680	-173.78764	2356	194		3.76
Mata Ua	11/30/2017	22:51	S89-Fluid-12	S89M2	major	10cm diam Smoker marker 274	-15.01729	-173.78805	2350	30		4.49
Mata Ua	11/30/2017	23:28	S89-Fluid-15	S89M3	major	10cm diam Smoker marker 274	-15.017897	-173.78805	2350	30		3.66
Mata Ua	12/1/2017	0:22	S89-Fluid-18	S89M4	major	Diffuse snail bed/border of white and dark snails	-15.01773	-173.78852	2359	156		6.23
Mata Ua	12/11/2017	23:58	S100-Fluid-13	S100M3	major	Flattop Stump	-15.01668	-173.78693	2335	118	327	3.82
Mata Ua	12/12/2017	2:03	S100-Fluid-19	S100M2	major	Voodoo Child	-15.01679	-173.78695	2340	107	322	3.84
Mata Ua	12/12/2017	2:55	S100-Fluid-23	S100M1	major	Big Smoke	-15.01675	-173.78597	2318	342	324	3.73
Mata Ua	12/12/2017	3:32	S100-Niskin-27	S100NiskAft	Niskin	Big Smoke	-15.01675	-173.78597	2315	0		8.32
Mata Ua	12/12/2017	3:33	S100-Niskin-28	S100NiskFwd	Niskin	Big Smoke	-15.01675	-173.78597	2310	0		7.70
Mata Tolu	12/3/2017	2:52	S91-Fluid-14	S91M2	major	Saguaro black smoker	-15.004629	-173.7936	1820	0	314	3.39
Mata Tolu	12/3/2017	3:50	S91-Fluid-17	S91M4	major	Lowboy black smoker	-15.004651	-173.79332	1824	142	260	3.64
Mata Tolu	12/6/2017	1:06	S94-Fluid-12	S94M3	major	Snail Alcove	-15.00482	-173.79354	1813	327	201	3.34
Mata Tolu	12/6/2017	3:33	S94-Fluid-21	S94M2	major	North, Tall, Handsome near top	-15.00449	-173.79359	1823	254	204	3.23
Mata Tolu	12/6/2017	2:36	S94-Fluid-17	S94M4	major	Mussels above white mat, diffuse venting, no chimneys	-15.00512	-173.79392	1843	184	20	5.83
Mata Tolu	12/6/2017	1:44	S94-Fluid-15	S94M1	major	Snail Alcove	-15.00482	-173.79354	1813	327	201	5.67
Mata Ono	12/13/2017	4:08	S101-Fluid-16	S101M2	major	Bodacious Booming Beehive lower vent	-14.94058	-173.79956	2362	316	299.4	3.43
Mata Ono	12/13/2017	4:43	S101-Niskin-21	S101NiskFwd	Niskin	Bodacious Booming Beehive	-14.94058	-173.79956	2355	0	3	6.82
Mata Ono	12/14/2017	1:10	S102-Fluid-12	S102M4	major	Summit snail/anemone diffuse on lava	-14.94041	-173.79967	2357	149	12.3	6.25
Mata Ono	12/14/2017	2:17	S102-Fluid16	S102M2	major	Rock Star chimney at summit, top of vent 2350	-14.94054	-173.79938	2354	240	238	3.01
Mata Ono	12/14/2017	2:57	S102-Fluid-19	S102M3	major	Bodacious Booming Beehive massive top vent	-14.94058	-173.79956	2359	0		5.71
Mata Ono	12/14/2017	3:44	S102-Fluid-23	S102M1	major	Bodacious Booming Beehive lower vent	14.94043	-173.77371	2363	322	299.4	3.16
Mata Fitu	12/8/2017	20:51	S97-Fluid-5	S97M4	major	Old Smokey	-14.91545	-173.77371	2758	294	274.5	3.97
Mata Fitu	12/9/2017	1:56	S97-Fluid-15	S97M1	major	Redwood	-14.91356	-173.77910	2616	17	295	3.3

Site	Date UTC	Time UTC	Sample# Dive	Sample# Lab	Sampler Type	Location Description	Latitude	Longitude	Depth m	Hdg Deg.	Temp °C	pH in lab
Mata Fitu	12/9/2017	2:10	S97-Fluid-16	S97M3	major	Redwood	-14.91356	-173.77910	2616	17	295	4.17
Mata Fitu	12/9/2017	3:43	S97-Fluid-21	S97M2	major	mini K2	-14.91339	-173.77910	2630	275	262	4.19
Tafu NELSC	12/9/2017	22:03	S98-Fluid-10	S98Nisk	Niskin	near-bottom slightly cloudy	-15.38236	-174.25264	1873	0	2.6	7.8
Tafu NELSC	12/10/2017	3:25	S98-Fluid-20	S98M2	major	at water/rock interface on volcanic rock next to breccia pillar	-15.37739	-174.24751	1740	0	2.7	7.76
Tafu NELSC	12/11/2017	1:08	S99-Fluid-16	S99M3	major	Contender Cliff	-15.35755	-174.23228	1676	0	2.8	7.8
Tafu NELSC	12/11/2017	3:40	S99-Fluid-22	S99M1	major	Iron vent	-15.36541	-174.23782	1423	0	5	7.07
Tafu NELSC	12/11/2017	3:46	S99-Fluid-23	S99NiskAft	Niskin	2-4m above iron vents, 5m away from sampled vent	-15.36509	-174.23771	1418	0	2.9	7.74
Tafu NELSC	12/11/2017	3:47	S99-Fluid-24	S99NiskFwd	Niskin	2-4m above iron vents	-15.36509	-174.23771	1418	0	2.9	7.75

4.3 Gas Sampling

Tamara Baumberger and Camilla Wilkinson

4.3.1 Leg 1 CTD Helium sampling

Seawater samples obtained from deployed CTD casts and tows were preserved in copper tubes sealed using an air operated copper tube crimper. In order to avoid air contamination or problems due to temperature changes, the samples were collected immediately following recovery of the CTD. Each sample consists of an A and B split, which allows a repeat analysis if necessary. Crimped and washed (in fresh water) copper tubes were bundled together and stored in foam lined boxes for transport.

Samples for helium analyses were collected from both vertical casts and tows. A summary is presented in tables below, and describes the location of each cast/tow. A total of 178 samples were preserved for future helium isotopic analysis. The full sample list is presented in Table 4.3.1-1 and 4.3.1.-2.

Table 4.3.1-1. *Description of each CTD cast analyses*

Cast	Rosette Position	Sample Identification	Depth (m)	Analyses		
				He	H2	CH4
V17B-02 Vertical cast over Niuatahi (Volcano O) cone	1	V17B-02-17	1242	x	x	x
	3	V17B-02-07	1202	x	x	x
	5	V17B-02-05	1152	x	x	x
	7	V17B-02-03	1125	x	x	x
	9	V17B-02-09	1121	x	x	x
	11	V17B-02-13	1110	x	x	x
	13	V17B-02-27	1062	x	x	x
	15	V17B-02-15	1002	x	x	x
	18	V17B-02-18	953	x	x	x
	19	V17B-02-19	902	x	x	x
V17B-03 Vertical cast over a lava flow found during 2011-2016 mapping NE of West Mata	1	V17B-03-01	2677	x	x	x
	3	V17B-03-07	2600	x	x	x
	5	V17B-03-30	2542	x	x	x
	7	V17B-03-11	2400	x	x	x
	9	V17B-03-26	2100	x	x	x
	11	V17B-03-22	1800	x	x	x
	13	V17B-03-24	1500	x	x	x
	15	V17B-03-15	1300	x	x	x
	17	V17B-03-16	1123	x	x	x
	19	V17B-03-21	900	x	x	x
V17B-04 Vertical cast over a lava flow found during 2011-2016 mapping N of West Mata	1	V17B-04-17	2416	x	x	x
	3	V17B-04-07	2302	x	x	x
	5	V17B-04-27	2152	x	x	x
	7	V17B-04-13	1878	x	x	x
	8	V17B-04-08	1600		x	x
	9	V17B-04-26	1297	x	x	x
	10	V17B-04-10	1199		x	x
	11	V17B-04-22	1101	x	x	x

Cast	Rosette Position	Sample Identification	Depth (m)	Analyses		
				He	H2	CH4
	12	V17B-04-12	1000		x	x
	13	V17B-04-24	900	x	x	x
	14	V17B-04-14	500		x	x
	1	V17B-05-03	3000	x	x	x
	2	V17B-05-02	2854		x	x
V17B-05 Vertical cast over basin west of the Matas		V17B-05-19	2700		x	x
	5	V17B-05-21	2570	x	x	x
	6	V17B-05-06	2612	x	x	x
	7	V17B-05-28	2488	x	x	x
	8	V17B-05-08	2445	x	x	x
	9	V17B-05-26	2199		x	x
	10	V17B-05-10	2133	x	x	x
	12	V17B-05-12	1850		x	x
	13	V17B-05-13	1751	x	x	x
	14	V17B-05-14	1498		x	x
	15	V17B-05-15	1244	x	x	x
	17	V17B-05-11	1088	x	x	x
	18	V17B-05-18	1030	x	x	x
	19	V17B-05-01	950		x	x
V17B-06 Vertical cast over Mata Fitu	1	V17B-06-30	2620	x	x	x
	3	V17B-06-05	2550	x	x	x
	5	V17B-06-24	2522	x	x	x
	7	V17B-06-22	2483	x	x	x
	9	V17B-06-26	2454	x	x	x
	11	V17B-06-27	2436	x	x	x
	13	V17B-06-13	2397	x	x	x
	15	V17B-06-21	2199	x	x	x
	16	V17B-06-16	1997	x	x	x
	17	V17B-06-11	1093	x	x	x
V17B-07 Vertical cast over serpentinite ridge	1	V17B-07-17	2781	x	x	x
	2	V17B-07-02	2764	x	x	x
	3	V17B-07-09	2700	x	x	x
	4	V17B-07-04	2669	x	x	x
	5	V17B-07-01	2612	x	x	x
	6	V17B-07-06	2535	x	x	x
	7	V17B-07-19	2447	x	x	x
	8	V17B-07-08	2350	x	x	x
	9	V17B-07-03	2249	x	x	x
	11	V17B-07-15	2128	x	x	x
	12	V17B-07-12	1948	x	x	x
	13	V17B-07-05	1850	x	x	x
	14	V17B-07-14	1648	x	x	x
	15	V17B-07-21	1179	x	x	x
	16	V17B-07-16	1143	x	x	x

Cast	Rosette Position	Sample Identification	Depth (m)	Analyses		
				He	H2	CH4
	17	V17B-07-11	1098	x	x	x
	18	V17B-07-18	999	x	x	x
	19	V17B-07-28	897		x	x
V17B-08 Vertical cast over Mata Ua (south of ridge)	1	V17B-08-30	2468	x	x	x
V17B-09 Vertical cast north of Mata Ua	1	V17B-09-30	2333	x	x	x
	3	V17B-09-17	2302	x	x	x
	5	V17B-09-9	2256	x	x	x
	6	V17B-09-6	2216	x	x	x
	9	V17B-09-3	2186	x	x	x
	10	V17B-09-10	2173	x	x	x
	13	V17B-09-05	2146	x	x	x
	15	V17B-09-21	2050	x	x	x
	16	V17B-09-16	1960	x	x	x
	18	V17B-09-18	1600	x	x	x
	19	V17B-09-28	1148	x	x	x
V17B-10 Vertical cast over West Mata	1	V17B-10-99	1258	x	x	x
	3	V17B-10-19	1241	x	x	x
	6	V17B-10-06	1223	x	x	x
	7	V17B-10-22	1197	x	x	x
	9	V17B-10-27	1149	x	x	x
	11	V17B-10-13	1068	x	x	x
	14	V17B-10-14	900	x	x	x
V17B-11 Vertical cast over East Mata	1	V17B-11-05	1277	x	x	x
	3	V17B-11-03	1250	x	x	x
	5	V17B-11-26	1225	x	x	x
	7	V17B-11-09	1211	x	x	x
	9	V17B-11-17	1150	x	x	x
	11	V17B-11-30	1102	x	x	x
	13	V17B-11-24	1001	x	x	x
		V17B-11-15	900		x	x
V17B-12 Vertical cast over West Mata (summit, formerly Hades, now a pit (ca. 1000 m deep)	1	V17B-12-13	1238	x	x	x
	3	V17B-12-27	1214	x	x	x
	5	V17B-12-22	1200	x	x	x
	7	V17B-12-19	1148	x	x	x
	9	V17B-12-99	1085	x	x	x
	11	V17B-12-5	1001	x	x	x
	12	V17B-12-12	900		x	x
V17B-13 Basin cast	1	V17B-13-03	2900	x	x	x
	2	V17B-13-02	2842	x	x	x
	3	V17B-13-26	2752	x	x	x

Cast	Rosette Position	Sample Identification	Depth (m)	Analyses		
				He	H2	CH4
west of West Mata	5	V17B-13-09	2649	x	x	x
	7	V17B-13-17	2503	x	x	x
	9	V17B-13-99	2326	x	x	x
	10	V17B-13-10	2201	x	x	x
	11	V17B-13-05	1500	x	x	x
	12	V17B-13-12	1250	x	x	x
	13	V17B-13-24	1228	x	x	x
	15	V17B-13-21	1145	x	x	x
	17	V17B-13-11	1101	x	x	x
	19	V17B-13-28	1054	x	x	x
	20	V17B-13-20	1000	x	x	x
	21	V17B-13-07	900	x	x	x

Table 4.3.1-2. *Description of each CTD tow analyses*

Tow	Rosette Position	Sample Identification	Depth (m)	Analyses		
				He	H2	CH4
T17B-01 Tow along the spine of West Mata	1	T17B-01-01	1350	x	x	x
	2	T17B-01-02	1522	x	x	x
	3	T17B-01-03	1282	x	x	x
	4	T17B-01-04	1274	x	x	x
	5	T17B-01-05	1140	x	x	x
	6	T17B-01-06	1230	x	x	x
	7	T17B-01-07	1236		x	x
	8	T17B-01-08	1223	x	x	x
	9	T17B-01-09	1223		x	x
	10	T17B-01-10	1108	x	x	x
	11	T17B-01-13	1220	x	x	x
	12	T17B-01-12	1116	x	x	x
	13	T17B-01-11	1122	x	x	x
	14	T17B-01-14	1404	x	x	x
	15	T17B-01-15	1298	x	x	x
	16	T17B-01-16	1222	x	x	x
	17	T17B-01-17	1205	x	x	x
	18	T17B-01-18	1195	x	x	x
	19	T17B-01-19	1163	x	x	x
	20	T17B-01-20	999	x	x	x
	21	T17B-01-21	950	x	x	x
T17B-02 Tow over Niuatahi (Volcano O). Start in center then	1	T17B-02-01	1139	x	x	x
	2	T17B-02-02	1737	x	x	x
	3	T17B-02-24	1704	x	x	x
	4	T17B-02-04	1399	x	x	x
	5	T17B-02-05	1303	x	x	x
	6	T17B-02-06	1303		x	x

Tow	Rosette Position	Sample Identification	Depth (m)	Analyses		
				He	H2	CH4
cut the cone towards rim	7	T17B-02-22	1216	x	x	x
	9	T17B-02-26	1207	x	x	x
	11	T17B-02-13	1159	x	x	x
	13	T17B-02-27	1106	x	x	x
	14	T17B-02-14	1067	x	x	x
	15	T17B-02-15	1005	x	x	x
	16	T17B-02-16	953	x	x	x
T17B-03 Tow over Mata Ua and Mata Tolu	1	T17B-03-30	2188	x	x	x
	2	T17B-03-02	2258	x	x	x
	3	T17B-03-07	2143	x	x	x
	4	T17B-03-04	2237	x	x	x
	5	T17B-03-27	2336	x	x	x
	6	T17B-03-06	2321	x	x	x
	7	T17B-03-05	2311	x	x	x
	8	T17B-03-08	2277	x	x	x
	9	T17B-03-26	2199	x	x	x
	10	T17B-03-10	2025	x	x	x
	11	T17B-03-22	1794	x	x	x
	12	T17B-03-12	1833	x	x	x
	13	T17B-03-24	1806	x	x	x
	14	T17B-03-14	1744	x	x	x
	15	T17B-03-15	1896	x	x	x
	16	T17B-03-16	2123	x	x	x
	17	T17B-03-11	2005	x	x	x
	18	T17B-03-18	1900	x	x	x
	19	T17B-03-01	1803	x	x	x
	20	T17B-03-20	1700	x	x	x
	21	T17B-03-09	1599	x	x	x
T17B-04 Tow over Mata Fitu	1	T17B-04-03	3273	x	x	x
	2	T17B-04-02	2429	x	x	x
	3	T17B-04-19	2569	x	x	x
	4	T17B-04-04	2470	x	x	x
	5	T17B-04-24	2361	x	x	x
	6	T17B-04-06	2585	x	x	x
	7	T17B-04-22	2448	x	x	x
	8	T17B-04-08	2300	x	x	x
	9	T17B-04-26	2154	x	x	x
	10	T17B-04-10	2005	x	x	x
	12	T17B-04-12	1499	x	x	x
	13	T17B-04-13	1199		x	x
	14	T17B-04-14	1150	x	x	x
	15	T17B-04-15	1112	x	x	x
	16	T17B-04-16	1055	x	x	x
	11	T17B-04-11	895	x	x	x

4.3.2 Leg 1 CTD Methane and Hydrogen Sampling

Analyses were conducted by Tamara Baumberger on Dave Butterfield's SRI GC. A total of 195 samples were measured for dissolved methane and hydrogen (CH_4 and H_2) collected from 4 tow-yo´s and 13 vertical casts during leg 1 of cruise FK171110. To determine the dissolved gas concentrations, 100 ml of bubble-free seawater was drawn directly into 140 ml syringes followed by the addition of 40 ml headspace gas of ultra-pure helium. The sample was vigorously shaken and allowed to warm to room temperature to reach equilibrium for H_2 and CH_4 between the water and gas phase. After equilibration, the headspace gas was injected into a SRI 8610C gas chromatograph. H_2 concentrations were determined with a highly sensitive pulsed discharge detector (PDD) and CH_4 concentrations were measured with a flame ionization detector (FID). The H2 concentrations for T17B-02 and V17B-02 are recalculated from the slope of the plotted standard curve because the internal formula in the program did not work. Background H_2 concentrations are between 0.5 and 1 nM.

T17B-01 West Mata. Tow along the West Mata spine with start over the 2016 lava flow. Two distinct plume layers were observed. The deeper layer was located between 1205 and 1236 m water depth with maximum CH_4 and H_2 concentrations of 83.9 nM and 3.7 nM at 1223 m water depth (55 m above seafloor). The shallower plume layer was between 1108 m and 1122 m water depth with CH_4 concentrations up to 17.7 nM (1122 m). Hydrogen concentrations in this layer were 3.5 nM at maximum. (21 samples)

T17B-02 Niuatahi (Volcano O). Tow at Niuatahi, former Volcano O, with start in the center of the caldera. The center cone was accidently only hit on its side while towing towards the rim. This tow was stopped early because the ship was following a wrong track (wrong end of tow WP in system). Methane concentrations were between 2.0 and 3.0 nM deeper than 2200 m and between 0.9 and 1.5 nM shallower than 2200 m. Re-evaluated H_2 concentrations range from 0.5 to 1.5 nM. (13 samples)

V17B-02 Niuatahi (Volcano O). Vertical cast over the cone of Niuatahi (Volcano O). Maximum CH_4 concentration of 2.7 nM at 1121 m water depth. Re-evaluated H_2 concentrations range from 0.2 to 1.5 nM. (10 samples)

V17B-03 "the muffin". Vertical cast over a lava flow NE of West Mata found by difference mapping between 2012 and 2016, called "the muffin". Small CH_4 elevation between 1800 and 2600 m with a maximum of 6.4 nM at 2400 nM. The H_2 concentration was highest closest to the seafloor at 2677 m with 5.7 nM. (10 samples)

V17B-04 New lava flow N of West Mata. Vertical cast over a lava flow N of West Mata found by difference mapping between 2012 and 2016. Elevated CH_4 concentrations from seafloor and up to 300 m above seafloor. The highest value of 8.4 nM was measured at 2302 m. Uniform H_2 concentrations between 2.4 and 2.8 nM. (11 samples)

T17B-03 Tow over Mata Ua and Mata Tolu. The highest CH_4 concentration was measured at the beginning of the tow over Mata Ua with 263.1 nM at a depth of 2143m. The H_2 maximum was measured at the same depth with a concentration of 8.5 nM. The plume reaches from 2188 to 2258 m. A second, much smaller, plume was found later in the tow with CH_4 values up to 30.8 nM at a depth of 1896 m. (21 samples)

V17B-05 Basin cast W of Matas. A vertical cast over the basin west of the Mata volcanoes. Two distinct CH_4 layers were found. A concentration of 12.8 nM at 2570 m and 21.7 nM 2488 m. Hydrogen was uniformly low. (16 samples)

T17B-04 Mata Fitu. Tow over Mata Fitu. Maximum CH_4 concentration of 242.1 nM at 2429 m water depth. The H_2 maximum was found in the same layer with a concentration of 4.5 nM. (16 samples)

V17B-06 Mata Fitu. Vertical cast over vent field at Mata Fitu. Two distinct plume layers were observed. The deeper one was characterized by a maximum CH_4 concentration of 222.6 nM at 2550 m and a maximum H_2

concentration of 3.1 nM at 2522 m. The 100 m shallower plume layer had a maximum CH_4 concentration of 262.6 nM and a maximum H_2 value of 7.4 nM at 2454 m. (10 samples)

V17B-07 Serpentinite Ridge. Vertical cast over the serpentinite ridge east of the Matas. Two plume layers where observed higher up in the water column. A smaller anomaly at 2447 m water depth with 11.7 nM CH_4 and background seawater H_2 concentrations. A stronger plume was found at 2128 m with a CH_4 concentration of 51.9 nM and 2.0 nM H_2. These plumes most likely come in from the Matas. (18 samples)

V17B-08 S of Mata Ua. Only one sample was collected near the seafloor at 2468 m. Methane concentration was 15.2 nM. Hydrogen did not show elevated values over background seawater concentration. (1 sample)

V17B-09 N of Mata Ua. Vertical cast north of Mata Ua. Elevated CH_4 concentrations from the seafloor (2333 m) up to 2146 m water depth with a strong hydrothermal plume maximum at 2173 m water depth. Methane concentrations in this layer reach up to 378.8 nM and H_2 concentrations up to 16.5 nM. These are the highest values measured during this cruise. (11 samples)

V17B-10 West Mata. Vertical cast over West Mata. Elevated CH_4 concentrations from the seafloor at 1258 m (49.0 nM) and up to 1197 m (32.8 nM). Slightly elevated H_2 concentrations up to 1.9 nM. (7 samples)

V17B-11 East Mata. Vertical cast over East Mata summit. Elevated CH_4 concentration from the seafloor at 1277 m up to 1211 m (around 10 nM). A distinct plume layer at 1225 m with a CH_4 concentration of 98.7 nM. Background H_2 concentrations. (8 samples)

V17B-12 West Mata summit. Vertical cast over what was formerly Hades and is now a pit. Elevated CH_4 concentrations from the seafloor (1238 m) up to 1200 m water depth. Plume maximum at 1214 m with a concentration of 25.0 nM CH_4. (7 samples)

V17B-13 Basin cast. Basin cast west of West Mata. Two distinct hydrothermal plume layers with elevated CH_4 concentrations. The deeper layer had a maximum CH_4 concentration of 6.0 nM at 2503 m water depth. The shallower plume layer had a CH_4 maximum of 8.7 nM at 1145 m water depth. Background H_2 concentrations. (15 samples)

4.3.3 Leg 2 ROV Gas Sampling

The samples for gas analysis were collected in titanium gas-tight bottles with internal volumes of about 150 to 167 ml. ROV SuBastian carried up to 3 gas-tight samplers in the basket in each fluid dive. A total of 24 gas-tight samples were collected during Leg 2 of FK171110. However, sample S99-gas-27-GT17 was lost due to a gas-tight sampler that broke during dive S99 (pulled trigger lead to oil leak) and S85-gas-09-GT6 and S97-gas-14-GT2 were accidently triggered in the basket. Once the samplers were retrieved from the seafloor, they were processed on the seagoing vacuum line and subsampled in 3 cc aluminosilicate ampules for shore-based noble gas analysis and in 35 cc Pyrex ampules for shore-based total gas and isotope analysis. Table 4.3.3-1 summarizes all the gas-tight samples.

S85 – West Mata summit traverse
First dive was conducted at West Mata summit. The background water temperature was 2.9 deg C. We landed on the SW slope of the volcano and did a traverse along the ridge. We took a gas-tight sample in the **SW Hades Pit (S85-gas-06)**. While we were sampling, the second sampler got accidently triggered in the basket by the manipulator arm (**S85-gas-09**). These samples were collected in the area where Hades was active in 2009. Hades is now a large pit with lots of diffuse venting going on. **GT 2** was triggered at **12:42** in the SW of this pit at a depth of 1288 m.

Table 4.3.3-1 Gas-tight samples.

#	Sample ID	GT #	tape color	Vent field/Chimney	Lat deg	Long deg	Depth m	fluid wt. (g)	Vent T deg C	[gas] mmol/kg
1	S85-gas-09-GT6	6	yellow	West Mata, SW Hades Pit, basket trip	-15.0950	-173.7496	1288	169.55	2.9	4.4
2	S85-gas-06-GT2	2	green	West Mata, SW Hades Pit	-15.0950	-173.7496	1288	157.85	17.9	20.9
3	S87-gas-07-GT12	12	yellow-green	West Mata, Hades Pit	-15.0944	-173.7491	1294	164.85	6.9	7.3
4	S87-gas-10-GT6	6	yellow	West Mata, Former Prometheus	-15.0942	-173.7480	1185	163.85	27.6	13.7
5	S87-gas-15-GT2	2	green	West Mata, Shrimpy Canyon	-15.0946	-173.7463	1276	157.60	6.5	12.5
6	S89-gas-04-GT6	6	yellow	Mata Ua, Temple of Smoke, Marker 226	-15.0168	-173.7876	2356	150.60	n/a	123.9
7	S89-gas-13-GT17	17	white	Mata Ua, Marker 274	-15.0173	-173.7881	2350	137.50	n/a	133.0
8	S89-gas-19-GT2	2	green	Mata Ua, Snail Fusion	-15.0177	-173.7885	2360	160.50	n/a	7.2
9	S91-gas-13-GT6	6	yellow	Mata Tolu, Saguaro	-15.0046	-173.7937	1821	145.30	314	58.4
10	S91-gas-18-GT12	12	yellow-green	Mata Tolu, Low Smoker	-15.0046	-173.7939	1823	165.75	260	4.4
11	S94-gas-10-GT6	6	yellow	Mata Tolu, Low Smoker	-15.0046	-173.7939	1823	162.00	230	33.6
12	S94-gas-11-GT2	2	green	Mata Tolu, Snail Alcove	-15.0048	-173.7935	1813	141.95	201	69.2
13	S94-gas-22-GT12	12	yellow-green	Mata Tolu, North, Tall & Handsome	-15.0045	-173.7936	1822	167.75	204	4.9
14	S97-gas-04-GT16	16	orange	Mata Fitu, Old Smokey	-14.9155	-173.7737	2758	17.8	274.5	n/a
15	S97-gas-13-GT6	6	yellow	Mata Fitu, Redwood	-14.9136	-173.7791	2616	167.45	295	37.0
16	S97-gas-14-GT2	2	green	Mata Fitu, Redwood, basket trip	-14.9136	-173.7791	2616	160.4	1.9	4.0
17	S99-gas-27-GT17	17	white	NELSC, N of Tafu, broken bottle, oil leak	n/a	n/a	n/a	n/a	n/a	n/a
18	S100-gas-12-GT16	16	orange	Mata Ua, Lau-Flattop	-15.0167	-173.7869	2335	137.85	327	139.5
19	S100-gas-18-GT6	6	yellow	Mata Ua, Voodoo Child	-15.0168	-173.7870	2340	165.15	322	32.1
20	S100-gas-22-GT2	2	green	Mata Ua, Big Smoke	-15.0168	-173.7860	2318	155.8	323	72.7
21	S101-gas-15-GT12	12	yellow-green	Mata Ono, B3 Beehive, lower orifice	-14.9406	-173.7996	2362	167.45	299	4.4
22	S102-gas-15-GT6	6	yellow	Mata Ono, Rockstar	-14.9405	-173.7994	2354	152.1	238	76.3
23	S102-gas-20-GT16	16	orange	Mata Ono, B3 Beehive	-14.9406	-173.7996	2359	159.2	299	12.7
24	S102-gas-24-GG2	2	green	Mata Ono, B3 Beehive, lower orifice	-14.9406	-173.7996	2362	151.15	299	42.1

S87- West Mata summit
This dive visited the active eruption sites from 2009 (Hades and Prometheus) in the West Mata summit area. Three gas samples were collected: **Old Hades Pit** (S87-gas-07, GT12), **Old Prometheus** (S87-gas-10, GT6), and **Shrimpy Canyon** (S87-gas-15, GT 2). The **Hades Pit** was characterized by the presence of a lot of shrimp, volcanic breccias and lava fragments. Shimmering water and orange and white bacterial mats was observed too. The white mat was hotter (16.9 deg C) than the orange one (10.8 deg C). The diffuse fluid flow rate was higher at the white mat. **GT 12** collected at **00:00** was triggered in a white mat with diffuse flow from below a rock. Tmax = 6.1 deg C. Deployed Marker 224. **Old Prometheus** is a diffuse fluid site where the old Prometheus eruption site was. The maximum temperature measured at this site was 28.4 deg C. Many shrimp at this diffuse site, not much else. **GT 6** was fired at **1:57** at a depth of 1185 in this diffuse vent close to where the temperature was measured. The third gas-tight sample was collected at the **Shrimpy Canyon**. This is an elongated diffuse fluid site with lots of shrimp. The maximum temperature measured was 9.5 deg C. We were moving along the crack with the temperature probe. The temperature was uniform over the whole opening with diffuse flow. **GT 2** was triggered at **3:37** in a tiny mound.

S89 – Mata Ua vent field
Diving from the flank to the summit from North. The vent field is located at the NW flank of Mata Ua. Three gas samples were collected during this dive: **Temple of Smoke** (S89-gas-04, GT 6), **Ua Marker** (S89-gas-13, GT17), and **Snail Fusion** (S89-gas-19, GT2). About 100 chimneys (estimated) were observed at Mata Ua. When approaching the big vent field, huge amounts of barnacles were seen on the rocks. Many chimneys/spires were venting black smoke. A very active vent field with lots of smoke in the water. Visibility was locally reduced by plenty smoke in the water. At one chimney structure Malachite was observed (at 20:08:20). The temperature probe unfortunately did not work during this dive, hence no venting temperatures are available. **Temple of Smoke** is about 10 m high. **GT 6** got fired at **20:34**. Deployment of Marker 226. **Ua Marker** was collected at a very strong venting black smoker chimney between WP6 and WP8 at a water depth 2350 m. Boiling. **GT 17** was fired at **23:06** in the middle of a strong smoking orifice with a diameter of about 10 cm. Marker deployed. **Snail Fusion** was collected in a diffuse venting are characterized by white hairy snails and by black non-hairy ones. The area was packed with snails, anemones and shrimp. **GT2** was fired next to snail fusion in diffuse vent at **00:33**. Marker 250 deployed.

S91 – Mata Tolu summit vent fields
Diving from the West Rift to the summit from North. The vent field is located at the top of the summit. Two chimneys were sampled for vent fluids: **Saguaro (S91-gas-13, GT 6) and Low Smoker (S91-gas-18, GT12)**. **Saguaro** is located towards the Northern end of the vent field. The Northern part of Saguaro had a black smoking orifice and was the strongest smoking chimney in this area. Temperature measurements varied with a Tmax = 314 deg C. The GT sample was taken in the orifice where the highest temperature measurement was taken. **GT 6** was fired at **02:40**. Deployed Marker 277. The second gas sample was collected at **Low Smoker**. It was smoking black smoke and had a Tmax = 260 deg C. It was very difficult to see if the snorkel was placed properly in the orifice. Even the use of the manipulator camera did not provide a better view. The setup of the gas-tight in the chimney took about 30 minutes. **GT 12** was fired at **04:23**, even though we were not sure if the snorkel was in. Turns out that the sample was only slightly about seawater gas concentrations. Repetition of the sample in dive S94.

S94 – Mata Tolu summit vent fields
The dive track covered the Mata Tolu West rift to the summit approaching from the North. The hydrothermal vent field was located at the summit of Mata Tolu. Three chimneys were sampled for vent fluids during dive S94: **Low Smoker (S94-gas-10, GT 6), Snail Alcove (S94-gas-11, GT2) and North, Tall & Handsome (S94-gas-22, GT12)**. **Low Smoker** was already sampled in dive S91, but visibility of the snorkel position was poor during sampling. The final gas content in the sample was only slightly above seawater. When arriving back at the Low Smoker chimney, a freshly grown beehive structure was

observed on the orifice where the sample was taken in dive S91. The grow rate of the beehive was about 40 to 50 cm in the 3 days between the two dives. The base of Low Smoker was covered with hairy white snails, dark not hairy snails, crab, shrimp and an eel was swimming around close to the vent fluid. There were several pink scale worms on the chimney. To sample fluids, the freshly grown beehive was removed. Again, the visibility for GT sampling was low, even though the manipulator camera was used to get a better view. **GT 6** was triggered at **00:09** in the front orifice. The temperature readings were unstable with a Tmax = 230 deg C. Marker 203 deployed. The second GT of this dive was fired at **Snail Alcove**. This chimney was located at the highest point of this summit vent field. Snail Alcove had at least three chimney openings that were smoking. Temperature measurements at one of the orifices venting a clear fluid. The temperature was 201 deg C at the top of the snail covered chimney. The venting was thin, but pretty strong. **GT 2** was fired at **01:06**. Deployed Marker 296 at this site. The last chimney we sampled during this dive was **North, Tall & Handsome**, a tall chimney located at the Northern end of this vent field. Clear fluid was venting from at least 4 different small spires on the chimney. The very top of this chimney with a clear venting fluid was sampled. The maximum measured temperature was 204 deg C. ROV free fly during sampling. The chimney was too high to park the vehicle for sampling. **GT 12** was triggered at **03:44**. When the bottle got triggered, the snorkel moved slightly out of the flow. Hence, the gas content was close to seawater concentrations. Marker 253 deployed.

S97 Mata Fitu from base to summit

This dive started at the base of Mata Fitu with a main focus on the hydrothermal vent fields on Fitu. Three gas samples were taken during S97: **Old Smokey (S97-gas-04, GT16), Redwood (S97-gas-13, GT6) and a Redwood basket trip (S97-gas-14, GT12).**

Shortly after arriving at the seafloor, a new vent field at the SE base of Mata Fitu at about 2765 m was discovered. A very old and solid looking chimney structure was called **Old Smokey**. The chimney had an old and solid base formed of many spires grown together. It was about 8 m high from base to the top. The chimney was venting grey to black smoke from several openings. Scale worms, shrimp, and some orange-color-coated crab were observed on it. The maximum measured temperature was 274.5 deg C. **GT16** was triggered with two arms at **20:36** in the same orifice as the temperature was measured. The trigger did not go very far in. A Marker was deployed at this site. After sampling this active chimney, the ROV was moving along an area with many inactive chimneys still at the base of Mata Fitu. SuBastian then climbed upslope to the known vent field located 2012. There was not much time for exploring in 2012. Many tall chimneys with a height of up to 17 m were located. A a 17 m tall chimney with a uniform diameter over the whole length got named **Redwood**. No flanges, or outlets along the chimney, but very strong black smoke venting from two orifices from the top. Maximum temperature measured was 295 deg C. **GT6** was fired at **01:39**. The snorkel moved out of position when bottle got triggered. **GT2** got accidently **fired in the basket** when trying to pick it up for a repeat sample at Redwood.

S100 Mata Ua NE flank traverse and vent fields

This dive started with a NE flank traverse and arrived at the Mata Ua flank vent fields at around half time. Three gas samples were taken during S100: **Lau-Flattop (S100-gas-12, GT16), Vodoo Child (S100-gas-18, GT6) and Big Smoke (S100-gas-22, GT2).**

Entering the vent field area from the NE. While moving upslope from the NE, a tiny extinct chimney was first encountered. The further upslope SuBastian traveled, the cloudier was the water. Additionally, sulfide chimney debris increased until the ROV reached an area with orange and white staining and sulphide chimney chunks at a depth of 2363 m. When moving further upslope, lots of extinct chimneys were observed at 2354 m depth. At 2242 m many chimneys with barnacles on them were located and actively venting chimneys in the background were seen. This turned out to be a huge vent field at the base of Mata Ua. While moving around in this forest of chimneys to check out the area, a large chimney got accidently knocked over. This provided the perfect orifice to sample fluids venting from the remaining stump. The chimney was called **Lau-Flattop**. It had one orifice with a diameter of about 10 cm and was venting black smoke. It was located at a depth of 2334 m. Highest measured temperature was 327 deg C. **GT 16** was fired at **23:47**. This site got Marker 297. About 20 m away, SuBastian set up for the next

chimney to be sampled. **Vodoo Child** was at a depth of 2340 m. It was a small chimney with intense smoking and a max temperature of 322 deg C. **GT 6** was fired at **01:50**. This site got Marker 229. The last gas-tight sample of this dive was collected at a 14 m tall chimney at a water depth of 2318 m. It had a temperature of 324 deg C and was named **Big Smoke**. **GT 2** was fired at 02:45. The site got Marker 206.

S101 Mata Ono Geo-traverse and vent field search

A new vent field was discovered on the summit of Mata Ono. This is the first vent field located at Mata Ono. The methane/hydrogen ratio measured in the water column in 2010 suggested a high temperature vent field at Ono. The vent field was located at the end of the dive. Not much time was left to explore the vent field. However, three big chimneys were located at the summit of Ono. Two were very tall and the third one was smaller with a lot of white mat on it. One of the tall chimneys was sampled for gas. It was over 12 m high and was venting very strongly from a big beehive that was over 40 cm wide. It was located at a water depth of 2362 m depth and we measured a temperature of 299 deg C. **GT 12** was triggered at 03:59, but turned out to be full of seawater.

S102 Mata Ono Geo-traverse and summit vent fields

This dive was designed to find a deeper located vent field according to the plume found in a CTD tow over Ono in 2010. The Northern flank was searched systematically, but no other vent field was located. So, SuBastian went back to the summit vent field and sample those chimneys again. Three gas samples were collected: **Rock Star (S102-gas-15-GT6), B3 Beehive (S102-gas-20-GT16), and B3 below beehive (S102-gas-24-GT2)**. The first chimney sampled was the one at the very top. It got named **Rock Star**. The chimney was about 15 meters high. The orifices at the top of the chimney were very thin resulted in sampling an orifice about 7 meters above seafloor instead. The maximum temperature measured was 238 deg C. Venting was observed from two a few centimeter wide openings. The front opening had a little easier access and got thus sampled. **GT 6** got fired at **02:01**. The next chimney sampled was the **Bodacious Booming Beehive B3** just next to it. First fluid was collected from the huge beehive (about 40 cm diameter) in a free-fly ROV mode. The sampler was held as close as possible to the venting beehive and then fired. **GT16** was fired at **03:09**. The last sample was taken in the same orifice as the sample collected in dive S101 a few meters below the beehive. **GT 2** was fired at **03:55**.

4.4 CTD and MAPR Water Column Studies

Plume mapping operations: Summary

Sharon Walker

4.4.1 CTD Operations

Water column surveys were conducted during Leg 1 of cruise FK171110 by AUV *Sentry* dives, CTD tow-yos and vertical casts. Additional full water column profiles were collected during the ROV descents/ascents of Leg 2. (See summary map Figure 1-1.)

Table 4.4-1 CTD Operations Leg 1

Cast	Station Name	Lat (deg) -S	Lat (min)-S	Long (deg)-W	Long (min)-W	Start time	End time	bottom depth (m)
1	V17B-01	-15	5.3811	-173	44.2671	10-Nov-2017 08:26	10-Nov-2017 08:55	~1550
2	T17B-01(start)	-15	5.3784	-173	44.3329	11-Nov-2017 16:40		
	T17B-01(end)	-15	6.5005	-173	46.3216		11-Nov-2017 20:58	
3	T17B-02(start)	-15	21.6310	-174	0.6702	13-Nov-2017 00:08		
	T17B-02(end)	-15	23.1388	-174	0.3870		13-Nov-2017 02:43	
4	V17B-02	-15	22.5400	-174	0.1436	13-Nov-2017 05:57	13-Nov-2017 06:49	1252
5	V17B-03	-15	3.9443	-173	42.5823	13-Nov-2017 19:04	13-Nov-2017 21:32	2687
6	V17B-04	-15	4.3070	-173	44.1407	14-Nov-2017 00:03	14-Nov-2017 02:22	2456
7	T17B-03(start)	-15	1.5209	-173	47.0702	14-Nov-2017 05:45		
	T17B-03(end)	-14	59.2044	-173	48.4475		14-Nov-2017 10:49	
8	V17B-05	-15	2.5330	-173	51.2568	14-Nov-2017 23:46	15-Nov-2017 03:23	3070
9	T17B-04(start)	-14	56.1001	-173	46.5133	16-Nov-2017 00:00		
	T17B-04(end)	-14	53.2579	-173	46.8630		16-Nov-2017 06:10	
10	V17B-06	-14	54.8041	-173	46.7490	16-Nov-2017 23:19	17-Nov-2017 02:26	2634
11	V17B-07	-15	0.3013	-173	42.9903	17-Nov-2017 05:43	17-Nov-2017 08:34	2792
12	V17B-08	-15	1.6493	-173	47.2612	18-Nov-2017 03:12	18-Nov-2017 05:22	2485
13	V17B-09	-15	1.0279	-173	47.3012	18-Nov-2017 06:02	18-Nov-2017 08:36	2346
14	V17B-10	-15	5.6330	-173	44.8306	18-Nov-2017 20:06	18-Nov-2017 21:36	1270
15	V17B-11	-15	6.1006	-173	40.6565	18-Nov-2017 23:14	19-Nov-2017 00:44	1287
16	V17B-12	-15	5.6872	-173	44.9561	19-Nov-2017 05:36	19-Nov-2017 07:03	1250
17	V17B-13	-15	7.1819	-173	47.5256	19-Nov-2017 19:41	19-Nov-2017 22:57	2912

A PMEL Miniature Autonomous Plume Recorder (MAPR) mounted on AUV *Sentry* and ROV *SuBastian* measured temperature, pressure, turbidity (optical backscatter) and oxidation-reduction potential (ORP). The turbidity and ORP sensors on the MAPR were identical to those integrated with the CTD (see below). While *Sentry* also has the same turbidity and ORP sensors integrated into its sensor suite, the MAPR provides much better data quality; MAPR sensors are powered independently and isolated from the *Sentry* power system while data from sensors integrated directly into *Sentry* can be subject to unpredictable effects of the *Sentry* power management system that cause additional noise and background drift. The data shown below (for *Sentry* and ROV dives) are from the MAPR sensors.

Deep particle plume layers were widely observed around the flanks and base of West Mata during this expedition, especially towards the northeast. Deep particle layers have, in the past, been associated with active eruptions and have completely lacked chemical indicators of hydrothermal fluids, which has been interpreted as syneruptive generation and remobilization of ash from the summit of these volcanoes downslope via gravity flows (i.e., Kavachi, NW Rota, West Mata, NELSC 2008 eruption, and Monowai). While an active eruption was not observed at West Mata during FK171110 (Leg 2) ROV operations, the presence of these deep particle plumes, the rapid diminishment of the deep plume particle concentrations between Leg 1 and Leg 2, and the presence of a new lava flow (2016-2017) on the northeast rift suggest eruptive activity may have been occurring very recently (possibly on the order of weeks) prior to our expedition. ORP signals did occur within the downslope particle layers over some of the new (2011-2017) lava flows, however the source of these anomalies may be dissociated from that of the particle plumes, instead originating from diffuse venting associated with still-cooling lava on the flanks and around the base of the volcano. It is also possible that some deep particulates are coming from hydrothermal sources on the 2011-2017 lava flows, however the most recent eruptive activity (2016-2017) formed deposits on the south side of the NE rift from near the top of the ridge (1550 m) all the way to the volcano's base (2335 m), and the distribution of the deep plume layers is consistent with downslope turbidity flows initiated by this activity.

The hydrothermal plume from the summit of West Mata was seen throughout the study area in the 1000-1300 m depth range, with a distribution that suggests local currents at this depth were primarily trending towards the southwest.

CTD operations:

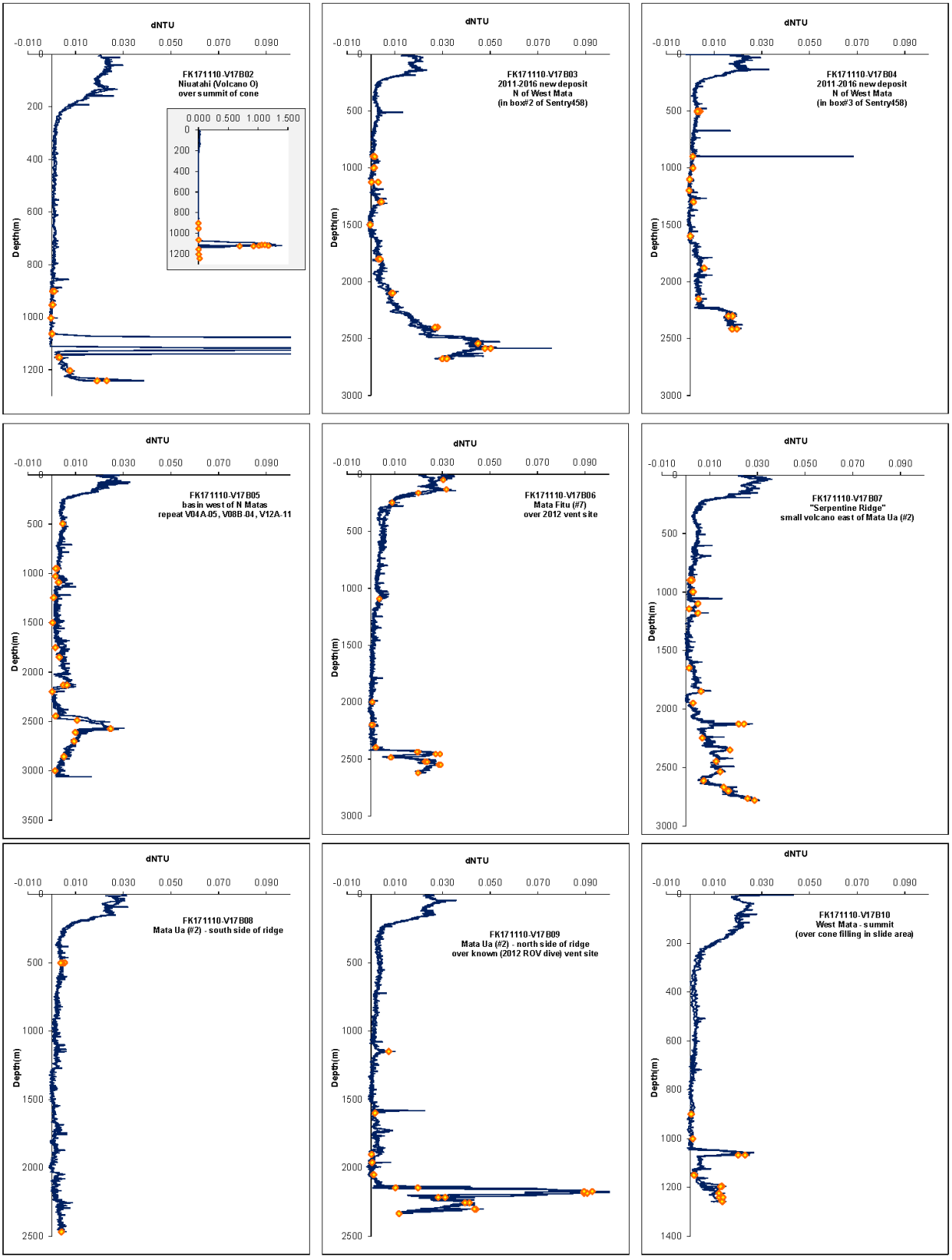
Four (4) CTD tows and thirteen (13) vertical casts were completed during cruise FK171110 (Table 4.4-1) using a Seabird 9*plus* CTD with auxiliary sensors for turbidity (optical backscatter), oxidation-reduction potential (ORP), and altitude above the seafloor. The system included two high sensitivity Seapoint turbidity meters (0-5 NTU), one PMEL ORP sensor (-500 to +500 mv), and one Valeport VA-500 altimeter (0-100 m range).

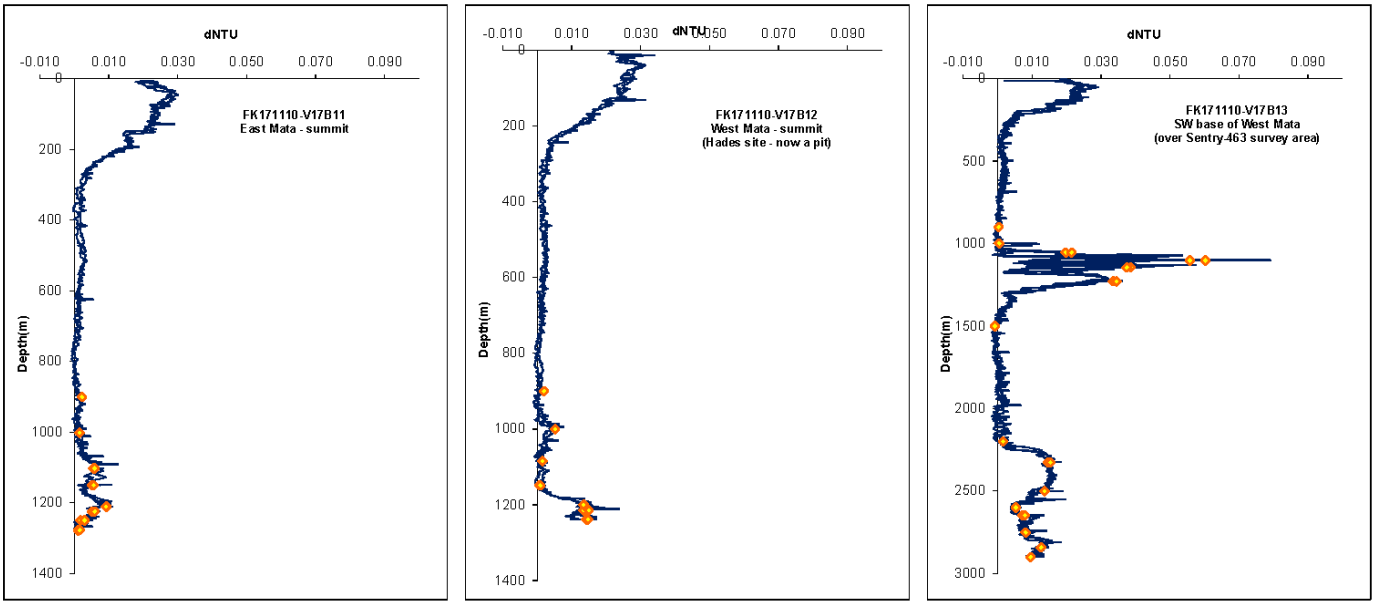
Only one failure occurred during the cruise - the CTD data signal was lost at 272 m during the downcast of V17B-01 (over the summit of West Mata); the cast was aborted. It was determined there was water in the sea cable, the ship's technicians re-terminated it, and everything functioned well after that.

The four CTD tows were completed over the following sites: West Mata, Niuatahi, Mata Ua/ Tolu, and Mata Fitu. Thirteen (13) vertical casts provided detailed vertical profiles and discrete water samples through the plumes at these sites. The rest of the vertical casts were completed over some of the new (2011-2017) flank/base lava flows, at East Mata, at a previously unexplored ridge east of Mata Ua ("Serpentine Ridge"), and in the basin west of the North Matas (at the same location where previous casts V04A-05, V10B-04 and V12A-11 were located). All vertical cast ΔNTU profiles are shown in Figure 4.4-1**.** Table 4.4-2 lists how many samples from tripped bottles were taken.

Figure 4.4.-1 ΔNTU profiles

V17B-01 - aborted
(sea cable required retermination)

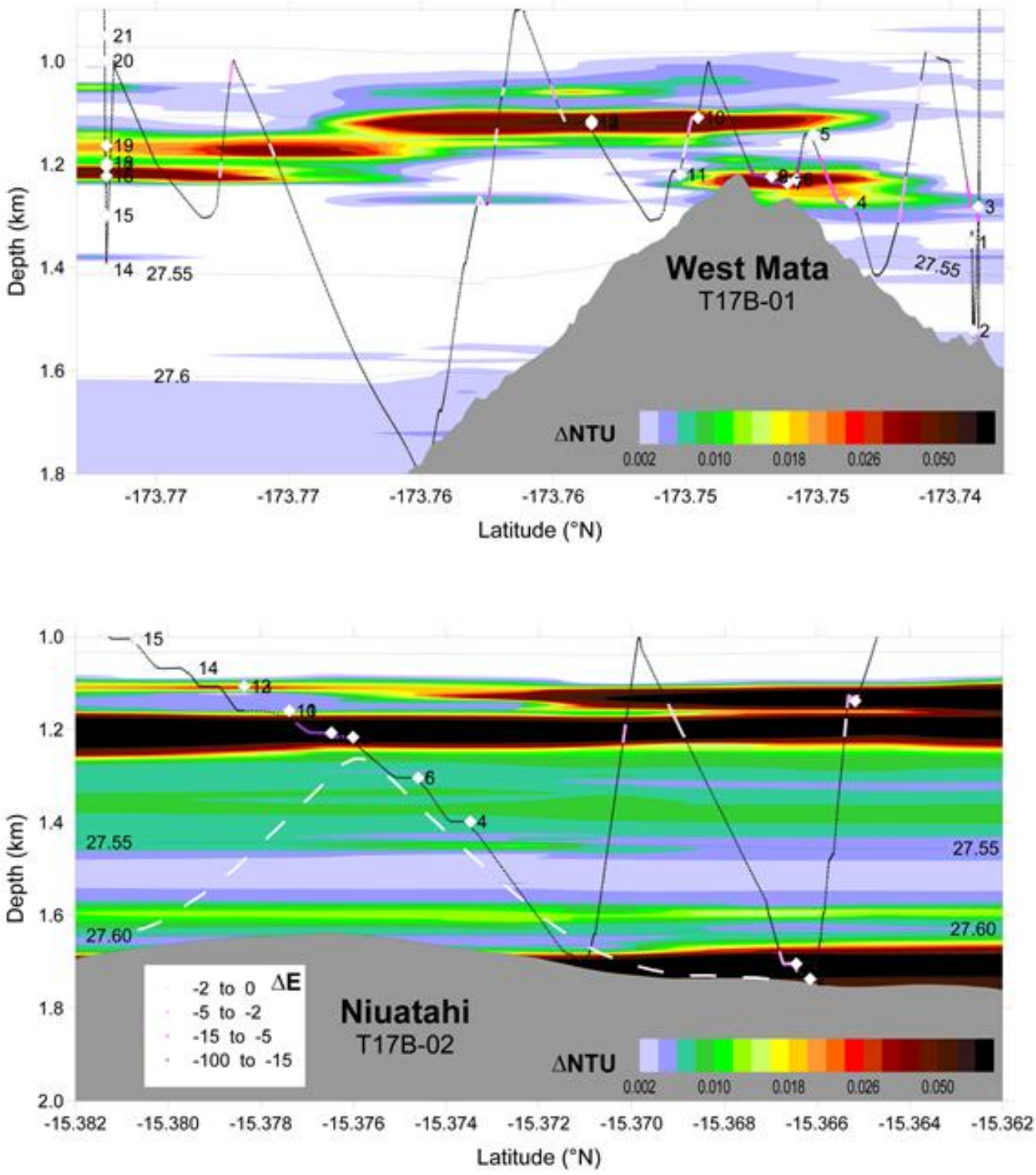




West Mata: West Mata was not observed to be actively erupting during our survey, but hydrothermal activity continues. Plumes over the summit were found in multiple layers between 1000 and 1300 m. Maximum turbidity values were seen during tow T17B-01 (ΔNTU = 0.07 to 0.09) at 1122 m and 1217 m, respectively (Figure 4.4-2). Compared to 2012 when plumes over the summit were centered ~1200-1250 m, the plumes in 2017 had a higher rise height, were more widespread horizontally, with a more intense ORP anomaly, but had lower maximum turbidity anomaly values. Five (5) of the vertical casts were located over the new (2011-2017) deposits on the summit, flanks, and around the base of West Mata. Increased turbidity was widespread around the base of West Mata during this cruise, especially towards the northeast. Only one vertical CTD cast (over “the muffin” flow NE of the West Mata summit) had an ORP anomaly within the deep particle maximum (V17B-03; ΔNTU > 0.07, ΔE ~ -1-3 mv, at depth ~2550 m). This cast was located within box#2 of the *Sentry*-458 survey.

Niuatahi: Tow T17B-02 was located within the caldera of Niuatahi volcano. An incorrect position was inadvertently entered for the endpoint of the tow, so this tow did not cross over the cone as intended and was ended early (Figure 4.4-2). A vertical cast (V17B-02) was located over the cone within the Niuatahi caldera to obtain a vertical profile and water samples through the plume. Maximum values were ΔNTU ~1.4 and ΔE = -182 mv at a depth of 1120 m over the cone.

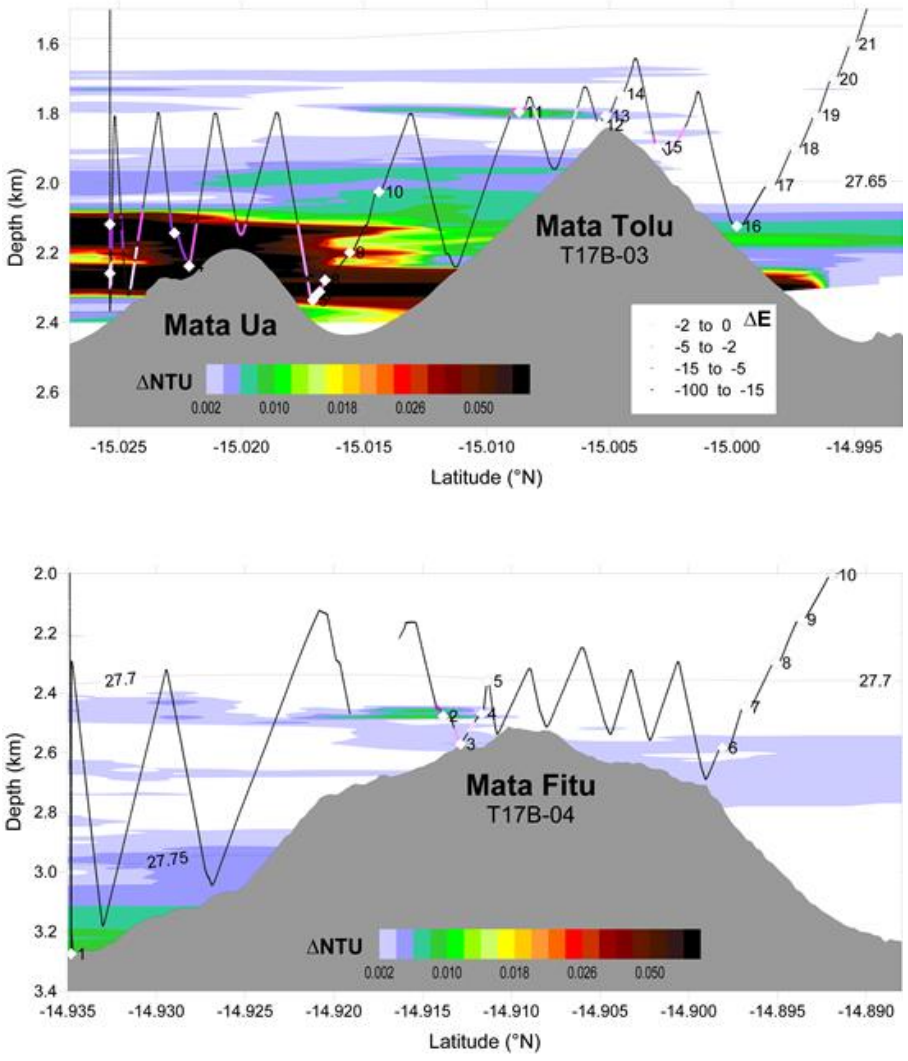
Figure 4.4-2 West Mata and Niuatahi Plumes



Mata Ua/Tolu: Known vent sites on the north side of Mata Ua generate plumes that spread throughout the valley between Mata Ua and Mata Tolu. Tow T17B-03 crossed both Mata Tolu and Mata Ua to the west of each summit (Figure 4.4-3). The plume from the previously-known site at the summit of Mata Tolu was seen at ~1800 m with modest maximum turbidity and ORP anomalies (ΔNTU = 0.016, ΔE ~ -5 mv). The plume from the Mata Ua site was more intense and extensive (maximum ΔNTU~0.2, ΔE ~ -50 mv) with some layering of the plume between depths of 2085-2330 m apparent both north and south of the Mata Ua ridge. Less intense particle enrichment was seen between 2085-1900 m south of Mata Tolu. It is unclear from this data alone if the shallower plume layers originate at Mata Tolu or Mata Ua, or somewhere else. Two vertical casts were placed north and south of Mata Ua close to where the T17B-03 trackline crossed the ridge, which was near the location of the known vent site on the north side. The strongest plume indicators were seen in the cast on the north side (V17B-09) with no compelling evidence of additional nearby sources on the south side of the ridge (V17B-08).

Mata Fitu: One CTD tow crossed Mata Fitu from south to north, passing over the previously-known vent site to the east of the summit. A relatively weak particle anomaly (ΔNTU = 0.029) coincident with an intense ORP signal (ΔE > -100 mv) was present in a thin layer (2420-2475 m) over the known vent site (Figure 4.4-3.)

Figure 4.4.-3 Mata Tolu and Mata Fitu Plumes



Other locations: Vertical CTD casts were also completed at East Mata (V17B-11), “Serpentine Ridge” (V17B-07; an unexplored edifice to the east of Mata Ua), and in the basin west of the North Matas (V17B-05; at the same location as previous casts V04A-05, V10B-04 and V12A-11). Traces of the deep particle layers around West Mata and the ~1100 m plume from the summit of West Mata were seen in each of these casts. The cast at East Mata also had a significant ORP anomaly (ΔE ~ -80 mv through the 1180-1250 m particle layer) indicating hydrothermal venting is still active there.

Table 4.4-2 Bottle samples (CTD tow-yo’s are in green).

Cast	StaName	3He	H2&CH4	pH	DIC	TDMe	DM	XRF	SEM	ligand	Comments
1	V17B-01	no samples									West Mata - over new deposit (+67m) seen during 2017 mapping (cast aborted - lost signal @ 272m; 08:30)
2	T17B-01	19	21	21	6	21	5	5	2		West Mata - tow over summit along ridge starting over new (2016-2017) +67 m deposit (sort of repeated T12A-03)
3	T17B-02	12	13	15	6	11	4	5	3		Niuatahi W->E (Volcano O) start mid-caldera then over cones to E rim (stopped early - ship heading to wrong waypoint)
4	V17B-02	10	10	16	6	8	6	6	1	6	Niuatahi (Volcano O) - over cone
5	V17B-03			10		10	3	3	3		2011-2016 new deposit north of West Mata (during Sentry-458, and within "box2" of this dive)
6	V17B-04	7	11	10		10	2	2	2		2011-2016 new deposit north of West Mata (during Sentry-458, and within "box3" of this dive)
7	T17B-03			21	10	18	6	6	3		Tow S->N across Mata Ua (#2) and Mata Tolu (#3) - over vent sites seen in 2012 ROV dives
8	V17B-05		16	20	3	16	4	4	2		Basin west of N Matas (repeat of V04A-05, V10B-04 and V12A-11)
9	T17B-04	15	16	17	7	15	5	5	2	11	Tow S->N across Mata Fitu (#7) - over vent site seen in 2012 ROV dives
10	V17B-06	10	10	17	7	20	7	7	2	11	over vent site (2012 ROV dive) on Mata Fitu (#7)

Cast	StaName	3He	H2&CH4	pH	DIC	TDMe	DM	XRF	SEM	ligand	Comments
11	V17B-07			18	1	17	4	4	2		"Serpentine Ridge" - small volcano east of Mata Ua (#2)
12	V17B-08	1	1			3	3	3			Mata Ua (#2) - south side of ridge
13	V17B-09			16	6	13	7	7	2	9	Mata Ua (#2) - north side of ridge (over vent site seen in 2012 ROV dive)
14	V17B-10	7	7	12	4	6	6	5	1		West Mata - summit (near cone filling in prior slide area)
15	V17B-11	7	7	14	4	8	6	6	1	8	East Mata - summit
16	V17B-12			12	4	7	4	4			West Mata - summit (over the former Hades site, now a pit)
17	V17B-13			20	8	20	9	9	3	8	West Mata - at base to SW - over Sentry dive 463

4.4.2 MAPR Operations:

A PMEL MAPR was attached to AUV *Sentry* on every dive during Leg 1 (dives 457 through 463), and on most ROV *SuBastian* dives during Leg 2. Turbidity anomaly (ΔNTU) distributions at West Mata, Mata Ua/Tolu and Mata Fitu are shown in Figure 4.4.-1 through **F**igure 4.4-3. Turbidity anomalies were widespread around the base of West Mata, especially towards the northeast. The near-bottom turbidity over “the muffin” site and the “NE pillow ridge” decreased significantly between Leg 1 and Leg 2 (maximum ΔNTU decreased by as much as 0.03-0.04 over the two week interval; Figure 4.4-7), and even though an above-bottom turbidity maximum was still present at ~2425 m on Nov 30, this too was diminished by Dec 05, indicating an episodic source for these plume layers.

Figure 4.4-1 West Mata MAPR turbidity anomalies

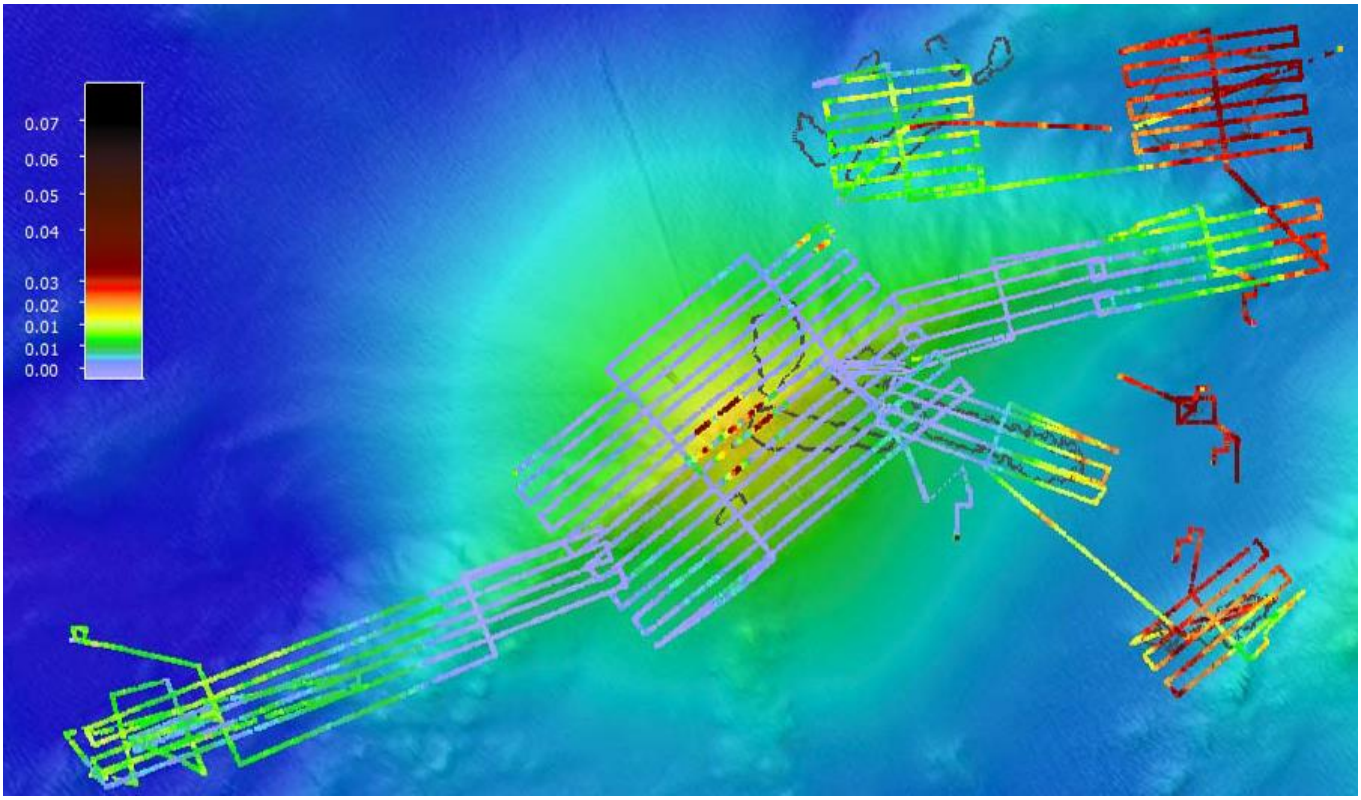


Figure 4.4-2 Mata Ua/Tolu MAPR turbidity anomalies

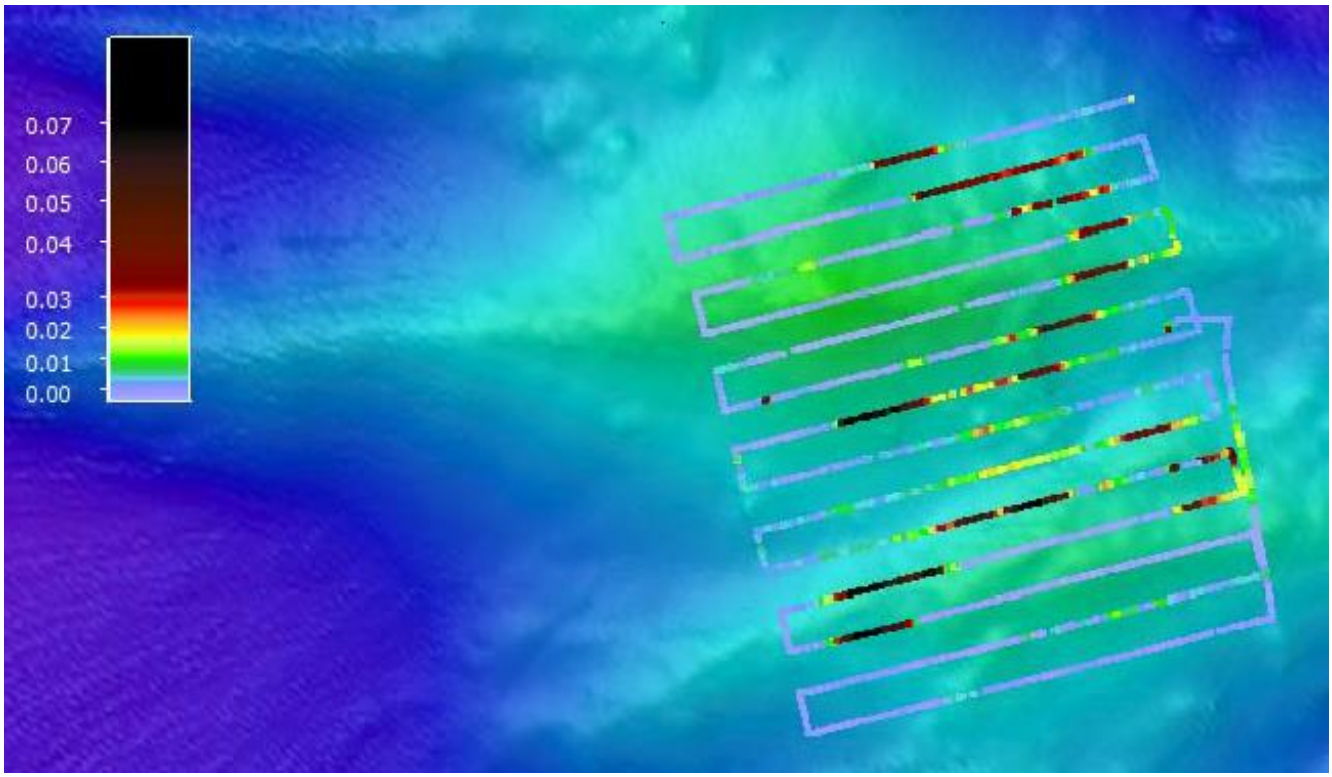
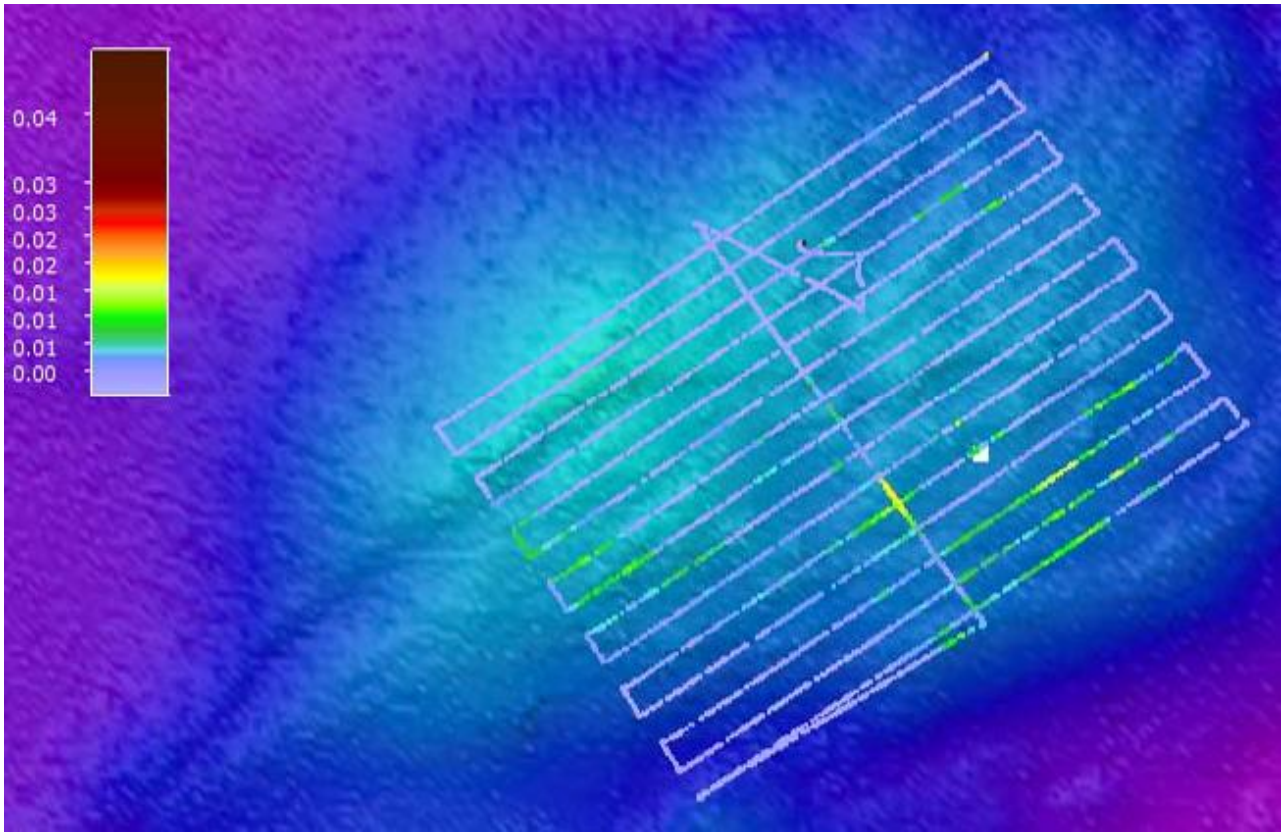
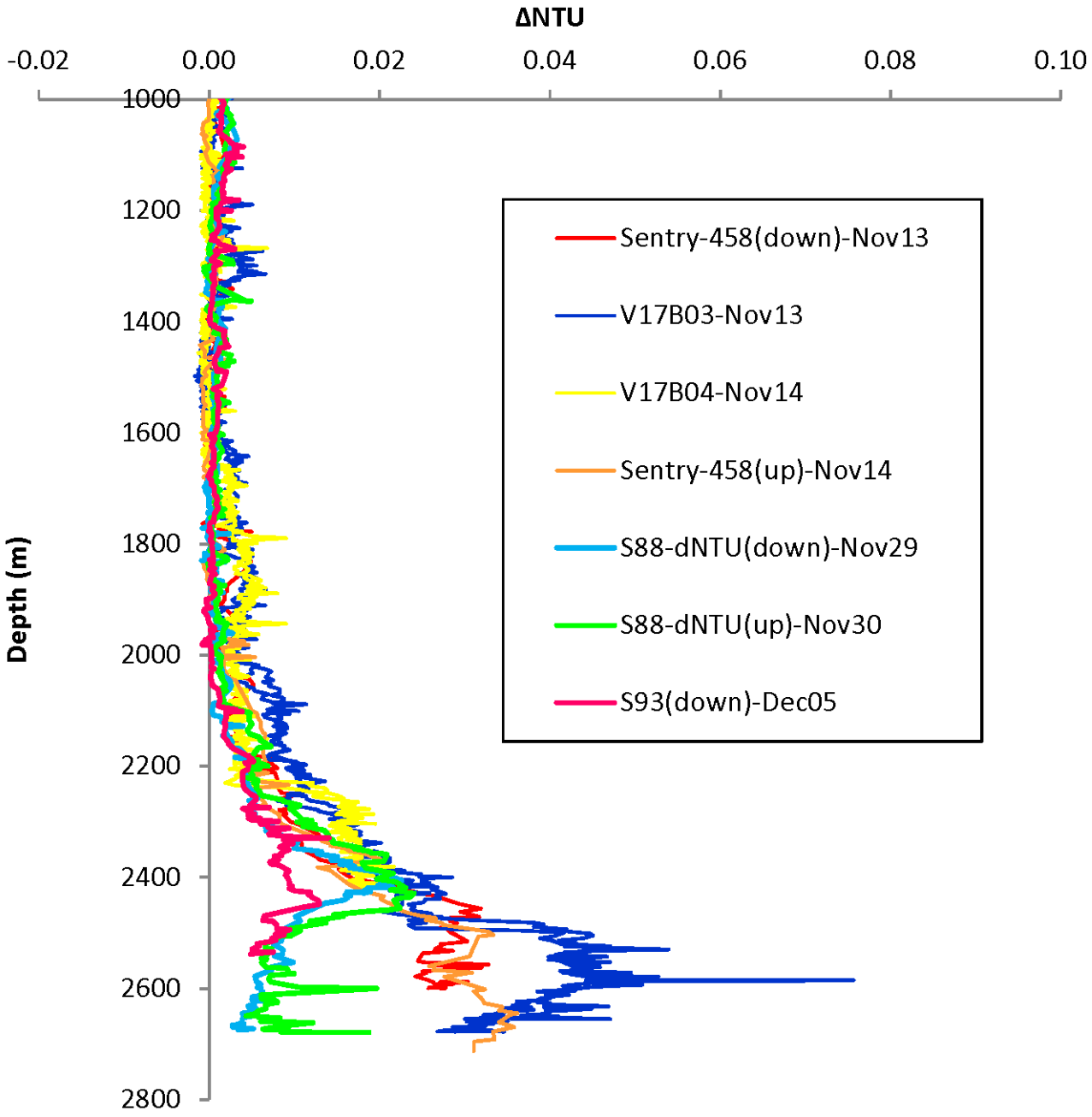


Figure 4.4-3 Mata Fitu MAPR turbidity anomalies



ORP anomalies were most intense over the summit of West Mata, and near the previously-known vent sites at Mata Ua, Mata Tolu and Mata Fitu. In the Mata Ua/Tolu survey, plumes were located within two distinct depth ranges (1825-1900 m and 2100-2300 m), similar to results from CTD tow T17B-03, and consistent with the known vent sites at the summit of Mata Tolu and on the north side of Mata Ua. The horizontal distribution of turbidity and ORP anomalies suggested additional sources, but could well be the result of an intense plume from the Mata Ua vent field being advected around the flanks of Mata Tolu. The turbidity and ORP anomalies during the *Sentry*-461 survey were more widespread and occurred at varying depths, suggesting additional unidentified sources at Mata Fitu.

Figure 4.4-4 ΔNTU Profiles



4.5 Macrobiology: Observations and Sampling during Underwater Fire (FK171110)

Walter Cho and Tim Shank

The overarching macro-biological objectives of the program were to investigate the benthic faunal community composition, distribution, and biogeographic character of the rear arc volcanoes, arc volcanoes and backarc spreading center volcanoes, specifically, the Mata volcanoes. This was undertaken via *in situ* visual observation, biological sampling, and post-cruise comparative analysis. This work follows on from our activities in the region since 2008 via bottom sampling and towed camera surveys (on R/V *Kilo Moana* cruises KM1008, KM1024, KM1129a), plus ROV observation and sampling (on R/V *Thompson* cruise TN234, R/V Roger Revelle cruise RR1211).

The comparative results of ROV SuBastian field observations on FK171110 and post-cruise laboratory studies of the biological samples are seeking **to understand the composition, distribution, diversity, associated geochemical and geological settings and habitats, and in some cases, to understand the temporal changes in biological community structures** taking place on the revisited target volcanoes (e.g., West Mata). As such, our post-cruise analysis will include the coincident relationship of vent fluid chemistry and biological community structure at each study site, and correlations to the geological controls (settings) on hydrothermal activity at these sites.

The biological program was fully integrated into the overall FK171110 program objectives to discover and observe hydrothermal vent sites and to sample fluids, mineral deposits, and biota associated with them. In general, biological observations were made throughout each dive, including transits in and around the vent sites.

A total of 86 numbered biological samples were taken at 7 volcanoes on the FK171110 expedition (see Table 4.5-1). Additional sites included two dacite flows, two sites at the NE and SW base of West Mata, and two sites at Tafu. These collections yielded a total of 1,232 individual specimens collected.

All bio-sample specimens (Table 4.5-2) are curated at the Woods Hole Oceanographic Institution. Each sample has been assigned a unique ID and registered in the Shank laboratory, a sample database managed by Molecular Ecology and Evolution Lab, Biology Department.

There are several preliminary biological findings to date:

- There was an apparent change in the density and location of *Opaepele* sp. and *Alvinocaris* sp. shrimp populations on West Mata relative to when they were last visited in 2012. The sites that previously had high densities of shrimp, such as “Creamsicle” and “Shrimp City” had significantly less or a complete lack of shrimp. In addition, the sites with higher abundance of shrimp were observed on the southern side of the ridge at the peak of West Mata whereas in 2012 the high-density sites were on the northern side of the ridge. In addition, overall density of shrimp appeared to be lower than in 2012.

- The differences in faunal composition among the volcanic seamounts were significant. Striking differences include the apparent abundance of *Vulcanolepas* sp. stalked barnacles at Mata Ua and Mata Fitu, but their notable absence from Mata Tolu, the volcano adjacent to and in-between Mata Ua and Mata Fitu. This may be due to factors related to depth as the hydrothermal vent sites on Mata Ua and Mata Fitu occurred at approximately 2300 m and 2600 m, respectively, while those at Mata Tolu

occurred at a depth of approximately 1800 m.

• Distinct faunal assemblages were observed in correlation with the apparent age and/or intensity of volcanic activity in a particular area. The Mata volcanoes provide a unique perspective as sites relatively close together host such distinct and diverse fauna. Vent-associated organisms dominate in areas of high-temperature and diffuse-flow venting while typical deep-sea fauna can be observed in inactive areas. However, the stark boundaries and close proximity of these identifiable communities are quite striking.

• Ongoing research will be focused on population connectivity studies of the sampled fauna to understand the connectivity and population structure of these communities on both a species and community level. In addition, phylogenetic studies will continue to investigate the evolutionary history of the fauna. We will also continue the temporal analysis of the Mata faunal communities, studying the relationship between the changes in the biological communities with changes in the chemical & geological processes in the area.

• The collection of a total of 1,232 individual organisms yielded 47 species.

Table 4.5-1 Numbered Biological Samples

Site	# of indiv. collected
Mata Fitu	133
Mata Ono	87
Mata Fa	8
Mata Tolu	183
Mata Ua	445
Mata Taha	14
West Mata	344
NE Base of West Mata	1
SW Base of West Mata	3
Northern Dacite Flow	2
Southern Dacite Flow	2
North Tafu	8
South Tafu	2

Site Specific (Preliminary) Observations, by Dive Number

Dive S85 – West Mata (Figure 6.4-1). The ROV landed in an area with typical non-vent, deep-sea fauna, including *Anthomastus* sp. corals, some whip corals, and anemones. We transited to an area of diffuse flow and collected nearby *Opaepele* sp. shrimp. We moved on to a ridge and saw larger aggregations of shrimp, dominated by *Opaepele* sp. shrimp but with some *Alvinocaris* sp. as well. Additionally, we observed some zoarcid fish, large polynoids, squat lobsters (possibly *Munidposis lauensis*), and brachyuran crabs. We observed large aggregations of shrimp at the peak, with fewer observed in a nearby pit. Collections included a total of 248 individuals: *Alvinocaris* sp. (2), Brachyuran crab (1), *Munidopsis lauensis* (4), *Opaepele* sp. (238), Polynoid (3).

Dive S86 – West Mata (Figure 6.4-2). This was a geology focused dive. We observed depressions filled with yellow sediment and a mixture of pteropod shells and possibly pieces of exoskeletons of crustaceans (called "spicules" in the event log). No diffuse flow or biological sample collections were taken during this dive. Towards the end of the dive, we entered an area with "older", inactive features and observed a more typical deep-sea fauna including yellow anemones, hydroids, bamboo and *chrysogorgia*-like corals along with invertebrate associates. We collected a chrysogorgid coral with 2 chirosytlid crab associates. Collections included a total of 13 individuals: Amphipod (2), Bamboo coral (1), Chirostylid crabs associated with a *Chrysogorgia* sp. coral (2), *Chrysogorgia* sp. (1), Hydroid (1), Polynoid (1), stalked sponges (3), yellow anemone (1).

Dive S87 – West Mata (Figure 6.4-3). The dive started in an area with hard substrate with multiple *Paragorgia* sp., bamboo corals, and *Anthomastus* sp. corals observed. Many of the *Paragorgia* sp. corals had a single ophiuroid (brittle star) associate on them (1 associate per colony). We collected a *Paragorgia* sp. coral with its ophiuroid associate. Additionally, we observed anemones, crinoids, and brisingid sea stars. We then transited over a sedimented area to get to the summit. Within this area we observed a few rocky outcrops with *Anthomastus* sp. corals. As we got closer to the summit, we observed more shrimp with some Alvinocarids and a few zoarcids. We then moved on to an area with more *Opaepele* sp., but there was no visible diffuse flow. We ended the dive on the north side of the summit where old "Shrimp City" and "Creamsicle" sites were. There were very few shrimp and less diffuse flow. We observed an increase in both as we neared the "Creamsicle" site and then came around to the south side of ridge where we saw more shrimp as in S085. We then moved the ROV off bottom to quickly transit to and explore a feature off to the south and in deeper water. We found a diffuse flow site named "Shrimp Canyon" and took paired major, gas tight, and biological slurp sample. Collections included a total of 53 individuals: *Asteroschema* sp. ophiuroid associated with *Paragorgia* sp. coral (1), Gastropod (5), *Opaepele* sp. shrimp (40), *Paragorgia* sp. (1), Polychaete (3), Polynoid (2), Zoarcid (1).

Dive S88 – NE base of West Mata, "Muffin" feature (Figure 6.4-4). This dive explored the "muffin" feature at the NE base of West Mata, at a depth of ~2600 m. The ROV came down in a sedimented area and then moved on to a rocky outcrop. We observed a few whip-like soft corals and a possible rattail fish. Not a lot of fauna was observed. Faunal observations included a sponge and an anemone on the edge of West Mata and about 3 clumps of algae/kelp wrack on the seafloor. A single ophiuroid brittle star was observed on the sediment. Most of the exposed substrate seemed to be bare of any sessile fauna. Collections included a single individual: Hydroid (1).

Dive S89 – Mata Ua (Figure 6.4-5). The dive explored a new hydrothermal vent site with large areas covered with *Vulcanolepas* sp. stalked barnacles. In areas on the periphery of active hydrothermal vent sites, galatheids and a large whelk that looked similar to ones seen in the Marianas was observed. We moved through a large active vent site, and observed galatheid squat lobsters, polynoids some paralvinellid worms, saw a few *Ifremeria nautilei* snails at the hydrothermal vents and potentially a new species of fuzzy crab. We then continued on to a site visited previously and took coordinated chemistry

and biology samples. This site appears to be a smaller vent field than the first one visited during this dive. We then moved on to a site with diffuse flow which had a patch of *Ifremeria nautilei* snails and *Alviniconcha* sp. snails where we took additional coordinated chemistry and biology samples. The last part of the dive was spent exploring the geology, moving to a dike feature where we observed more abundant stalked barnacles. Collections included a total of 324 individuals: *Alviniconcha* sp. (6), Vulcanolepas sp. barnacle (8), *Bathymodiolus brevior* mussel (1)*, Eochionelasmus* sp. barnacle (7), Gastropod (4), *Ifremeria nautilei* snail (22), Limpet sp. 1 (10), Limpet sp. 2 (97), mixed polychaetes (15), *Opaepele* sp. shrimp (15), *Paralvinella* sp. worm (1), Polychaete (18), polychaetes and limpets (30), Polynoid (2), Polynoid Large (2), Polynoid Small (2), stalked barnacle (3), unknown part of crab? (1), *Vulcanolepas* sp. (80).

Dive S90 – Mata Fitu (Figure 6.4-6)*.* This dive was an exploratory dive that conducted a geology transect. Most of the dive focused on geological observations and collections. We observed non-vent deep-sea organisms, including several Isidids (bamboo coral colonies – both single whip and multi-branching colonies). In the early part of the dive, we saw branching Isidids, then toward the latter half of the dive we entered an area with *Lepidisis*-like bamboo corals and whip corals. We collected a small whip coral on a rock. Around Waypoints 7 and 8 we started observing several dead colony stalks. We also observed a single *Iridogorgia* colony, but without any invertebrate associate. Additional biological observations included multiple pinkish holothurians, a few green sea urchins, and non-vent shrimp. Collections included a total of 3 individuals: Sponge (1), Whip coral (2).

Dive S91 – Mata Tolu (Figure 6.4-7)*.* The ROV landed in a region with a few whip, bamboo corals present. During the transit over hard substrate we observed a few holothurians, yellow-green sea urchins, *Lepidisis*-like bamboo corals and a few chrysogorgids. Additionally, we observed a stalked coral with 3 branches at the top, which may be a black coral. We observed possible hydrothermal sedimentation at ~2006m and then entered an active venting area that was visited before. We surveyed the whole area, visiting multiple chimney sites with varying amounts of flow. The vent communities were dominated by snails, primarily *Ifremeria nautilei*, but some *Alviniconcha* sp. also seem to be present. *Opaepele* sp. shrimp and possibly *Alvinocaris* sp. shrimp seemed to be present along with galatheid squat lobsters and brachyuran crabs. *Paralomis* sp. (?) crabs were also present. At the hydrothermal vent chimneys we observed paralvinellid worms on the active chimneys in white bacterial mats and the vent snails appeared more at the base of the chimneys or on surrounding, inactive chimneys. It is interesting to note the differences in the fauna at Mata Tolu versus the fauna at Mata Ua, which is geographically close. There was a complete lack of stalked barnacles at Mata Tolu, while Mata Ua had dense aggregations of them. Additionally, the *Bathymodiolus* sp. mussels at Mata Tolu occurred along the periphery of the vent field at Mata in small clumps and appeared to be smaller and darker than the Mata Ua mussels that occurred singly. Collections included a total of 41 individuals: Barnacle (1), Brachyuran crab (4), Coral (1), Gastropod (1), *Ifremeria nautilei* (7), Limpet sp. 1 (7), Limpet sp. 2 (3), *Opaepele* sp. shrimp (1), Polychaetes (5), Polynoid Large (2), Polynoid Medium (1), Polynoid Small (8).

Dive S092 – Large Dacite flows (Figure 6.4-8)*.* This dive was focused on exploring large dacite glows. The bottom was heavily sedimented. We observed occasional bamboo corals, sponges on exposed hard substrate, occasional holothurians scattered along bottom, a few grenadier fish, and a few ophiuroid brittle stars on the sediment, which were large and had distinct spines on the arms. We also observed a squidworm, *Teuthidodrilus* sp. Collections included a total of 2 individuals: ophiuroid (1), whip coral (1).

Dive S093 – Lava flows along West Mata (Figure 6.4-9)*.* The dive started at a deeper feature and then ran over a sedimented area with distinct ripples. The fauna in this area was dominated by tubed worms or possibly tubed anemones. There also appeared to be stalked carnivorous sponges which appeared to be

bent by the current. As the ROV moved into a lumpier sedimented area, we occasionally observed *Chrysogorgia* and bamboo corals, stalked crinoids, and non-stalked crinoids. There were no biological collections made during this dive.

Dive S094 – Mata Tolu (Figure 6.4-10). The dive started on a broken-up lava field. We observed a few bamboo corals (*Lepidisis*-like), yellow-green sea urchins, and holothurians (*Stichypus*-like?). After we transited over the top of the feature, we entered a more sedimented area with orange (possibly iron?) staining. We observed glass sponges and multiple *Chrysogorgia* corals with galatheid squat lobster associates. As we entered a new area with more mounds and rubble, we observed a *Chrysogorgia* coral that was fan-shaped. We saw less corals in this area, a few bamboo skeletons, sea urchins, and a deep-sea red shrimp. Collections included a total of 142 individuals: *Alviniconcha* sp. snail (4), *Alvinocaris* sp. shrimp(1), Barnacle (5) *Bathymodiolus brevior* mussel (4), Brachyuran crab (1), Gastropod (1), *Ifremeria nautilei* snail (9), Limpet sp. 1 (6), Limpet sp. 2 (31), *Nautilocaris* sp. shrimp (1), *Opaepele* sp. shrimp (67), Polynoid (11), Polynoid Large (1).

Dive S095 – SW Base of West Mata (Figure 6.4-11). This was a geology-focused dive and we did not observe much biology. We saw, a few anemones, a crinoid, a stalked crinoid, two swimming holothurians, and a coral on a rock near the rippled sediment. Collections included a total of 3 individuals: pennatulid sea pen (1), stalked sponge (1), worm in a tube (1).

Dive S096 – Mata Fa (Figure 6.4-12). This was an exploration dive. The ROV came down on a rocky area where there was not much biology to note. There was an anemone on loose rocks. As the dive progressed and we approached the middle mound area we began to observe more branching bamboo corals, like *Keratoisis* sp. coral, a small *Iridigorgia* sp. coral, and some single stalked bamboo corals (*Lepidisis* sp.). Additionally, we observed holothurians and sea urchins. We also observed a sea star eating a branched bamboo coral. We collected a bamboo skeleton with ophiuroid brittle stars on it. The tops of the summits seem to be sedimented area with corals growing on them. *Ophiomusium*-like brittle stars were observed on the sedimented areas. Near the end of dive we saw off impressions in a thin layer of sediment on a hard rock. The layer had a distinct pattern of impressions, similar to *Paleodictyon nodosum*. Collections included a total of 8 individuals: bamboo coral skeleton (1), Chirostylid crab (1), *Chrysogorgia* sp. coral (1), Hydroid (2), *Ophiomusium* brittle star (1), *Ophioplinthaca* sp. brittle star (2).

Dive S097 – Mata Fitu (Figure 6.4-13). This dive started with a geology transect before returning to a hydrothermal vent site visited in 2012. We came upon an active hydrothermal chimney at a greater depth than expected in an area with inactive chimneys. We observed bacterial mats, some shrimps, polynoids, brachyuran crabs (some were coated and covered and appeared dark and black), and a few galatheid squat lobsters. These vent-associated fauna were observed very near an area with brisingid sea stars. We then transited to a sedimented area with ophiuroid brittle stars, some whip corals, hydroids, and xenophyophores. We continued to move through an area of extinct chimneys. There were no observations of living organisms except for a single brisingid sea star, which was usually located on the highest chimney. We continued on to the largerhydrothermal vent field visited in 2012 and surveyed the area. The black smokers were very tall with many of them not having a wide base at the bottom. We observed small clusters of *Opaepele* sp. shrimp, clumps of *Vulcanolepas* sp. barnacles along the edges of chimneys, a few *Ifremeria nautilei* snails (some of which very close to chimney tops), large polynoids, and brachyuran crabs. We also observed holothurians, similar to *Chiridota hydrothermica*, vent-associated holothurians previously described at Manus Basin, North Fiji Basin, and the South East Pacific Rise. Collections included a total of 130 individuals: Gastropod (6), Hydroid (2), *Ifremeria nautilei* snail (2),

Opaepele sp. shrimp (17), Polychaete (1), Polynoid (2), Polynoid Small (1), stalked barnacle (1), *Vulcanolepas* sp. stalked barnacle (98).

Dive S098 – NELSC (Northeast Lau Spreading Center) South Tafu (Figure 6.4-14). The ROV came down into a sedimented area. Faunal observations were rare, but we did see a deep-sea red shrimp and a grenadier. We also observed swimming polychaetes throughout the dive. We observed a sedimented area with rocks and passed an area of a lot of yellow flocculent material. We did see cloudy water at different points along the top of the ridge, as well as possible vent-related shrimp (possibly *Nautilocaris* sp.), galatheid squat lobsters, and eel-pout fish. However, there was no visible shimmering water or any large bacterial mats. We slurped a few of the shrimp. Collections included a total of 2 individuals: *Nautilocaris* sp. shrimp (2).

Dive S099 - North Tafu (Figure 6.4-15). The ROV entered a hard substrate area with bamboo corals (branched and unbranched forms), anemones, grenadier fish, and galatheid squat lobsters. We observed small areas with shimmering water with bacterial mats, polynoids, galatheid squat lobsters, possibly *Alvinocaris* sp. shrimp with nodules on them (possibly parasites?), and whelks. The ROV also came to the top of a feature and saw a lot of orange staining, seeming to indicate that it was dominated by iron. We also observed a lot of shimmering water, but no fauna. Collections included a total of 8 individuals: *Alvinocaris* sp. shrimp (2), Bivalve (1), Chirostylid crab (1), *Chrysogorgia* sp. coral (1) *Munidopsis lauensis* squat lobster (1), Polynoid (1), Whelk (1).

Dive S100 – Mata Ua (Figure 6.4-16). Biological observations during this dive include a few sea urchins and cusk eels as we were entering a new hydrothermal vent field. The hydrothermal vent areas were dominated by stalked barnacles on inactive chimneys that were located near active chimneys. Active chimneys had *Alviniconcha sp.* shrimp, *Ifremeria nautilei* snails, some individual large mussels (probably *Bathymodiolus brevior*), some *Opaepele* sp. shrimp, brachyuran crabs, galatheid squat lobsters, large polynoids, and paralvinellid worms. Collections included a total of 121 individuals: *Alviniconcha* sp. shrimp (5), *Bathymodiolus brevior* mussel (1), *Eochionelasmus* sp. barnacle (6), Gastropod (1), *Ifremeria nautilei* snail (2), Limpet sp. 2 (8), *Opaepele* sp. shrimp (11), *Paralvinella* sp. worm (4), polychaetes (2), polynoid Large (6), polynoid Small (2), *Vulcanolepas* sp. stalked barnacle (73).

Dive S101 – Mata Ono (Figure 6.4-17). The ROV came down on a sedimented area over cooled lavas. The biological observations appeared to mainly be typical non-vent deep-sea fauna. We made several observations of the bony-eared assfish (*Acanthonus armatus*), a large *Chrysogorgia* sp. coral with a galatheid squat lobster associates and multiple individuals of platyctenida (benthic ctenophores). We also observed an echiuran on a rock, a large anemone, scattered holothurians. We came upon an area with diffuse flow dominated by anemones. We also observed a lot of cusk eels gathering in this area. We entered an active venting site at the summit of Mata Ono with high temperature vents dominated by snails. We observed both *Ifremeria nautilei* and *Alviniconcha* sp. snails as well as polynoids, brachyuran crabs, some galatheid squat lobsters and some shrimp (probably *Opaepele* sp.). Collections included a total of 25 individuals: Brachyuran crab (1), Hydroid (1), *Ifremeria nautilei* snail (6), Limpet sp. 1 (3), *Opaepele* sp. shrimp (1), polynoid worm (13).

Dive S102 – Mata Ono (Figure 6.4-18). This dive was focused on exploring Mata Ono in an attempt to identify more hydrothermal vent sites. There were not many more high temperature sites observed. The *Opaepele* sp. shrimp were less apparent and appeared to stay within snail clusters. We collected both *Alviniconcha* sp. and *Ifremeria nautilei* sp. snails. Collections included a total of 62 individuals: *Alviniconcha* sp. snail (3), Anemone (3), Brachyuran crab (1), Hydroid (2), *Ifremeria nautilei* snail (7), Limpet (14), Limpet sp. 1 (6), Limpet sp. 1? (5), Limpet sp. 2 (7), *Opaepele* sp. shrimp (11), Polynoid Large (2).

Dive S103 – West Mata, Upper East Rift (Figure 6.4-19). The ROV landed in a sedimented area with old lava flows. We observed bamboo corals, anemones, cusk eels, and deep-sea shrimp. We also observed small *Chrysogorgia* sp. corals. As we neared the summit we entered areas with vent fauna including galatheid squat lobsters, brachyuran crabs, and shrimp. There appeared to be multiple species of shrimp including *Opaepele* sp. and *Alvinocaris* sp., and potentially a few different kinds as well. It seemed that some areas had more *Alvinocaris* sp. than before. However, there was no real apparent diffuse flow, except when we got closer to the summit. As we did so, the shrimp increased in density and we began observing shimmering water around cracked lava flows, but no concentrated flows. Collections included a total of 30 individuals: *Alvinocaris* sp. shrimp (1), Bacteria sac? (2), Gastropod (1), *Opaepele* sp. shrimp (13), Polynoid Large (1), Polynoid Small (12).

Dive S104 – Mata Taha (Figure 6.4-20). When the ROV first landed we observed ophiuroid brittle stars on sediment. We observed old hydrothermal vent chimney structures that had a mix of branching bamboo corals, *Chrysogorgia* sp. corals with galatheid squat lobster associates, and possibly *Stichopathes* sp. whip corals. Collections included a total of 14 individuals: Amphipod (1), Barnacle (1), Chirostylid crab (1), *Chrysogorgia* sp. coral (1), Coral (1), Hydroid (4), Polychelida crustacean (1), Sponge 1 (1), Sponge 2 (3).

Dive S105 – Northern Dacite (Figure 6.4-21). This dive was focused on exploring a deep dacite flow near the Mata volcanoes. The biological observations were of non-vent fauna and included brittle stars, burrows, and stalked corals. Many typical deep-sea fauna were observed on a field of blocky talus including crinoids, *Chrysogorgia* sp. corals, branching bamboo corals, and whip corals. Some corals were observed with associates, such as ophiuroid brittle stars on a branching corals and galatheid squat lobsters. Sponges were observed on pillow structures as well as additional corals growing on broken pillow debris including *Chrysogorgia* sp. and whip corals. Additional biological observations included large sponges, holothurians, rattail fish, glass sponges and another observation of the fossil pattern of *Paleodictyon nodosum*, similar to what was observed on Dive S096 at Mata Fa. The pattern occurred on a very thin layer of sediment. We next entered an area of sediment-talus contact and observed some stalked corals and sponges including more *Chrysogorgia* sp. corals. We also observed more holothurians, hydroids, brisingid sea stars, stalked crinoids and a few sea urchins. We then moved into a relatively flat area with bigger blocks and observed brisingid sea stars, corals, sponges, crinoids, shrimp, and a few sea urchins. The area appeared to be dominated by relatively old lava as we observed relatively larger corals here than in earlier parts of the dive. Collections included a total of 2 individuals: Chirostylid crab (1), *Pseudochrysogorgia* sp. coral (1).

Table 4.5-2 Macrobiological Samples

ID	Site	Date	Time	Dive	Sample ID	Station	Latitude	Longitude	Depth	Specimen ID	n	Shipboard ID	Preservation	Common ID
1	West Mata	11/26/2017	23:08:00	S085	S85-bio-08	SW Hades Pit	-15.09497	-173.74956	1284.4	S085-bio08-SHR1	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
2	West Mata	11/26/2017	23:08:00	S085	S85-bio-08	SW Hades Pit	-15.09497	-173.74956	1284.4	S085-bio08-SHR2	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
3	West Mata	11/26/2017	23:08:00	S085	S85-bio-08	SW Hades Pit	-15.09497	-173.74956	1284.4	S085-bio08-SHR3	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
4	West Mata	11/26/2017	23:08:00	S085	S85-bio-08	SW Hades Pit	-15.09497	-173.74956	1284.4	S085-bio08-SHR4	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
5	West Mata	11/26/2017	23:08:00	S085	S85-bio-08	SW Hades Pit	-15.09497	-173.74956	1284.4	S085-bio08-SHR5	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
6	West Mata	11/26/2017	23:08:00	S085	S85-bio-08	SW Hades Pit	-15.09497	-173.74956	1284.4	S085-bio08-SHR6	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
7	West Mata	11/26/2017	23:08:00	S085	S85-bio-08	SW Hades Pit	-15.09497	-173.74956	1284.4	S085-bio08-SHR7	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
8	West Mata	11/26/2017	23:08:00	S085	S85-bio-08	SW Hades Pit	-15.09497	-173.74956	1284.4	S085-bio08-SHR8	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
9	West Mata	11/26/2017	23:08:00	S085	S85-bio-08	SW Hades Pit	-15.09497	-173.74956	1284.4	S085-bio08-SHR9	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
10	West Mata	11/26/2017	23:08:00	S085	S85-bio-08	SW Hades Pit	-15.09497	-173.74956	1284.4	S085-bio08-SHR10	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
11	West Mata	11/26/2017	23:08:00	S085	S85-bio-08	SW Hades Pit	-15.09497	-173.74956	1284.4	S085-bio08-SHR11-30	20	Opaepele shrimp	Frozen (bulk)	Shrimp
12	West Mata	11/26/2017	23:08:00	S085	S85-bio-08	SW Hades Pit	-15.09497	-173.74956	1284.4	S085-bio08-SHR31-50	20	Opaepele shrimp	Frozen (bulk)	Shrimp
13	West Mata	11/26/2017	23:08:00	S085	S85-bio-08	SW Hades Pit	-15.09497	-173.74956	1284.4	S085-bio08-SHR51	105	Opaepele shrimp	Frozen (bulk)	Shrimp
14	West Mata	11/27/2017	0:35:03	S085	S85-bio-11	10m NE of Marker 139	-15.09434	-173.74829	1189.1	S085-bio11-SHR1	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
15	West Mata	11/27/2017	0:35:03	S085	S85-bio-11	10m NE of Marker 139	-15.09434	-173.74829	1189.1	S085-bio11-SHR2	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
16	West Mata	11/27/2017	0:35:03	S085	S85-bio-11	10m NE of Marker 139	-15.09434	-173.74829	1189.1	S085-bio11-SHR3	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
17	West Mata	11/27/2017	0:35:03	S085	S85-bio-11	10m NE of Marker 139	-15.09434	-173.74829	1189.1	S085-bio11-SHR4	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
18	West Mata	11/27/2017	0:35:03	S085	S85-bio-11	10m NE of Marker 139	-15.09434	-173.74829	1189.1	S085-bio11-SHR5	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
19	West Mata	11/27/2017	0:35:03	S085	S85-bio-11	10m NE of Marker 139	-15.09434	-173.74829	1189.1	S085-bio11-SHR6	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
20	West Mata	11/27/2017	0:35:03	S085	S85-bio-11	10m NE of Marker 139	-15.09434	-173.74829	1189.1	S085-bio11-SHR7	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
21	West Mata	11/27/2017	0:35:03	S085	S85-bio-11	10m NE of Marker 139	-15.09434	-173.74829	1189.1	S085-bio11-SHR8	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
22	West Mata	11/27/2017	0:35:03	S085	S85-bio-11	10m NE of Marker 139	-15.09434	-173.74829	1189.1	S085-bio11-SHR9	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp

ID	Site	Date	Time	Dive	Sample ID	Station	Latitude	Longitude	Depth	Specimen ID	n	Shipboard ID	Preservation	Common ID
23	West Mata	11/27/2017	0:35:03	S085	S85-bio-11	10m NE of Marker 139	-15.09434	-173.74829	1189.1	S085-bio11-SHR10	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
24	West Mata	11/27/2017	0:35:03	S085	S85-bio-11	10m NE of Marker 139	-15.09434	-173.74829	1189.1	S085-bio11-SHR11-30	20	Opaepele shrimp	Frozen (bulk)	Shrimp
25	West Mata	11/27/2017	0:35:03	S085	S85-bio-11	10m NE of Marker 139	-15.09434	-173.74829	1189.1	S085-bio11-SHR31-50	20	Opaepele shrimp	Frozen (bulk)	Shrimp
26	West Mata	11/27/2017	0:35:03	S085	S85-bio-11	10m NE of Marker 139	-15.09434	-173.74829	1189.1	S085-bio11-SHR51-75	25	Opaepele shrimp	Frozen (bulk)	Shrimp
27	West Mata	11/27/2017	1:27:00	S085	S85-bio-13	East edge of summit ridge	-15.09396	-173.74766	1189.9	S085-bio13-SHR1	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
28	West Mata	11/27/2017	1:27:00	S085	S85-bio-13	East edge of summit ridge	-15.09396	-173.74766	1189.9	S085-bio13-SHR2	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
29	West Mata	11/27/2017	1:27:00	S085	S85-bio-13	East edge of summit ridge	-15.09396	-173.74766	1189.9	S085-bio13-SHR3	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
30	West Mata	11/27/2017	1:27:00	S085	S85-bio-13	East edge of summit ridge	-15.09396	-173.74766	1189.9	S085-bio13-GAL1	1	Munidopsis lauensis	frozen	Galatheid
31	West Mata	11/27/2017	1:27:00	S085	S85-bio-13	East edge of summit ridge	-15.09396	-173.74766	1189.9	S085-bio13-GAL2	1	Munidopsis lauensis	frozen	Galatheid
32	West Mata	11/27/2017	1:27:00	S085	S85-bio-13	East edge of summit ridge	-15.09396	-173.74766	1189.9	S085-bio13-GAL3	1	Munidopsis lauensis	frozen	Galatheid
33	West Mata	11/26/2017	23:41:00	S085	S85-bio-10	WP10	-15.09433	-173.74960	1265.5	S085-bio10-SHR1	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
34	West Mata	11/26/2017	23:41:00	S085	S85-bio-10	WP10	-15.09433	-173.74960	1265.5	S085-bio10-CRB1	1	Brachyuran crab	frozen	Crab
35	West Mata	11/26/2017	23:41:00	S085	S85-bio-10	WP10	-15.09433	-173.74960	1265.5	S085-bio10-POL1	1	Polynoid	frozen	Polynoid
36	West Mata	11/26/2017	23:41:00	S085	S85-bio-10	WP10	-15.09433	-173.74960	1265.5	S085-bio10-POL2	1	Polynoid	frozen	Polynoid
37	West Mata	11/27/2017	2:37:00	S085	S85-bio-16	near summit, close to WP17	-15.09404	-173.74595	1272.8	S085-bio16-SHR1	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
38	West Mata	11/27/2017	2:37:00	S085	S85-bio-16	near summit, close to WP17	-15.09404	-173.74595	1272.8	S085-bio16-SHR2	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
39	West Mata	11/27/2017	2:37:00	S085	S85-bio-16	near summit, close to WP17	-15.09404	-173.74595	1272.8	S085-bio16-SHR3	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
40	West Mata	11/27/2017	2:37:00	S085	S85-bio-16	near summit, close to WP17	-15.09404	-173.74595	1272.8	S085-bio16-SHR4	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
41	West Mata	11/27/2017	2:37:00	S085	S85-bio-16	near summit, close to WP17	-15.09404	-173.74595	1272.8	S085-bio16-SHR5	1	Alvinocaris sp.	95% EtOH; RNALater; frozen	Shrimp
42	West Mata	11/27/2017	2:37:00	S085	S85-bio-16	near summit, close to WP17	-15.09404	-173.74595	1272.8	S085-bio16-SHR6	1	Alvinocaris sp.	95% EtOH; RNALater; frozen	Shrimp

ID	Site	Date	Time	Dive	Sample ID	Station	Latitude	Longitude	Depth	Specimen ID	n	Shipboard ID	Preservation	Common ID
43	West Mata	11/27/2017	2:37:00	S085	S85-bio-16	near summit, close to WP17	-15.09404	-173.74595	1272.8	S085-bio16-POL1	1	Polynoid	frozen	Polynoid
44	West Mata	11/27/2017	2:37:00	S085	S85-bio-16	near summit, close to WP17	-15.09404	-173.74595	1272.8	S085-bio16-GAL1	1	Munidopsis lauensis	frozen	Galatheid
45	West Mata	11/28/2017	2:50:00	S086	S86-bio-17	WP14	-15.08952	-173.74050	1513.9	S086-bio17-COR1	1	Bamboo coral	95% EtOH; RNALater; frozen	Coral
46	West Mata	11/28/2017	03:18:42	S086	S86-bio-21	20m west from WP14	-15.08943	-173.74070	1507.0	S086-bio21-SPO1	1	stalked sponge	frozen	Sponge
47	West Mata	11/28/2017	3:02:00	S086	S86-bio-19	10 m from WP14	-15.08949	-173.74060	1508.6	S086-bio19-COR1	1	Chrysogorgia	95% EtOH; RNALater; dried	Coral
48	West Mata	11/28/2017	3:02:00	S086	S86-bio-19	10 m from WP14	-15.08949	-173.74060	1508.6	S086-bio19-GAL1	1	Chirostylid crab	95% EtOH; RNALater; frozen	Galatheid
49	West Mata	11/28/2017	3:02:00	S086	S86-bio-19	10 m from WP14	-15.08949	-173.74060	1508.6	S086-bio19-GAL2	1	Chirostylid crab	95% EtOH; RNALater; frozen	Galatheid
50	West Mata	11/28/2017	3:13:00	S086	S86-bio-20	20m west from WP14	-15.08943	-173.74070	1507.0	S086-bio20-ANM1	1	yellow anemone	95% EtOH; RNALater; frozen	Anemone
51	West Mata	11/28/2017	3:13:00	S086	S86-bio-20	20m west from WP14	-15.08943	-173.74070	1507.0	S086-bio20-ANM2	1	yellow anemone	95% EtOH; RNALater; frozen	Anemone
52	West Mata	11/28/2017	3:13:00	S086	S86-bio-20	20m west from WP14	-15.08943	-173.74070	1507.0	S086-bio20-SPO1	1	stalked sponge	frozen	Sponge
53	West Mata	11/28/2017	3:13:00	S086	S86-bio-20	20m west from WP14	-15.08943	-173.74070	1507.0	S086-bio20-SPO2	1	stalked sponge	frozen	Sponge
54	West Mata	11/28/2017	3:13:00	S086	S86-bio-20	20m west from WP14	-15.08943	-173.74070	1507.0	S086-bio20-POL1	1	polynoid	frozen	Polynoid
55	West Mata	11/28/2017	1:21:51	S086	S86-bio-13	very close to WP13	-15.08818	-173.73881	1565.5	S086-bio13-HYD1	1	Hydroid	frozen	Hydroid
56	West Mata	11/28/2017	1:21:51	S086	S86-bio-13	very close to WP13	-15.08818	-173.73881	1565.5	S086-bio13-AMP1	1	Amphipod	frozen	Amphipod
57	West Mata	11/28/2017	1:21:51	S086	S86-bio-13	very close to WP13	-15.08818	-173.73881	1565.5	S086-bio13-AMP2	1	Amphipod	frozen	Amphipod
58	West Mata	11/28/2017	19:01:00	S087	S87-bio-02	50 m north of WP1	-15.10199	-173.74852	1618.1	S086-bio2-COR1	1	Paragorgia	95% EtOH; RNALater; frozen	Coral
59	West Mata	11/28/2017	19:01:00	S087	S87-bio-02	50 m north of WP1	-15.10199	-173.74852	1618.1	S086-bio2-OPH1	1	Asteroschema ?	95% EtOH; RNALater; frozen	Ophiuroid
60	West Mata	11/29/2017	0:52:00	S087	S87-bio-09	10 m south of WP13	-15.09405	-173.74814	1198.6	S087-bio9-FSH1	1	Zoarcid	Frozen	Fish
61	West Mata	11/29/2017	0:52:00	S087	S87-bio-09	10 m south of WP13	-15.09405	-173.74814	1198.6	S087-bio9-SHR1	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
62	West Mata	11/29/2017	0:52:00	S087	S87-bio-09	10 m south of WP13	-15.09405	-173.74814	1198.6	S087-bio9-SHR2	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
63	West Mata	11/29/2017	0:52:00	S087	S87-bio-09	10 m south of WP13	-15.09405	-173.74814	1198.6	S087-bio9-SHR3	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
64	West Mata	11/29/2017	0:52:00	S087	S87-bio-09	10 m south of WP13	-15.09405	-173.74814	1198.6	S087-bio9-SHR4	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
65	West Mata	11/29/2017	0:52:00	S087	S87-bio-09	10 m south of WP13	-15.09405	-173.74814	1198.6	S087-bio9-SHR5	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp

ID	Site	Date	Time	Dive	Sample ID	Station	Latitude	Longitude	Depth	Specimen ID	n	Shipboard ID	Preservation	Common ID
66	West Mata	11/29/2017	0:52:00	S087	S87-bio-09	10 m south of WP13	-15.09405	-173.74814	1198.6	S087-bio9-SHR6	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
67	West Mata	11/29/2017	0:52:00	S087	S87-bio-09	10 m south of WP13	-15.09405	-173.74814	1198.6	S087-bio9-SHR7	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
68	West Mata	11/29/2017	0:52:00	S087	S87-bio-09	10 m south of WP13	-15.09405	-173.74814	1198.6	S087-bio9-SHR8	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
69	West Mata	11/29/2017	0:52:00	S087	S87-bio-09	10 m south of WP13	-15.09405	-173.74814	1198.6	S087-bio9-SHR9	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
70	West Mata	11/29/2017	0:52:00	S087	S87-bio-09	10 m south of WP13	-15.09405	-173.74814	1198.6	S087-bio9-SHR10	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
71	West Mata	11/29/2017	0:52:00	S087	S87-bio-09	10 m south of WP13	-15.09405	-173.74814	1198.6	S087-bio9-SHR11-SHR16	6	Opaepele shrimp	bulk frozen	Shrimp
72	West Mata	11/29/2017	1:50:16	S087	S87-bio-12	Midway between WP16 and WP16; Prometheus site	-15.09420	-173.74804	1184.9	S087-bio12-SHR1	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
73	West Mata	11/29/2017	1:50:16	S087	S87-bio-12	Midway between WP16 and WP16; Prometheus site	-15.09420	-173.74804	1184.9	S087-bio12-SHR2	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
74	West Mata	11/29/2017	1:50:16	S087	S87-bio-12	Midway between WP16 and WP16; Prometheus site	-15.09420	-173.74804	1184.9	S087-bio12-SHR3	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
75	West Mata	11/29/2017	1:50:16	S087	S87-bio-12	Midway between WP16 and WP16; Prometheus site	-15.09420	-173.74804	1184.9	S087-bio12-SHR4	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
76	West Mata	11/29/2017	1:50:16	S087	S87-bio-12	Midway between WP16 and WP16; Prometheus site	-15.09420	-173.74804	1184.9	S087-bio12-SHR5	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
77	West Mata	11/29/2017	1:50:16	S087	S87-bio-12	Midway between WP16 and WP16; Prometheus site	-15.09420	-173.74804	1184.9	S087-bio12-SHR6	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp

ID	Site	Date	Time	Dive	Sample ID	Station	Latitude	Longitude	Depth	Specimen ID	n	Shipboard ID	Preservation	Common ID
78	West Mata	11/29/2017	1:50:16	S087	S87-bio-12	Midway between WP16 and WP16; Prometheus site	-15.09420	-173.74804	1184.9	S087-bio12-SHR7	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
79	West Mata	11/29/2017	1:50:16	S087	S87-bio-12	Midway between WP16 and WP16; Prometheus site	-15.09420	-173.74804	1184.9	S087-bio12-SHR8	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
80	West Mata	11/29/2017	1:50:16	S087	S87-bio-12	Midway between WP16 and WP16; Prometheus site	-15.09420	-173.74804	1184.9	S087-bio12-SHR9	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
81	West Mata	11/29/2017	1:50:16	S087	S87-bio-12	Midway between WP16 and WP16; Prometheus site	-15.09420	-173.74804	1184.9	S087-bio12-SHR10	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
82	West Mata	11/29/2017	1:50:16	S087	S87-bio-12	Midway between WP16 and WP16; Prometheus site	-15.09420	-173.74804	1184.9	S087-bio12-SHR11-21	11	Opaepele shrimp	bulk frozen	Shrimp
83	West Mata	11/29/2017	3:25:29	S087	S87-bio-17	20 m NW of WP19	-15.09461	-173.74635	1276.0	S087-bio17-SHR1	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
84	West Mata	11/29/2017	3:25:29	S087	S87-bio-17	20 m NW of WP19	-15.09461	-173.74635	1276.0	S087-bio17-SHR2	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
85	West Mata	11/29/2017	3:25:29	S087	S87-bio-17	20 m NW of WP19	-15.09461	-173.74635	1276.0	S087-bio17-SHR3	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
86	West Mata	11/29/2017	3:25:29	S087	S87-bio-17	20 m NW of WP19	-15.09461	-173.74635	1276.0	S087-bio17-GAS1	1	Gastropod	frozen	Gastropod
87	West Mata	11/29/2017	3:25:29	S087	S87-bio-17	20 m NW of WP19	-15.09461	-173.74635	1276.0	S087-bio17-GAS2	1	Gastropod	frozen	Gastropod
88	West Mata	11/29/2017	3:25:29	S087	S87-bio-17	20 m NW of WP19	-15.09461	-173.74635	1276.0	S087-bio17-GAS3	1	Gastropod	frozen	Gastropod
89	West Mata	11/29/2017	3:25:29	S087	S87-bio-17	20 m NW of WP19	-15.09461	-173.74635	1276.0	S087-bio17-GAS4	1	Gastropod	frozen	Gastropod
90	West Mata	11/29/2017	3:25:29	S087	S87-bio-17	20 m NW of WP19	-15.09461	-173.74635	1276.0	S087-bio17-GAS5	1	Gastropod	frozen	Gastropod
91	West Mata	11/29/2017	3:25:29	S087	S87-bio-17	20 m NW of WP19	-15.09461	-173.74635	1276.0	S087-bio17-POL1	1	Polynoid	frozen	Polynoid
92	West Mata	11/29/2017	3:25:29	S087	S87-bio-17	20 m NW of WP19	-15.09461	-173.74635	1276.0	S087-bio17-POL2	1	Polynoid	frozen	Polynoid

ID	Site	Date	Time	Dive	Sample ID	Station	Latitude	Longitude	Depth	Specimen ID	n	Shipboard ID	Preservation	Common ID
93	West Mata	11/29/2017	3:25:29	S087	S87-bio-17	20 m NW of WP19	-15.09461	-173.74635	1276.0	S087-bio17-PLY1	1	Polychaete	frozen	Polychaete
94	West Mata	11/29/2017	3:25:29	S087	S87-bio-17	20 m NW of WP19	-15.09461	-173.74635	1276.0	S087-bio17-PLY2	1	Polychaete	frozen	Polychaete
95	West Mata	11/29/2017	3:25:29	S087	S87-bio-17	20 m NW of WP19	-15.09461	-173.74635	1276.0	S087-bio17-PLY3	1	Polychaete	frozen	Polychaete
96	"Muffin"	11/29/2017	21:55:36	S088	S88-rock-06	80 m NE of WP5	-15.07141	-173.71264	2707.4	S088-rock6-HYD1	1	Hydroid	frozen	Hydroid
97	Mata Ua	11/30/2017	20:18:00	S089	S89-Sulfide-03	~50 m SE of WP1	-15.01680	-173.78764	2356.1	S89-Sulfide3-BAR1	1	Vulcanolepas	frozen	stalked barnacle
98	Mata Ua	11/30/2017	20:46:00	S089	S89-bio-06	~50 m SE of WP1	-15.01680	-173.78764	2356.0	S089-bio6-BAR1	1	Vulcanolepas	95% EtOH; RNALater; frozen	stalked barnacle
99	Mata Ua	11/30/2017	20:46:00	S089	S89-bio-06	~50 m SE of WP1	-15.01680	-173.78764	2356.0	S089-bio6-BAR2	1	Vulcanolepas	95% EtOH; RNALater; frozen	stalked barnacle
100	Mata Ua	11/30/2017	20:46:00	S089	S89-bio-06	~50 m SE of WP1	-15.01680	-173.78764	2356.0	S089-bio6-BAR3	1	Vulcanolepas	95% EtOH; RNALater; frozen	stalked barnacle
101	Mata Ua	11/30/2017	20:46:00	S089	S89-bio-06	~50 m SE of WP1	-15.01680	-173.78764	2356.0	S089-bio6-BAR4	1	Vulcanolepas	95% EtOH; RNALater; frozen	stalked barnacle
102	Mata Ua	11/30/2017	20:46:00	S089	S89-bio-06	~50 m SE of WP1	-15.01680	-173.78764	2356.0	S089-bio6-BAR5	1	Vulcanolepas	95% EtOH; RNALater; frozen	stalked barnacle
103	Mata Ua	11/30/2017	20:46:00	S089	S89-bio-06	~50 m SE of WP1	-15.01680	-173.78764	2356.0	S089-bio6-BAR6	1	Vulcanolepas	95% EtOH; RNALater; frozen	stalked barnacle
104	Mata Ua	11/30/2017	20:46:00	S089	S89-bio-06	~50 m SE of WP1	-15.01680	-173.78764	2356.0	S089-bio6-BAR7	1	Vulcanolepas	95% EtOH; RNALater; frozen	stalked barnacle
105	Mata Ua	11/30/2017	20:46:00	S089	S89-bio-06	~50 m SE of WP1	-15.01680	-173.78764	2356.0	S089-bio6-BAR8	1	Vulcanolepas	95% EtOH; RNALater; frozen	stalked barnacle
106	Mata Ua	11/30/2017	20:46:00	S089	S89-bio-06	~50 m SE of WP1	-15.01680	-173.78764	2356.0	S089-bio6-BAR9	1	Vulcanolepas	95% EtOH; RNALater; frozen	stalked barnacle
107	Mata Ua	11/30/2017	20:46:00	S089	S89-bio-06	~50 m SE of WP1	-15.01680	-173.78764	2356.0	S089-bio6-BAR10	1	Vulcanolepas	95% EtOH; RNALater; frozen	stalked barnacle
108	Mata Ua	11/30/2017	20:46:00	S089	S89-bio-06	~50 m SE of WP1	-15.01680	-173.78764	2356.0	S089-bio6-BAR11	20	Vulcanolepas	bulk frozen	stalked barnacle
109	Mata Ua	11/30/2017	20:46:00	S089	S89-bio-06	~50 m SE of WP1	-15.01680	-173.78764	2356.0	S089-bio6-BAR12	49	Vulcanolepas	bulk frozen	stalked barnacle
110	Mata Ua	11/30/2017	20:46:00	S089	S89-bio-06	~50 m SE of WP1	-15.01680	-173.78764	2356.0	S089-bio6-GAS1-3	3	gastropod	frozen	Gastropod
111	Mata Ua	11/30/2017	23:46:00	S089	S89-bio-17	20 m east of WP6	-15.01729	-173.78805	2350.3	S089-bio17-SHR1	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
112	Mata Ua	11/30/2017	23:46:00	S089	S89-bio-17	20 m east of WP6	-15.01729	-173.78805	2350.3	S089-bio17-SHR2	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
113	Mata Ua	11/30/2017	23:46:00	S089	S89-bio-17	20 m east of WP6	-15.01729	-173.78805	2350.3	S089-bio17-SHR3	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
114	Mata Ua	11/30/2017	23:46:00	S089	S89-bio-17	20 m east of WP6	-15.01729	-173.78805	2350.3	S089-bio17-SHR4	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
115	Mata Ua	11/30/2017	23:46:00	S089	S89-bio-17	20 m east of WP6	-15.01729	-173.78805	2350.3	S089-bio17-SHR5	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
116	Mata Ua	11/30/2017	23:46:00	S089	S89-bio-17	20 m east of WP6	-15.01729	-173.78805	2350.3	S089-bio17-POL1	1	Polynoid	frozen	Polynoid

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117	Mata Ua	11/30/2017	23:46:00	S089	S89-bio-17	20 m east of WP6	-15.01729	-173.78805	2350.3	S089-bio17-PLY1	1	Polychaete	frozen	Polychaete
118	Mata Ua	11/30/2017	23:46:00	S089	S89-bio-17	20 m east of WP6	-15.01729	-173.78805	2350.3	S089-bio17-CRB1	1	unknown part of crab?	frozen	Gastropod
119	Mata Ua	11/30/2017	22:08:00	S089	S89-sulfide-11	5-10 m SW of WP5	-15.01659	-173.78767	2355.9	S089-sulfide11-PLY1	14	Polychaete	frozen	Polychaete
120	Mata Ua	11/30/2017	22:02:00	S089	S89-bio-09	5-10 m SW of WP5	-15.01659	-173.78767	2355.9	S089-bio9-GAS1	1	Ifremeria nautilei	95% EtOH; RNALater; frozen	Gastropod
121	Mata Ua	11/30/2017	22:02:00	S089	S89-bio-09	5-10 m SW of WP5	-15.01659	-173.78767	2355.9	S089-bio9-GAS2	1	Ifremeria nautilei	95% EtOH; RNALater; frozen	Gastropod
122	Mata Ua	11/30/2017	22:02:00	S089	S89-bio-09	5-10 m SW of WP5	-15.01659	-173.78767	2355.9	S089-bio9-GAS3	1	Ifremeria nautilei	95% EtOH; RNALater; frozen	Gastropod
123	Mata Ua	11/30/2017	22:02:00	S089	S89-bio-09	5-10 m SW of WP5	-15.01659	-173.78767	2355.9	S089-bio9-GAS4	1	Ifremeria nautilei	95% EtOH; RNALater; frozen	Gastropod
124	Mata Ua	11/30/2017	22:02:00	S089	S89-bio-09	5-10 m SW of WP5	-15.01659	-173.78767	2355.9	S089-bio9-GAS5	1	Ifremeria nautilei	95% EtOH; RNALater; frozen	Gastropod
125	Mata Ua	11/30/2017	22:02:00	S089	S89-bio-09	5-10 m SW of WP5	-15.01659	-173.78767	2355.9	S089-bio9-GAS6	2	Limpet 1	frozen	Gastropod
126	Mata Ua	11/30/2017	22:02:00	S089	S89-bio-09	5-10 m SW of WP5	-15.01659	-173.78767	2355.9	S089-bio9-GAS7	11	Limpet 2	frozen	Gastropod
127	Mata Ua	11/30/2017	22:02:00	S089	S89-bio-09	5-10 m SW of WP5	-15.01659	-173.78767	2355.9	S089-bio9-BAR1	3	stalked barnacle	frozen	stalked barnacle
128	Mata Ua	11/30/2017	22:02:00	S089	S89-bio-09	5-10 m SW of WP5	-15.01659	-173.78767	2355.9	S089-bio9-PLY1	1	polychaete	frozen	Polychaete
129	Mata Ua	11/30/2017	20:46:00	S089	S89-bio-06	~50 m SE of WP1	-15.01680	-173.78764	2356.0	S089-bio6-BAR13	7	Eochionelasmus barnacle	frozen	Barnacle
130	Mata Ua	11/30/2017	22:06:00	S089	S89-bio-10	5-10 m SW of WP5	-15.01659	-173.78767	2355.9	S089-bio10-MUS1	1	Bathymodiolus brevior	piece of gill and foot each 95% EtOH; RNALater; frozen; viscera frozen; shell dried	Mussel
131	Mata Ua	11/30/2017	22:06:00	S089	S89-bio-10	5-10 m SW of WP5	-15.01659	-173.78767	2355.9	S089-bio10-GAS1	15	Limpet 2	frozen	Gastropod
132	Mata Ua	11/30/2017	22:06:00	S089	S89-bio-10	5-10 m SW of WP5	-15.01659	-173.78767	2355.9	S089-bio10-BAR1	8	Barnacle	frozen	Barnacle
133	Mata Ua	11/30/2017	21:56:00	S089	S89-bio-08	5-10 m SW of WP5	-15.01659	-173.78767	2356.0	S089-bio8-POL1-2	2	Polynoid Large	frozen	Polynoid
134	Mata Ua	11/30/2017	21:56:00	S089	S89-bio-08	5-10 m SW of WP5	-15.01659	-173.78767	2356.0	S089-bio8-POL3-4	2	Polynoid Small	frozen	Polynoid
135	Mata Ua	11/30/2017	21:56:00	S089	S89-bio-08	5-10 m SW of WP5	-15.01659	-173.78767	2356.0	S089-bio8-PLY1	2	Polychaete	frozen	Polychaete
136	Mata Ua	11/30/2017	21:56:00	S089	S89-bio-08	5-10 m SW of WP5	-15.01659	-173.78767	2356.0	S089-bio8-GAS1	1	Gastropod	frozen	Gastropod
137	Mata Ua	11/30/2017	21:56:00	S089	S89-bio-08	5-10 m SW of WP5	-15.01659	-173.78767	2356.0	S089-bio8-WRM1	1	Paralvinella worm	frozen	Polychaete
138	Mata Ua	11/30/2017	20:51:00	S089	S89-bio-07	~50 m SE of WP1	-15.01659	-173.78767	2355.4	S089-bio7-GAS1	1	Ifremeria nautilei	95% EtOH; RNALater; frozen	Gastropod

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139	Mata Ua	11/30/2017	20:51:00	S089	S89-bio-07	~50 m SE of WP1	-15.01659	-173.78767	2355.4	S089-bio7-GAS2	1	Ifremeria nautilei	95% EtOH; RNALater; frozen	Gastropod
140	Mata Ua	11/30/2017	20:51:00	S089	S89-bio-07	~50 m SE of WP1	-15.01659	-173.78767	2355.4	S089-bio7-GAS3	1	Ifremeria nautilei	95% EtOH; RNALater; frozen	Gastropod
141	Mata Ua	11/30/2017	20:51:00	S089	S89-bio-07	~50 m SE of WP1	-15.01659	-173.78767	2355.4	S089-bio7-POL1-5	1	Polynoid	frozen	Polynoid
142	Mata Ua	11/30/2017	20:51:00	S089	S89-bio-07	~50 m SE of WP1	-15.01659	-173.78767	2355.4	S089-bio7-SHR1	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
143	Mata Ua	11/30/2017	20:51:00	S089	S89-bio-07	~50 m SE of WP1	-15.01659	-173.78767	2355.4	S089-bio7-SHR2	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
144	Mata Ua	11/30/2017	20:51:00	S089	S89-bio-07	~50 m SE of WP1	-15.01659	-173.78767	2355.4	S089-bio7-SHR3	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
145	Mata Ua	11/30/2017	20:51:00	S089	S89-bio-07	~50 m SE of WP1	-15.01659	-173.78767	2355.4	S089-bio7-SHR4	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
146	Mata Ua	11/30/2017	20:51:00	S089	S89-bio-07	~50 m SE of WP1	-15.01659	-173.78767	2355.4	S089-bio7-SHR5	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
147	Mata Ua	11/30/2017	20:51:00	S089	S89-bio-07	~50 m SE of WP1	-15.01659	-173.78767	2355.4	S089-bio7-SHR6	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
148	Mata Ua	11/30/2017	20:51:00	S089	S89-bio-07	~50 m SE of WP1	-15.01659	-173.78767	2355.4	S089-bio7-SHR7	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
149	Mata Ua	11/30/2017	0:52:00	S089	S89-bio-20	25 m NE of WP3	-15.01773	-173.78852	2360.1	S089-bio20-GAS1	1	Alviniconcha sp.	95% EtOH; RNALater; frozen	Gastropod
150	Mata Ua	11/30/2017	0:52:00	S089	S89-bio-20	25 m NE of WP3	-15.01773	-173.78852	2360.1	S089-bio20-GAS2	1	Alviniconcha sp.	95% EtOH; RNALater; frozen	Gastropod
151	Mata Ua	11/30/2017	0:52:00	S089	S89-bio-20	25 m NE of WP3	-15.01773	-173.78852	2360.1	S089-bio20-GAS3	1	Alviniconcha sp.	95% EtOH; RNALater; frozen	Gastropod
152	Mata Ua	11/30/2017	0:52:00	S089	S89-bio-20	25 m NE of WP3	-15.01773	-173.78852	2360.1	S089-bio20-GAS4	1	Alviniconcha sp.	95% EtOH; RNALater; frozen	Gastropod
153	Mata Ua	11/30/2017	0:52:00	S089	S89-bio-20	25 m NE of WP3	-15.01773	-173.78852	2360.1	S089-bio20-GAS5	1	Alviniconcha sp.	95% EtOH; RNALater; frozen	Gastropod
154	Mata Ua	11/30/2017	0:52:00	S089	S89-bio-20	25 m NE of WP3	-15.01773	-173.78852	2360.1	S089-bio20-GAS6	1	Alviniconcha sp.	95% EtOH; RNALater; frozen	Gastropod
155	Mata Ua	11/30/2017	0:52:00	S089	S89-bio-20	25 m NE of WP3	-15.01773	-173.78852	2360.1	S089-bio20-GAS7	1	Ifremeria nautilei	95% EtOH; RNALater; frozen	Gastropod
156	Mata Ua	11/30/2017	0:52:00	S089	S89-bio-20	25 m NE of WP3	-15.01773	-173.78852	2360.1	S089-bio20-GAS8	1	Ifremeria nautilei	95% EtOH; RNALater; frozen	Gastropod
157	Mata Ua	11/30/2017	0:52:00	S089	S89-bio-20	25 m NE of WP3	-15.01773	-173.78852	2360.1	S089-bio20-GAS9	1	Ifremeria nautilei	95% EtOH; RNALater; frozen	Gastropod
158	Mata Ua	11/30/2017	0:52:00	S089	S89-bio-20	25 m NE of WP3	-15.01773	-173.78852	2360.1	S089-bio20-GAS10	8	Limpet 1	frozen	Gastropod
159	Mata Ua	11/30/2017	0:52:00	S089	S89-bio-20	25 m NE of WP3	-15.01773	-173.78852	2360.1	S089-bio20-GAS11	71	Limpet 2	frozen	Gastropod
160	Mata Ua	11/30/2017	0:52:00	S089	S89-bio-20	25 m NE of WP3	-15.01773	-173.78852	2360.1	S089-bio20-PLY1	15	mixed ploychaetes	frozen	Polychaete
161	Mata Ua	11/30/2017	0:52:00	S089	S89-bio-20	25 m NE of WP3	-15.01773	-173.78852	2360.1	S089-bio20-SHR1	3	Opaepele shrimp	frozen	Shrimp
162	Mata Ua	11/30/2017	23:35:00	S089	S89-bio-16	20 m east of WP6	-15.01729	-173.78805	2350.3	S089-bio16-GAS1	1	Ifremeria nautilei	95% EtOH; RNALater; frozen	Gastropod

ID	Site	Date	Time	Dive	Sample ID	Station	Latitude	Longitude	Depth	Specimen ID	n	Shipboard ID	Preservation	Common ID
163	Mata Ua	11/30/2017	23:35:00	S089	S89-bio-16	20 m east of WP6	-15.01729	-173.78805	2350.3	S089-bio16-GAS2	1	Ifremeria nautilei	95% EtOH; RNALater; frozen	Gastropod
164	Mata Ua	11/30/2017	23:35:00	S089	S89-bio-16	20 m east of WP6	-15.01729	-173.78805	2350.3	S089-bio16-GAS3	1	Ifremeria nautilei	95% EtOH; RNALater; frozen	Gastropod
165	Mata Ua	11/30/2017	23:35:00	S089	S89-bio-16	20 m east of WP6	-15.01729	-173.78805	2350.3	S089-bio16-GAS4	1	Ifremeria nautilei	95% EtOH; RNALater; frozen	Gastropod
166	Mata Ua	11/30/2017	23:35:00	S089	S89-bio-16	20 m east of WP6	-15.01729	-173.78805	2350.3	S089-bio16-GAS5	1	Ifremeria nautilei	95% EtOH; RNALater; frozen	Gastropod
167	Mata Ua	11/30/2017	23:35:00	S089	S89-bio-16	20 m east of WP6	-15.01729	-173.78805	2350.3	S089-bio16-GAS6	1	Ifremeria nautilei	95% EtOH; RNALater; frozen	Gastropod
168	Mata Ua	11/30/2017	23:35:00	S089	S89-bio-16	20 m east of WP6	-15.01729	-173.78805	2350.3	S089-bio16-GAS7	1	Ifremeria nautilei	95% EtOH; RNALater; frozen	Gastropod
169	Mata Ua	11/30/2017	23:35:00	S089	S89-bio-16	20 m east of WP6	-15.01729	-173.78805	2350.3	S089-bio16-GAS8	1	Ifremeria nautilei	95% EtOH; RNALater; frozen	Gastropod
170	Mata Ua	11/30/2017	23:35:00	S089	S89-bio-16	20 m east of WP6	-15.01729	-173.78805	2350.3	S089-bio16-GAS9	1	Ifremeria nautilei	95% EtOH; RNALater; frozen	Gastropod
171	Mata Ua	11/30/2017	23:35:00	S089	S89-bio-16	20 m east of WP6	-15.01729	-173.78805	2350.3	S089-bio16-GAS10	1	Ifremeria nautilei	95% EtOH; RNALater; frozen	Gastropod
172	Mata Ua	11/30/2017	23:35:00	S089	S89-bio-16	20 m east of WP6	-15.01729	-173.78805	2350.3	S089-bio16-GAS11	1	Ifremeria nautilei	95% EtOH; RNALater; frozen	Gastropod
173	Mata Ua	11/30/2017	23:35:00	S089	S89-bio-16	20 m east of WP6	-15.01729	-173.78805	2350.3	S089-bio16-MIX	30	polychaetes and limpets	frozen	Polychaetes and Gastropod
174	Mata Fitu	12/2/2017	2:06:00	S090	S90-rock-12	~1 m to north	-14.90962	-173.78844	2459.0	S90-rock12-COR1	1	whip coral	frozen	Coral
175	Mata Fitu	12/2/2017	2:06:00	S090	S90-rock-12	~1 m to north	-14.90962	-173.78844	2459.0	S90-rock12-SPO1	1	sponge	frozen	Sponge
176	Mata Fitu	12/1/2017	19:25:00	S090	S90-rock-02	near WP2	-14.91652	-173.79852	2521.1	S90-rock2-COR1	1	whip coral	frozen	Coral
177	Mata Tolu	12/2/2017	20:50:00	S091	S91-bio-03	at WP3	-15.00566	-173.80150	2058.4	S91-bio3-COR1	1	Coral	95% EtOH; RNALater; frozen	Coral
178	Mata Tolu	12/3/2017	3:01:00	S091	S91-bio-15	Saguaro active chimney	-15.00465	-173.79366	1821.1	S91-bio15-GAS1	1	Ifremeria nautilei	95% EtOH; RNALater; frozen	Gastropod
179	Mata Tolu	12/3/2017	3:01:00	S091	S91-bio-15	Saguaro active chimney	-15.00465	-173.79366	1821.1	S91-bio15-GAS2, 3	2	Limpet 2	frozen	Gastropod
180	Mata Tolu	12/2/2017	20:43:00	S091	S91-rock-04	WP3	-15.00566	-173.80150	2058.3	S91-rock4-BAR1	1	Barnacle	frozen	Barnacle
181	Mata Tolu	12/3/2017	3:01:00	S091	S91-bio-15	Saguaro active chimney	-15.00465	-173.79366	1821.1	S91-bio15-POL1	1	Polynoid Large	frozen	Polynoid
182	Mata Tolu	12/3/2017	3:01:00	S091	S91-bio-15	Saguaro active chimney	-15.00465	-173.79366	1821.1	S91-bio15-POL2	1	Polynoid Small	frozen	Polynoid
183	Mata Tolu	12/3/2017	3:01:00	S091	S91-bio-15	Saguaro active chimney	-15.00465	-173.79366	1821.1	S91-bio15-SHR1	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp

ID	Site	Date	Time	Dive	Sample ID	Station	Latitude	Longitude	Depth	Specimen ID	n	Shipboard ID	Preservation	Common ID
184	Mata Tolu	12/3/2017	3:01:00	S091	S91-bio-15	Saguaro active chimney	-15.00465	-173.79366	1821.1	S91-bio15-CRB1	1	Brachyuran crab	95% EtOH; RNALater; frozen	Crab
185	Mata Tolu	12/3/2017	3:01:00	S091	S91-bio-15	Saguaro active chimney	-15.00465	-173.79366	1821.1	S91-bio15-CRB2	1	Brachyuran crab	95% EtOH; RNALater; frozen	Crab
186	Mata Tolu	12/3/2017	3:01:00	S091	S91-bio-15	Saguaro active chimney	-15.00465	-173.79366	1821.1	S91-bio15-POL3	1	Polynoid Large	frozen	Polynoid
187	Mata Tolu	12/3/2017	4:32:18	S091	S91-bio-19	Low Smoker	-15.00466	-173.79390	1824.6	S91-bio19-GAS1	1	Ifremeria nautilei	95% EtOH; RNALater; frozen	Gastropod
188	Mata Tolu	12/3/2017	4:32:18	S091	S91-bio-19	Low Smoker	-15.00466	-173.79390	1824.6	S91-bio19-GAS2	1	Ifremeria nautilei	95% EtOH; RNALater; frozen	Gastropod
189	Mata Tolu	12/3/2017	4:32:18	S091	S91-bio-19	Low Smoker	-15.00466	-173.79390	1824.6	S91-bio19-GAS3	1	Ifremeria nautilei	95% EtOH; RNALater; frozen	Gastropod
190	Mata Tolu	12/3/2017	4:32:18	S091	S91-bio-19	Low Smoker	-15.00466	-173.79390	1824.6	S91-bio19-GAS4	1	Ifremeria nautilei	95% EtOH; RNALater; frozen	Gastropod
191	Mata Tolu	12/3/2017	4:32:18	S091	S91-bio-19	Low Smoker	-15.00466	-173.79390	1824.6	S91-bio19-GAS5	1	Ifremeria nautilei	95% EtOH; RNALater; frozen	Gastropod
192	Mata Tolu	12/3/2017	4:32:18	S091	S91-bio-19	Low Smoker	-15.00466	-173.79390	1824.6	S91-bio19-GAS6	1	Ifremeria nautilei	95% EtOH; RNALater; frozen	Gastropod
193	Mata Tolu	12/3/2017	4:32:18	S091	S91-bio-19	Low Smoker	-15.00466	-173.79390	1824.6	S91-bio19-GAS7	1	Limpet 2	frozen	Gastropod
194	Mata Tolu	12/3/2017	1:41:00	S091	S91-sulfide-12B	Base of Beehive chimney	-15.00478	-173.79362	1821.4	S91-sulfide12B-PLY1	5	Polychaetes	frozen	Polychaetes
195	Mata Tolu	12/3/2017	4:32:18	S091	S91-bio-19	Low Smoker	-15.00466	-173.79390	1824.6	S91-bio19-CRB1	1	Brachyuran crab	95% EtOH; RNALater; frozen	Crab
196	Mata Tolu	12/3/2017	4:32:18	S091	S91-bio-19	Low Smoker	-15.00466	-173.79390	1824.6	S91-bio19-CRB2	1	Brachyuran crab	95% EtOH; RNALater; frozen	Crab
197	Mata Tolu	12/3/2017	4:32:18	S091	S91-bio-19	Low Smoker	-15.00466	-173.79390	1824.6	S91-bio19-GAS8	7	Limpet 1	frozen	Gastropod
198	Mata Tolu	12/3/2017	4:32:18	S091	S91-bio-19	Low Smoker	-15.00466	-173.79390	1824.6	S91-bio19-GAS9	1	gastropod	frozen	Gastropod
199	Mata Tolu	12/3/2017	4:32:18	S091	S91-bio-19	Low Smoker	-15.00466	-173.79390	1824.6	S91-bio19-POL2	1	Polynoid Medium	frozen	Polynoid
200	Mata Tolu	12/3/2017	4:32:18	S091	S91-bio-19	Low Smoker	-15.00466	-173.79390	1824.6	S91-bio19-POL3	7	Polynoid Small	frozen	Polynoid
201	Dacite Flow	12/4/2017	23:46:00	S092	S92-bio-12	300 m SW of WP3	-15.18942	-173.91598	2508.6	S92-bio12-COR1	1	whip coral	95% EtOH; RNALater; frozen	Coral
202	Dacite Flow	12/5/2017	0:30:00	S092	S92-bio-15	70 m SW of Sample 13	-15.19112	-173.91717	2495.8	S92-bio15-OPH1	1	Ophiuroid	95% EtOH; RNALater; frozen	Ophiuroid
203	Mata Tolu	12/5/2017	23:37:00	S094	S94-bio-08	Low Smoker	-15.00457	-173.79389	1823.4	S94-bio8-SHR1	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
204	Mata Tolu	12/5/2017	23:37:00	S094	S94-bio-08	Low Smoker	-15.00457	-173.79389	1823.4	S94-bio8-SHR2	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
205	Mata Tolu	12/5/2017	23:37:00	S094	S94-bio-08	Low Smoker	-15.00457	-173.79389	1823.4	S94-bio8-SHR3	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp

ID	Site	Date	Time	Dive	Sample ID	Station	Latitude	Longitude	Depth	Specimen ID	n	Shipboard ID	Preservation	Common ID
206	Mata Tolu	12/5/2017	23:37:00	S094	S94-bio-08	Low Smoker	-15.00457	-173.79389	1823.4	S94-bio8-SHR4	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
207	Mata Tolu	12/5/2017	23:37:00	S094	S94-bio-08	Low Smoker	-15.00457	-173.79389	1823.4	S94-bio8-SHR5	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
208	Mata Tolu	12/5/2017	23:37:00	S094	S94-bio-08	Low Smoker	-15.00457	-173.79389	1823.4	S94-bio8-SHR6	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
209	Mata Tolu	12/5/2017	23:37:00	S094	S94-bio-08	Low Smoker	-15.00457	-173.79389	1823.4	S94-bio8-SHR7	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
210	Mata Tolu	12/5/2017	23:37:00	S094	S94-bio-08	Low Smoker	-15.00457	-173.79389	1823.4	S94-bio8-SHR8	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
211	Mata Tolu	12/5/2017	23:37:00	S094	S94-bio-08	Low Smoker	-15.00457	-173.79389	1823.4	S94-bio8-SHR9	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
212	Mata Tolu	12/5/2017	23:37:00	S094	S94-bio-08	Low Smoker	-15.00457	-173.79389	1823.4	S94-bio8-SHR10	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
213	Mata Tolu	12/5/2017	23:37:00	S094	S94-bio-08	Low Smoker	-15.00457	-173.79389	1823.4	S94-bio8-SHR11	11	Opaepele shrimp	bulk frozen	Shrimp
214	Mata Tolu	12/5/2017	23:37:00	S094	S94-bio-08	Low Smoker	-15.00457	-173.79389	1823.4	S94-bio8-SHR12	1	Alvinocaris sp.	95% EtOH; RNALater; frozen	Shrimp
215	Mata Tolu	12/6/2017	1:13:00	S094	S94-bio-13	Snail Alcove	-15.00482	-173.79354	1813.3	S94-bio13-SHR1	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
216	Mata Tolu	12/6/2017	1:13:00	S094	S94-bio-13	Snail Alcove	-15.00482	-173.79354	1813.3	S94-bio13-SHR2	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
217	Mata Tolu	12/6/2017	1:13:00	S094	S94-bio-13	Snail Alcove	-15.00482	-173.79354	1813.3	S94-bio13-SHR3	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
218	Mata Tolu	12/6/2017	1:13:00	S094	S94-bio-13	Snail Alcove	-15.00482	-173.79354	1813.3	S94-bio13-SHR4	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
219	Mata Tolu	12/6/2017	1:13:00	S094	S94-bio-13	Snail Alcove	-15.00482	-173.79354	1813.3	S94-bio13-SHR5	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
220	Mata Tolu	12/6/2017	1:13:00	S094	S94-bio-13	Snail Alcove	-15.00482	-173.79354	1813.3	S94-bio13-SHR6	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
221	Mata Tolu	12/6/2017	1:13:00	S094	S94-bio-13	Snail Alcove	-15.00482	-173.79354	1813.3	S94-bio13-SHR7	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
222	Mata Tolu	12/6/2017	1:13:00	S094	S94-bio-13	Snail Alcove	-15.00482	-173.79354	1813.3	S94-bio13-SHR8	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
223	Mata Tolu	12/6/2017	1:13:00	S094	S94-bio-13	Snail Alcove	-15.00482	-173.79354	1813.3	S94-bio13-SHR9	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
224	Mata Tolu	12/6/2017	1:13:00	S094	S94-bio-13	Snail Alcove	-15.00482	-173.79354	1813.3	S94-bio13-SHR10	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
225	Mata Tolu	12/6/2017	1:13:00	S094	S94-bio-13	Snail Alcove	-15.00482	-173.79354	1813.3	S94-bio13-SHR11	10	Opaepele shrimp	bulk frozen	Shrimp
226	Mata Tolu	12/6/2017	2:56:00	S094	S94-bio-19	in SE pit at Mussel patch	-15.00512	-173.79392	1842.8	S94-bio19-GAS1	1	Ifremeria nautilei	95% EtOH; RNALater; frozen	Gastropod
227	Mata Tolu	12/6/2017	2:56:00	S094	S94-bio-19	in SE pit at Mussel patch	-15.00512	-173.79392	1842.8	S94-bio19-SHR1	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
228	Mata Tolu	12/6/2017	2:56:00	S094	S94-bio-19	in SE pit at Mussel patch	-15.00512	-173.79392	1842.8	S94-bio19-SHR2	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
229	Mata Tolu	12/6/2017	2:56:00	S094	S94-bio-19	in SE pit at Mussel patch	-15.00512	-173.79392	1842.8	S94-bio19-POL1-4	4	Polynoid	frozen	Polynoid

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230	Mata Tolu	12/6/2017	3:50:00	S094	S94-bio-23	North, Tall, Handsome	-15.00449	-173.79359	1822.5	S94-bio23-SHR1	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
231	Mata Tolu	12/6/2017	3:50:00	S094	S94-bio-23	North, Tall, Handsome	-15.00449	-173.79359	1822.5	S94-bio23-SHR2	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
232	Mata Tolu	12/6/2017	3:50:00	S094	S94-bio-23	North, Tall, Handsome	-15.00449	-173.79359	1822.5	S94-bio23-SHR3	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
233	Mata Tolu	12/6/2017	3:50:00	S094	S94-bio-23	North, Tall, Handsome	-15.00449	-173.79359	1822.5	S94-bio23-SHR4	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
234	Mata Tolu	12/6/2017	3:50:00	S094	S94-bio-23	North, Tall, Handsome	-15.00449	-173.79359	1822.5	S94-bio23-SHR5	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
235	Mata Tolu	12/6/2017	3:50:00	S094	S94-bio-23	North, Tall, Handsome	-15.00449	-173.79359	1822.5	S94-bio23-SHR6	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
236	Mata Tolu	12/6/2017	3:50:00	S094	S94-bio-23	North, Tall, Handsome	-15.00449	-173.79359	1822.5	S94-bio23-SHR7	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
237	Mata Tolu	12/6/2017	3:50:00	S094	S94-bio-23	North, Tall, Handsome	-15.00449	-173.79359	1822.5	S94-bio23-SHR8	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
238	Mata Tolu	12/6/2017	3:50:00	S094	S94-bio-23	North, Tall, Handsome	-15.00449	-173.79359	1822.5	S94-bio23-SHR9	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
239	Mata Tolu	12/6/2017	3:50:00	S094	S94-bio-23	North, Tall, Handsome	-15.00449	-173.79359	1822.5	S94-bio23-SHR10	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
240	Mata Tolu	12/6/2017	3:50:00	S094	S94-bio-23	North, Tall, Handsome	-15.00449	-173.79359	1822.5	S94-bio23-SHR11	8	Opaepele shrimp	bulk frozen	Shrimp
241	Mata Tolu	12/6/2017	3:50:00	S094	S94-bio-23	North, Tall, Handsome	-15.00449	-173.79359	1822.5	S94-bio23-GAS1	1	Gastropod	frozen	Gastropod
242	Mata Tolu	12/6/2017	3:52:00	S094	S94-bio-24	North, Tall, Handsome	-15.00449	-173.79359	1821.3	S94-bio24-POL1-2	2	Polynoid	frozen	Polynoid
243	Mata Tolu	12/6/2017	3:52:00	S094	S94-bio-24	North, Tall, Handsome	-15.00449	-173.79359	1821.3	S94-bio24-GAS1	1	Limpet 1	frozen	Gastropod
244	Mata Tolu	12/6/2017	3:52:00	S094	S94-bio-24	North, Tall, Handsome	-15.00449	-173.79359	1821.3	S94-bio24-SHR1	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
245	Mata Tolu	12/6/2017	3:52:00	S094	S94-bio-24	North, Tall, Handsome	-15.00449	-173.79359	1821.3	S94-bio24-SHR2	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
246	Mata Tolu	12/6/2017	3:52:00	S094	S94-bio-24	North, Tall, Handsome	-15.00449	-173.79359	1821.3	S94-bio24-SHR3	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
247	Mata Tolu	12/6/2017	3:52:00	S094	S94-bio-24	North, Tall, Handsome	-15.00449	-173.79359	1821.3	S94-bio24-SHR4	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
248	Mata Tolu	12/6/2017	3:52:00	S094	S94-bio-24	North, Tall, Handsome	-15.00449	-173.79359	1821.3	S94-bio24-SHR5	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
249	Mata Tolu	12/6/2017	2:46:00	S094	S94-bio-18	in SE pit at Mussel patch	-15.00512	-173.79392	1842.7	S94-bio18-MUS1	1	Bathymodiolus brevior	piece of gill and foot each 95% EtOH; RNALater; frozen; viscera frozen; shell dried	Mussel
250	Mata Tolu	12/6/2017	2:46:00	S094	S94-bio-18	in SE pit at Mussel patch	-15.00512	-173.79392	1842.7	S94-bio18-MUS2	1	Bathymodiolus brevior	piece of gill and foot each 95% EtOH; RNALater; frozen; viscera frozen; shell dried	Mussel

ID	Site	Date	Time	Dive	Sample ID	Station	Latitude	Longitude	Depth	Specimen ID	n	Shipboard ID	Preservation	Common ID
251	Mata Tolu	12/6/2017	2:46:00	S094	S94-bio-18	in SE pit at Mussel patch	-15.00512	-173.79392	1842.7	S94-bio18-MUS3	1	Bathymodiolus brevior	piece of gill and foot each 95% EtOH; RNALater; frozen; viscera frozen; shell dried	Mussel
252	Mata Tolu	12/6/2017	2:46:00	S094	S94-bio-18	in SE pit at Mussel patch	-15.00512	-173.79392	1842.7	S94-bio18-MUS4	1	Bathymodiolus brevior	piece of gill and foot each 95% EtOH; RNALater; frozen; viscera frozen; shell dried	Mussel
253	Mata Tolu	12/6/2017	2:46:00	S094	S94-bio-18	in SE pit at Mussel patch	-15.00512	-173.79392	1842.7	S94-bio18-BAR1-2	2	Barnacle	frozen	Barnacle
254	Mata Tolu	12/6/2017	2:46:00	S094	S94-bio-18	in SE pit at Mussel patch	-15.00512	-173.79392	1842.7	S94-bio18-GAS1	18	Limpet 2	frozen	Gastropod
255	Mata Tolu	12/6/2017	2:46:00	S094	S94-bio-18	in SE pit at Mussel patch	-15.00512	-173.79392	1842.7	S94-bio18-BAR3-5	3	Barnacle	frozen	Barnacle
256	Mata Tolu	12/6/2017	2:46:00	S094	S94-bio-18	in SE pit at Mussel patch	-15.00512	-173.79392	1842.7	S94-bio18-GAS2	5	Limpet 2	frozen	Gastropod
257	Mata Tolu	12/6/2017	2:46:00	S094	S94-bio-18	in SE pit at Mussel patch	-15.00512	-173.79392	1842.7	S94-bio18-GAS3	3	Limpet 2	frozen	Gastropod
258	Mata Tolu	12/6/2017	2:46:00	S094	S94-bio-18	in SE pit at Mussel patch	-15.00512	-173.79392	1842.7	S94-bio18-GAS4	1	Limpet 2	frozen	Gastropod
259	Mata Tolu	12/5/2017	23:50:00	S094	S94-sulfide-09	Low Smoker	-15.00457	-173.79389	1823.9	S94-sulfide9-CRB1	1	Brachyuran crab	frozen	Crab
260	Mata Tolu	12/6/2017	1:54:00	S094	S94-sulfide-16	Active vent chimney	-15.00493	-173.79351	1813.1	S94-sulfide16-GAS1	1	Ifremeria nautilei	95% EtOH; RNALater; frozen	Gastropod
261	Mata Tolu	12/6/2017	3:52:00	S094	S94-bio-24	North, Tall, Handsome	-15.00449	-173.79359	1821.3	S94-bio24-POL3	1	Polynoid Large	frozen	Polynoid
262	Mata Tolu	12/6/2017	3:52:00	S094	S94-bio-24	North, Tall, Handsome	-15.00449	-173.79359	1821.3	S94-bio24-SHR6	1	Opaepele shrimp	frozen	Shrimp
263	Mata Tolu	12/6/2017	1:25:00	S094	S94-bio-14	Snail Alcove	-15.00482	-173.79354	1813.3	S94-bio14-GAS1	1	Alviniconcha sp.	95% EtOH; RNALater; frozen	Gastropod
264	Mata Tolu	12/6/2017	1:25:00	S094	S94-bio-14	Snail Alcove	-15.00482	-173.79354	1813.3	S94-bio14-GAS2	1	Alviniconcha sp.	95% EtOH; RNALater; frozen	Gastropod
265	Mata Tolu	12/6/2017	1:25:00	S094	S94-bio-14	Snail Alcove	-15.00482	-173.79354	1813.3	S94-bio14-GAS3	1	Alviniconcha sp.	95% EtOH; RNALater; frozen	Gastropod
266	Mata Tolu	12/6/2017	1:25:00	S094	S94-bio-14	Snail Alcove	-15.00482	-173.79354	1813.3	S94-bio14-GAS4	1	Alviniconcha sp.	95% EtOH; RNALater; frozen	Gastropod
267	Mata Tolu	12/6/2017	1:25:00	S094	S94-bio-14	Snail Alcove	-15.00482	-173.79354	1813.3	S94-bio14-GAS5	1	Ifremeria nautilei	95% EtOH; RNALater; frozen	Gastropod
268	Mata Tolu	12/6/2017	1:25:00	S094	S94-bio-14	Snail Alcove	-15.00482	-173.79354	1813.3	S94-bio14-GAS6	1	Ifremeria nautilei	95% EtOH; RNALater; frozen	Gastropod
269	Mata Tolu	12/6/2017	1:25:00	S094	S94-bio-14	Snail Alcove	-15.00482	-173.79354	1813.3	S94-bio14-GAS7	1	Ifremeria nautilei	95% EtOH; RNALater; frozen	Gastropod
270	Mata Tolu	12/6/2017	1:25:00	S094	S94-bio-14	Snail Alcove	-15.00482	-173.79354	1813.3	S94-bio14-GAS8	1	Ifremeria nautilei	95% EtOH; RNALater; frozen	Gastropod
271	Mata Tolu	12/6/2017	1:25:00	S094	S94-bio-14	Snail Alcove	-15.00482	-173.79354	1813.3	S94-bio14-GAS9	1	Ifremeria nautilei	95% EtOH; RNALater; frozen	Gastropod

ID	Site	Date	Time	Dive	Sample ID	Station	Latitude	Longitude	Depth	Specimen ID	n	Shipboard ID	Preservation	Common ID
272	Mata Tolu	12/6/2017	1:25:00	S094	S94-bio-14	Snail Alcove	-15.00482	-173.79354	1813.3	S94-bio14-GAS10	1	Ifremeria nautilei	95% EtOH; RNALater; frozen	Gastropod
273	Mata Tolu	12/6/2017	1:25:00	S094	S94-bio-14	Snail Alcove	-15.00482	-173.79354	1813.3	S94-bio14-GAS11	1	Ifremeria nautilei	95% EtOH; RNALater; frozen	Gastropod
274	Mata Tolu	12/6/2017	1:25:00	S094	S94-bio-14	Snail Alcove	-15.00482	-173.79354	1813.3	S94-bio14-GAS12	4	Limpet 1	frozen	Gastropod
275	Mata Tolu	12/6/2017	1:25:00	S094	S94-bio-14	Snail Alcove	-15.00482	-173.79354	1813.3	S94-bio14-GAS13	4	Limpet 2	frozen	Gastropod
276	Mata Tolu	12/6/2017	1:25:00	S094	S94-bio-14	Snail Alcove	-15.00482	-173.79354	1813.3	S94-bio14-POL1	5	Polynoid	frozen	Polynoid
277	Mata Tolu	12/6/2017	3:52:00	S094	S94-bio-24	North, Tall, Handsome	-15.00449	-173.79359	1821.3	S94-bio24-SHR7	1	Nautilocaris shrimp	frozen	Shrimp
278	Mata Tolu	12/6/2017	3:52:00	S094	S94-bio-24	North, Tall, Handsome	-15.00449	-173.79359	1821.3	S94-bio24-GAS2	1	Limpet 1	frozen	Shrimp
279	SW Base of West Mata	12/7/2017	0:25:00	S095	S95-rock-11	just east of last sample	-15.11804	-173.78911	2885.9	S95-rock11-SPO1	1	stalked sponge	frozen	Sponge
280	SW Base of West Mata	12/7/2017	2:20:00	S095	S95-bio-18	~50 m further from WP5	-15.11704	-173.78661	2863.5	S95-bio18-WRM1	1	worm in tube	frozen	Polychaete
281	SW Base of West Mata	12/7/2017	2:34:00	S095	S95-bio-19	close by	-15.11715	-173.78642	2853.7	S95-bio19-PEN1	1	Pennatulid?	95% EtOH; RNALater; whole specimen in 95% EtOH	Pennatulid
282	Mata Fa	12/8/2017	1:36:00	S096	S96-bio-16	80 m SW of WP6	-14.98946	-173.79979	2341.0	S96-bio16-COR1	1	Chrysogorgia	95% EtOH; RNALater; dried	Coral
283	Mata Fa	12/8/2017	1:36:00	S096	S96-bio-16	80 m SW of WP6	-14.98946	-173.79979	2341.0	S96-bio16-GAL1	1	Chirostylid crab	95% EtOH; RNALater; frozen	Galatheid
284	Mata Fa	12/7/2017	21:21:00	S096	S96-rock-05	40 m NW of WP2	-14.99127	-173.80790	2482.1	S96-rock05-HYD1	1	Hydroid	frozen	Hydroid
285	Mata Fa	12/7/2017	23:16:00	S096	S96-rock-10	40 m NW of 5	-14.99020	-173.80116	2329.1	S96-rock10-HYD1	1	Hydroid	frozen	Hydroid
286	Mata Fa	12/8/2017	2:32:00	S096	S96-bio-18	~10 m ahead of Sed-17	-14.98821	-173.79703	2340.0	S96-bio18-OPH1	1	Ophiomusium?	95% EtOH; RNALater; frozen	Ophiuroid
287	Mata Fa	12/7/2017	23:29:00	S096	S96-bio-11	WP5	-14.99039	-173.80089	2320.5	S96-bio11-COR1	1	bamboo coral skeleton	frozen	Coral
288	Mata Fa	12/7/2017	23:29:00	S096	S96-bio-11	WP5	-14.99039	-173.80089	2320.5	S96-bio11-OPH1	1	Ophioplinthaca sp.	95% EtOH; RNALater; frozen	Ophiuroid
289	Mata Fa	12/7/2017	23:29:00	S096	S96-bio-11	WP5	-14.99039	-173.80089	2320.5	S96-bio11-OPH2	1	Ophioplinthaca sp.	95% EtOH; RNALater; frozen	Ophiuroid
290	Mata Fitu	12/9/2017	2:57:00	S097	S97-bio-19	~15 m North of WP4	-14.91348	-173.77912	2626.0	S97-bio19-BAR1	1	Vulcanolepas	95% EtOH; RNALater; frozen	stalked barnacle
291	Mata Fitu	12/9/2017	2:57:00	S097	S97-bio-19	~15 m North of WP4	-14.91348	-173.77912	2626.0	S97-bio19-BAR2	1	Vulcanolepas	95% EtOH; RNALater; frozen	stalked barnacle
292	Mata Fitu	12/9/2017	2:57:00	S097	S97-bio-19	~15 m North of WP4	-14.91348	-173.77912	2626.0	S97-bio19-BAR3	1	Vulcanolepas	95% EtOH; RNALater; frozen	stalked barnacle
293	Mata Fitu	12/9/2017	2:57:00	S097	S97-bio-19	~15 m North of WP4	-14.91348	-173.77912	2626.0	S97-bio19-BAR4	1	Vulcanolepas	95% EtOH; RNALater; frozen	stalked barnacle

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294	Mata Fitu	12/9/2017	2:57:00	S097	S97-bio-19	~15 m North of WP4	-14.91348	-173.77912	2626.0	S97-bio19-BAR5	1	Vulcanolepas	95% EtOH; RNALater; frozen	stalked barnacle
295	Mata Fitu	12/9/2017	2:57:00	S097	S97-bio-19	~15 m North of WP4	-14.91348	-173.77912	2626.0	S97-bio19-BAR6	20	Vulcanolepas	bulk frozen	stalked barnacle
296	Mata Fitu	12/9/2017	2:57:00	S097	S97-bio-19	~15 m North of WP4	-14.91348	-173.77912	2626.0	S97-bio19-GAS1	6	Gastropod	frozen	Gastropod
297	Mata Fitu	12/9/2017	3:07:00	S097	S97-bio-20	at Eiffel Tower	-14.91348	-173.77912	2624.0	S97-bio20-GAS1	1	Ifremeria nautilei	95% EtOH; RNALater; frozen	Gastropod
298	Mata Fitu	12/9/2017	3:07:00	S097	S97-bio-20	at Eiffel Tower	-14.91348	-173.77912	2624.0	S97-bio20-GAS2	1	Ifremeria nautilei	95% EtOH; RNALater; frozen	Gastropod
299	Mata Fitu	12/9/2017	3:07:00	S097	S97-bio-20	at Eiffel Tower	-14.91348	-173.77912	2624.0	S97-bio20-POL1	1	Polynoid small	frozen	Polynoid
300	Mata Fitu	12/8/2017	22:23:00	S097	S97-bio-08	120 m SE of WP13	-14.91683	-173.77509	2734.1	S97-bio8-BAR1	1	stalked barnacle	95% EtOH; RNALater; frozen	stalked barnacle
301	Mata Fitu	12/8/2017	19:21:00	S097	S97-sulfide-02	~20 m NE of WP1; Old Smokey	-14.91559	-173.77340	2766.6	S97-sulfide2-HYD1	2	Hydroid	frozen	Hydroid
302	Mata Fitu	12/9/2017	2:32:00	S097	S97-bio-18	At WP4	-14.91356	-173.77910	2626.1	S97-bio18-SHR1	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
303	Mata Fitu	12/9/2017	2:32:00	S097	S97-bio-18	At WP4	-14.91356	-173.77910	2626.1	S97-bio18-SHR2	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
304	Mata Fitu	12/9/2017	2:32:00	S097	S97-bio-18	At WP4	-14.91356	-173.77910	2626.1	S97-bio18-BAR1	1	Vulcanolepas	95% EtOH; RNALater; frozen	stalked barnacle
305	Mata Fitu	12/9/2017	2:32:00	S097	S97-bio-18	At WP4	-14.91356	-173.77910	2626.1	S97-bio18-BAR2	1	Vulcanolepas	95% EtOH; RNALater; frozen	stalked barnacle
306	Mata Fitu	12/9/2017	2:32:00	S097	S97-bio-18	At WP4	-14.91356	-173.77910	2626.1	S97-bio18-BAR3	1	Vulcanolepas	95% EtOH; RNALater; frozen	stalked barnacle
307	Mata Fitu	12/9/2017	2:32:00	S097	S97-bio-18	At WP4	-14.91356	-173.77910	2626.1	S97-bio18-BAR4	1	Vulcanolepas	95% EtOH; RNALater; frozen	stalked barnacle
308	Mata Fitu	12/9/2017	2:32:00	S097	S97-bio-18	At WP4	-14.91356	-173.77910	2626.1	S97-bio18-BAR5	1	Vulcanolepas	95% EtOH; RNALater; frozen	stalked barnacle
309	Mata Fitu	12/9/2017	2:32:00	S097	S97-bio-18	At WP4	-14.91356	-173.77910	2626.1	S97-bio18-BAR6	1	Vulcanolepas	95% EtOH; RNALater; frozen	stalked barnacle
310	Mata Fitu	12/9/2017	2:32:00	S097	S97-bio-18	At WP4	-14.91356	-173.77910	2626.1	S97-bio18-BAR7	1	Vulcanolepas	95% EtOH; RNALater; frozen	stalked barnacle
311	Mata Fitu	12/9/2017	2:32:00	S097	S97-bio-18	At WP4	-14.91356	-173.77910	2626.1	S97-bio18-BAR8	1	Vulcanolepas	95% EtOH; RNALater; frozen	stalked barnacle
312	Mata Fitu	12/9/2017	2:32:00	S097	S97-bio-18	At WP4	-14.91356	-173.77910	2626.1	S97-bio18-BAR9	1	Vulcanolepas	95% EtOH; RNALater; frozen	stalked barnacle
313	Mata Fitu	12/9/2017	2:32:00	S097	S97-bio-18	At WP4	-14.91356	-173.77910	2626.1	S97-bio18-BAR10	1	Vulcanolepas	95% EtOH; RNALater; frozen	stalked barnacle
314	Mata Fitu	12/9/2017	2:32:00	S097	S97-bio-18	At WP4	-14.91356	-173.77910	2626.1	S97-bio18-BAR11	20	Vulcanolepas	bulk frozen	stalked barnacle
315	Mata Fitu	12/9/2017	2:32:00	S097	S97-bio-18	At WP4	-14.91356	-173.77910	2626.1	S97-bio18-BAR12	43	Vulcanolepas	bulk frozen	stalked barnacle
316	Mata Fitu	12/9/2017	2:32:00	S097	S97-bio-18	At WP4	-14.91356	-173.77910	2626.1	S97-bio18-PLY1	1	Polychaete	frozen	Polychaete

ID	Site	Date	Time	Dive	Sample ID	Station	Latitude	Longitude	Depth	Specimen ID	n	Shipboard ID	Preservation	Common ID
317	Mata Fitu	12/8/2017	21:03:00	S097	S97-bio-06	Old Smokey	-14.91545	-173.77371	2757.0	S97-bio6-POL1	1	Polynoid	frozen	Polynoid
318	Mata Fitu	12/8/2017	21:03:00	S097	S97-bio-06	Old Smokey	-14.91545	-173.77371	2757.0	S97-bio6-POL2	1	Polynoid	frozen	Polynoid
319	Mata Fitu	12/8/2017	21:03:00	S097	S97-bio-06	Old Smokey	-14.91545	-173.77371	2757.0	S96-bio6-SHR1	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
320	Mata Fitu	12/8/2017	21:03:00	S097	S97-bio-06	Old Smokey	-14.91545	-173.77371	2757.0	S96-bio6-SHR2	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
321	Mata Fitu	12/8/2017	21:03:00	S097	S97-bio-06	Old Smokey	-14.91545	-173.77371	2757.0	S96-bio6-SHR3	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
322	Mata Fitu	12/8/2017	21:03:00	S097	S97-bio-06	Old Smokey	-14.91545	-173.77371	2757.0	S96-bio6-SHR4	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
323	Mata Fitu	12/8/2017	21:03:00	S097	S97-bio-06	Old Smokey	-14.91545	-173.77371	2757.0	S96-bio6-SHR5	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
324	Mata Fitu	12/8/2017	21:03:00	S097	S97-bio-06	Old Smokey	-14.91545	-173.77371	2757.0	S96-bio6-SHR6	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
325	Mata Fitu	12/8/2017	21:03:00	S097	S97-bio-06	Old Smokey	-14.91545	-173.77371	2757.0	S96-bio6-SHR7	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
326	Mata Fitu	12/8/2017	21:03:00	S097	S97-bio-06	Old Smokey	-14.91545	-173.77371	2757.0	S96-bio6-SHR8	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
327	Mata Fitu	12/8/2017	21:03:00	S097	S97-bio-06	Old Smokey	-14.91545	-173.77371	2757.0	S96-bio6-SHR9	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
328	Mata Fitu	12/8/2017	21:03:00	S097	S97-bio-06	Old Smokey	-14.91545	-173.77371	2757.0	S96-bio6-SHR10	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
329	Mata Fitu	12/8/2017	21:03:00	S097	S97-bio-06	Old Smokey	-14.91545	-173.77371	2757.0	S96-bio6-SHR11	5	Opaepele shrimp	bulk frozen	Shrimp
330	South Tafu	12/10/2017	3:16:00	S098	S98-bio-19	near WP9	-15.37739	-174.24751	1741.8	S98-bio19-SHR1	1	Nautilocaris? shrimp	95% EtOH; RNALater; frozen	Shrimp
331	South Tafu	12/10/2017	3:16:00	S098	S98-bio-19	near WP9	-15.37739	-174.24751	1741.8	S98-bio19-SHR2	1	Nautilocaris? shrimp	95% EtOH; RNALater; frozen	Shrimp
332	North Tafu	12/11/2017	2:05:00	S099	S99-bio-19	near WP6	-15.36036	-174.23415	1641.9	S99-bio19-COR1	1	Chrysogorgia	95% EtOH; RNALater; dried	Coral
333	North Tafu	12/11/2017	2:05:00	S099	S99-bio-19	near WP6	-15.36036	-174.23415	1641.9	S99-bio19-GAL1	1	Chirostylid crab	95% EtOH; RNALater; frozen	Galatheid
334	North Tafu	12/11/2017	1:20:00	S099	S99-bio-17	along track	-15.35755	-174.23228	1675.8	S99-bio17-GAL1	1	Munidopsis lauensis	frozen	Galatheid
335	North Tafu	12/11/2017	1:20:00	S099	S99-bio-17	along track	-15.35755	-174.23228	1675.8	S99-bio17-POL1	1	Polynoid	frozen	Polynoid
336	North Tafu	12/11/2017	1:20:00	S099	S99-bio-17	along track	-15.35755	-174.23228	1675.8	S99-bio17-BIV1	1	Bivalve	frozen	Bivalve
337	North Tafu	12/11/2017	1:20:00	S099	S99-bio-17	along track	-15.35755	-174.23228	1675.8	S99-bio17-GAS1	1	Whelk	frozen	Gastropod
338	North Tafu	12/11/2017	1:20:00	S099	S99-bio-17	along track	-15.35755	-174.23228	1675.8	S99-bio17-SHR1	1	Alvinocaris sp. ?	95% ethanol	Shrimp
339	North Tafu	12/11/2017	1:20:00	S099	S99-bio-17	along track	-15.35755	-174.23228	1675.8	S99-bio17-SHR2	1	Alvinocaris sp. ?	95% EtOH; RNALater; frozen	Shrimp
340	Mata Ua	12/12/2017	0:08	S100	S100-bio-14	Low Flat Top Smoker	-15.01668	-173.78693	2334.9	S100-bio14-BAR1	1	Vulcanolepas	95% EtOH; RNALater; frozen	stalked barnacle

ID	Site	Date	Time	Dive	Sample ID	Station	Latitude	Longitude	Depth	Specimen ID	n	Shipboard ID	Preservation	Common ID
341	Mata Ua	12/12/2017	0:08	S100	S100-bio-14	Low Flat Top Smoker	-15.01668	-173.78693	2334.9	S100-bio14-BAR2	1	Vulcanolepas	95% EtOH; RNALater; frozen	stalked barnacle
342	Mata Ua	12/12/2017	0:08	S100	S100-bio-14	Low Flat Top Smoker	-15.01668	-173.78693	2334.9	S100-bio14-BAR3	1	Vulcanolepas	95% EtOH; RNALater; frozen	stalked barnacle
343	Mata Ua	12/12/2017	0:08	S100	S100-bio-14	Low Flat Top Smoker	-15.01668	-173.78693	2334.9	S100-bio14-BAR4	1	Vulcanolepas	95% EtOH; RNALater; frozen	stalked barnacle
344	Mata Ua	12/12/2017	0:08	S100	S100-bio-14	Low Flat Top Smoker	-15.01668	-173.78693	2334.9	S100-bio14-BAR5	1	Vulcanolepas	95% EtOH; RNALater; frozen	stalked barnacle
345	Mata Ua	12/12/2017	0:08	S100	S100-bio-14	Low Flat Top Smoker	-15.01668	-173.78693	2334.9	S100-bio14-BAR6	1	Vulcanolepas	95% EtOH; RNALater; frozen	stalked barnacle
346	Mata Ua	12/12/2017	0:08	S100	S100-bio-14	Low Flat Top Smoker	-15.01668	-173.78693	2334.9	S100-bio14-BAR7	1	Vulcanolepas	95% EtOH; RNALater; frozen	stalked barnacle
347	Mata Ua	12/12/2017	0:08	S100	S100-bio-14	Low Flat Top Smoker	-15.01668	-173.78693	2334.9	S100-bio14-BAR8	1	Vulcanolepas	95% EtOH; RNALater; frozen	stalked barnacle
348	Mata Ua	12/12/2017	0:08	S100	S100-bio-14	Low Flat Top Smoker	-15.01668	-173.78693	2334.9	S100-bio14-BAR9	1	Vulcanolepas	95% EtOH; RNALater; frozen	stalked barnacle
349	Mata Ua	12/12/2017	0:08	S100	S100-bio-14	Low Flat Top Smoker	-15.01668	-173.78693	2334.9	S100-bio14-BAR10	1	Vulcanolepas	95% EtOH; RNALater; frozen	stalked barnacle
350	Mata Ua	12/12/2017	0:08	S100	S100-bio-14	Low Flat Top Smoker	-15.01668	-173.78693	2334.9	S100-bio14-BAR11	8	Vulcanolepas	bulk frozen	stalked barnacle
351	Mata Ua	12/12/2017	0:08	S100	S100-bio-14	Low Flat Top Smoker	-15.01668	-173.78693	2334.9	S100-bio14-BAR12	5	Eochionelasmus barnacle	bulk frozen	Barnacle
352	Mata Ua	12/12/2017	0:08	S100	S100-bio-14	Low Flat Top Smoker	-15.01668	-173.78693	2334.9	S100-bio14-BAR13	13	Vulcanolepas	bulk frozen	stalked barnacle
353	Mata Ua	12/12/2017	0:13	S100	S100-sulfide-16	Low Flat Top Smoker	-15.01668	-173.78693	2335.0	S100-sulfide16-BAR1	1	Eochionelasmus barnacle	frozen	Barnacle
354	Mata Ua	12/12/2017	0:13	S100	S100-sulfide-16	Low Flat Top Smoker	-15.01668	-173.78693	2335.0	S100-sulfide16-PLY1	2	Polychaetes	frozen	Polychaete
355	Mata Ua	12/11/2017	23:24	S100	S100-bio-11	Low Flat Top Smoker	-15.01668	-173.78693	2334.7	S100-bio11-MUS1	1	Bathymodiolus brevior	piece of gill and foot each 95% EtOH; RNALater; frozen; viscera frozen; shell dried	Mussel
356	Mata Ua	12/11/2017	23:17	S100	S100-bio-10	Low Flat Top Smoker	-15.01668	-173.78693	2334.7	S100-bio10-SHR1	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
357	Mata Ua	12/11/2017	23:17	S100	S100-bio-10	Low Flat Top Smoker	-15.01668	-173.78693	2334.7	S100-bio10-SHR2	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
358	Mata Ua	12/11/2017	23:17	S100	S100-bio-10	Low Flat Top Smoker	-15.01668	-173.78693	2334.7	S100-bio10-SHR3	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
359	Mata Ua	12/11/2017	23:17	S100	S100-bio-10	Low Flat Top Smoker	-15.01668	-173.78693	2334.7	S100-bio10-GAS1	1	Ifremeria nautilei	95% EtOH; RNALater; frozen	Gastropod
360	Mata Ua	12/11/2017	23:17	S100	S100-bio-10	Low Flat Top Smoker	-15.01668	-173.78693	2334.7	S100-bio10-POL1	1	Polynoid Large	frozen	Polynoid
361	Mata Ua	12/11/2017	23:17	S100	S100-bio-10	Low Flat Top Smoker	-15.01668	-173.78693	2334.7	S100-bio10-POL2	1	Polynoid small	frozen	Polynoid
362	Mata Ua	12/11/2017	23:17	S100	S100-bio-10	Low Flat Top Smoker	-15.01668	-173.78693	2334.7	S100-bio10-GAS2	7	Limpet 2	frozen	Gastropod

ID	Site	Date	Time	Dive	Sample ID	Station	Latitude	Longitude	Depth	Specimen ID	n	Shipboard ID	Preservation	Common ID
363	Mata Ua	12/12/2017	2:08	S100	S100-bio-20	Low Flat Top Smoker	-15.01679	-173.78695	2340.0	S100-bio20-POL1	1	Polynoid Large	frozen	Gastropod
364	Mata Ua	12/12/2017	2:08	S100	S100-bio-20	Low Flat Top Smoker	-15.01679	-173.78695	2340.0	S100-bio20-POL2	1	Polynoid Large	frozen	Gastropod
365	Mata Ua	12/12/2017	2:08	S100	S100-bio-20	Low Flat Top Smoker	-15.01679	-173.78695	2340.0	S100-bio20-SHR1	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
366	Mata Ua	12/12/2017	2:08	S100	S100-bio-20	Low Flat Top Smoker	-15.01679	-173.78695	2340.0	S100-bio20-SHR2	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
367	Mata Ua	12/12/2017	2:08	S100	S100-bio-20	Low Flat Top Smoker	-15.01679	-173.78695	2340.0	S100-bio20-SHR3	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
368	Mata Ua	12/12/2017	2:08	S100	S100-bio-20	Low Flat Top Smoker	-15.01679	-173.78695	2340.0	S100-bio20-SHR4	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
369	Mata Ua	12/12/2017	2:08	S100	S100-bio-20	Low Flat Top Smoker	-15.01679	-173.78695	2340.0	S100-bio20-POL3	1	Polynoid small	frozen	Polynoid
370	Mata Ua	12/12/2017	2:08	S100	S100-bio-20	Low Flat Top Smoker	-15.01679	-173.78695	2340.0	S100-bio20-POL3	1	Gastropod	frozen	Gastropod
371	Mata Ua	12/12/2017	2:08 or 3:12	S100	S100-bio-24	Probably Low Flat Top Smoker	-15.01675	-173.78597	2317.9	S100-bio24-BAR1	1	Vulcanolepas	95% EtOH; RNALater; frozen	stalked barnacle
372	Mata Ua	12/12/2017	2:08 or 3:12	S100	S100-bio-24	Probably Low Flat Top Smoker	-15.01675	-173.78597	2317.9	S100-bio24-BAR2	1	Vulcanolepas	95% EtOH; RNALater; frozen	stalked barnacle
373	Mata Ua	12/12/2017	2:08 or 3:12	S100	S100-bio-24	Probably Low Flat Top Smoker	-15.01675	-173.78597	2317.9	S100-bio24-BAR3	1	Vulcanolepas	95% EtOH; RNALater; frozen	stalked barnacle
374	Mata Ua	12/12/2017	2:08 or 3:12	S100	S100-bio-24	Probably Low Flat Top Smoker	-15.01675	-173.78597	2317.9	S100-bio24-BAR4	1	Vulcanolepas	95% EtOH; RNALater; frozen	stalked barnacle
375	Mata Ua	12/12/2017	2:08 or 3:12	S100	S100-bio-24	Probably Low Flat Top Smoker	-15.01675	-173.78597	2317.9	S100-bio24-BAR5	1	Vulcanolepas	95% EtOH; RNALater; frozen	stalked barnacle
376	Mata Ua	12/12/2017	2:08 or 3:12	S100	S100-bio-24	Probably Low Flat Top Smoker	-15.01675	-173.78597	2317.9	S100-bio24-BAR6	1	Vulcanolepas	95% EtOH; RNALater; frozen	stalked barnacle
377	Mata Ua	12/12/2017	2:08 or 3:12	S100	S100-bio-24	Probably Low Flat Top Smoker	-15.01675	-173.78597	2317.9	S100-bio24-BAR7	1	Vulcanolepas	95% EtOH; RNALater; frozen	stalked barnacle
378	Mata Ua	12/12/2017	2:08 or 3:12	S100	S100-bio-24	Probably Low Flat Top Smoker	-15.01675	-173.78597	2317.9	S100-bio24-BAR8	1	Vulcanolepas	95% EtOH; RNALater; frozen	stalked barnacle
379	Mata Ua	12/12/2017	2:08 or 3:12	S100	S100-bio-24	Probably Low Flat Top Smoker	-15.01675	-173.78597	2317.9	S100-bio24-BAR9	1	Vulcanolepas	95% EtOH; RNALater; frozen	stalked barnacle
380	Mata Ua	12/12/2017	2:08 or 3:12	S100	S100-bio-24	Probably Low Flat Top Smoker	-15.01675	-173.78597	2317.9	S100-bio24-BAR10	1	Vulcanolepas	95% EtOH; RNALater; frozen	stalked barnacle
381	Mata Ua	12/12/2017	2:08 or 3:12	S100	S100-bio-24	Probably Low Flat Top Smoker	-15.01675	-173.78597	2317.9	S100-bio24-BAR11	32	Vulcanolepas	bulk frozen	stalked barnacle

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382	Mata Ua	12/12/2017	2:08 or 3:12	S100	S100-bio-24	Probably Big Smoke	-15.01675	-173.78597	2317.9	S100-bio24-SHR1	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
383	Mata Ua	12/12/2017	2:08 or 3:12	S100	S100-bio-24	Probably Big Smoke	-15.01675	-173.78597	2317.9	S100-bio24-SHR2	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
384	Mata Ua	12/12/2017	2:08 or 3:12	S100	S100-bio-24	Probably Big Smoke	-15.01675	-173.78597	2317.9	S100-bio24-SHR3	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
385	Mata Ua	12/12/2017	2:08 or 3:12	S100	S100-bio-24	Probably Big Smoke	-15.01675	-173.78597	2317.9	S100-bio24-SHR4	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
386	Mata Ua	12/12/2017	2:08 or 3:12	S100	S100-bio-24	Probably Big Smoke	-15.01675	-173.78597	2317.9	S100-bio24-GAS1	1	Ifremeria nautilei	95% EtOH; RNALater; frozen	Gastropod
387	Mata Ua	12/12/2017	2:08 or 3:12	S100	S100-bio-24	Probably Big Smoke	-15.01675	-173.78597	2317.9	S100-bio24-GAS2	1	Limpet 2	frozen	Gastropod
388	Mata Ua	12/12/2017	3:16	S100	S100-bio-25	Big Smoke	-15.01675	-173.78597	2317.9	S100-bio25-POL1	3	Polynoid Large	frozen	Polynoid
389	Mata Ua	12/12/2017	3:16	S100	S100-bio-25	Big Smoke	-15.01675	-173.78597	2317.9	S100-bio25-PLY1	4	Paralvinella worm	frozen	Polychaete
390	Mata Ua	12/12/2017	3:16	S100	S100-bio-25	Big Smoke	-15.01675	-173.78597	2317.9	S100-bio25-GAS1	1	Alviniconcha sp.	95% EtOH; RNALater; frozen	Gastropod
391	Mata Ua	12/12/2017	3:16	S100	S100-bio-25	Big Smoke	-15.01675	-173.78597	2317.9	S100-bio25-GAS2	1	Alviniconcha sp.	95% EtOH; RNALater; frozen	Gastropod
392	Mata Ua	12/12/2017	3:16	S100	S100-bio-25	Big Smoke	-15.01675	-173.78597	2317.9	S100-bio25-GAS3	1	Alviniconcha sp.	95% EtOH; RNALater; frozen	Gastropod
393	Mata Ua	12/12/2017	3:16	S100	S100-bio-25	Big Smoke	-15.01675	-173.78597	2317.9	S100-bio25-GAS4	1	Alviniconcha sp.	95% EtOH; RNALater; frozen	Gastropod
394	Mata Ua	12/12/2017	3:16	S100	S100-bio-25	Big Smoke	-15.01675	-173.78597	2317.9	S100-bio25-GAS5	1	Alviniconcha sp.	95% EtOH; RNALater; frozen	Gastropod
395	Mata Ono	12/12/2017	23:13	S101	S101-rock-05	50 m SW of WP2	-14.94501	-173.79875	2601.6	S101-rock5-HYD1	1	Hydroid	frozen	Hydroid
396	Mata Ono	12/13/2017	4:23	S101	S101-bio-18	Dark Castle Vent	-14.94058	-173.79956	2360.0	S101-bio18-SHR1	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
397	Mata Ono	12/13/2017	4:23	S101	S101-bio-18	Dark Castle Vent	-14.94058	-173.79956	2360.0	S101-bio18-POL1	5	Polynoid	frozen	Polynoid
398	Mata Ono	12/13/2017	4:23	S101	S101-bio-18	Dark Castle Vent	-14.94058	-173.79956	2360.0	S101-bio18-POL2	8	Polynoid	frozen	Polynoid
399	Mata Ono	12/13/2017	4:23	S101	S101-bio-18	Dark Castle Vent	-14.94058	-173.79956	2360.0	S101-bio18-CRB1	1	Brachyuran crab	95% EtOH; RNALater; frozen	Crab
400	Mata Ono	12/13/2017	4:23	S101	S101-bio-18	Dark Castle Vent	-14.94058	-173.79956	2360.0	S101-bio18-GAS1	1	Ifremeria nautilei	95% EtOH; RNALater; frozen	Gastropod
401	Mata Ono	12/13/2017	4:23	S101	S101-bio-18	Dark Castle Vent	-14.94058	-173.79956	2360.0	S101-bio18-GAS2	1	Ifremeria nautilei	95% EtOH; RNALater; frozen	Gastropod
402	Mata Ono	12/13/2017	4:23	S101	S101-bio-18	Dark Castle Vent	-14.94058	-173.79956	2360.0	S101-bio18-GAS3	1	Ifremeria nautilei	95% EtOH; RNALater; frozen	Gastropod
403	Mata Ono	12/13/2017	4:23	S101	S101-bio-18	Dark Castle Vent	-14.94058	-173.79956	2360.0	S101-bio18-GAS4	1	Ifremeria nautilei	95% EtOH; RNALater; frozen	Gastropod
404	Mata Ono	12/13/2017	4:23	S101	S101-bio-18	Dark Castle Vent	-14.94058	-173.79956	2360.0	S101-bio18-GAS5	1	Ifremeria nautilei	95% EtOH; RNALater; frozen	Gastropod
405	Mata Ono	12/13/2017	4:23	S101	S101-bio-18	Dark Castle Vent	-14.94058	-173.79956	2360.0	S101-bio18-GAS6	1	Ifremeria nautilei	95% EtOH; RNALater; frozen	Gastropod

ID	Site	Date	Time	Dive	Sample ID	Station	Latitude	Longitude	Depth	Specimen ID	n	Shipboard ID	Preservation	Common ID
406	Mata Ono	12/13/2017	4:23	S101	S101-bio-18	Dark Castle Vent	-14.94058	-173.79956	2360.0	S101-bio18-GAS7	2	Limpet 1	frozen	Gastropod
407	Mata Ono	12/13/2017	4:23	S101	S101-bio-18	Dark Castle Vent	-14.94058	-173.79956	2360.0	S101-bio18-GAS8	1	Limpet 1	frozen	Gastropod
408	Mata Ono	12/14/2017	3:20	S102	S102-bio-21	Bodaceous Booming Beehive (B^3)	-14.94058	-173.79956	2360.2	S102-bio21-SHR1	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
409	Mata Ono	12/14/2017	3:20	S102	S102-bio-21	Bodaceous Booming Beehive (B^3)	-14.94058	-173.79956	2360.2	S102-bio21-SHR2	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
410	Mata Ono	12/14/2017	3:20	S102	S102-bio-21	Bodaceous Booming Beehive (B^3)	-14.94058	-173.79956	2360.2	S102-bio21-SHR3	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
411	Mata Ono	12/14/2017	3:20	S102	S102-bio-21	Bodaceous Booming Beehive (B^3)	-14.94058	-173.79956	2360.2	S102-bio21-SHR4	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
412	Mata Ono	12/14/2017	3:20	S102	S102-bio-21	Bodaceous Booming Beehive (B^3)	-14.94058	-173.79956	2360.2	S102-bio21-SHR5	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
413	Mata Ono	12/14/2017	3:20	S102	S102-bio-21	Bodaceous Booming Beehive (B^3)	-14.94058	-173.79956	2360.2	S102-bio21-SHR6	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
414	Mata Ono	12/14/2017	3:20	S102	S102-bio-21	Bodaceous Booming Beehive (B^3)	-14.94058	-173.79956	2360.2	S102-bio21-POL1	1	Polynoid Large	frozen	Polynoid
415	Mata Ono	12/14/2017	3:20	S102	S102-bio-21	Bodaceous Booming Beehive (B^3)	-14.94058	-173.79956	2360.2	S102-bio21-GAS1	1	Limpet 1	frozen	Gastropod
416	Mata Ono	12/14/2017	1:17	S102	S102-bio-13	40 m SE of WP17	-14.94041	-173.79967	2357.6	S102-bio13-GAS1	1	Ifremeria nautilei	95% EtOH; RNALater; frozen	Gastropod
417	Mata Ono	12/14/2017	1:17	S102	S102-bio-13	40 m SE of WP17	-14.94041	-173.79967	2357.6	S102-bio13-GAS2	1	Ifremeria nautilei	95% EtOH; RNALater; frozen	Gastropod
418	Mata Ono	12/14/2017	1:17	S102	S102-bio-13	40 m SE of WP17	-14.94041	-173.79967	2357.6	S102-bio13-GAS3	1	Ifremeria nautilei	95% EtOH; RNALater; frozen	Gastropod
419	Mata Ono	12/14/2017	1:17	S102	S102-bio-13	40 m SE of WP17	-14.94041	-173.79967	2357.6	S102-bio13-GAS4	1	Ifremeria nautilei	95% EtOH; RNALater; frozen	Gastropod
420	Mata Ono	12/14/2017	1:17	S102	S102-bio-13	40 m SE of WP17	-14.94041	-173.79967	2357.6	S102-bio13-GAS5	1	Ifremeria nautilei	95% EtOH; RNALater; frozen	Gastropod
421	Mata Ono	12/14/2017	1:17	S102	S102-bio-13	40 m SE of WP17	-14.94041	-173.79967	2357.6	S102-bio13-GAS6	5	Limpet 2	frozen	Gastropod

ID	Site	Date	Time	Dive	Sample ID	Station	Latitude	Longitude	Depth	Specimen ID	n	Shipboard ID	Preservation	Common ID
422	Mata Ono	12/14/2017	1:17	S102	S102-bio-13	40 m SE of WP17	-14.94041	-173.79967	2357.6	S102-bio13-GAS7	1	Limpet 2	frozen	Gastropod
423	Mata Ono	12/14/2017	1:17	S102	S102-bio-13	40 m SE of WP17	-14.94041	-173.79967	2357.6	S102-bio13-GAS8	5	Limpet 1?	frozen	Gastropod
424	Mata Ono	12/14/2017	1:17	S102	S102-bio-13	40 m SE of WP17	-14.94041	-173.79967	2357.6	S102-bio13-GAS9	2	Limpet 1	frozen	Gastropod
425	Mata Ono	12/14/2017	1:17	S102	S102-bio-13	40 m SE of WP17	-14.94041	-173.79967	2357.6	S102-bio13-GAS10	1	Limpet 2	frozen	Gastropod
426	Mata Ono	12/14/2017	1:17	S102	S102-bio-13	40 m SE of WP17	-14.94041	-173.79967	2357.6	S102-bio13-GAS11	14	Limpet	frozen	Gastropod
427	Mata Ono	12/13/2017	20:40	S102	S102-rock-05	~10 m upslope	-14.94267	-173.80747	2675.6	S102-rock5-HYD1	2	Hydroid	frozen	Hydroid
428	Mata Ono	12/14/2017	2:26	S102	S102-bio-18	Rock Star	-14.94054	-173.79938	2351.2	S102-bio18-GAS1	1	Alviniconcha sp.	95% EtOH; RNALater; frozen	Gastropod
429	Mata Ono	12/14/2017	2:26	S102	S102-bio-18	Rock Star	-14.94054	-173.79938	2351.2	S102-bio18-GAS2	1	Alviniconcha sp.	95% EtOH; RNALater; frozen	Gastropod
430	Mata Ono	12/14/2017	2:26	S102	S102-bio-18	Rock Star	-14.94054	-173.79938	2351.2	S102-bio18-GAS3	1	Alviniconcha sp. Shell only	frozen	Gastropod
431	Mata Ono	12/14/2017	2:26	S102	S102-bio-18	Rock Star	-14.94054	-173.79938	2351.2	S102-bio18-POL1	1	Polynoid Large	frozen	Polynoid
432	Mata Ono	12/14/2017	2:26	S102	S102-bio-18	Rock Star	-14.94054	-173.79938	2351.2	S102-bio18-SHR1	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
433	Mata Ono	12/14/2017	2:26	S102	S102-bio-18	Rock Star	-14.94054	-173.79938	2351.2	S102-bio18-SHR2	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
434	Mata Ono	12/14/2017	2:26	S102	S102-bio-18	Rock Star	-14.94054	-173.79938	2351.2	S102-bio18-SHR3	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
435	Mata Ono	12/14/2017	2:26	S102	S102-bio-18	Rock Star	-14.94054	-173.79938	2351.2	S102-bio18-GAS4	1	Limpet 1	frozen	Gastropod
436	Mata Ono	12/14/2017	2:26	S102	S102-bio-18	Rock Star	-14.94054	-173.79938	2351.2	S102-bio18-GAS5	1	Ifremeria nautilei	95% EtOH; RNALater; frozen	Gastropod
437	Mata Ono	12/14/2017	2:26	S102	S102-bio-18	Rock Star	-14.94054	-173.79938	2351.2	S102-bio18-GAS6	1	Ifremeria nautilei	95% EtOH; RNALater; frozen	Gastropod
438	Mata Ono	12/14/2017	2:26	S102	S102-bio-18	Rock Star	-14.94054	-173.79938	2351.2	S102-bio18-CRB1	1	Brachyuran crab	95% EtOH; RNALater; frozen	Crab
439	Mata Ono	12/14/2017	2:26	S102	S102-bio-18	Rock Star	-14.94054	-173.79938	2351.2	S102-bio18-GAS7	1	Limpet 1	95% EtOH; RNALater; frozen	Gastropod
440	Mata Ono	12/14/2017	2:26	S102	S102-bio-18	Rock Star	-14.94054	-173.79938	2351.2	S102-bio18-GAS8	1	Alviniconcha sp.	95% EtOH; RNALater; frozen	Gastropod
441	Mata Ono	12/14/2017	1:24	S102	S102-bio-14	40 m SE of WP17	-14.94041	-173.79967	2357.7	S102-bio14-ANM1	1	Anemone	95% EtOH; RNALater; frozen	Anemone
442	Mata Ono	12/14/2017	1:24	S102	S102-bio-14	40 m SE of WP17	-14.94041	-173.79967	2357.7	S102-bio14-ANM2	1	Anemone	95% EtOH; RNALater; frozen	Anemone
443	Mata Ono	12/14/2017	1:24	S102	S102-bio-14	40 m SE of WP17	-14.94041	-173.79967	2357.7	S102-bio14-ANM3	1	Anemone	95% EtOH; RNALater; frozen	Anemone
444	Mata Ono	12/14/2017	1:24	S102	S102-bio-14	40 m SE of WP17	-14.94041	-173.79967	2357.7	S102-bio14-GAS9	1	Limpet 1	frozen	Gastropod
445	Mata Ono	12/14/2017	2:26	S102	S102-bio-18	Rock Star	-14.94054	-173.79938	2351.2	S102-bio18-SHR4	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp

ID	Site	Date	Time	Dive	Sample ID	Station	Latitude	Longitude	Depth	Specimen ID	n	Shipboard ID	Preservation	Common ID
446	Mata Ono	12/14/2017	2:26	S102	S102-bio-18	Rock Star	-14.94054	-173.79938	2351.2	S102-bio18-SHR5	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
447	West Mata	12/15/2017	3:32	S103	S103-bio-26	29 m NW of WP20	-15.09374	-173.74622	1267.7	S103-bio26-SHR1	1	Alvinocarisshrimp	95% EtOH; RNALater; frozen	Shrimp
448	West Mata	12/15/2017	3:32	S103	S103-bio-26	29 m NW of WP20	-15.09374	-173.74622	1267.7	S103-bio26-SHR2	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
449	West Mata	12/15/2017	3:32	S103	S103-bio-26	29 m NW of WP20	-15.09374	-173.74622	1267.7	S103-bio26-SHR3	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
450	West Mata	12/15/2017	3:32	S103	S103-bio-26	29 m NW of WP20	-15.09374	-173.74622	1267.7	S103-bio26-SHR4	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
451	West Mata	12/15/2017	3:32	S103	S103-bio-26	29 m NW of WP20	-15.09374	-173.74622	1267.7	S103-bio26-SHR5	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
452	West Mata	12/15/2017	3:32	S103	S103-bio-26	29 m NW of WP20	-15.09374	-173.74622	1267.7	S103-bio26-SHR6	1	Opaepele shrimp	frozen	Shrimp
453	West Mata	12/15/2017	3:32	S103	S103-bio-26	29 m NW of WP20	-15.09374	-173.74622	1267.7	S103-bio26-SHR7	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
454	West Mata	12/15/2017	3:32	S103	S103-bio-26	29 m NW of WP20	-15.09374	-173.74622	1267.7	S103-bio26-POL1	1	Polynoid Large	frozen	Polynoid
455	West Mata	12/15/2017	3:32	S103	S103-bio-26	29 m NW of WP20	-15.09374	-173.74622	1267.7	S103-bio26-POL2	1	Polynoid small	frozen	Polynoid
456	West Mata	12/15/2017	3:32	S103	S103-bio-26	29 m NW of WP20	-15.09374	-173.74622	1267.7	S103-bio26-GAS1	1	Gastropod	frozen	Gastropod
457	West Mata	12/15/2017	2:24	S103	S103-bio-23	~40m SE of WP18	-15.09313	-173.74568	1289.1	S103-bio23-SHR1	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
458	West Mata	12/15/2017	2:24	S103	S103-bio-23	~40m SE of WP18	-15.09313	-173.74568	1289.1	S103-bio23-SHR2	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
459	West Mata	12/15/2017	2:24	S103	S103-bio-23	~40m SE of WP18	-15.09313	-173.74568	1289.1	S103-bio23-POL1	2	Polynoid small	frozen	Polynoid
460	West Mata	12/14/2017	18:58	S103	S103-bio-03	20 m east of WP2	-15.08813	-173.73794	1589.4	S103-bio3-SHR1	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
461	West Mata	12/14/2017	18:58	S103	S103-bio-03	20 m east of WP2	-15.08813	-173.73794	1589.4	S103-bio3-SHR2	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
462	West Mata	12/14/2017	18:58	S103	S103-bio-03	20 m east of WP2	-15.08813	-173.73794	1589.4	S103-bio3-POL1	1	Polynoid small	frozen	Polynoid
463	West Mata	12/14/2017	18:58	S103	S103-bio-03	20 m east of WP2	-15.08813	-173.73794	1589.4	S103-bio3-POL2	1	Polynoid small	frozen	Polynoid
464	West Mata	12/14/2017	21:00	S103	S103-bio-09	Spatter mound	-15.08923	-173.73887	1519.9	S103-bio9-SHR1	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
465	West Mata	12/14/2017	21:00	S103	S103-bio-09	Spatter mound	-15.08923	-173.73887	1519.9	S103-bio9-SHR2	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
466	West Mata	12/14/2017	21:00	S103	S103-bio-09	Spatter mound	-15.08923	-173.73887	1519.9	S103-bio9-SHR3	1	Opaepele shrimp	95% EtOH; RNALater; frozen	Shrimp
467	West Mata	12/14/2017	21:00	S103	S103-bio-09	Spatter mound	-15.08923	-173.73887	1519.9	S103-bio9-POL1	7	Polynoid small	frozen	Polynoid
468	West Mata	12/14/2017	21:00	S103	S103-bio-09	Spatter mound	-15.08923	-173.73887	1519.9	S103-bio9-BAC1	2	Bacteria sac?	frozen	Bacteria?
469	Mata Taha	12/15/2017	21:43	S104	S104-bio-07	50 m East of WP4	-15.03629	-173.78394	2308.8	S104-bio7-DEC1	1	Polychelida	95% EtOH; RNALater; frozen	Decapod

ID	Site	Date	Time	Dive	Sample ID	Station	Latitude	Longitude	Depth	Specimen ID	n	Shipboard ID	Preservation	Common ID
470	Mata Taha	12/16/2017	1:09	S104	S104-rock-16	150 m SW of WP4	-15.04044	-173.79022	2239.8	S104-rock16-HYD1	1	Hydroid	frozen	Hydroid
471	Mata Taha	12/16/2017	3:13	S104	S104-rock-20	50 m NW of WP11	-15.04170	-173.78536	2161.4	S104-rock20-HYD1	1	Hydroid	frozen	Hydroid
472	Mata Taha	12/15/2017	23:59	S104	S104-sulfide-13	100 m SW of WP6	-15.03914	-173.78965	2261.1	S104-sulfide13-HYD1	1	Hydroid	frozen	Hydroid
473	Mata Taha	12/15/2017	23:59	S104	S104-sulfide-13	100 m SW of WP6	-15.03914	-173.78965	2261.1	S104-sulfide13-HYD2	1	Hydroid	frozen	Hydroid
474	Mata Taha	12/15/2017	23:59	S104	S104-sulfide-13	100 m SW of WP6	-15.03914	-173.78965	2261.1	S104-sulfide13-SPO1	1	Sponge 1	frozen	Sponge
475	Mata Taha	12/15/2017	23:59	S104	S104-sulfide-13	100 m SW of WP6	-15.03914	-173.78965	2261.1	S104-sulfide13-SPO2	3	Sponge 2	frozen	Sponge
476	Mata Taha	12/15/2017	23:59	S104	S104-sulfide-13	100 m SW of WP6	-15.03914	-173.78965	2261.1	S104-sulfide13-AMP1	1	Amphipod	frozen	Amphipod
477	Mata Taha	12/15/2017	23:59	S104	S104-sulfide-13	100 m SW of WP6	-15.03914	-173.78965	2261.1	S104-sulfide13-BAR1	1	Barnacle	frozen	Barnacle
478	Mata Taha	12/16/2017	0:12	S104	S104-bio-14	100 m SW of WP6	-15.03914	-173.78965	2260.3	S104-bio14-COR1	1	Chrysogorgia	95% EtOH; RNALater; frozen	Coral
479	Mata Taha	12/16/2017	0:12	S104	S104-bio-14	100 m SW of WP6	-15.03914	-173.78965	2260.3	S104-bio14-GAL1	1	Chirostylid crab	95% EtOH; RNALater; frozen	Galatheid
480	Mata Taha	12/16/2017	2:53	S104	S104-rock-19		-15.04029	-173.78604	2197.6	S104-rock19-COR1	1	Coral	frozen	Coral
481	Northern Dacite	12/16/2017	23:09	S105	S105-bio-14	SE of WP5 ~50 m?	-14.89831	-173.94227	2678.8	S105-bio-14-COR1	1	Pseudochryso gorgia	95% EtOH; RNALater; frozen; dried	Coral
482	Northern Dacite	12/16/2017	23:09	S105	S105-bio-14	SE of WP5 ~50 m?	-14.89831	-173.94227	2678.8	S105-bio-14-GAL1	1	Chirostylid	95% EtOH; RNALater; frozen; dried	Galatheid

4.6 Mapping

4.6.1 AUV Sentry Dives – Leg 1 – Multibeam mapping and photo surveys

Bill Chadwick and Susan Merle

The primary goal of the AUV Sentry dives was to collect multibeam sonar data on Leg 1 in areas where we planned to make ROV SuBastian dives on Leg 2. These areas included recent eruption sites on West Mata Seamount and active hydrothermal vent fields on Mata Fitu, Mata Tolu and Mata Ua. Secondary goals included taking near-bottom photographs in selected areas for ground truth and recording MAPR data on Sentry for the purpose of hydrothermal plume mapping along the near-bottom sonar and photo-transect tracklines. The Sentry MAPR data will be described in a separate section.

The mobilization of Sentry on R/V Falkor was challenging because of high traffic and limited space at the pier in Apia, Samoa. The Falkor had to move off the pier prior to the arrival of the Sentry team and couldn't get back to load the Sentry vehicle on board for a couple days after the planned cruise start date. The decision was made to go to the work site for ship-based multibeam surveys and then return to Apia to get Sentry 1.5 days later. Once Falkor was able to get to the pier, the mobilization proceeded quickly.

The Sentry dives for multibeam sonar mapping were conducted such that: (1) the survey altitude was 65-70 meters for ~1.5 meter lateral resolution, (2) the survey speed was ~1.8 knots, (3) dive durations were between 17-23 hours, with turn-arounds of 12-16 hours in between dives, (4) AUV Sentry was within acoustic communication range for navigation most of the time, and (5) a battery powered and internally recording PMEL MAPR instrument was mounted on Sentry for all dives.

There were six Sentry science dives on Leg 1 (457, 458, 460, 461, 462, and 463), plus one short (6hr) engineering dive (459). The first 3 dives were at West Mata (summit, NE and SE) the next 2 dives were at Mata Fitu, and Mata Tolu/Ua, and the last dive was at West Mata SW. However, only the first three of the dives collected high-quality bathymetry data. On the remaining three dives, problems with the primary Reson sonar and then the back-up sonar prevented successful multibeam data acquisition, which was disappointing. The primary sonar stopped working after about 90% of the planned mapping on dive 460 (~10% lost). The secondary sonar was then put on the vehicle and worked for about the first 15% or the survey planned on dive 461, but then also failed and the remaining ~85% of the survey was lost. Neither sonars were on the vehicle for dive 462, because troubleshooting and attempted repairs were still being conducted on both of them on the ship. The primary sonar was placed back on the AUV for dive 463, but only collected very noisy data that were far below the usual mapping quality, so were only marginally useful (and only after heroic post-dive editing on shore by the Sentry group). On the bright side, the mapping data for the first three dives were excellent.

Photo surveys were conducted on dives 458, 460, and 463. During dives 458 and 460 the photo surveys were short reconnaissance transects over areas of depth change between ship-based multibeam surveys. The dive 463 survey was more extensive due to the unlikely possibility of a working sonar. The image quality, although slightly dark, was sufficient for identifying seafloor features (e.g., young vs. old lava flows) and aided in planning subsequent ROV dives.

Sentry Dive Summaries

<u>Sentry Dive 457</u>

This dive surveyed West Mata Summit and the upper NE and SW rifts. The Sentry AUV multibeam surveys aimed, in part, to resurvey areas that had been mapped with the MBARI AUV *D. Allan B.* in 2009. The 2017 Sentry survey targeted the recent eruption sites at the summit and on the upper parts of both rift zones that had previously been identified as depth changes from repeated ship-based multibeam surveys. This survey also provided a valuable base-map for exploration and sampling with ROV SuBastian dives S85, S87, and S103.

<u>Sentry Dive 458</u>

This dive mapped two separate recent eruption sites on the NE flank of West Mata, and the lower part of the NE rift zone. Both eruption sites had been identified from depth changes between ship-based multibeam surveys in 2011-2016. The first site was a ridge of pillow lavas on the steep NE slope, and the second was located at the deep NE base of the volcano. The latter site was affectionately nicknamed “the muffin”, because the Sentry survey revealed that lava had apparently intruded into sediments, domed them upward, and then lava erupted onto the seafloor around the and cracked mound of uplifted sediment. One photo transect was collected over the NE flank pillow ridge and another was run over “the muffin” and surrounding lava flows.

Sentry Dive 460

Dive 460 was conducted on the SE side of West Mata and started at the SW base of East Mata where a possible area of depth change between ship-based surveys was located, but a photo transect there showed only old eroded lava outcrops, indicating it is probably not a recent eruption site. Next Sentry surveyed up the SE flank of West Mata and the middle east rift zone where two areas of depth change had been identified between ship-based multibeam surveys between February 2016 and this cruise (December 2017). Photo transects were run over both areas of depth change. The area on the SE flank appeared to be a very smooth slope in the bathymetry and photos revealed fragmental debris that coarsened upslope and included areas of yellow microbial mats. The area on the middle east rift zone was mapped on Dive 457 and has a distinctive shingled lava flow morphology and the photo survey showed very young pillow lavas that were locally completely covered by thick accumulations of volcanic ash. In places, the ash had collapsed downward, apparently into void space among the buried pillows, forming small circular pits. Some of the pits had yellow microbial mat floc in the bottoms, apparently picked up and transported from nearby areas by bottom currents. At first these pits appeared to have positive relief in the Sentry photos, so were very confusing until the third dimension was revealed during ROV SuBastian dives. After the last photo transect, Sentry collected multibeam bathymetry over the middle NE rift zone, connecting the data surveyed on dive 457 and 458. The primary sonar failed near the end of this dive.

Sentry Dive 461

This dive attempted to map the summit of Mata Fitu, but the back-up multibeam sonar also failed after the first few tracklines were completed. Nevertheless, many old and a few active hydrothermal vent chimneys were revealed in the new bathymetry in the SE part of the survey. Unfortunately, the multibeam sonar died before the previously known hydrothermal vent field at Mata Fitu could be mapped.

Sentry Dive 462

Dive 462 was conducted between the summits of Mata Tolu and Mata Ua (both North Matas). Unfortunately neither multibeam sonars were on board for this dive since they were both being worked on the ship. Sentry only collected sensor data on this dive.

Sentry Dive 463

The final Sentry dive was along the lower SW rift zone of West Mata. The primary multibeam sonar was back on the vehicle after an attempted repair, and it did collect some data, but it was far noisier than usual, and so it was not very useful, despite a heroic attempt to edit the data by the Sentry team on shore. The Sentry tracklines during dive 463 crossed over two areas of depth change detected between ship-based multibeam surveys. The deepest one was at the base of West Mata’s SW rift and appeared between surveys in May 2010 and November 2011. The other area, just to the east, appeared between surveys in June 1996 and November 2008. The latter area of depth change is at the western edge of the area mapped by the MBARI Mapping AUV in May 2009, and so was probably a post-eruption survey. Photo survey lines were collected over both of the areas of depth change at the end of the dive. The photos confirmed that both areas of depth change appeared to be recent eruption sites.

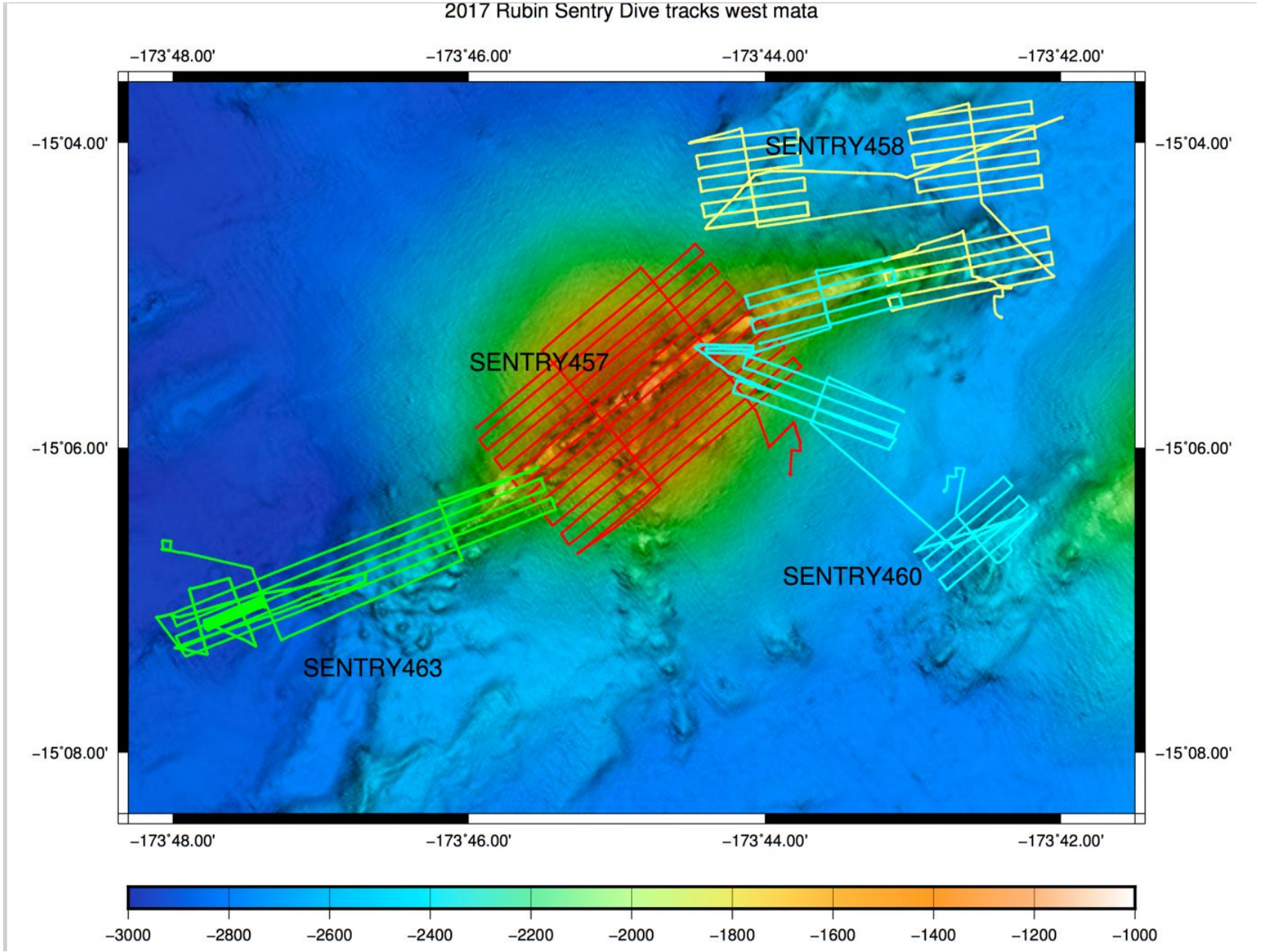


Figure 4.6.1-1 Map of tracklines from AUV Sentry dives 457, 458, 460, and 463 at West Mata volcano.

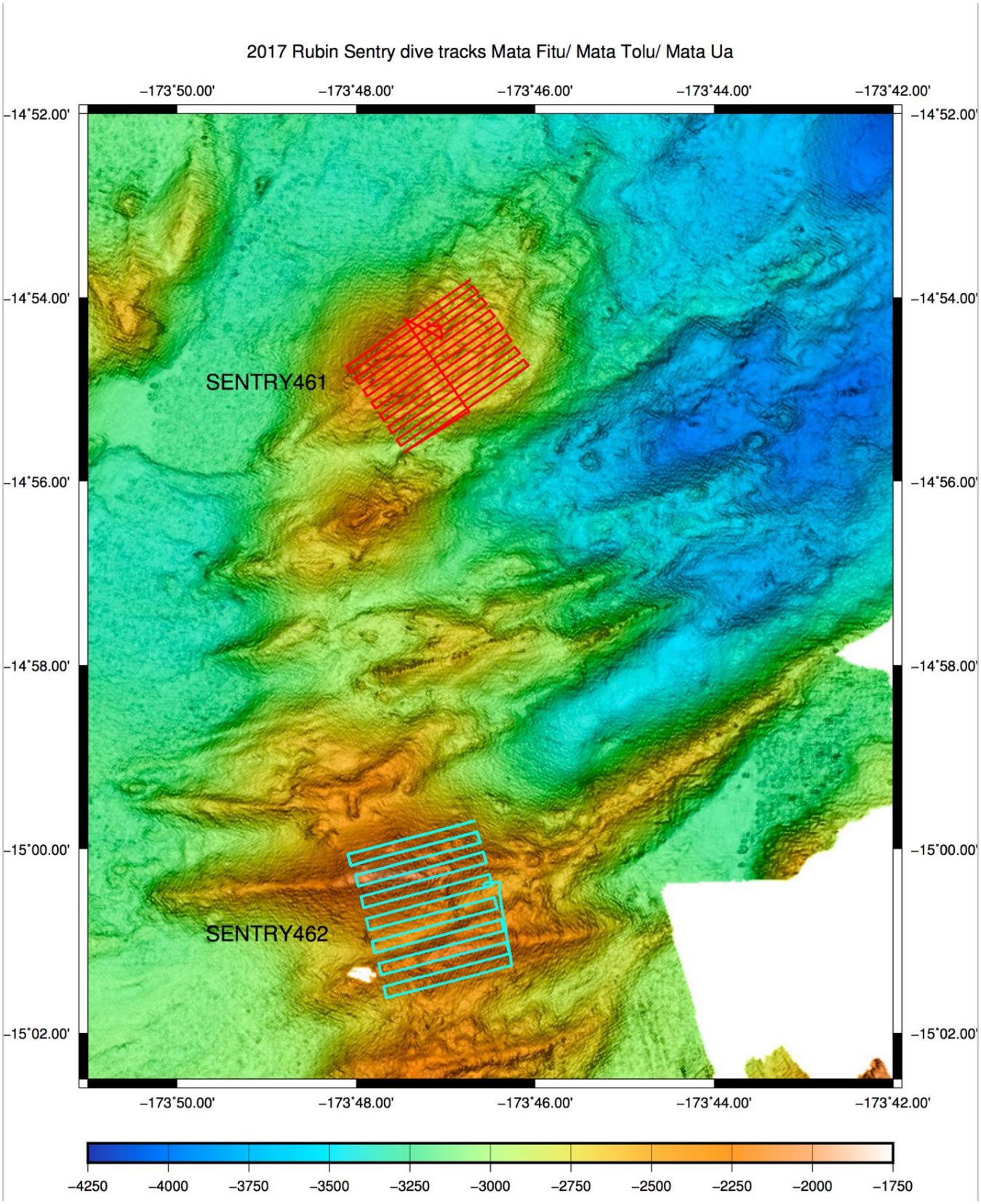


Figure 4.6.1-2 Map of tracklines from AUV Sentry dives 461 and 462 at Mata Fitu, Mata Tolu, and Mata Ua.

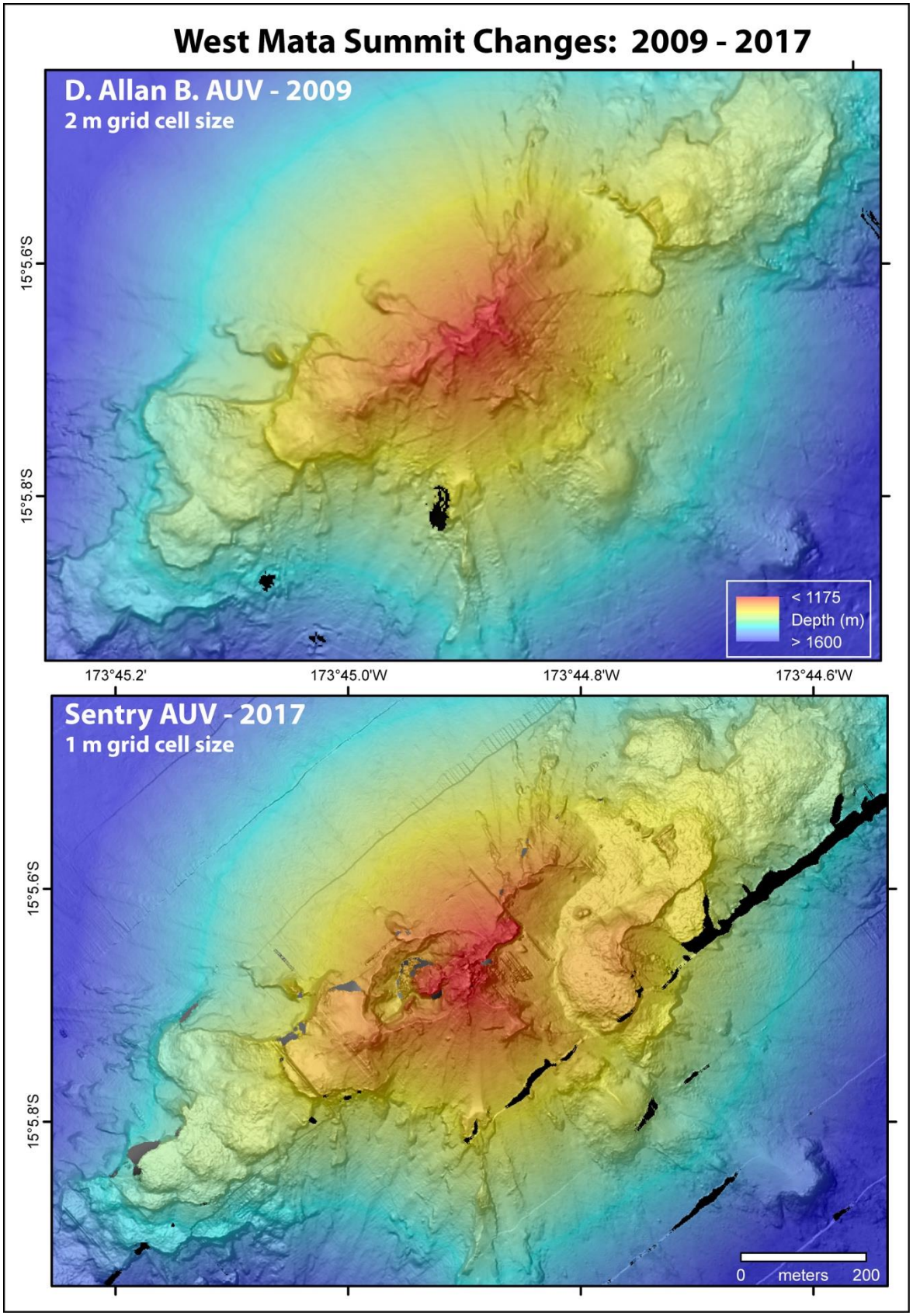


Figure 4.6.1-3 Maps of AUV surveys at West Mata summit in 2009 and 2017, revealing depth changes.

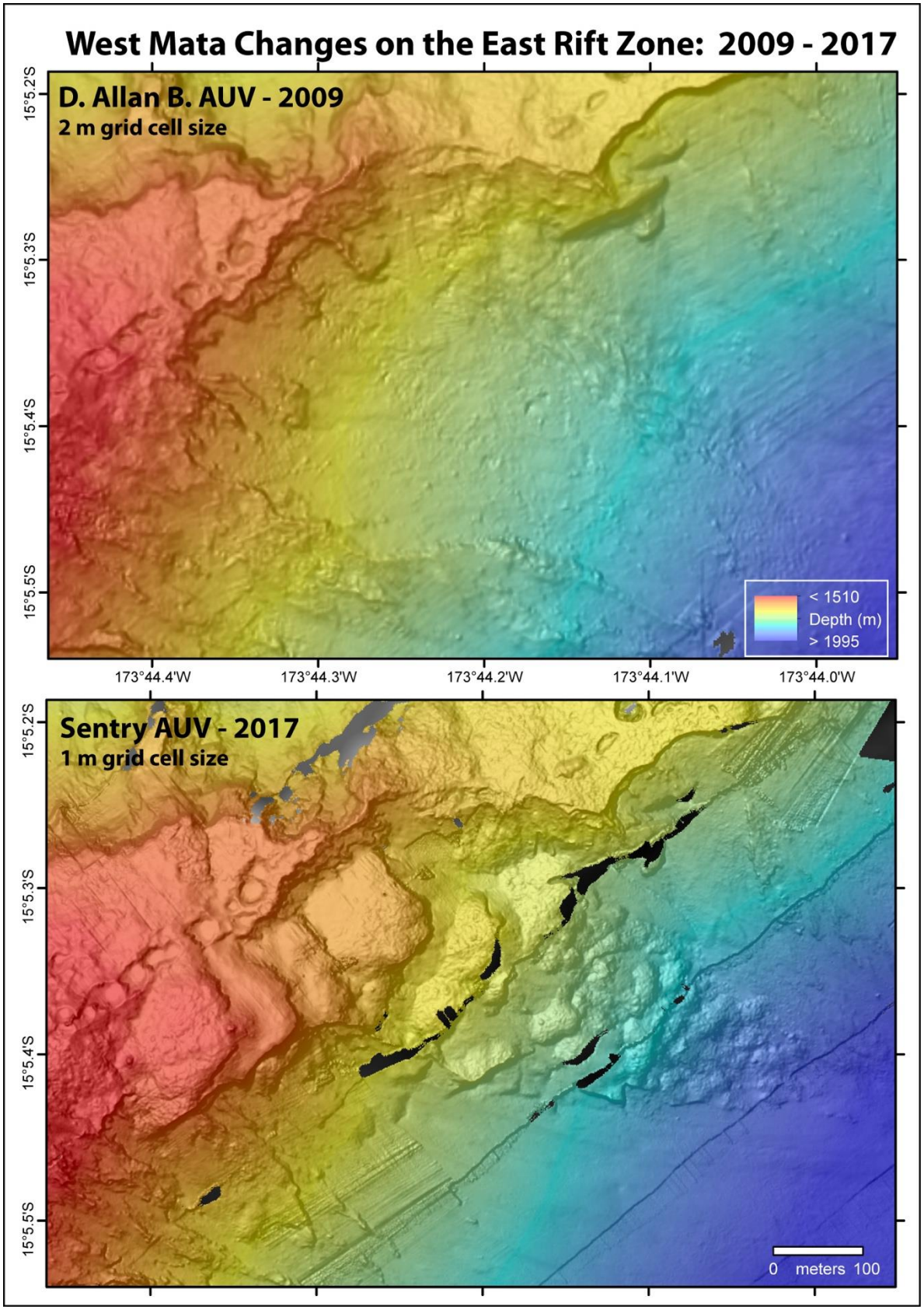


Figure 4.6.1-4 Maps of AUV surveys at West Mata east rift in 2009 and 2017, revealing depth changes.

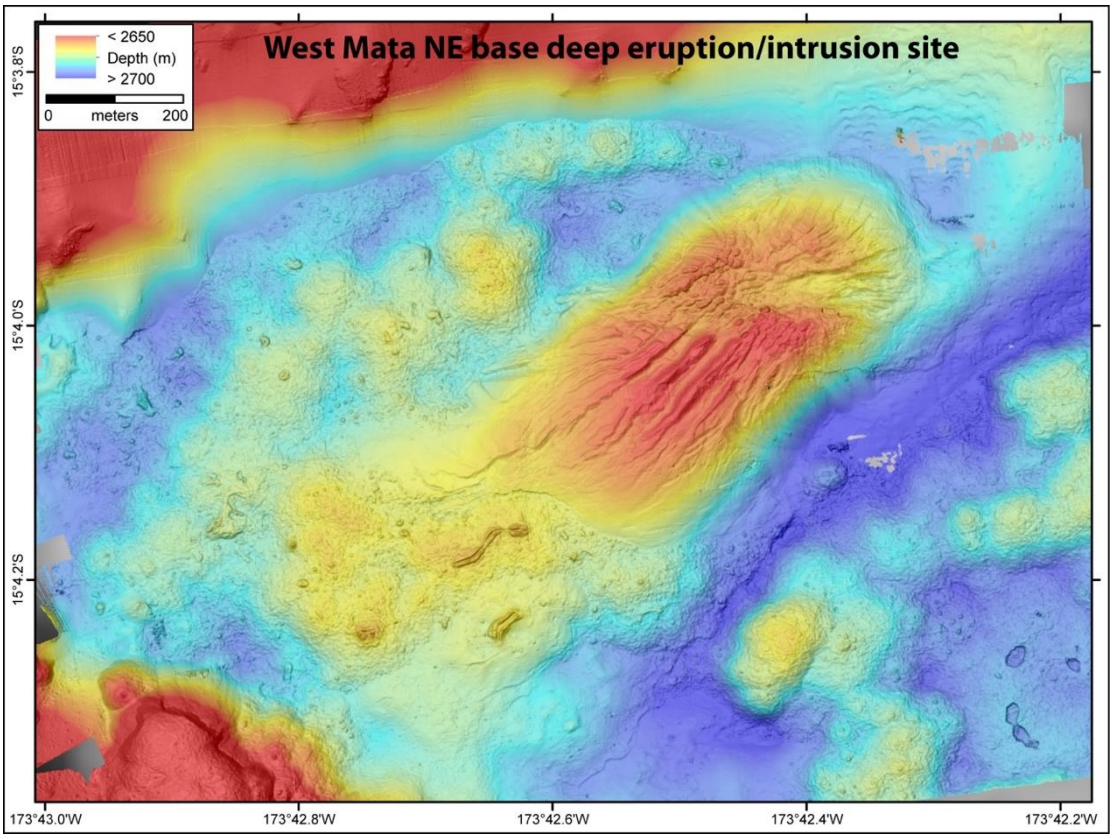


Figure 4.6.1-5 Map of Sentry AUV bathymetry (dive 458) of "the muffin" at the NE base of West Mata, the area of uplifted sediments (red area at center with cracks) due to intrusion of lava below, which later erupted on the seafloor to the W and S (light blue and yellow areas with rougher texture).

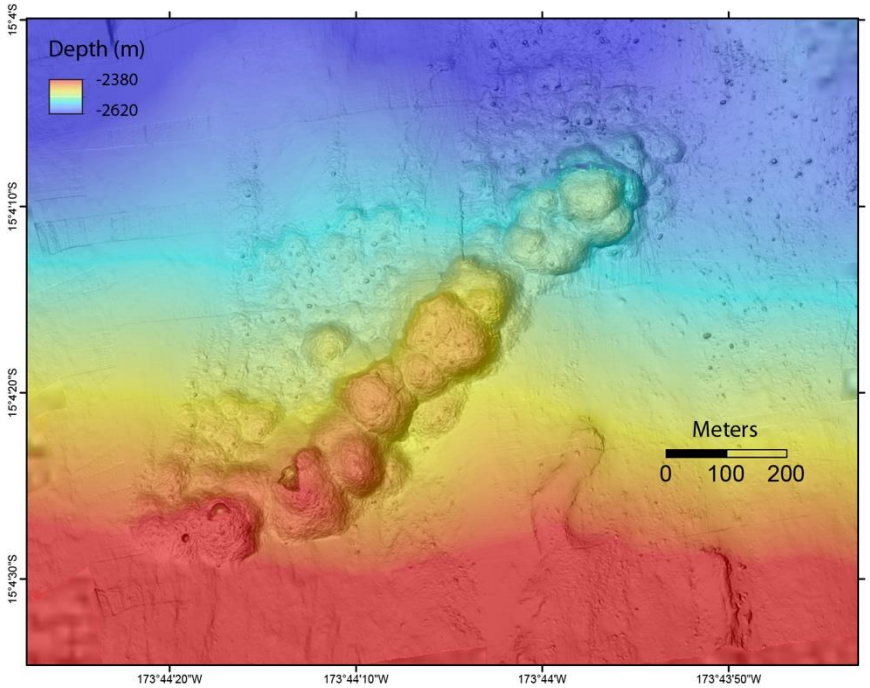
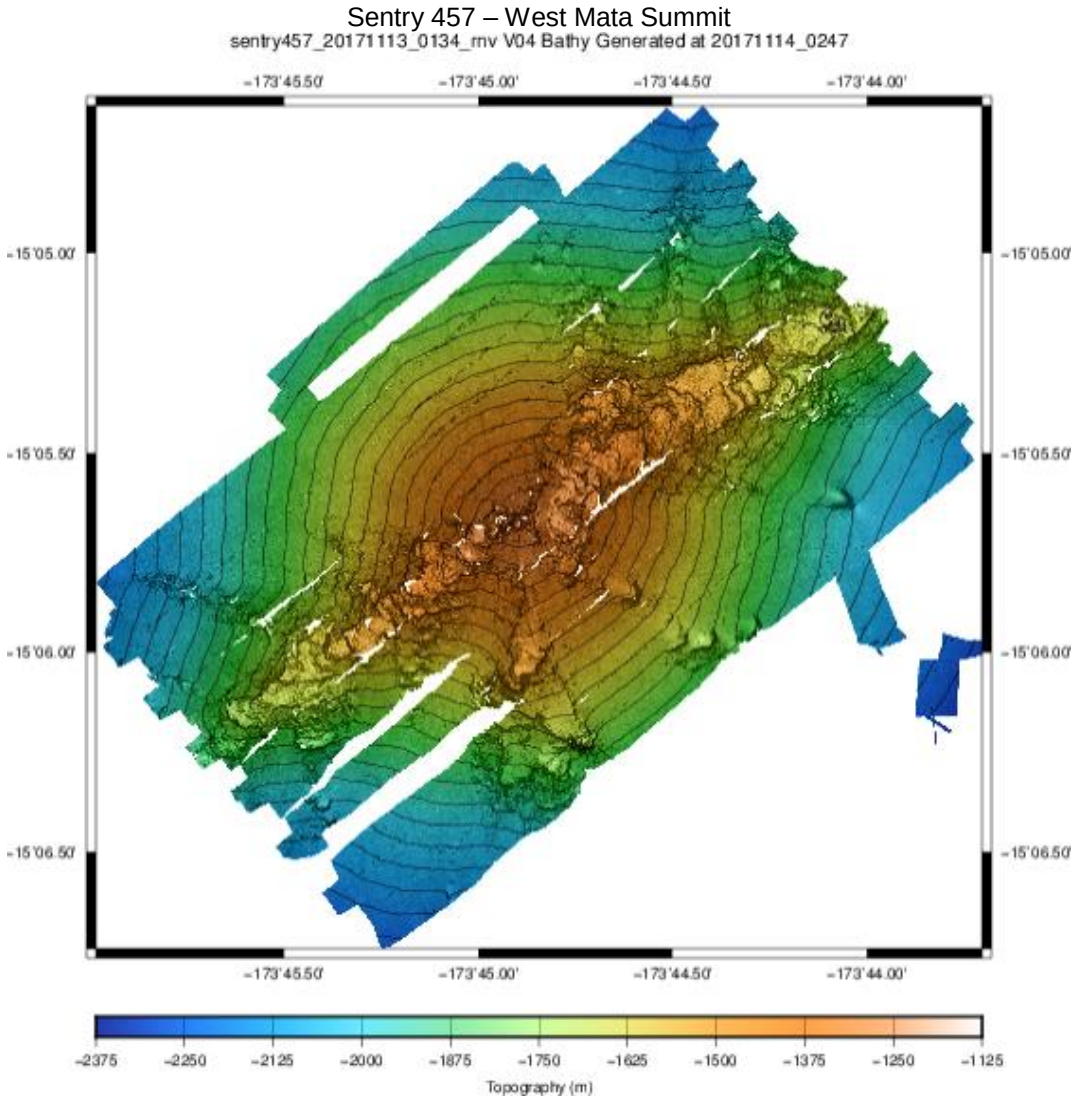


Figure 4.6.1-6 Map of Sentry AUV bathymetry (dive 458) of the young pillow ridge on the NE slope of West Mata that appeared as depth changes between 2011-2016 ship-based bathymetric surveys.

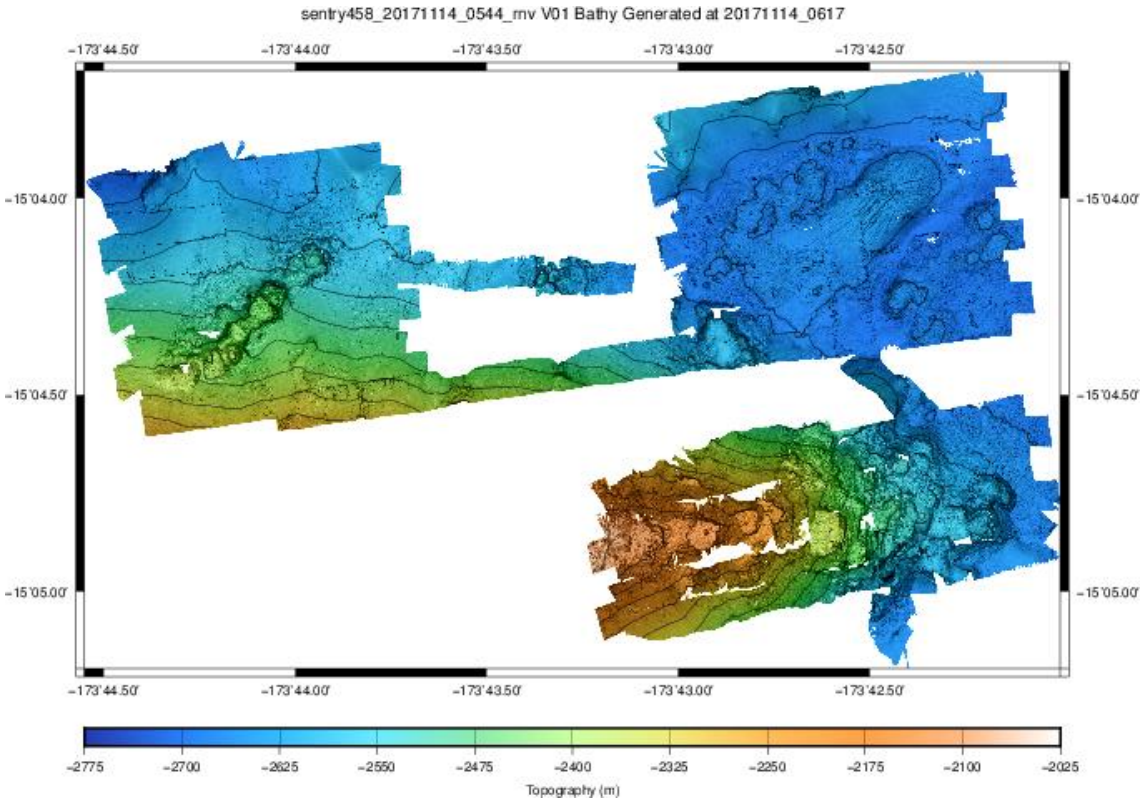
Sentry Dive Statistics

Sentry Dive Statistics					
Dive number	**Start Time (GMT)**	**End Time (GMT)**	**Survey Time hours**	**Deck-to-Deck hours**	**Distance Travelled (km)**
Sentry 457	11/11/2017 22:01	11/12/2017 20:07	19.9	22.3	60.14
Sentry 458	11/13/2017 09:44	11/14/2017 04:24	16.4	18.7	49.57
Sentry 460	11/15/2017 04:43	11/15/2017 22:35	15.8	17.9	42.30
Sentry 461	11/16/2017 09:20	11/17/2017 04:15	16.5	18.9	52.62
Sentry 462	11/18/2017 01:08	11/18/2017 17:50	14.5	16.7	41.67
Sentry 463	11/19/2017 02:12	11/20/2017 00:19	19.5	22.1	47.75
Totals			102.6	116.6	294.05

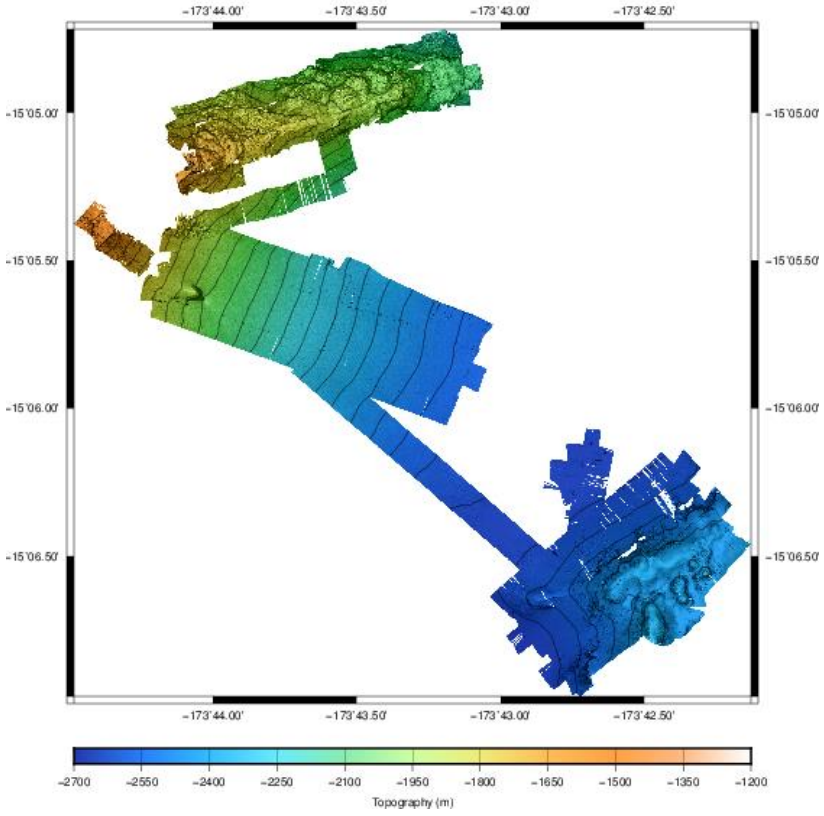
Sentry Dive Bathymetry Maps



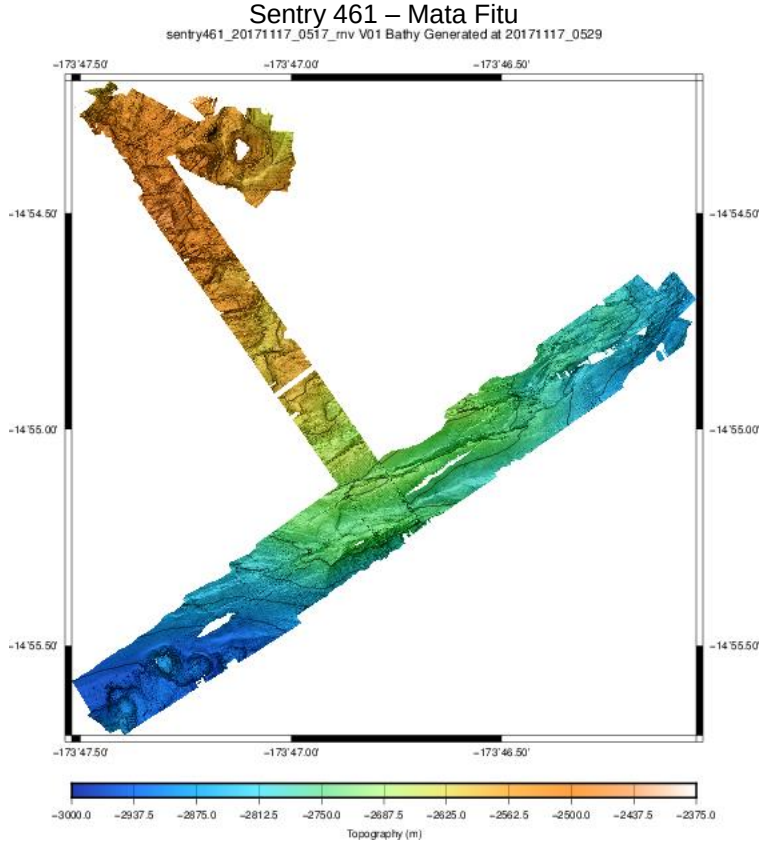
Sentry 458 – West Mata – NE Flank, NE Base, and Lower NE Rift



Sentry 460 – West Mata SE Flank and middle NE Rift



Sentry 461 – Mata Fitu



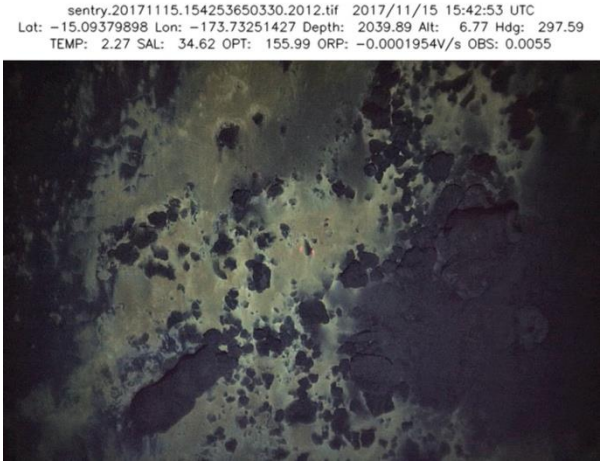
Sentry Dive Photos

Photos from Sentry dive 458 (West Mata NE Base) of the young pillow ridge (2012-2016) NE of the summit. (Left) Young intact pillow lavas, (Right) Co-eruption talus accumulated below steep slopes.

Photos from Sentry dive 458 (West Mata NE Base) of (left) young lava flows (2012-2016) that erupted around the uplifted sediment (“the muffin”), and (right) lavas had ash-laden sediment and prominent ripple marks, suggesting co- or post-eruption density currents.

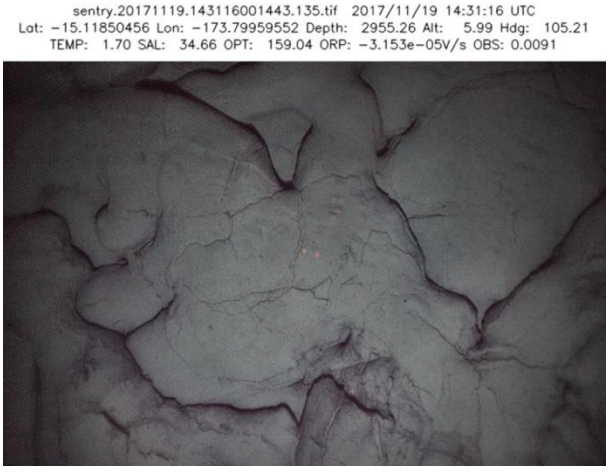
Photos from Sentry dive 458 (West Mata NE Base) showing (left) ash-laden ripple marks on the uplifted sediment (“the muffin”), and (right) the edge of a fissure atop the uplifted sediment.

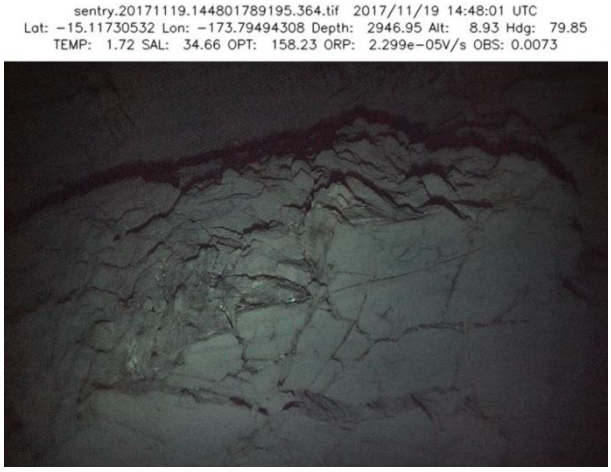
Photos from Sentry dive 460 (West Mata middle NE Rift) showing (left) young pillow lavas erupted between 2016-2017, and (right) ash cover with pits and yellow microbial mat.



Photos from Sentry dive 460 (West Mata SE Slope) of (left) fragmental debris making up area of depth change (2016-2017), (right) with staining from microbial mat in some places.

Photos from Sentry dive 463 (West Mata SW Base) showing (left) older knobby lava flow, and (right) the overlying younger (2010-2011) lava flow with local hydrothermal staining.





Photos from Sentry dive 463 (West Mata SW Base) showing (left) fluid lobes of the young (2010-2011) lava flow, and (right) the edge of an uplifted tumulus in the young flow.

4.6.2 R/V Falkor EM302 Multibeam Mapping

Susan G. Merle

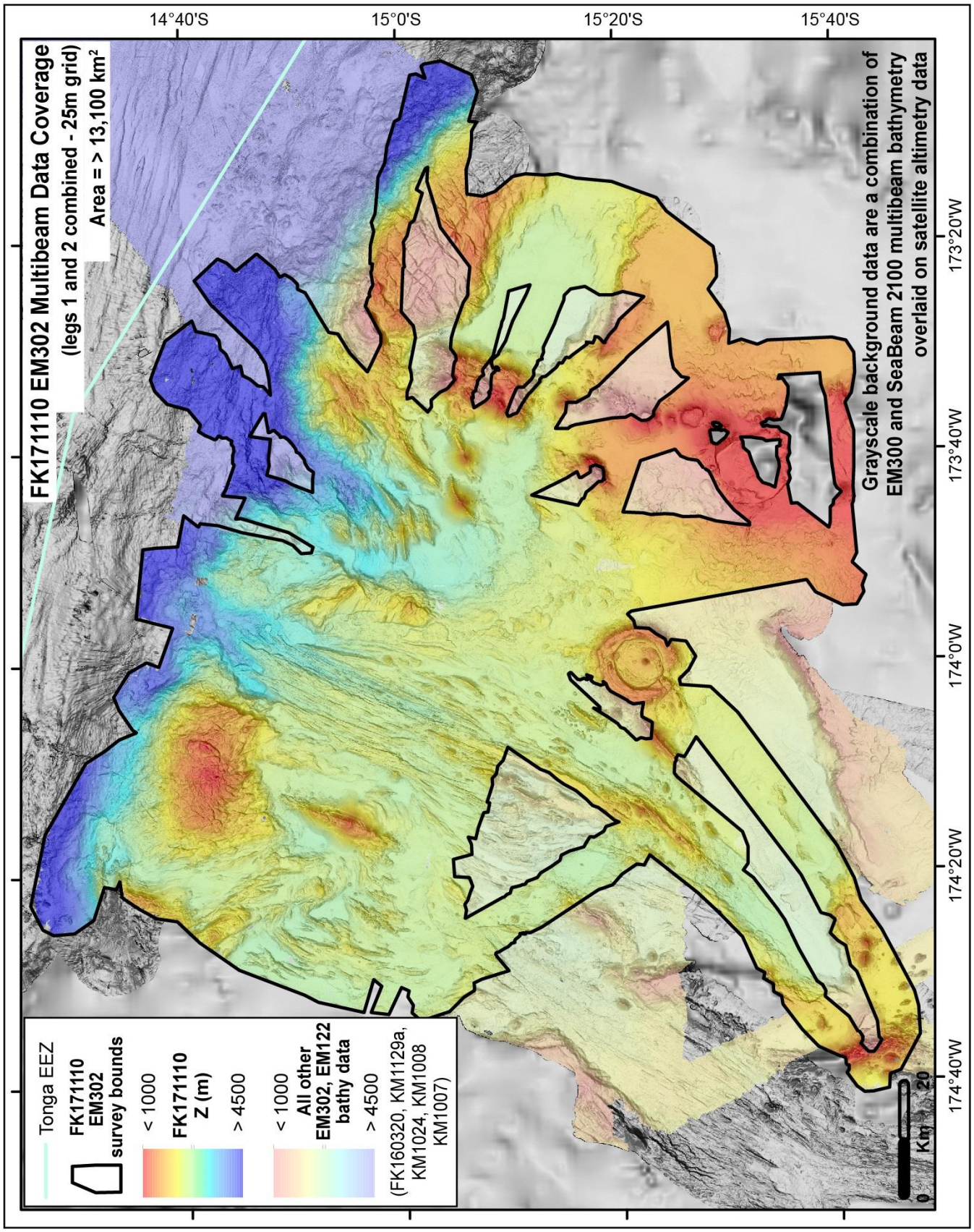


Figure 4.6.2-1 EM302 Multibeam coverage of the area.

Mapping with the R/V *Falkor* EM302 multibeam system was conducted between other operations on leg 1 (CTD casts, tows, Sentry dives) and leg 2 (ROV Subastian dives). Time did not allow us to venture too far away from our general operations area, so after we had mapped all previously unmapped areas, we decided to focus our efforts on mapping over older, lower-quality EM300 and SeaBeam 2100 data in the NE Lau basin area. The new EM302 and EM122 systems have nearly 4 times as many soundings per ping when compared to the older EM300 system (432 vs. 135), justification for the re-survey with the newer EM302 system. There were five EM302 and EM122 surveys in the area over the past several years: FK160320, KM1129a, KM1024, KM1008 and KM1007. The Falkor 2017 effort was to edge-map around those datasets, filling in gaps between those surveys. An area greater than 13,100 km^2 of the seafloor was mapped on the FK171110 expedition. Data were generally good, especially at survey speeds of 8 knots and less. Predictively, the data were noisier as ship speed increased or the weather degraded. Raw and processed multibeam data are available at NCEI, formerly NGDC.

Depth Differencing

West Mata and the Northeast Lau Spreading Center (NELSC) were re-mapped to compute bathymetric depth differences between the FK171110 survey and previous surveys.

West Mata

Using water column and gas data, an eruption at West Mata was first discovered during the November 2008 expedition (TN227). Subsequent multibeam surveys have revealed a number of eruptions at the volcano over the next decade. See Embley et al. 2014 for information regarding all depth differences computed between June 1996 and November 2011 at West Mata. A survey in March 2016 (FK160320) was compared to the 2011 data and new lava flows were discovered near the summit and at the N/NE base of the edifice. West Mata was surveyed again at the start of the FK171110 expedition. When comparing the 2017 bathymetry to data collected the previous year on FK160320, two new areas of depth change were discovered, one on the middle east rift zone (over 70 m thick) and the other downslope to the southeast (over 30 m thick). The east rift depth change was confirmed as a new eruption site by AUV Sentry and ROV SuBastian dives. The downslope area covered with fragmental debris was more enigmatic. It could be debris shed from the east rift eruption site. West Mata was surveyed two more times during the six week expedition. No new areas of depth change were detected between the start and end of the 2017 expedition, indicating there was no eruptive activity while we were there.

Tafu, Northeast Lau Spreading Center (NELSC)

Using water column and gas data, an eruption at NELSC was discovered during the November 2008 expedition (TN227). During the following May 2009 rapid-response expedition (TN234) the Jason ROV discovered young, sediment-free, glassy lava with no sessile organisms at the “Puipui” eruption site. The 2009 multibeam data were also compared to bathymetry collected earlier by the Koreans in 2006, and an area of depth change was discovered on the north rift zone of Tafu Cone (a small volcano on the NELSC, N of the “Puipui” site). The NELSC and surrounding area were re-surveyed during the FK171110 expedition. Prior to the 2017 expedition, the last multibeam survey at NELSC was in May 2010 (KM1008). FK171110 bathymetry data were compared to the 2010 data and two new areas of depth change were discovered, one on the north rift zone of Tafu, and one on the south rift zone. The larger lava flow on the south rift zone had a maximum thickness of 108 m.

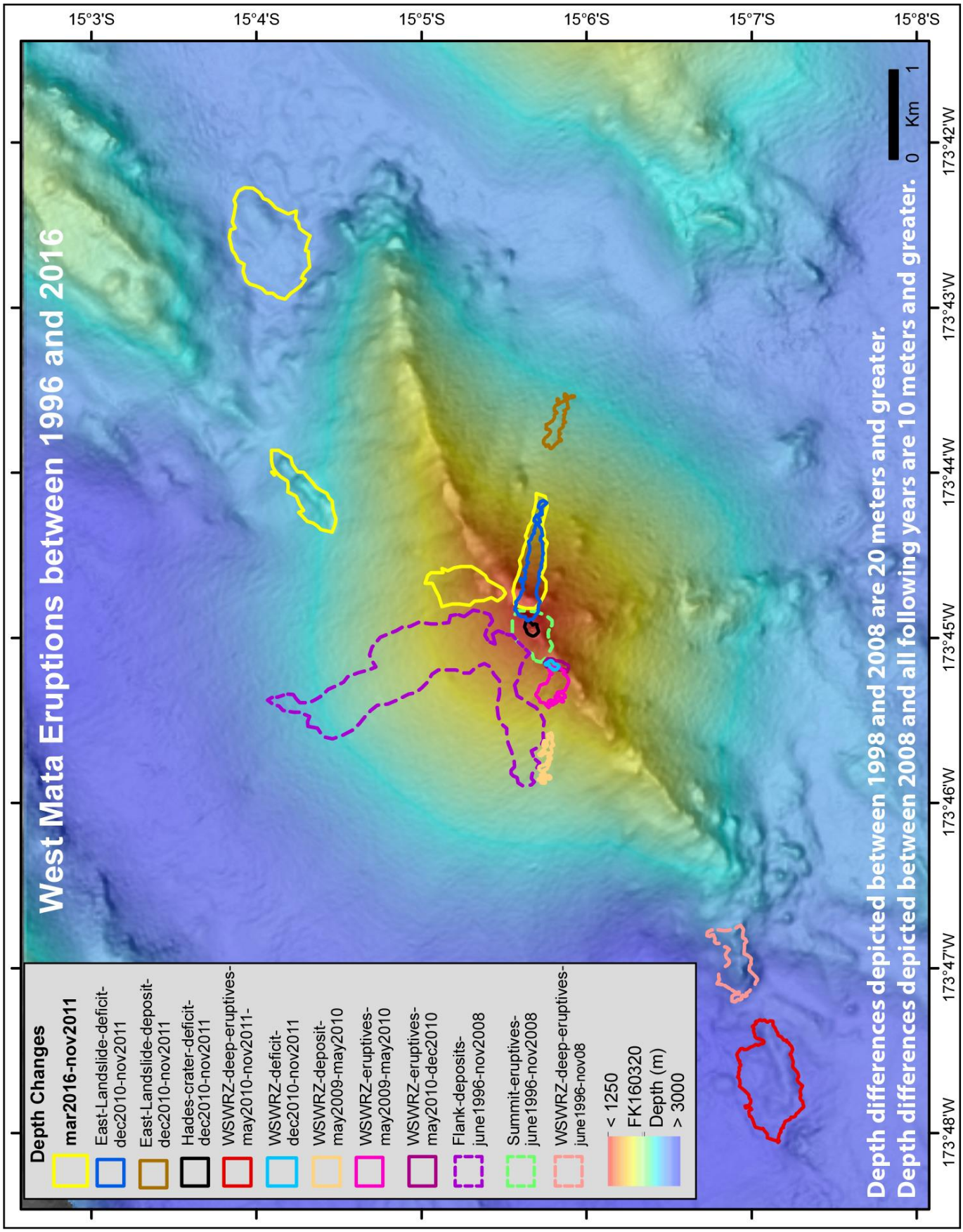


Figure 4.6.2-2 West Mata depth differences showing eruptions.

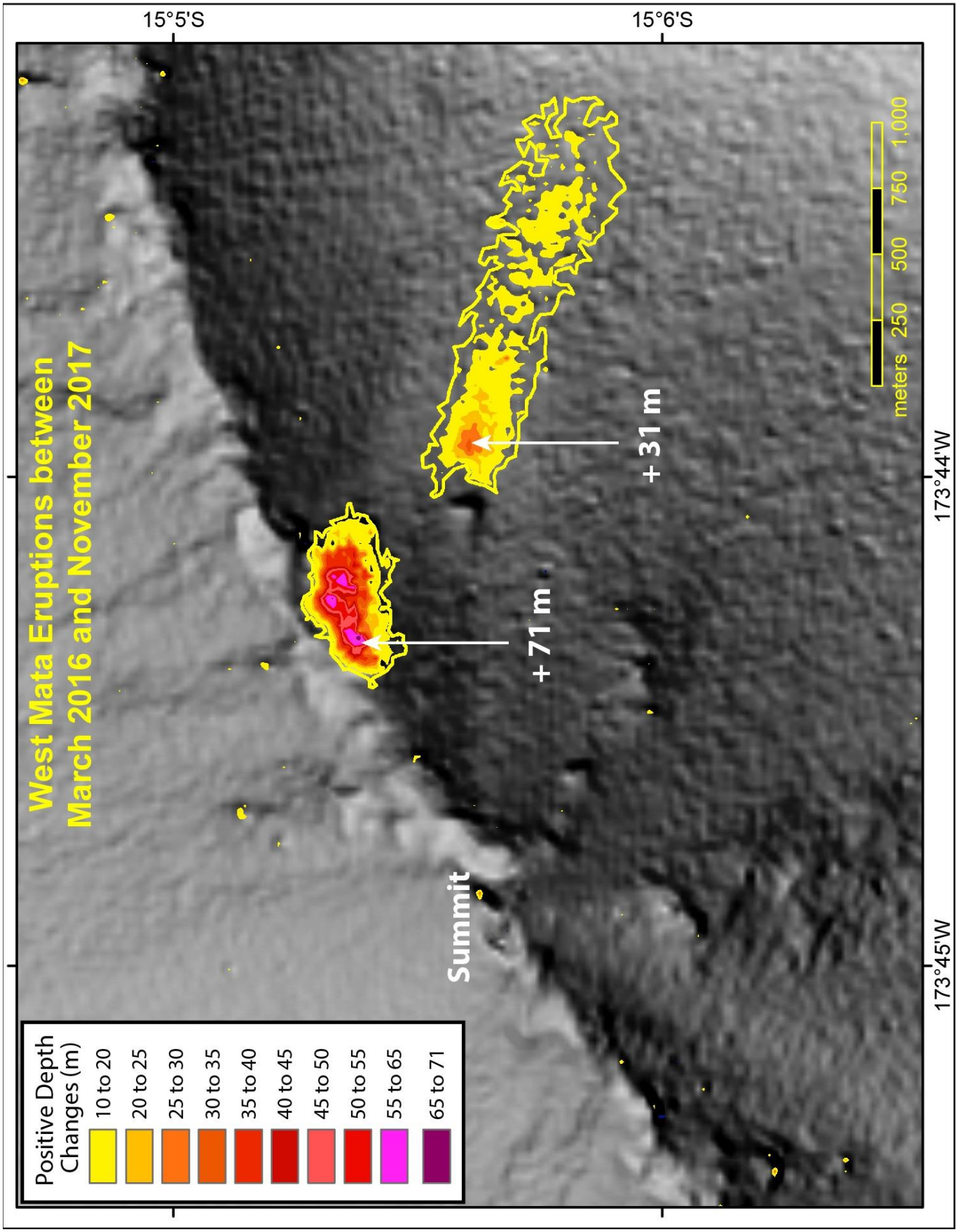


Figure 4.6.2-3 West Mata eruptions between March 2016 and November 2017.

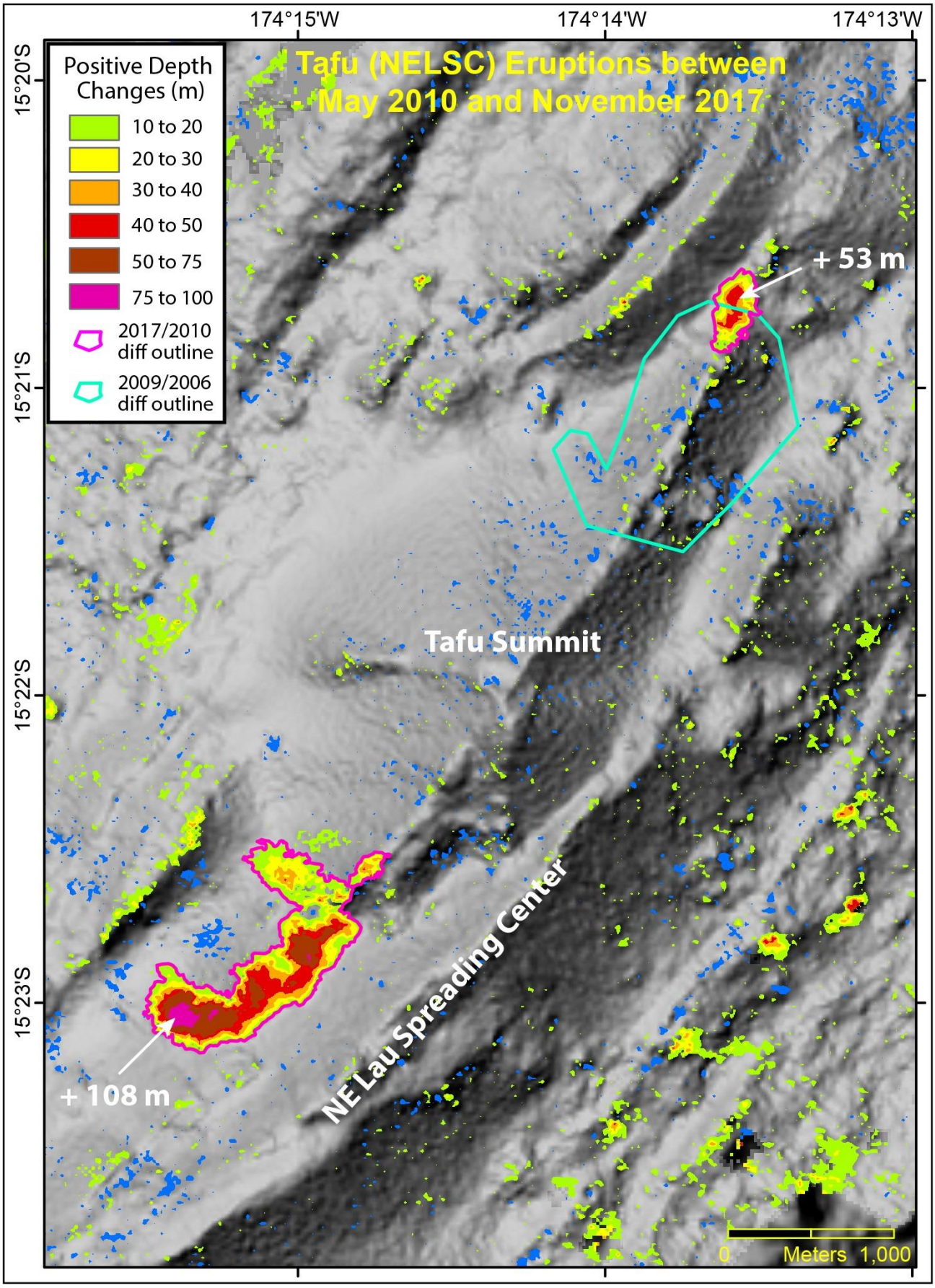


Figure 4.6.2-4 Tafu depth differences and eruptions.

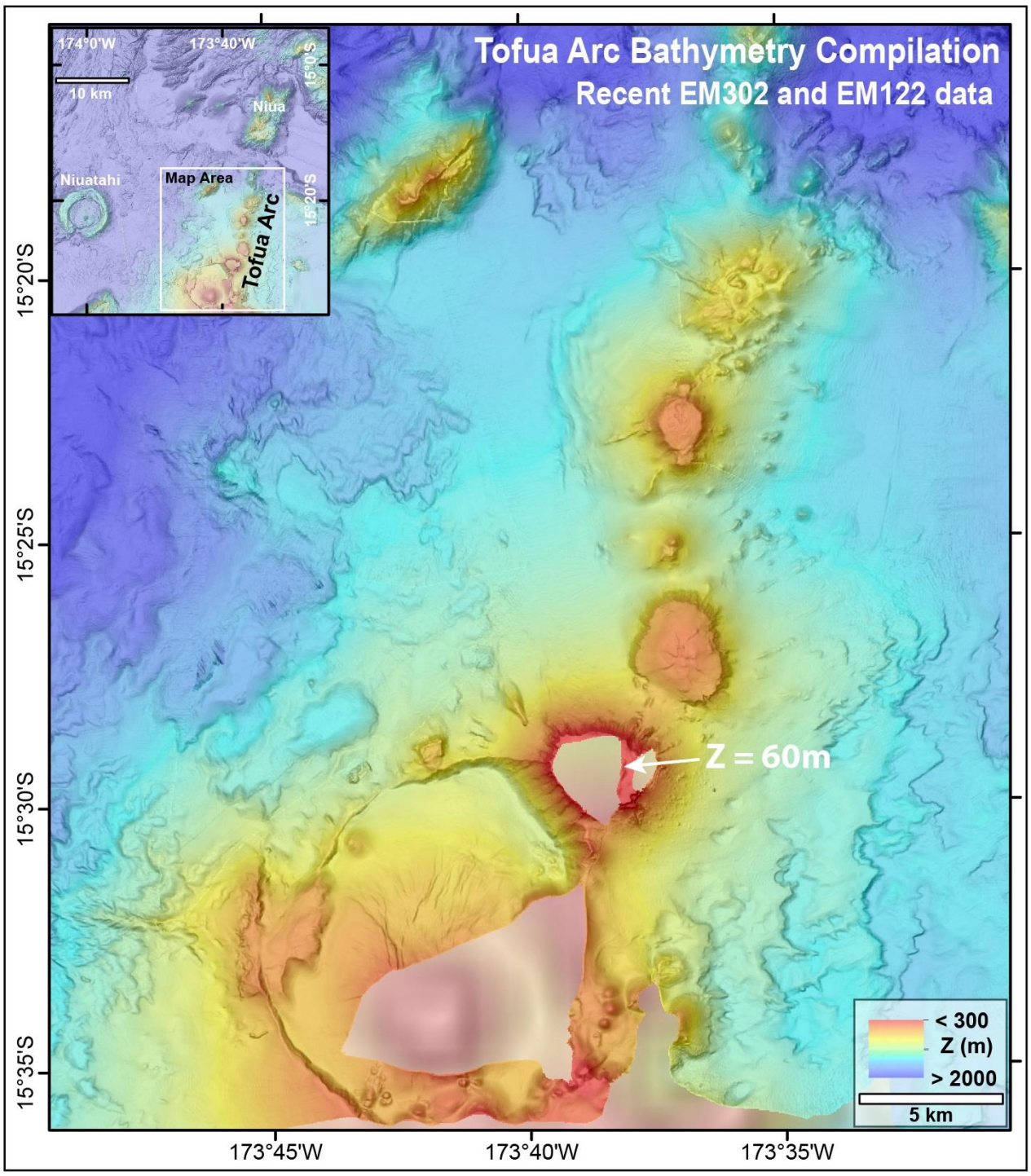


Figure 4.6.2-5 Tofua Arc multibeam bathymetry compilation.

A concerted effort was made to map more of the active Tofua arc during the 2017 expedition. Prior to the FK160320 survey, only satellite altimetry data were available at 750 m grid-cell size on the northern arc (with the exception of Niua). The FK171110 expedition appended the 2016 data moving farther south along the arc. A stunning large caldera was discovered (bottom of image) that is at least 14 kilometers across. Concern about the possibility of unmapped shoals in the area prohibited mapping the entire structure with R/V Falkor.

4.7 Outreach

Bill Chadwick

Our on-board videographer and outreach coordinator this year was Mónika González from a company called Luma (https://luma.co.cr/). She wrote or solicited all the posts to the cruise blog on the Schmidt Ocean Institute web site:

https://schmidtocean.org/cruise/underwater-fire-studying-submarine-volcanoes-tonga/

and recorded and edited stills and video clips that were posted on the cruise blog. These video clips are also now posted on the EOI YouTube Channel:

https://www.youtube.com/channel/UCwYal-KFaA52F5lF9IUd9oA

Ship-to-shore video calls included interactions with students and teachers in several classrooms from Oregon. We also corresponded to several reporters interested in the cruise while at sea, who wrote on-line stories about the cruise, such as this one:
https://earther.com/robots-are-now-livestreaming-underwater-volcanoes-for-s-1821051300

During SuBastian ROV dives, Falkor streamed live video to shore via the SOI YouTube channel, and the video from all of the ROV dives is now archived and available there:

https://www.youtube.com/playlist?list=PLJGVqQI3okzZM9VcE_JWliRcdgxXJL85Y

or here:

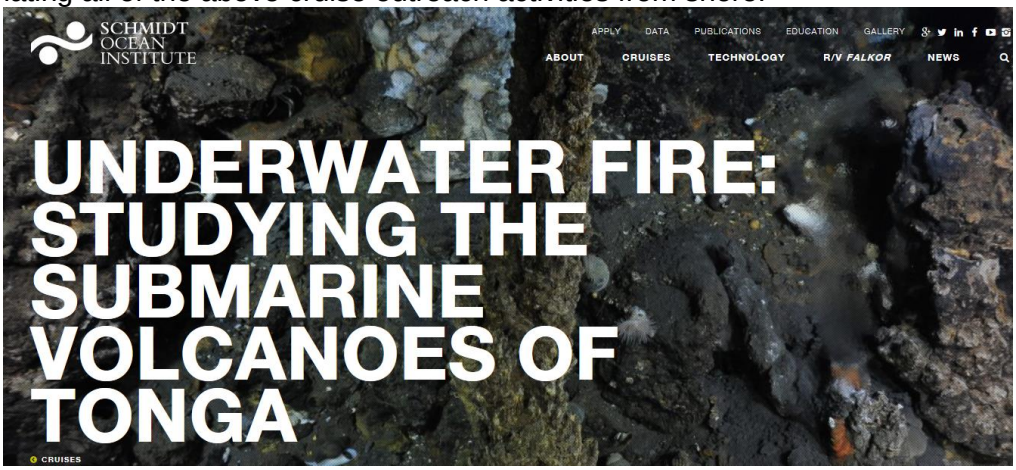
https://www.youtube.com/user/SchmidtOceanVideos/playlists

During the dives, as time allowed, we conversed with public viewers all over the world in real-time via live chat on the SOI YouTube channel and/or the SOI Facebook page from the ROV control room on Falkor.

Something new this year was using the web-based software and smart-phone app Slack (slack.com) to enhance communication between the on-board science team and scientific colleagues on shore. This was done by inviting a group of people to use a chatroom or workspace where text, images, and files could be shared, and we conversed in real-time during the dives.

After the cruise, a press release from the Schmidt Ocean Institute was released to highlight the main results and findings.

Carlie Wiener, Victoria Sindorf, and Logan Mock-Bunting (SOI shore-side outreach specialists) were very helpful in coordinating all of the above cruise outreach activities from shore.



5.0 ROV SuBastian data logging, imagery and video recording systems

Bill Chadwick and Andra Bobbitt

Data Logging

During FK171110 – Leg 2, we first attempted to use Squidle+ software for data logging and capturing video frame grabs during ROV *SuBastian* dives. Squidle+ was developed for annotating photo surveys over coral reefs, and later other capabilities were added for more general scientific logging during ROV dives. Squidle+ had been used on Falkor with SuBastian in September 2017 with many needed changes & improvements identified, and software updates were still being made just before and during our cruise. A major drawback to this was that the software developer was located in Australia and no one on board Falkor was familiar with the software and how it worked to help troubleshoot problems. Squidle+ was used for data logging during the first few ROV dives (S85-S88), but we lost confidence in the software when we noticed that some log entries were missing from the post-dive Squidle+ logs. Fortunately the marine technicians in the control room were also performing some sparse logging in parallel using "Leighton's logging system", and this helped us discover and partially recover from the drop-outs in Squidle+. After dive S88, we abandoned Squidle+ for data logging and used Leighton's logging system exclusively for dives S89-S105. One drawback to Leighton's system is that it has no integration with the frame-grabbing system. So we continued to run Squidle+ during each dive, but only to capture video frame grabs at 1Hz throughout the dives.

Leighton's system did have the advantage that a more complete suite of ROV data was logged. ROV navigation positions were recorded for USBL, Sprint and Greensea. Falkor ship positions were included in the spreadsheet as well. ROV CTD data was recorded including pressure converted to depths in meters which proved to be very useful. In total, depths were noted in Leighton logs for Greensea, Sprint, PARO and CTD. PARO was the ROV's depth recorder and was expected to be the depth utilized during dives for data logging and navigating. Due to depth difference problems noted in the 2016 Mariana SuBastian expedition (FK161129), the 2017 data was analyzed for its relative match with the AUV Sentry bathymetry collected on Leg 1.

Major depth problems were discovered with the Squidle+ logging system, Figure 5-1. The depth recorded was offset from not only the Sentry data but did not match the raw PARO depths provided in a separate file. Squidle+ depths were consistently deeper than Sentry but the raw PARO depth matched within a few meters of Sentry. For dive S088, Leighton's logging system was operating during sample collection and pilot activities. The depth data from this file showed that the Sprint depth offset (~30m) was the same as the Squidle+ depth offset between Sentry (Fig 5-1 inset for S088). The depths from Sentry, PARO and the CTD were all much more in agreement for this dive (less than a few meters difference). For all of the Squidle+ dives, the depths from the raw PARO file did not match the depths recorded in data logs and offsets increased with dive depth. The evidence would indicate that instead of logging the ROV depths, Squidle+ logged Sprint depth. Offsets were noted during the dives by the data logger and scientist but were complicated by the deterioration of the USBL navigation system. Table 5-1 summarizes the depth discrepancies observed in the data. Once logging was switched to Leighton's system, depths were more consistent with PARO (logged and raw), CTD and Greensea in agreement and an offset of Sprint ~30m deeper. The exceptions were a 19m average offset (vs. 30m) of Sprint for S091 and subsequent data switching during dives S093-S095. S093 appears to have switched logging PARO at 22:58:34 with Sprint depths, less than half-way through the dive (Fig. 5-1). S094 and S095 had shorter periods of depth data switching.

Navigation varied for each dive and deteriorated once the USBL transducer malfunctioned. Ship's heading was found to improve navigation in some cases but it was not always possible to optimize heading due to sea conditions. All dives required post-cruise edits but some dives were nearly unrecoverable so sample positions

are questionable. Greensea and USBL positions were almost identical in the logging files and it appeared Greensea was used for the Squidle+ dives so for consistency these were used for the GIS positions.

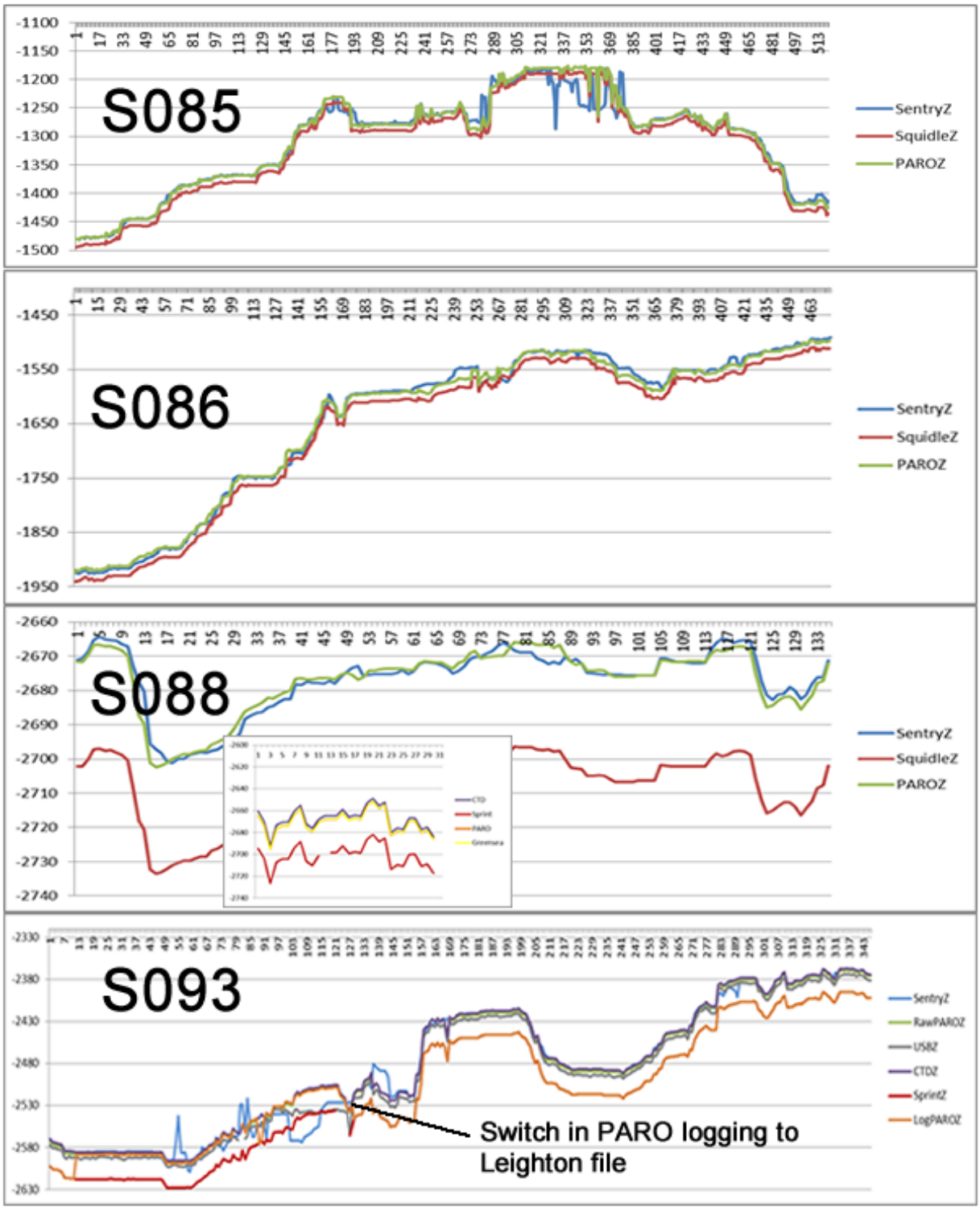


Figure 5-5. Altitude was added to all the depth values for comparison with AUV Sentry depth. The insert for S088 is depth, no altitude and shows the 30m deeper depths of Sprint which were apparently used for Squidle+ as depth. Graph S093 shows depth logged as PARO became offset compared to the raw PARO values at 22:58:34 and remained so for the dive.

Table 5-1 Depth offsets and navigation notes.

Dive	Place	Logging	Nav Quality	Navigation Notes	Depth Notes
S085	WMata	Squidle	ok	bad nav at summit	Squidle depth ~10m deeper than SentryZ; Squidle ~11m deeper than PARO
S086	WMata	Squidle	good	bad nav at some sampling sites	rawPARO+Alt ~1.2m shallower than SentryZ; **Squidle ~16m deeper than Sentry; Squidle Z is 15m deeper than Raw Paro Z.**
S087	WMata	Squidle	good		Squidle depth ~14m deeper than PARO
S088	WMata	Squidle	bad	Nav bad between samples 5-14	Squidle depth ~30m deeper than SentryZ (**Appears that SprintZ was being logged as Z**)
S089	Mata Ua	Leighton	good		PARO 2.7m deeper than CTDZ; depths similar (except Sprint)
S090	Mata Fitu	Leighton	bad	Bad after sample 11; ok at beginning	Can't compare Sentry Z due to bad nav; depths similar, PARO 2.8 deeper than CTDZ
S091	Mata Tolu	Leighton	good	Bad at sample-02	(Sprint depth ~19m deeper than others)
S092	Dacite	Leighton	good		CTD depth ~30m shallower than all other depths (including SPRINT which is usually off compared to others).
S093	WMata	Leighton	ok	bad around sample-05	At beginning until 20:24 & 22:45 **Sprint & logged "PARO" switch** and then offset 30m compared to other depths. PARO*.raw values differ than logged Paro at this point.
S094	Mata Tolu	Leighton	bad	really bad at beginning	Sprint/CTD depths switched and offset again ~10m average: begin-19:29:44
S095	WMata	Leighton	bad	Noisy throughout dive	At 20:29:41 Paro switched and now matches CTD; Greensea switched from Sprint values.
S096	Mata Fa	Leighton	good		Sprint consistently deeper (~30m)
S097	Mata Fitu	Leighton	good		Sprint consistently deeper (~30m); CTD ~2m shallower than Paro; Sentry 461 matches Paro!
S098	South Tafu	Leighton	mixed	Bad after sample-13	22:45-23:02 Greensea/Paro match Sprint, offset from CTD depth.
S099	North Tafu	Leighton	bad	editable	Sprint consistently deeper (~30m)
S100	Mata Ua	Leighton	bad	do not trust any positions	Sprint consistently deeper (~30m)
S101	Mata Ono	Leighton	bad	mainly bad until after sample-11	one small offset at 23:25 where all are same as Sprint except CTD
S102	Mata Ono	Leighton	bad	entire dive is bad	Sprint consistently deeper (~30m)
S103	WMata	Leighton	mixed	bad at beginning/deep & between wp11-13	Sprint consistently deeper (~30m); Sentry ~12m deeper than PARO/CTD
S104	Mata Taha	Leighton	bad	entire dive is shakey	Sprint consistently deeper (~30m)
S105	Dacite	Leighton	bad	entire dive is really bad	Sprint consistently deeper (~30m)

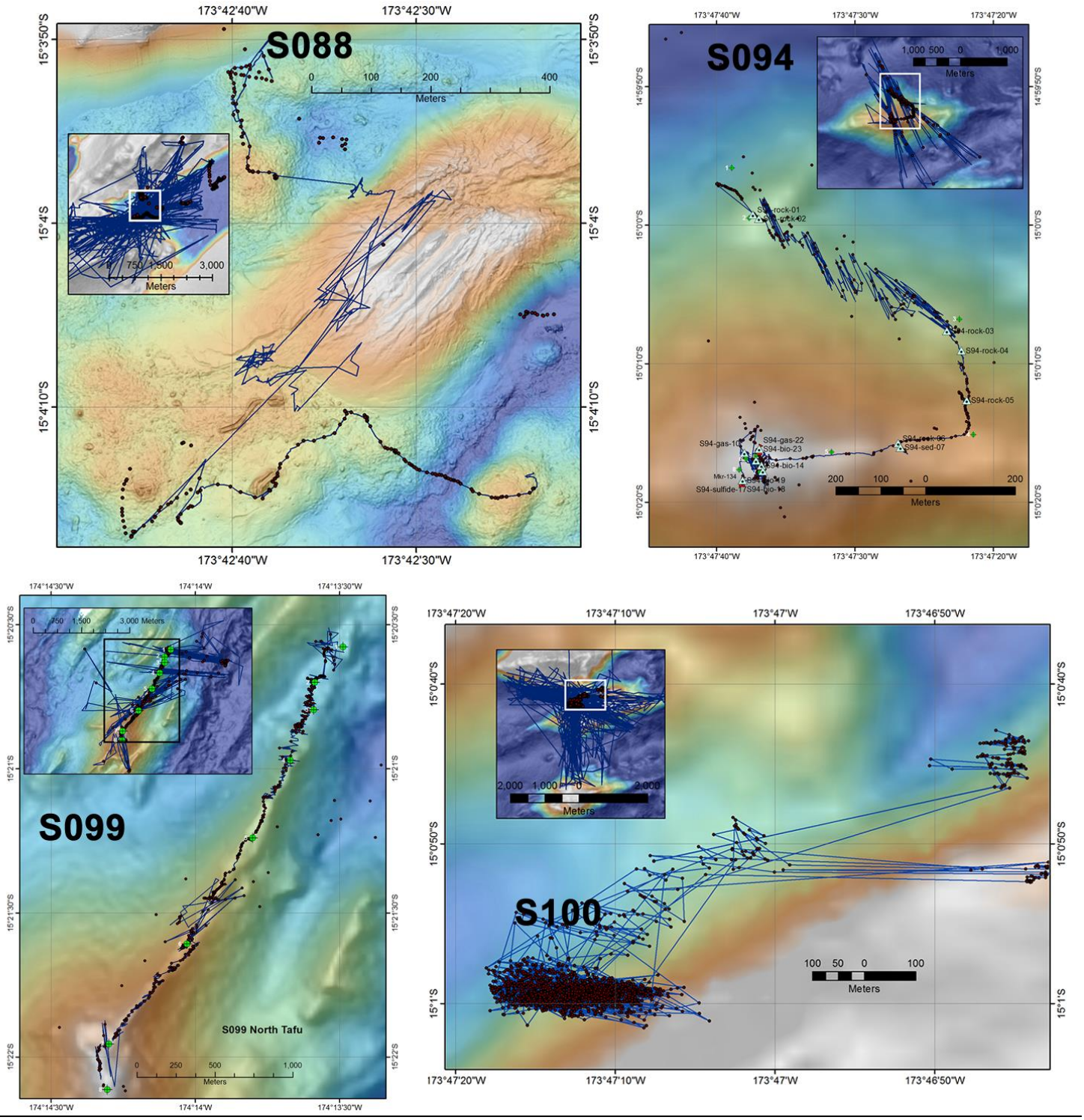


Figure 5-2. Navigation before and after edits for select dives. Inserts show the 1-second Greensea navigation fixes before editing. Blue lines are the ROV tracks from the 1-second data and the red dots are the navigation from the dive logger (Squidle+ or Leighton) files.

Still imagery (video frame-grabs)

ROV SuBastian has no digital still camera. The only still imagery is from video frame-grabs from the 4K science camera on the ROV. There were two ways of capturing frame-grabs. One was to run the Squidle+ software to continuously capture frame-grabs at 1Hz in the background, which were recorded at 4K resolution (3840 x 2160 pixels) as jpg files that are 1-3 Mb is size, with filenames like FK171110_FK171110_S0101_20171212T235819Z_S5K.jpg. The other method was to manually capture a framegrab from the same 4K camera, but triggered by the marine tech in the control room hitting the space bar on a keyboard on request. (We made the recommendation to SOI that this function should be made available to the science watch leader or the science data logger in the future). These highlight frame grabs are also at 3840 x 2160 pixels and 0.9-2.5 Mb in file size.

Table 5-2 Summary of the video framegrabs for each ROV *SuBastian* dive.

Dive number	Number of Squidle 1Hz framegrabs	Total Squidle file size (Gb)	Number of 4K highlight grabs	Total 4K file size (Mb)
S85	40,142	62.56	648	803.5
S86	32,270	51.81	495	596.8
S87	33,978	63.18	437	606.3
S88	38,855	54.77	450	524.4
S89	40,447	71.70	644	849.7
S90	37,770	55.88	538	650.8
S91	34,401	64.47	536	727.3
S92	37,556	60.83	460	558.3
S93	30,362	55.33	425	556.6
S94	31,618	51.59	569	691.3
S95	38,348	64.27	577	764.9
S96	31,220	56.90	567	767.3
S97	32,808	53.13	478	586.7
S98	33,164	60.05	550	722.2
S99	35,836	65.03	710	944.4
S100	38,177	58.67	505	591.5
S101	22,994	36.51	363	419.9
S102	39,096	61.24	459	577.1
S103	35,793	70.40	607	902.2
S104	32,088	56.87	431	582.8
S105	22,102	43.04	336	502.3
TOTAL	719,025	1218.23	10785	13926

Video recordings

Video was recorded during the ROV SuBastian in several formats. Video from the 4K Science Camera was recorded continuously in both 4K format (3840 x 2160) and HD format (1920 x 1080). In addition, video from the Pilot's camera was also recorded continuously in HD format. We only summarize the HD format files below. The continuous HD video was recorded in 10-minute mp4 video files (~1.89 Gb each with a data rate of ~25 Mbit/sec for the Science camera, and 0.6-1.9 Gb each with a data rate of 10-20 Mbit/sec for the Pilot's camera). All the continuously recorded HD video files have control room audio and a date/time annotation overlay. These files have names like "FK171110_20171126T180727Z_HD_S0085.mp4".

Another set of video files that were recorded are ones that were manually captured as 4K video highlights to files without date/time in the names, like "Capture0000.mov", "Capture0001.mov", etc, and are numbered sequentially during each dive. However, sometimes there is more than one folder of highlight movies for a given dive (folder names of SSD1, SSD2), and each start with "Capture0000.mov", so there can be redundancy in file names. However, the files in the SSD1 folder are from the Science Camera, and the files in SSD2 are from the Pilot Camera. The highlight files were recorded at 4K resolution (3840 x 2160) with a data rate of ~900 Mbit/sec. There is no audio and date/time overlay included with these highlight video files, but they do have embedded timecode.

Table 5-3 Summary of the HD and 4K highlight video files for each ROV *SuBastian* dive.

Dive number	Continous HD SCI_cam # files / total file size (Gb)	HD SIT_cam # files / total files size (Gb)	Manual video highlights – number of clips	Manual video highlights – total file size (Gb)
S85	67 / 125.39	67 / 93.50	9	34.31
S86	70 / 131.40	70 / 99.89	20	204.01
S87	59 / 105.60	60 / 92.03	4	24.76
S88	65 / 121.62	65 / 64.97	17	162.26
S89	63 / 117.92	64 / 97.09	20	352.19
S90	55 / 103.51	55 / 75.54	12	217.26
S91	63 / 113.14	64 / 102.81	42	425.42
S92	63 / 116.69	62 / 74.24	13	212.36
S93	50 / 93.32	50 / 87.13	6	143.91
S94	56 / 104.26	56 / 96.59	33	305.26
S95	53 / 98.91	54 / 77.82	23	218.67
S96	53 / 99.89	51 / 83.96	19	151.59
S97	58 / 100.4	58 / 85.3	37	474.26
S98	60 / 107.12	57 / 79.14	15	76.93
S99	60 / 113.88	60 / 95.91	27	201.46
S100	55 / 101.95	56 / 89.65	47	290.48
S101	39 / 72.24	39 / 60.84	21	101.13
S102	55 / 102.84	55 / 88.74	46	273.82
S103	66 / 121.87	65 / 103.45	28	162.09
S104	55 / 100.09	54 / 75.70	6	57.72
S105	37 / 69.62	37 / 63.75	1	6.81
TOTAL	1202 / 2221.66	1199 / 1788,05	446	4096.70

Note that in addition to the video files above, there were also 4K continuous video files, which are not included in the list above.

6.0 ROV SuBastian

6.1 SuBastian Summary and Statistics

Ken Rubin

Summary of ROV SuBastian Dives

ROV SuBastian was deployed 21 times, visiting 11 different submarine volcanoes. The vehicle generally went in the water at approximately 7 AM and returned to the ship at 7 PM each day. Dive plans were developed using the (fairly cumbersome) SOI dive plan template, which we streamlined during the expedition, to include detailed lists of way points, objectives, sampling tools, and location maps; finalized dive plans and navigation underlay maps were provided on the day of the dive to various parties on the ship (ROV team, bridge, marine techs, science party) and the shore-based SOI team via google drive. Ken Rubin and Bill Chadwick shared responsibility for dive planning, alternatingly producing plans to meet as many science party objectives as possible. In general there were two types of dive profiles (a. exploration + geo-sampling, and b. more focused hydrothermal vent, chimney and biological sampling). We were always prepared to take most types of sample (rocks, sediment, fluids, organisms) on each dive, and many dives ended up being a hybrid between these aforementioned profiles. A general strategy of dives was discussed with the science party and SOI staff before the expedition, including dive target prioritization, and then during the expedition discussed with the scientists, ROV team and bridge to optimize objectives and efficiency. Dives generally had one of two configurations of tools of the front porch of the vehicle as per the dive profiles above, optimized either for (a) geological specimen collection (grabs, scoops, push cores), with one biobox and fluid sampling (at most, 4 majors and 3 gas tights across the front of the porch). We made frequent use of the suction sampler for bio specimens, as well as the manipulator for bio sample grabs, and through the course of the expedition worked with the engineering department and ROV team to develop sediment scoops (canvas bags on metal rings) of various configurations. These also proved useful for some bio sampling (e.g., snails on chimneys). NOAA-EOI site markers were carried on each dive and deployed at sites of likely return. These were extremely useful at hydrothermal vent revisits at Matas Tolu and Ono, although we were unable to find at least one marker we deployed at West Mata in one of the young lava flows near the summit.

Dive base maps were prepared initially from existing (EM122 and 302) and then new shipboard (EM302) multibeam, as geotiffs, followed by addition of AUV Sentry bathy maps in a handful of spots where we had coverage from Leg 1 operations, and/or existing AUV bathy: D. Allen B. AUV bathy at West Mata collected in 2009 in collaboration with MBARI and Abyss AUV (Remus 6000) bathymetry collected in 2012 at Mata Tolu in collaboration with Marum institute. Waypoint files provided to the ROV team were combined with the base maps for in-dive display.

Dive navigation was done on the ship using the SOI proprietary Greensea system, which used real-time USBL, DVL and INS navigation streams to provide a so-called best estimate vehicle position. Navigation proved to be the most problematic area of ROV operations, both because of the obtuse nature of the Greensea processing algorithm, and because of subpar and essentially faulty USBL system performance, especially during the second half of leg 2. The impacts were felt greatest on dives deeper than 2000m water depth (i.e., most of them) with some dives having essentially no useable USBL. Instead, we have estimated vehicle position from water depth and features observed. Substantial effort was done by Susan Merle on the ship, and Andra Bobbitt back on shore, to try to improve the dive nav and to remove the spurious fixes, with variable quality results. Some dives, such as parts of dive S100 at Mata Ua, are essentially unfixable. It is likely that some dive tracks will be revised in places as details of each dive are reviewed in the context of the GIS data available.

Dive logging was another issue that proved difficult. The Squidle+ system SOI had contracted for the service proved to be cumbersome and unreliable for real-time logging activities, crashing when too many entries were stored, and loosing entries that the system could not associate with an image. Eventually these bugs were largely worked out, but not until several dives into the program, and not without significant loss of confidence in the system by the logging team. The team migrated after the second dive to using an in-house logging system developed by lead tech Leighton Rolley (the so-called Leighton-Logger), which performed for the most part flawlessly, although it does not associate images with log entries and has some issues with text string parsing

that requires manually cleaning of the log files when special characters or commas make their way into user logged data. The logging effort was led by Susan Merle, who trained up a handful of other cruise participants on the types of observations to log, descriptive terms, sampling nomenclature, and the like.

All dives were streamed live on YouTube and Facebook live, using capabilities of the ship, ROV, and marine tech team. Dives were narrated by Ken and Bill on a spit watch system with opportunities for a handful of other cruise participants to also have time on the microphone. Because SOI only has one live stream, we occasionally had them display dive maps and navigation screens (when the nav was usable), to help viewers see where we were. Although the numbers of comments in the chats on these two feeds were large (especially on Facebook, which had many thousands of viewers at a time), dive leads were able to interact occasionally with these viewers using the chat capability of those feeds.

Real-time interaction with a handful of interested, shore-based colleagues (e.g., Embley, Shank, Clague, Carrey, Portner, Resing and the shore-based outreach team of Carlie and Logan) were facilitated by the use of Slack (a web-based collaboration tool). A workspace was developed for the program, with each dive getting a separate channel. Dive plans and maps were shared before the dive, and nav screen grabs and other commentary were shared during the dives. We received many helpful suggestions and discussions during the dives from this interaction that enhanced the dives.

Table 6-1 lists all of the dives and locations, and Section 6.2 has brief narratives and objectives for each dive. Please see also the maps for each dive (6.3). In summary, there were 21 total deployments at 11 Volcanoes, including 7 dives at West Mata, 2 each at Mata Ua, Mata Ono, Mata Fitu, Mata Tolu and Tafu, 1 each at Mata Fa, Mata Taha and 2 large unnamed dacite lava flows, “LL_B” and “LL_D” of Embley and Rubin, 2018). During these dives we collected 250 rock samples, 59 sediment samples, 31 sulfide samples, 56 Vent fluid samples (of which 24 were for gas), and > 470 biological samples.

Preliminary results of these ROV dives:

6. West Mata is the most active volcano in the area (8 to 10 eruptions in last 10-15 years). Diffuse flow systems continue at the summit and new ones are established at two of the most recent eruption sites. There is still no focused flow hydrothermal venting at West Mata, but several diffuse flow sites are developed and colonized..
7. There is a significant variety in eruption style at West Mata, with lavas and pyroclasts in all cases, but a great proportion of pyroclasts (in some cases >1m thick) near the 1.2 km depth summit (i.e., in shallower water) and a greater proportion of lavas at depth. A single flow that started as an intrusion, uplifting sediments and spilling lava out its base was also observed and sampled on the northern flank of the volcano’s base.
8. Hydrothermal vents: A new active hydrothermal system was discovered at Mata Ono. Previously-known vent fields at Mata Ua and Mata Fitu are now known to be much larger than thought before the expedition. The vent field at the Mata Tolu summit was much better defined in size and relationships to geological structures on the volcano. Extinct chimneys were found at Mata Taha. No active venting was observed at Mata Fa (although some minor diffuse flow was indicated in places on the youngest volcanic cones)
9. Distinct differences in chimney size, shape, number, ecology and community structure were observed at the different hydrothermal vent sites. Vent fluid compositions are broadly similar to what has been observed in the past. Vent fields are located in different areas of the volcanoes, with only two of them being at the volcano summits (Tolu and Ua).
10. North Mata apparent eruption ages: The youngest volcanism at Matas Talu and Ua was discovered to be on satellite cones near to but away from the summits. Mata Fa has a wide mixture of apparent volcanic ages across several small cones, Mata Taha appears to be the least active (recently) and Mata Fitu is largely tectonized, but with some young volcanism at the eastern base of the summit cone.
11. We observed large scale production of volcanic sediments from explosive phases of volcanism at West Mata and Tafu Cone (on the NELSC), which were sampled. Similar volcanic sediments were also discovered and sampled at Mata Tolu, Fa and the large dacite lava flows LL_B and LL_D (the dacites also appear to have produced pumice deposits).

12. Eruption Style: There is a large variety of lava eruption styles at most volcanoes, including pillows (as expected) but with a significant range of morphologies. Particularly surprising was the co-occurrence of high flow-rate lava forms at West Mata, Mata Tolu and Mata Fitu. Also, discovery of a magma intrusion into sediment, causing uplift, and that subsequently erupted from the base of the uplift structure, at West Mata was a first for the region.
13. Two new eruptions in the last 5 years were discovered and documented at Tafu Cone (NELSC), as well as a diffuse flow hydrothermal site discovered at its summit.

Table 6-1 Dive locations and statistics

Dive	Place	Date Begin(UTC)	Off Deck	On Bottom	Off Bottom	On Deck	Total Time	Bottom Time	Samples
S085	West Mata	11/26/2017	17:44:02	18:58:13	5:32:53	5:55:12	12:11:10	10:34:40	22 samples collected (2 fluid; 2 gas; 5 biology; 1 sediment; 12 rock)
S086	West Mata	11/27/2017	17:11:25	18:33:31	4:10:18	4:46:21	11:34:56	9:36:47	21 samples collected (5 biology; 2 sediment; 14 rock)
S087	West Mata	11/29/2017	17:17:15	18:39:34	4:10:16	5:11:03	11:53:48	9:30:42	18 samples collected (4 fluid; 3 gas; 4 biology; 2 sediment; 5 rock)
S088	West Mata-Muffin	11/30/2017	17:07:23	19:02:05	4:48:18	5:48:05	12:40:42	9:46:13	18 samples collected (1 fluid; 4 sediment; 13 rock)
S089	Mata Ua	12/1/2017	17:11:08	19:08:15	3:44:00	5:42:07	12:30:59	8:35:45	25 samples collected (4 fluid; 3 gas; 8 biology; 3 sulfide; 1 sediment; 6 rock)
S090	Mata Fitu	12/2/2017	17:06:12	19:00:48	4:09:25	5:58:17	12:52:05	9:08:37	17 samples collected (1 sediment; 16 rock)
S091	Mata Tolu	12/3/2017	17:06:39	19:12:40	4:38:03	6:02:25	12:55:46	9:25:23	19 samples collected (2 fluid; 2 gas; 3 biology; 3 sulfide; 1 sediment; 8 rock)
S092	Large Dacite	12/4/2017	17:15:15	19:10:20	3:46:48	5:26:16	12:11:01	8:36:28	23 samples collected (2 biology; 5 sediment; 15 rock; 1 bottle)
S093	West Mata	12/5/2017	17:07:38	18:49:36	3:19:17	4:57:36	11:49:58	8:29:41	19 samples collected (5 sediment; 14 rock)
S094	Mata Tolu	12/6/2017	17:09:35	19:01:18	3:59:35	5:36:34	12:26:59	8:58:17	25 samples collected (4 fluid; 3 gas; 7 biology; 4 sulfide; 1 sediment; 6 rock)
S095	West Mata	12/7/017	17:04:02	19:13:54	3:43:46	5:54:19	12:50:17	8:29:52	22 samples collected (2 biology; 3 sediment; 17 rock)
S096	Mata Fa	12/8/2017	17:08:46	18:50:41	3:33:07	5:12:59	12:04:13	8:42:26	20 samples collected (3 biology; 3 sediment; 14 rock)

Dive	Place	Date Begin(UTC)	Off Deck	On Bottom	Off Bottom	On Deck	Total Time	Bottom Time	Samples
S097	Mata Fitu	12/9/2017	17:06:47	18:50:18	3:56:05	5:50:36	12:43:49	9:05:47	22 samples collected (4 fluid; 3 gas; 5 biology; 7 suldfide; 1 sediment; 2 rock)
S098	South Tafu	12/10/2017	17:09:03	18:43:18	4:14:58	5:29:32	12:20:29	9:31:40	22 samples collected (2 fluid; 1 biology; 5 sediment; 14 rock)
S099	North Tafu	12/11/2017	17:05:08	18:34:30	4:28:40	5:37:43	12:32:35	9:54:10	26 samples collected (4 fluid; 2 biology; 3 sediment; 17 rock)
S100	Mata Ua	12/12/2017	17:03:46	18:50:16	3:52:29	5:41:22	12:37:36	9:02:13	28 samples collected (5 fluid; 3 gas; 6 biology; 6 sulfide; 1 sediment; 7 rock)
S101	Mata Ono	12/13/2017	20:10:45	22:11:11	4:43:04	6:35:03	10:24:18	6:31:53	21 samples collected (3 fluid; 1 gas; 1 biology; 2 sulfide; 3 sediment; 11 rock)
S102	Mata Ono	12/14/2017	17:03:31	19:00:44	4:05:50	5:55:17	12:51:46	9:05:06	25 samples collected (4 fluid; 3 gas; 4 biology; 3 sulfide; 2 sediment; 9 rock)
S103	WMata	12/15/2017	17:06:47	18:20:02	4:15:05	5:14:24	12:07:37	9:55:03	25 samples collected (4 fluid; 3 gas; 4 biology; 3 sulfide; 2 sediment; 9 rock)
S104	Mata Taha	12/16/2017	17:06:53	18:55:03	3:49:45	5:29:16	12:22:23	8:54:42	21 samples collected (2 biology; 2 sulfide; 2 sediment; 15 rock)
S105	Northern Dacite	12/17/2017	16:01:32	18:00:46	0:10:16	1:54:09	9:52:37	6:09:30	18 samples collected (1 biology; 5 sediment; 12 rock)

6.2 Dive Objectives and Summaries

S085 West Mata Summit Objectives:

1. This is a survey and 2.2 km long geo-transect of the West Mata Summit intended to traverse several features that show up as depth anomalies in MB surveys since 2009, We have 2017 Sentry data for all of the dive site.
2. Work generally upslope from 1400m to 1200m for first half of the dive towards a collapse pit, traverse undulating topography @ 1180 to 1250m for most of the second half of the dive, then, time permitting, descend back to 1400m along the north slope of the NE rift one.
3. Take opportunistic rock and push core samples, note locations of vents for next dive at summit. (we will use the temperature probe and sample some bio and fluids if observed – minimal fluids configuration)

S085 Summary:
This was a familiarization dive starting west of previously known terrain around “mat meadow”, traversing to the summit, into Hades pit, along the north face of the ridgeline above the former Prometheus, shrimp city and creamsicle sites, returning eastward on the south side of that ridge (the landslide headwall), traversing onto the young (post 2012) lava mound that developed in the old landslide area, and then traversing north to another contemporaneous eruption deposit on the north face of the volcano. The young lava mound has experienced widespread diffuse flow hydrothermal activity and has associated organisms. A collapse on the south side (downslope) of this new flow was also briefly explored. After this the dive headed northeasterly to visit another young lava unit emplaced in the same time period. It was viewed heading downslope to have some very steep debris laden flow fronts and young fresh lava mounds, but no fluid venting.

S086 West Mata Summit Objectives:

1. This is a survey and 1.8 km long sinuous geo-transect of the lava formation NE of the West Mata Summit intended to traverse a feature that showed up as depth anomaly in between 2016 and 2017 Falkor MB survey, We have 2017 Sentry data for all of the dive site.
2. Work generally upslope from 1920m to 1485m in a new lava flow on a sinuous but generally uphill trajectory for the first 12 WPs and then in older terrain with interesting “Pillow Pox” formation seen in Sentry Photos.
3. Take opportunistic rock and push core samples, we will likely use the temperature probe and sample some bio and fluids if observed – minimal fluids configuration)

S086 Summary:
This dive visited the newest eruption deposit at West Mata, that formed sometime between repeat bathy mapping in 2016 and late 2017. The dive started in sediment east of the eastern distal end of the lava flow, traversed westward over pillow lavas with some pyroclastic debris cover, then ran a series of east-west traverses up a stair steps of flow lobes with steep nearly vertical flow fronts and nearly flat interiors. The shallowest portions of the new flow are extensively to completely covered by pyroclastic debris and extensive microbial mat deposits. The dive also explored the northern lava flow boundary and found non-vent fauna and abundant young pyroclasts mantling older lava outcrops.

S087 West Mata Summit Objectives:

1. This is a survey and 1.9 km long geo-transect upslope from the shallow part of the south rift ne and 16430m depth to the summit region at 1230m depth, collecting lava and sediment samples.
2. At the summit we will visit Hades Pit first and then sites along roughly the same dive path as Dive S85, with more intensive sampling of fluids and biology, including the 2012-2016 cone on the SE part of the summit. FULL Fluids configuration of basket (3 gas tights + 4 majors).

S087 Summary:
This dive started downslope on a north-south trending ridge line from the summit (perhaps a less-well

developed rift zone) in an area of mapped depth change in the past decade. His area was largely sediment covered with some deep sea corals on rocks outcrops with no evidence of recent igneous activity. The dive continued to the summit, re-visiting sites in Hades pit and the post 2012 lava mound for more extensive water and biological sampling.

S088 West Mata NE base – "The Muffin" Objectives:

1. This is a geo-transect across an uplifted mound of sediment ("the muffin") and young lava flows that surround it, located at the NE base of West Mata. Both the sediment mound and the surrounding lava flows are part of a MB depth change between 2012-2016. We have 1-m Sentry bathymetry for this dive site.
2. The dive will start SE of the muffin ridge, will sample old & new lavas, then will drive up the axis of the sediment mound, and finally back down to the lava flows on the NW side of the mound. Area is relatively flat 2690m to 2650m. Main sampling will be opportunistic rock and push core samples, and sediment scoop bags (fluids if observed – minimal fluids configuration).

S088 Summary:

This last of the initial sequence of West Mata dives visited the curious uplifted sediment dome affectionately referred to as the "muffin" on board ship, surrounding lava flows (which appear to flow out from the base of the uplifted mound), and the contact of young lavas with the West Mata edifice on the south margin. The lavas were young but otherwise unremarkable (boninite like everything else at West Mata). Several small rifts at the summit of the sediment mound were examined and found to have 1-2 m thick sequences of sediment (largely volcanoclastic and presumably turbidites or debris flows related to the surrounding edifices) that in places had active diffuse flow hydrothermal activity and microbial mat development. Navigation was particularly bad on this dive.

S089 Mata Ua Flank to Summit from North Objectives:

This is a two part dive at Mata Ua with a 1.3 km long track

1. Survey/circumnavigate a previously studied vent field, taking rock, sulfide, water and bio samples at a site centered at 2360m water depth. FULL Fluids configuration of basket (3 gas tights + 4 majors)
2. Sample lavas and make observations on a geotransect to the summit. To accomplish the second goal, fluid sampling should be completed by 1 PM.

S089 Summary:

This dive started in the valley between Matas Ua and Tolu, and 250m east and 100m north of a known hydrothermal vent system from the 2012 SROF expedition. Extensive active hydrothermal chimneys and diffuse flow venting were encountered nearly immediately, and in much greater density than a site visited in 2012 further to the southwest. This site was named Temple of Smoke, for the large number of smoking spires, many covered with extensive colonies of stalked barnacles. The field was sampled and explored to define the downslope and upslope extent (restricted to a ~50m depth range), after which the field was explored to the southwest, including the 2012 site and the western edge of the field. The dive then did a quick geo-transect traverse up the north flank of the volcano, visiting both of the two mounds at the summit. Both were found to be extensively sedimented.

S090 Mata Fitu Objectives:

1. This is a geo-transect across the summit of Mata Fitu volcano, which is the northern-most of the North Mata group. This area of the seamount has not been visited before, so this will be an exploratory dive to check out areas where the MAPR sensors on AUV Sentry saw anomalies on Leg1. (so there is no guarantee we'll see any venting, but it's possible we'll find something new). We DO NOT have 1-m Sentry bathymetry over most of the area for this dive site (just ship bathymetry).
2. The main sampling will be opportunistic rock sampling and fluids if observed (minimal fluids configuration on the ROV). Depth range is 2385 to 2535 m.

S090 Summary:

This dive visited the broad platform just south and east of the highest peak at Mata Fitu, traversing SE, NE and

the NW through a series of fault block horst and graben terrain showing mostly sediment and highly fragmented lava debris, with almost no in place lava observed in the first half of the dive. A brief interlude up the south face of the summit cone found only rock debris. The dive then traversed east and then north, along a single trackline of AUV Sentry bathy, into younger-looking and less tectonized lava flows, including fairly young looking lava near the end of the dive. The dive was remarkable for the complete dearth of hydrothermal venting and fauna, with only sparse non-vent fauna observed.

S091 Mata Tolu West Rift to Summit from North Objectives:

This is a two part dive at Mata Ua with a 1.4 km long track

1. Sample lavas and make observations on a geotransect along the west rift one to the summit.
2. Survey/circumnavigate a previously studied vent field, taking rock, sulfide, water and bio samples at a site centered at 2360m water depth. Part Fluids configuration of basket (2 gas tights + 2 majors).

S091 Summary:

The first part of this dive was a geo-transect along the west rift zone to the summit to sample lavas and make observations. Pillowed flow lobes with flatter tops were observed, as well as an area of high effusion rate sheet flows and jumbled flow terrain just beneath the summit. The second part of the dive was to survey, circumnavigate and sample a previously studied vent field (2012) at the summit, to provide spatial ground truth to a poorly navigated 2012 AUV Abyss bathy map, and then to identify and sample some hydrothermal chimneys, with a site revisit anticipated. A small pit on the west side of the summit platform was examined, and found to have extensive active diffuse flow venting, as well as debris strewn walls. The formation mechanism of the pit is presumably collapse, but no definitive evidence was observed in the walls.

S092 Large Dacite Flow Objectives:

1. This dive will be a geo-transect across a Large Dacite Lava Flow on the seafloor located 19 km SW of West Mata summit (mostly 2400-2550 m). Main objective is to sample lavas and make visual observations on a geo-transect from a large lava pond to a series of hills located to the west. No hydrothermal vents expected (minimal fluid-sampling configuration on ROV).
2. Determine if the western hills, which have low-acoustic backscatter compared to the high-backscatter of the dacite flow, are part of the eruption of this flow (perhaps as pyroclastic phase?) and perhaps the source of the dacite lava flow, or whether they are older seafloor surrounding the dacite flow.

S092 Summary:

This dive was a geo-transect across a Large Dacite Lava Flow located 19 km SW of West Mata summit (mostly 2400-2550 m), starting on a broad shallow collapse depression and working west. Lavas with a range or morphologies and with some sediment dusting were observed on the floor of the collapse. The “wall” of the collapse was a series of down-dropped and separated slivers of rock allowing views of the internal stratigraphy of what appear to be quite massive flow interiors (up to 20m). The dive then traversed an area of parallel collapse and apparent lava flow channels, reaching a very tall (>25m) tumulus structure near the western lava flow boundary. The dive then visited two low-acoustic backscatter “hills” to the west of the flow as potential vent sources. These were dusted with sediment, although the sides of the lower (eastern) of the two mounds visited was strewn with small dacite cobbles and blocks, and has ~50 cm thick, coarse volcanolastic deposit of nearly pure volcanic glass chunks with fragmental and fluidal shapes. The higher mound had fewer to no dacite blocks, but near its summit we encountered a partly lithified deposit (15-20cm thick) of poorly cemented (welded?) fresh glass fragments. No evidence of hydrothermal venting on this dive.

S093 West Mata – NE Pillow Ridge Objectives:

1. This dive will be two separate geo-transects: one shorter one up an older ridge NE of West Mata volcano, and a second longer transect up a young ridge of pillow lavas on the NE flank of West Mata volcano that was erupted between 2012-2016. The starting depth is 2587 m and will end at 2365 m.
2. The main objective is to sample both old and new lavas and make visual observations on a geo-transect. We will also sample sediments. No hydrothermal vents expected (minimal fluid-sampling configuration on ROV).

S093 Summary:
This dive started to the north of West Mata, on the toe of an older NE-SW ridgeline of unknown parentage, traversing over a sedimented field strewn with stalked organisms, and then working upslope to West Mata, to perform a geo-transect up a young ridge of pillow lavas on the NE flank of West Mata erupted between 2012-2016, sampling lavas and sediments, and making visual observations on a geo-transect. These mounds were very steep sided and roughly flat topped, with a large collapse structure in one of the shallowest mounds that showed some evidence of diffuse flow venting. This dive had the benefit of an excellent AUV Sentry map from Leg 1.

S094 Mata Tolu West Rift to Summit from North Objectives:

This is a two part dive at Mata Tolu with a 1.3 km long track overall
1. Sample lavas and make observations on a geotransect along a mound of the north part of the volcano and on the upper east rift one to the summit.
2. Sample the vent field at sites identified on dive s91, taking sulfide, water and bio samples at a site centered at 1800m water depth. Full Fluids configuration of basket (3 gas tights + 4 majors).

S094 Summary:
This dive started on a constructional mound north (~50m tall) of the summit that was found to be relatively young boninite lava. The dive then traverse east over mostly sedimented terrain (including areas of hydrothermal stain) to the N rift zone, then following a traverse of the upper east rift to the summit. The lavas were not particularly young looking, and have variable sediment coating, as well as extinct hydrothermal chimneys and sediment more than 10m east of the summit. The dive then went to the summit and samples and examined in and around several chimney structures as well as in the small west-summit pit. Shifted AUV Abyss bathy was a big help at the summit.

S095 West Mata – SW Base Objectives:

1. This dive will be a geo-transect at the SW Base of West Mata volcano, roughly from west-to-east, starting deep at nearly 3000 m and generally driving upslope, ending at 2600 m. We will visit and sample two recent eruption sites (one definite, one unsure) and the surrounding older lavas. This dive will be mainly rock and sediment sampling; no hydrothermal vents expected.
2. The first (deeper) young lava flow is on relatively gentle slopes with only about 100 m of relief. This was identified by ship multibeam depth changes between May 2010 and November 2011. It consists of thinner pillow lavas to the north and a thicker ridge of pillow mounds, oriented E-W, to the south.
3. The second, shallower area of depth change is between surveys in 1996 and 2008 and is less certain because the 1996 survey is of lower quality. Nevertheless, it corresponds to an area of pillow mounds in 2009 MBARI AUV bathymetry and we will want to sample them.

S095 Summary:
This dive was a geo-transect at the SW Base of West Mata volcano, roughly west-to-east, through two areas of depth change at the volcano between May 2010 and November 2011, and 1996 and 2008, respectively. This was one of the deepest dive starts (~3000 m). Lava surrounded by sediment was observed in the younger of the two deposits, with pillows, including some ornamented. A zone with tumuli was observed well to the north of the shallow ridge forming the south portion of this lava flow, with some high effusion rate morphologies. The dive then traversed somewhat older looking sea bed, comprised mostly of pillow lava, with unclear distinction between the eastern boundary of the younger flow, the somewhat older lava flow, and intervening terrain, finishing upslope on the SW rift zone.

S096 Mata Fa Objectives:

1. This dive will be a geo-transect across the summit of Mata Fa volcano, one of the North Mata group of volcanoes. This will be the first ROV dive on Mata Fa, and there have been no camera tows here, so the dive will be a very exploratory in that we don't know what we will find. There is no evidence of a hydrothermal system on Mata Fa, but it's possible we could encounter some extinct chimney fields. The dive track is designed for viewing and sampling the main constructional morphologic features around the summit.

2. Main sampling with be rocks and sediments (using scoops). The dive starts on the west rift zone of Mata Fa, which is made of two separate ridges, one higher than the other. It starts on the lower ridge then jumps to the higher ridge before proceeding towards the summit. Afterwards the ROV will drive down the east rift zone.

S096 Summary:
This dive was a geo-transect across the ridgelines and cones that define the structure we call Mata Fa volcano. It was our first and only visit to the volcano. The main constructional features around the summit area are an E-W trending ridgeline, a N-S tending ridgeline caped by several mounds, and a broader E-W trending ridgeline east of that. The dive started on a deeper, steep-sided ridgeline of pillow lava with sediment on the narrow top of the ridge, traversed upslope on to a less steep sided but equally sedimented pillow lava mound, explored three young and step sided constructional pillow mounds on the N-S ridge, with some faint evidence of diffuse flow, and then traversed north to the eastern ridge, which was again mostly sedimented, older lava terrain.

S097 Mata Fitu Vent Site Objectives:
1. This dive will visit the known hydrothermal vent field at Mata Fitu volcano, one of the North Mata group of volcanoes. The dive will start downslope of the area of known venting and will traverse back-and-forth upslope to establish the aerial extent of venting. The dive will be a mix of geo-transects to visually explore the area, sample lavas and sediments, and will also do chemical and biological sampling at the hydrothermal vents.
2. This is the second dive of this expedition at Mata Fitu. The first dive explored the summit area to the northwest of this dive and did not visit the hydrothermal vent field.

S097 Summary:
This second dive at Mata Fitu started near a series of small mounds in the one swath of AUV Sentry data that we had from leg 1 at this site and then traversed upslope to previously studied (2012) vent field. The deeper structures turned out to be mostly extinct, 10-15 m tall hydrothermal chimneys, although one active chimney was found as well. An east-west transect through the area found plenty of extinct but no more active chimneys. The dive then headed upslope and observed and sampled within and around a previously studied (2012) vent field.

S098 South Tafu Eruption Site Objectives:

1. This dive will visit a young volcanic deposit that was emplaced sometime after 2010 and before our survey of a few days ago, according to a MB difference map. We expect to see and sample young basalt lava and pyroclasts.
2. Opportunistically sample vent fluids or biota if observed (minimum fluids config.).

S098 Summary:
This dive was on a young volcanic deposit emplaced sometime after 2010 and before our 2017 Falkor survey south of Tafu Cone on the NELSC. The apparently fissure fed lava flow (and the dive) followed the strike of the dominant ridgeline in the area forming a south rift of Tafu itself. The dive headed upslope (generally north) on a ridgeline parallel to the ridgeline where the Puipui 2008 eruption occurred (which is further south on the NELSC). We observed young basalt lava, very steep sided pillow mounds (some vertical with in place pillow lava “drips” and elephant trunk-elongated pillows). The pillow mounds often had flatter tops. A series of vent structures with agglutinated spatter, and collapsed lava structures, were found at the higher elevations of the lava flow near the end of the dive.

S099 North Tafu Objectives:

1. This dive will explore the back-arc spreading axis north of Tafu cone (yesterday’s dive was south of Tafu cone. We will visit two young eruption sites, one constrained by before-and-after bathymetric surveys between 2010-2017, and the other between 2006-2009. Similar to yesterday’s dive, we expect to see and sample young basalt lava and pyroclasts.
2. Opportunistically sample vent fluids or biota if observed (minimum fluids config.).

S099 Summary:
This second dive on the north side of Tafu Cone was designed to look at two young eruption deposits on the northern rift. One was emplaced sometime after 2010 and before our 2017 Falkor survey, and the other (deeper, near the start of the dive), was emplaced a few years before 2010 (we imaged it by Towcam and dredged it in 2010). ROV navigation was particularly bad on parts of this dive, especially at the dive start and midway through the dive. The older/deeper young flow already had some sediment dusting on it as well as sparse benthic non-vent fauna living on it The younger of the two flows was similar to that observed the day before, with steep sides and flatter tops.

S100 Mata Ua Objectives:

1. This dive will visit flank sites on the Northeast flank of Mata Ua young volcanic for geological observations over a 1 km track. It will then traverse over the venting site, exploring along the way, over an additional 0.6 km of track. We will include some sort of 100th dive ceremony near the vents.
2. Several hundred meters NE of the know vent sites we will look for additional chimney as we move into the Temple of Smoke are, after which we will observe and sample vent fluids, chimneys, and biota (maximum fluids config.).

S100 Summary:
A scenic finish at the Temple of Smoke vent field was chosen for this dive, with a start exploring the saddle between Tolu and Ua, and a part of a northeast-trending, linear ridge extending from the main structure of the volcano. The navigation system performed especially poorly on this dive, and gave mostly spurious fixes. The dive mostly headed upslope to the south from the saddle to the ridge line, then crabbed back down the slope heading due west to approach the Temple of Smoke field 500m or so west of where we had previously encountered it. Some inactive chimneys were observed on the margins, but many active chimneys were observed and sampled in the field. A metal “banner” was briefly deployed and photographed near the top a chimney in celebration of the 100th SuBastian dive. This was recovered and returned to the ship.

S101 Mata Ono Objectives:

1. This dive will be the first ROV dive on Mata Ono volcano, one of the North Mata Group. The dive will start on a constructional cone on the west flank, then ascend along a ridge and traverse the south flank at ~2500 m for geological observations. It will then visit a constructional cone on the east flank and from there will ascend the east ridge up to the summit.
2. A CTD tow-yo in 2010 detected a hydrothermal plume over Mata Ono, extending from 2400-2500 m depth (below the summit, mostly on the N side), but a hydrothermal site has never been looked for on the seafloor. We will search for this vent site during the latter part of the dive, particularly on the traverse up the east ridge toward the summit. If a new vent site is found, we will plan to have a second dive at Mata Ono for fluid sampling.

S101 Summary:
This dive started on the SW flank of the Mata Ono, encountering fresh, unsedimented lava right at the start of the dive. These lavas contain extremely rare enstatite phenocrysts and megacrysts. The dive progressed upslope to the east, traversing the south face of the summit cone well below the summit in mostly old-looking lava or lava debris, approached a small depression and satellite cone east of the main summit edifice (where a significant abundance of deep sea corals was observed), and then ascend to the summit from the east. A diffuse flow vent field with abundant snails and smokey water, rimmed by areas venting clear fluids and extensively colonized by anemones. Near the western end of the summit platform two large (>10m tall) active compound hydrothermal chimney structures were discovered and sampled.

S102 Mata Ono Objectives:

1. This dive will be the second ROV dive on Mata Ono volcano. The dive will start on a constructional cone on the west flank, then ascend along a ridge and traverse the west and north flanks at depths ranging up to 2500m from ~2525 m for geological/rock observations. It will then visit a constructional cone on the east flank and from there will ascend the west ridge upslope a bit.

2. We will then run a series of lines traversing the west and north face of the cone at depths of 2525m, 2500m, 2475m, etc.. looking at chimney structures, and identifying sampling sites. We plan to traverse the area beneath the summit and identify where chimneys are and aren't BEFOR stopping to sample.
3. Sampling will commence once the field is evaluated and defined.

S102 Summary:
This return dive to Mata Ono started on an elongate ridge structure heading east from the northern part of the volcano, and then traversed the northern face of the summit cones multiple times in search of more substantial venting, anticipated from the fairly robust chronic plume detected in the water column above the volcano. Rock units were generally very old looking, with extensive faulting and fissuring on this part of the volcano, and variably heavy sediment cover. After a lot of searching the northern and western faces of the summit cone, and nothing more than limited diffuse flow venting, the ROV returned to the summit vent field for additional sampling.

S103 West Mata Upper East Rift Objectives:
1. This dive will be a geo-traverse primarily to sample lavas and sediments on three recent eruption sites on the upper east rift zone of West Mata volcano. The dive starts at the 2016-2017 eruption site about 1.5 km NE of the summit, then will visit the two 2012-2016 eruptions sites further upslope (which may be the same event).
2. A secondary goal will be to sample fluids and biology late in the dive at the southern of two 2012-2016 eruption sites, just east of the summit.

S103 Summary:
This dive was a return to the shallower reaches of the 2016-2017 eruption at West Mata deposit to examine and sample pyroclastic deposits, diffuse flow venting, the northern flow margin, and then also to traverse along the NE rift zone to visit the 2012-2016 lava flow that was briefly seen at the end of dive S85. The dive crabbed a debris slope below the summit to enter the young lava flow field mid slope, and then headed due south to move up through the flow field to observe and sample on a geo-transect, confirming multiple very steep tall flow fronts with debris at their bases.

S104 Mata Taha Objectives:

1. This dive will be the first ROV dive on Mata Taha volcano, another one of the North Mata Group of volcanoes. The dive will be a geo-traverse starting on the north flanks and visiting several constructional cones on the way up to the summit.
2. Main goal will be rock and sediment sampling, but there is also a weak hydrothermal plume over Mata Taha (probably from diffuse vents), so we will sample fluids and biology if we encounter any hydrothermal vent sites.

S104 Summary:
This dive started on a small mound structure NE of the main volcano edifice at Mata Taha, traversed west to another volcanic mound. Both mounds were extensively sedimented but did have rocky volcanic outcrops too. The westward traverse from this second cone to a third satellite cone to the NW of the summit was largely sediment covered, with occasional rocky outcrops. A fourth, somewhat larger satellite cone west of the summit was visited, followed by a turn due east, to approach and ascend the summit. A single extinct hydrothermal chimney was encountered on the edge of a fissure below the summit in the area. The dive then visited two cones on the summit, finding heavily sedimented volcanic outcrops. The dive was not able to visit the steep south face of the summit cone, or the elongate east-west trending ridgeline to the east of the summit, both of which have steeper terrain and might be good targets for a future dive in the area.

S105 Northern Dacite Objectives:

1. This dive will be the first ROV dive on a deep dacite lava flow adjacent to the North Mata Volcanoes. It is similar in size and character to the dive 92 dacite lava, but deeper and of higher acoustic backscatter. We hope to learn if the latter is from a younger lava surface or several other possible causes as well as to look for pyroclasts in lower backscatter parts of the lava flow. The objective of the dive is to examine several

different flow areas to examine lava morphology starting deep and moving shallower, including a traverse up a nearly 100m high escarpment that forms the edge of what looks like a lava drainout structure.
2. The main goal will be rock and sediment sampling, but we expect to sample some as well.

S105 Summary:

The last dive of the program was a short geo-transect through the northern portions of the LL_D dacite lava flow. The dive began in rock debris in the center of a half-crater (unbounded on the west side), then ascended a small elongate ridge in the crater, finding small amounts of in place lava at the top of the ridge. It then traversed south of that cone, finding and sampling volcanic sediments containing pumice and scoria in several places before ascending the steep south wall of the half-crater. The wall was angular volcanic debris at the base, transitioning into several in place lava flows visible in the wall, and culminating in following one of several sheeted dikes upward to the top of the wall, where the dike was found to feed a lava flow. The presence of the dike suggest that this lava flow was fed by a north-south trending fissure, rather than a point source vent at the shallower southern portion of the lava flow. Once on top of the wall, several small cones, debris fields and intervening depressions were visited in an area we had interpreted as lava channels in the bathy but no traditional lava channel structures were observed. Before leaving the bottom the ROV pilots unfurled a banner with Christmas wishes for their families.

6.3 SuBastian Dive Maps

Maps are in geographic (unprojected coordinates). ROV positions and samples have been edited to remove some of the worst navigation.

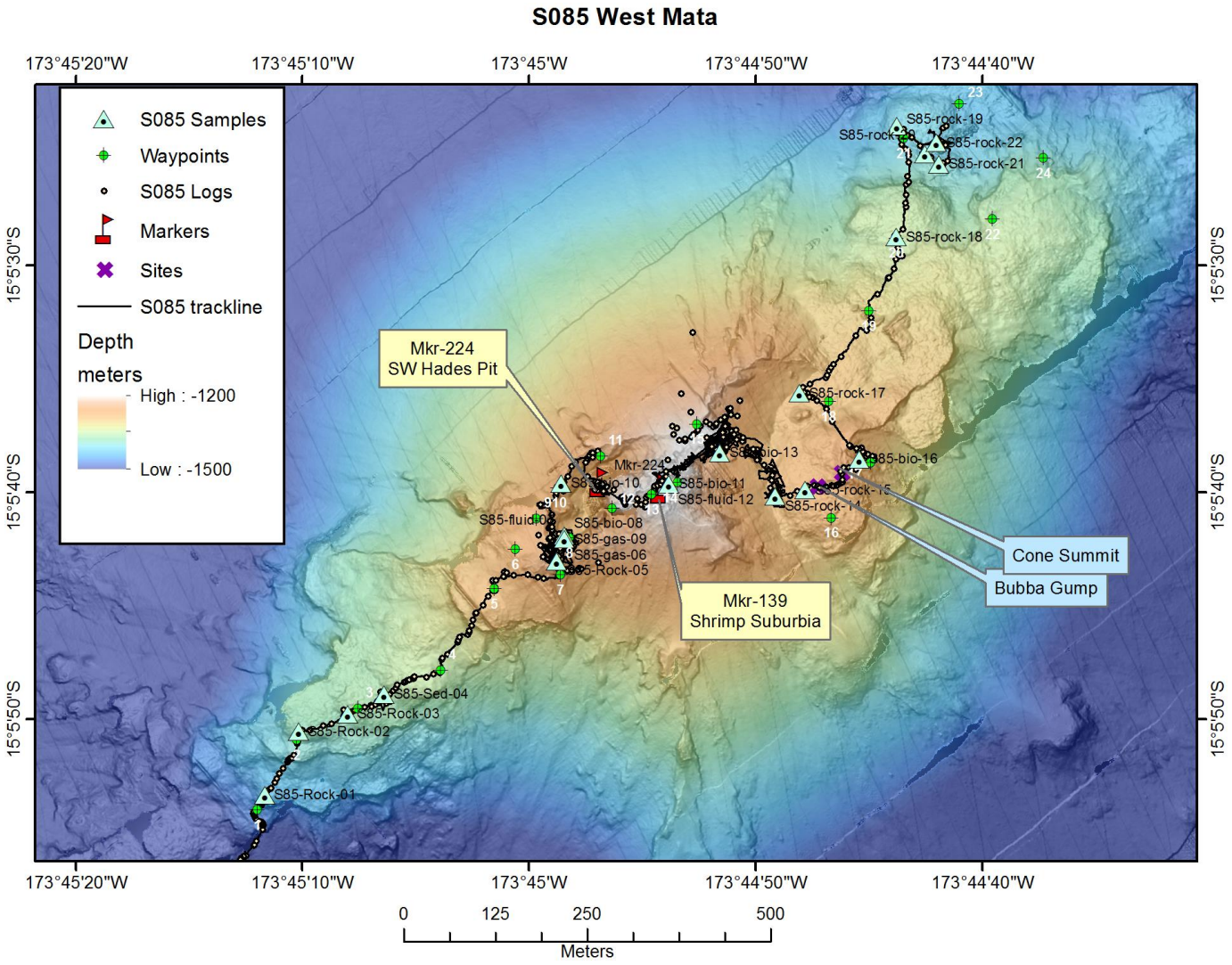


Figure 6.3-1 S085

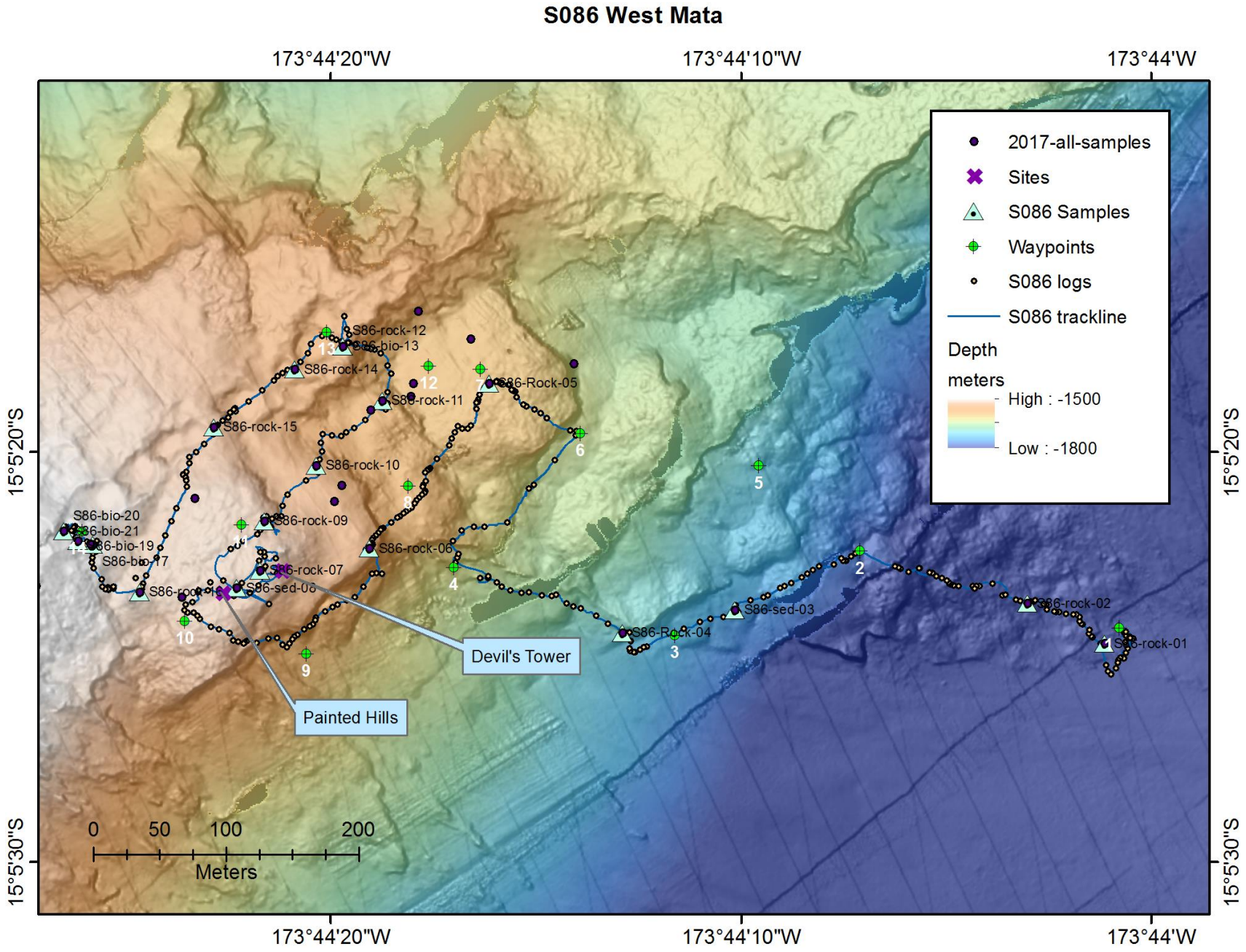
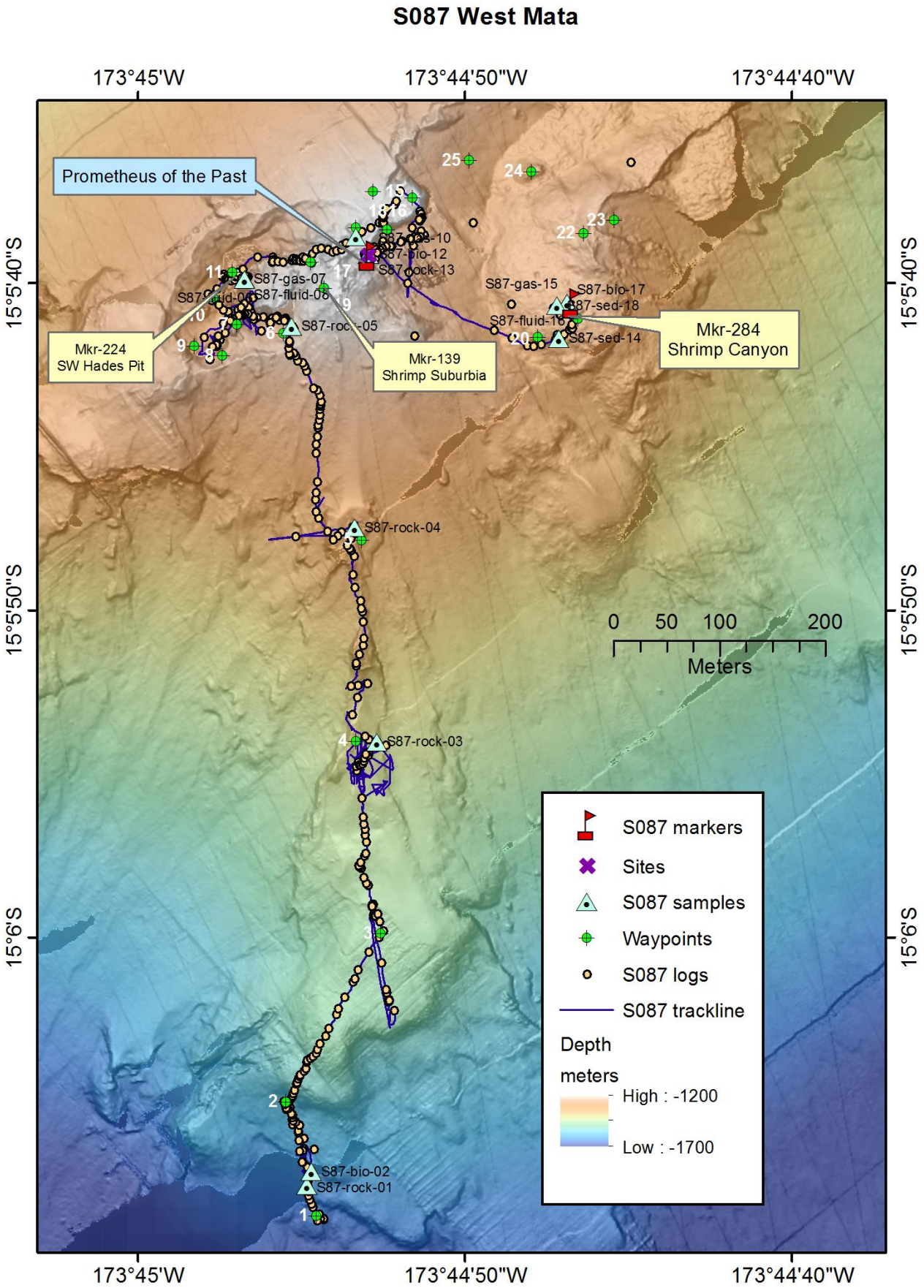


Figure 6.3-6 S086



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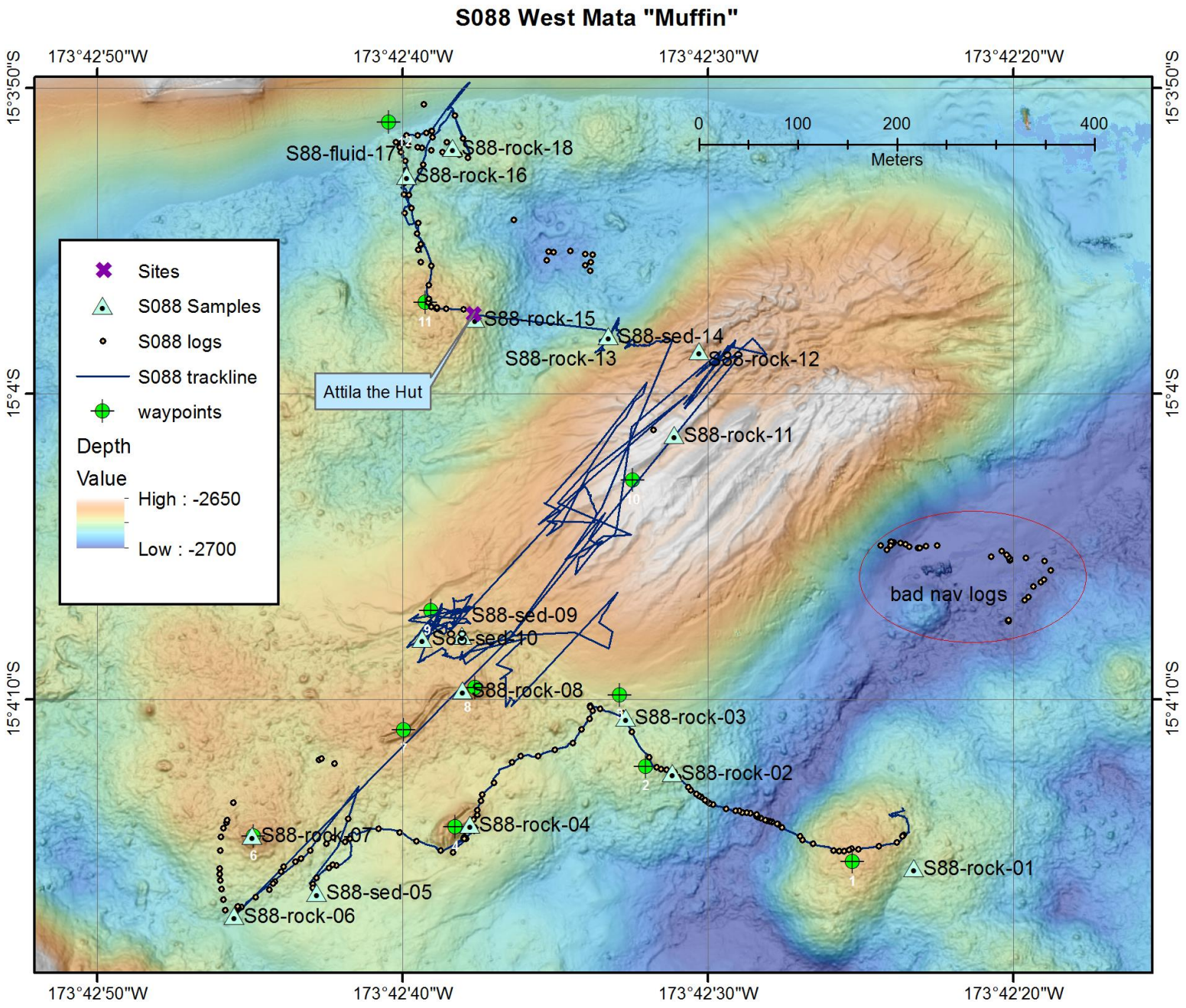

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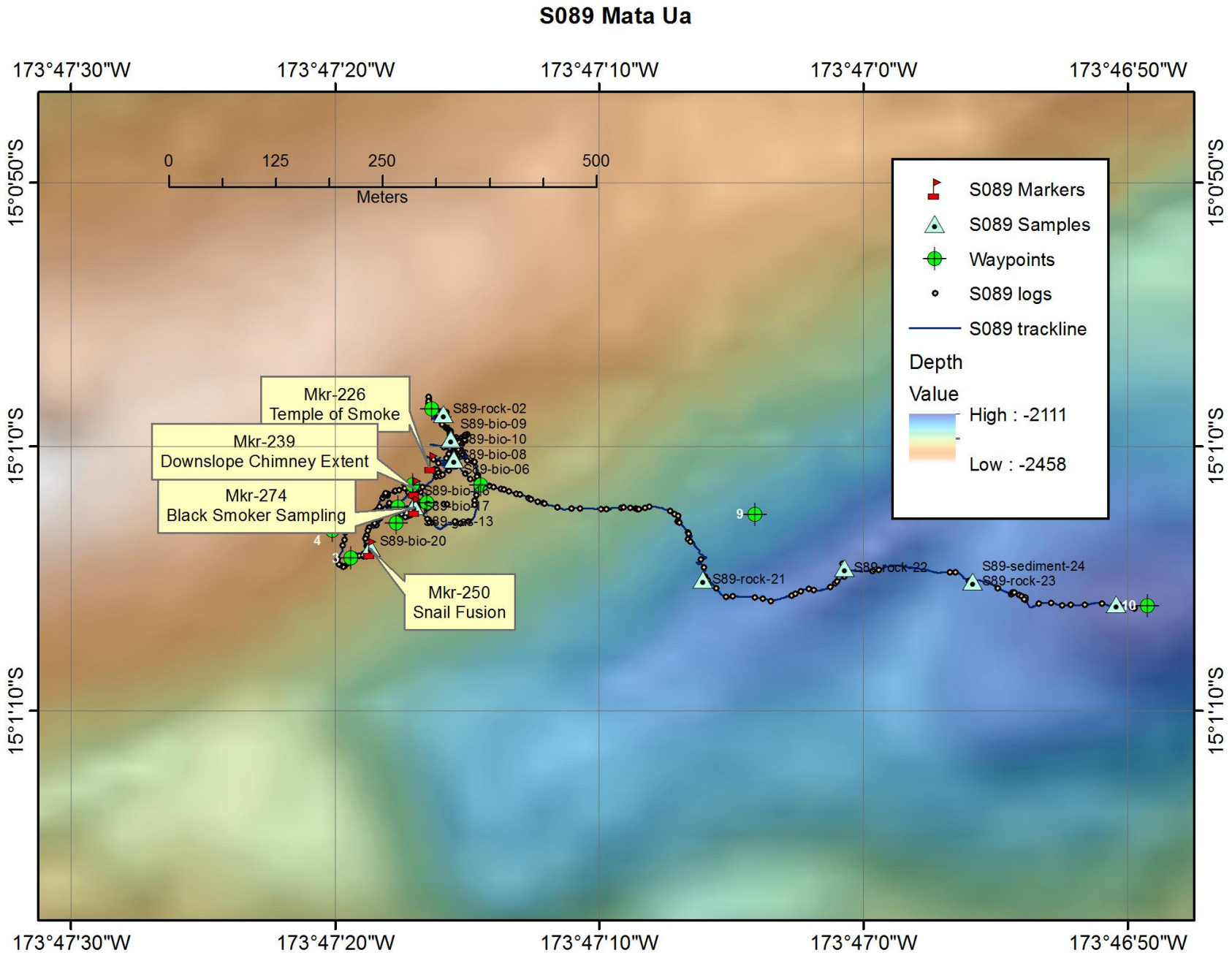

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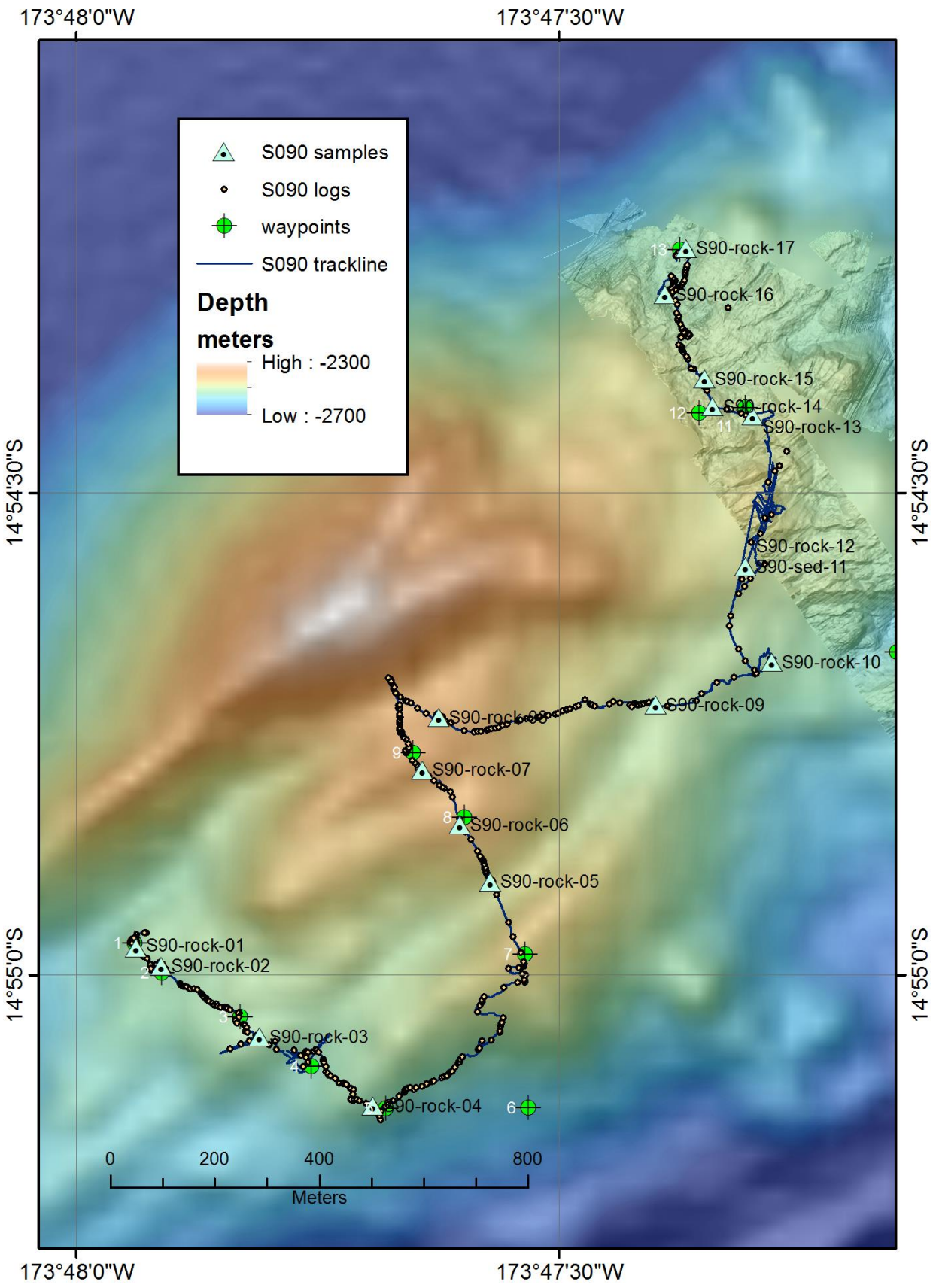


Figure 6.3-10 S090

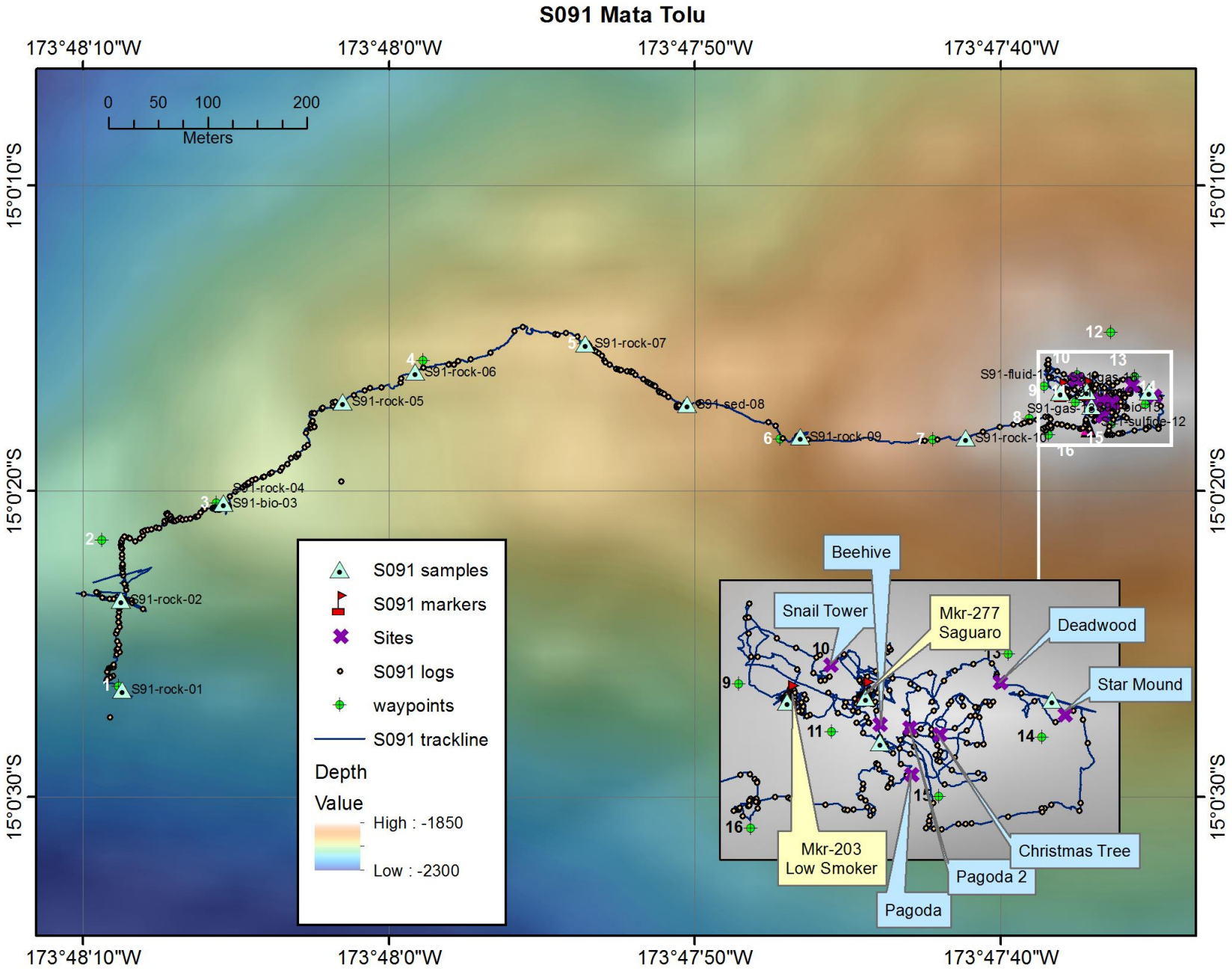
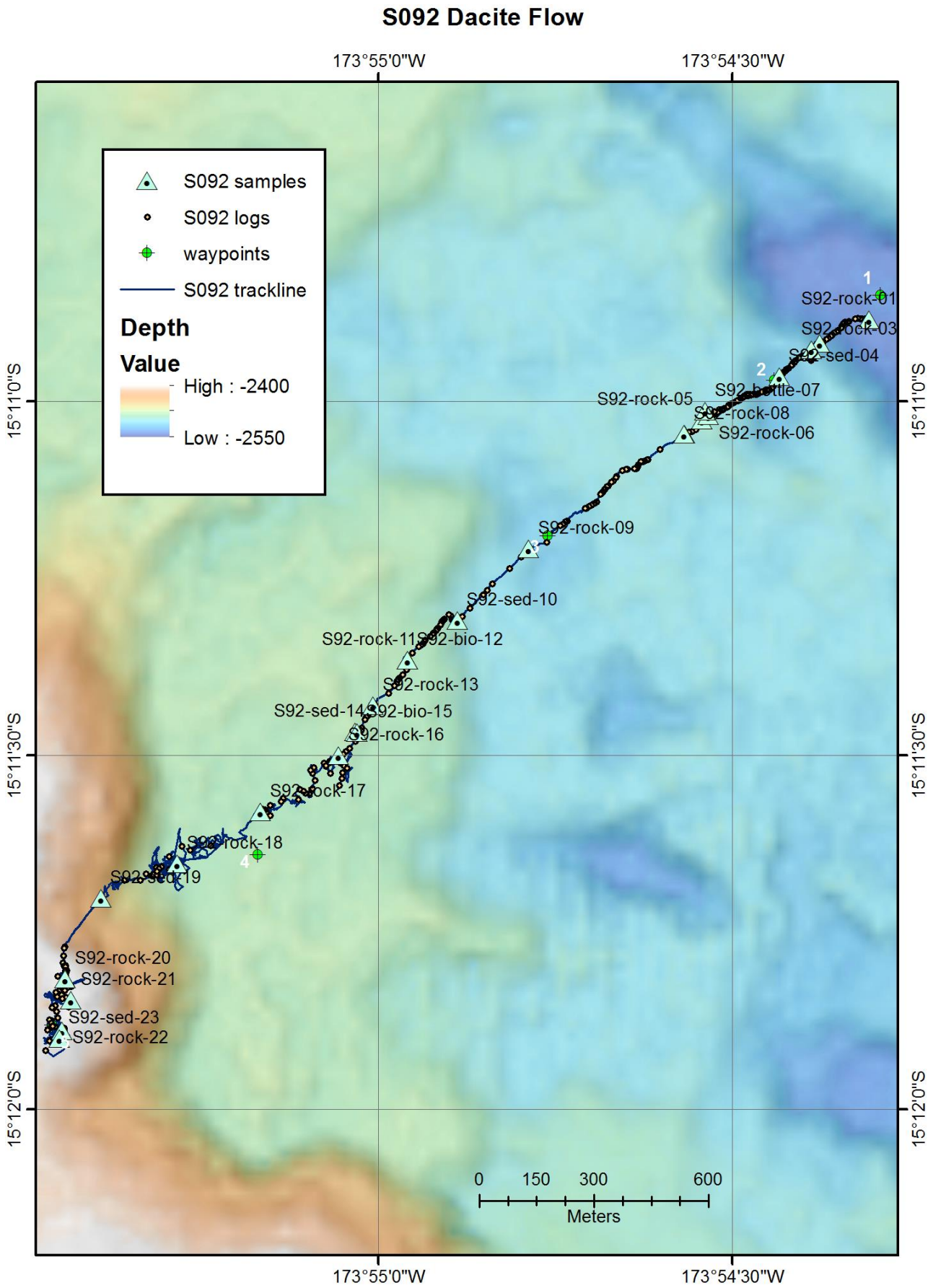


Figure 6.3-11 S091



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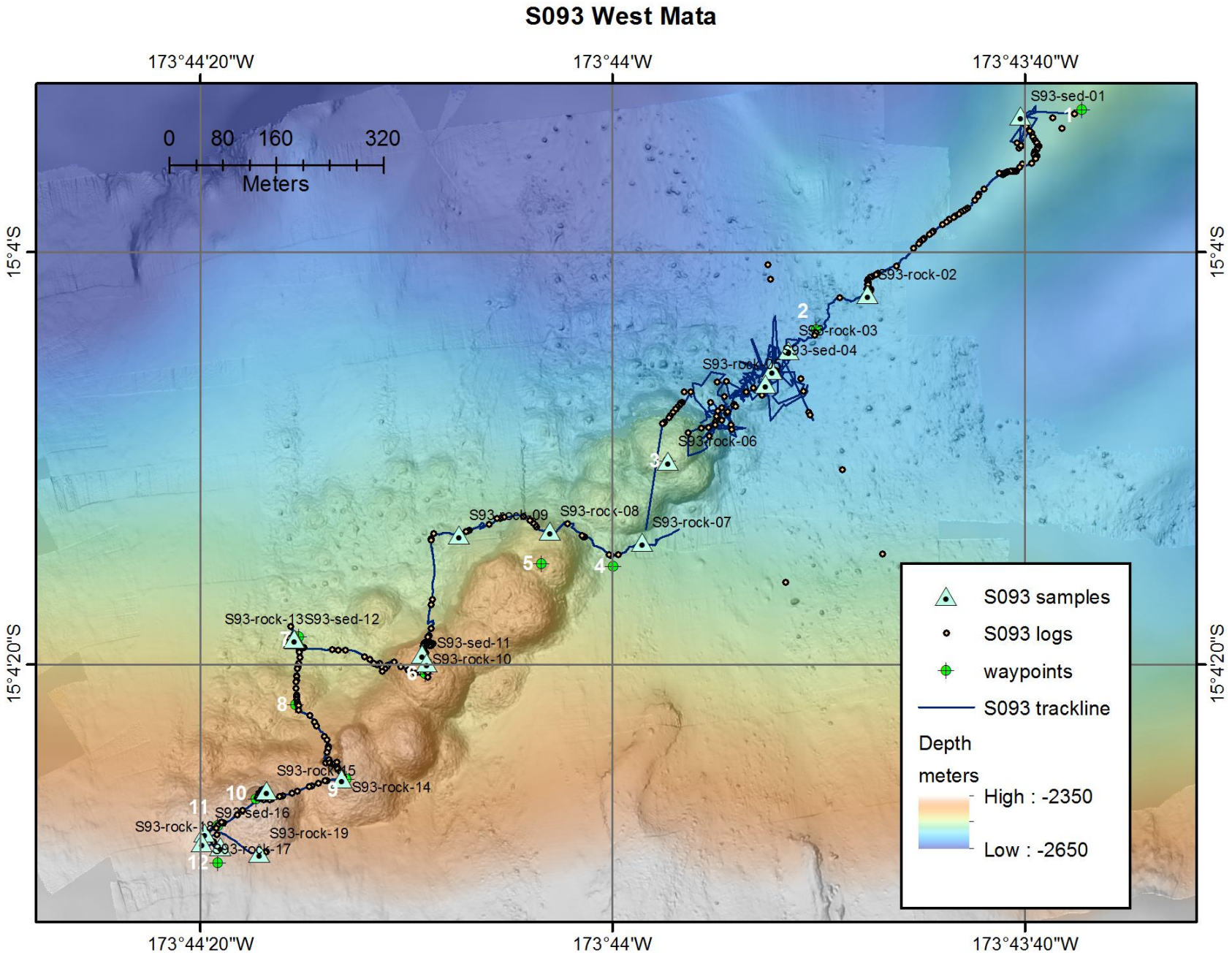

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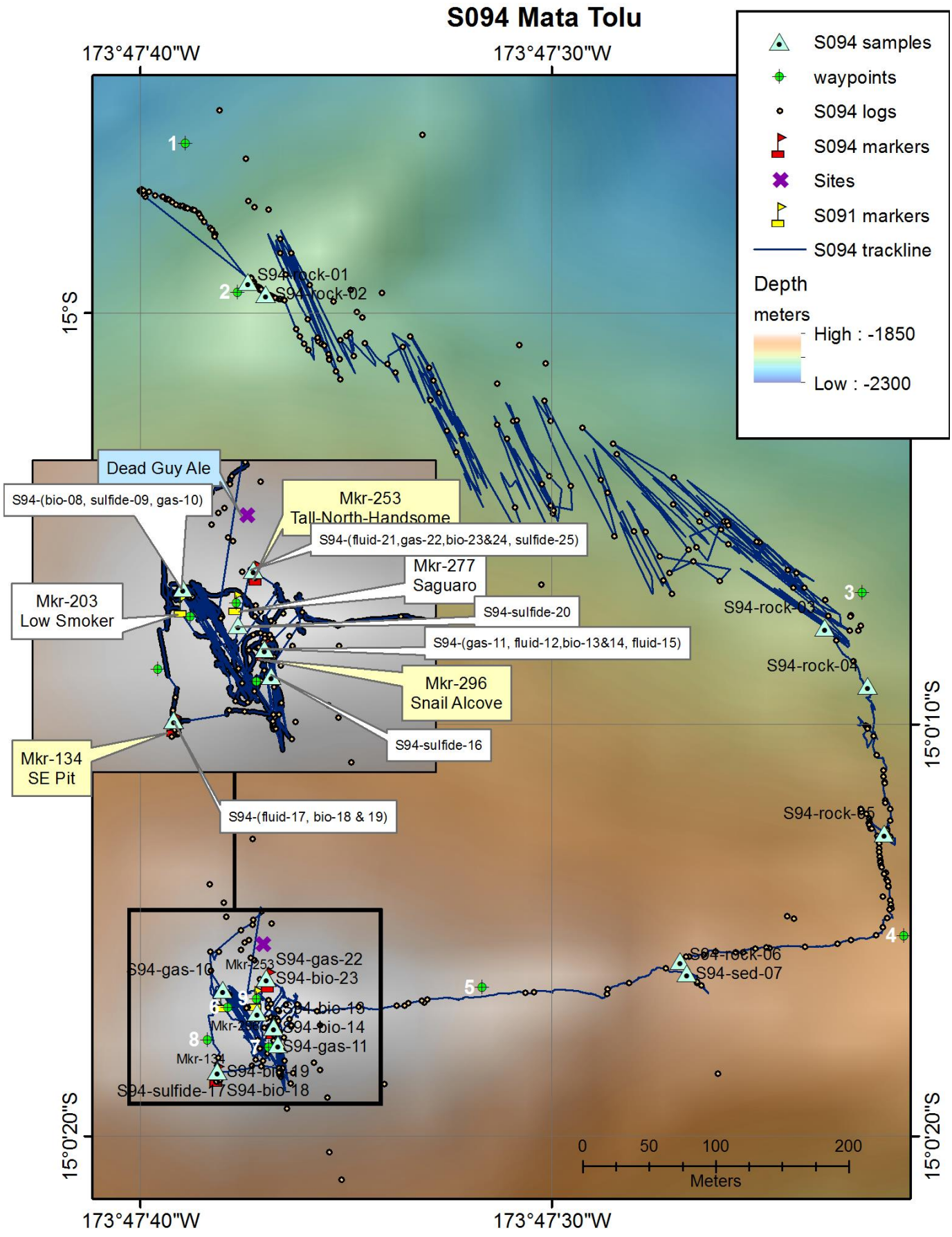

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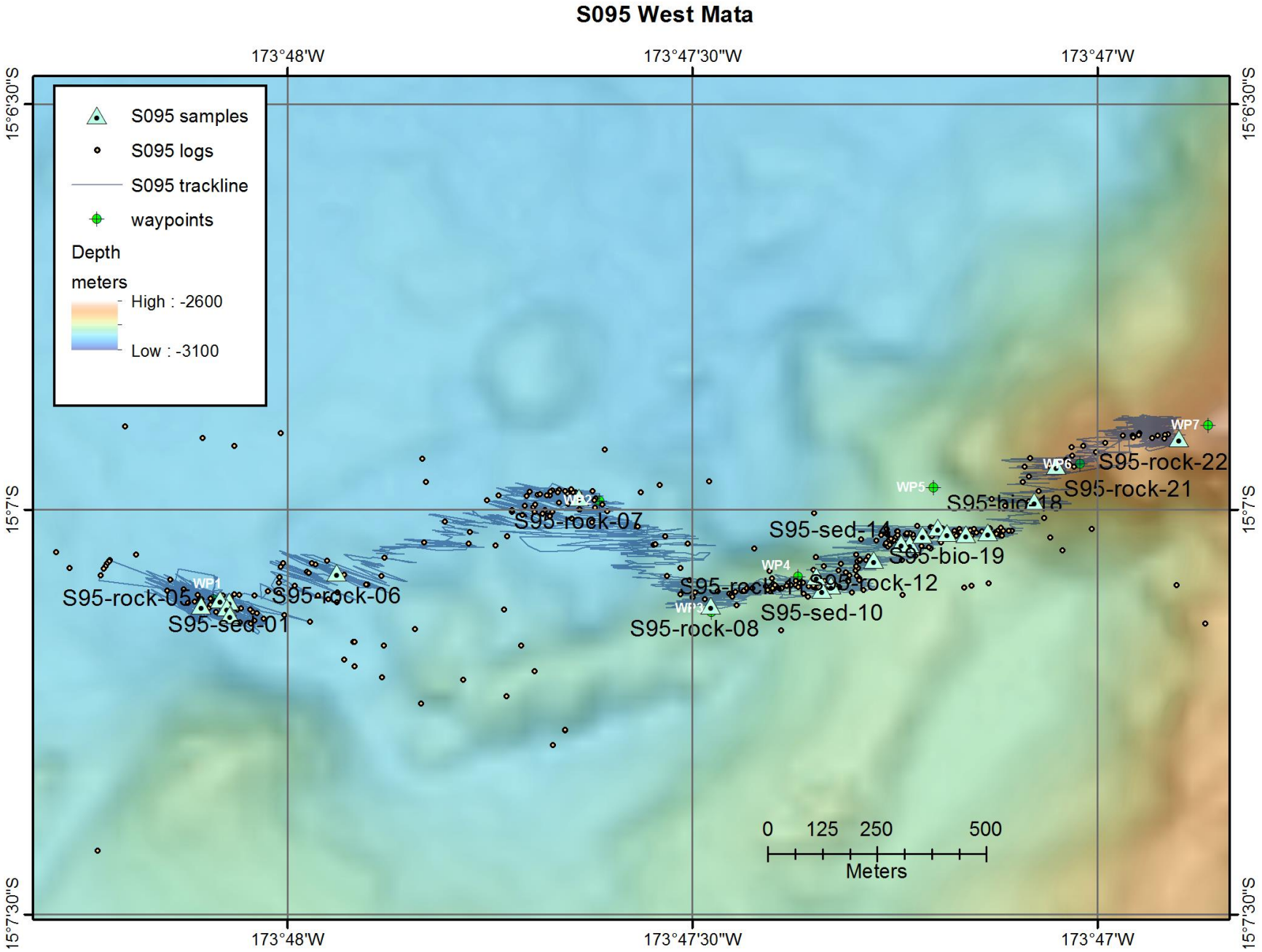

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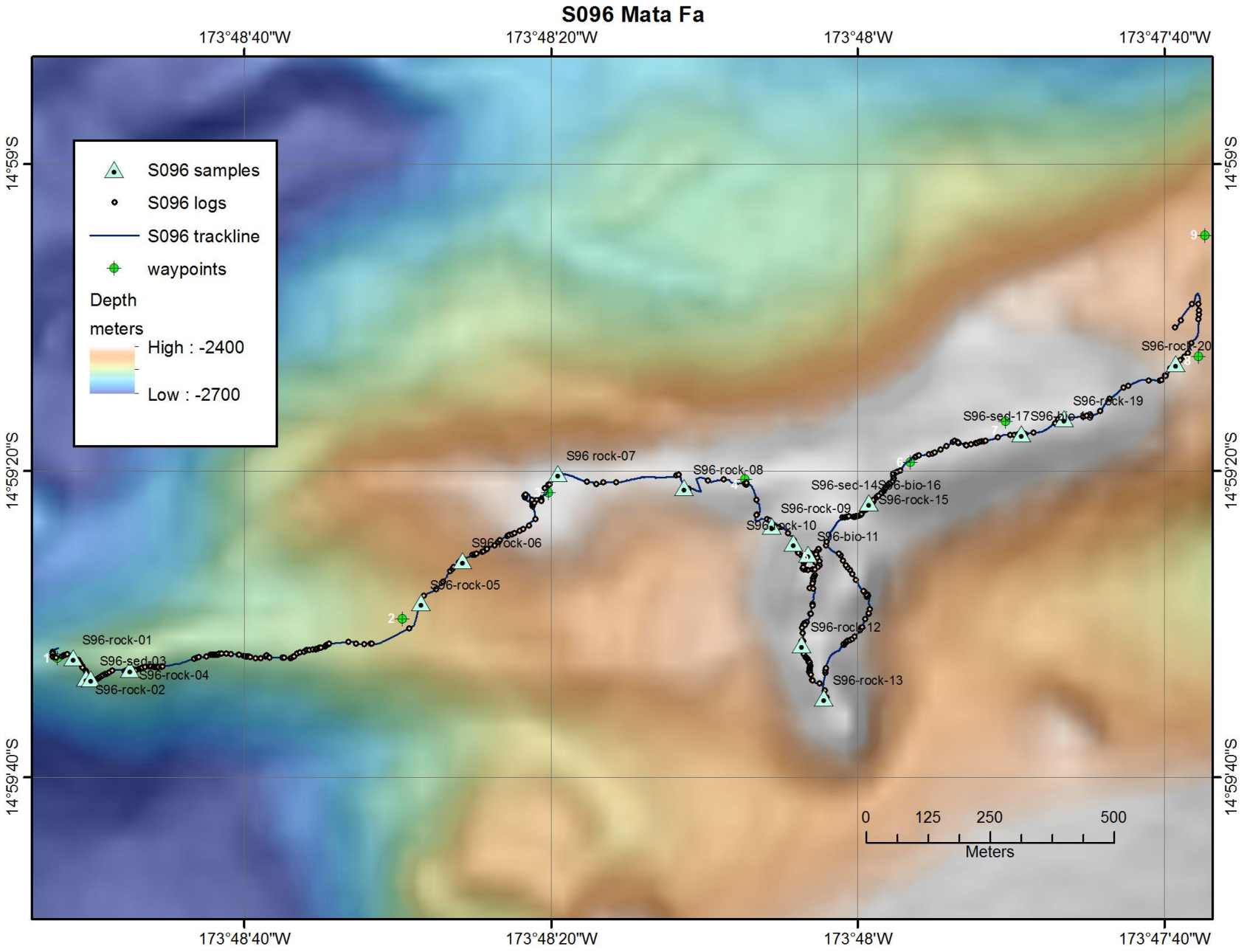

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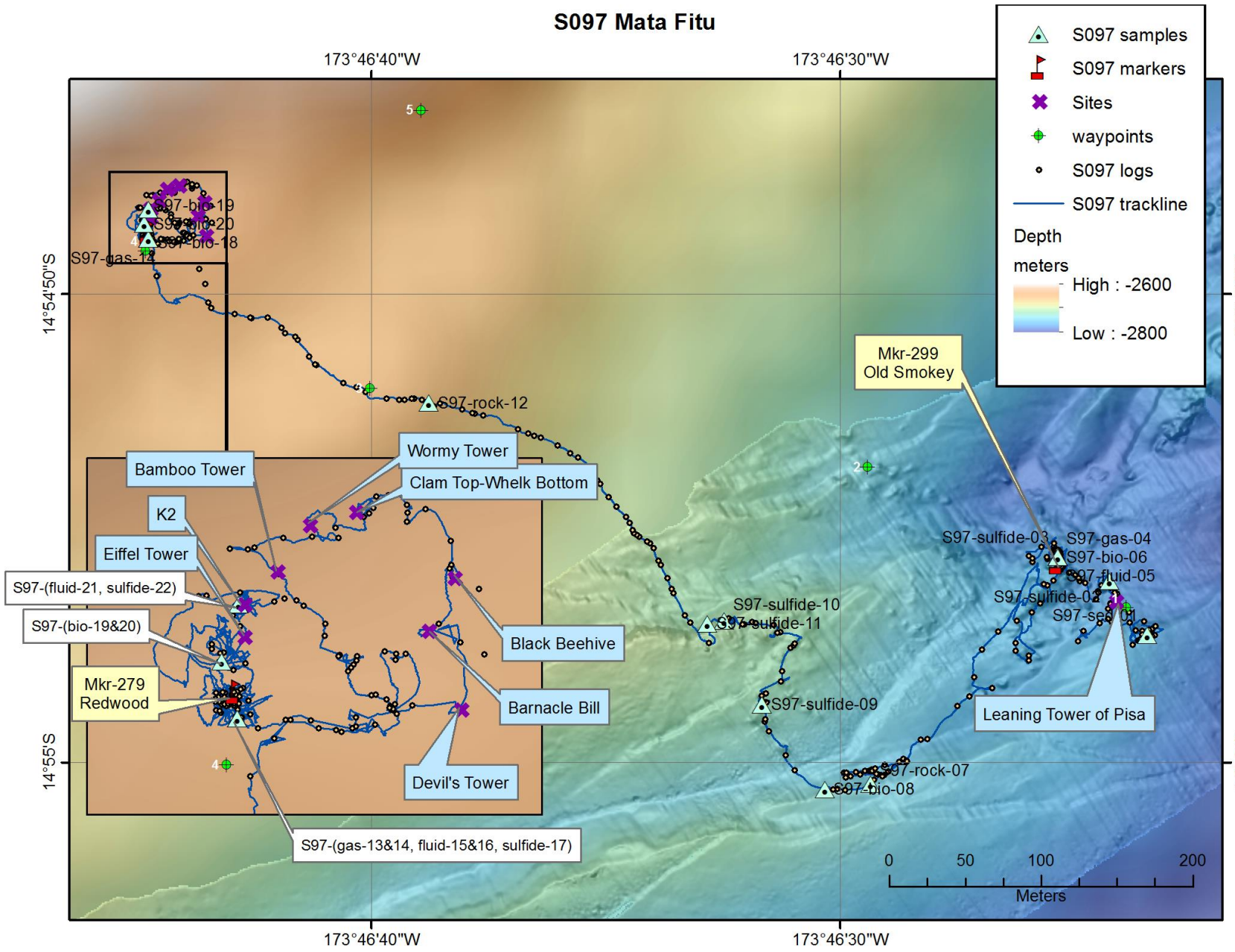

Figure 6.3-17 S097

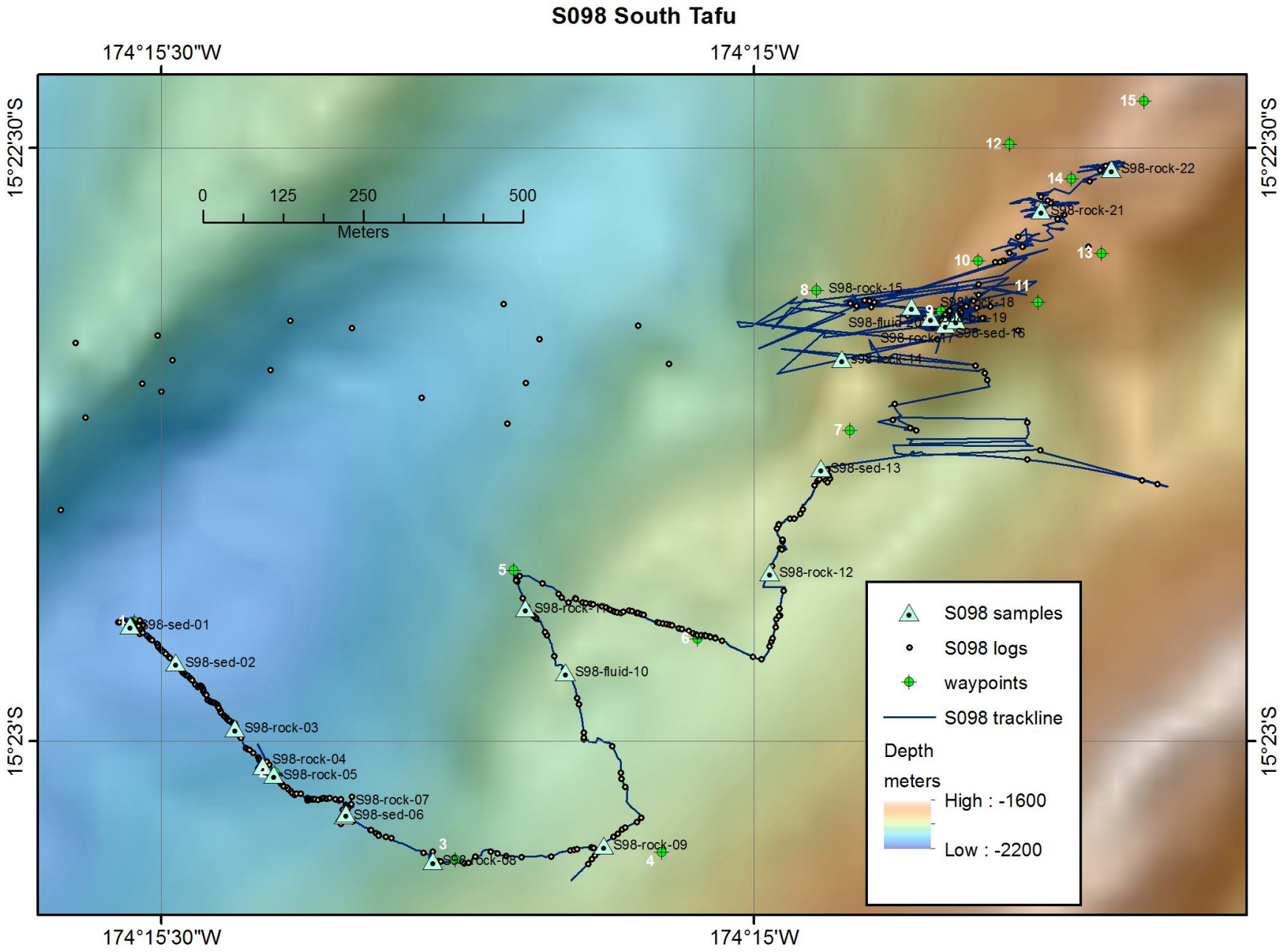

Figure 6.3-14 S098

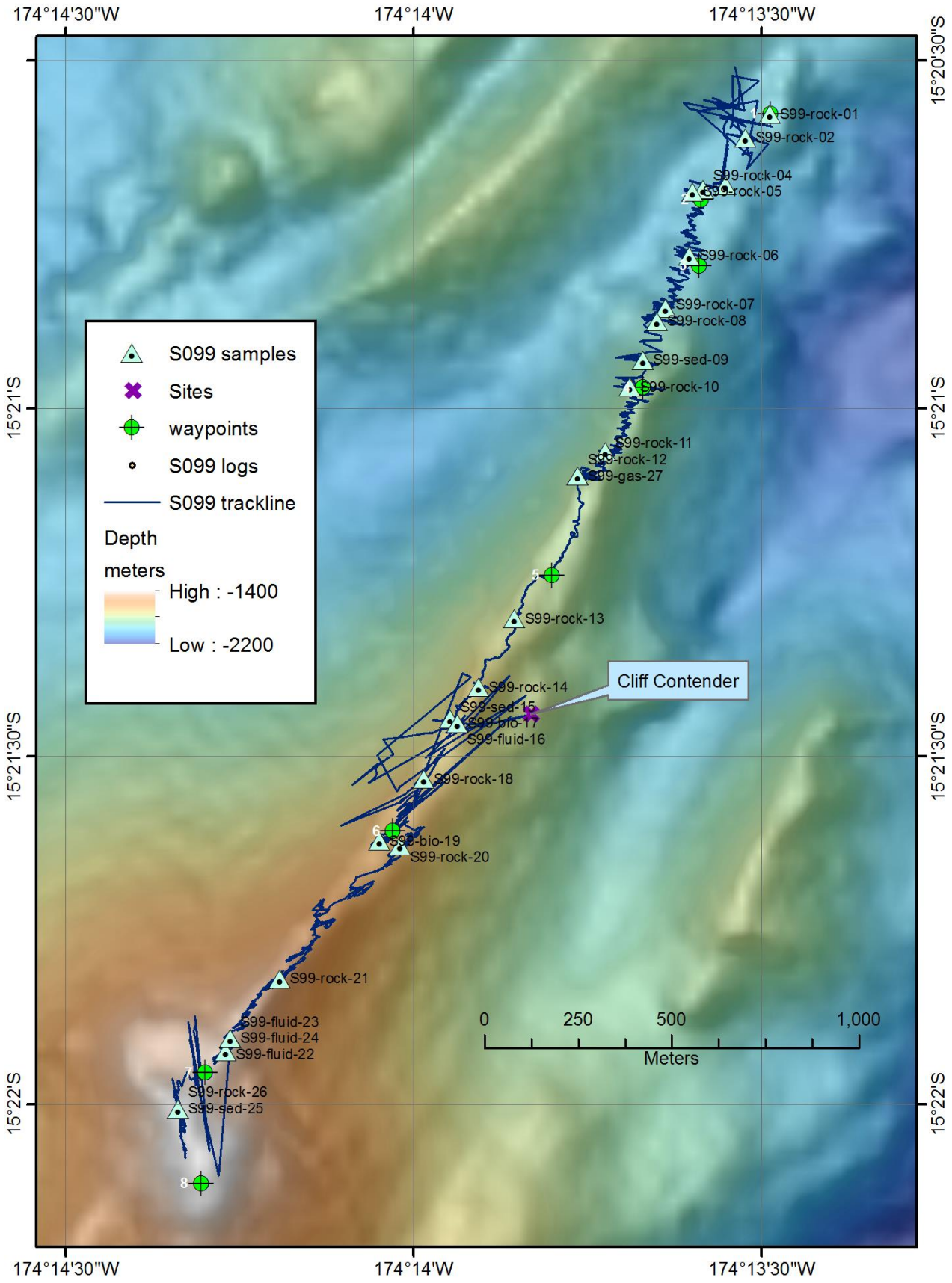

Figure 6.3-15 S099

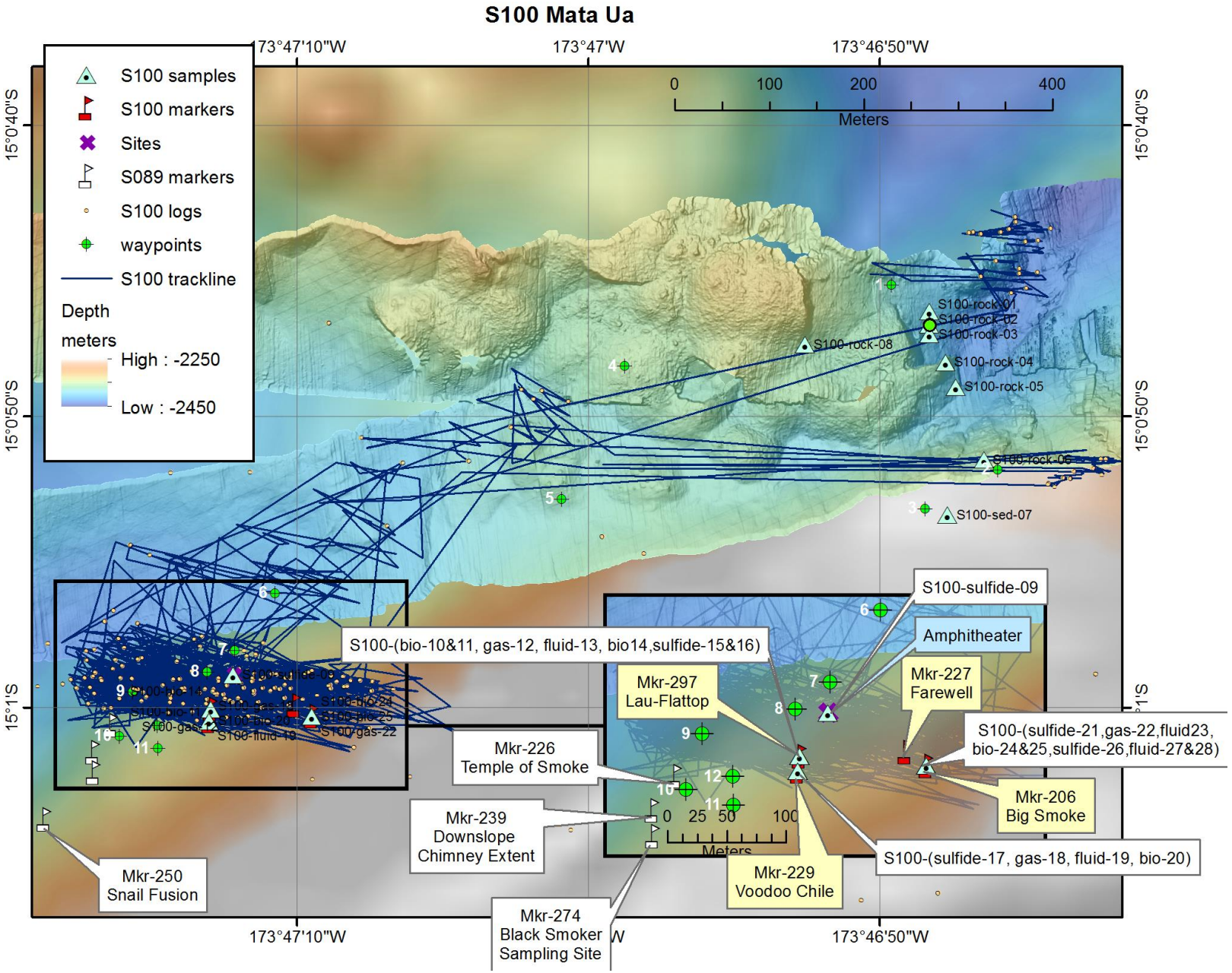

Figure 6.3-16 S100

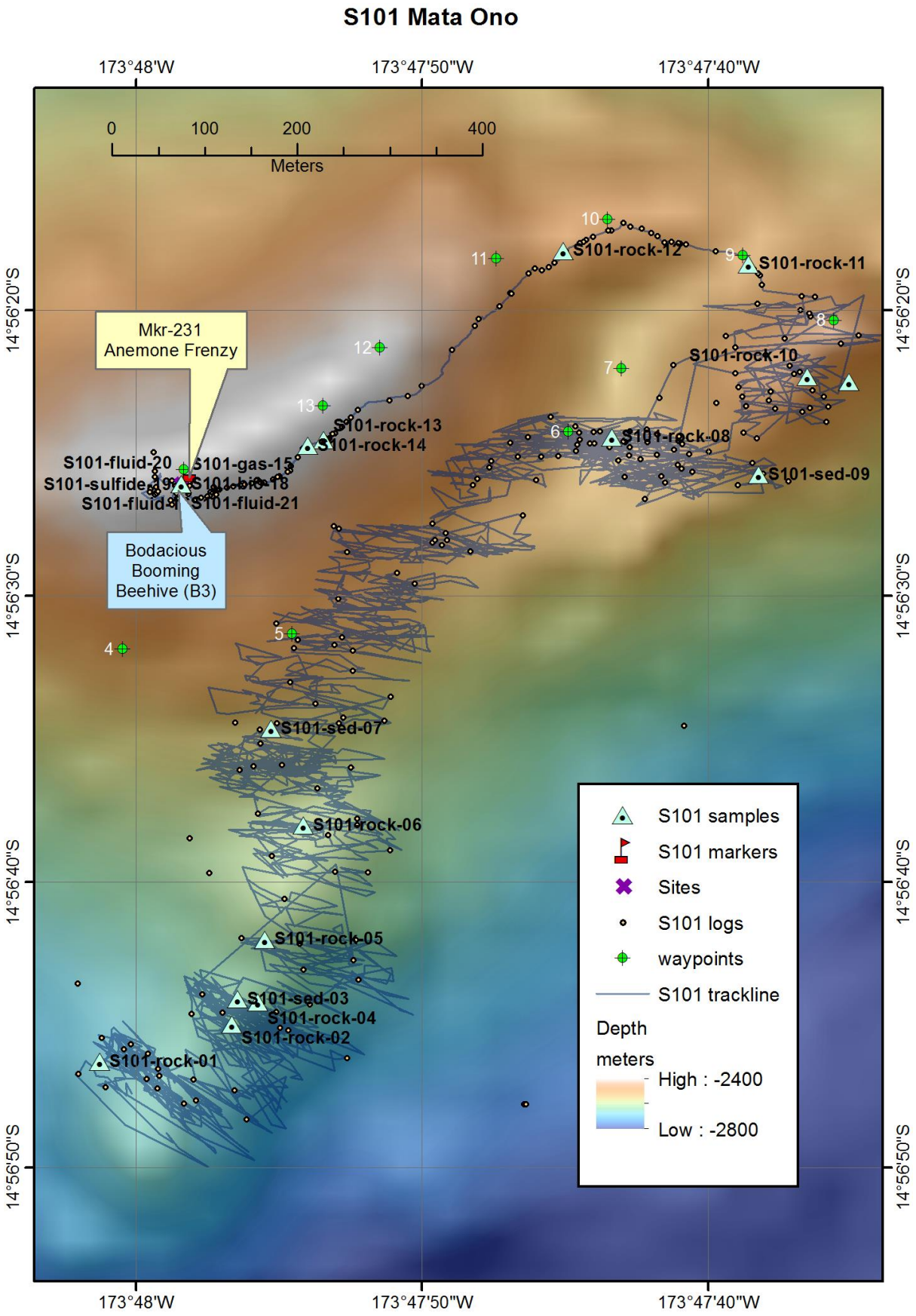

Figure 6.3-17 S101

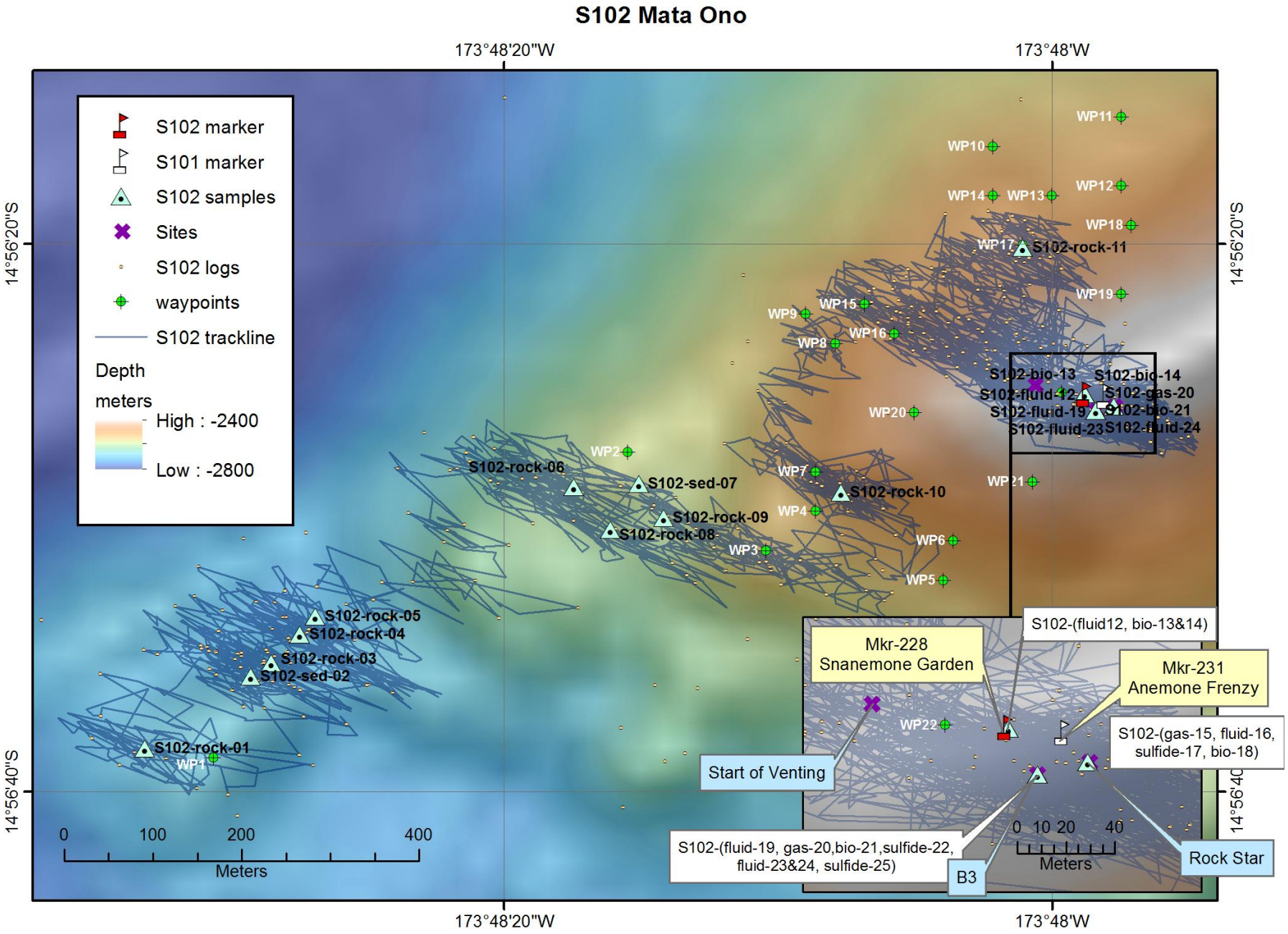

Figure 6.3-18 S102

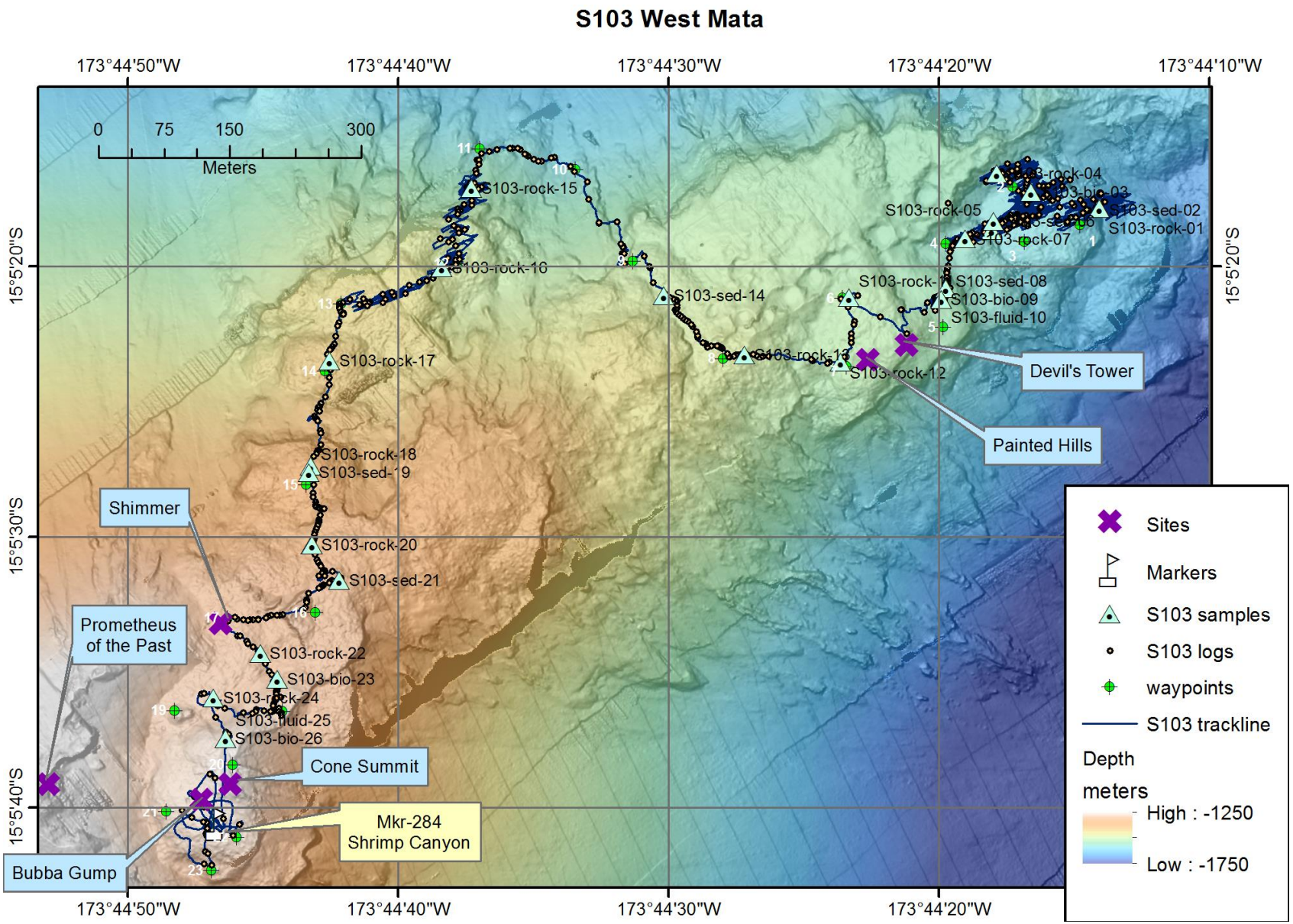

Figure 6.3-189 S103

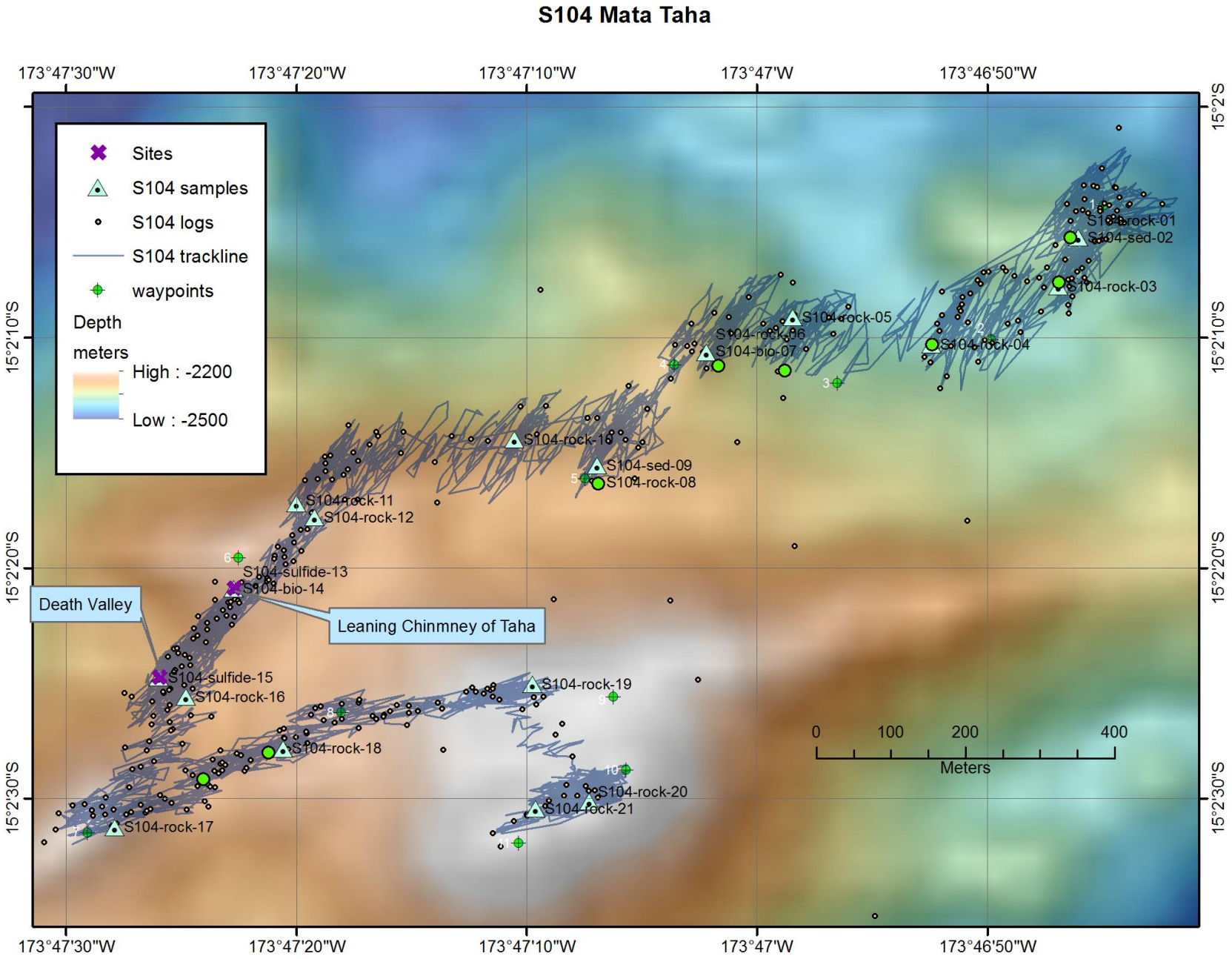

Figure 6.3-20 S104

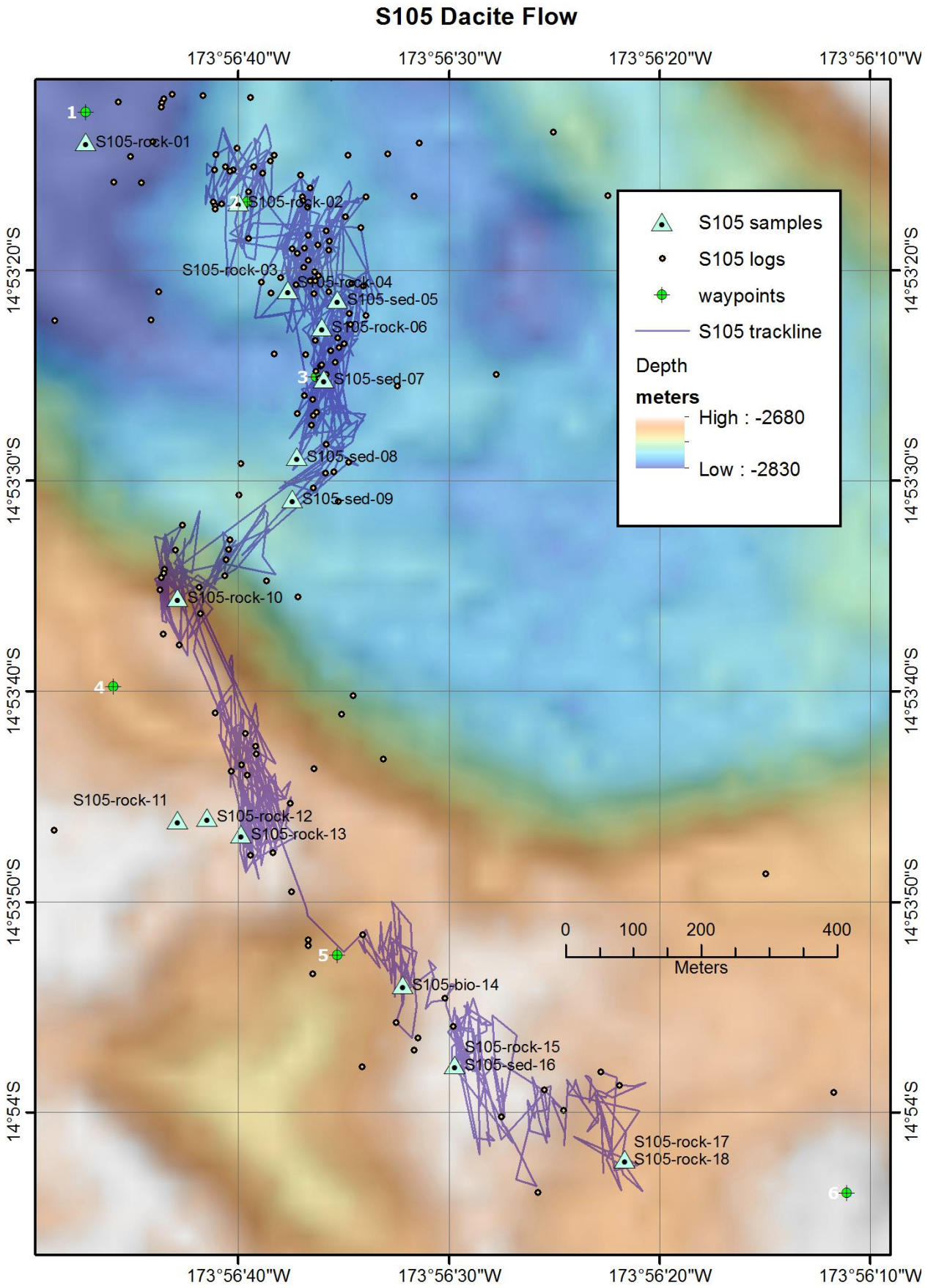

Figure 1921 S105

6.4 SuBastian Markers-Vents

Physical markers (provided by NOAA PMEL EOI Program) were placed at several sites during the SuBastian Dives. Markers were used to denote some of the sampling sites and areas that may be of interest for return expeditions. The depths for markers deployed on S85-S89 have been corrected to the PAROS depth values (bold-italics), replacing the Squidle-logged depths which were 10+ meters deeper.

Table 6.4-1 Markers deployed on FK171110 by SuBastian.

Marker	Edifice	Site	Latitude	Longitude	Depth	Dive Deployed	Logger Comments	Heading	Record Number
Mkr-224	W Mata	SW Hades Pit	-15.09432	-173.74915	***1282***	S85	Up the wall a bit (on N/NE wall) on the slope of the pit in shimmer and bacmat.	40	289
Mkr-139	W Mata	Shrimp Suburbia	-15.09440	-173.74840	***1188***	S85	Area of intense venting and lots of shrimp. Marker 10 m upslope from sampling site - half way between Prometheus and Shrimp City.	68	325
Mkr-284	W Mata	Shrimp Canyon	-15.09462	-173.74631	***1266***	S87	On new flow (2017-2011) lots of shrimp and squat lobsters. Diffuse 9°C flow.	335	494
Mkr-226	Mata Ua	Temple of Smoke	-15.01683	-173.78788	***2356***	S89	No words for this wonder. Deployed on steep slope in smoker field. Sampled black smoker just downslope from marker.	196	146
Mkr-239	Mata Ua	Downslope Chimney Extent	-15.01710	-173.78805	2358	S89	Edge of vent field (chimney line - largely inactive). Sampled sulfide worms and polynoids ~ 20 m SW of the marker	180	169
Mkr-274	Mata Ua	Black Smoker Sampling Site	-15.01729	-173.78805	2350	S89	Huge sulfides 17 m high. In the vicinity of 2012 Flashing site. Sampled.	32	234
Mkr-250	Mata Ua	Snail Fusion	-15.01774	-173.78852	2360	S89	Huge diffuse site with lots of biota Snails living together sampled	156	282
Mkr-277	Mata Tolu	Saguaro	-15.00463	-173.79366	1820	S91	At the summit. 250°C. Black smoker chimneys. About 3 m high â€“ steeper on N face. Wide with a couple areas of black smokers and a little piece on top that looks like a Saguaro cactus.	351	552
Mkr-203	Mata Tolu	Low Smoker	-15.00464	-173.79389	1824	S91	T=260°C. Sampled. NW edge of venting.	192	570
Mkr-296	Mata Tolu	Snail Alcove	-15.00482	-173.79354	1813	S94	201°C. At the vent fields just up from the eastern side of the pit. Huge structure with lots of snails. Sampled.	214	442
Mkr-134	Mata Tolu	SE Pit	-15.00514	-173.79392	1843	S94	Tmax=23°C at sampling site but higher temps in surrounding area (43°C). At the base of the wall. Mussels above. Max=23°C. Stubby marker.	156	449

Marker	Edifice	Site	Latitude	Longitude	Depth	Dive Deployed	Logger Comments	Heading	Record Number
Mkr-253	Mata Tolu	Tall-North-Handsome	-15.00349	-173.79326	1822	S94	Handsome is huge with funny flange at top. Lots of black smokers and biota. Sampled. Tmax=204°C but not a good reading. Probably much hotter. Marker placed on extinct chimney to the SW (?) right next door.	249	486
Mkr-299	Mata Fitu	Old Smokey	-14.91548	-173.77371	2765	S97	275°C. 2765 m at the base. ~8m high. Tall and crusty. Sampled	290	133
Mkr-279	Mata Fitu	Redwood	-14.91352	-173.77911		S97	Tmax=295°C but probably hotter. 17+ meters high. No broad base - rises out of the ground like a redwood tree. 2 main black smoker beehives at top and lots of smaller ones. Base is 2630m. Marker deployed at 2633m.	19	405
Mkr-297	Mata Ua	Lau-Flattop	-15.01668	-173.78693	2340	S100	327°C. Sampled	130	262
Mkr-229	Mata Ua	Voodoo Child	-15.01680	-173.78695	2340	S100	322°C Sampled	82	367
Mkr-206	Mata Ua	Big Smoke	-15.01675	-173.78597	2330	S100	324°C Sampled	155	411
Mkr-227	Mata Ua	Farewell	-15.01665	-173.78613	2322	S100	Beautiful smoker on our way out of the field. Not sampled.	324	431
Mkr-231	Mata Ono	Anemone Frenzy	-14.94043	-173.79947	2358	S101	Diffuse flow site at summit. Did not sample. Anemones everywhere.	261	305
Mkr-228	Mata Ono	Snanemone Garden	-14.94941	-173.79967	2358	S102	Sampled water and biology. Area of diffuse flow with lots of anemones and Alvinoconcha snails. C=12.3°C .	148	386

Table 6.4-2 Named sites (without physical markers) during FK171110 SuBastian dives

Edifice	Site	Latitude	Longitude	Depth	Dive	Logger Comments	Record #
W Mata	Bubba Gump	-15.09437	-173.74647	***1267.4***	S85	Shrimp everywhere as well as squat lobsters. Nav marker here called "Bubba Gump"	427
W Mata	Cone Summit	-15.09421	-173.74617	***1251.1***	S85	Adding nav target called "Cone Summit" - when we get to the highest point..	438
W Mata	Painted Hills	-15.08985	-173.73962	***1513.3***	S86	Hydrothermal staining on rolling hills. Putting down a nav marker called "Painted Hills". Looks like a Monet painting.....	303
W Mata	Devil's Tower	-15.08970	-173.73922	***1515.3***	S86	Devils Tower is about 5 m high at least with lots of yellow staining. Some microbial mat and lots of yellow floc. It's a Hornito. Can see little peak in the bathy.	306
W Mata	Prometheus of the Past	-15.09421	-173.74804	***1186***	S87	Sampled but did not deploy a marker. 24C fluid. Spectacular site with biota and lots of flow.	418

Edifice	Site	Latitude	Longitude	Depth	Dive	Logger Comments	Record #
W Mata	Attila the Hut	-15.06595	-173.71048	***2671.9***	S88	Local high surround by smooth lava.	401
Mata Tolu	Pagoda Chimney	-15.00488	-173.79353	1819	S91	This is probably what we called Pagoda chimney in 2012.	356
Mata Tolu	Pagoda Chimney2	-15.00474	-173.79353	1819.5	S91	This one looks like a pagoda too. The altitude is about 8 meters. Put in dive target Pagoda Chimney 2.	363
Mata Tolu	Beehive	-15.00473	-173.79362	1815.4	S91	Fairly big beehive (not 2012 Smoker Chimney)	379
Mata Tolu	Snail Tower	-15.00455	-173.79377	1825.1	S91	Snail Tower nav target. Looking to the SE.	418
Mata Tolu	Deadwood	-15.00460	-173.79326	1837	S91	Inactive sulfides. Calling this place "Deadwood". 15.0046031 173.7932566. Z=1837 at the base of this structure. (Sampled)	444
Mata Tolu	Star Mound	-15.00470	-173.79306	1838.9	S91	"Star mound" this sulfide chimney with no venting and the sea stars.	450
Mata Tolu	Christmas Tree	-15.00476	-173.79344	1820	S91	Christmas tree - massive sulfide: The base is probably 10 meters wide. Christmas tree pos: 15.00476 173.79344. Z=1820 at top and > 6 m tall.	488
Mata Tolu	Dead Guy Ale	-15.00426	-173.79362	1821	S94	Dead Guy Ale: 15.0042613 173.7936195 Z=1821 m This sulfide structure is ~ 5m high. Stored in partition 11. The sampling site was maybe Lawrence Whelk.	486
Mata Fitu	Leaning Tower of Pisa	-14.91572	-173.77336	2767	S97	14.915716 S 173.7733645 Chris fix for this leaning old extinct chimney structure. "Leaning Tower of Pisa". Sampled	57
Mata Fitu	Devil's Tower	-14.91355	-173.77876	2622.2	S97	Devils Tower. 14.9135370 173. 778768. Z=2622. Alt=13m.	292
Mata Fitu	Barnacle Bill	-14.91343	-173.77881	2618.1	S97	Still moving up this large chimney. Barnacle Bill. 14.9134250 173.7788214. 15 meters high. Smokers. Tall and skinny.	297
Mata Fitu	Black Beehive	-14.91335	-173.77877	2624.8	S97	Now we're heading NW. Black smoker beehive on top. Black beehive. Hdg is 29614.013355 173.778777. Hdg = 9m. Iron encrusted tower.	300
Mata Fitu	Clam Top - Whelk Bottom	-14.91325	-173.77892	2627.3	S97	Anemones and whelks galore here. Dubbing this "Clam Top - Whelk Bottom".	309
Mata Fitu	Wormy Tower	-14.91327	-173.77899	2626.5	S97	Scale worms; shrimp; squat lobsters; Just one area of venting up top. Black smoker bee hives near the bottom. Dubbed "Wormy Tower" 14.9132515 173.7789774 Z=2630 at the base.	315
Mata Fitu	Bamboo Tower	-14.91334	-173.77904	2628.3	S97	Beyond it is another monster tower. Bamboo Tower??	322
Mata Fitu	Eiffel Tower	-14.91344	-173.77909	2624.6	S97	Eiffel Tower target: 14.913457 173.7791502. Z=2623 at the top. It's about 9 m high. Eiffel Tower has lots of orifices - some big beehives with gray smoke. Sampled.	407
Mata Fitu	K2	-14.91339	-173.77909	2631.7	S97	Found a fairly tall chimney ~10m west of Bamboo Tower. Terry suggests "K2". Sampled.	419
North Tafu	Cliff Contender	-15.35732	-174.23052	1676	S99	Nav fix for Cliff Could Have Been a Contender (Cliff Contender) site: 15.357548 174.232277 Z=1671. "Cliff Could Have Been a Contender" site. That's probably a little patch of sulfur with some white filamentous mat on edge. Sampled.	400
Mata Ua	Amphitheater	-15.01635	-173.78672	2346.7	S100	S100-sulfide-09 Location: 15.0163547 173.7867155 depth 2348m "The Amphitheatre". ~7m tall chimney. Sampled.	214

Edifice	Site	Latitude	Longitude	Depth	Dive	Logger Comments	Record #
Mata Ono	Giant Beehive - Renamed Bodacious Booming Beehive (B3)	-14.94058	-173.79956	2361	S101	The largest beehive structure we've ever seen. 40+ cm across. Lots of secondary beehives and spires. Position on S101: 14.9405783 173.7995584. Sampled.	347
Mata Ono	Start of Venting	-14.94032	-173.80017	2380	S102	Putting a nav marker in here where the hydrothermal venting starts - at least the animals. Started at about 2380 m.	360
Mata Ono	Rock Star Chimney	-14.94054	-173.79938	2361	S102	Summit of Mata Ona. Castle-looking feature with a broad base and lots of spires. Sampled. T=238C. Sampled at 2354 m Alt=7.5m at sampling site. Edifice ht = ? (see log).	392
W Mata	Shimmer	-15.09256	-173.74627	1285	S103	NAV TARGET: SHIMMER 15.0925316 173.7461874. Z=1287 m. A little bit of shimmering water; some shrimp; polynoids; brachyuran crab;	537
Mata Taha	Leaning Chimney of Taha	-15.03914	-173.78965	2261	S104	This extinct chimney is 6 meters tall - the consensus of the ROV pilot. This is an odd tilted crooked chimney - all by itself. At least for now. Sampled.	252
Mata Taha	Death Valley	-15.04021	-173.79055	2252	S104	Chimney spire - weathered and covered in sediment. Intact? 15.038254 173.798012. Probably a 9 m high chimney. Sampled.	265

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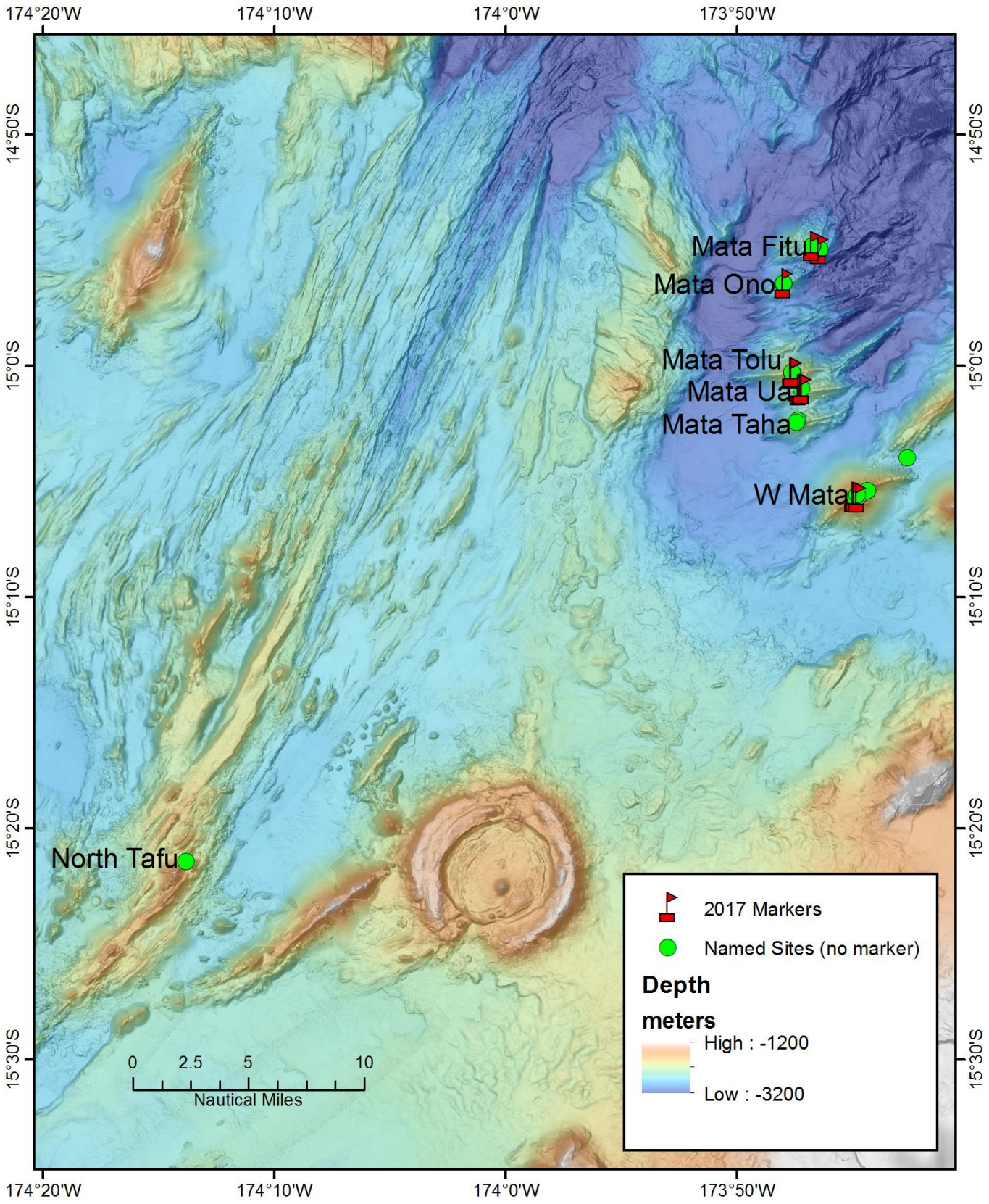

Figure 6.4-1 Markers and sites named on FK171110. See individual dive maps for marker numbers and names.

6.5 SuBastian Samples

SuBastian samples were collected on each dive and numbered sequentially as collected. Samples are named by dive, type and their collection number: Dive-type-Number, S085-rock-01 for example. The type in the name indicates the primary purpose of the sample and the description will indicate if there were subsamples of different types (such as rock collected that had biology on it). The time and date are GMT, not local times. Position information was evaluated after the dive to determine the best latitude/longitude between Greensea and the navigator's written positions then adjusted as displayed on the dive maps. For more information see Section 5.0 regarding navigation issues and examine each dive's map for navigation quality during sampling. Depths for dives S085-S088 and a sample logs are incorrect for depths for these dives as well.) Sample metadata is submitted to SESAR (System for Earth Sample Registration) at www.geosamples.org.

sample	Description	latitude	longitude	depth	altitude	heading	date	time	dive	record
S85-Rock-01	Sample S85-Rock-01. Piece of disgorged pillow and its boninite glassy lava rind (very circular) covered in volcaniclastic sediments. Pillow ~5cm thick and rind about 10cm long by 5cm thick. Can see pyroxene crystals. Probably fell from pillow piece directly above it. ~22m NE of waypoint 1. Going in the biobox partition 1.	-15.09815	-173.75324	***1443.5***	1.1	40	2017-11-26	19:27:35	S85	55
S85-Rock-02	S85-rock-02. ~20 cm long x 10 wide cm x 10 cm thick. All glassy rind with lava drips. Disgorged pillow lava piece probably from pillow directly above it. The piece is glassy and fragile. Looks like lava drips on top. Placed in rock box section 1. ~11m NNE of waypoint 2.	-15.09737	-173.75282	***1403.0***	2.0	43	2017-11-26	19:59:28	S85	88
S85-Rock-03	S85-rock-03. Grabbed a piece of altered rock, pillow rind. 40cm long w0cm wide by 1cm thick glass rind. Pillow rind. Huge rock with orange alteration. Placed in stbd rock box. ~15m SW of waypoint 3.	-15.09716	-173.75222	***1374.8***	2.6	36	2017-11-26	20:16:49	S85	103
S85-Sed-04	S85-Sed-04. Three sample attempts with core tube #4, ultimately using tube as scoop and sample placed in core holder. Coarse volcanic sand. 36m NE of waypoint 3.	-15.09691	-173.75178	***1368.7***	0.0	137	2017-11-26	20:43:52	S85	130
S85-Rock-05	S85-rock-05. 15cm Pillow fragment with glassy rind and orange staining. Second piece of boninite. Very vesicular. Put in rock box partition 2. From top of pinnacle SW of Hades pit rim. ~19m N of waypoint 7.	-15.09529	-173.74966	***1231.6***	0.0	34	2017-11-26	21:44:20	S85	194
S85-gas-06	Collecting sample S85-Gas-06 in green gas tight sampler. From strongly shimmering water on SW wall of Hades pit. Temperature measured at 17.7degC. (Waypoint 8).	-15.09502	-173.74957	***1277.5***	1.5	188	2017-11-26	22:41:52	S85	234
S85-fluid-07	S85-fluid-07. Major sampler yellow is in position inside the vent where GTB collected. Collecting sample S85-fluid-07. Location: SW Hades Pit wall.	-15.09502	-173.74957	***1277.5***	1.5	188	2017-11-26	22:57:46	S85	240

sample	Description	latitude	longitude	depth	altitude	heading	date	time	dive	record
S85-bio-08	S85-bio-08 Collecting shrimp samples via suction from inside Hades pit. ROV came off bottom from previous samples and slightly different location/heading for this sample. Sample is located in Canister 7.	-15.09497	-173.74956	***1273.9***	6.5	263	2017-11-26	23:10:44	S85	245
S85-gas-09	S85-gas-09. Yellow Gastight that was inadvertently tripped at SW Hades Pit. Tripped right at same time as sampling with green gastight S85-gas06 (sample out of sequence). Background sample.	-15.09502	-173.74957	***1258.3***	4.6	188	2017-11-26	23:32:17	S85	262
S85-bio-10	S85-bio-10. Suction sample of biology from NNW rim of Hades pit. Sucking up a shrimp (Opaepele); 2 scaleworms into Canister 6. (Waypoint 10).	-15.09433	-173.74960	***1255.3***	2.7	21	2017-11-26	23:42:45	S85	272
S85-bio-11	S85-bio-11. 10m NE of Mkr-139 at "Shrimp Suburbia". Area of intense venting and milky water. Suction of shrimp into Canister 5. Z=1190. ~15m NE of Mkr-139 between waypoints 13 and 14.	-15.09434	-173.74829	***1178.7***	1.7	356	2017-11-27	00:35:03	S85	334
S85-fluid-12	S85-fluid-12. Major sampler 4. Huge amount of flow. Same location at Shrimp Suburbia as the previous bio sample (#11). Temperature measured at 22.5degC after sampling.	-15.09434	-173.74829	***1180.6***	1.0	298	2017-11-27	00:40:48	S85	337
S85-bio-13	S85-bio-13. Squat lobster sample taken after trying to sample very fast shrimp (Opaepele). ~48m SE of waypoint 15. Substrate is brownish pillow lavas with sulfur stain.	-15.09396	-173.74766	***1180.7***	85.1	335	2017-11-27	01:28:34	S85	378
S85-rock-14	S85-rock-14. On the new lava cone-in place lava. Z=1293. 15.09471 173.74618. Going in middle biobox partition 4. Near base of slope with new/old contact of new cone. ~80m NW of waypoint 16.	-15.09449	-173.74698	***1279.3***	1.9	92	2017-11-27	01:58:42	S85	410
S85-rock-15	S85-rock-15. Lobate lava with drain-out features. Grabbing a piece of the lava rind/crust on the roof. Z=1281. Lava drips all over the bottom. Sample broken to fit in rock box partition 4. 1cm or so thick lava glass layer on top. Sample about 25cm or more. ~51m NW of waypoint 16 (which is near nav marker of Bubba Gump.)	-15.09441	-173.74662	***1270.2***	1.7	89	2017-11-27	02:07:23	S85	418
S85-bio-16	S85-bio-16. Suction of shrimp (Alvinocaris) and 2-3 squat lobsters from ridge Ken and Bill believe is spatter. Behind this spatter are large pillow lobes. Location named "Spatter site". Into chamber 3. Just west of waypoint 17.	-15.09404	-173.74595	***1262.3***	8.0	212	2017-11-27	02:36:05	S85	448

sample	Description	latitude	longitude	depth	altitude	heading	date	time	dive	record
S85-rock-17	Sample S85-rock-17. Heavily sedimented lobates at new cone. Position 15.0932647 173.7466466. Depth 1298m. ~35m N of W of waypoint 18. Placed in rock box 3.	-15.09323	-173.74669	***1287.7***	0.0	330	2017-11-27	03:09:36	S85	476
S85-rock-18	Sample S85-rock-18. Sedimented pillow-lobate structures with large fracture in flow. Location at waypoint 20; depth 1358m. Placed in biobox partition 2. May not be new flow.	-15.09131	-173.74550	***1347.5***	0.0	57	2017-11-27	03:39:12	S85	501
S85-rock-19	S85-Rock-19 from flatter lobate newer flows (clear signs of hydrothermal activity with some sediment). 20-25cm across with nice glass rind. At waypoint 21.	-15.08995	-173.74549	***1419.1***	0.8	154	2017-11-27	04:06:38	S85	518
S85-rock-20	S85-Rock-20 taken from young-jumbled-fragmented flow with large pillow sticking out. 35m SE of waypoint 21-heading toward waypoint 22.	-15.09029	-173.74514	***1417.7***	0.5	145	2017-11-27	04:15:56	S85	527
S85-rock-21	S85-Rock-21. Broken pillow that partially drained. Fragile-took 2 attempts. Area of truncated and non-truncated pillows with orange staining. Placed in forward basket (marker storage). Almost halfway between waypoints 21 and 22.	-15.09042	-173.74498	***1412.4***	0.0	154	2017-11-27	04:22:19	S85	531
S85-rock-22	S85-rock-22. Heavily crystalline with lots of olivine and pyroxene. Being placed in marker box with sample 21. From moderately sedimented pillows on gentler slope from opposing slope of Rock-21 (~28m north of that sample). Closer to waypoint 21 (~43m east of #21) Taken to compare if same lava flow.	-15.09016	-173.74501	***1421.8***	0.9	296	2017-11-27	04:39:13	S85	538
S86-rock-01	S86-Rock-01. Angular piece of broken in-place boninite pillow. 25 cm with thick glass rind. Squat pillow fragment very angular. Piece is from the center of pillow all the way to rind. Olivine and pyroxene crystal visible in this boninite. Banding on bottom and top. Small amount of aluminum sulfur staining. At distal edge of lava flow near waypoint 1.	-15.09019	-173.73365	***1927.9***	1.9	284	2017-11-27	19:05:50	S86	34
S86-rock-02	S86-Rock-02. From this "sheet/lobate" flow (a short little rivulet in the midst of these pillows) Jumbled on the edges. Fragile and crumbly from "ribbon edge" of sheet-ish flow. Glass and green olivine/pyroxene crystals. 3 pieces. 10cm curvilinear crystal-rich; mostly glass; broke into 2 pieces . Piece 3 30cmx20cmx15. Rectangular preserved folded surface of sheet . Lots of crystals near glass. Not as many in interior. Supreme boninite. Placed in partition 5. Between waypoint 1 & 2.	-15.08992	-173.73417	***1875.9***	1.8	336	2017-11-27	19:31:40	S86	59

sample	Description	latitude	longitude	depth	altitude	heading	date	time	dive	record
S86-sed-03	S86-Sed-03. Scoop with push core #2 of coarse black sediment from landslide debris. Lots of crystals in the sediment. Fine component as well but most particles are several mm in diameter to 1 cm fragments. Pile of volcaniclastic seds in core. Placed in compartment #4. Between waypoint 2 & 3.	-15.08996	-173.73615	***1745.5***	2.1	294	2017-11-27	20:42:06	S86	125
S86-Rock-04	S86-rock-04. Piece of pillow. ~10cm-crystal rich; irregularly shaped. Above the steep slope of the landslide - on a more gentle slope. ~35m west of waypoint 3. In partition 6.	-15.09012	-173.73691	***1696.5***	1.7	275	2017-11-27	21:00:03	S86	144
S86-Rock-05	S86-rock-05. Large piece of top crust or huge pillow from new lava flow area (40-45m thick) with thick sediment and depressions containing gold floc. Green crystals in the boninite are probably clinipyroxene. Lots of vesicles in the lava. In area of deep sediments. Very vesicular on the bottom. Glassy on the top. ~30 cm broken in half. ~10m SE of waypoint 7.	-15.08843	-173.73782	***1592.2***	1.2	312	2017-11-27	21:53:43	S86	201
S86-rock-06	S86-rock-06. Rim of disgorged pillow lava. Crumbly; sediment cover; Z=1565. Good grab. Crystals and crumbly. Glassy outer rind of disgorged pillow from in place pillows on steep slope. In biobox partition 1. Between waypoints 8 & 9.	-15.08955	-173.73863	***1551.5***	0.0	226	2017-11-27	22:46:20	S86	258
S86-rock-07	S86-rock-007. Piece of pillow crust - not intact from pillows flowing down Devils Tower Hornito. Tetragonal with vesicles and crystals. 30+ cm long - nearly half of a pillows rind. Glass on both ends. Lots of phenocrysts. Pipe-like elongated vesicles. ~37m SE of waypoint 11.	-15.08969	-173.73937	***1516.8***	2.6	80	2017-11-27	23:30:06	S86	310
S86-sed-08	S86-Sed-08 Dark ash below surface where took temperature of 2.6degC. Lunar-esque landscape ~23m SW of Devils Tower sample. Scoop with push core 1 (no catcher). Very coarse. Volcanic ash and crystals. Bubble wall fragments; glass; hair. Put into tube 3. ~47m NE of waypoint 10 & ~47m SE of waypoint 11.	-15.08981	-173.73953	***1516.1***	0.0	221	2017-11-27	23:50:45	S86	324
S86-rock-09	S86-rock-09. Grabbing the rind of a disgorged pillow. From next deeper lava terrace (2nd terrace) of previous samples. Piece 1: Very thin piece of rind. Crumbly. Small (fist-sized) fragment of pillow crust. 2nd piece is glass fragments and vesicular rock ~15cmlong. 3rd piece angular glassy rind ~15cm long and thicker than other pieces. Going into biobox partition 4. ~17m due E of waypoint 11.	-15.08936	-173.73934	***1529.8***	4.0	250	2017-11-28	00:05:19	S86	337

sample	Description	latitude	longitude	depth	altitude	heading	date	time	dive	record
S86-rock-10	S86-rock-10. Flow front of 2nd terrace. (at the base of the slope). Odd disgorged pillow. Z=1574m. Crumbly. Piece of pillow rind (from the top of a weird-misshapen pillow. ~ 10cm long - almost cube-shaped we think. Going into partition 7. A few flakes got into 8. 80m NE of waypoint 11.	-15.08898	-173.73899	***1559.1***	1.7	222	2017-11-28	00:35:05	S86	353
S86-rock-11	S86-rock-11. Beautiful piece of pre-fractured pillow hanging down this flow front. Great pillow cross section. 30x15 cm. Glass on the top and bottom. Vesicular angular. Shape of large piece of pie. 42m SW of waypoint 12.	-15.08855	-173.73854	***1583.4***	4.5	249	2017-11-28	00:51:59	S86	373
S86-rock-12	S86-rock-12. On the old lavas above the new lava flows at the top of a cliff. Sample of huge old pillow. Vesicular rind and brownish-yellow stain with lava drips. ~ 10cm x 10cm. Putting it into partition 2 in the biobox. Sort of shaped like a fashionable boot. ~63m N of W of waypoint 12.	-15.08818	-173.73881	***1551.7***	1.1	323	2017-11-28	01:09:49	S86	392
S86-bio-13	S86- bio-13. Gorgonian corals with mysid's. Collected from pillow sample 12. Put in biobox #2.	-15.08818	-173.73881	***1551.7***	6.6	270	2017-11-28	01:20:32	S86	397
S86-rock-14	S86-rock-14. From the outer surface of the pillow in area just SW of easternmost collapse pit. Very crystal-rich and crumbly. Tube-like vesicles "Weathered". Don't see any glass. 10 cm long. Into biobox 3. ~37m SW of waypoint 13.	-15.08833	-173.73913	***1555.9***	0.9	242	2017-11-28	01:35:28	S86	409
S86-rock-15	S86-rock-15. Hollow tube-like inside with yellow staining and secondary mineralization. Outcrop of older lavas with broken/drained pillows. Part of the sample broke off on top the marker box - two small pieces; might be further fractured. Midway between waypoint 13 & 14.	-15.08872	-173.73968	***1533.9***	6.3	233	2017-11-28	01:54:30	S86	421
S86-rock-16	Sample S86-rock-16. Distinctive red altered streak at glass-groundmass transition. 20-25cm wide. Near small cone with fresh pillow lavas and microbial mats. Most are intact and in place. Placed in gastight box. Between waypoints 10 & 14.	-15.08984	-173.74018	***1515.0***	1.7	220	2017-11-28	02:25:33	S86	448
S86-bio-17	S86-bio-17 bamboo coral; white with nodules and small rock attached to base from older flow. Placed in biobox 1. ~14mSW of waypoint 14.	-15.08952	-173.74050	***1500.8***	0.0	319	2017-11-28	02:49:54	S86	465
S86-rock-18	S86-rock-18. Piece of older lava flow that also hosted the previous sample (coral). Rock has a sponge attached. Sample size roughly 10 cm. Into at least two pieces in box 10. Same location as bio-17.	-15.08952	-173.74052	***1500.7***	3.2	319	2017-11-28	02:55:33	S86	467

sample	Description	latitude	longitude	depth	altitude	heading	date	time	dive	record
S86-bio-19	Sample S86-bio-19. Coral and TWO squat lobsters growing on side of older lava. Into biobox 2. Along ridge of older flow (same flow as last samples).	-15.08949	-173.74060	***1495.6***	1.4	279	2017-11-28	03:03:33	S86	471
S86-bio-20	S86-bio-20. Suction of partial and whole anemone in jar 4 from near vertical wall of older flow. ~10m west of waypoint 14.	-15.08943	-173.74070	***1493.7***	4.3	153	2017-11-28	03:17:34	S86	481
S86-bio-21	**Sample S86-bio-21**. Whole anemone sample. Sample jar also 4. Also sample S86-bio-20. Location 15d5m21.910s 173d44m26.521 depth 1511m.	-15.08945	-173.74071	***1493.4***	2.1	123.2	2017-11-28	03:18:42	***S86***	2.1
S87-rock-01	S87-rock-01. Grabbing a large piece of in place lava on this slope. Fairly altered with manganese and iron oxides. Layer of glass as well. Lots of iron staining. Probably several hundred years old. Rock is greater than fist size into partition 5. Pillow lava fragment. Radially cracked. 20 cm in diameter. On South Rift Zone just north of waypoint 1.	-15.10211	-173.74856	***1617.7***	2.8	355	2017-11-28	18:48:18	S87	14
S87-bio-02	S87-bio-02. Bubble gum coral (pink) with ophioroid (brittle star) on old pillow. In BioBox partition 1. Just upslope from rock-01.	-15.10199	-173.74852	***1603.9***	2.6	12	2017-11-28	19:02:21	S87	25
S87-rock-03	S87-rock-03. About 8cm pillow rind with some iron-manganese coating. Fragile with glass. Several pieces into biobox 2. In location of outcrops after traversing volcaniclastic sands from waypoints 2-4. Location ~20m E of waypoint 4. -15.0987168 -173.7465791 depth 1420m	-15.09834	-173.74797	***1404.5***	3.2	309	2017-11-28	21:17:54	S87	146
S87-rock-04	S87-rock-04. Jabba the pillow contains a lot of volcanoclastic sediment and may have a small dune formation in the cavity. Amygdules on sample surface described as "lizard skin" texture. Sample split and keeping right hand piece with less iron staining. In biobox partition 6. Near waypoint 5.	-15.09652	-173.74816	***1299.6***	3.2	306	2017-11-28	21:48:40	S87	173
S87-rock-05	S87-rock-05. Olivine crystals on fresh rock surfaces. Glassy rind. Trianglish shape. ~15 cm longest. 3cm glass rind. Tan color. Boninite lava. These lavas are much younger than the previous samples. From piece of lava on cliff of stacked pillows with white microbial mat on rock faces. Into partition 7. Just E of waypoint 6.	-15.09481	-173.74869	***1198.6***	2.5	4	2017-11-28	22:20:18	S87	214

sample	Description	latitude	longitude	depth	altitude	heading	date	time	dive	record
S87-fluid-06	S87-fluid-06 Major #1 in white (hair-like) & orange bacterial mat under a red rock. Highest temp reading of 24.02C in sediments. Water temp ~7degC. Fired at 2347-had to hit ram second time. ~12m SE of Mkr-224 on the NNE pit (waypoint #11).	-15.09441	-173.74909	***1283.4***	1.3	80	2017-11-28	23:47:17	S87	301
S87-gas-07	S87-Gas 07. Same location as fluid-06. Fired at 0006:47.	-15.09441	-173.74909	***1283.4***	1.3	78	2017-11-29	00:02:45	S87	313
S87-fluid-08	S87-fluid-08. Major #2 sampler in 22degC area of white bacterial floc. Same position as previous 2 samples (6 and 7). Fired at 0028:17. Ram hit twice to fill.	-15.09441	-173.74909	***1283.6***	1.2	78	2017-11-29	00:22:52	S87	328
S87-bio-09	S87-bio-09. Suction into chamber 8. ~10 - 15 Opaepele and 1 zoarcid on steep cliff in Shrimp Suburbia area at waypoint 13.	-15.09405	-173.74814	***1189.1***	0.0	118	2017-11-29	00:55:17	S87	369
S87-gas-10	S87-gas-10. GTB 6 (yellow). Temperature of 27.55degC. Taken at Prometheus site.	-15.09420	-173.74804	***1175.7***	0.0	49	2017-11-29	01:55:58	S87	431
S87-fluid-11	S87-Fluid-11. Major sampler #3. In same position as previous gas sample. Start 0212.	-15.09420	-173.74804	***1175.6***	0.0	49	2017-11-29	02:09:05	S87	437
S87-bio-12	S87-Bio-12. Suction of shrimp (mostly opaepele) at Prometheus. Sampled the top of the pillow here. Sampled into canister 1.	-15.09420	-173.74804	***1175.8***	0.0	49	2017-11-29	02:21:15	S87	443
S87-rock-13	S87-Rock-13. Pillow lava with glass rind and sulfur coating. 10x15cm conical with whitish surface. Piece of boninite pillow with some sulfur coating. Expecting low levels of alteration. Same location as previous Prometheus samples. In partition 8.	-15.09420	-173.74804	***1175.8***	0.0	50	2017-11-29	02:27:11	S87	445
S87-sed-14	S87-Sed-14. Bag #1 Scoop of the mixed variation of light and dark volcaniclastic sediments. Probably some shell fragments and sulfur particles. Into partition 9. On new mound ~20m E of Waypoint 20.	-15.09491	-173.74642	***1270.9***	0.0	68	2017-11-29	02:57:16	S87	463
S87-gas-15	S87-gas-15 Green GT 2 temp in vent is 9C. At Shrimp Canyon ~10m NW of waypoint 21 (Mkr-284).	-15.09461	-173.74635	***1265.7***	0.9	335	2017-11-29	03:37:50	S87	484
S87-fluid-16	S87-Fluid-16 Major 4. Same location at Shrimp Canyon.	-15.09461	-173.74635	***1265.7***	0.9	335	2017-11-29	03:46:56	S87	488
S87-bio-17	S87-Bio-17 Shrimp suction into chamber 2. Looks like there are both types of shrimp and a couple scale worms. Polynoids. Same location at Shrimp Canyon.	-15.09461	-173.74635	***1265.7***	0.0	334	2017-11-29	03:51:55	S87	491
S87-sed-18	S87-Sed-18. Slightly SW of previous samples in area with more ash. Volcaniclastic sediments in the dip between the "rolling hills" Pillow lobes. Scoop bag #2. 15.0946339S -173.7464384 Z=1277m.	-15.09464	-173.74644	***1266.8***	0.6	289	2017-11-29	04:00:45	S87	497

sample	Description	latitude	longitude	depth	altitude	heading	date	time	dive	record
S88-rock-01	S88-Rock-01. Upper piece of pillow crust with glass. 40cm long. Tabular piece. Orange stain inside with vesicles with thin sedimentary cover. Ken guess it's a century or two old. Into partition 5. From landing site (bad nav fixes-using GIS guess).	-15.07097	-173.70646	***2673.6***	0.6	298	2017-11-29	19:17:29	S88	13
S88-rock-02	S88-rock-02. Piece of large cracked pillow. Very crystal rich and glassy. Some orange staining. From a flat pillow - almost lobate transitional. 15cm. ~27m SE of waypoint 2.	-15.07011	-173.70865	***2673.6***	0.0	14	2017-11-29	19:17:29	S88	90
S88-rock-03	S88-rock-03. Radial pillow bud at lava/sediment contact. Fine sediment on this. Curvilinear external crust. Olivine and clinopyroxine. Center is gray. Glassy exterior. 50% crystal. Lack of vesicles. Porphyritic. Partition 7. ~35m S of waypoint 3.	-15.06960	-173.70908	***2676.4***	0.0	221	2017-11-29	20:15:02	S88	101
S88-rock-04	S88-rock-04. Exterior of this older lava on tumuli. Pie shaped. Not as crystal rich as previous sample. More iron staining. Glass in the interior. Not nearly as many crystals. Some vesicles. Brownish rind (MnOX) 20cm long from folded ripple on surface of jumbled lava. From waypoint 4 at the parallel ridge.	-15.07058	-173.71050	***2673.7***	2.7	186	2017-11-29	20:21:33	S88	126
S88-sed-05	S88-sed-05. Four scoops of fine sediment. Possible co-ignimbrite-like feature. Into box 9. ~75m SE of waypoint 56.	-15.07120	-173.71189	***2663.4***	0.0	244	2017-11-29	20:40:58	S88	151
S88-rock-06	S88-rock-06 Inflated cracked pillow. Large piece of pillow with attached coral. 47 cm pillow interior fragment. Manganese coating with some fresh glass. Not many phenocrysts visible. Center of unpartitioned basket. From north rift of W Mata ERZ.	-15.07141	-173.71264	***2675.6***	0.7	227	2017-11-29	21:21:14	S88	178
S88-rock-07	S88-rock-07 Outer pillow tumulus pillow crust from area of multiple textures and degrees of inflation in a small area of stacked lava flows. 10x15cm glassy rind and crystalline content. (Bad nav-heading toward waypoint 6-using WP6 for position.)	-15.07068	-173.71248	***2676.6***			2017-11-29	21:54:21	S88	196
S88-rock-08	S88-rock-08. Upper crust of this tumulus feature (between WP 7 & 8). Weathered with vesicles mitten shaped. 30cm round and egg shaped roundish. No obvious glassy crust. Crystalline and not a lot of vesicles. In the crack between the tumulus's ~ 10m W of WP8. 15d 4' 9.693" 173d 42' 38.043". In bin 2.	-15.06936	-173.71056	***2667.8***	2.1	108	2017-11-29	22:21:38	S88	241

sample	Description	latitude	longitude	depth	altitude	heading	date	time	dive	record
S88-sed-09	J88-Sed-09. Push core 4. Thick sediments of the Muffin adjacent to lava. Made it into the tube; but lots of the sediment is escaping.~30m SW of waypoint 9.	-15.06886	-173.71057	***2661.9***	0.0	136	2017-11-29	23:22:11	S88	263
S88-sed-10	S88-Sed-10. In thick sediments on the muffin. The Core is over half full. Light-colored layer on the top. Navigator position is SE of waypoint 9.	-15.06889	-173.71093	***2668.7***	0.4	60	2017-11-29	23:43:26	S88	284
S88-rock-11	S88-rock-11 Chalky piece from the base of Pagoda-looking stratographic feature on top of Muffin's ridges. 5cm cubic piece of probably ash (white colored). Broke in 2 pieces into biobox 3. Took second piece. No ROV nav-probably somewhere between waypoint 10 and ship's position (15d 4' 0.386" 173d 42' 29.63")	-15.06704	-173.70864	***2668.1***	0.7	323	2017-11-29	23:59:44	S88	337
S88-rock-12	S88-rock-12. 15-10 cm. Crystal-rich vesicular lava. Mineralization on the surface. Some vesicles. Orange staining. Pie shaped. Going into partition 7. Multi-colored green yellow and orange-stained rock from striped glassy background. Irregular shape. Brown on one face. From side of one of Muffin's ridges. Using Navigators estimated location: 15d 3' 58.57' 173d 42' 30.294"	-15.06628	-173.70842	***2658.1***	0.0	341	2017-11-30	00:53:55	S88	361
S88-rock-13	S88-rock-13 20x15cm roughly. Phyric with thick glass rind and large vesicles up to cm scale. Sampled from the NW muffin contact of sediment and lava. Into box 9. Position is GIS guess post-cruise.	-15.06614	-173.70924	***2660.1***	1.0	209	2017-11-30	01:24:54	S88	375
S88-sed-14	S88-sed-14 Scoop 2. (Location 15.0681 173.70671 BAD position-don't use-using GIS guess for rock-13) Repositioned from rock-13 to nearby ledge to sample on flat surface. Put in between biobox and center sample box.	-15.06614	-173.70924	***2682.9***	0.0	183	2017-11-30	01:44:29	S88	382
S88-rock-15	S88-rock-15. Multiple jagged pieces of rock from the side of Attila the Hut (local high surrounded by smooth lava flows). Second piece is 15x10cm with elongated vesicles-very friable. Placed into biobox 4. location -15.06598 -173.71047 depth 2669m	-15.06598	-173.71045	***2680.1***	2.2	261	2017-11-30	01:59:38	S88	407
S88-rock-16	S88-rock-16 Piece of collapsed pillow in area of endless pillows. Large scoop like underside with large several cm bubble. Into forward marker box. Between waypoint 11 & 12.	-15.06468	-173.71107	***2669.4***	1.6	340	2017-11-30	02:37:28	S88	424
S88-fluid-17	S88-fluid-17 Sampling bottom water in basket. Major 2 at same location as rock-16.	-15.06468	-173.71107	***2681.4***	2.7	339	2017-11-30	03:09:41	S88	425

sample	Description	latitude	longitude	depth	altitude	heading	date	time	dive	record
S88-rock-18	Sample S88-rock-18. Roughly 10x5cm into box 10. Very glassy and highly phyric 40-50% with large phenos. East of waypoint 12 near contact.	-15.06443	-173.71066	***2679.1***	0.5	28	2017-11-30	03:12:03	S88	436
S89-rock-01	S89-rock-01 Grabbing crumbly oxidized sulfide. Chimney? Orange staining. Mineral rich. Roundish black and orange. 8-10cm in longest direction. Sample pulverized. ~15m SE of waypoint 1.	-15.01632	-173.78775	2380.9	0.0	181	2017-11-30	03:31:08	S89	45
S89-rock-02	S89-rock-02 Grabbing a piece of weathered grayish lava (on the surface). Stained rock. Oxidized and crumbly. Microbial material on it. Vesicular and angular pie shaped. 30 - 35 cm. No glass. Tabular fragment. Same location as rock-01.	-15.01632	-173.78775	2381.0	0.0	181	2017-11-30	19:35:15	S89	50
S89-sulfide-03	S89-sulfide-03. 3 pieces. Piece 1 beehive-spewing hot water and black smoke; Piece 2 from base (10cm); 3rd piece (15cm) more grayish (sulfide and participates of barium). Chimney is flashing. Chalcopyrite in the center. Taken from Temple of Smoke complex on steep slope. Between waypoint 1 & 2.	-15.01680	-173.78764	2356.1	2.9	193	2017-11-30	20:13:35	S89	117
S89-gas-04	S89-gas-04. Gastight (yellow #6) in orifice of black smoker that was broken off - sulfide-03 location. Fired at 2934. Snorkel black-good sample. (Same location at Temple of Smoke).	-15.01680	-173.78764	2356.0	4.3	194	2017-11-30	20:33:54	S89	129
S89-fluid-05	S89-fluid-05. Major sampler #1 in same black smoker orifice as the previous samples (3 and 4). Nozzle in the flow. Looks good.	-15.01680	-173.78764	2356.0	0.0	194	2017-11-30	20:41:03	S89	134
S89-bio-06	S89-bio-06. Stalked barnacles just to the right of the black smoker chimney just sampled. Nice grab of several stalked barnacles. ~10m S of waypoint 5.	-15.01680	-173.78764	2356.0	3.8	193	2017-11-30	20:47:02	S89	139
S89-bio-07	S89-bio-07. Just upslope from flashing black smoker sampled earlier. 3 Ifremer snails.	-15.01659	-173.78767	2355.4	0.0	192	2017-11-30	21:01:32	S89	145
S89-bio-08	S89-bio-08. Suction of sulfide worms and polynoids. Canister 6. Same location. (Later noticed nothing in canister).	-15.01659	-173.78767	2356.0	3.3	154	2017-11-30	21:58:14	S89	174
S89-bio-09	S89-bio-09. Suctioning Ifremeria snails into canister 6. Also getting white bac mat; Possibly got Opapele shrimp. Several large snails going into biobox 3. Same location.	-15.01659	-173.78767	2355.9	0.0	155	2017-11-30	22:02:09	S89	175
S89-bio-10	S89-bio-10. Large single mussel with barnacles and limpets attached. Same location as previous bio samples 08 & 09.	-15.01659	-173.78767	2355.9	3.3	153	2017-11-30	22:06:55	S89	179

sample	Description	latitude	longitude	depth	altitude	heading	date	time	dive	record
S89-sulfide-11	S89-sulfide-11. Weathered extinct small sulfide chimney with mat and scaleworms on top. Bulgy; orange/gray. Got the top portion. > 40cm long and 20cm wide. Into partition 9. Same location as bio samples.	-15.01659	-173.78767	2355.9	0.0	153	2017-11-30	22:09:17	S89	180
S89-fluid-12	S89-fluid-12. Major 2 water sample from active black smoker. Tmax ~405C ambient ~0.3C. Probe not calibrated so temperature readings probably too high. Location -15.01729 -173.7880455 depth 2350m. Halfway between waypoints 6 and 8.	-15.01729	-173.78805	2349.9	1.9	29	2017-11-30	22:47:20	S89	196
S89-gas-13	S89-gas-13. Gastight fired at 230622. Vigorous black smoke flow. Same location as fluid sample.	-15.01729	-173.78805	2350.0	1.2	32	2017-11-30	23:06:52	S89	204
S89-sulfide-14	S89-sulfide-14. Pieces of whitish chimney base that fell down while fluid/gas sampling with lots of silica and cement with black sulfides in between. Crumbly craggy 15 cm in longest distance. Same location as previous fluid and gas samples.	-15.01729	-173.78805	2350.2	1.3	31	2017-11-30	23:22:31	S89	216
S89-fluid-15	S89-fluid-15. Major sampler #3 in same location and same black smoker orifice. Start at 2327 UTC. Z=2350m. This vent is boiling. Great sample.	-15.01729	-173.78805	2350.2	1.7	32	2017-11-30	23:29:00	S89	218
S89-bio-16	S89-bio-16. Scoop bag 1 of Ifremeria snails on chimney just to the left of the black smoker previously sampled. Same sample position as previous. 3-4 snails in bag.	-15.01729	-173.78805	2350.3	1.5	31	2017-11-30	23:36:09	S89	224
S89-bio-17	S89-bio-17. Opapele shrimp and into chamber 8. Suction of volcaniclastic seds next to the black smoker orifice and slow shrimp. Same location.	-15.01729	-173.78805	2350.3	1.7	32	2017-11-30	23:45:50	S89	232
S89-fluid-18	S89-fluid-18. Major sampler #4 at diffuse site with lots of biota. Large diffuse flow area SW of previous samples (~70m) and ~21m NE of waypoint 3. Snail Fusion Site. -15.017736 S -173.7885168 W. Z=2340m	-15.01773	-173.78852	2359.9	1.0	157	2017-12-01	0:19:13	S89	264
S89-gas-19	S89-gas-19. Gastight Green #2 at "Snail Fusion". In same spot as Major sampler. Diffuse flow in area of lots of snails. Fired at 0033:45.	-15.01773	-173.78852	2360.0	1.0	157	2017-12-01	0:33:38	S89	270
S89-bio-20	S89-bio-20. Scoop bag #2 of both species of snails Ifremer (black) snails and the Alvinoconcha (white) snails collected. That bag is nearly full. Same location.	-15.01773	-173.78852	2360.1	0.0	156	2017-12-01	0:52:26	S89	280
S89-rock-21	S89-rock-21. In place rock with sponge growth above talus. 10x5cm roughly triangular rough surface with some orange sediment or discoloration. East of vent sampling sites heading upslope. ~95m SW of waypoint 9.	-15.01806	-173.78502	2164.3	2.6	166	2017-12-01	2:21:03	S89	397

sample	Description	latitude	longitude	depth	altitude	heading	date	time	dive	record
S89-rock-22	S89-rock-22. 20x15cm piece with radial fracture and possible glass rind. Upslope and ~120m SE of waypoint 9.	-15.01794	-173.78353	2118.3	1.9	107	2017-12-01	2:48:46	S89	417
S89-rock-23	S89-rock-23. Piece from flow contact with in place striated/smooth pillows under sediment. 30x30cm square blocky pillow fragment and some orange sediment. Halfway between waypoints 9 & 10.	-15.01808	-173.78218	2144.2	0.4	122	2017-12-01	3:06:12	S89	427
S89-sed-24	S89-sediment-24. Sediment at base of lava flow where sample 23 was collected.	-15.01808	-173.78218	2144.2	0.4	117	2017-12-01	3:15:13	S89	431
S89-rock-25	S89-rock-25. 50cm half-pillow large irregular vesicles with patchy orange alteration. Possibly glass crust. In talus. ~40m W of waypoint 10.	-15.01832	-173.78067	2101.9	3.7	94	2017-12-01	3:38:30	S89	449
S90-rock-01	S90-rock-01. In area of ropey lava. Fine sediment coating. 20 cm radially fractured pillow fragment with iron staining on the exterior. 1 glassy rind layer 1cm thick. In partition 5 rock box. At landing site waypoint 1.	-14.91620	-173.79896	2520.5	3.0	158.093	2017-12-01	19:08:33	S90	33
S90-rock-02	S90-rock-02. Shelly-outer rind of pillow lava in place. Brownish patina on surface. Glassy surface with lots of vesicles. Grayish interior. Older more altered rock. Large very vesicular 50 cm arcuate shape. More than 1 cm glass. Manganese staining. In unpartitioned box. Near waypoint 2.	-14.91652	-173.79852	2521.1	1.2	141.647	2017-12-01	19:30:36	S90	58
S90-rock-03	S90-rock-03. Flat- lobate-like lava. Striated crust. Sedimented. Outer surface has striations. Top of a lobate crust. 15cm thick. Glass crust. Not many vesicles or large phenocrysts. ~50m SW of waypoint 3.	-14.91774	-173.79683	2509.7	1.7	107.847	2017-12-01	20:06:46	S90	118
S90-rock-04	S90-rock-04. Older sedimented pillow lava with bread-crust surface. Cracked and radial morphology. Manganese crust and iron oxide staining on broken surface. 30 cm long. Don't see much of vesicles or crystals. Glass rind. On top of partition 7. ~24m W of waypoint 5.	-14.91894	-173.79487	2533.1	0.4	111.143	2017-12-01	20:38:01	S90	168
S90-rock-05	S90-rock-05. Old weathered pillow lava on this steep slope just to the north of the middle ridge. Weathered. Largish piece with glass on 2 surfaces-crumbly exterior. Old and fuzzy. 15 cm with sediment adhering. Into partition 8. Between waypoint 7 & 8.	-14.91507	-173.79285	2449.2	0.8	5.21851	2017-12-01	22:08:55	S90	247
S90-rock-06	S90-rock-06. Piece of large in-place pillow (Big Bertha). 15x10cm blocky with oxide coating and maybe some Fe-Mn crust. Near waypoint 8.	-14.91408	-173.79338	2400.9	2.6	343.768	2017-12-01	22:36:14	S90	272

sample	Description	latitude	longitude	depth	altitude	heading	date	time	dive	record
S90-rock-07	S90-rock-07. ~35m SE of waypoint 9. Roughly 10x15cm some orange sediment in vesicles and possible glass rind? Fe-Mn staining on crust. In area of broken up rock with some in place.	-14.91313	-173.79402	2378.6	4.1	316.978	2017-12-01	23:01:10	S90	283
S90-rock-08	S90-rock-08. Piece of intact pillow . Vesicular and really friable. 10cm x 5cm. Narrower. Lightly sedimented pillow fragment. Banded in the center. Orange weathered layer under the glass. Into partition 3. ~80m NE of waypoint 9.	-14.91222	-173.79373	2402.2	0.0	160.724	2017-12-02	0:12:07	S90	367
S90-rock-09	S90-rock-09. Cracked in-place pillow on ridge top. Grabbed small-ish piece wedged in crack. This piece tumbled off from slightly farther up the extrusion. ~40 cm long. Some vesicles. Outer surface. Extensive magnesium coating and sediment. In gastight milk crate. Halfway between waypoint 9 & 10.	-14.91201	-173.78999	2496.8	1.7	112.659	2017-12-02	0:49:06	S90	423
S90-rock-10	S90-rock-10. Area of in-place pillows. 30x10cm pillow rind with some alteration in core to slight yellow-green color. Large internal vesicles grading to smaller at edge. 2/3 the distance from waypoint 9 to 10.	-14.91127	-173.78799	2515.3	0.0	250.433	2017-12-02	1:29:13	S90	434
S90-sed-11	S90-sed-11. Volcaniclastic/pelagic sediment pile. Location is ~180m north of previous sample.	-14.90962	-173.78844	2459.0	0.0	347.322	2017-12-02	1:59:27	S90	449
S90-rock-12	S90-rock-12. Flat-topped altered pillow lava crust with whip coral attached. Dual rock-bio sample. 10x15cm approx. Same location as sed-11.	-14.90962	-173.78844	2459.0	0.0	306.782	2017-12-02	2:10:10	S90	452
S90-rock-13	S90-rock-13. Piece 1: piece of pillow toe with large olivines and <1cm glass rind. Fresh. 10-15cm on a side. Piece 2: Giant olivine and lots of sediment. 10x10cm or smaller. Area of lava flow with sediment. ~20m SE of waypoint 11.	-14.90701	-173.78832	2490.4	1.1	279.965	2017-12-02	2:34:29	S90	457
S90-rock-14	S90-rock-14. Highly vesicular chunk with Mn crust and glassy rind. ~35cm across. Area of fractured pillow flows between waypoint 11 & 12. Sample taken at ~30m ENE of waypoint 12.	-14.90685	-173.78901	2473.7	2.2	295.241	2017-12-02	3:00:02	S90	465
S90-rock-15	S90-rock-15. Ropey lava. Must have been really fluid when it came out. Baby rock. Thin glassy surface. Altered. Manganese and iron crust. Irregularly shaped. 15 cm long. Went into gastight box. Area of ropey/jumbled lavas on a mound with sediment. ~65m NNE of waypoint 12.	-14.90637	-173.78915	2489.6	1.3	301.415	2017-12-02	3:08:07	S90	475

sample	Description	latitude	longitude	depth	altitude	heading	date	time	dive	record
S90-rock-16	S90-rock-16. Not in place but from this flow. Weathered interior. Orange wedge shaped. 20 cm. Manganese and iron oxide coating. Outer rounded surface of a pillow. Glass? In basket behind majors. ~90m SSE or waypoint 13.	-14.90492	-173.78983	2533.4	0.0	23.8184	2017-12-02	3:40:37	S90	528
S90-rock-17	S90-rock-17. Huge toe of pillow that is chicken-breast shaped. Large piece with altered crust. 45-50 cm long. Glass all around with 2 broken surfaces. Came off the larger inflated striated pillow at the top of mound. ~12m W of waypoint 13.	-14.90411	-173.78946	2538.4	0.7	6.90491	2017-12-02	3:52:09	S90	548
S91-rock-01	S91-rock-01. Old pillow at landing site. Crumbly. Disgorged striated pillow. Angular flat piece. Crust 25cm slab 5-6 cm thick. Lava drips. Some vesicles. Mn oxide coating. Into partition 9. At waypoint 1.	-15.00736	-173.80242	2147.3	3.6	351.019	2017-12-02	19:20:27	S91	33
S91-rock-02	S91-rock-02. Hollowed out - outer shell of folded sheet flow. Shelly part of flow. Black glass. Outer Mn oxide crust. Black shiny lava with phenocrysts. Area of coherent bands of folded sheet flow. In partition 5. 3 pieces: 10x5cm squarish slab; 6-7cm long-skinny and crystal rich; 20cm circular with fracture pattern. Between waypoints 1 & 2.	-15.00654	-173.80243	2112.6	0.0	355.952	2017-12-02	19:42:16	S91	76
S91-bio-03	S91-bio-03. Coral (?) that looks like a palm tree. Intact in the claw. Long narrow stalk with what looks like palm fronds on top. In partition 1 biobox (taller). In swirly lobate flow within meters E of waypoint 3.	-15.00566	-173.80150	2058.4	0.0	32.981	2017-12-02	20:31:20	S91	170
S91-rock-04	S91-rock-04. In place fragile "Ribbon" of lobate/sheet lava just downslope of lava slabs. Pretty crunchy rock. Large crystals. Vesicles. Manganese oxide coating. Green crystals. 30 cm long 19 cm thick. Into partition 10. East within meters of location as bio-03.	-15.00566	-173.80150	2058.3	0.0	8.05298	2017-12-02	20:39:40	S91	174
S91-rock-05	S91-rock-05. Pillow toe sample 10x15cm in elongated pillows with lots of anemones. Vesicular with large olivines and patchy Fe staining Between waypoints 3 and 4.	-15.00474	-173.80042	2024.8	8.3	1.90613	2017-12-02	21:18:44	S91	223
S91-rock-06	S91-rock-06. 10x15cm chunk relatively fresh interior with biology on crust. In area with patchy sediments with microbial growth (riddled with diffuse flow?). Orange alteration under glass and large olivines. Just W of waypoint 4.	-15.00447	-173.79976	2003.2	3.6	101.25	2017-12-02	21:32:08	S91	233

sample	Description	latitude	longitude	depth	altitude	heading	date	time	dive	record
S91-rock-07	Tip of pillow lobe from large pillow with striations and bread crust rind. Area with sponges and corals. 8 cm or so. A little manganese coating. Vesicular. Z=1995m. 15.00421 S 173.79821 W. At waypoint 5.	-15.00422	-173.79821	1995.6	0.9	134.275	2017-12-02	22:06:44	S91	249
S91-sed-08	S91-sed-08. Sample of coarse sediment on this debris-strewn slope. Black sediment with rock fragments Between waypoints 5 and 6.	-15.00477	-173.79729	1961.9	1.4	48.0817	2017-12-02	22:28:31	S91	288
S91-rock-09	S91-rock-09. 40 cm long arrowhead shaped with Mn crust and lots of oxide staining. From intact pillows with broken faces on slope. ~20m E of waypoint 6.	-15.00506	-173.79626	1925.6	0.9	116.84	2017-12-02	22:45:52	S91	295
S91-rock-10	S91-rock-10. 2 pieces: 7x7cm two glass rinds with green-grey ground mass center and thin crust ~7cm across. Abundant mm-scale olivines more typical of boninite. Mix of talus and in place flows; anemones at waypoint 7.	-15.00507	-173.79476	1861.9	1.4	79.3652	2017-12-02	23:02:45	S91	300
S91-sulfide-11	S91-sulfide-11. Sulfide spire 40x15cm. Manganese coating. Large extinct chimney sample. Copper (blues and greens) and purple. Colorful mineral-rich. Some cavities inside. From inactive chimney site "Deadwood" on NE side of summit and ~15m south of waypoint 13.	-15.00465	-173.79310	1836.8	0.0	141.553	2017-12-03	0:44:56	S91	446
S91-sulfide-12	S91-sulfide-12. Sulfide chimney grab. Highly oxidized on the outside (orange crust) Roundish 10 cm. Sparkling gray center with 2 central fluid outflow zones. Second piece of this sulfide that is extending down (not up) from the massive structure. 25 cm squarish from side of larger mound. Orange coating. Gray center. Minerals in there. Into biobox partition 2. At Bee Hive Chimney complex; E of Waypoint 11.	-15.00478	-173.79362	1821.4	2.0	9.43176	2017-12-03	1:34:59	S91	503
S91-gas-13	S91-gas-13. Sample from vent of black smoker in hottest orifice (top center) measured at 314degC. Saguaro Chimney. Location 15.004629 173.79366 depth 1820m	-15.00465	-173.79366	1821.0	1.7	46.0327	2017-12-03	2:41:44	S91	547
S91-fluid-14	S91-fluid-14. Water sample from same vent as gas-13. Same location as gas-13.	-15.00465	-173.79366	1821.0	1.7	44.1211	2017-12-03	2:52:09	S91	548
S91-bio-15	S91-bio-15. Two crabs plus at least one scale worm and some shrimp. Also a mollusk all into biobox 2. Same location at Saguaro.	-15.00465	-173.79366	1821.1	1.7	45.5933	2017-12-03	3:06:34	S91	549
S91-sulfide-16	S91-sulfide-16. Piece of sulfide broken off of vent where gas and fluid samples were taken. Dark grey and less than 10x10cm. Broke into several small pieces. Saguaro Vent.	-15.00465	-173.79366	1819.4	3.1	27.2351	2017-12-03	3:18:40	S91	551

sample	Description	latitude	longitude	depth	altitude	heading	date	time	dive	record
S91-fluid-17	S91-fluid-17. Major sampler 4 in the black smoker orifice where the temp spiked up to 260C. Fired at 0353. At Low Smoker site NW of Saguaro.	-15.00466	-173.79390	1824.0	0.0	140.444	2017-12-03	3:54:11	S91	563
S91-gas-18	S91-gas-18. Gas tight from Low Smoker where fluid-17 taken.	-15.00466	-173.79390	1823.8	0.0	183.06	2017-12-03	4:24:19	S91	568
S91-bio-19	S91-bio-19. Big old scoop of snails at Low Smoker vent (Mkr-203).	-15.00466	-173.79390	1824.6	0.0	245.226	2017-12-03	4:36:19	S91	571
S92-rock-01	S92-rock-01. Black glassy rock. Nearly aphyric (no crystals). This piece is all glass. Looks more like obsidian. Sharp angular surface thick glass coating. 26x15cm. From jumbled sheet flow. ~70m SW of waypoint 1.	-15.18141	-173.90511	2564.7	0.8	216.656	2017-12-03	19:25:12	S92	56
S92-rock-02	S92-rock-02. Crumbly lava. Hole in the middle. 10 cm upper surface fragment of pressure ridge. Striated dacite lava on side. Thick blocky glass. 2nd piece: Yellow-brown staining on inner surface. Huge glassy rind. 20 cm thick glassy outer surface. Angular flat-ish. Into partition 5. Between waypoints 1 & 2.	-15.18195	-173.90627	2552.5	1.1	232.372	2017-12-03	19:48:51	S92	97
S92-rock-03	S92-rock-03. Crust / upper plate from large elongated pillow at top of ridge slope. Fragile; glassy; 5 cm spherical piece of glass from pillow exterior. 2nd piece of elongate pillow lobe: Upper surface with interior. Glass on the side. Bulbous piece with ridges. No evidence of vesicles or crystals. 20 cm x 15 cm. Wedge-shaped rounded on side. Into partition 6. ~25m SW of rock-02.	-15.18210	-173.90647	2531.4	3.5	232.723	2017-12-03	20:05:32	S92	119
S92-sed-04	S92-sed-04. Push core #4 into fine-grained deep sediment on flat-ish highly sedimented plain here. The core is full (~25 cm in there). Fairly light buff-colored material. In the pit. At waypoint 2.	-15.18274	-173.90722	2548.1	0.0	213.278	2017-12-03	20:37:05	S92	170
S92-rock-05	S92-rock-05. 15x10 piece of dacite from edge of jumbled (in-place) lava flow. Angular and glassy; vesicular. Likely will have orange sediment stuck to it. (Outside of the pit). Between waypoint 2 & 3.	-15.18377	-173.90905	2524.6	0.0	212.992	2017-12-03	21:10:42	S92	228
S92-rock-06	S92-rock-06. 10x10cm glassy edge of pillow just under jumbled sheet flows. Some sediment and microbial filament on surface. One tiny extra piece. ~15mNE of rock-05 after coming off bottom to get mud off of ROV.	-15.18367	-173.90888	2525.0	0.4	150.32	2017-12-03	21:24:19	S92	232
S92-bottle-07	S92-bottle-07. Antique wide-mouth bottle 5x20cm. Same general location as rock-06.	-15.18355	-173.90897	2522.2	4.2	167.454	2017-12-03	21:27:19	S92	233

sample	Description	latitude	longitude	depth	altitude	heading	date	time	dive	record
	Approaching bulbous striated pillow with smooth pillow flows coming off of it. First one we've encountered today so setting down for a sample	-15.18409	-173.90945	2523.4	2.8	220.32	2017-12-03	21:34:17		238
S92-rock-08	S92-rock-08. Piece of highstanding bulbous-striated pillow; first encountered in this dacite flow. 10x15cm angular w brown stain on side. Couple of 0.5cm vesicles. Between waypoint 2 & 3.	-15.18410	-173.90946	2524.8	1.3	214.167	2017-12-03	21:43:30	S92	240
S92-rock-09	S92-rock-09. Piece of ropy jumbled lava. Brown-red surface staining with patchy exposed glass. 1cm ropes on surface. 5x15cm. From area of burrows in sediment between boulders. ~60m SW or waypoint 3.	-15.18679	-173.91313	2537.9	0.0	231.586	2017-12-03	22:35:05	S92	280
S92-sed-10	S92-sed-10. Scoop bag 4 into the sediments (fine; beige-ish in color) at the base of these bulbous pillows. Thin veneer of sediments ~10cm with rock underneath. Full scoop into milk crate behind gastights. 1/3 distance between waypoint 3 to 4.	-15.18849	-173.91480	2522.8	0.4	167.948	2017-12-03	23:06:17	S92	304
S92-rock-11	S92-rock-11. Piece of striated broken pillow crust (plate) in area with worm trails & burrows. Fine sediment coating. Fragile; crumbly; 10 x 15 cm. Orange staining. Crumbled - 2 pieces. Angular. Brown staining on 1 side. Placed in biobox2. Little less than halfway between waypoints 3 & 4.	-15.18942	-173.91598	2508.3	1.1	173.018	2017-12-03	23:42:00	S92	335
S92-bio-12	S92-bio-12. Coral - stalked coral; probably a bamboo coral. Exact same position as sample 11. Z=2509 15.189418 173.916857. Went into biobox with the rock.	-15.18942	-173.91598	2508.6	0.8	172.315	2017-12-03	23:47:03	S92	338
S92-rock-13	S92-rock-13. Piece of jumbled flow with striations (fluid looking). Black glass interior with hollow areas. Angular. 5-30 cm on long side. Glassy with ropey surface texture. Plate of color on surface of glass. Rougher texture on outside. Chonchoidal fracture on inside. From thin pancakey flow. No visible vesicles. Into biobox 4. Halfway between waypoints 3 & 4.	-15.19049	-173.91679	2508.5	0.7	196.419	2017-12-04	0:04:54	S92	354
S92-sed-14	S92-sed-14. Push core 1 into the sediments on dune-like environment. Sands deeper than measuring stick of 30cm. Light brown - sandy colored seds. Fine-grained with no visible ash. ~80m SW of rock-13.	-15.19110	-173.91720	2500.3	0.3	189.146	2017-12-04	0:22:39	S92	375
S92-bio-15	S92-bio-15. Suction of big brittle star in dune area after cresting ridge. It's big. and stretched out across the segments. Very close to sed-14 location.	-15.19112	-173.91717	2495.8	4.8	128.546	2017-12-04	0:31:55	S92	382

sample	Description	latitude	longitude	depth	altitude	heading	date	time	dive	record
S92-rock-16	S92-rock-16. Ropey outer crust of lava rock on top of pillow lobe covered with sediment on sandy slope. Large rock with large visible hollow (eye) in rock center. Rolled up lava. Small stretched vesicles. Almost aphyric. Manganese coating on outside. 25 - 30 cm long; width at bottom is ~25 cm across. Into marker box. ~75mSW of samples 14 & 15.	-15.19167	-173.91760	2504.2	0.0	199.177	2017-12-04	0:35:46	S92	389
S92-rock-17	S92-rock-17. Arcuate fracture pattern on this blocky-jumbled-pressure ridge. Sediment coating. 10x10 cm with arcuate fracture surfaces. Softball sized in front stbd corner of box. Just over 100m north of waypoint 4.	-15.19298	-173.91945	2506.3	1.3	268.451	2017-12-04	1:05:16	S92	422
S92-rock-18	S92-rock-18. Edge of broken inflated tumuli-like lava flow sitting on top of lobate pillows. Trapezoidal 10x12cm. Vesicular with Mn-coat. Corner with Fe-staining. ~200m west of waypoint 4.	-15.19421	-173.92140	2508.4	0.9	247.714	2017-12-04	1:46:42	S92	429
S92-sed-19	S92-sed-19. Scoop-2 of volcaniclastic/pelagic sediment and some VERY viscous mud from top of small dune. ~200m SW of rock-18.	-15.19503	-173.92320	2464.3	1.4	223.824	2017-12-04	2:34:46	S92	444
S92-rock-20	Sheety-platy lava on highly sedimented seafloor. 15-20 cm piece relatively soft rock. Might be welded ash or fine grained volcanic rock. Crumbly. Going in for 2nd grab ~35cm long. Altered-log shaped. Dark banded layer. Into partition 10 and some pieces into 9. ~150m upslope of waypoint 5.	-15.19693	-173.92404	2419.0	0.0	180.082	2017-12-04	2:56:34	S92	455
S92-rock-21	S92-rock-21. In-place piece of rock near the summit of the largest hill so far. Well-consolidated. Orange-stained outer coating. Rock has a bit of a point at the end. 10x10 angular. Some black stain? Lighter colored. Near rock-20 moving upslope to waypoint 5.	-15.19742	-173.92391	2418.2	0.8	238.799	2017-12-04	3:14:38	S92	477
S92-rock-22	S92-rock-22. Near summit of mound. Odd-looking platy stuff. Rhombohedral cracks in this rock. Cracked down the middle. Sandstone colored interior. Into partition 5. 15x8 cm. Stayed together well. Z=2415m. Buff colored. At waypoint 5.	-15.19815	-173.92410	2414.8	0.5	248.84	2017-12-04	3:30:41	S92	491
S92-sed-23	S92-sed-23. Scoop bag #1 in sediments. Sticky somewhat consolidated gelatinous seds. Nothing dark in seds. Taken just below rock-22 ou on sedimented/sandy slope.	-15.19832	-173.92417	2415.1	0.0	156.912	2017-12-04	3:36:34	S92	494

sample	Description	latitude	longitude	depth	altitude	heading	date	time	dive	record
S93-sed-01	S93-sed-01. Push core 1 of coarse volcanic sand from sedimented area of rippled sand. Went down 7-8cm. Black grains. Fresh and black with buff-colored pelagic seds on top. Looks like most of it dumped out. Nav bad-position about 90m W of waypoint 1.	-15.06483	-173.72783	2538.5	0.0	227	2017-12-04	19:11:03	S93	54
S93-rock-02	S93-rock-02. From saddle between No-Name and W Mata. Piece 1: Coating of precipitates out of sea water. Cracked. Fragile. Crystal-rich. Huge olivine crystal. > 1cm in diameter. Orange/grown staining on outside-fresh interior. Angular and small vesicles. Crystal rich. No glass. 2nd piece: Porphorytic. More crystal then rock. Deep green clinopyroxene. Sliver of the same rock. Cracked. Orange staining. Black manganese coating. 3rd piece with huge megacrysts (either one crystal or a combination of many fused crystals). Less than 5 cm. 4th: Circular piece. Huge crystals. Iron staining on the face. Just adjacent to previous pieces. Vesicles. Clinopyroxene. No glass. Partition 5. ~90m NE of waypoint 2.	-15.06723	-173.72989	2588.0	0.6	176	2017-12-04	20:42:01	S93	166
S93-rock-03	S93-rock-03. Edge of pillow flow in sedimented basin. 7x3cm wedge-shaped crust. Second piece of crust of this young pillow flow. 10x3cm with ribbon of white stain through center of crust. Third chunk of crust from pillow. Greenish-white stain on top surface. 4x6cm and squarish. ~50m SW of waypoint 2.	-15.06799	-173.73096	2596.8	2.0	224	2017-12-04	21:10:16	S93	180
S93-sed-04	S93-sed04. Scoop 2 of volcanic sediment immediately at base of young distal lava flow at NE flank of West Mata Volcano. (Just away from rock-03 outcrop). Two scoops	-15.06825	-173.73117	2598.1	0.0	269	2017-12-04	21:35:25	S93	187
S93-rock-05	S93-rock-05. Chunk of overhanging crust 10x15cm. Lots of glass and olivine and wedge-shaped. Delaware-looking with some groundmass. Area of stacked pillows with less sediment. Between waypoints 2 & 3.	-15.06844	-173.73127	2587.1	3.1	201	2017-12-04	21:51:18	S93	192
S93-rock-06	S93-rock-06. Very vesicular porphyritic glassy rind from inflated pillow at top of mound. Nav off so precise location uncertain at waypoint 3.	-15.06948	-173.73258	2508.4	0.0	222	2017-12-04	22:28:35	S93	251
S93-rock-07	S93-rock-07. 5x10cm vesicular with fresh glass and ropy surface. Grey groundmass. Blocky with large fresh olivines. Edge of flow and sediments after descending mound at waypoint 3.	-15.07057	-173.73293	2525.5	2.3	261	2017-12-04	22:55:09	S93	257

sample	Description	latitude	longitude	depth	altitude	heading	date	time	dive	record
S93-rock-08	S93-rock-08. Free-hanging pillow toe 50-60 cm and shaped like hairy mushroom. Steep slope with truncated pillows. ~70m NE of Waypoint 5.	-15.07042	-173.73417	***2497.9***	13.7	230	2017-12-04	23:16:49	S93	266
S93-rock-09	S93-rock-09. Vesicular pillow crust from field showing signs of hydrothermal alteration near base of mound. Orange and white stripe on edge 25x15cm. Area of intact pillows. ~125m WNW of waypoint 5.	-15.07047	-173.73540	***2516.0***	0.9	213	2017-12-04	23:38:50	S93	280
S93-rock-10	S93-rock-10. Inflated pillow crust with striae at the surface. 20x15cm piece. Lots of minerals; dark and glassy. Angular with striations. Banding is the flow on the outer edge. Into front of partition 10. Top of pillow mound ~25m N of waypoint 6.	-15.07208	-173.73590	***2421.9***	1.1	116	2017-12-05	0:09:17	S93	310
S93-sed-11	S93-sed-11. Volcaniclastic sediment scoop from pocket nearly surrounded by large pillow tubes. Dark sparkly grains. Gray dust rising. Black shiny sediment crystals. The volcaniclastic seds are really black beneath the pelagic marine snow area. 3in sediment in bag with hole. ~15m N of waypoint 6.	-15.07220	-173.73583	***2419.6***	0.0	158	2017-12-05	0:21:41	S93	319
S93-sed-12	S93-sed-12. Push core #2 with the core catcher in this very black volcaniclastic ash/sed layer at western edge of main flow. Sed thickness 20cm. Core is ~ 1/3 full. At waypoint 7.	-15.07188	-173.73762	***2489.3***	0.0	295	2017-12-05	1:03:08	S93	364
S93-rock-13	S93-rock-13. Small piece of thin lobe on edge of new flow. 5cm thin wedge. Lots of olivines. Small vesicles. Glass rind. Super fresh. Piece 2: Flat-ish rind from the top edge of long flat pillow. Glassy rind; Irregular shape. Some vesicles. Lots of green minerals. 8-10cm across. Into biobox 1. Same location as sed-12.	-15.07188	-173.73762	***2490.2***	0.4	334	2017-12-05	1:08:28	S93	369
S93-rock-14	S93-rock-14. Large pillow with platy exterior. A small hole in the bottom. Some striated surfaces. Crust with striations and banding. 3 cm in longest dimension. 2nd piece: Long narrow piece. 25 cm slab of glassy pillow rind. Can't see crystals from this side. Into biobox 2. Top of high at waypoint 9.	-15.07376	-173.73698	***2379.9***	0.8	160	2017-12-05	1:46:53	S93	425
S93-rock-15	S93-rock-15. 5x10cm phyric glass rind from pillow with some hydrothermal staining. Outside of pit on the edge near waypoint 10.	-15.07392	-173.73799	***2376.8***	0.0	140	2017-12-05	2:22:58	S93	462
S93-sed-16	S93-sed-16. Scoops of volcaniclastic sediment/ash next to collapse pit. Two good scoops. At waypoint 11.	-15.07449	-173.73882	***2369.7***	0.0	190	2017-12-05	2:53:26	S93	476

sample	Description	latitude	longitude	depth	altitude	heading	date	time	dive	record
S93-rock-17	S93-rock-17. 5x5cm half glass block with orange stripe at base. Vesicular and lots of olivine. Sampled from older crusty pillow with a lot of sediment. Near sed-16; ~30m SW of waypoint 11.	-15.07462	-173.73886	***2369.5***	0.4	194	2017-12-05	2:59:13	S93	479
S93-rock-18	S93-rock-18. 10x5 cm columnar shaped chunk of collapsed pillow. Tall and skinny with an orange stain at base. Highly vesicular. Between waypoints 11 & 12.	-15.07468	-173.73861	***2371.6***	0.5	294	2017-12-05	3:07:36	S93	483
S93-rock-19	S93-rock-19. 50x25 mace-like piece of crust from older sedimented lobate flow. Monster pillow rind. West of waypoint 12.	-15.07476	-173.73808	***2375.5***	0.0	51	2017-12-05	3:17:53	S93	486
S94-rock-01	Intact pillow knob from pile of pillows . Quite large. Small diameter pillow. 15 cm across. Surficial sediment -some iron staining. Glassy surface. Has a crack in it. Broke into 2 pieces. Crust on outside. See some phenocrysts. Olivine. Some vesicles. ~15m NE of waypoint 2.	-14.99979	-173.79372	2163.3	2.5	151.298	2017-12-05	19:26:49	S94	83
S94-rock-02	S94-rock-02. Disgorged pillow bud beneath large bulbous pillow from top of hill. Gray-ish interior. Quadrant of pillow bud. Spongy texture with volcanic glass. Vesicular. Not a lot of phenocrysts. 10-15 cm. Nice glassy upper surface. ~20m E of waypoint 2.	-14.99987	-173.79360	2136.1	1.8	122.657	2017-12-05	19:43:08	S94	107
S94-rock-03	S94-rock-03. Chunk of older shelly pahoehoe-like crust of jumbled sheet flow. Vesicular with thin glass. Med grey alt band under glass and pyric. Near waypoint 3-~35m SW.	-15.00212	-173.78982	2042.9	3.7	222	2017-12-05	21:09:27	S94	264
S94-rock-04	S94-rock-04. Just above talus slope; in place bulbous pillow crust. Sampled 3 chunks of rock ranging from 5x7cm to 10x10cm. Vesicular sponge-like and pyric. ~70m S of waypoint 3.	-15.00252	-173.78953	2050.5	3.0	180	2017-12-05	21:22:13	S94	267
S94-rock-05	S94-rock-05. Upper crust of top of pillow tube. Flattish with rind. Vesicular. Orange stain. Glass. Green olivine crystals. Pretty vesicular. 7cm across 10-20 cm on long side. Up debris slope from rock-04. ~80m N or waypoint 4.	-15.00351	-173.78942	1974.1	4.5	211	2017-12-05	21:57:20	S94	288

sample	Description	latitude	longitude	depth	altitude	heading	date	time	dive	record
S94-rock-06	S94-rock06. Piece of ropy jumbled flow between two pillow deposits. Two pieces 5x7 and 5x7 should fit together and picked up a third. Large center vesicle and phyric. (Using logger position.) Between waypoints 4 & 5.	-15.00438	-173.79080	1906.2	0.5	319	2017-12-05	22:46:12	S94	333
S94-sed-07	S94-sed-07. Sediment sitting on top of jumbled lava flow near rock-06. (Bad nav position).	-15.00446	-173.79075	1905.7	0.7	327	2017-12-05	22:56:08	S94	336
S94-bio-08	S94-bio-08. Shrimp from Low Smoker Vent. ~15m N of waypoint 6. Low Boy Vent.	-15.00457	-173.79389	1823.4	0.8	259	2017-12-05	23:37:48	S94	357
S94-sulfide-09	S94-sulfide-09. Sample of chimney spire at Low Smoker. Nice little smoker. The top broke off. It was active. Not black smoke. Was 10 cm across but it broke. Into Partition 2. Broke into 3 pieces. At 1824m height on chimney. Black smoke came out of orifice after sampling.	-15.00457	-173.79389	1823.9	2.0	142	2017-12-05	23:51:15	S94	358
S94-gas-10	GT#6 in hot black beehive orifice at top of Low Boy. (Mkr-203 area-seen in background.) Fired at 0009:50. Nozzle was black. Temp reading of 260degC on previous dive; today highest 230degC. (Fluid sampled here on dive S91).	-15.00457	-173.79389	1823.2	0.0	247	2017-12-06	0:10:23	S94	372
S94-gas-11	S94-gas-11. GT #2 green. At the top of Snail Alcove in small beehive with vigorous flow. This beehive got up to 200C. Fired at 0055:35. Looks like a good sample. Snail Alcove: 15.0048215 S 173.7935434 W.	-15.00482	-173.79354	1813.4	4.0	327	2017-12-06	0:55:39	S94	412
S94-fluid-12	S94-fluid-12. Major sampler #3 in the same little smoker orifice where the gastight was taken. Snail Alcove. Looks good - right in the flow. Triggered at 01:07:21.	-15.00482	-173.79354	1813.3	0.0	327	2017-12-06	1:07:28	S94	416
S94-bio-13	S94-bio-13. Suction into Chamber #2. Opaepele shrimp; Alvinocaris (?). Shrimp Alcove top of chimney.	-15.00482	-173.79354	1813.3	4.0	327	2017-12-06	1:14:24	S94	419
S94-bio-14	S94-bio-14. Scoop bag #1 Alvinoconcha snails (~6) and Ifremeria snails (~?). Snail Alcove position on dive S96: 15.0048215 17.7935434 2nd scoop in same place after sulfide-16 of hairy snails.	-15.00482	-173.79354	1813.3	4.0	327	2017-12-06	1:16:10	S94	420
S94-fluid-15	S94-fluid-15. Sample in the area where the snails were living near the top of the chimney. Z=1813.4. ~ 30 cm from the top of the chimney where biology sampled. Fired.	-15.00482	-173.79354	1813.4	3.9	12	2017-12-06	1:43:52	S94	428
S94-sulfide-16	S94-sulfide-16. Beautiful active sulfide piece from the very top of the chimney. Pyramid-shaped. Gold interior 8 cm tall. Fluid outflows. Z=1813m.	-15.00493	-173.79351	1813.1	5.1	290	2017-12-06	1:55:20	S94	437

sample	Description	latitude	longitude	depth	altitude	heading	date	time	dive	record
S94-fluid-17	S94-fluid-17 Major sampler #4. In crack beneath the mussels where the temp was 23C. At base of south wall in pit. Fired at 0236. 15.005142 173.793922 Z=1843.	-15.00512	-173.79392	1842.4	0.5	184	2017-12-06	2:39:55	S94	470
S94-bio-18	S94-bio-18. Mussel scoop. At the Pit site just above fluid-17. Into biobox 3.	-15.00512	-173.79392	1842.7	0.0	159	2017-12-06	2:53:24	S94	474
S94-bio-19	S94-bio-19. Chamber 3 slurp: Opaepele shrimp. Alvinocaris shrimp; Ifremeria. The Pit site.	-15.00512	-173.79392	1842.8	0.0	159	2017-12-06	2:58:02	S94	476
S94-sulfide-20	S94-sulfide-20. Spire from inactive sulfide 40 cm tall 10-15 cm diameter from ~5m structure. Orange staining. Coating of iron oxide - gray interior Round spire with 2cm wide central fluid upflow zone. Into partition 11. Bee Hive Towers NE of The Pit at Deal Guy Ale.	-15.00472	-173.79365	1820.3	3.7	65	2017-12-06	3:08:38	S94	485
S94-fluid-21	S94-fluid-21. Major #2. near the top of Tall-North-Handsome. In clear vigorous fluids flowing from spigot. Fired 0333:30. Looks good. Tmaz 204degC but not far into flow.	-15.00449	-173.79359	1822.3	8.1	302	2017-12-06	3:34:46	S94	502
S94-gas-22	S94-gas-22. Gastight 12 yellow/green into same orifice at Tall-North-Handsome.	-15.00449	-173.79359	1822.4	7.3	313	2017-12-06	3:37:45	S94	504
S94-bio-23	S94-bio-23. Suction into Canister 4. Shrimp; Lots of them. From SE side of Tall-North-Handsome.	-15.00449	-173.79359	1822.5	3.7	334	2017-12-06	3:51:06	S94	511
S94-bio-24.	S94-bio-24. Suction into Canister 5: Branchinotogluma (the scale worm); Snail stuck in the intake valve. Tall-North-Handsome.	-15.00449	-173.79359	1821.3	7.2	323	2017-12-06	3:53:24	S94	512
S94-sulfide-25	S94-sulfide-25. Spire from inactive portion of Big-Tall-Handsome. Sort of pagoda shaped piece. Got the little tip. with a nice point on the top.	-15.00449	-173.79359	1821.7	7.2	318	2017-12-06	3:55:09	S94	513
S95-sed-01	Push core #3. Into the deep seds. 40+ cm of sediments. The seds are black under the thin pelagic lighter seds. Coarse plug of dark volcanic seds. Upper part of tube has finer grain size. At landing site-really bad navigation. edge of a heavily sedimented area that looks like a contact. Flatter pillow lobes that are heavily sedimented next to more bulbous pillows up slope.	-15.11856	-173.80120	3011.8	0.0	149	2017-12-06	19:27:31	S95	37
S95-rock-02	S95-rock-02. High-standing pillow nub that is attached. In sandy bottom. Olivine-phyric. Green phenocrysts. No vesicles evident. Spectacular rock. 10x4cm with glassy shell. Grabbed pieces that broke off nearby rock as well. Into partition 5. Same location as sed-01.	-15.11852	-173.80138	3011.8	0.0	149	2017-12-06	19:31:04	S95	39

sample	Description	latitude	longitude	depth	altitude	heading	date	time	dive	record
S95-rock-03	S95-rock-03. Pillow bud-like feature sticking out from a more extruded bit of lava. Still has lots of crystals with some orange staining. See crystals in the glass. About 10% vesicular. 2nd piece 7x3cm with more glassy exterior. Not far from rock-02.	-15.11869	-173.80123	3007.1	1.0	156	2017-12-06	19:52:01	S95	59
S95-rock-04	S95-rock-04. Cracked pillow with 1-2cm of sediment cover. At contact? Grab of pillow rind. Extra flaky slab of glass. Less than cm thick 10-ish cm long. Upper surface of young sedimented coated pillow at the flow margin of 2010/2011 eruption. Crystals on surface and glass flakes separating. 2 flaky pieces of the upper surface of pillow.	-15.11884	-173.80118	3008.3	0.6	84	2017-12-06	20:18:15	S95	83
S95-rock-05	S95-rock-05. Pillow bud under thick-ish seds. 2m from rock-04. Circular.15 cm long. Radial. Green crystals. Wow super packed with crystals. Porphoritic. Olivine and clinopyroxene. Small vesicles. Rocky interior. Into partition 8.	-15.11865	-173.80177	3009.0	0.0	114	2017-12-06	20:27:51	S95	90
S95-rock-06	S95-rock-06. Environment is at a Spur - small section of jumbled up curtain-folded sheets: Thicker rind on this lava: Frothier interiors. Two pieces of a broken flow. 3x5cm and 10x15cm. Larger piece has a lot of hydrothermal staining. At jumbled flow pressure ridge. (No navigator position-east from Waypoint 1).	-15.11796	-173.79899	2953.3	2.9	105	2017-12-06	20:54:08	S95	129
S95-rock-07	S95-rock-07. Sheet flow surface plate. Iron staining on the bottom. See fresh glass on the corner. Flat elongate slab - broke into 25-30cm piece. ~20m W waypoint 2.	-15.11643	-173.79400	2955.2	1.9	114	2017-12-06	22:06:50	S95	166
S95-rock-08	S95-rock-08. Crust of collapsed pillow. Phyric 5x20cm with very fresh glass rind. Area with pillows flattening out into meandering lobes.	-15.11864	-173.79129	2894.9	0.7	141	2017-12-06	23:23:16	S95	216
S95-rock-09	S95-rock-09. Outer edge / rind of collapsed lobate pillow. 7 cm thick. Pie sliced. Vesicles and crystals. Broken edge is black - exposed edge is brown. On the little high ~25 m SE of waypoint 4.	-15.11824	-173.78881	2877.8	0.8	76	2017-12-06	23:54:24	S95	245
S95-sed-10	S95-sed-10. Scoop bag 1. We're on the edge of this lava flow in sediments that are light and dark banded ripples near a contact..	-15.11831	-173.78900	2889.1	0.7	97	2017-12-07	0:11:11	S95	260

sample	Description	latitude	longitude	depth	altitude	heading	date	time	dive	record
S95-rock-11	S95-rock-11. Older lava flow to the east. From older broken up eroded pillow piece at top of old wall. Intact. Quite altered. Nice glass rind. 20cm by 10cm. Plug - thick glass at the top. Some vesicles. Lots of the interior. Orange staining - has a pillow toe-like feature. Into partition 9.	-15.11804	-173.78911	2885.9	0.9	76	2017-12-07	0:24:16	S95	277
S95-rock-12	S95-rock-12. Piece of large cracked weathered older (Corals growing on it) pillow. Outer piece: 10x8 cm piece. One nice fresh face. Crystals in there. Weathered seds and crud in to biobox 3. Somewhere between waypoint 4 & 5.	-15.11770	-173.78793	2881.6	0.0	101	2017-12-07	0:44:37	S95	295
S95-rock-13	S95-rock-13. Platey sheet of the outer crust of edge of rippled slope sheety/platey flow with some buds around the edge. Seeing some crystals in this thin plate of glassy cruse. Circular- 10 cm by 1cm thick. 15.117412 173.786810 Z=2889m	-15.11737	-173.78719	2888.7	0.0	138	2017-12-07	1:03:27	S95	311
S95-sed-14	S95-sed-14. Push core #2 with the core catcher. Deep sediments on this flatish plain. From edge of flow up against sedimented ridge. That core is full - at least upon collection. Uniform black volcanic seds. No internal stratigraphy. 15.117374 173.787272.	-15.11736	-173.78736	2887.1	0.0	141	2017-12-07	1:18:09	S95	320
S95-rock-15	S95-rock-15. Jumbled sheet flow with drain-out bathtub features (shelves) along side of fissure. . Z=2890 m. Slab is 7 cm thick. 2 layers. Lava drips. Ridged pattern. Very crystal rich. Olivine and some pyroxine. 15.117259 173.786498.	-15.11718	-173.78692	2889.5	0.0	92	2017-12-07	1:29:42	S95	333
S95-rock-16	S95-rock-16. Sample from jumbled pillow lava; full with crystal. porphyritic; glassy and arcuate shaped; 20-25 cm. 15.1172125 173.7859079 Z=2880m	-15.11717	-173.78603	2880.2	0.9	59	2017-12-07	1:59:16	S95	361
S95-rock-17	S95-rock-17. Piece of rind and small amount of interior. 25 cm long by 10 cm thick. Crystal-rich. Upper 1 cm thick glassy rind. Not as crystal rich as the sheet we just sampled (rock-16). 15.1171499 173.7862279.	-15.11714	-173.78558	2874.5	4.1	101	2017-12-07	2:09:52	S95	372
S95-bio-18	S95-bio-18. Pencil tube worm (carnivorous polychaete) attached to top of large pillow on a slope. Got it all. It's about 10 cm long and skinny (toothpick thick). Biobox 2. 15.117066 173.786620.	-15.11704	-173.78661	2863.5	1.1	138	2017-12-07	2:21:37	S95	384

sample	Description	latitude	longitude	depth	altitude	heading	date	time	dive	record
S95-bio-19	S95-bio-19. Suction into Jar 2: Unidentified tunicate? Or sea pen? Red interior with something that resembles polyps on the outside. Bluish overall color. White eggs (?) at base. Well-connected to rock. 15.1171764 173.786405. Z=2854 m. From 2 overlapping young flows.	-15.11715	-173.78642	2853.7	0.0	59	2017-12-07	2:31:37	S95	392
S95-rock-20	S95-rock-20. Flow-talus contact as moved upslope. Another dangler. Phyric telescoping pillow lava. 15.1167031 173.7846586 depth 2804m	-15.11650	-173.78462	2804.0	8.6	111	2017-12-07	2:52:10	S95	400
S95-rock-21	S95-rock-21. From top of cliff. Chunk of fresh pillow rind 3x5cm. 15.1157597 173.7838459 depth 2704m	-15.11576	-173.78417	2704.9	0.0	63	2017-12-07	3:11:47	S95	410
S95-rock-22	S95-rock-22. Ingrown pillow toe inside partly drained pillow at top of pile. Phyric and two 5x5 chunks. Third piece ~5x10cm. 15.1152122 173.7620305 depth 2702m	-15.11521	-173.78164	2701.9	0.0	118	2017-12-07	3:41:41	S95	426
S96-rock-01	S96-rock-01. 20 cm pillow fragment from lower edge of a unit of piled up pillows on a steep slope. Vesicles. Looks like crystals. Bio stain with sediment and manganese coating. Looks more like 20 cm. Wedge-shaped. 14.9922924 173.18142087. 30 m east of WP1.	-14.99227	-173.81421	2584.1	5.4	142	2017-12-07	19:03:51	S96	48
S96-rock-02	S96-rock-02. Broken-up massive pillow from old ridge. Cracked and altered on its exterior surface. Looks like it shattered in place. Volcanic glass (crumbly) from exterior. A few fragments of exterior. 4 cm in length. 2nd grab: 5 cm with glassy surface and a bit of interior with it. Some occasional green crystals and glassy exterior surface. Into biobox 1. ~70m SE of waypoint 1.	-14.99264	-173.81398	2554.5	0.0	172	2017-12-07	19:17:17	S96	81
S96-sed-03	S96-sed-03. Sediment scoop with bag #3. Area of coarse black shiny seds and lighter pelagic (?) seds in rippled area (the ripples are not very high). Next to rock-02.	-14.99265	-173.81390	2554.2	0.0	2	2017-12-07	19:41:23	S96	92
S96-rock-04	S96-rock-04. Elongate flattened pillow as moved up WRZ. Grabbing a sheet-ish looking piece from the surface. Piece 1: Glassy with crystals. Small piece. 4-5 cm Arcuate shape. Glassy surface. Some minor crystal content. Piece 2: Fairly vesicular - small bubbles. 2-fer. Nice pieces. Manganese oxide surface. Blacker piece on top from fresh exterior. Piece 3: 10 cm irregularly shaped with curved exterior surface. Smaller rock with fresher surface - angular	-14.99248	-173.81318	2552.5	0.8	66	2017-12-07	20:05:32	S96	119

sample	Description	latitude	longitude	depth	altitude	heading	date	time	dive	record
S96-rock-05	S96-rock-05. Pillow lava from in-place outcrop among the infinite sediments. 10x7. Fe oxide stain on one face and Mn on another. Vesicular and phyric with slightly more xtals in glass rind. ~40mNE of waypoint 2.	-14.99127	-173.80790	2482.1	0.9	35	2017-12-07	21:22:04	S96	199
S96-rock-06	S96-rock-06. Rind of fractured-bulbous pillow in outcrop above talus slope. Light sediment. Midway between waypoints 2 & 3.	-14.99051	-173.80716	2430.0	0.8	53	2017-12-07	21:43:20	S96	213
S96 rock-07	S96-rock-07. 20x15cm piece with Mn coating. One fresh face. From ridge crest ~20m N waypoint 3.	-14.98893	-173.80543	2393.6	0.0	104	2017-12-07	22:18:54	S96 rock	256
S96-rock-08	S96-rock-08. Small 5x5cm vesicular and phyric. Mn-crust and Fe staining but VERY fresh interior. Second 5x5cm that broke in two. ~100m ESE of waypoint 4.	-14.98919	-173.80314	2385.2	2.9	63	2017-12-07	22:47:09	S96	264
S96-rock-09	S96-rock-09. Pillow toe 2 pieces with orange staining on glass rind from stack of pillows with little sediment. 20x10cm. Midway between waypoints 4 & 5.	-14.98988	-173.80155	2392.2	9.9	124	2017-12-07	23:05:36	S96	279
S96-rock-10	S96-rock-10. Pillow ornament from large striated pillow. 10x20 vesicular and nearly aphyric. Peanut-shaped with biota. Orange staining on glass rind. ~50m NW of waypoint 5.	-14.99020	-173.80116	2329.1	47.6	167	2017-12-07	23:18:20	S96	283
S96-bio-11	S96-bio-11. Bamboo skeleton with 2 ophioroids (brittle stars). On young-ish pillow lava rind near top of cone. ~15m NW of waypoint 5.	-14.99039	-173.80089	2320.5	9.0	98	2017-12-07	23:33:03	S96	308
S96-rock-12	S96-rock-12. N base of southern cone. Pillow bud (severed the head). Vesicular grayish interior. Lots of gas pockets. Melon sized. Manganese staining on outer edges. Black glass. Circular. Brown clay. 40x20cm.	-14.99203	-173.80101	2375.8	1.3	174	2017-12-08	0:01:08	S96	348
S96-rock-13	S96-rock-13. Really black interior. Angular large wedge. Gray staining on exterior. Large patch of black interior exposed. Interior looks vesicular and porphoritic. Brown coating. Fresh face on one side. 20x10cm.	-14.99300	-173.80060	2328.9	1.0	163	2017-12-08	0:23:03	S96	378
S96-sed-14	S96-sed-14. Scoop 1. Below summit on sandy slope (80m SW of summit cone). Buff-colored seds on top. Seds are dark in color. Z=2344. Between waypoints 5 & 6.	-14.98946	-173.79979	2343.4	0.0	54	2017-12-08	1:22:27	S96	440
S96-rock-15	S96-rock-15. Taken next to sed-14. Glassy angular vesicular crystal rich piece of pillow lava. 10 cm long and 4 cm wide?	-14.98946	-173.79979	2341.6	1.3	344	2017-12-08	1:33:38	S96	441

sample	Description	latitude	longitude	depth	altitude	heading	date	time	dive	record
S96-bio-16	S96-bio-16. Chrysogorgia coral with squat lobster. We only see 1 squat lobster but may be more. Nicely plucked off the holdfast rock. ~10cm tall. In biobox 1.	-14.98946	-173.79979	2341.0	0.0	311	2017-12-08	1:39:24	S96	444
S96-sed-17	S96-sed-17. Scoop into bag #2. Z=2340. T14.9882115 173.7970433.Coarse volcanic deposit on little ridge. Banding of light/dark.	-14.98821	-173.79703	2339.1	1.1	98	2017-12-08	2:24:17	S96	508
S96-bio-18	S96-bio-18. Suction of brittle star off sandy seafloor. Brittle star is poking out the suction hose. Suctioned off sandy seafloor here. Same location as previous sample. Into biobox 2.	-14.98821	-173.79703	2340.0	0.0	91	2017-12-08	2:31:05	S96	511
S96-rock-19	S96-rock-19. Pillow fragment with ~1cm glass rind. 10x15cm and large vesicles full of sediment. 1/3 distance between waypoint 7 & 8.	-14.98793	-173.79625	2343.8	1.6	51	2017-12-08	2:50:41	S96	517
S96-rock-20	S96-rock-20. Rind of an intact huge pillow. 8x5cm vesicular with Mn-coat and some sediment infill in the vesicles. ~40m W of waypoint 8.	-14.98694	-173.79423	2410.1	0.0	129	2017-12-08	3:19:08	S96	532
S97-sed-01	S97-sed-01. Scoop 1 of light-brown sediment from sandy hillock. 10 micron fraction. Sediment is not very dark even under the surface layer. Orangish iron oxide colored fine seds.~20m SE of waypoint 1.	-14.91591	-173.77318	2764.8	0.0	68	2017-12-08	19:06:05	S97	42
S97-sulfide-02	S97-sulfide-02. 12cm of top of extinct weathered chimney. ~4 m tall. Cross section is pretty solid. Several upflow zones. White zones of anhydrite and barite with dispersed crystals. Lots of white anhydrite and chalcopyrite. Possibly barite and bornite? Orange coating. Hydroids and brysingids on top. Leaning Tower of Pisa. Partition 9. ~20m NW of waypoint 1.	-14.91559	-173.77340	2766.6	0.0	323	2017-12-08	19:23:37	S97	63
S97-sulfide-03	S97-sulfide-03. 5 cm piece of central black smoker vent. 2mm - cm thick zone of chalcopyrite. Brown alteration on exterior. Friable into biobox 2. Old Smokey site (8m chimney with 2 spires) about 30m NW of sulfide02.	-14.91545	-173.77371	2757.8	5.2	295	2017-12-08	19:52:29	S97	96
S97-gas-04	S97-gas-04. Gastight #16 Orange. In orifice where the temp reached 274.5C. Depth at the top is 2758 (~ 8m tall sulfide). Old and crusty. Sample questionable-had to use manip for ram.	-14.91545	-173.77371	2757.9	6.8	222	2017-12-08	20:23:31	S97	110
S97-fluid-05	S97-fluid-05. Major fluid sampler #4. In same orifice as the gastight - Tmax=274.5C. On top of "Old Smokey". Fired at 2050:55.	-14.91545	-173.77371	2758.0	6.9	225	2017-12-08	20:50:59	S97	122

sample	Description	latitude	longitude	depth	altitude	heading	date	time	dive	record
S97-bio-06	S97-bio-06. Shrimp suction on iron oxide coated area - at 2759 m. Some white wispy bac mat. Got quite a few shrimp. 1 large polynoid. At Old Smokey chimney.	-14.91545	-173.77371	2757.0	8.6	222	2017-12-08	21:06:00	S97	132
S97-rock-07	S97-rock-07. Piece of weathered; old and sediment covered - outer glassy surface suspected. Black-ish interior. Beat-up outer glass. 7 cm fragment. Upper glassy surface. Alteration-probably boninite. Came from outer rind of partially drained out pillow from area of faulted up pillow pile in sand swale. 2nd piece: glassy rind-altered area under glass. Vesicle but no crystals. In biobox 2.	-14.91679	-173.77482	2740.8	0.8	270	2017-12-08	22:09:00	S97	178
S97-bio-08	S97-bio-08. Large barnacle on glassy rock. Rock not included.	-14.91683	-173.77509	2734.1	1.2	316	2017-12-08	22:24:37	S97	186
S97-sulfide-09	S97-sulfide-09. Chimlet sample from tall extinct hydrothermal chimney. Blood-orange surface deposits. 5x20cm chimlet of chimlet	-14.91632	-173.77546	2717.9	6.5	12	2017-12-08	22:39:21	S97	196
S97-sulfide-10	S97-sulfide-10. Chimlet spire from extinct chimney. ~60mNW of sulfide-09.	-14.91583	-173.77569	2708.1	1.5	82	2017-12-08	23:07:15	S97	212
S97-sulfide-11	S97-sulfide-11. Sampling an extinct chimney with pinecone-shaped chimlets. Got piece of pinecones 15x20cm. Black outer coat with Fe staining in inner rim. Dense. ~10m W of sulfide-10.	-14.91584	-173.77578	2708.0	0.0	219	2017-12-08	23:25:08	S97	214
S97-rock-12	S97-rock-12. Piece of pillow from jumbled debris. Supposedly in place. Iron oxide coating. 30x20 cm long pillow fragment. Outer crust and some hollow inside. ~40m ESE of waypoint 3. In behind major #4.	-14.91454	-173.77744	2651.8	2.0	288	2017-12-09	0:00:18	S97	256
S97-gas-13	S97-gas-13. Gastight bottle #6 - yellow. In orifice where Tmax=295C. It's in there. Fired at 0139:40. At Redwood chimney in area of many active chimneys just 10m north of waypoint 4. Sample probably not good.	-14.91356	-173.77910	2615.9	17.2	18	2017-12-09	1:39:54	S97	377
S97-gas-14	S97-gas-14. GTB-2 green. Fired in the milk crate. Not a hydrothermal sample. Will process it anyway for background sea water sample. Redwood: 14.913523 173.779106.	-14.91356	-173.77910	2616.5	15.6	16	2017-12-09	1:51:28	S97	382
S97-fluid-15	S97-fluid-15. Major #1. Going for same orifice as gastight and temp at Redwood. Sampling at 2616 m near the top. Fired at 0155:30. Full at 0157:55.	-14.91356	-173.77910	2615.7	17.8	16	2017-12-09	1:55:33	S97	383
S97-fluid-16	S97-fluid-16. Duplicate fluid sample in same orifice as fluid-15. Major sampler #3. Fired at 0209:30. Redwood.	-14.91356	-173.77910	2615.7	16.8	16	2017-12-09	2:10:44	S97	386

sample	Description	latitude	longitude	depth	altitude	heading	date	time	dive	record
S97-sulfide-17	S97-sulfide-17. Sulfide from top of Redwood. Orifice where we were sampling. The area where the beehive grew back in less than 1 hour. Beautiful chalcopyrite in there. Small piece of active venting area. 5 cm max. Outer rind. Fell in the gastight box.	-14.91356	-173.77910	2615.9	16.5	355	2017-12-09	2:21:44	S97	392
S97-bio-18	S97-bio-18. Suction of biology from S side of Redwood. Z=2626 here on the chimney. Jar #3 ~15 Shrimp (Opaepele); 2 red and white scale worms; Barnacle.	-14.91356	-173.77910	2626.1	5.9	11	2017-12-09	2:41:42	S97	401
S97-bio-19	S97-bio-19. Suction of Holothurian (Chirodota) Long skinny rather transparent creature and barnacles. At active Eiffel Tower (~9m tall). From the south side of this chimney-about 5m off seafloor.	-14.91348	-173.77912	2626.0	5.0	335	2017-12-09	2:57:29	S97	409
S97-bio-20	S97-bio-20. Scoop #4 of snails. At Eiffel Tower.	-14.91348	-173.77912	2624.0	7.6	358	2017-12-09	3:04:36	S97	415
S97-fluid-21	S97-fluid-21. Water sample from 262C vent on K2 Chimney. Location 14.913382 173.7790881 depth 2631m.	-14.91339	-173.77910	2631.5	2.5	279	2017-12-09	3:44:07	S97	423
S97-sulfide-22	S97-sulfide-22. Part of the K2 chimney.	-14.91339	-173.77910	2612.5	20.0	330	2017-12-09	3:53:12	S97	424
S98-sed-01	S98-sed-01. Scoop of sediment in sandy area with some hydrothermal patches. Even the lighter seds are darker than normal. Dark black material. Glassy. Fresh black shiny volcanic fragments. Half a bag. Near waypoint 1.	-15.38171	-174.25877	2116.7	0.0	147	2017-12-09	18:52:14	S98	34
S98-sed-02	S98-sed-02. Pushcore of yellow flocculent sand overlaying black volcaniclastic sands. The yellow/orange floc is probably over a centimeter thick. Orange floc is fairly coherent. Extremely coarse volcanic sand. ~90m SE of waypoint 1.	-15.38223	-174.25812	2112.5	0.6	140	2017-12-09	19:16:24	S98	69
S98-rock-03	S98-rock-03. Piece of rock in area of fragmental lavas on steep slope. From bent pillow tube. Piece 1: Thick glassy rind-1cm. Large olivine crystals. Gray banded ground mass. From bent pillow tube. Piece 2: Extreme blackness on surface. Thick glass. 5 cm piece of same rock. Grayish ground mass is micro-crystalline fabric. ~90m NW of waypoint 2.	-15.38315	-174.25729	2049.8	2.1	141	2017-12-09	19:56:18	S98	141
S98-rock-04	S98-rock-04. Armored plate from large coherent pillow (hollow with yellow floc flowing from interior) from slope. 10 cm 1.5 cm glass rind on upper surface. Thinner glass rind on lower surface. White coating on part of interior. Band of relatively thick vesicles up the center of the rind. Seeing some crystals and yellow floc coating. Into partition 6. ~20m NW of waypoint 2.	-15.38368	-174.25690	2002.9	1.6	122	2017-12-09	20:16:41	S98	169

sample	Description	latitude	longitude	depth	altitude	heading	date	time	dive	record
S98-rock-05	S98-rock-05. Extruded pillow toe fragment from large (40m tall) pillow mound. Piece 1: Olivine crystals. Looks like all glass. Iron floc stuck to exteriors. Piece 2: Lost most of its glass. Large crystal in center. Rounded larger than first piece. At waypoint 2.	-15.38381	-174.25675	1961.9	20.3	151	2017-12-09	20:34:46	S98	190
S98-sed-06	S98-sed-06. Scoop #2 of volcaniclastic sediment between pillow lobes. Some lighter seds on surface but mostly black. Bag half full. Between waypoints 2 & 3.	-15.38438	-174.25576	1934.7	1.2	179	2017-12-09	20:56:50	S98	234
S98-rock-07	S98-rock-07. Piece of pillow tube/lobe near sed-06. Outer rind of hollow pillow with orange floc coming out interior. Lots of young microbial staining on surface. Crystals and vesicular upper surface and more dense core. Rough texture glassy surface. 20x7cm into partition 8.	-15.38435	-174.25573	1934.0	0.6	132	2017-12-09	21:04:47	S98	239
S98-rock-08	S98-rock-08. Fragment of drainage from large pillow. Long-wavelength fold on glassy surface. 10x20cm. Thick vesicular glassy rind with vertical Fe stains. ~30m W of waypoint 3.	-15.38502	-174.25451	1908.3	0.8	101	2017-12-09	21:31:25	S98	252
S98-rock-09	S98-rock-09. Outer shell of drained-out pillow at the flow boundary. Fragile outer rind; crumbly glass exterior. Mostly glass pillow lava frag. 3cm thick 7cm long. Wedge shaped. Iridescent look to glass. Very young. Very vesicular and some is frothy. 2nd smaller piece. 5cm long. In biobox 1.~90m W of waypoint 4.	-15.38480	-174.25211	1904.2	0.0	48	2017-12-09	22:02:13	S98	274
S98-fluid-10	S98-fluid-10. In area of extensive microbial deposits on flows with some swimming polychaetes and squat lobsters. Forward Niskin successfully fired.	-15.38236	-174.25264	1873.7	3.5	338	2017-12-09	22:54:30	S98	303
S98-rock-11	S98-rock-11. Logalicious 30x20cm pillow segment. Phyric and vesicular with thick grey groundmass and black core. ~60m SE of waypoint 5.	-15.38147	-174.25321	1938.0	5.1	92	2017-12-09	23:21:36	S98	314
S98-rock-12	S98-rock-12. Collapsed pillow mound fragment from slope near ridge top. Size 5 x 8 cm. glass rim. ~150m NE of waypoint 6.	-15.38096	-174.24978	1808.1	0.9	18	2017-12-10	00:20:40	S98	380
S98-sed-13	S98-sed-13. Pushcore of black volcaniclastic seds where a big shrimp is sitting. ~75m SW of waypoint 7. (Nav beginning to go bad.)	-15.37950	-174.24906	1807.6	0.0	37	2017-12-10	00:44:52	S98	411

sample	Description	latitude	longitude	depth	altitude	heading	date	time	dive	record
s98-rock-14	S98-rock-14. Fresh pillow piece (toe?) from facing a steep slope. Our water depth here is 1879. We're hanging over the cliff edge. Tube about 25cm long 10 cm diameter. Perfect glassy crust. Huge olivine crystals. Small vesicles. In partition 9. Between waypoints 7 & 8. (Nav bad)	-15.37797	-174.24876	1878.6	2.4	85	2017-12-10	01:26:39	s98	449
S98-rock-15	S98-rock-15. From top of steep pillow mound. Outer rind weird pillow with multiple layers. Z=1761. No nav. Angular piece of pillow rind. Pie shaped. 12 cm. Glassy exterior 1-2 mm glassy crust. Vesicular and angular. Some crystals. Into bin 10. Maybe 50m W of waypoint 9.	-15.37723	-174.24779	1761.3	1.3	105	2017-12-10	02:27:44	S98	502
S98-sed-16	S98-sed-16. Scoop 3 of black volcaniclastic seds with yellow bacterial floc on top. We have nav. ~20m S of waypoint 9.	-15.37748	-174.24731	1749.2	1.1	50	2017-12-10	02:36:29	S98	510
S98-rock-17	S98-rock-17. 10x5cm lava from jumbled flow with shrimp and squat lobsters. Some Fe and S staining. Vesicular and phyric with sharp point on bottom on one side. Waypoint 9.	-15.37741	-174.24716	1740.3	0.9	89	2017-12-10	02:51:34	S98	517
S98-rock-18	S98-rock-18. Grab of odd highstanding breccia feature (looked like chimney) with altered chunks of lava. Very top piece; ~7x10cm with fairly extensive white and orange staining on surfaces	-15.37739	-174.24751	1740.2	5.3	100	2017-12-10	02:59:47	S98	521
S98-bio-19	S98-bio-19. Slurp of two shrimp in breccia mound area. Same location as rock-18.	-15.37739	-174.24751	1741.8	1.5	75	2017-12-10	03:17:15	S98	527
S98-fluid-20	S98-fluid-20. Major sample to go with the shrimp. Slope is unstable so we are firing it near the talus pile and not in it.	-15.37739	-174.24751	1741.8	1.5	77	2017-12-10	03:27:18	S98	528
S98-rock-21	S98-rock-21. Very murky water area. Mostly glass frothy with orange coat from a highstanding feature. 5x15cm. Between waypoints 10 & 14.	-15.37588	-174.24597	1673.4	4.8	9	2017-12-10	03:59:29	S98	551
S98-rock-22	S98-rock-22. Very poor visibility Sample of jumbly/spatter texture lava possibly from older event. 15x25cm with extensive Fe-stains. Looks like near-vent. Using navigator's guess. ~55m NE of waypoint 14.	-15.37529	-174.24498	1658.9	9.3	46	2017-12-10	04:13:42	S98	556
S99-rock-01	S99-rock-01. Large pillow at landing site - grab of pillow rind. Larger piece with lots of interior. Staining on 1 side. 1-2 cm glassy rind. 20 cm chunk. Gray vesicular center. Into quad 8-very crumbly. No nav so using waypoint 1 as location.	-15.34295	-174.22479	1954.7	0.8	270	2017-12-10	18:40:34	S99	31

sample	Description	latitude	longitude	depth	altitude	heading	date	time	dive	record
S99-rock-02	S99-rock-02. Crumbly sheety lava. Piece of large fragmented near-vent spatter. Iridescent sheen. Folded. 20 cm irregular shape; mostly glass. Large vesicles. No obvious crystals. Between waypoints 1 & 2.	-15.34352	-174.22538	1953.4	2.8	181	2017-12-10	19:31:51	S99	65
S99-rock-03	S99-rock-03. From large mound of pillow with sediment at edge of flow on 2000m contour. Staining frothy 1cm glass on upper surface. No big crystals 15 cm. triangular wedge-shaped piece. Pillow surface and center. White specks on rock surface. Into bin #6. ~70m NE of waypoint 2.	-15.34467	-174.22586	1998.9	4.4	244	2017-12-10	19:59:31	S99	110
S99-rock-04	S99-rock-04. From broken up-swirly patterned sheety exterior of a pillow. Z=1975. Slab of more intact upper surface of pillow. 20cm with glass rind and some spongey gray interior. Near waypoint 2.	-15.34476	-174.22639	1973.8	1.6	272	2017-12-10	20:11:22	S99	130
S99-rock-05	S99-rock-05. Pillow crust from the base of a pillow. Lots of yellow alteration on gray-ish center with vesicles. Pie shaped with hole in top. 15-20 cm long. Some iron staining. Frothy interior. Into partition 7. Near waypoint 2.	-15.34482	-174.22664	1970.2	1.9	214	2017-12-10	20:22:52	S99	142
S99-rock-06	S99-rock-06. Pillow rind from lobate-looking pillow with white staining in its cracks. Chris fix: 15.346311 174.226760. Slab is pie shaped. Slabby top of pillow. 25+ cm length. Glassy rind. vesicular 2-toned grayish and lighter banded interior. Near waypoint 3.	-15.34635	-174.22672	1965.4	1.5	184	2017-12-10	20:45:12	S99	172
S99-rock-07	S99-rock-07. Orange flocculant material on this rumbly-looking rock in area of vent biota on slope (scoria). 15 cm angularly broken pillow fragment. Glass crust. Slightly vesicular. Between waypoints 3 & 4.	-15.34760	-174.22730	1932.2	1.3	186	2017-12-10	21:00:16	S99	211
S99-rock-08	S99-rock-08 Sample of top crust from a lobate pillow. 5x5cm vesicular. Half glass half groundmass and frothy. Aphyric or close to it. Piece 2 & 3also in Biobox 2 about same size. Looks like maybe rare small hydroids on outer surface. Location: 15.3480407 174.2273816 depth 1912m. Between waypoints 3 & 4.	-15.34791	-174.22751	1912.5	1.4	242	2017-12-10	21:17:49	S99	221
S99-sed-09	S99-sed-09. Scoop of sediment deposited on top of lobate pillows in flattened flow. 15.3488458 174.2278238 depth 1892m.	-15.34885	-174.22782	1892.7	0.9	141	2017-12-10	21:37:58	S99	227

sample	Description	latitude	longitude	depth	altitude	heading	date	time	dive	record
S99-rock-10	S99-rock-10. Crust from a hollowed out pillow. 3-4 cm on a side almost 10 cm on long axis. Lot of glass. First piece was small and fragile. Nav fix -15.349475 -174.228162. Two more pieces gotten on a second grab. All went into biobox bin 3. Broke up a lot going into bin. From flatter ridge near waypoint 4.	-15.34949	-174.22814	1849.4	1.3	195	2017-12-10	22:01:47	S99	236
S99-rock-11	S99-rock-11. Suction of filaments of spun glass from interior of inflated and drained pillow off steep slope ridge face. ~200m SW of waypoint 4.	-15.35103	-174.22874	1830.2	6.0	270	2017-12-10	22:29:47	S99	252
S99-rock-12	S99-rock-12. From lava pillows/tubes on near vertical wall. Sample of pillow tube detachment end. Lava Britney Spear. Surface hydroids and lots of vesicular glass around groundmass core. Roughly 35x10cm before breaking. Three pieces. Between waypoints 4 & 5.	-15.35162	-174.22940	1808.7	1.0	204	2017-12-10	22:53:54	S99	259
S99-rock-13	S99-rock-13. Going for the tip of a pillow "toe". Big drainout pillow to the right and left. Vesicles Green olivine crystals. Nice glass rind on all surfaces but broken one. 15x15 circular bud. Some staining on the interior. ~150m SW of waypoint 5 .	-15.35504	-174.23091	1763.4	2.6	214	2017-12-10	23:39:52	S99	321
S99-rock-14	S99-rock-14. Rind of pillow tube. Olivine crystals visible. Vesicular; Glass exterior. Glat. 30 cm long 15 cm wide. Less than midway from waypoint 5 to 6.	-15.35669	-174.23176	1701.2	0.0	284	2017-12-11	00:14:31	S99	347
S99-sed-15	S99-sed-15. Sediment sample in this dark coarse volcaniclastic seds from flatter surface after moving up ridge. Black shiny - some very large grains. Z=1675. Nav fix: 15.357470 174.232244. Midway between waypoints 5 & 6.	-15.35744	-174.23245	1674.2	0.0	212	2017-12-11	00:42:54	S99	382
S99-fluid-16	S99-fluid-16.Major #3. Sample fluids above small patch of sulfur and filamentous (long hairy) mat. A few animals sparsely scattered about. Nav fix: 15.357548 174.232277 Z=1671. Fired at 0102:50. Done at 0104:50. From diffuse venting near vertical cliff at "Cliff Could Have Been a Contender" site.	-15.35755	-174.23228	1676.1	0.0	162	2017-12-11	01:03:13	S99	401
S99-bio-17	S99-bio-17. Suction 3 shrimp; 1 squat lobster; 1 small whelk; 1 scale worm; and Sulfur mat. Same location as fluid-16.	-15.35755	-174.23228	1675.8	3.4	177	2017-12-11	01:22:23	S99	407
S99-rock-18	S99-rock-18. Ropey sheet flow crust. Crumbly. Shiny surface. Skinny piece. 20 cm x 5 cm. Long skinny glassy shiny; aphyric. 15.358883 174.233083. From north of step-steep slope ~150m NE of waypoint 6.	-15.35888	-174.23308	1684.1	0.0	213	2017-12-11	01:39:34	S99	430

sample	Description	latitude	longitude	depth	altitude	heading	date	time	dive	record
S99-bio-19	S99-bio-19. Sample of Chrysogorgia with a squat lobster on old lava just after new lava contact. Broke the top off of it. Have the squat lobster too. Chris fix: 15.360397 174.2340815 Z=1642m	-15.36036	-174.23415	1641.9	1.3	102	2017-12-11	02:07:08	S99	472
S99-rock-20	S99-rock-20. Rind of pillow that is hollowed out. Fragile - oxidized. 15 cm crumbly narrow rind. Glassy? Older flow - don't know what year. Z=1625 Chris fix: 15.3604403 174.2336205	-15.36047	-174.23365	1620.5	2.9	215	2017-12-11	02:25:15	S99	484
S99-rock-21	S99-rock-21. Chunk of frothy glass from young-looking lava flow after traverse over older flow. Covered in hydroids. 15x15cm platy like Wisconsin. Location: 15.3636708 174.2365880 depth 1490m. Between waypoints 6 & 7.	-15.36366	-174.23652	1490.5	3.5	269	2017-12-11	03:05:27	S99	538
S99-fluid-22	S99-fluid-22. Fluid sample at very microbial outcrop along ridge with diffuse flow and Tmax=5C.	-15.36541	-174.23782	1423.2	1.7	231	2017-12-11	03:40:27	S99	565
S99-fluid-23	S99-fluid-23. Niskin sample over this hydrothermal active jumbly lava. Shimmering water along ridge. Altitude 3m over flows.	-15.36509	-174.23771	1419.2	2.3	237	2017-12-11	03:46:41	S99	569
S99-fluid-24	S99-fluid-24. Another Niskin in same place as first niskin.	-15.36509	-174.23771	1419.3	2.4	239	2017-12-11	03:47:18	S99	570
S99-sed-25	S99-sed-25. Scoop #2: volcaniclastic sediments - Black shiny seds. A bit more coherent upper crust lighter(?). Z=1379. Chris fix:15.36689237 174.2389108. Just before crest of summit at waypoint 8.	-15.36678	-174.23896	1378.7	0.9	162	2017-12-11	04:16:08	S99	596
S99-rock-26	S99-rock-26. Piece of pillow covered in yellow bacterial floc outer coating. The rock is fresh and black inside. Dome-shaped black and vesicular rock. 10cm. Piece 2: Looks fresh inside. 20 cm with iron cm. Grey frothy bubbly stuff near margins. Black inside. Same location as sed-25.	-15.36678	-174.23896	1378.4	0.9	129	2017-12-11	04:19:08	S99	597
S99-gas-27	This sample was tripped during stowage of Rock-12. Using that location information. This sample was accidental. It will be processed. Gastight 17 white.	-15.35162	-174.22940	1034.5	0.0	210	2017-12-11	04:43:01	S99	606
S100-rock-01	S100-sed-100. Stirred up yellow seds on slope. Exterior piece with interior included. Very Vesicular and crystal rich. Altered rind. Black glassy rind. Black interior. 25 cm x 20 cm. Brown/black staining on exterior. 15.012884 173.780081. Z=2387m.	-15.01288	-173.78008	2387.4	2.3	167	2017-12-11	19:04:22	S100	42

sample	Description	latitude	longitude	depth	altitude	heading	date	time	dive	record
S100-rock-02	S100-rock-02. Massive old pillow. Edge piece. Very vesicular. Large pillow rind. Vesicles are elongate and over 1cm. 7x5 cm wide. Into partition 6. Nice interior of pillow. Light brown/orange sediment. Very large crystals of green pyroxene. Navigator fix very uncertain: 15.0130130 173.7800763	**-15.01301**	**-173.78008**	2354.2	0.0	177	2017-12-11	19:25:23	S100	58
S100-rock-03	S100-rock-03. Pillow toe-like off cracked tube. Preserved interior. Orange staining on exterior.. Crystal rich with fresh interior. 30 cm long. Angular vesicular. Upslope ~15m from rock-02. Navigators best guess (no nav): 15.0131041 173.7800765.	**-15.01310**	**-173.78008**	2340.8	1.7	143	2017-12-11	19:36:54	S100	64
S100-rock-04	S100-rock-04. Piece of shelly-old-in place pillow. Glassy exterior. Smaller vesicles. Orange sed staining. 4cm across angular. Little glass rind. Crystals not visible. 2nd piece. Somewhat fresh interior. Preserved glassy exterior. Large wedge-shaped fragment of pillow. MnO coating on interior. 30x25cm. Upper surface of glass. Nav guesstimate: 15.0133684 173.7799255.	**-15.01337**	**-173.77993**	2327.9	4.5	135	2017-12-11	19:48:06	S100	76
S100-rock-05	S100-rock-05. Slabby pillow top (elongate pillow tube piece) on slope. All the exterior glass intact. 30 cm long. Smaller vesicles. Navigators best guess (no nav): 15.0136037 173.7798252.	**-15.01360**	**-173.77983**	2267.0	3.3	141	2017-12-11	20:12:01	S100	104
S100-rock-06	S100-rock-06. Piece of elongate pillow. Nice glassy rind. Less vesicular - small bubbles. Some crystals - less than others. 20 cm x 15 cm. Narrow wedge shape. ~18m upslope from previous sample and 12m apart in elevation. NAVIGATOR BEST GUESS: 15.0140592 173.7795558.	**-15.01430**	**-173.77956**	2252.3	7.2	144	2017-12-11	20:20:33	S100	111
S100-sed-07	S100-sed-07. From heavily sedimented plain. Light-sandy brown- sediments here. Scoop bag#2. Light brown/ orangish seds - coarser upper surface and buff colored underneath.	-15.01483	-173.77991	2254.9	0.0	126	2017-12-11	20:29:27	S100	121
S100-rock-08	S100-rock-08. From sharp boundary area of talus and in-place pillows. Piece of pillow with fresh glass rind and some orange surface staining. No hydroids made it. 5x7cm.	**-15.01320**	**-173.78126**	2380.2	1.4	308	2017-12-11	21:24:24	S100	171
S100-sulfide-09	From large chimney graveyard (after found active smokers nearby). Piece of chimney spire. Aiming for the top - hovering grab. 5x10cm orange with white filaments. From top of ~7m tall chimney. 15.0163547 173.7867155 depth 2348m "The Amphitheatre".	**-15.01635**	**-173.78672**	2346.7	7.2	135	2017-12-11	22:27:37	S100	213

sample	Description	latitude	longitude	depth	altitude	heading	date	time	dive	record
S100-bio-10	S100-bio-10. In area of tall black smokers. Right next to black smoker orifice: Suction chamber 5. 4 Shrimp (look like Opaepele) - some are really tiny; Snails (Ifremeria). Lau-FlatTop site at 5m off bottom.	-15.01668	-173.78693	2334.7	6.5	117	2017-12-11	23:22:29	S100	231
S100-bio-11	S100-bio-11. Mussels from the top of the flat chimney. Into biobox 2. Covered in little limpets probably. Same location.	-15.01668	-173.78693	2334.7	6.5	117	2017-12-11	23:24:44	S100	233
S100-gas-12	S100-gas-12. Gastight #16 orange. 327C black smoker gaping orifice. Looks like it's good and deep in the flow. Fired 2346:55. 15.0166822 173.786930 Z=2339 at base and 2335 at sampling site orifice. 327 C.	-15.01668	-173.78693	2334.8	4.3	119	2017-12-11	23:47:07	S100	243
S100-fluid-13	S100-fluid-13. Major sampler #3 in same huge orifice at Lau-Flattop. Fired at ? It's filling now. 0001:05 finished.	-15.01668	-173.78693	2334.9	4.2	119	2017-12-12	00:01:16	S100	246
S100-bio-14	S100-bio-14. Grab of stalked barnacles. Got some sulfide as well - not exactly the sampling site; but to the left of it. Hdg=119	-15.01668	-173.78693	2334.9	3.4	119	2017-12-12	00:09:19	S100	255
S100-sulfide-15	S100-sulfide-15. Grab of sulfide when sampling stalked barnacles on chimney to the left of sampling orifice. Must be warm because lots of vent animals were living on it.	-15.01668	-173.78693	2334.9	6.0	111	2017-12-12	00:10:33	S100	257
S100-sulfide-16	S100-sulfide-16. Sulfide piece from very near the black smoker orifice. Beautiful piece. Outer piece of large sulfide probably chalcopyrite and anhydrite minerals. 15 - 20 cm across.	-15.01668	-173.78693	2335.0	4.4	119	2017-12-12	00:14:52	S100	259
S100-sulfide-17	S100-sulfide-17. Grabbed sulfide chimney spirt. It's white coating - pointed on top. 5 cm high - only half the piece is there. 2nd grab. The top piece of sulfide in the center. Nice flow zones. Chalcopyrite. Circular piece 2 cm. Nice little piece of sulfide with sparkly chalcopyrite interior. Into biobox 1. Voodoo Child little sulfide. 15.0167948 173.786947. Z=2340.	-15.01679	-173.78695	2340.0	0.0	108	2017-12-12	01:16:00	S100	338
S100-gas-18	S100-gas-18. Yellow gastight #6. Using both arms to right the sampler in the claw. Large black smoker flow at Voodoo Child. Temp measured at 322decC.	-15.01679	-173.78695	2340.0	1.6	108	2017-12-12	01:42:10	S100	348
S100-fluid-19	S100-fluid-19. Major sampler #2/ Fluid sample in same orifice as gas sample (and sulfide too) Voodoo Child little sulfide chimney. Z=322C. Fired 0203:32. End at 0204:25.	-15.01679	-173.78695	2340.0	1.9	101	2017-12-12	02:02:15	S100	359

sample	Description	latitude	longitude	depth	altitude	heading	date	time	dive	record
S100-bio-20	SS100-bio-20. Suction into canister #6. 3 Opaepele shrimp (including ones covered in black sulfide); Polynoid. Barnacles. At Voodoo Child.	-15.01679	-173.78695	2340.0	2.4	100	2017-12-12	02:12:18	S100	365
S100-sulfide-21	S100-sulfide-21. Large chunk of active sulfide taken from top of Big Smoke 35 cm. Chalcopyrite circular area. From Big Smoke. 15.0167531 S `73.7859689 Z=2330 at seafloor.	-15.01675	-173.78597	2318.0	0.0	343	2017-12-12	02:39:09	S100	382
S100-gas-22	S100-gas-22. GT#2 green fired at 0245:43. Looks like a good sample. Directly in the venting orifice at the top of Big Smoke.	-15.01675	-173.78597	2318.0	6.7	343	2017-12-12	02:46:29	S100	387
S100-fluid-23	S100-fluid-23. Major sampler #1. Fluid sample in the same black smoker hole as gastight; and Chris's sulfide sample. 0254:29	-15.01675	-173.78597	2318.0	7.3	342	2017-12-12	02:55:10	S100	393
S100-bio-24	S100-bio-24. Suction Shrimp (5). Probably mixed in with other bio sample to be figured out later	-15.01675	-173.78597	2317.9	7.2	343	2017-12-12	03:16:17	S100	398
S100-bio-25	S100-bio-25. Scale worms and some sulfur worms from same location/vent as sample 24. Got two snails - Alvinoconcha.	-15.01675	-173.78597	2317.9	7.1	343	2017-12-12	03:23:15	S100	399
S100-sulfide-26	S100-sulfide-26. Large shiny piece of sulfide 10 - 15 cm part of second chimney vent at Big Smoke top. Massive chunk of pyrite. Went into the forward stbd part of gastight container.	-15.01675	-173.78597	2318.0	7.2	342	2017-12-12	03:26:23	S100	402
S100-fluid-27	S100-fluid-27. Aft Niskin in the smoke. We're at 2318 right now. Fired at 2315.6 m at Big Smoke.	-15.01675	-173.78597	2315.4	14.1	90	2017-12-12	03:32:41	S100	405
S100-fluid-28	S100-fluid-28. Forward Niskin fired at 2309 m. In the plume over Big Smoke.	-15.01675	-173.78597	2309.9	19.0	76	2017-12-12	03:33:36	S100	406
S101-rock-01	S101-rock-01. Grab 1: 2 pieces Drained out pillow - piece up upper crust. Black glass under upper sed layer. Lots of big crystals. 3 cm slightly vesicular. Glassy rind. 2nd piece: pillow rind. Very crystal rich. 10 cm x 6 cm across. 1 cm glass rind. Orange/brown staining on underside. Not too vesicular. Into partition 5. Near on bottom site with no biota.	-14.94620	-173.80036	2668.8	0.8	50	2017-12-12	22:20:13	S101	29
S101-rock-02	S101-rock-02. Ornamental toe of pillow just above small slope break where pillow morphology changed. Orange FeO stains on exterior with very fresh interior. Spongy and phyric. 10x15cm toe.	-14.94583	-173.79907	2639.4	1.4	27	2017-12-12	22:36:17	S101	41
S101-sed-03	S101-sed-03. Scoop of volcaniclastic sediment off the top of a pillow. Coarse black seds with some tan fines. Location 14.945588 173.799012 depth 2629m.	-14.94559	-173.79901	2629.1	1.0	59	2017-12-12	22:50:18	S101	46

sample	Description	latitude	longitude	depth	altitude	heading	date	time	dive	record
S101-rock-04	S101-rock-04. Grab of drained pillow crust from the same flow that has a tall coral attached to it. Rock is very frothy and phyric. Fe surface staining. 5x10x10cm with large light pyx. (Nav bad).	-14.94561	-173.79882	2626.0	0.0	38	2017-12-12	22:57:24	S101	49
S101-rock-05	S101-rock-05. Vesicular phyric rock with some Fe and Mn surface staining. Frothy and irregular vesicle shape. Olivine and cpx including in rind. 14.944879 173.798626 depth 2601m.	-14.94501	-173.79875	2601.6	0.0	31	2017-12-12	23:14:43	S101	61
S101-rock-06	S101-rock-06. Sample of a bulbous striated pillow with hollow interior. Super bubbly with drips on the bottom. Fe stains all over and some sediment on top. 35x20cm.	-14.94390	-173.79837	2587.6	0.0	359	2017-12-12	23:41:00	S101	75
S101-sed-07	S101-sed-07. Scoop of sediment from talus slope. Signs of hydrothermal activity (orange patches) with coarser sediment.. Location: 14.943123 173.798675 depth 2550m.	-14.94295	-173.79869	2539.1	2.3	360	2017-12-13	0:09:55	S101	88
S101-rock-08	S101-rock-08. Pillow piece. Top of small pillow. Probably came off of piece directly above it. 1st piece is circular with small vesicles. Some crystals. Very little glass. 3-5 cm - roundish. Gray interior. Large white crystals angular. Green pyroxene(?) crystals. Large vesicles. 15 cm. Thick glassy rind. The white crystals are probably orthopyroxene.	-14.94012	-173.79537	2524.8	1.2	103	2017-12-13	1:19:50	S101	144
S101-sed-09	S101-sed-09. Scoop bag #2. Sed has orangish/yellow coating (hydrothermal). Mottled brown/blackish at surface. Black sparkly seds - volcaniclastic. Navigator fix (bad): Z=2513 m. 15.016742 173.787618.	-14.94049	-173.79395	2512.9	5.5	56	2017-12-13	1:42:06	S101	168
S101-rock-10	S101-rock-10. At the edge of satellite cone summit SE of summit. Long in place pillow lava - outer crust. Nice glass surface. White crystals. Small vesicles. Cow-shaped. 10 cm long 6 cm across. Into biobox 2. Glass rind on 2+ sides.	-14.93953	-173.79347	2464.7	0.8	32	2017-12-13	1:58:11	S101	201
	CORRECTION FOR SAMPLE-9 (Sed-9): 14.9393662 173.7947334.	-14.93958	-173.79307	2463.2	2.2	32	2017-12-13	2:01:23		204
S101-rock-11	S101-rock-11. From slope with in-place pillows. Pillow bud-like piece. - got half of it. Some white staining below the glass. Vesicles and some white crystal. Manganese coating. Grayish interior. 35 cm long. Filled up partition 9. Close to WP9 . Z=2485 m Nav fix: 14.9384109 173.7940416.	-14.93843	-173.79404	2485.7	0.9	353	2017-12-13	2:23:03	S101	235

sample	Description	latitude	longitude	depth	altitude	heading	date	time	dive	record
S101-rock-12	S101-rock-12. Half way between WP10 & 11. Rind of large pillow with cracked collapsed top. Z=2455 m. Wedge of crust. 25 cm long - 7 cm wide. 5 cm high. Black glassy crust. Very vesicular Some white crystals. 14.9382468 173.7965702.	-14.93831	-173.79585	2454.8	2.5	242	2017-12-13	2:40:25	S101	256
S101-rock-13	S101-rock-13. From east side of summit ridge. Drained out; worn out; seen its better days; piece of pillow crust! Gaseous big vesicles. Mostly outer edge or some interior as well. Don't see any glass. 2 pieces: 10x5cm and 8x5cm pieces. SW of waypoint 13.	-14.94015	-173.79818	2362.7	1.7	245	2017-12-13	3:06:20	S101	282
S101-rock-14	S101-rock-14. Grab from more tube-like lava behind the previous pillow sample (rock-13). 5x5 cm piece. glassy pillow rind. ~0.5 m behind rock-13. Z=2363 m. 14.9400886 173.7989411	-14.94020	-173.79833	2357.9	2.2	250	2017-12-13	3:13:49	S101	284
S101-gas-15	S101-gas-15. Sample from 299C smoker vent. Giant Beehive Chimney at summit. 14.9405783 173.7995584 depth 2360m.SW of waypoint 14.	-14.94058	-173.79956	2362.1	6.2	316	2017-12-13	4:01:10	S101	360
S101-fluid-16	S101-fluid-16. Water sample from 299C vent. Location: 14.9405783 173.7995584 depth 2360m.	-14.94058	-173.79956	2362.8	4.6	356	2017-12-13	4:17:01	S101	362
S101-sulfide-17	S101-sulfide-17. Sample of sulfide from the 299C vent. Location: 14.9405783 173.7995584 depth 2360m.	-14.94058	-173.79956	2362.8	4.9	359	2017-12-13	4:20:54	S101	364
S101-bio-18	S101-bio-18. Snail in front basket at same location on Giant Beehive Chimney. Crab and snails. Location: 14.9405783 173.7995584 depth 2360m.	-14.94058	-173.79956	2360.0	8.9	11	2017-12-13	4:31:03	S101	365
S101-sulfide-19	S101-sulfide-19. Scoop of sulfide fragments from 299C vent. Location: 14.9405783 173.7995584 depth 2360m.	-14.94058	-173.79956	2361.8	7.1	354	2017-12-13	4:39:00	S101	366
S101-fluid-20	S101-fluid-20. Niskin of smoky water at ~12m altitude at Giant Beehive.	-14.94058	-173.79956	2354.9	13.7	345	2017-12-13	4:42:19	S101	367
S101-fluid-21	S101-fluid-21. Fore Niskin fired at 2355m depth.	-14.94058	-173.79956	2352.8	19.5	343	2017-12-13	4:42:52	S101	368
S102-rock-01	S102-rock-01. Piece of pillow tube - nub at the end. Sedimented. Glass on a couple sides. Manganese/iron staining. Vesicular. Don't see white minerals. Fresh interior. 30x15cm. Into partition 9. ~70m W of waypoint 1.	-14.94401	-173.80920	2680.8	1.2	117	2017-12-13	19:12:32	S102	27
S102-sed-02	S102-sed-02. Scoop bag number 2. Scoop of volcaniclastic seds/sand from flat-ish seafloor. Very coarse black sand. Clumpy-ish gray seds as well. Z=2689m 14.9435140 173.8078919.	-14.94328	-173.80812	2689.2	0.0	32	2017-12-13	19:27:59	S102	45

sample	Description	latitude	longitude	depth	altitude	heading	date	time	dive	record
S102-rock-03	S102-rock-03. Outer crust of pillow tube near top of local high. Fragile/crumbly. Some vesicles. Small olivine crystals (?). Glass on lower corner? 10x10 cm piece. 1st piece is wedge-shaped and may be mostly interior. Z=2704m. 2nd piece: More exterior glass on this one. Ridges. 10ish cm fragment. Into partition 5.	-14.94314	-173.80792	2704.4	0.8	119	2017-12-13	19:47:57	S102	60
S102-rock-04	S102-rock-04. Intact pillow (not disgorged or collapsed) with a little barnacle and whip coral on top. Bubbly. 1 face glass - thick rind 1cm . Olivine and pyroxene crystals. 6cm longest dimension. Into quad 6. 2nd grab: Pyroxene megacryst - Some glass 5cm across. Vesicular. From pillow at edge of fissure. Z=2689m. 14.9432518 173.8070277	-14.94285	-173.80763	2688.9	0.7	158	2017-12-13	20:20:07	S102	111
S102-rock-05	S102-rock-05. Pillow toe from pillow tube. Huge. Broken face view - not seeing big white crystals. Rounded and elongate 25+ cm Glass all around; vesicular; very close to rock-04 but on different lava unit.	-14.94267	-173.80747	2675.6	5.3	64	2017-12-13	20:42:45	S102	122
S102-rock-06	S102-rock-06. Chunk of pillow lava from an intact flow somewhere on the approach to waypoint 2. Shaped like a slice of Chicago deep dish. 25x15cm; Fe and Mn coats; vesicular. Location 14.9412878 173.8051033 depth 2561m.	-14.94136	-173.80485	2563.6	10.9	56	2017-12-13	21:12:03	S102	160
S102-sed-07	S102-sed-07. Sed scoop. Came across relatively flat spot with a lot of sediment covering some volcanic spatter. Near-vent and in the area of what is interpreted as a small cone on the map. Fines are very sticky on the canvas; probably finer overall grain size distribution.	-14.94132	-173.80419	2577.8	0.4	69	2017-12-13	21:21:13	S102	165
S102-rock-08	S102-rock-08. Piece of jumbly lava; 3x7cm crusty bit with glass rind. Very cloudy water.	-14.94179	-173.80448	2583.5	3.5	130	2017-12-13	21:40:14	S102	177
S102-rock-09	S102-rock-09. Grab of top crust from an inflated pillow on a local high in the vicinity of waypoint 2-3. Glassy face. Pie shaped. Vesicular. Not too many crystals. Olivines and pyroxenes. 15 cm long.	-14.94167	-173.80394	2521.0	1.3	9	2017-12-13	22:00:29	S102	189
S102-rock-10	S102-rock-10. 5x7cm chunk of outer pillow lava crust. Pretty vesicular and some Fe and Mn coating. In place rock with flows having fair amount of sediment. Maybe near waypoint 7.	-14.94141	-173.80214	2464.6	0.0	299	2017-12-13	22:40:31	S102	234

sample	Description	latitude	longitude	depth	altitude	heading	date	time	dive	record
S102-rock-11	S102-rock-12. Piece of intact (at least sort of) pillow lobe. This is a big rock - not huge. Vesicular. Manganese on 1 side. Wedge shaped piece of a pillow. Good glass on a layer at least. Area with sheet-like on one side and lobate pillows to the other. Near waypoint 17. Z=2433m. 15x10 cm. 14.9392458 173.79900867 (bad pos).	-14.93892	-173.80030	2427.7	0.0	129	2017-12-13	23:52:17	S102	288
S102-fluid-12	S102-fluid-12. Major #3 in crack area of 12.3C water. Fired at 0109:12. Done 0110:25. Snanemone Garden: Z=2358 m 14.940412 173.799667.Snanemone Garden Site: large area of diffuse flow.	-14.94041	-173.79967	2357.5	0.9	148	2017-12-14	01:12:43	S102	378
S102-bio-13	S102-bio-13. Scoop bag #4 for biology: 4+ Ifremeria snails (big guys). Placed behind major box. Snanemone Garden.	-14.94041	-173.79967	2357.6	0.9	148	2017-12-14	01:17:41	S102	382
S102-bio-14	S102-bio-14. Suction jar#8. Pretty large pink anemones that were attached to a rock. Got 3 or 4 of them. Snanemone Garden	-14.94041	-173.79967	2357.7	0.8	148	2017-12-14	01:24:11	S102	384
S102-gas-15	S102-gas-15. Gastight #6 - yellow. Fired at 0201:12. Saw the poof when they depressed the ram. 238degC flow gray-smoker orifice. Rock Star is: 173.799375 W 14.940536 S. Z=~2361 at the seafloor. ~25m W of previous samples (?). Samples taken at ~7 m up the chimney at 2354 m. Tmax=238C.	-14.94054	-173.79938	2353.7	7.9	240	2017-12-14	02:01:35	S102	405
S102-fluid-16	S102-fluid-16. Major sampler #2. Same orifice position; etc. as gastight. Fired at 0217:17. Finished at 0218:30. Rock Star.	-14.94054	-173.79938	2353.7	7.8	240	2017-12-14	02:18:41	S102	411
S102-sulfide-17	S102-sulfide-17. Sulfide spire from active beehive. Flow hole in the center. Chalcopyrite? Narrow chimney spire. Taken right next to gas and fluid sampling site. The next spigot over. Placed in biobox 2.	-14.94054	-173.79938	2353.7	7.6	260	2017-12-14	02:24:45	S102	416
S102-bio-18	S102-bio-18. Suction into chamber 1: Huge Ifremeria snails (They are larger than the brachyuran crabs) brachyuran crabs; 1 snail - could be the hairy variety (going in biobox 2). Rock Star facing SW-different heading than previous samples.	-14.94054	-173.79938	2351.2	9.6	261	2017-12-14	02:34:48	S102	421
S102-fluid-19	S102-fluid-19. Major #3. Sampling while hovering over Bodacious Booming Beehive (B3-also from Dive S101 Giant Beehive). Fired. We think it's probably over 300C. (Location was just below Rock Star).	-14.94058	-173.79956	2357.5	11.8	335	2017-12-14	02:57:16	S102	435
S102-gas-20	S102-gas-20. Sample of smoker gases from top of B3.	-14.94058	-173.79956	2358.6	10.3	299	2017-12-14	03:08:54	S102	438

sample	Description	latitude	longitude	depth	altitude	heading	date	time	dive	record
S102-bio-21	S102-bio-21. Suction of 10 shrimp from Shrimp Township at the base of upper beehives at B3.	-14.94058	-173.79956	2360.2	9.0	339	2017-12-14	03:25:12	S102	440
S102-sulfide-22	S102-sulfide-22. Fragment of a rather large chimney sample from B3.	-14.94058	-173.79956	2360.9	5.6	316	2017-12-14	03:32:36	S102	442
S102-fluid-23	S102-fluid-23. Water sample from smoker vent about halfway up the B3 chimney structure. 2362.7m. (Major ????)	-14.94058	-173.79956	2362.2	6.6	323	2017-12-14	03:44:43	S102	443
S102-fluid-24	S102-fluid-24. Sample from the same hydrothermal vent as S102-fluid-23. (Major ??)	-14.94058	-173.79956	2362.3	6.2	325	2017-12-14	03:55:19	S102	444
S102-sulfide-25	S102-sulfide-25. Most of the rest of the whole chimlet we pulled off earlier as S102-sulfide-22 on B3.	-14.94058	-173.79956	2366.1	1.4	346	2017-12-14	04:05:17	S102	445
S103-rock-01	S103-rock-01. New pillow lava crust from landing site at WP1. Fresh shiny glass. Large phenocrysts. Very vesicular. 2016-2017 flow. Z=1596. 2 5x5cm pieces. Into biobox 1. Z=1596. 15.088296 173.737241.	-15.08830	-173.73724	1596.3	0.0	283	2017-12-14	18:31:10	S103	27
S103-sed-02	S103-sed-02. Push core 3. Coarse grained volcaniclastic sed. Nothing pelagic. Black shiny coarse. Tube is ~1/3 full. Same location.	-15.08830	-173.73724	1596.2	1.3	284	2017-12-14	18:35:37	S103	30
S103-bio-03	S103-bio-03. Suction of 2 small white scale worm; orange floc (some white floc too) ; black fresh volcaniclastic sand. The orange mat is really coherent. 15.088127 173.737943 Z=1589. T=4.69 C. (High temp was 4.98degC.) ~20m SE of waypoint 2.	-15.08813	-173.73794	1589.4	0.0	292	2017-12-14	18:59:33	S103	59
S103-rock-04	S103-rock-04. Frothy deposit - areas of glass - jumbled pattern. Grabbing pillow piece. Unstable. Black and glassy where the piece fell. Near-vent deposit from prior eruption. Older Rock. Piece has some orange coating. Nice black glass surface on 2 sides. Crystals some small 10 cm long. Not very vesicular. Z=1577. 15.087994 173.738276. Into partition 5. ~25m NW of waypoint 2.	-15.08794	-173.73830	1577.1	2.2	233	2017-12-14	19:19:51	S103	88
S103-rock-05	S103-rock-05. Piece of young frothy pillow "tongue" exgorged lava. Crystal-rich boninite. Fragile sheet that broke off the disgorged end.1st piece. Glassy. Abundant crystals. 3 cm. Young fresh fragile frothy glass-sampled out of pillow tongue. 2nd piece: Ropey piece of lava just beneath piece 1. Glassy fresh phenocryst rich. 15.0884054 173.7380671	-15.08852	-173.73835	1578.2	4.4	234	2017-12-14	19:40:36	S103	122

sample	Description	latitude	longitude	depth	altitude	heading	date	time	dive	record
S103-sed-06	S103-sed-06. Extremely coarse volcanic sed. Black and shiny. At crest of sand dune. Produced during 2016-2017 eruption. Z=1570. 15.0884115 173.7382234.	-15.08843	-173.73833	1570.2	0.0	234	2017-12-14	20:00:07	S103	140
S103-rock-07	S103-rock-07. Bulbous pillow with disgorged end and twisty-looking toe on top. Grabbing piece near the toe. Fresh crystal-rich glassy. Large crystals. Vesicles. Thick glassy rind (cm's). Grayer material. Circular-ish shape. 20 cm long From next step up from sed-06 site. Placed in partition 8. 15.088600 173.738616. Z=1558m. ~20m E of waypoint 4.	-15.08861	-173.73862	1557.5	2.0	259	2017-12-14	20:10:34	S103	158
S103-sed-08	S103-sed-08. Scoop bag 3. Coarse spattery-like seds / small rock fragments / some yellow floc. More coherent rock as well. From gentle slope. Coarse. Fresh-glassy. Near vent deposit including spatter? 15.0891313 173.7388080. Between waypoint 4 & 5.	-15.08912	-173.73882	1530.5	0.9	209	2017-12-14	20:30:47	S103	182
S103-bio-09	S103-bio-09. Suction chamber 4: 3 Opaepele shrimp; 10+ polynoids. From 3m tall Spatter Mound in a crack-former eruptive vent site. 15.089261 173.738921 Z=1520. Tmax=4.69degC. ~30m N of waypoint 5.	-15.08923	-173.73887	1519.9	2.8	214	2017-12-14	20:59:38	S103	216
S103-fluid-10	S103-fluid-10. Aft Niskin taken from the side of this Spatter Mound (actually ~10m tall). Some location as sample 9.	-15.08923	-173.73887	1517.2	4.8	225	2017-12-14	21:02:28	S103	220
S103-rock-11	S103-rock-11. Crust of fairly large drained pillow tube we found at the sediment/slope contact at waypoint 6. 15x25cm irregular chunk with Some Mn/Fe/S alteration patches. 15.0892060 173.7399760 depth 1515m. Just E of waypoint 6.	-15.08921	-173.73981	1516.3	2.5	225	2017-12-14	21:20:47	S103	233
S103-rock-12	S103-rock-12. Narrow pillow tubes. 10x10cm pie slice of face-melting vesicular and very phyric with thick glass rind. Minimal secondary coating; looks extremely fresh. 15.0198835 173.7399095 depth 1518m. Near waypoint 7.	-15.08988	-173.73990	1518.8	1.0	125	2017-12-14	21:35:35	S103	241
S103-rock-13	S103-rock-13. Piece of jumbly spatter just short of waypoint 8. Phyric and very glassy. Vesicular and fragile. Location 15.0897957 173.7408626 depth 1474m. 15x25cm. (Not sure if new or old flow)	-15.08980	-173.74088	1474.2	1.0	289	2017-12-14	21:52:39	S103	253

sample	Description	latitude	longitude	depth	altitude	heading	date	time	dive	record
S103-sed-14	S103-sed-14. Scoop bag 1. Surficial sediments here near the axis of the east rift zone (just to the north of it). Lighter brown surficial seds with black patches. Z=1458m. Blacker seds under the lighter surface. 15.089246 173.741753. Sampling just the upper surface.(2/3 distance between waypoint 8 & 9)	-15.08919	-173.74172	1457.5	1.9	234	2017-12-14	22:13:49	S103	298
S103-rock-15	S103-rock-15. Pillow lava piece from steep slope - pillow pile. Nice glass surface. 30x15x10 cm. Some staining and large vesicles. Lots of crystals. Spongey pillow interior. ~45m from waypoint 11 to 12.	-15.08809	-173.74369	1502.9	3.2	150	2017-12-14	23:39:40	S103	345
S103-rock-16	S103-rock-16. Drained out pillow. Rind with thick glass rind on 3 sides ~1 cm. . Spongy grayish center. Crystals and vesicles. 15 cm on long axis 10 on short axis. From step/terrace level of this slope section. Just past waypoint 12.	-15.08891	-173.74399	1450.2	1.5	245	2017-12-15	00:00:52	S103	371
S103-rock-17	S103-rock-17. Piece of rind and come interior - pie wedge from large broken pillow. Yellow staining. Lots of crystals. gray interior. Glassy dark part 1 cm thick. 15x20 cm. Some large vesicles. Going into biobox 4. Z=1420 m. 15.0898648 173.7451580 near waypoint 14.	-15.08986	-173.74515	1419.4	0.5	174	2017-12-15	00:30:24	S103	413
S103-rock-18	S103-rock-18. Corner of the pillow rind from large broken pillow. Pie shaped. Thick class. Vesicles - 1cm thick crust. Gray center. 10 cm on narrower and 15 on longer side. Going into biobox 3. Z=1350. 15.0909443 173.7453364 Just before waypoint 15.	-15.09094	-173.74534	1349.4	0.8	165	2017-12-15	00:55:46	S103	439
S103-sed-19	S103-sed-19. Scoop bag 2. In area of lobate lavas with thick seds on the top. Sed color is lighter on top with black fresh volcaniclastic black seds underneath. The lighter seds on top also include hydrothermal mat on the top. Z=1350. 15.0910086 173.7453586. Storing it in the marker box. Near waypoint 15.	-15.09101	-173.74536	1349.2	0.9	162	2017-12-15	01:03:43	S103	446
	Sitting here at the base of a disgorged pillow. Going to grab a sample.	-15.09175	-173.74533	1320.9	1.1	175	2017-12-15	01:24:38		478
S103-rock-20	S103-rock-20. Delicate surface texture on this 2012-2016 lava. 20 long 5 to 10 cm wide. Large vesicles. Glassy rind. No visible crystals. Z=1321. 15.0917580 173.7453297 into partition 10.	-15.09175	-173.74533	1320.9	0.0	175	2017-12-15	01:28:00	S103	479

sample	Description	latitude	longitude	depth	altitude	heading	date	time	dive	record
S103-sed-21	S103-sed-21. New lava flow area (2012-2016) with thick seds that is light and black rippled with some yellow bacterial mat as well. At edge of contact in newer with microbial mats. NE of waypoint 16 (offset with Sentry map?)	-15.09211	-173.74505	1305.6	0.9	174	2017-12-15	01:40:59	S103	500
S103-rock-22	S103-rock-22. Good piece of bubbly vesicular rock Crystals in the rind and smaller crystals in the interior. Large void spaces. Z=1290. 15.0928442 173.7458779 35+ cm long 25 cm wide. Slipped on top of the scoop bags. Between waypoints 17 & 18.	-15.09286	-173.74586	1289.3	0.8	138	2017-12-15	02:14:00	S103	548
S103-bio-23	S103-bio-23. Suction jar 5. Alvinocaris ?(probably not); Opaepele; white scaleworm; pink scaleworm. Z=1289m 15.0931569 173.7457246. Newer lava. ~35m NNW of waypoint 18.	-15.09313	-173.74568	1289.1	1.6	171	2017-12-15	02:30:11	S103	558
S103-rock-24	S103-rock-24. Highest chunk of jumbly spatter from the top of Coneholio (waypoint 19) composed of narrow pillow tubes and spatter. 5x10cm glassy and phyric. Azimuthal vesicles. 15.0932943 173.7464016 depth 1276m.	-15.09332	-173.74634	1274.7	4.4	162	2017-12-15	02:58:07	S103	589
S103-fluid-25	S103-fluid-25. Major sampler #1 from 6C vent (ambient is 0.4degC warmer than previous 2 hours). Location: 15.093796 173.7462064 depth 1267.7m. From diffuse vent at the base of a pillow north of waypoint 20.	-15.09374	-173.74622	1267.7	1.2	37	2017-12-15	03:23:04	S103	602
S103-bio-26	S103-bio-26. Sample of Alvinocaris shrimp (1); Opele (5); and scale worm (1) from 6C vent. Location 15.093796 173.7462064 depth 1267.7m.	-15.09374	-173.74622	1267.7	1.1	33	2017-12-15	03:34:00	S103	603
S104-rock-01	S104-rock-01. Edge piece of flattish shelly pillow. Z=2352. orangish staining on exterior. Black interior - fine vesicles. Bubbly hole - glass on top. Small white crystals. 12 cm. Blocky. In quad 5. From older lavas upslope from landing site at waypoint 1 on satellite cone.	-15.03491	-173.77946	2351.4	0.0	221	2017-12-15	19:12:59	S104	40
S104-sed-02	S104-sed-02. Scoop bag #2. Area with 2-15cm thick seds. The volcaniclastics here are not dark black - quite a bit lighter in color (brown/gray ish). Light colored sand on surface. White circular granules (bio?) mixed with brown grains (very fine). Z=2352. Same location as sample 1. 15.0349054 173.7794550. Z=2355.	-15.03491	-173.77946	2351.9	0.0	226	2017-12-15	19:35:34	S104	49

sample	Description	latitude	longitude	depth	altitude	heading	date	time	dive	record
S104-rock-03	S104-rock-03. Jumbled sheet next to flat pillow lobe. Jumbled morphology. Taken from ropey jumbly spattery lump of lava. Cm-scale wavelength folds. Some glass. 10-15cm. Frothy magma. Into partition 6. 15.0354404 173.7796930. Between waypoint 1 & 2.	-15.03549	-173.77969	2388.7	0.8	3	2017-12-15	19:54:01	S104	70
S104-rock-04	S104-rock-04. Piece of jumbled from top of sheety lava (fluid-looking texture). 15.0361934 173.7812228. Crumbly. Frothy; small vesicles; some glass.~ 4 cmx1cm piece. 2nd grab: Fll flow interior White crystals some vesicles. Very altered. Irregular shape. 10cm in longest dimension. From base of northern slope heading to waypoint 3.	-15.03619	-173.78122	2381.6	1.7	193	2017-12-15	20:34:06	S104	109
S104-rock-05	S105-rock-05. Pillow (elongated) surrounded by thick sandy sediments. Z=2348m. Upper surface with come nice interior. Very vesicular with few crystals (aphyric?) . 10x7 cm. Orange staining on exterior. Location: 15.0365087 173.7829996 depth 2348m	-15.03587	-173.78290	2345.4	1.8	264	2017-12-15	21:10:07	S104	136
S104-rock-06	Slab of pillow crust. Heavily sedimented and drippy underside. Vesicular so that'll stay in it. 15x20cm Location 15.0364462 173.7838021 depth 2309m. Area of sediment and in-place pillows. ~40m NE of waypoint 4.	-15.03629	-173.78394	2309.3	1.1	264	2017-12-15	21:40:10	S104	149
S104-bio-07	Suction of Crangon shrimp. Same location.	-15.03629	-173.78394	2308.8	1.1	266	2017-12-15	21:43:49	S104	150
S104-rock-08	Jumbly frothy looking lava flow poking out of the sediment; crystal poor. vesicular. some glass ~half circular 10 cm. Location: z = 2260; 15.0378676; 173.7852540 Near waypoint 5.	-15.03765	-173.78526	2262.0	4.0	293	2017-12-15	22:11:12	S104	171
S104-sed-09	S104-sed-09. Coarse volcanic gravel sample. Z=2264. Scoop bag #1 Location: 15.0377795 173.7853838. (Same location as rock-08?)	-15.03765	-173.78526	2261.4	2.8	8	2017-12-15	22:22:20	S104	174
S104-rock-10	S104-rock-10. Piece of folded lava pillow. Very bubbly and full of fine sediment. 10x15cm.	-15.03734	-173.78625	2260.2	0.0	297	2017-12-15	22:37:31	S104	179
S104-rock-11	S105-rock-11. Pillow rind from weathered and sedimented pillow. 15 x 10 cm. From broken lava ridge while waiting for ship. 15.0388696. 173.7895640	-15.03811	-173.78889	2222.0	4.1	241	2017-12-15	23:24:08	S104	209
S104-rock-12	S104-rock-12. From large pillow with collapsed top (older in-place lavas). Highly oxidized - lots of secondary sediment filling the vesicles. Z=2238m. Lots of glass. 15x20cm. Manganese/iron coating. Angular. Into gastight box. 15.039232 173.789487	-15.03828	-173.78867	2238.3	0.0	216	2017-12-15	23:34:55	S104	217

sample	Description	latitude	longitude	depth	altitude	heading	date	time	dive	record
S104-sulfide-13	S104-sulfide-13. Sulfide spire top from old chimney. Orange stained interior. Brown exterior. Pointy top. Broke into at least 2 pieces. Into biobox 3. 15.038254 173.798012 (bad pos) Leaning Chimney of Taha (extinct chimney) ~6m tall.	-15.03914	-173.78965	2261.1	1.4	217	2017-12-16	00:06:02	S104	250
S104-bio-14	S104-bio-14. Biota from same old extinct chimney just sampled. Chrysogorgia (pink) with squat lobster. Into biobox 2. Many beautiful corals on this extinct chimney.	-15.03914	-173.78965	2260.3	3.6	281	2017-12-16	00:13:13	S104	251
S104-sulfide-15	S104-sulfide-15. Spire from extinct chimney at "Death Valley". Z=2258m . Leaning sulfide with horizontal banding. Weathered and covered in sediment about 9m tall. Area with a line of extinct chimneys. 15.038254 173.798012	-15.04021	-173.79055	2254.8	3.5	255	2017-12-16	00:28:56	S104	264
S104-rock-16	S104-rock-16. Outer cruse of old cracked pillow. Outer crust of pillow manganese staining. hydroid on top. vesicles. 6x4 cm angular. On slope of constructional mound on western summit crest. (??) 15.041176 173.790786 (bad pos). Z=2240m.	-15.04044	-173.79022	2239.8	2.8	147	2017-12-16	01:09:23	S104	286
S104-rock-17	S104-rock-17. Pillow with weird sediment pattern on top (holes in a geometric pattern). Z=2197. Piece of crust. 7x2 cm. Z=2197. Flat-ish All manganese coated. Thin brittle crust piece. Z=2197 m 15.042003 173.791493. Top of western mound near waypoint 7.	-15.04201	-173.79108	2196.8	0.0	202	2017-12-16	01:33:40	S104	307
S104-rock-18	S104-rock-18. Weathered large bulbous pillow with lots of cracking (in place within rubble) . Glass surface? Some vesicles; banding 15-29 cm long. From slabby crust. Grainy. Behind the major box. From the west base of the summit cone. Z=2247 15.041026 173.789131.	-15.04107	-173.78905	2247.6	0.0	116	2017-12-16	02:15:04	S104	357
S104-rock-19	S104-rock-19. Piece of bulbous cracked crumbly sedimented pillow - knob and plate. Z=2198 m. highly oxidized exposed surface. Large vesicles. Glassy crust. 25x20 cm. 15.040306 173.786507.	-15.04029	-173.78604	2197.6	0.9	23	2017-12-16	02:53:39	S104	394
S104-rock-20	S104-rock-20. 15x15 chunk of pillow rind. Prebroken. Mn-crust with large elongate vesicles on top. Drippy bottom. A couple of hydroids. After heavy sedimented area then into a ravine with busted up pillows and some in-place bubbly pillows. 15.041357 173.7855785 depth 2160m.	-15.04170	-173.78536	2161.4	1.0	211	2017-12-16	03:16:41	S104	407
S104-rock-21	S104-rock-21. Part of the crust of a half-drained pillow tube near waypoint 11. ~7x15cm; breaking into two.	-15.04179	-173.78600	2167.0	2.2	203	2017-12-16	03:32:27	S104	418

sample	Description	latitude	longitude	depth	altitude	heading	date	time	dive	record
S105-rock-01	S105-rock-01. From thick dense dacite flow on the bottom (layered) and small glassy outer crust - flatish surface. Glassy exterior with oxidized coating on interior. Stretched texture on the glass. Interior has a gray look. 7cm long. From a lava flow that's 1.5 m thick. No vesicles or crystals that can be seen. 14.887193 173.946451	**-14.88719**	**-173.94645**	2790.7	4.3	130	2017-12-16	18:21:48	S105	36
S105-rock-02	S105-rock-02. Pillow-like structure with buffalo-hair outer striated rind - very glassy underneath (shiny); obsidian-like. Long angular piece of black glass with a small bit of gray interior. 25cm long - pointy end. From top of small ridge (30-40m high). 14.8879879 173.9444424.	**-14.88799**	**-173.94444**	2794.0	0.8	159	2017-12-16	18:37:18	S105	61
S105-rock-03	S105-rock-03. Piece from pillow with exposed fresh glassy interior and some banding. Different texture glass on interior than exterior for these lavas. Nice 10cm piece of outer layer with buffalo hair. 14.8891448 173.9437913	-14.88914	-173.94379	2793.4	1.0	49	2017-12-16	18:57:44	S105	86
S105-rock-04	S105-rock-04. Same pillow-different piece. Z=2793m. Piece from interior. Some orange staining on 1 side. Massive with conchoidal-like fracture.	-14.88914	-173.94379	2793.1	1.5	47	2017-12-16	19:01:42	S105	87
S105-sed-05	S105-sed-05. Bag #4: Scoop of orangish surface with a bit of crusty layering. Pasty orange coating on the bag. Orange crusty layer; mustard yellowish green layer; Thicker layer of darker material; also some gray coarse volcanic sand. Z=2805. 14.8892748 173.9431381	-14.88927	-173.94314	2805.3	0.7	66	2017-12-16	19:11:00	S105	97
S105-rock-06	S105-rock-06. Piece from the blocky pillow interior. Massive interior. Elongate angular piece. 25cm long. Pillow interior. Z=2797. 14.8896350 173.9433376.	-14.88964	-173.94334	2795.0	0.0	142	2017-12-16	19:29:54	S105	112
S105-sed-07	S105-sed-07. Core #2. Buff-colored sed surface. Harder layers in there. Darker sediments in the bottom are coarser (volcaniclastic ash?) and buff colored seds (pelagic) on top. Sedimented layer at base of slope measured at 20-40cm. Z=2815. 14.8903206 173.9433119.	-14.89032	-173.94331	2814.5	0.0	102	2017-12-16	19:50:28	S105	126
S105-sed-08	S105-sed-08. Scoop #3 of thick layer of coarse pebbles that overlay buff-colored seds. Pebble layer is ~10 cm thick and various sizes. From coarse pebbles on top of the buff layer (at the distal edge of fragmented slope) Z=2815. The buff-colored layer is sticky is somewhat coherent. 14.8913405 173.9436663.	-14.89134	-173.94367	2814.9	0.0	204	2017-12-16	20:01:00	S105	136

sample	Description	latitude	longitude	depth	altitude	heading	date	time	dive	record
S105-sed-09	S105-sed-09. Area with <10cm thick sed. Scoop of sediment lens next to talus contact. Shallow lens with coarse fragments and some pumice clasts. Trying to get a good representation of the size fractions present. Location: 14.8919000 173.9437271 depth 2792m.	-14.89190	-173.94373	2791.7	0.0	176	2017-12-16	20:35:13	S105	155
S105-rock-10	S105-rock-10. From area with lots of dikes. Chunk of dike rock from wall of rock near waypoint 4. Columnar joints and some curved fracture planes. Faceted. 25x20cm. Mn coat and evidence of prior Fe stains. Location: 14.8932083 173.9452427 depth 2707.5m.	-14.89321	-173.94524	2707.5	0.0	184	2017-12-16	21:25:57	S105	182
S105-rock-11	S105-rock-11. Chunk of glassy pillow overlying the dike complex. 10x10cm. Piece has "buffalo head hair" texture where glass rind is intact. Location 14.8961433 173.9452471 depth 2688m.	-14.89614	-173.94525	2687.1	1.8	338	2017-12-16	21:49:21	S105	192
S105-rock-12	S105-rock-12. Swirly outer crust on pillow. Massive flow interior of jumbly sheet-like flow. Black shiny whole coherent fold. 20x15 cm. Into biobox 3. Z=2680. 14.8961066 173.9448542.	-14.89611	-173.94485	2682.3	1.2	207	2017-12-16	22:01:45	S105	200
S105-rock-13	S105-rock-13. Pillow crust from flat region along approach to waypoint 5. Fresh glassy with some Fe stains and radial banding. Pillows here are slightly squat with buffalo head hair glass texture. Location 14.8963248 173.9444023 depth 2678m.	-14.89632	-173.94440	2677.7	0.6	80	2017-12-16	22:43:10	S105	216
S105-bio-14	S105-bio-14. Chrysogorgia (tentative ID; looks odd; "Puff Daddy") sample with a squat lobster in the center. Location 14.8983133 173.9422745 depth 2682m.	-14.89831	-173.94227	2678.8	4.2	139	2017-12-16	23:12:46	S105	228
S105-rock-15	S105-rock-15. Chunk of pillow crust with perfect buffalo head hair glass rind. Area with higher sediment load in water and on pillows. Location 14.8993756 173.9415846 depth 2676m.	-14.89938	-173.94158	2676.3	1.0	135	2017-12-16	23:30:03	S105	235
S105-sed-16	S105-sed-16. Scoop of very fine sediment sitting atop pillows at rock-15 location.	-14.89938	-173.94158	2675.6	2.1	146	2017-12-16	23:37:04	S105	236
S105-rock-17	S105-rock-17. Chunk of rock with thicker ropy texture on flat top - somewhere west of waypoint 6. Location 14.9006223 173.9393462 depth 2706m.	-14.90062	-173.93935	2705.7	0.6	64	2017-12-16	23:59:10	S105	245
S105-rock-18	S105-rock-18. Christmas gift from the ROV pilots. "Dirtbag" 10x15cm with orange sediment coating on bottom. 14.9006223 173.9393462 depth 2706m.	-14.90062	-173.93935	2702.5	3.5	7	2017-12-17	00:08:16	S105	246

6.6 SuBastian Dive Logs

S085 W Mata

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S085 W Mata Logger Comments	Record #
2017-11-26	18:56:13	-15.09915	-173.75354	***1440.5***	0.0	22.5	Switching to USBL position.	13
2017-11-26	18:58:24	-15.09890	-173.75350	***1473.8***	6.0	20.6	Bottom in sight at 185825	14
2017-11-26	18:58:37	-15.09892	-173.75353	***1473.7***	7.1	18.2	Outcrop and whip coral.	15
2017-11-26	18:58:52	-15.09894	-173.75354	***1475.0***	7.0	19.2	Hovering and setting up to the SW of the summit on the SW rift zone.	16
2017-11-26	18:59:21	-15.09876	-173.75338	***1475.3***	3.2	19.0	Will be making out way up the west rift zone to the summit.	17
2017-11-26	18:59:40	-15.09876	-173.75337	***1473.8***	4.0	19.4	Soft corals on the rocks and the white dots are probably sponges.	18
2017-11-26	19:00:12	-15.09872	-173.75334	***1472.7***	4.8	19.2	Anthomastus corals - red corals. Seeing possible stalked anemone. White small guys are probably sponges.	19
2017-11-26	19:00:58	-15.09858	-173.75327	***1473.2***	3.8	19.3	Whip corals on this Volcaniclastic sedimented area with pillows to the left.	20
2017-11-26	19:01:45	-15.09852	-173.75326	***1473.5***	2.8	25.7	Microbial mat on large pillow that may have rolled down slope.	21
2017-11-26	19:02:10	-15.09850	-173.75327	***1473.0***	3.7	24.0	Yellow guy is another type of anemone. When zoomed in saw hydroid.	22
2017-11-26	19:02:36	-15.09849	-173.75328	***1472.9***	3.8	25.3	Old pillow lava ahead and debris that has fallen downslope.	23
2017-11-26	19:03:24	-15.09850	-173.75330	***1473.5***	4.8	24.5	Young pillow debris on top of the older pillow. Possible microbial mat in the crevices.	24
2017-11-26	19:04:02	-15.09850	-173.75328	***1474.4***	3.6	33.5	Anthymathus (sp?) and anemones. Whip corals.	25
2017-11-26	19:04:53	-15.09848	-173.75328	***1474.7***	3.0	33.5	We're setting up.	26
2017-11-26	19:05:22	-15.09848	-173.75329	***1473.2***	2.8	33.5	Altered pillow lavas here. Older because are colonized by corals and other biota.	27
2017-11-26	19:05:48	-15.09848	-173.75329	***1473.4***	4.3	33.5	Darker; smaller pillow lavas above large pillows are younger. Probably broken off from up above.	28
2017-11-26	19:06:20	-15.09847	-173.75330	***1473.8***	2.8	33.6	Corals take some time to colonize pillow surfaces so we know they have been here for some time.	29
2017-11-26	19:07:39	-15.09844	-173.75335	***1472.5***	4.0	29.6	Zooming in the broken smaller pillows. White dots. Not sure what they are?	30
2017-11-26	19:08:40	-15.09841	-173.75337	***1471.8***	4.6	28.5	Looking at the interior of a pillow rind.	31
2017-11-26	19:09:05	-15.09841	-173.75337	***1471.6***	4.4	27.8	Not sure what the white specks are. Can see pyroxene minerals in pillow.	32

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S085 W Mata Logger Comments	Record #
2017-11-26	19:09:32	-15.09840	-173.75337	***1470.4***	4.8	29.8	Crinoid on pillow.	33
2017-11-26	19:10:36	-15.09839	-173.75337	***1472.5***	4.8	29.1	The dots on the pillows may be sulfur. Some orange staining on the pillows. Microbial mat.	34
2017-11-26	19:11:05	-15.09838	-173.75338	***1469.5***	0.0	29.6	Heading upslope. Pillows intact and look quite young.	35
2017-11-26	19:11:28	-15.09838	-173.75338	***1468.2***	5.5	30.2	Contact here. Younger broken pillows and fragments with orange microbial mat.	36
2017-11-26	19:11:59	-15.09835	-173.75337	***1466.3***	6.6	29.9	Stalked sponges (lollypop).	37
2017-11-26	19:12:23	-15.09834	-173.75335	***1464.2***	7.3	29.8	Moving upslope. Area where the seabed has changed.	38
2017-11-26	19:12:49	-15.09833	-173.75334	***1460.8***	7.7	29.9	Hard to tell what the yellow staining is. Hydrothermal deposit? Sulfur? Microbial staining according to Ken.	39
2017-11-26	19:13:31	-15.09831	-173.75332	***1456.3***	9.2	29.9	Coming up on area with lots of staining.	40
2017-11-26	19:13:53	-15.09830	-173.75332	***1455.8***	13.9	29.1	Pillows are about 1 meter in diameter.	41
2017-11-26	19:14:11	-15.09828	-173.75331	***1455.3***	9.4	29.7	Stalked crinoid. Bright yellow.	42
2017-11-26	19:14:32	-15.09828	-173.75331	***1455.5***	13.7	30.0	These rocks are in place. Ken wants a sample - the perfect sample.	43
2017-11-26	19:15:17	-15.09828	-173.75329	***1453.5***	13.2	29.3	Lasers on.	44
2017-11-26	19:15:39	-15.09826	-173.75329	***1451.5***	0.0	30.1	These pillows have a coating of pyroclastic sediment (thicker than previous downslope pillows).	45
2017-11-26	19:16:37	-15.09824	-173.75329	***1448.3***	0.0	29.6	Fish hanging out in the pillow hollow. Not much else growing on these pillows. Younger surface.	46
2017-11-26	19:17:03	-15.09823	-173.75327	***1446.0***	0.0	30.3	See the occasional hydroid here. This lave formed in the last 5 - 10 years.	47
2017-11-26	19:17:32	-15.09822	-173.75328	***1444.5***	3.5	27.0	Looks like a contact ahead?? Maybe not	48
2017-11-26	19:18:41	-15.09820	-173.75323	***1442.3***	5.2	31.3	We're in young lava now. Uneven migrating contact. It's relatively thin.	49
2017-11-26	19:19:53	-15.09816	-173.75326	***1442.2***	3.8	41.6	Contemplating which pillow ring to sample.	50
2017-11-26	19:21:09	-15.09816	-173.75324	***1442.3***	2.2	38.3	Extruded pillow lava with glassy crust. Boninite pillows. Going to try to grab a piece.	51
2017-11-26	19:24:10	-15.09816	-173.75323	***1443.5***	1.1	39.6	Going to attempt to sample this pillow rind at 15d 5.8902' 173d 45.19438' Z=1456m	52
2017-11-26	19:26:09	-15.09816	-173.75324	***1443.5***	1.1	40.1	Attempting grab of this pillow ring.	53
2017-11-26	19:26:23	-15.09816	-173.75324	***1443.5***	1.1	41.1	Covered in Volcaniclastic sediments (dust). We're just upslope of waypoint 1.	54

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S085 W Mata Logger Comments	Record #
2017-11-26	19:27:35	-15.09815	-173.75324	***1443.5***	1.1	40.5	**Sample S85-Rock-01**. Glassy rind of pillow. ~5cm thick. Can see pyroxene crystals. Going in the biobox.	55
2017-11-26	19:28:48	-15.09816	-173.75323	***1443.5***	1.0	40.3	S85-Rock-01 cont. Going in the biobox. Going in the far left front of the biobox. partition 1.	56
2017-11-26	19:30:15	-15.09816	-173.75323	***1443.5***	1.0	39.6	Sample S85-rock-01 Z=~1457.	57
2017-11-26	19:31:34	-15.09816	-173.75324	***1443.5***	1.0	39.2	We will add to this sample with another grab. S85-rock-01 cont. Grabbing piece of large pillow lava (very circular). This part will be the glassy rind.	58
2017-11-26	19:33:06	-15.09816	-173.75324	***1443.5***	0.9	39.0	Sample 1 cont. Previous piece was disgorged (as the pillow was formed and cooled a crack formed and the lava "disgorged". This piece we're collecting now is the glassy rind.	59
2017-11-26	19:34:39	-15.09815	-173.75323	***1443.5***	1.9	40.3	This sample has 2 pieces - it's the same lava. Going into the same compartment in the biobox.	60
2017-11-26	19:35:24	-15.09815	-173.75324	***1443.6***	1.9	36.8	Sample 1 cont. Boninite lava rind (second rock in sample 1).	61
2017-11-26	19:36:07	-15.09814	-173.75324	***1443.1***	2.5	38.7	Sample (part 2) in the biobox. About 10 cm long by 5 cm thick. Mostly glass. Finished sampling.	62
2017-11-26	19:37:47	-15.09814	-173.75325	***1440.0***	5.7	39.8	Looking over the area.	63
2017-11-26	19:38:09	-15.09813	-173.75323	***1438.9***	4.9	39.9	Working our way up the slope. Still in the young lava area.	64
2017-11-26	19:38:31	-15.09810	-173.75321	***1439.2***	5.1	24.9	Fish - rattail (grenadier) looming over the long pillow lavas.	65
2017-11-26	19:39:23	-15.09807	-173.75318	***1437.6***	4.1	24.9	White microbial mat in the cracks of this broken-up pillow area.	66
2017-11-26	19:40:11	-15.09806	-173.75316	***1436.7***	4.0	23.0	Two small stalk sponges.	67
2017-11-26	19:41:25	-15.09799	-173.75312	***1436.1***	2.6	24.3	Small pillow lava fragments, probably younger than the ones covered with sediment.	68
2017-11-26	19:42:20	-15.09795	-173.75309	***1432.4***	6.8	30.3	More pillow fragments here with nice glass rinds and some minor brown to white staining.	69
2017-11-26	19:43:31	-15.09789	-173.75306	***1427.2***	5.2	31.0	Coming up slope of talus, that is volcanic debris rolling down the flanks of volcanoes.	70
2017-11-26	19:44:30	-15.09782	-173.75302	***1421.0***	5.1	30.2	Talus forms via shaking and breaking of rock often related to activity; little sediment coverage.	71
2017-11-26	19:45:27	-15.09775	-173.75297	***1416.2***	5.0	29.8	Fragmental debris with the base of the lava flow.	72
2017-11-26	19:45:51	-15.09773	-173.75295	***1413.3***	4.6	27.9	Now we are back into pillows which is the base of the lava flow.	73
2017-11-26	19:46:23	-15.09772	-173.75295	***1411.5***	6.4	28.5	At the top of the screen we see a shrimp.	74

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S085 W Mata Logger Comments	Record #
2017-11-26	19:46:59	-15.09772	-173.75295	***1408.9***	9.1	28.1	Decapitated pillows - which created the talus that we saw farther downslope.	75
2017-11-26	19:47:40	-15.09772	-173.75294	***1404.8***	11.0	29.7	Slightly larger pillow lavas now. Bulbous pillow on top of more elongated pillows.	76
2017-11-26	19:48:10	-15.09770	-173.75293	***1402.6***	14.1	28.7	Moving upslope.	77
2017-11-26	19:48:38	-15.09770	-173.75291	***1400.8***	14.0	30.0	Elongated pillow tubes. At the top of the steps are more bulbous lavas.	78
2017-11-26	19:49:11	-15.09766	-173.75289	***1398.7***	5.3	26.0	Here the steep slopes help promote pillow formation. Larger bulbous lavas on the top of the steps. Elongated tubes are on the slopes.	79
2017-11-26	19:50:36	-15.09752	-173.75285	***1393.1***	6.2	15.7	We're going to start looking around for another sample.	80
2017-11-26	19:50:59	-15.09749	-173.75284	***1391.9***	6.7	16.8	We're in the vicinity of WP2.	81
2017-11-26	19:51:43	-15.09748	-173.75285	***1390.7***	8.4	16.4	Ken is nosing around for the perfect sample.	82
2017-11-26	19:52:10	-15.09747	-173.75284	***1389.0***	7.5	19.5	Snooping around.	83
2017-11-26	19:52:58	-15.09744	-173.75283	***1386.5***	6.5	19.3	Coming upslope in young pillow lavas looking for a way to sample. Lobates with radial cracks.	84
2017-11-26	19:53:54	-15.09741	-173.75282	***1384.2***	3.9	20.1	These pillows alternated in their extrusion times; grow; expand; stall out at different times (during the eruption phase)	85
2017-11-26	19:55:18	-15.09742	-173.75282	***1385.3***	7.9	52.7	May go for this one ahead?	86
2017-11-26	19:58:19	-15.09736	-173.75281	***1384.5***	2.9	40.3	Ken thinks this rock fell from the pillow piece right above it. Hoping he will get more than just the glassy rind.	87
2017-11-26	19:59:28	-15.09737	-173.75282	***1385.5***	2.0	42.9	**S85-rock-02**. Piece of pillow off rock above it. ~25cm. The piece is glassy and fragile. Looks like lava drips on top.	88
2017-11-26	20:01:30	-15.09737	-173.75282	***1385.5***	2.4	43.7	S85-rock-02. ~20 cm long x 10 wide cm x 10 cm thick. All glassy rind with lava drips. Disgorged pillow lava piece.	89
2017-11-26	20:02:36	-15.09737	-173.75282	***1385.5***	0.0	42.9	S85-rock-02 cont. Deciding where to put this pretty piece of lava with lava drips.	90
2017-11-26	20:04:51	-15.09738	-173.75282	***1385.5***	2.2	42.8	Sample going into center basket (rock box) segment 1. Sample safely in place.	91
2017-11-26	20:05:59	-15.09738	-173.75281	***1385.5***	2.3	43.0	S85-rock-02 15d 5.8450' 173d 45.1705 Z=1399m.	92
2017-11-26	20:06:42	-15.09737	-173.75281	***1383.1***	4.3	43.8	Moving upslope again.	93
2017-11-26	20:07:14	-15.09736	-173.75278	***1381.5***	2.8	36.1	More pillow lavas.	94
2017-11-26	20:08:46	-15.09735	-173.75269	***1380.0***	3.9	56.4	Lasers back on. T he rock jockey. All rock all the time. Diving on West Mata volcano.	95

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S085 W Mata Logger Comments	Record #
2017-11-26	20:09:40	-15.09730	-173.75252	***1380.2***	3.7	64.8	Heading from WP 2 to WP 3.	96
2017-11-26	20:10:15	-15.09728	-173.75243	***1381.4***	3.3	65.6	Seeing more of the red anthomastus (sp?) corals.	97
2017-11-26	20:11:39	-15.09718	-173.75228	***1378.4***	4.4	56.2	These lavas are not as young. Seeing sediment dusting on top. Some stringy organic stuff living on top of it.	98
2017-11-26	20:12:14	-15.09717	-173.75227	***1375.7***	0.0	55.9	Seeing more marine snow in the water column now.	99
2017-11-26	20:14:20	-15.09716	-173.75222	***1373.7***	4.7	37.2	Searching around for a sample of this older lava.	100
2017-11-26	20:15:32	-15.09716	-173.75222	***1374.8***	1.7	36.8	Odd-looking coating on the pillow. Seeing lollypop sponges.	101
2017-11-26	20:16:10	-15.09715	-173.75222	***1374.8***	2.4	36.2	Orangish-brownish tones on these lavas (altered) older rocks.	102
2017-11-26	20:16:49	-15.09716	-173.75222	***1374.8***	2.6	36.5	**S85-rock-03**. Grabbed a piece of this altered rock. 25cm long 10cm wide by 1cm thick glass rind. Pillow rind.	103
2017-11-26	20:18:27	-15.09714	-173.75220	***1374.8***	1.7	36.2	S85-rock-03 cont. 15d 5.8323' 173d 45.1340 Z=1389.	104
2017-11-26	20:19:35	-15.09715	-173.75221	***1374.7***	2.5	30.8	S85-rock-03 cont. Huge rock with lots of orangish alteration.	105
2017-11-26	20:20:32	-15.09715	-173.75222	***1374.6***	2.2	26.7	S85-rock-03 cont. Re-estimating the size of the rock to 40cm x 20cm (says Terry).	106
2017-11-26	20:22:06	-15.09711	-173.75228	***1374.7***	2.8	26.6	S85-rock-03 cont. Pu in rock box 5 to stbd. Took up entire box.	107
2017-11-26	20:24:15	-15.09713	-173.75222	***1371.0***	4.0	23.3	Still in this area of older lavas.	108
2017-11-26	20:25:44	-15.09712	-173.75216	***1370.1***	0.0	65.5	Lollipop (stalked) sponges on the rocks.	109
2017-11-26	20:26:09	-15.09712	-173.75214	***1369.0***	2.7	66.0	Background water data from CTD: temp=3.01 Oxygen=185.	110
2017-11-26	20:27:35	-15.09709	-173.75210	***1368.6***	1.8	67.2	Stalked (lollipop) coral on this older rock.	111
2017-11-26	20:28:12	-15.09709	-173.75211	***1368.3***	2.6	67.1	Spicules are the glass spines that sometimes stick out of the corals.	112
2017-11-26	20:28:36	-15.09708	-173.75210	***1367.8***	1.7	76.8	Possible stalked crinoid. Porifera (sponges)/	113
2017-11-26	20:29:16	-15.09709	-173.75207	***1368.0***	1.0	76.6	The landscape has changed a bit. Depression now after coming over these pillow lavas.	114
2017-11-26	20:29:48	-15.09707	-173.75202	***1368.7***	1.9	75.4	Now heading up slope.	115
2017-11-26	20:30:27	-15.09705	-173.75194	***1368.3***	2.3	76.0	Beautiful depression here with Volcaniclastic seds.	116
2017-11-26	20:30:54	-15.09707	-173.75193	***1368.1***	3.5	70.3	Saw a scaleworm swimming.	117
2017-11-26	20:31:20	-15.09704	-173.75189	***1369.4***	2.3	72.6	Really flat pillows - sort of transitional to lobates.	118
2017-11-26	20:31:51	-15.09702	-173.75184	***1368.4***	1.3	69.9	Sedimented area between these large pillow/lobate flows.	119

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S085 W Mata Logger Comments	Record #
2017-11-26	20:32:33	-15.09700	-173.75186	***1366.0***	2.9	70.1	These lavas are draped with volcanic ash.	120
2017-11-26	20:32:56	-15.09700	-173.75185	***1366.2***	3.7	67.9	Seafloor is more lobate-like - with sediments between the lobes.	121
2017-11-26	20:33:51	-15.09695	-173.75183	***1367.8***	2.0	81.6	Going to attempt a sediment scoop next.	122
2017-11-26	20:34:25	-15.09694	-173.75180	***1368.1***	0.0	101.6	Will attempt a "push core" into the sediment here.	123
2017-11-26	20:34:56	-15.09693	-173.75180	***1368.5***	0.7	118.2	Will wait to log this as a sample because push cores are hard to get.	124
2017-11-26	20:36:58	-15.09694	-173.75180	***1368.6***	0.0	113.2	Attempt **S85-Sed-04** with a push core. Using core tube #4.	125
2017-11-26	20:37:44	-15.09694	-173.75179	***1368.6***	0.0	112.9	S85-Sed-04 cont. Push core going into the sediment. Looks pretty coarse. Dumping out. Will try again.	126
2017-11-26	20:39:22	-15.09692	-173.75179	***1368.6***	0.4	113.0	S85-Sed-04 cont. Second attempt. 15d 5.8172 173d 45.1063' Z=1382m. Still don't have the sample.	127
2017-11-26	20:41:21	-15.09692	-173.75180	***1368.6***	0.0	120.0	We've stirred up the sediments here. Bad visibility.	128
2017-11-26	20:42:39	-15.09691	-173.75181	***1368.7***	0.0	135.0	S85-Sed-04 cont. Going for a second attempt. Black particles are glass. The lighter brownish material is much finer.	129
2017-11-26	20:43:52	-15.09691	-173.75178	***1368.7***	0.0	136.8	S85-Sed-04 cont. That core looks great. About 3/4 full. Coarse volcanic sand. Lost most of that. Will go for a second push.	130
2017-11-26	20:44:57	-15.09691	-173.75178	***1368.7***	0.0	136.4	S85-Sed-04 cont. Another attempt. Less than the last time. Didn't get it.	131
2017-11-26	20:46:40	-15.09688	-173.75180	***1368.7***	0.0	133.7	S85-Sed-04 cont. Part of it went in the tube. Not sure how much ended up in the tube.	132
2017-11-26	20:49:33	-15.09692	-173.75181	***1368.8***	0.0	130.2	S85-Sed-04 cont. Now going to just scoop it up into the core and then dump into the core holder (quiver).	133
2017-11-26	20:51:34	-15.09701	-173.75186	***1368.7***	0.0	130.4	Pushing the core down now. Used the core as a scoop. 3 different collections and sampling attempts.	134
2017-11-26	20:53:04	-15.09703	-173.75175	***1368.8***	0.0	130.3	Push cores are going to a Dave Clague protégé at San Jose State.	135
2017-11-26	20:54:55	-15.09689	-173.75182	***1368.8***	0.0	130.4	Continuing upslope. Will head to the next waypoint.	136
2017-11-26	20:56:22	-15.09691	-173.75180	***1367.5***	3.0	103.2	Heading to the next waypoint. NE toward WP 4.	137
2017-11-26	20:57:17	-15.09692	-173.75171	***1358.3***	7.2	47.8	Moving up slope again. Looking at pillows- some truncated.	138

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S085 W Mata Logger Comments	Record #
2017-11-26	20:57:52	-15.09687	-173.75167	***1353.7***	6.7	47.4	The lavas we're looking at are probably 1 - 2 decades old.	139
2017-11-26	20:58:09	-15.09684	-173.75164	***1353.3***	3.7	48.2	staining on the pillows.	140
2017-11-26	20:58:27	-15.09680	-173.75162	***1351.8***	2.4	49.9	A little more orange staining - approaching another top of the step.	141
2017-11-26	20:59:09	-15.09677	-173.75154	***1350.3***	1.5	59.7	More yellow chunks of microbial mat or sulfur?	142
2017-11-26	20:59:28	-15.09676	-173.75152	***1349.4***	1.6	60.9	Looks like a volcanicalstic drape of sand.	143
2017-11-26	20:59:47	-15.09675	-173.75150	***1349.2***	2.5	68.7	Lobate lava with skylight.	144
2017-11-26	21:00:05	-15.09674	-173.75147	***1349.5***	2.0	79.4	Little circular sections of mat. Odd-looking yellow mat. Zoomed in. It's orange and granular.	145
2017-11-26	21:01:42	-15.09671	-173.75141	***1350.3***	0.3	81.8	Looking at granular orange deposits on the seafloor. Probably organic substrate. Probably a microbial deposit.	146
2017-11-26	21:02:31	-15.09672	-173.75141	***1350.4***	0.3	81.8	Going to pull out the temperature probe and give it a try in this area of orange mat.	147
2017-11-26	21:04:23	-15.09673	-173.75142	***1350.4***	0.0	81.9	Deployment of the temperature probe.	148
2017-11-26	21:05:05	-15.09671	-173.75142	***1350.4***	0.0	81.9	Stick the probe into sediment; ambient T = 1.5 C; T change up to 2.0 C total; not much temperature increase.	149
2017-11-26	21:06:50	-15.09672	-173.75143	***1350.4***	0.0	81.9	Stowing the probe now and move on up slope.	150
2017-11-26	21:08:11	-15.09670	-173.75141	***1348.5***	2.4	81.8	Many microbial mats on top of volcanic sediment; solid glassy rock sticks out.	151
2017-11-26	21:09:13	-15.09670	-173.75126	***1349.0***	2.3	79.6	Several larger microbial mats on top of sediment drape.	152
2017-11-26	21:09:52	-15.09667	-173.75117	***1349.8***	3.0	74.5	Coming out of the sandy to patch into region with pillow fragments.	153
2017-11-26	21:10:38	-15.09666	-173.75109	***1349.1***	3.4	44.1	Deposition of the fragments seems younger than the sediments; (overlies sediments).	154
2017-11-26	21:11:58	-15.09649	-173.75107	***1345.6***	2.4	36.2	Several fragments; hard to identify; maybe plastic trash?	155
2017-11-26	21:13:09	-15.09648	-173.75106	***1343.0***	2.1	46.7	Just passed through way point 4; 15 m to the north; cruising towards way point 5.	156
2017-11-26	21:13:55	-15.09643	-173.75100	***1335.6***	3.6	40.0	Back into the volcanic sand; little bit of rock debris and yellowish staining/microbial mats.	157
2017-11-26	21:15:02	-15.09628	-173.75088	***1326.0***	4.1	30.3	Lots of thick orange staining in this area. Some orange granular deposits.	158
2017-11-26	21:15:25	-15.09626	-173.75087	***1322.0***	5.2	29.5	Mats are more extensive here.	159
2017-11-26	21:15:44	-15.09621	-173.75085	***1316.3***	6.6	33.7	Moving up the steeper slope here. A little bit of white material near some of the orifices.	160

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2017-11-26	21:16:27	-15.09618	-173.75076	***1309.9***	8.2	26.4	Pillow lave covered with orange deposit. This extensive of deposits has a microbial component.	161
2017-11-26	21:17:04	-15.09616	-173.75074	***1302.6***	16.6	27.3	Volcanic sand over the top of the microbial mat.	162
2017-11-26	21:17:22	-15.09614	-173.75073	***1303.4***	17.6	25.5	ROV dive @-85. Moving up this slope to the top of another step.	163
2017-11-26	21:18:20	-15.09608	-173.75071	***1293.2***	14.5	26.2	The nav shows us coming to the top of a step. Bright orange deposits (mat) around this area.	164
2017-11-26	21:18:54	-15.09600	-173.75069	***1289.0***	5.2	20.7	Black volcanic sand draping over the rock. Ripples and bright orange/yellow mat.	165
2017-11-26	21:19:22	-15.09593	-173.75066	***1286.1***	3.2	32.9	Oxidized iron (?) mat.	166
2017-11-26	21:19:45	-15.09592	-173.75066	***1286.0***	4.8	36.8	We are coming up on Mat Meadow. Actually too deep yet. Mat Meadow is about 1280m.	167
2017-11-26	21:20:48	-15.09583	-173.75056	***1281.4***	3.5	43.5	Seeing lots of mat here on this flatter plain.	168
2017-11-26	21:21:54	-15.09572	-173.75051	***1279.0***	0.5	40.5	Don't see many pillows poking out. Thick mat/sediment coating over the lavas in this area.	169
2017-11-26	21:22:28	-15.09565	-173.75045	***1279.4***	2.2	43.4	Not seeing much biota.	170
2017-11-26	21:22:38	-15.09564	-173.75042	***1278.9***	2.6	55.8	This mat looks less orange??	171
2017-11-26	21:23:01	-15.09561	-173.75042	***1277.7***	2.0	7.9	We're looking at a fissure. Will head upslope from here.	172
2017-11-26	21:24:37	-15.09552	-173.75045	***1276.7***	3.9	67.3	We're moving up this "fissure" in this area of lobate flows.	173
2017-11-26	21:24:59	-15.09552	-173.75041	***1275.1***	4.1	60.4	Lobate lavas can be disrupted.	174
2017-11-26	21:26:05	-15.09544	-173.75029	***1268.7***	5.0	51.6	The lavas under this mat are dark black.	175
2017-11-26	21:26:22	-15.09542	-173.75031	***1269.0***	4.7	54.6	Looking at a slope with rock debris; black volcanic sand.	176
2017-11-26	21:27:30	-15.09543	-173.75028	***1269.1***	0.0	151.7	We were probably at Luo when Ken thought we were. ***It was 10 m too deep, so either have depth offset.***	177
2017-11-26	21:28:11	-15.09548	-173.75031	***1268.6***	9.6	106.6	Jason depths were 10 m shallower than the Subastian depths.	178
2017-11-26	21:29:50	-15.09548	-173.75031	***1268.7***	8.3	106.2	Contours are wrong on the geotiff. They are contours for the Sentry data before it was shifted 20 m to the north.	179
2017-11-26	21:32:23	-15.09546	-173.75019	***1264.4***	3.1	70.1	Not sure of the difference between Jason depths and Subastian depths - there was no marker placed so not sure if we were in the exact same spot.	180
2017-11-26	21:33:28	-15.09545	-173.75002	***1255.4***	3.3	84.5	Looking at a couple of crabs here.	181
2017-11-26	21:35:01	-15.09548	-173.74989	***1252.6***	5.1	69.3	Traversing along the slope edge.	182

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S085 W Mata Logger Comments	Record #
2017-11-26	21:35:36	-15.09550	-173.74982	***1252.0***	6.5	57.8	Really brecciated broken up lavas.	183
2017-11-26	21:37:19	-15.09546	-173.74965	***1241.2***	8.0	15.8	Going to move to the top of this mound.	184
2017-11-26	21:38:38	-15.09546	-173.74964	***1236.6***	0.0	9.1	We want to get up on top of the high ground and look around for a rock sample.	185
2017-11-26	21:39:18	-15.09544	-173.74961	***1234.0***	0.0	354.1	Lots of shrimp in this area.	186
2017-11-26	21:39:58	-15.09540	-173.74954	***1234.3***	0.0	355.1	Some of these shrimp are pregnant.	187
2017-11-26	21:40:28	-15.09540	-173.74948	***1234.0***	0.0	353.7	Fair number of shrimp here.	188
2017-11-26	21:40:57	-15.09539	-173.74941	***1233.7***	0.0	357.0	Shrimp and vent fish here.	189
2017-11-26	21:41:16	-15.09538	-173.74936	***1234.1***	0.0	354.1	Zooming in on the shrimp. Looks 2 species of shrimp.	190
2017-11-26	21:42:26	-15.09530	-173.74915	***1229.9***	0.0	13.7	Super unstable rocky slope.	191
2017-11-26	21:42:54	-15.09531	-173.74965	***1231.4***	2.6	32.8	The crabs we saw were closer to a spider crab than a vent crab.	192
2017-11-26	21:43:31	-15.09529	-173.74965	***1231.6***	0.0	36.0	We're at the top of the pinnacle at the edge of the Hades pit. We're at the SW edge of the pit.	193
2017-11-26	21:44:20	-15.09529	-173.74966	***1231.6***	0.0	34.0	S85-rock-05. Didn't take the first rock. Z=1242m.	194
2017-11-26	21:46:14	-15.09523	-173.74983	***1231.6***	0.0	34.7	**S85-rock-05**. 15 cm pillow fragment with glassy rind and orange staining. Very vesicular.	195
2017-11-26	21:47:24	-15.09510	-173.74985	***1231.6***	0.0	35.1	S85-rock-05 cont. Dropping it into center rock box partition 2.	196
2017-11-26	21:48:29	-15.09497	-173.74989	***1231.6***	0.0	35.0	S85-rock-05 cont Another piece of boninite. SW rim of Hades pit. ~ 10 m to WP-7. 15d 5.7113 173d 44.9836.	197
2017-11-26	21:49:49	-15.09509	-173.74986	***1230.1***	2.6	37.3	Looks like we are over the top of the pit now.	198
2017-11-26	21:51:14	-15.09499	-173.74972	***1238.6***	7.9	35.6	Just seeing blue water now. Trying to position ourselves to see the face of the pit.	199
2017-11-26	21:52:03	-15.09501	-173.74976	***1238.3***	3.4	104.5	We see the bottom now. Seems like we are probably in Hades pit.	200
2017-11-26	21:52:40	-15.09500	-173.74974	***1236.1***	6.7	171.5	We're at the edge of the pit/ Not much smoke in the water. Our heading is toward the south.	201
2017-11-26	21:54:33	-15.09491	-173.74972	***1242.9***	0.0	190.9	We're heading 191d. Looking toward the south.	202
2017-11-26	21:55:16	-15.09512	-173.74947	***1251.4***	0.0	191.6	Brecciated pillows. A little bit of iron staining. Not a significant amount.	203
2017-11-26	21:55:44	-15.09513	-173.74947	***1254.8***	28.1	189.0	This pit is about 40 m deep. Moving down the wall. Will traverse around the pit wall.	204
2017-11-26	21:56:20	-15.09510	-173.74946	***1258.3***	22.6	189.9	We did get one sample to the SW of the pit. We're now inside the pit about half way down the wall.	205
2017-11-26	21:56:45	-15.09510	-173.74946	***1258.5***	21.2	188.8	We're in blocky lavas. Not much debris. Don't see much biota. in here.	206

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S085 W Mata Logger Comments	Record #
2017-11-26	21:57:25	-15.09508	-173.74948	***1261.7***	18.0	188.7	Looks like a dike here in the pit.	207
2017-11-26	21:58:09	-15.09503	-173.74952	***1264.2***	18.0	188.5	Looking at the SW wall of the pit. See dike. Not much staining of any sort here.	208
2017-11-26	21:58:58	-15.09502	-173.74950	***1263.4***	18.0	191.2	Down inside Hades pit crater near the summit of West Mata.	209
2017-11-26	21:59:29	-15.09501	-173.74951	***1262.6***	19.5	190.5	We're going to descend farther into the pit; then move along to the north and east sides of the pit.	210
2017-11-26	22:01:48	-15.09496	-173.74956	***1255.1***	22.2	190.3	Ship is maneuvering so that we can continue to descend into Hades pit crater.	211
2017-11-26	22:04:18	-15.09496	-173.74954	***1271.1***	13.0	190.7	Microbial mat now showing up on the walls of the crater.	212
2017-11-26	22:04:45	-15.09496	-173.74954	***1271.0***	10.4	190.3	Zooming in on this lighter colored mat and shimmer!!	213
2017-11-26	22:05:09	-15.09496	-173.74954	***1271.1***	10.2	190.2	Diffuse flow along the wall here at 1291 meters on the SW wall.	214
2017-11-26	22:06:07	-15.09496	-173.74954	***1271.0***	9.8	190.4	Zooming in on the diffuse flow here. Doesn't look like any one orifice for the flow.	215
2017-11-26	22:06:39	-15.09496	-173.74954	***1272.5***	10.2	190.4	Going to look at some of the little pockets in the wall.	216
2017-11-26	22:07:39	-15.09500	-173.74952	***1276.6***	2.6	190.0	Looks like it's leaking diffuse flow all over the place on this SW wall.	217
2017-11-26	22:08:05	-15.09500	-173.74952	***1277.7***	2.6	190.3	Seeing shrimp here..	218
2017-11-26	22:08:34	-15.09501	-173.74952	***1277.9***	1.5	189.5	Quite a lot of shrimp here. Alvinocaris of some type.	219
2017-11-26	22:09:03	-15.09501	-173.74952	***1278.0***	0.0	188.1	In an area of oxidized yellow mat and white microbial mat - lots of diffuse flow.	220
2017-11-26	22:09:34	-15.09501	-173.74951	***1278.0***	1.2	188.6	Dave is looking for a fluid sample site. Going for an area with a white ring - which implies warmer diffuse flow (warmer than the orange oxidized mats).	221
2017-11-26	22:11:03	-15.09502	-173.74951	***1278.0***	1.2	188.5	We are deploying the temperature probe over the bacterial mat.	222
2017-11-26	22:13:39	-15.09502	-173.74951	***1278.0***	1.1	190.1	Shimmering water is visible at the vent next to the temperature probe. 14.2C	223
2017-11-26	22:14:37	-15.09502	-173.74951	***1278.0***	1.1	189.9	We are moving to a different orifice. Temperature is 17.5C	224
2017-11-26	22:16:45	-15.09502	-173.74952	***1278.0***	1.1	189.8	We see shrimp in the frame. Species is ID'd as Opaepele.	225

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S085 W Mata Logger Comments	Record #
2017-11-26	22:17:56	-15.09501	-173.74952	***1278.1***	1.3	189.6	We moved the temperature probe to a larger vent. Temperature is 17.7C. Shimmering water visible.	226
2017-11-26	22:20:01	-15.09502	-173.74953	***1277.4***	1.2	190.5	We have moved slightly uphill to another orifice with bacterial filaments and strongly shimmering water. Temperature probe has been deployed into the orifice and is giving us a reading of 17.7 - 17.8C.	227
2017-11-26	22:27:18	-15.09499	-173.74954	***1277.5***	1.3	189.9	Temperature probe has been put away. We are deploying a gas tight sampler with the starboard arm.	228
2017-11-26	22:29:15	-15.09501	-173.74952	***1277.5***	1.4	189.9	Stowing starboard arm.	229
2017-11-26	22:30:46	-15.09501	-173.74953	***1277.5***	1.5	189.8	We are deploying the green gas tight sampler with the port arm. Pilots are preparing to lift the sampler out of its basket.	230
2017-11-26	22:33:47	-15.09500	-173.74953	***1277.5***	1.5	190.3	The pilots are maneuvering the gas sampler into position over the vent.	231
2017-11-26	22:35:10	-15.09500	-173.74954	***1277.5***	1.5	189.7	We are adjusting our grip on the gas sampler to a more secure position.	232
2017-11-26	22:37:01	-15.09501	-173.74954	***1277.4***	1.5	189.5	The pilots have successfully adjusted the sampler position in the port arm grip.	233
2017-11-26	22:41:52	-15.09502	-173.74957	***1277.5***	1.5	188.5	Collecting sample **S085-Gas-06** in green gas tight sampler. Location is 15d5.718 173d44.980. Depth is 1288m.	234
2017-11-26	22:44:05	-15.09500	-173.74955	***1277.5***	1.6	187.8	We are stowing the green gas tight sampler back in its crate.	235
2017-11-26	22:47:38	-15.09501	-173.74954	***1277.5***	1.6	188.3	Waypoint 8, where we are taking gas and major samples, has a lot of shrimp. They are not collected near the vent, but commonly seen swimming just above the lavas and ROV.	236
2017-11-26	22:49:17	-15.09501	-173.74954	***1277.5***	1.6	188.2	A squat lobster has decided to hang out on the starboard sampling arm.	237
2017-11-26	22:51:13	-15.09502	-173.74955	***1277.5***	1.5	188.6	Green gas tight sampler has been resecured.	238
2017-11-26	22:56:32	-15.09501	-173.74955	***1277.5***	1.5	188.2	Deploying major sampler. Also noticed that the yellow gas tight sampler was accidentally "popped" by the port arm during sampling with the green gas tight unit. This happened off-frame several minutes ago.	239

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S085 W Mata Logger Comments	Record #
2017-11-26	22:57:46	-15.09502	-173.74955	***1277.5***	1.5	188.1	Major sampler is in position inside the vent. Collecting sample **S85-fluid-07**. Location: 15d5.718 173d44.980. Depth 1288m. Time 22:59 UTC.	240
2017-11-26	23:02:02	-15.09501	-173.74954	***1277.5***	1.5	189.4	Majors sampler returned to basket.	241
2017-11-26	23:04:35	-15.09500	-173.74954	***1277.6***	1.4	189.9	Majors sampler (yellow) resecured in basket.	242
2017-11-26	23:06:40	-15.09500	-173.74953	***1277.0***	3.0	190.4	ROV is off bottom.	243
2017-11-26	23:08:34	-15.09498	-173.74954	***1273.3***	8.2	262.7	Sediment with microbial Fe staining and abundant small shrimp.	244
2017-11-26	23:10:44	-15.09497	-173.74956	***1273.9***	6.5	263.1	Collecting shrimp samples via suction. **S85-bio-08**; location 15d5.699 173d 44.972. Depth 1282m. Sample is located in jar 7.	245
2017-11-26	23:14:46	-15.09496	-173.74958	***1263.6***	14.0	274.0	We are moving over a stack of pillow lavas with relatively little sediment.	246
2017-11-26	23:16:00	-15.09497	-173.74960	***1257.4***	18.4	272.4	(Continued from previous entry) Massive boninite wall; also seen on the descent. Getting more pillowy as we ascend.	247
2017-11-26	23:16:48	-15.09499	-173.74960	***1253.2***	20.1	254.6	Sediment and microbial mats observed as the volcanic pile flattens out at top.	248
2017-11-26	23:17:47	-15.09502	-173.74967	***1247.2***	0.0	208.3	Sudden transition occurs at the top of the boninite pile from pillowy to more massive texture.	249
2017-11-26	23:18:35	-15.09502	-173.74965	***1246.2***	0.0	230.1	We are looking into the new crater at summit of West Mata.	250
2017-11-26	23:20:14	-15.09504	-173.74960	***1244.0***	24.9	135.0	We are circumnavigating the pit in a counterclockwise direction.	251
2017-11-26	23:22:39	-15.09513	-173.74962	***1243.6***	0.0	101.2	Circumnavigating the rim of the pit. The rim features a lot of rubble and pillowy boninite. Minor disorientation in navigation. We were first heading SE, and now are turning around to head NW along the pit.	252
2017-11-26	23:25:05	-15.09495	-173.74963	***1258.4***	0.0	318.2	We are approximately 21m off the bottom.	253
2017-11-26	23:25:32	-15.09490	-173.74973	***1257.1***	5.3	295.2	The ROV descended to ~5m above seafloor. Abundant pillows in this screengrab.	254
2017-11-26	23:26:08	-15.09488	-173.74976	***1256.7***	6.6	280.7	Fewer pillows, rim of pit right in front of camera.	255
2017-11-26	23:26:38	-15.09487	-173.74975	***1262.3***	3.1	86.7	We are taking a wrap out of the tether.	256
2017-11-26	23:27:01	-15.09486	-173.74972	***1260.7***	6.0	348.3	Current position downslope of Hades, a previous sample site. Oldest of the young rocks were sampled here.	257

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S085 W Mata Logger Comments	Record #
2017-11-26	23:27:49	-15.09480	-173.74972	***1255.4***	10.0	308.6	Lava flows and pillows on rim and minor sediment. Approaching waypoint 9.	258
2017-11-26	23:28:33	-15.09479	-173.74975	***1251.6***	0.0	324.9	Navigating along rim to waypoint 9.	259
2017-11-26	23:29:24	-15.09472	-173.74972	***1252.1***	11.6	279.5	Note gas tight, major, and bio samples (6-7-8) are in area we just dubbed "SW Hades Pit".	260
2017-11-26	23:31:40	-15.09459	-173.74987	***1258.1***	6.3	85.4	Just turned NE heading toward next waypoint 10.	261
2017-11-26	23:32:17	-15.09457	-173.74978	***1258.3***	4.6	89.5	NOTICE: **S85-gas-09**. Gastight that was inadvertently tripped (yellow gastight sampler) at SW Hades Pit. Tripped right at same time as sampling with green gastight.	262
2017-11-26	23:33:48	-15.09448	-173.74968	***1256.9***	6.0	6.0	Truncated pillows we saw in 2010.	263
2017-11-26	23:34:00	-15.09445	-173.74967	***1256.2***	5.0	12.0	NOTE that S850gas-09 is out of sequence.	264
2017-11-26	23:34:31	-15.09443	-173.74958	***1254.4***	6.9	350.6	Same truncated pillows we saw in 2012 with the Quest ROV. We're on the NW side of the pit.	265
2017-11-26	23:35:22	-15.09439	-173.74958	***1256.1***	6.0	359.5	We're continuing to the NE along the rim. Seeing lots of shrimp and some squat lobsters, crabs, scaleworms and shrimp.	266
2017-11-26	23:37:29	-15.09436	-173.74959	***1254.3***	3.6	18.5	Lots of shrimp on the rim. Scaleworms;	267
2017-11-26	23:38:26	-15.09436	-173.74963	***1254.6***	4.5	20.6	Crazy looking peak here with large pillows on the top. Broken pillows on the sides of this high.	268
2017-11-26	23:39:25	-15.09433	-173.74961	***1255.5***	2.6	21.7	We've seen what appears to be several(?) types of shrimp.	269
2017-11-26	23:40:09	-15.09433	-173.74961	***1255.4***	2.1	21.8	Squat lobsters in this area. Shrimp and scaleworms.	270
2017-11-26	23:40:41	-15.09433	-173.74961	***1254.9***	2.1	21.8	Going to go in and try to get some shrimp here. Will be sample S85-bio-10. 15d 5.6599' 173d 44.9764 Z=~1268.	271
2017-11-26	23:42:45	-15.09433	-173.74960	***1255.3***	2.7	21.2	**S85-bio-10**. Sucking up a shrimp (Opaepele); 2 scaleworms into Canister 6.	272
2017-11-26	23:45:36	-15.09432	-173.74957	***1254.0***	3.9	21.3	Moving along the rim to the N/NE.	273
2017-11-26	23:47:09	-15.09425	-173.74953	***1255.9***	4.2	346.6	We're looking at the crater rim. To the right is the pit.	274
2017-11-26	23:48:21	-15.09412	-173.74948	***1254.4***	3.7	359.6	The crater rim is really narrow. White bacterial mat in the cracks and some cloudy water.	275
2017-11-26	23:49:00	-15.09407	-173.74943	***1252.4***	3.3	3.0	Lots of breccia inside the crater.	276
2017-11-26	23:50:56	-15.09399	-173.74926	***1242.2***	8.1	36.8	Going back up to the rim. Lots of broken truncated pillows.	277
2017-11-26	23:51:35	-15.09396	-173.74924	***1239.2***	7.0	46.9	We're in the area where we sampled the molten pillow lava in 2009.	278

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S085 W Mata Logger Comments	Record #
2017-11-26	23:52:00	-15.09396	-173.74922	***1239.7***	0.0	96.1	Going to look at the wall and then head over to the next waypoint.	279
2017-11-26	23:52:25	-15.09394	-173.74916	***1240.3***	6.8	301.6	This was the area of the molten lava we saw in 2009.	280
2017-11-26	23:53:30	-15.09402	-173.74922	***1249.4***	3.5	290.0	Ken wants to look at the wall as we head to the south. Facing north as we back down the pit - we hope.	281
2017-11-26	23:54:41	-15.09406	-173.74929	***1251.2***	10.1	336.0	We are now on the northern rim of the crater slowly moving towards way point 12.	282
2017-11-26	23:55:44	-15.09408	-173.74931	***1255.7***	8.4	342.0	Descending down the crater wall; yellow appearing iron stains among volcanic brecciated rock.	283
2017-11-26	23:57:22	-15.09425	-173.74929	***1269.8***	12.1	6.1	Descending into the bottom of the pit. North side of the pit; Water appears cloudy .	284
2017-11-26	23:58:23	-15.09431	-173.74919	***1279.4***	8.4	5.7	Volcanic sediment with yellow to white cover; low temperature venting; sulfur rich.	285
2017-11-26	23:59:28	-15.09433	-173.74916	***1283.6***	3.7	24.8	Shimmery water indicating low temperature venting; sulfur rich staining on the talus.	286
2017-11-27	00:00:44	-15.09432	-173.74915	***1282.7***	2.8	39.9	Preparing to put down a marker.	287
2017-11-27	00:01:07	-15.09432	-173.74915	***1282.8***	3.0	39.8	Picking up **marker 224.**	288
2017-11-27	00:01:48	-15.09432	-173.74915	***1282.5***	3.1	39.9	Placing marker onto the white patch with shimmering water.	289
2017-11-27	00:02:37	-15.09432	-173.74916	***1282.4***	3.1	46.3	View of marker 224.	290
2017-11-27	00:03:22	-15.09435	-173.74915	***1285.7***	4.3	284.1	Turning towards waypoint 12.	291
2017-11-27	00:04:04	-15.09436	-173.74917	***1284.7***	2.4	133.2	Volcanic rock outcropping with white sulfur (?) stains.	292
2017-11-27	00:04:41	-15.09442	-173.74916	***1280.3***	8.2	100.5	Big cliff of pillow fragments with little vent holes in the wall with white staining around them.	293
2017-11-27	00:05:39	-15.09441	-173.74911	***1274.8***	12.4	103.3	Fresh rock fragment - fell from above?	294
2017-11-27	00:06:00	-15.09441	-173.74910	***1272.0***	13.3	114.8	Lots of little vent holes.	295
2017-11-27	00:06:36	-15.09443	-173.74907	***1269.2***	9.3	139.2	Sulfur in between rock fragments.	296
2017-11-27	00:07:11	-15.09444	-173.74909	***1266.5***	0.0	139.2	Wall becomes more brecciated as we move up the wall; iron coating?	297
2017-11-27	00:08:08	-15.09443	-173.74909	***1260.8***	20.1	139.2	Nicely looking pillow outlines with some sulfur stains in cracks or holes.	298
2017-11-27	00:09:05	-15.09436	-173.74911	***1254.4***	13.7	138.6	Steep wall for brecciated lavas with yellow (iron) stain.	299
2017-11-27	00:10:03	-15.09434	-173.74911	***1246.4***	31.2	139.4	Wall lava with microbial mat cover.	300
2017-11-27	00:10:46	-15.09439	-173.74919	***1239.6***	42.4	138.9	Moving up onto the mount in the crater of NW Mata.	301

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S085 W Mata Logger Comments	Record #
2017-11-27	00:11:15	-15.09441	-173.74920	***1233.7***	46.1	139.2	Abundant white fill of racks; we came up 50 m since we left the bottom of the crater.	302
2017-11-27	00:12:19	-15.09438	-173.74905	***1222.6***	45.5	139.4	Almost vertical brecciated lavas with some minor volcanic sediment drape; close to the highest part of the volcano.	303
2017-11-27	00:13:17	-15.09442	-173.74896	***1215.5***	0.0	136.1	End of cliff; reached top as we move SE; lots of blocks of lavas with sulfuric staining.	304
2017-11-27	00:14:22	-15.09459	-173.74883	***1210.4***	2.9	129.5	Lots of altered rock with vent fish.	305
2017-11-27	00:14:49	-15.09456	-173.74884	***1209.7***	3.5	129.7	Fish is eel pout.	306
2017-11-27	00:15:23	-15.09457	-173.74883	***1206.3***	6.2	140.7	Moving over large altered mount; approaching the area of the old summit.	307
2017-11-27	00:16:04	-15.09451	-173.74887	***1199.1***	9.9	141.4	We're 80 m + higher than the bottom of the pit.	308
2017-11-27	00:16:21	-15.09450	-173.74885	***1196.9***	13.2	142.2	Cloudy water and lots of alteration.	309
2017-11-27	00:16:42	-15.09450	-173.74884	***1190.8***	0.0	140.4	Getting toward the top of the volcanic summit.	310
2017-11-27	00:17:03	-15.09455	-173.74885	***1189.6***	13.4	140.3	Looks like we are at the top.	311
2017-11-27	00:17:26	-15.09455	-173.74884	***1189.3***	0.0	148.1	Summit of West Mata. Lots of cloudy water off to the east.	312
2017-11-27	00:17:48	-15.09457	-173.74883	***1190.3***	0.0	135.1	Summit was a bit of a pinnacle. Will continue east coming off of the steep terrain.	313
2017-11-27	00:19:12	-15.09452	-173.74868	***1197.9***	11.5	183.5	That steep pinnacle was probably not the highest spot. There is a ridge to the east that is higher.	314
2017-11-27	00:19:56	-15.09459	-173.74863	***1200.6***	0.0	79.6	More truncated pillows.	315
2017-11-27	00:20:27	-15.09462	-173.74858	***1198.8***	5.0	78.8	Seeing lots of pillow lavas and plenty of shrimp scattered along the bottom.	316
2017-11-27	00:20:47	-15.09460	-173.74857	***1198.6***	4.2	79.4	Eel pout; squat lobsters. and fat fish with big mouth.	317
2017-11-27	00:21:42	-15.09456	-173.74857	***1198.2***	0.0	80.9	Broken up lavas here.	318
2017-11-27	00:22:22	-15.09450	-173.74857	***1197.5***	2.5	106.1	Lots of life here. Seeing much more here than we saw in the Hades area.	319
2017-11-27	00:23:00	-15.09448	-173.74854	***1196.3***	2.3	105.6	Lots of biota up here. Seeing tons of shrimp.	320
2017-11-27	00:24:00	-15.09447	-173.74852	***1192.8***	2.0	104.9	Talus; broken up pillows here in an area of lots of biota.	321
2017-11-27	00:24:23	-15.09446	-173.74850	***1189.7***	2.8	69.3	Rubble on this ridge as we climb toward WP14.	322
2017-11-27	00:24:53	-15.09443	-173.74847	***1189.0***	3.4	69.3	More and more white staining and good shimmering flow right here.	323
2017-11-27	00:25:17	-15.09441	-173.74846	***1188.2***	1.9	69.4	Deployed 1 marker in the bottom of the pit. Marker-224.	324

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S085 W Mata Logger Comments	Record #
2017-11-27	00:26:01	-15.09440	-173.74847	***1187.7***	3.2	68.6	Deploying at marker here in this area of lots of diffuse venting and biota. **DEPLOYING Marker 139** up high up slope.	325
2017-11-27	00:27:29	-15.09437	-173.74844	***1186.0***	0.0	67.9	Marker 139 depth of 1198.	326
2017-11-27	00:28:04	-15.09436	-173.74847	***1185.0***	3.5	67.9	Marker-139 position: 173.7484 15.0944.	327
2017-11-27	00:29:28	-15.09435	-173.74843	***1179.1***	0.0	40.2	Still heading up this ridge. We stirred up a lot of floc.	328
2017-11-27	00:30:03	-15.09430	-173.74838	***1178.2***	0.0	44.9	Tons of floc in the water column here.	329
2017-11-27	00:30:30	-15.09431	-173.74838	***1177.7***	3.3	9.8	The rocks here are covered with white floc. Tons of shrimp here.	330
2017-11-27	00:30:53	-15.09430	-173.74837	***1177.6***	4.1	343.0	Highly altered rock here with lots of shrimp. We're in between Prometheus and Shrimp City.	331
2017-11-27	00:32:52	-15.09436	-173.74842	***1180.2***	2.8	46.9	Area of intense venting here. Lots of flow all over the place here.	332
2017-11-27	00:34:02	-15.09435	-173.74832	***1179.4***	2.3	22.8	Milky-flocky area of white staining; rocks covered with shrimp.	333
2017-11-27	00:35:03	-15.09434	-173.74829	***1178.7***	1.7	356.4	**S85-bio-11**. 10m NE of Mkr-139 at **"Shrimp Suburbia"**. Suction of shrimp. Suction into canister 5. Z=1190.	334
2017-11-27	00:37:40	-15.09433	-173.74831	***1178.7***	2.3	348.0	S85-bio-11 cont. Shrimp suburbia is same position as sample 11 in the nav.	335
2017-11-27	00:39:38	-15.09431	-173.74830	***1179.7***	0.0	291.1	S85-bio-11 cont. 15.0943195 173.7482840 . Z=1198.	336
2017-11-27	00:40:48	-15.09427	-173.74835	***1180.6***	1.0	297.8	**S85-fluid-12**. Major sampler 4. Same location at Shrimp Suburbia as the previous bio sample (#11).	337
2017-11-27	00:44:03	-15.09438	-173.74836	***1180.7***	0.0	295.8	S85-fluid-12 cont. (last entry may have referred to bio-11 - which was in the same place).	338
2017-11-27	00:45:52	-15.09429	-173.74834	***1180.7***	0.0	295.9	S85-fluid-12 cont. In this area with a huge amount of flow. Major sampler 4 - Subastian sample S85-fluis-12.	339
2017-11-27	00:47:01	-15.09430	-173.74836	***1180.7***	0.0	296.2	S85-fluid-12 cont. Taking the sample at 0048Zulu	340
2017-11-27	00:49:12	-15.09425	-173.74833	***1180.7***	0.0	295.9	Finished fluid sample at 004950.	341
2017-11-27	00:49:57	-15.09419	-173.74833	***1180.7***	0.0	295.9	Next will take the temperature here where the last 2 samples were taken (Shrimp Suburbia).	342
2017-11-27	00:52:20	-15.09434	-173.74839	***1180.7***	0.0	295.6	Water sampler stored away; deployment finished.	343
2017-11-27	00:54:58	-15.09459	-173.74869	***1180.7***	0.0	296.2	Still on same position; temperature probe will be deployed next.	344
2017-11-27	00:55:42	-15.09431	-173.74837	***1180.7***	0.0	295.8	Temperature probe deployment started.	345

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S085 W Mata Logger Comments	Record #
2017-11-27	00:56:44	-15.09404	-173.74830	***1180.7***	0.0	296.1	Start measurement of temperature after searching for the same positions as majors #4 fluid sampler.	346
2017-11-27	00:57:53	-15.09373	-173.74823	***1180.7***	0.0	297.8	Temperature max = 22.5 C first measurement.	347
2017-11-27	00:59:12	-15.09324	-173.74813	***1180.7***	0.0	298.3	Looking for another good spot to measure vent fluid temperature.	348
2017-11-27	01:00:44	-15.09249	-173.74800	***1180.7***	0.0	297.8	Finished temperature measurement; T probe gets stored away.	349
2017-11-27	01:01:21	-15.09365	-173.74819	***1176.3***	2.6	304.5	Moving on eastward towards way point 14.	350
2017-11-27	01:02:42	-15.09363	-173.74824	***1178.4***	2.0	64.0	New moving towards the northeast on craggy ridge.	351
2017-11-27	01:03:33	-15.09380	-173.74816	***1179.0***	11.1	97.9	Lots of staining no the rocks; small eel.	352
2017-11-27	01:04:29	-15.09381	-173.74809	***1176.8***	6.0	94.2	Large jelly fish; stained rock face the background.	353
2017-11-27	01:05:59	-15.09379	-173.74809	***1170.9***	17.2	115.1	Moving back to the ridge; lots of staining between rock fragments.	354
2017-11-27	01:06:51	-15.09376	-173.74801	***1174.0***	5.8	61.6	Shimmer at the top of mound; lots of shrimp.	355
2017-11-27	01:07:21	-15.09373	-173.74799	***1174.8***	4.8	57.1	Narrow ridge with diffuse venting at the top; lots of shimmer.	356
2017-11-27	01:08:04	-15.09369	-173.74795	***1176.0***	0.0	82.5	Lots of shimmering going on at the top of this ridge at the headwall of the old landslide.	357
2017-11-27	01:08:40	-15.09368	-173.74794	***1175.7***	5.9	91.5	Biota everywhere.	358
2017-11-27	01:09:54	-15.09363	-173.74791	***1177.7***	4.7	53.4	We will head along the summit ridge for a bit farther and then will head over to the new 90m cone.	359
2017-11-27	01:11:06	-15.09357	-173.74783	***1179.2***	4.5	105.5	This whole knife-edge ridge has warm water flowing out of it.	360
2017-11-27	01:11:42	-15.09360	-173.74779	***1178.4***	3.0	87.0	This is the summit area at the north of the landslide area.	361
2017-11-27	01:12:02	-15.09364	-173.74775	***1177.9***	0.0	54.2	Beautiful pillow-shaped banding on these lava rocks.	362
2017-11-27	01:12:36	-15.09362	-173.74771	***1175.1***	3.9	39.6	More diffuse flow ahead to the north of the summit ridge.	363
2017-11-27	01:13:02	-15.09360	-173.74771	***1174.8***	3.5	41.5	We're following the ridge to the north of the landslide and then will head to the south.	364
2017-11-27	01:13:59	-15.09356	-173.74765	***1174.7***	4.8	44.3	Wow. We're at 1188 m here at this summit.	365
2017-11-27	01:15:00	-15.09352	-173.74759	***1174.0***	3.5	58.7	Some odd-looking beautiful jelly.	366
2017-11-27	01:15:43	-15.09353	-173.74760	***1173.1***	5.2	72.9	Image of jelly.	367
2017-11-27	01:16:16	-15.09352	-173.74761	***1172.5***	7.3	83.4	Jelly just swam away.	368
2017-11-27	01:17:55	-15.09347	-173.74754	***1176.2***	0.0	110.4	Getting ready to move on to another waypoint.	369
2017-11-27	01:18:44	-15.09342	-173.74756	***1175.3***	13.3	113.9	Heading downslope toward Waypoint 16.	370

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S085 W Mata Logger Comments	Record #
2017-11-27	01:21:20	-15.09341	-173.74754	***1180.8***	0.0	136.5	Getting a ship move to prepare to move downslope towards Waypoint 16.	371
2017-11-27	01:22:41	-15.09350	-173.74745	***1189.6***	31.8	254.0	Lots of sulfur on rock, near vertical cliff.	372
2017-11-27	01:25:10	-15.09370	-173.74759	***1180.2***	0.0	302.4	Some Opaepele shrimp on rock face.	373
2017-11-27	01:25:47	-15.09370	-173.74757	***1180.7***	0.0	309.8	Attempting sampling of shrimp while turning the ship.	374
2017-11-27	01:26:28	-15.09363	-173.74760	***1180.8***	0.0	335.3	Substrate is brownish stained pillow lavas with sulfur stain.	375
2017-11-27	01:27:29	-15.09396	-173.74769	***1180.7***	0.0	335.3	Sample attempt failed - shrimp moving fast!	376
2017-11-27	01:28:15	-15.09395	-173.74766	***1180.7***	0.0	335.9	Another failed attempt to catch these fast shrimps	377
2017-11-27	01:28:34	-15.09396	-173.74766	***1180.7***	85.1	335.0	**S85-bio-13**. Squat lobster sample taken; 15d 09.39 173d 74.76; z= 1190m	378
2017-11-27	01:30:12	-15.09395	-173.74765	***1178.6***	0.0	324.4	Continuing to try getting a shrimp; lots of lava fragments with stains.	379
2017-11-27	01:30:57	-15.09395	-173.74767	***1178.7***	0.0	279.4	Large mound of black pillow lavas with shrimp on it.	380
2017-11-27	01:31:31	-15.09395	-173.74770	***1178.8***	5.4	264.3	Attempt number 4 failed.	381
2017-11-27	01:32:17	-15.09399	-173.74770	***1179.9***	0.0	287.7	Another failed attempt to sample shrimp - these critters are way too fast.	382
2017-11-27	01:33:23	-15.09392	-173.74771	***1177.5***	21.8	283.4	Sampling of squat lobster failed.	383
2017-11-27	01:34:22	-15.09388	-173.74776	***1179.0***	22.1	297.4	Steep ridge flank at view while ship is positioning.	384
2017-11-27	01:35:28	-15.09377	-173.74783	***1180.2***	0.0	302.2	Leaving summit ridge and head towards way point 16 now.	385
2017-11-27	01:36:22	-15.09361	-173.74793	***1187.9***	0.0	258.0	Moving over landslide scarps with nicely banded pillow lavas.	386
2017-11-27	01:37:06	-15.09346	-173.74802	***1194.4***	0.0	218.0	Moving over top of fragmented lava.	387
2017-11-27	01:37:56	-15.09349	-173.74753	***1203.2***	39.8	235.0	Large ridge-like feature of volcanic	388
2017-11-27	01:39:01	-15.09332	-173.74742	***1210.2***	0.0	223.6	Black round fish on top of small volcanic fragments.	389
2017-11-27	01:39:33	-15.09368	-173.74747	***1210.6***	0.0	228.4	Large near vertical cliffs of pillow lava. Becoming less stained.	390
2017-11-27	01:40:33	-15.09382	-173.74739	***1216.3***	0.0	252.9	Lots of truncated pillows at landslide scarp; formed sometime 2011 ish.	391
2017-11-27	01:41:26	-15.09389	-173.74759	***1223.3***	28.5	219.7	Volcanic lavas with sulfuric stains.	392
2017-11-27	01:41:52	-15.09376	-173.74762	***1230.4***	0.0	206.6	Moving down along ridge-like structure towards the bottom of landslide deposit.	393
2017-11-27	01:43:01	-15.09370	-173.74762	***1242.8***	4.1	234.1	Shimmery water indicating low temp venting; crack sulfur fillings	394
2017-11-27	01:43:53	-15.09371	-173.74763	***1243.5***	3.8	218.3	Lots of little shrimp; on top of fragmented lava	395
2017-11-27	01:44:57	-15.09370	-173.74752	***1250.3***	3.5	189.9	Near vertical cliff of lava with iron stains.	396

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2017-11-27	01:45:38	-15.09374	-173.74751	***1250.6***	5.8	234.4	Near vertical dike-like lava; possibly vertically fragmented pillow lava	397
2017-11-27	01:46:25	-15.09373	-173.74749	***1252.6***	0.0	217.3	Many shrimp around little vent openings; shimmery water.	398
2017-11-27	01:47:19	-15.09379	-173.74746	***1257.8***	3.5	150.0	Turning away from the vertical scarp and turning to the SE and heading toward the new cone.	399
2017-11-27	01:47:59	-15.09377	-173.74738	***1264.3***	1.5	158.6	Still moving down the slope a bit. We are beyond the steep slope; now on a talus; gentle slope.	400
2017-11-27	01:49:22	-15.09391	-173.74726	***1270.2***	6.8	214.4	Giant slab that fell off the slope. We're in the landslide deposit area.	401
2017-11-27	01:50:27	-15.09404	-173.74721	***1273.4***	5.1	223.1	We're about at the base of this landslide area. A little more time.	402
2017-11-27	01:51:08	-15.09411	-173.74712	***1276.1***	6.6	217.9	We're on near the base of this slope at ~1295 m.	403
2017-11-27	01:52:12	-15.09421	-173.74701	***1281.2***	4.0	192.0	Contact!!!	404
2017-11-27	01:52:29	-15.09423	-173.74702	***1280.9***	2.5	173.7	We're at the base of this new cone on the western edge.	405
2017-11-27	01:53:04	-15.09429	-173.74703	***1282.1***	2.6	144.2	This cone built since we were here in 2012. Sometime between 2012 and 2016 and it built a cone 90 m high.	406
2017-11-27	01:54:49	-15.09439	-173.74705	***1280.2***	3.7	129.3	Ken is shopping for a rock sample that he is sure is the new lava - not something that fell downhill from the area of the summit to the NW.	407
2017-11-27	01:56:18	-15.09450	-173.74700	***1278.9***	3.7	123.7	Facing SE toward the new lava dome.	408
2017-11-27	01:57:58	-15.09450	-173.74697	***1279.3***	0.0	96.0	Odd long skinny pillow. in the middle of broader pillows.	409
2017-11-27	01:58:42	-15.09449	-173.74698	***1279.3***	1.9	92.2	**S85-rock-14** on the new lava cone. In place lava. Z=1293. 15.09471 173.74618. Going in middle biobox partition 4.	410
2017-11-27	02:01:45	-15.09448	-173.74699	***1279.1***	0.0	104.4	S85-rock-14 is not in a biobox - it's in a rock box.	411
2017-11-27	02:02:29	-15.09447	-173.74700	***1277.6***	4.8	147.9	Going to head east going up the mound.	412
2017-11-27	02:03:23	-15.09455	-173.74697	***1274.0***	7.6	112.6	Noticing a lot of debris on the pillows. Little bits of rock etc. Where did it come from.	413
2017-11-27	02:03:52	-15.09452	-173.74695	***1270.4***	4.5	103.6	Volcaniclastic sediments? Or are these sediments that are falling from the summit area?	414
2017-11-27	02:05:09	-15.09448	-173.74680	***1268.7***	2.9	108.3	If we didn't have before and after bathymetry one might not guess that this is so young.	415
2017-11-27	02:05:53	-15.09443	-173.74672	***1268.0***	3.2	114.6	These look like lobates with a little collapse.	416
2017-11-27	02:06:19	-15.09443	-173.74665	***1267.9***	2.8	107.8	Squat lobsters hanging off the roof of this collapse area.	417

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S085 W Mata Logger Comments	Record #
2017-11-27	02:07:23	-15.09441	-173.74662	***1270.2***	1.7	89.1	**S85-rock-15**. Lobate lava with drain-out features. Grabbing a piece of the lava rind on the roof. Z=1281. Lava drips all over the bottom.	418
2017-11-27	02:09:06	-15.09442	-173.74662	***1270.0***	1.4	92.4	S85-rock-15. crust of lobate lava with lava drips. 15 5.6651' 173d 44.797. Z=1282m.	419
2017-11-27	02:10:45	-15.09441	-173.74661	***1269.9***	1.5	92.0	S85-rock-15 cont. Trying to break it up because it's too big. Using 2 claws for this task.	420
2017-11-27	02:12:03	-15.09441	-173.74662	***1270.0***	1.5	92.0	S85-rock-15 cont. Have the sample. Lobate piece of roof. 45-50 cm long - spear-chucker-shaped. About 15 cm thick. Lobate with drips. 1cm or so thick lava glass layer on top.	421
2017-11-27	02:13:22	-15.09441	-173.74662	***1270.1***	1.3	92.3	S85-rock-15 cont. The rock broke so are going to put it in middle rock box partition 4. Now 25 cm or more.	422
2017-11-27	02:15:12	-15.09440	-173.74662	***1270.0***	1.4	92.2	Taking the other piece out and getting rid of it.	423
2017-11-27	02:16:09	-15.09439	-173.74663	***1270.0***	1.4	91.4	Finished with sample 15. Are now going to continue heading east to the top of this mound about 50m to the east.	424
2017-11-27	02:17:23	-15.09436	-173.74660	***1266.4***	3.2	88.0	Lobates and pillows with lots of diffuse flow coming out of the top of this mound.	425
2017-11-27	02:17:55	-15.09436	-173.74650	***1266.9***	1.5	137.1	This lava flow is still warm. Lots of white sediments.	426
2017-11-27	02:18:36	-15.09437	-173.74647	***1267.4***	2.1	128.2	Shrimp everywhere as well as squat lobsters. Nav marker here called "Bubba Gump"	427
2017-11-27	02:20:11	-15.09439	-173.74644	***1266.9***	0.7	107.8	Huge area of light-colored sediments; lots of flow; lots of shrimp. Awesome scene here - sort of like a moonscape = with shrimp.	428
2017-11-27	02:21:21	-15.09437	-173.74636	***1265.4***	2.0	90.0	Now we're coming into a crazier-looking area of spattering lavas.	429
2017-11-27	02:22:52	-15.09436	-173.74629	***1263.1***	3.1	89.6	We're getting near the summit of this cone.	430
2017-11-27	02:23:35	-15.09437	-173.74627	***1261.0***	2.6	89.8	We're almost at the top of this feature. Lots of squat lobsters; scale worms; nice pillows.	431
2017-11-27	02:24:09	-15.09436	-173.74624	***1260.3***	1.1	89.9	Scaleworms in a row - surrounded by shrimp that are thick up here.	432
2017-11-27	02:24:32	-15.09435	-173.74623	***1259.3***	1.9	89.8	Getting more of the gray sediment again between the pillows.	433
2017-11-27	02:25:08	-15.09434	-173.74619	***1258.4***	2.0	90.2	Lots of hydrothermal mats.	434
2017-11-27	02:25:40	-15.09433	-173.74618	***1256.7***	1.9	84.8	We want to take a look around before we fall over the top of this cone.	435

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S085 W Mata Logger Comments	Record #
2017-11-27	02:26:06	-15.09432	-173.74616	***1254.9***	2.4	84.4	Looks like we are up here at the top of this cone.	436
2017-11-27	02:26:55	-15.09429	-173.74616	***1253.5***	3.6	46.0	Adding nav target called "Cone Summit" - when we get to the highest point..	437
2017-11-27	02:27:53	-15.09421	-173.74617	***1251.1***	2.0	357.8	We're at the top of the cone.	438
2017-11-27	02:28:09	-15.09419	-173.74618	***1250.2***	2.5	355.6	We're going to back down this cone (facing the west). Looking at the face of the landslide as we go.	439
2017-11-27	02:28:55	-15.09414	-173.74615	***1253.8***	5.1	243.2	Shrimp carpet on the top of this cone. Lots of diffuse flow.	440
2017-11-27	02:30:23	-15.09414	-173.74608	***1256.4***	6.4	250.7	We're looking at a vent fish sticking his head into the shrimp. May be eating it.	441
2017-11-27	02:30:58	-15.09415	-173.74604	***1258.8***	5.5	262.0	Backing down the cone - at the little landslide wall - looking to the west.	442
2017-11-27	02:31:50	-15.09416	-173.74600	***1261.0***	3.8	261.8	Some big pillows to the right. Lots of staining in this area.	443
2017-11-27	02:32:18	-15.09412	-173.74598	***1260.9***	3.5	258.4	The pillows look in place.	444
2017-11-27	02:32:45	-15.09411	-173.74595	***1260.9***	0.0	258.0	Giant pillows and some jumble. Smatter??	445
2017-11-27	02:33:10	-15.09410	-173.74593	***1261.7***	7.5	253.8	It really drops off to the right of the vehicle (north).	446
2017-11-27	02:35:15	-15.09407	-173.74593	***1262.2***	9.2	211.6	We're going to suction the big shrimp into chamber 3.	447
2017-11-27	02:36:05	-15.09404	-173.74595	***1262.3***	8.0	211.5	**S85-bio-16**. Going in for a suction on this ridge Ken and Bill believe is spatter. Behind this spatter are large pillow lobes.	448
2017-11-27	02:38:29	-15.09410	-173.74597	***1262.6***	0.0	243.0	S85-bio-16 cont. at just named "Spatter site". Z=1280m. Still filling chamber 3 with shrimp. 2 Alvinocaris and 2-3 squat lobsters.	449
2017-11-27	02:43:00	-15.09409	-173.74586	***1263.5***	15.6	227.8	Stowing the wand.	450
2017-11-27	02:43:25	-15.09406	-173.74589	***1263.6***	12.9	205.9	S85-bio-16. 15.094 173.7460. Z=1283.	451
2017-11-27	02:44:57	-15.09403	-173.74593	***1270.1***	4.6	199.5	Looking at a stack of pillows below that spatter target. Some are truncated.	452
2017-11-27	02:45:28	-15.09403	-173.74591	***1273.8***	6.3	209.2	Lots of volcanic sand.	453
2017-11-27	02:45:46	-15.09402	-173.74589	***1274.8***	4.1	208.6	We're going to descend a little farther down this scarp and see what happens.	454
2017-11-27	02:46:12	-15.09400	-173.74587	***1276.6***	5.0	205.9	Now we're looking at more jumbled fragmented pillows that fell down slope.	455
2017-11-27	02:46:57	-15.09402	-173.74582	***1280.6***	3.9	227.3	2 vent fish - at one time.	456
2017-11-27	02:47:53	-15.09403	-173.74582	***1284.0***	2.8	246.2	1294 m here. We're on a debris field now.	457

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S085 W Mata Logger Comments	Record #
2017-11-27	02:48:19	-15.09403	-173.74577	***1282.6***	4.3	247.9	We've reached the bottom of the in-place pillows. We're in debris. We are heading up slope to the pillow flow surface.	458
2017-11-27	02:49:09	-15.09400	-173.74580	***1279.0***	3.3	298.1	The southern part of the mound seems to have a lot more diffuse flow coming out of it.	459
2017-11-27	02:50:04	-15.09398	-173.74585	***1273.8***	5.3	296.8	Intense yellow staining.	460
2017-11-27	02:51:46	-15.09396	-173.74590	***1270.8***	2.8	298.1	Looks like iron-oxide mat on the rocks here.	461
2017-11-27	02:52:08	-15.09395	-173.74591	***1268.4***	3.5	293.8	This is a remnant of something that fell downslope. Sizable remnant.	462
2017-11-27	02:52:58	-15.09390	-173.74593	***1268.1***	7.8	245.7	Ascending up the side of the steepest "landslide" slope here.	463
2017-11-27	02:53:39	-15.09391	-173.74596	***1265.0***	5.0	253.3	More spatterish stuff.	464
2017-11-27	02:54:32	-15.09391	-173.74599	***1261.2***	6.8	298.1	Really rubbly here.	465
2017-11-27	02:55:19	-15.09388	-173.74606	***1257.4***	3.6	315.8	We're back up on the rim.	466
2017-11-27	02:55:32	-15.09387	-173.74607	***1257.4***	5.2	315.1	We're at the summit of the new cone again. Seeing lots of Volcaniclastic sediment. Have to believe it belongs to this cone.	467
2017-11-27	02:58:05	-15.09358	-173.74628	***1283.5***	2.3	324.1	Still on the "new" lava surface (sometime between 2012 - 2016). Sediment on top could be pyroclastic? Yellow tinted mat could be hydrothermal?	468
2017-11-27	02:59:14	-15.09342	-173.74636	***1283.8***	2.3	323.3	Nice proper pillow.	469
2017-11-27	03:02:44	-15.09332	-173.74648	***1285.6***	1.3	308.7	Heavily sedimented lobate lava flows from new cone. Sediment compositions not currently known.	470
2017-11-27	03:04:03	-15.09328	-173.74653	***1284.8***	2.3	267.1	Top flow has less sediment than most other lobate flows in the area.	471
2017-11-27	03:04:34	-15.09327	-173.74657	***1286.3***	1.9	295.9	Looks like partially collapsed (shelly) lobate flow	472
2017-11-27	03:05:02	-15.09323	-173.74659	***1286.6***	2.3	293.3	Transition to rubbly pillows - rather abrupt.	473
2017-11-27	03:06:04	-15.09324	-173.74663	***1287.6***	0.0	298.0	Drained lobe in foreground.	474
2017-11-27	03:08:46	-15.09325	-173.74667	***1287.7***	0.0	330.6	Repositioning for better sample collection angle.	475
2017-11-27	03:09:36	-15.09323	-173.74669	***1287.7***	0.0	330.4	**Sample S85-rock-17**. Position 15.0932647 173.7466466. Depth 1298m	476
2017-11-27	03:10:58	-15.09322	-173.74664	***1287.7***	0.0	329.4	Sample S85-rock-17 into sample rock box 3. 03:11 UTC	477
2017-11-27	03:12:35	-15.09322	-173.74664	***1287.1***	2.5	246.4	Rubbly young samples probably rolled down from elsewhere.	478
2017-11-27	03:14:12	-15.09316	-173.74664	***1286.1***	4.0	313.3	Lobate flows have lots of sediment, while the rubble pile is less sedimented.	479

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S085 W Mata Logger Comments	Record #
2017-11-27	03:15:06	-15.09312	-173.74656	***1289.0***	2.1	57.7	Unclear whether sediment is from uphill, or if it is an ashy deposit.	480
2017-11-27	03:16:34	-15.09304	-173.74637	***1289.8***	4.2	42.1	Moving along scarp toward waypoint 19	481
2017-11-27	03:16:56	-15.09301	-173.74635	***1291.5***	1.1	55.7	Orange sediments/mats on top of lava flows.	482
2017-11-27	03:17:39	-15.09295	-173.74633	***1293.3***	1.9	47.0	Jellyfish over lobate flows.	483
2017-11-27	03:18:07	-15.09291	-173.74630	***1294.3***	1.5	45.0	Pillow in foreground cracked open and emptied.	484
2017-11-27	03:18:48	-15.09287	-173.74627	***1293.7***	3.1	44.2	Possibly two different eruption events? Look at sedimentation differences on the two pillows.	485
2017-11-27	03:20:05	-15.09278	-173.74618	***1292.9***	2.2	45.2	Change in texture up section to rougher surfaces, less sediment.	486
2017-11-27	03:22:57	-15.09253	-173.74600	***1301.1***	0.5	38.2	More bright orange mats	487
2017-11-27	03:24:24	-15.09246	-173.74586	***1301.2***	4.1	36.3	Clearing a scarp or ridge roughly 20m south of waypoint 19	488
2017-11-27	03:25:07	-15.09234	-173.74581	***1310.0***	3.0	2.0	Ridge we just cleared is comprised of older rocks	489
2017-11-27	03:25:28	-15.09230	-173.74581	***1309.6***	1.7	0.2	More lobate flows past the ridge. Almost at waypoint 19.	490
2017-11-27	03:26:32	-15.09221	-173.74583	***1311.4***	1.7	7.5	Larger lava flows appearing. Still ashy and/or sedimented.	491
2017-11-27	03:28:43	-15.09202	-173.74573	***1318.0***	2.5	43.0	Moving across flows toward waypoint 20. Not much to see.	492
2017-11-27	03:30:34	-15.09181	-173.74560	***1329.6***	4.7	118.1	Sedimented slope with pillow flows.	493
2017-11-27	03:31:00	-15.09182	-173.74560	***1329.8***	4.2	174.4	Oxidation on exposed surfaces after flow broke.	494
2017-11-27	03:33:40	-15.09182	-173.74559	***1331.0***	5.1	95.0	Attempted sample at oxidized flow, but rock was too friable. Attempt abandoned and will try again at a nearby site.	495
2017-11-27	03:34:28	-15.09170	-173.74553	***1339.6***	3.0	51.4	Small white sponges are present on the flows, which indicates that these eruptives are older than 2012. Truncated pillows end at steep scarp.	496
2017-11-27	03:35:25	-15.09158	-173.74551	***1344.1***	3.9	86.2	Rubble pile of broken pillows down section on scarp face.	497
2017-11-27	03:35:58	-15.09155	-173.74543	***1343.9***	3.8	33.7	Another rubble-to-pillow transition	498
2017-11-27	03:36:37	-15.09145	-173.74548	***1345.9***	2.3	3.0	More sedimented pillow to lobate textures. The area is under evaluation for sampling.	499
2017-11-27	03:38:03	-15.09133	-173.74552	***1347.5***	0.0	44.8	Large fracture in flow	500
2017-11-27	03:39:12	-15.09131	-173.74550	***1347.5***	0.0	57.3	**Sample S85-rock-18**. Location at waypoint 20; depth 1358m. Lat-lon	501
2017-11-27	03:40:46	-15.09130	-173.74552	***1347.5***	0.0	56.7	S85-rock-18 into biobox partition 2. Sample coordinates 15.0913329 173.7454619	502

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S085 W Mata Logger Comments	Record #
2017-11-27	03:43:15	-15.09122	-173.74542	***1345.1***	2.9	26.7	Note that S85-rock-17 may not be from the new flow. Its location falls out of the bathy change between 2012 and 2017. Next waypoint falls within the bathy difference and we are not sure yet whether waypoint 20 and 21 have the same recent activity.	503
2017-11-27	03:45:50	-15.09094	-173.74538	***1353.0***	2.8	352.8	Driving to waypoint 21, not much to see.	504
2017-11-27	03:46:15	-15.09090	-173.74539	***1352.8***	3.2	3.4	Very cool bioluminescent jellyfish	505
2017-11-27	03:48:08	-15.09080	-173.74539	***1362.3***	0.0	184.4	Sedimented pillows; smaller in diameter than the lobate flows we encountered in the waypoint 20 area.	506
2017-11-27	03:48:56	-15.09067	-173.74538	***1370.5***	22.7	179.8	Truncated pillows on a very steep slope.	507
2017-11-27	03:50:17	-15.09065	-173.74535	***1390.8***	7.3	174.1	Pillows lower in sequence show lower truncation frequency.	508
2017-11-27	03:51:33	-15.09057	-173.74536	***1394.6***	4.7	178.0	Moving down section into pillow talus. Thrusters are kicking up significant amounts of sediment.	509
2017-11-27	03:54:24	-15.09040	-173.74535	***1405.4***	4.6	172.5	Large intact pillow under pillow debris and sediments	510
2017-11-27	03:55:39	-15.09032	-173.74535	***1409.4***	5.6	112.8	Turning vehicle to face upcoming waypoint 21 and starting to see more intact pillows.	511
2017-11-27	03:57:37	-15.09027	-173.74536	***1411.8***	4.5	153.0	Lobate flows transitioning into flows with rougher surface texture.	512
2017-11-27	03:58:09	-15.09024	-173.74539	***1413.0***	7.0	152.6	Fragmental large pieces of debris at contact. We are looking for the contact for the suspected new lava flow in this area. No evidence of it yet, but a 10m change occurred in this area since 2012.	513
2017-11-27	03:59:01	-15.09018	-173.74544	***1416.0***	3.2	156.3	Transitioning back into larger pillows from smaller, truncated pillows.	514
2017-11-27	03:59:31	-15.09011	-173.74545	***1416.0***	1.8	156.9	Lava is transitioning to flatter lobate flows. Still sedimented; fractured with altered/oxidized parts.	515
2017-11-27	04:00:24	-15.09005	-173.74545	***1416.1***	3.6	153.7	Appears we may be into younger lava flows. Clear signs of hydrothermal activity, although still some sediment. We are at waypoint 21.	516
2017-11-27	04:03:30	-15.08995	-173.74548	***1418.5***	1.3	154.8	Setting ROV down for sampling attempt.	517
2017-11-27	04:06:38	-15.08995	-173.74549	***1419.1***	0.8	154.4	Sample taken; S85-Rock-19; 15.0899511/173.7454833, Z=1430m	518
2017-11-27	04:08:15	-15.08994	-173.74549	***1419.0***	0.7	155.1	**S85-Rock-19**; 20-25cm across; has nice glass rind.	519
2017-11-27	04:08:56	-15.08994	-173.74548	***1418.1***	1.5	149.5	Moving on towards way point 23.	520

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S085 W Mata Logger Comments	Record #
2017-11-27	04:10:41	-15.08999	-173.74541	***1415.8***	2.2	128.3	Large, lumpy looking pillow lava mostly covered with sediments.	521
2017-11-27	04:11:51	-15.09007	-173.74536	***1415.5***	1.2	111.9	Large, beautiful looking lava flow with fresh appearing glass.	522
2017-11-27	04:12:41	-15.09009	-173.74531	***1414.4***	1.7	125.7	Young lava flow deposit transitioning into more jumbly, fragmented lava	523
2017-11-27	04:13:40	-15.09019	-173.74521	***1415.8***	1.9	138.8	Some of the crack between pillows have stains; probably sulfur?	524
2017-11-27	04:14:16	-15.09028	-173.74517	***1417.2***	1.4	138.8	Moving on towards waypoint 22 coming into the rocky rubble.	525
2017-11-27	04:15:08	-15.09030	-173.74514	***1417.7***	0.8	143.0	Large Pillow sticking ~2m out.	526
2017-11-27	04:15:56	-15.09029	-173.74514	***1417.7***	0.5	144.7	**Sample S85-Rock-20** taken.	527
2017-11-27	04:20:06	-15.09034	-173.74508	***1417.3***	2.7	150.3	S85-rock-20 Location 15d05m2.53 173d44m42.78 depth 1430m.	528
2017-11-27	04:21:18	-15.09043	-173.74500	***1413.3***	3.8	155.1	Truncated and non-truncated pillows about halfway between waypoints 21 and 22.	529
2017-11-27	04:21:54	-15.09045	-173.74499	***1412.8***	0.0	163.2	Orange hydrothermal staining on rock. Looks somewhat fresher on this slope.	530
2017-11-27	04:22:19	-15.09042	-173.74498	***1412.4***	0.0	153.7	Broken pillow that partially drained. Going to attempt a sample of this; rock will be fragile.	531
2017-11-27	04:25:07	-15.09048	-173.74494	***1412.9***	0.0	189.0	First sampling attempt here was unsuccessful; drainage/cascade fell apart. Repositioning to try again.	532
2017-11-27	04:27:07	-15.09043	-173.74493	***1412.7***	0.0	202.0	**S85-rock-21** going into forward basket (used to hold location markers). Depth 1431m; location 15.090426 173.7449	533
2017-11-27	04:30:23	-15.09041	-173.74493	***1412.2***	2.4	110.1	Lobate flows continuing downslope. Sedimented flows.	534
2017-11-27	04:31:11	-15.09038	-173.74488	***1417.6***	5.7	21.3	Halfway between wps 21 and 22; coming off of slope and starting to go up another with intentions to get another sample from face before continuing to next waypoint.	535
2017-11-27	04:32:31	-15.09019	-173.74490	***1422.2***	5.2	279.4	Well-formed, moderately sedimented pillow lavas on gentler slope	536
2017-11-27	04:33:48	-15.09017	-173.74497	***1422.0***	1.7	272.0	We suspect that the rocks on these opposing cliff faces are from the same lava flows despite some differences in morphology. We're sampling both to confirm.	537

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S085 W Mata Logger Comments	Record #
2017-11-27	04:39:13	-15.09016	-173.74501	***1421.8***	0.9	296.2	**S85-rock-22**. Heavily crystalline with lots of olivine and pyroxene. Being placed in marker box with sample 21. Location 15.0901707 173.7449711; depth 1433m	538
2017-11-27	04:43:42	-15.08998	-173.74493	***1421.2***	8.1	324.4	ROV off bottom and moving.	539

S086 W Mata

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S086 W Mata Logger Comments	Record #
2017-11-27	18:30:22	-15.09028	-173.73353	***1868.5***	64.4	353.1	Bottom coming up in 12 m.	2
2017-11-27	18:32:31	-15.09029	-173.73352	***1917.0***	8.2	357.5	Bottom in sight.	3
2017-11-27	18:32:52	-15.09028	-173.73352	***1914.7***	4.8	358.5	Intact pillows that are surrounded by sediments.	4
2017-11-27	18:33:50	-15.09029	-173.73352	***1916.2***	4.5	1.1	Setting down. Intact pillows surrounded by sediments.	5
2017-11-27	18:35:51	-15.09022	-173.73349	***1915.9***	4.4	359.6	We've lost the background for our nav screen. They're working on it.	6
2017-11-27	18:37:25	-15.09018	-173.73351	***1913.2***	4.4	357.7	Hanging out here until we get the nav background back.	7
2017-11-27	18:39:23	-15.09013	-173.73351	***1910.5***	5.5	326.3	Sitting here over this bulbous pillow/lobate. The pillow is broken off. The lobate looks intact.	8
2017-11-27	18:43:29	-15.09011	-173.73352	***1908.8***	6.8	326.3	Still near out touchdown site waiting for the nav background.	9
2017-11-27	18:46:50	-15.09011	-173.73352	***1907.7***	6.8	326.1	We got the nav background back.	10
2017-11-27	18:47:54	-15.09011	-173.73350	***1907.8***	6.7	313.0	Still getting our bearings. Got the nav background again. Still getting all the other screens up.	11
2017-11-27	18:50:49	-15.09016	-173.73345	***1912.3***	7.3	292.0	We are probably on the new flow now.	12
2017-11-27	18:51:22	-15.09014	-173.73348	***1911.7***	4.4	294.7	We're at WP1	13
2017-11-27	18:52:04	-15.09015	-173.73348	***1912.1***	5.6	277.5	Seeing sulfur in the cracks between the pillows.	14
2017-11-27	18:52:48	-15.09025	-173.73351	***1914.4***	6.3	254.3	Going to head to the south of the rough terrain.	15
2017-11-27	18:53:08	-15.09028	-173.73354	***1913.7***	4.9	253.6	Pillows.	16
2017-11-27	18:53:19	-15.09030	-173.73355	***1913.6***	4.4	254.0	Blue water here.	17
2017-11-27	18:53:28	-15.09032	-173.73356	***1914.0***	5.1	253.7	We're looking at the distal edge of this flow.	18
2017-11-27	18:53:52	-15.09035	-173.73357	***1915.3***	5.2	249.9	We're at the very edge of the flow - The SE edge of the flow.	19
2017-11-27	18:54:17	-15.09039	-173.73360	***1914.1***	3.5	249.8	We're out of/near the edge of the flow.	20
2017-11-27	18:54:29	-15.09040	-173.73360	***1913.2***	4.7	281.2	We are now on the distal edge of the lava flow. Sed between pillows.	21

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S086 W Mata Logger Comments	Record #
2017-11-27	18:55:11	-15.09037	-173.73363	***1910.3***	5.8	357.1	Not sure if the sed was in place before the flow or is volcaniclastics from the eruption,.	22
2017-11-27	18:55:33	-15.09033	-173.73364	***1909.9***	4.4	355.9	Looking at pillow lava flows - that flow at 0.5 - 1m / minute.	23
2017-11-27	18:56:37	-15.09022	-173.73366	***1907.4***	3.7	354.4	The pillow lavas are ~ 1m in diameter.	24
2017-11-27	18:56:54	-15.09021	-173.73365	***1907.6***	4.7	345.9	Looking for a place where the pillows are cracked open for a sample.	25
2017-11-27	18:57:11	-15.09021	-173.73365	***1908.5***	4.6	337.2	Light dusting of sediment - some sulfur in the cracks. This flow is probably less than a year old.	26
2017-11-27	18:57:57	-15.09020	-173.73365	***1909.8***	2.0	336.0	Setting down for our first sample on the SW distal end of this flow.	27
2017-11-27	18:58:26	-15.09020	-173.73365	***1909.8***	1.7	336.4	Picking our pillow.	28
2017-11-27	18:58:47	-15.09019	-173.73365	***1909.8***	1.7	336.2	Still looking around for the perfect pillow.	29
2017-11-27	19:02:48	-15.09020	-173.73365	***1907.9***	4.1	335.8	Ken is looking for a somewhat cracked rock but in place. That is easier to sample.	30
2017-11-27	19:04:32	-15.09019	-173.73365	***1909.5***	1.8	284.5	Most of the lavas here are intact.	31
2017-11-27	19:05:02	-15.09019	-173.73365	***1909.5***	1.9	283.6	Going in for the grab.	32
2017-11-27	19:05:25	-15.09019	-173.73365	***1909.5***	1.9	283.6	10 cm lasers on.	33
2017-11-27	19:05:50	-15.09019	-173.73365	***1909.5***	1.9	283.6	**S86-Rock-01**. Angular piece of broken in-place pillow. Z=1930m.	34
2017-11-27	19:06:54	-15.09019	-173.73365	***1909.5***	1.9	283.7	S86-Rock-01. 25 cm with thick glass rind. Squat pillow fragment very angular. Piece is from the center of pillow all the way to rind. Olivine and pyroxene crystal visible in this boninite.	35
2017-11-27	19:08:27	-15.09019	-173.73365	***1909.6***	1.8	283.8	S86-Rock-01 cont. Going into the front milkcrate. Beautiful banding on the bottom and top. Darker center. A small amount of aluminum sulfur staining.	36
2017-11-27	19:09:25	-15.09019	-173.73365	***1909.5***	1.8	283.9	S86-Rock-01 in forward milk crate. Z=1930. Angular 25cm fragment of boninite pillow. 15d 05' 24.695" 173d 44' 01.121".	37
2017-11-27	19:12:03	-15.09019	-173.73367	***1905.2***	4.4	313.5	Heading upslope now. passing over pillows with some type of coating - looks like volcaniclastic seds and possibly sulfur.	38
2017-11-27	19:13:50	-15.09015	-173.73373	***1899.9***	4.4	313.7	Cracked intact pillows.	39
2017-11-27	19:14:05	-15.09014	-173.73374	***1899.1***	3.2	314.0	Mostly elongated pillow tubes. Round bulbous pillows and elongated pillow tubes.	40
2017-11-27	19:14:43	-15.09012	-173.73376	***1896.5***	3.9	315.8	Some crawly animal tracks (lines in sediment).	41

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S086 W Mata Logger Comments	Record #
2017-11-27	19:15:07	-15.09010	-173.73375	***1895.6***	3.8	321.7	Beautiful elongated pillow tubes and some bulbous pillow lavas.	42
2017-11-27	19:16:28	-15.09006	-173.73380	***1893.5***	2.7	322.1	Broken open pillow that lava disgorged out of it.	43
2017-11-27	19:16:48	-15.09006	-173.73380	***1893.2***	1.8	322.0	Slowly but surely these pillows formed.	44
2017-11-27	19:17:14	-15.09004	-173.73382	***1892.0***	1.9	322.6	Large bulbous pillows over smoother elongate pillows.	45
2017-11-27	19:17:41	-15.09001	-173.73382	***1891.9***	2.2	322.6	Some of the pillows appear hollow - because of drainout. Mineral deposits: oxides of iron; hydroxides of aluminum. Some of the material are grazed by microorganisms.	46
2017-11-27	19:18:43	-15.08999	-173.73384	***1890.5***	2.5	296.3	Jumbled array of pillows (broken large pillows) over more elongate pillows flowing down slope.	47
2017-11-27	19:19:18	-15.08999	-173.73386	***1889.0***	2.9	293.9	Coming on top of a little step. Combination of bubbles and crystals make these boninite. pillows look rough.	48
2017-11-27	19:20:34	-15.08999	-173.73391	***1886.9***	1.9	294.2	Steeper slope with lots of broken pillows - and fragmental debris.	49
2017-11-27	19:21:15	-15.08997	-173.73396	***1885.3***	3.3	293.7	Orange and yellow staining on pillows.	50
2017-11-27	19:21:40	-15.08997	-173.73398	***1884.9***	3.8	293.8	Zooming in on pink things. It's sulfur. White stuff is probably sulfur. Can also see the crystals in the rock.	51
2017-11-27	19:22:30	-15.08997	-173.73399	***1884.6***	3.8	293.7	Pinkish stuff is probably iron oxide staining. Chemical precipitants of one type or other and a little bit of ash.	52
2017-11-27	19:24:28	-15.08996	-173.73404	***1880.1***	3.2	293.7	Seeing more broken pillows.	53
2017-11-27	19:25:23	-15.08992	-173.73404	***1877.9***	4.5	294.0	Continuing upslope. We're still in the area where the flow is less than 10m thick.	54
2017-11-27	19:25:58	-15.08992	-173.73406	***1876.3***	3.5	293.6	Mound of broken jumbled up pillow lava.	55
2017-11-27	19:27:45	-15.08991	-173.73413	***1875.0***	4.7	304.3	Jumbled flow probably flowed relatively down the hill and inflated back out as the slope angle shallows; we will attempt to sample.	56
2017-11-27	19:29:08	-15.08992	-173.73416	***1876.4***	2.9	335.7	Side view of the lava flow.	57
2017-11-27	19:31:06	-15.08992	-173.73417	***1875.9***	2.5	336.1	Going to sample this flow that looks almost like a sheet flow.	58
2017-11-27	19:31:40	-15.08992	-173.73417	***1875.9***	1.8	336.4	**S86-rock-02**. From this "sheet/lobate" flow (a short little rivulet in the midst of these pillows) Jumbled on the edges. Will grab a piece of the jumbled flow at the edge.	59

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S086 W Mata Logger Comments	Record #
2017-11-27	19:33:14	-15.08991	-173.73416	***1875.9***	0.0	336.4	S86-rock-02 cont. Lobate-ish / sheety-ish small flow here. Grabbing small piece from edge of flow.	60
2017-11-27	19:34:50	-15.08991	-173.73416	***1876.0***	1.9	336.3	S86-rock-02 cont. Going in for a different piece as the first one was dropped.	61
2017-11-27	19:36:41	-15.08992	-173.73416	***1876.0***	1.5	336.4	S86-rock-02 cont. Still attempting a sample. Are going to use port arm instead of stbd.	62
2017-11-27	19:41:11	-15.08990	-173.73412	***1876.0***	1.9	336.7	Pulling out the stbd arm now (were using the port arm previously). Going in for the grab.	63
2017-11-27	19:41:55	-15.08990	-173.73415	***1876.0***	2.1	336.0	S86-rock-02 cont. Fragile and crumbly from "ribbon edge" of sheetish flow.	64
2017-11-27	19:42:48	-15.08991	-173.73416	***1876.0***	2.2	336.7	S86-rock-02 cont. Sparkling glass and green crystals of olivine and pyroxene. 10 cm curvilinear crystal rich mostly glassy. Broke into 2 pieces. Going in for another.	65
2017-11-27	19:44:03	-15.08992	-173.73415	***1875.9***	2.2	336.5	S86-rock-02 cont. Into partition 5 with first 2 pieces. Picking up another large piece of this flow. Glass on all sides (except broken piece). Supreme boninite.	66
2017-11-27	19:45:45	-15.08992	-173.73416	***1876.1***	2.1	336.7	S86-rock-02 cont. Beautiful rock. Piece 3 30cm x 20cm x15. Rectangular preserved folded surface of sheet . Lots of crystals near glass. Not as many in interior.	67
2017-11-27	19:46:54	-15.08991	-173.73416	***1874.4***	3.0	336.0	Heading upslope.	68
2017-11-27	19:47:19	-15.08990	-173.73416	***1873.8***	2.5	310.6	S86-rock-02 cont. Z=1895. 15d 05' 21.811" 173d 44' 03.53" position for sample 2.	69
2017-11-27	19:48:27	-15.08990	-173.73422	***1870.6***	2.2	294.2	Continuing upslope toward waypoint 2.	70
2017-11-27	19:48:54	-15.08989	-173.73425	***1868.7***	2.9	295.0	Some broken pillows and fragments on this steeper slope.	71
2017-11-27	19:50:05	-15.08986	-173.73434	***1860.8***	3.8	294.8	Staining only in the cracks of these pillows. Lightly sedimented - not sure what the seds are (volcaniclastics? hydrothermal?)	72
2017-11-27	19:50:54	-15.08986	-173.73432	***1856.9***	5.4	294.7	Bulbous pillows with striations. Stretching cracks on that pillow.	73
2017-11-27	19:51:56	-15.08978	-173.73441	***1853.1***	5.5	294.5	More yellow staining on these pillows - in the cracks.	74
2017-11-27	19:52:55	-15.08980	-173.73450	***1849.6***	5.8	294.3	Broken pillows scattered about.	75
2017-11-27	19:53:19	-15.08981	-173.73454	***1847.5***	5.1	295.0	Coming up over a series of gentle mounds.	76
2017-11-27	19:53:39	-15.08980	-173.73454	***1845.2***	4.0	291.2	Elongate pillows here.	77

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S086 W Mata Logger Comments	Record #
2017-11-27	19:53:54	-15.08980	-173.73451	***1844.1***	5.0	290.3	A small amount of sed dusting. Much less sed than we saw at the distal edge of the flow.	78
2017-11-27	19:54:32	-15.08982	-173.73453	***1840.0***	4.8	290.0	We need to be able to sample the sediments to know where they came from.	79
2017-11-27	19:55:29	-15.08980	-173.73464	***1835.9***	3.0	290.2	Lots of open spaces not filled with sediments.	80
2017-11-27	19:55:52	-15.08980	-173.73467	***1834.2***	2.7	290.4	White blobs could be sulfur or hydrothermal.	81
2017-11-27	19:56:13	-15.08979	-173.73469	***1832.3***	3.4	290.1	Microbial mat?	82
2017-11-27	19:56:27	-15.08978	-173.73470	***1831.3***	3.6	290.6	More broken and decapitated pillows as the slope increases.	83
2017-11-27	19:57:07	-15.08978	-173.73470	***1828.4***	5.2	289.5	Bulbous hanging pillows.	84
2017-11-27	19:57:43	-15.08976	-173.73472	***1825.3***	7.8	289.7	Rough-bread crusted surface large pillow. Crenulated (broken and folded) exterior.	85
2017-11-27	19:58:23	-15.08975	-173.73475	***1821.9***	5.4	290.2	Seeing more seds now on the pillows.	86
2017-11-27	19:59:22	-15.08973	-173.73479	***1816.9***	4.4	290.1	At the base of another little slope.	87
2017-11-27	19:59:48	-15.08971	-173.73481	***1815.7***	0.0	290.1	Crenulated pillows.	88
2017-11-27	20:00:16	-15.08971	-173.73483	***1813.9***	3.2	290.1	Lots of fragments here and broken pillows. Can see iron staining inside.	89
2017-11-27	20:02:02	-15.08968	-173.73490	***1806.8***	0.0	289.4	Still continuing up slope.	90
2017-11-27	20:02:21	-15.08968	-173.73491	***1805.6***	0.0	290.1	About 35m SE of WP2.	91
2017-11-27	20:03:38	-15.08970	-173.73497	***1801.3***	3.5	290.1	Still traveling over pillow lavas.	92
2017-11-27	20:04:34	-15.08968	-173.73503	***1797.4***	3.4	290.3	Sideways lave tube	93
2017-11-27	20:04:44	-15.08968	-173.73504	***1796.7***	2.9	290.6	Elephant pillow.	94
2017-11-27	20:05:13	-15.08966	-173.73507	***1794.6***	3.4	290.4	We've got 2 samples in the bag. We will head toward waypoint 3.	95
2017-11-27	20:08:47	-15.08958	-173.73534	***1781.0***	4.1	244.5	We're going to skirt along to the SW in the 10-20m thick lava zone.	96
2017-11-27	20:09:14	-15.08960	-173.73537	***1778.6***	5.8	243.7	Pillow lavas - of course - truncated on this steep slope.	97
2017-11-27	20:09:56	-15.08963	-173.73540	***1775.9***	7.5	242.0	Pillow tubes hanging out and freestanding.	98
2017-11-27	20:10:15	-15.08963	-173.73540	***1774.7***	8.1	242.4	Coming into a bit thicker part of the flow.	99
2017-11-27	20:10:43	-15.08963	-173.73542	***1772.0***	8.6	242.9	The slope is much steeper here.	100
2017-11-27	20:11:18	-15.08961	-173.73543	***1768.4***	10.5	240.9	Amazing slope with long narrow pillow lavas and bulbous pillows. Fresh lavas.	101
2017-11-27	20:12:36	-15.08965	-173.73548	***1762.7***	0.0	243.2	Young pristine pillows. 0.5 - 1 m across and 5 - 8 m long. Pillows flowed over each other.	102
2017-11-27	20:14:00	-15.08967	-173.73558	***1758.5***	2.6	243.2	Odd looking sort of transition from bulbous pillows to more smooth pillows. - or maybe it is just the lighting.	103

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S086 W Mata Logger Comments	Record #
2017-11-27	20:14:49	-15.08969	-173.73563	***1756.4***	3.4	244.1	Actually still look like the same types of lava. Elongated pillows that flowed down slope.	104
2017-11-27	20:15:18	-15.08971	-173.73566	***1753.6***	3.4	244.0	Some orangish staining in the pillow cracks. Very lightly sedimented.	105
2017-11-27	20:15:58	-15.08974	-173.73570	***1750.6***	4.5	243.9	Heading W/SW toward waypoint 3 on new lavas that are 10 - 20 m thick.	106
2017-11-27	20:17:06	-15.08978	-173.73577	***1745.3***	2.6	244.1	Maybe a little more sediment in some of the pockets.	107
2017-11-27	20:17:40	-15.08980	-173.73582	***1743.5***	2.8	243.7	On young lava flows don't see much - if any - macrofauna.	108
2017-11-27	20:18:03	-15.08981	-173.73585	***1743.2***	2.4	243.7	Coming up to another flattish area. Haven't seen anything this level during this dive.	109
2017-11-27	20:19:02	-15.08986	-173.73593	***1746.3***	3.0	243.8	We're 3 meters above the bottom and dropping down again.	110
2017-11-27	20:19:22	-15.08987	-173.73596	***1746.2***	1.6	243.8	Slope is increasing again. Pillows perpendicular to slope turning into fragmented angular talus.	111
2017-11-27	20:20:09	-15.08990	-173.73605	***1743.8***	3.4	243.5	Pillow fragments. Landslide deposit probably from this eruption.	112
2017-11-27	20:21:15	-15.08993	-173.73615	***1742.1***	3.6	242.9	Probably landslide from steep slope to the north.	113
2017-11-27	20:21:52	-15.08995	-173.73614	***1742.9***	4.6	264.3	Next we will grab some sediment debris from the landslide debris (from new flow).	114
2017-11-27	20:22:41	-15.08996	-173.73615	***1745.3***	2.6	292.8	Going in for a push core in this landslide debris of rocks and sands.	115
2017-11-27	20:23:07	-15.08996	-173.73615	***1745.4***	2.1	291.9	**S86-Sed-03**. Sediment push core with a catcher in the bottom. Setting up to sample.	116
2017-11-27	20:25:19	-15.08997	-173.73615	***1745.4***	1.6	292.6	Going to the push core with the catcher on the bottom. Sediment push-core 4 seems to have come apart. That didn't work. Won't be using that push core.	117
2017-11-27	20:29:17	-15.08999	-173.73614	***1745.4***	2.0	292.8	S86-Sed-03 cont. Attempting again with push core 3. Going in for the grab. So far it's holding together. It broke.	118
2017-11-27	20:31:03	-15.08997	-173.73615	***1745.4***	2.0	292.7	SAMPLE 3 sediment core did not work. Will continue on this traverse and re-use the S86-03 sample number for our next attempt at a sample.	119
2017-11-27	20:33:05	-15.08996	-173.73615	***1745.4***	2.1	292.9	Going to try a regular old push core here instead (the one without the catcher on the bottom).	120

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S086 W Mata Logger Comments	Record #
2017-11-27	20:36:16	-15.08997	-173.73615	***1745.3***	2.1	292.7	S86-Sed-03. Attempting push core again with corer that doesn't have the catcher at the bottom. Housekeeping. Don't have the sample.....yet.....	121
2017-11-27	20:39:08	-15.08997	-173.73613	***1745.3***	2.1	292.6	Going in for the push core.	122
2017-11-27	20:40:31	-15.08997	-173.73614	***1745.1***	2.4	291.9	Poking around in the sediment that is deceptively thin here overlying the lavas.	123
2017-11-27	20:41:21	-15.08996	-173.73615	***1745.0***	2.4	294.7	This ~5 cm thick sediment is ~ 5 cm thick.	124
2017-11-27	20:42:06	-15.08996	-173.73615	***1745.5***	2.1	294.1	S86-Sed-03. Scooping up this coarse black sediment. Lots of crystals in the sediment. Fine component as well but most particles are several mm in diameter to 1 cm fragments. Pile of volcaniclastic seds in core.	125
2017-11-27	20:44:25	-15.08996	-173.73615	***1745.7***	1.9	295.9	S86-Sed-03. Want to look at the fragments in the sediments. Want to look if they are deformed (still hot). Pouring sediment into #4 compartment (but taken with PC 2).	126
2017-11-27	20:45:59	-15.08997	-173.73615	***1745.7***	2.0	295.4	S86-Sed-03. Push core used as a scoop. Volcaniclastic sediments from landslide area. Z=1764. 15d 05' 23.87' 173d 44' 10.184".	127
2017-11-27	20:48:10	-15.09000	-173.73618	***1741.3***	5.5	290.7	Moving on. See more pillow debris.	128
2017-11-27	20:48:39	-15.09001	-173.73623	***1739.9***	4.7	289.7	Transitioning out of volcaniclastic sands in landslide area. Now into big pillow debris - some several m in diameter.	129
2017-11-27	20:49:21	-15.09002	-173.73632	***1737.7***	6.8	289.7	Seeing some intact pillows now as well as decapitated levels and debris.	130
2017-11-27	20:49:53	-15.09004	-173.73639	***1734.3***	6.6	289.6	More in place pillow lavas now - some decapitated. See some yellow staining in the center of the decapitated pillows.	131
2017-11-27	20:50:55	-15.09009	-173.73650	***1728.9***	6.4	290.2	All broken pillow faces - very steep slope. Very shelly with hollow interiors.	132
2017-11-27	20:53:18	-15.09021	-173.73675	***1716.9***	14.6	308.9	Doesn't take much of a slope change to go from in place pillows to broken pillows.	133
2017-11-27	20:53:38	-15.09021	-173.73677	***1716.3***	13.2	314.1	We're at the very steep escarpment now and lots of broken pillows. See some shiny black lavas that are not broken as well.	134
2017-11-27	20:54:11	-15.09023	-173.73680	***1714.5***	16.3	313.7	Decapitated pillows hanging out on this steep slope.	135

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S086 W Mata Logger Comments	Record #
2017-11-27	20:55:06	-15.09025	-173.73683	***1709.2***	19.6	314.0	More staining on the rock surfaces here. This rock face probably formed during or shortly after the eruption thus seeing lots of chemical banding. Warm water needed to form these chemical precipitates.	136
2017-11-27	20:55:54	-15.09025	-173.73684	***1702.5***	0.0	313.7	Huge broken up pillow lavas with staining in the interior of the pillows.	137
2017-11-27	20:56:33	-15.09024	-173.73686	***1697.8***	0.0	314.3	Slope has changed here. Was near vertical wall previously.	138
2017-11-27	20:56:51	-15.09022	-173.73687	***1697.7***	0.0	314.2	Slope is more gentle here and seeing lots of sand (volcaniclastic).	139
2017-11-27	20:57:20	-15.09017	-173.73686	***1697.0***	3.6	314.1	Lavas are more shelly here. Not as many broken lavas as on the steep wall.	140
2017-11-27	20:57:54	-15.09012	-173.73688	***1696.1***	3.5	289.6	Trying to find a rock sample here. at the top of the landslide where the slope declines.	141
2017-11-27	20:59:07	-15.09012	-173.73691	***1696.1***	3.2	276.8	"Shelly" lavas are hollow pillows.	142
2017-11-27	20:59:25	-15.09011	-173.73691	***1696.5***	2.0	275.6	Setting down to attempt another rock sample. Jumbled up pieces. Cracked pieces that have fallen a handful of feet.	143
2017-11-27	21:00:03	-15.09012	-173.73691	***1696.5***	1.7	274.9	**S86-rock-04**. Above the steep slope of the landslide - on a more gentle slope. Just to the west of WP3.	144
2017-11-27	21:01:10	-15.09012	-173.73691	***1696.5***	1.7	277.5	S86-rock-04 cont. Grab of pillow piece. Z=1712. 10 cm mostly glassy pillow interior piece. Lots of minerals. Going into partition 6.	145
2017-11-27	21:02:39	-15.09012	-173.73691	***1696.7***	1.7	274.3	S86-rock-04 cont. ~10 cm. Crystal rich irregularly shaped (somewhat roundish).	146
2017-11-27	21:03:48	-15.09011	-173.73687	***1694.3***	3.5	275.0	Moving on toward WP4. Blue water to the left of screen. More sediment here.	147
2017-11-27	21:05:14	-15.09005	-173.73701	***1690.1***	4.0	283.8	S86-rock-04. Location: 15d 5'24.458" 173d 44' 12.815".	148
2017-11-27	21:06:22	-15.09000	-173.73709	***1683.6***	6.2	283.4	Heading up this steep slope again. Elongate pillows. Less broken pillows.	149
2017-11-27	21:07:26	-15.08995	-173.73720	***1676.2***	5.6	281.2	Back into all in place lavas.	150
2017-11-27	21:08:05	-15.08994	-173.73725	***1672.2***	4.9	281.1	Slope is starting to flatten out a bit. Agrees well with the bathymetry.	151
2017-11-27	21:08:34	-15.08992	-173.73729	***1668.7***	3.7	281.4	Pillow flows along a slope with varying degrees of sedimentation visible. Two events here, or slope-related?	152

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2017-11-27	21:09:43	-15.08986	-173.73736	***1660.9***	4.2	281.1	Pillow in foreground is partially drained.	153
2017-11-27	21:10:02	-15.08987	-173.73740	***1659.4***	4.0	281.0	Whether or not the pillows break is dependent on the per-existing slope; this kind of eruption tends to build its own topography.	154
2017-11-27	21:10:40	-15.08986	-173.73746	***1655.5***	4.4	281.2	Angle at which sediments start depositing depends on physical characteristics of the seds themselves. Steeper slopes lead to longer pillow flows; becoming more bulbous when the slope shallows.	155
2017-11-27	21:11:42	-15.08984	-173.73755	***1648.9***	5.4	275.4	More whitish streaks visible on these pillows, probably related to hydrothermal activity leaving secondary deposits.	156
2017-11-27	21:12:26	-15.08985	-173.73760	***1645.0***	5.2	277.8	This survey area is part of one of the "holes" in our Sentry dataset; no information is available there for our geotiff used as a reference during dives.	157
2017-11-27	21:13:11	-15.08983	-173.73767	***1641.2***	3.3	277.3	More evidence of mineral deposits after these pillows were deposited	158
2017-11-27	21:13:50	-15.08980	-173.73773	***1638.4***	3.3	277.4	Pile of pillow lavas; progressively younger as you go up section.	159
2017-11-27	21:14:24	-15.08977	-173.73777	***1635.7***	4.0	277.2	Decapitated pillows and fragments along slope. Smaller diameter than the previous few frames. Some orange deposits on sediments starting to become visible	160
2017-11-27	21:15:22	-15.08974	-173.73782	***1629.5***	5.4	276.8	Steep slope with many small diameter broken pillows	161
2017-11-27	21:16:31	-15.08974	-173.73788	***1619.1***	11.2	307.0	Noticing a small increase of smoke in the water; possibility of some venting further uphill. Fewer broken pillows and more intact and in place pillows.	162
2017-11-27	21:17:49	-15.08973	-173.73783	***1607.9***	0.0	306.5	More orange hydrothermal deposits on the pillows in this section	163
2017-11-27	21:19:04	-15.08964	-173.73804	***1601.7***	9.8	306.2	Lobate flow morphology as the slope flattens. Waypoint 4	164
2017-11-27	21:19:30	-15.08961	-173.73803	***1601.6***	2.8	305.9	Waypoint 4; sediments but probably not thick	165
2017-11-27	21:19:56	-15.08958	-173.73802	***1600.3***	6.8	303.7	Streamers in volcaniclastic sediments. These are minor disturbances as some of the sediments slump in small amounts.	166
2017-11-27	21:20:53	-15.08949	-173.73806	***1600.1***	6.7	294.9	Lava flows emplaced on top of sediments. Unstable configuration leads to broken pillows and scarps.	167

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S086 W Mata Logger Comments	Record #
2017-11-27	21:21:55	-15.08943	-173.73800	***1608.1***	3.2	324.0	"Hey pillow lava how're you doing? Fine thank you" Humanoid face expected out of some comic book.	168
2017-11-27	21:22:40	-15.08940	-173.73792	***1608.2***	3.1	328.3	Channelized sediment flow "chute".	169
2017-11-27	21:23:12	-15.08940	-173.73785	***1610.7***	5.5	5.7	"Compound flattened piece of lava" - not pillow, not lobate	170
2017-11-27	21:24:29	-15.08937	-173.73769	***1618.3***	0.0	345.5	Uneven slope with many pillows that look intact.	171
2017-11-27	21:26:45	-15.08914	-173.73755	***1621.4***	15.9	302.4	Abundant broken pillow heads	172
2017-11-27	21:27:13	-15.08911	-173.73751	***1620.4***	14.4	302.0	Little sediment and plenty of iron staining on the broken faces. Wisps of smoke visible in the water.	173
2017-11-27	21:29:08	-15.08895	-173.73737	***1618.1***	15.5	300.8	Variety of diameters and morphology in pillow stack. Sedimentation level increasing. Probably volcaniclastic sand piling up/	174
2017-11-27	21:31:13	-15.08878	-173.73723	***1618.6***	17.1	302.3	Slope nearly vertical	175
2017-11-27	21:31:35	-15.08875	-173.73723	***1618.2***	19.7	302.7	Waypoint 6	176
2017-11-27	21:32:58	-15.08875	-173.73727	***1611.8***	0.0	296.8	Stack of drained pillows	177
2017-11-27	21:35:10	-15.08866	-173.73743	***1603.8***	4.5	307.9	This platy morphology forms when a flow stalls momentarily and it sort of folds over on itself.	178
2017-11-27	21:36:10	-15.08863	-173.73747	***1599.9***	3.5	307.5	More platy drained flows. Quenched margins with molten interior that breaks out and freezes as it drains.	179
2017-11-27	21:37:09	-15.08860	-173.73751	***1596.4***	4.0	307.1	Flatter flow with volcaniclastic sediment.	180
2017-11-27	21:37:58	-15.08858	-173.73756	***1595.2***	2.4	307.0	Note for log - we intentionally skipped waypoint 5 and went straight from 4 to 6.	181
2017-11-27	21:38:30	-15.08857	-173.73759	***1595.0***	1.2	306.1	Sedimented plate from a lobate lava that has orange staining. Possible microbial origin and may indicate that diffuse flow might be nearby.	182
2017-11-27	21:40:20	-15.08852	-173.73763	***1595.1***	0.7	302.9	Circular depressions with orange deposits. We are taking a closer look.	183
2017-11-27	21:41:31	-15.08848	-173.73764	***1595.7***	1.9	301.8	Close-up of one of the potholes on top of the lobate lava flow. Either an iron or sulfur-based deposit. Probably a microbial colony.	184
2017-11-27	21:42:17	-15.08848	-173.73765	***1596.1***	0.3	300.7	Macro of the mat	185
2017-11-27	21:42:33	-15.08848	-173.73765	***1596.1***	0.3	300.7	Microbial mat and spicules of unknown origin. They look like pipette tips.	186
2017-11-27	21:43:01	-15.08848	-173.73765	***1596.1***	0.3	300.7	Close-up of microbial mat and spicules. Question: Why do these depressions form and why do the microbial mats form within these?	187
2017-11-27	21:44:38	-15.08848	-173.73765	***1596.1***	0.3	300.7	The next pit over has a rock in it, but no microbial colonies.	188

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S086 W Mata Logger Comments	Record #
2017-11-27	21:45:30	-15.08847	-173.73766	***1596.1***	0.3	300.7	Zooming in on these circular depressions at the top of the lobate lava flow. Where microbes tend to collect. Not sure if iron or sulfur orange deposits.	189
2017-11-27	21:46:15	-15.08847	-173.73766	***1596.1***	0.3	300.7	The orange deposit just blew around so probably microbial.	190
2017-11-27	21:47:37	-15.08847	-173.73766	***1594.7***	1.8	302.2	Heading toward waypoint 6 (cut out waypoint 5).	191
2017-11-27	21:48:12	-15.08844	-173.73769	***1594.0***	1.2	302.0	How thick are the sediments here? 10-20cm at least??	192
2017-11-27	21:48:57	-15.08843	-173.73773	***1593.4***	1.5	301.9	The sediments are thick enough to bury most of the pillows so must be pretty thick.	193
2017-11-27	21:49:19	-15.08842	-173.73775	***1593.0***	0.7	301.8	White microbial mat to the left.	194
2017-11-27	21:49:32	-15.08841	-173.73777	***1592.6***	0.9	301.7	More pits - this time without the orange stuff.	195
2017-11-27	21:49:59	-15.08842	-173.73777	***1592.7***	1.7	292.0	Looking at the bacterial mat in the cracks in the large bulbous pillows.	196
2017-11-27	21:50:41	-15.08843	-173.73779	***1592.0***	1.5	290.9	In this area the new flow is 40 - 45 m thick.	197
2017-11-27	21:50:58	-15.08844	-173.73781	***1591.8***	1.5	301.2	Big monstrous pillows here.	198
2017-11-27	21:51:14	-15.08844	-173.73781	***1592.2***	2.0	311.3	Lots of patches of bac mat in the background.	199
2017-11-27	21:52:18	-15.08843	-173.73782	***1592.2***	1.2	311.5	**S86-rock-05**. Attempt to pick up crust of this large pillow (~3m across).	200
2017-11-27	21:53:43	-15.08843	-173.73782	***1592.2***	1.2	311.5	S86-rock-05 cont. Grabbing a large piece of pillow crust. Z=1607. Green crystals in the boninite are probably clinipyroxene. Lots of vesicles in the lava. In area of deep sediments.	201
2017-11-27	21:58:53	-15.08842	-173.73782	***1592.2***	1.3	322.9	S86-rock-05 cont. Breaking the large piece in half. Got a nice small chunk of this very vesicular. Pie-shaped wedge. Very vesicular on the bottom. Glassy on the top. ~30 cm (that seems large) long axis.	202
2017-11-27	22:02:16	-15.08843	-173.73782	***1592.2***	1.4	323.3	S86-rock-05 cont. Top rind of huge pillow in this area of deep sediments and the weird little depressions with gold floc. Z=1607	203
2017-11-27	22:03:24	-15.08843	-173.73781	***1592.2***	1.3	323.6	S86-rock-05 cont. Huge vesicles over a cm. Extremely large crystals. Partition 9. 15d 5' 17.926' 173d 44' 16.373''.	204
2017-11-27	22:05:26	-15.08844	-173.73781	***1591.1***	2.1	323.4	Approaching waypoint 7 where we will turn to the S/SW. Circular depressions in the sediment. Flocculent iron oxide deposits. Don't know why they are forming.	205

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S086 W Mata Logger Comments	Record #
2017-11-27	22:07:29	-15.08846	-173.73785	***1591.5***	1.6	284.2	Ripples in the volcaniclastic sediments. Lavas here are looking more lobate. with large pillows poking out here and there.	206
2017-11-27	22:08:53	-15.08850	-173.73788	***1591.2***	1.0	273.7	Lavas (large inflated pillow) poking through the sediment.	207
2017-11-27	22:10:06	-15.08853	-173.73789	***1591.0***	2.2	272.7	More "splotchy" zones of microbial colonies visible on top of lava flows and sediments.	208
2017-11-27	22:10:55	-15.08855	-173.73790	***1591.2***	1.9	272.9	Close-up of microbial colonies at the base of a pillow in one of the depressions.	209
2017-11-27	22:11:32	-15.08856	-173.73790	***1591.4***	1.6	272.8	Sediments are rippled and almost dune-like. Appears to be a thicker deposit here.	210
2017-11-27	22:12:55	-15.08860	-173.73790	***1591.3***	1.5	272.0	Microbial colonies tend to concentrate in depressions. Debating whether they are formed in place or deposited. Currently Ken favors in situ formation.	211
2017-11-27	22:15:31	-15.08871	-173.73794	***1590.2***	1.1	273.0	Coherent patches of bacterial mats	212
2017-11-27	22:16:08	-15.08873	-173.73796	***1589.3***	1.1	272.8	Only volcaniclastic sediment visible here; no rocks poking through.	213
2017-11-27	22:16:49	-15.08873	-173.73800	***1589.2***	0.9	272.5	Particularly large in situ microbial mat. Possibly two different types of orange deposits. The pits earlier have balled up colonies while in this frame it tends to mantle the sediment.	214
2017-11-27	22:18:01	-15.08872	-173.73803	***1589.3***	1.2	272.4	Buried pillow lava. Lots of volcaniclastic sediment.	215
2017-11-27	22:19:27	-15.08876	-173.73805	***1588.5***	0.8	272.4	Major microbial colony	216
2017-11-27	22:20:21	-15.08880	-173.73807	***1588.3***	1.4	273.2	Colors come from oxidized metals released from the microbes as waste. Chemosynthesis is prevalent at this depth.	217
2017-11-27	22:21:12	-15.08884	-173.73809	***1588.4***	1.7	272.6	thick and thin broad mat deposits and linear bands of iron-rich deposits reflecting the localization of fluid flows.	218
2017-11-27	22:22:42	-15.08894	-173.73817	***1590.7***	2.3	272.6	Seeing pillows poking out of the thick hydrothermal sediments and volcaniclastic sands.	219
2017-11-27	22:23:34	-15.08900	-173.73822	***1590.0***	3.3	272.2	We're in a thick part of the flow. Not as hot here.	220
2017-11-27	22:24:01	-15.08901	-173.73823	***1589.2***	3.1	272.2	Just approaching waypoint 8. Looking at broken pillows with more white and brown staining. Also iron staining.	221
2017-11-27	22:24:29	-15.08901	-173.73823	***1587.8***	5.1	271.7	At the base of a small slope. Pillow tubes.	222

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S086 W Mata Logger Comments	Record #
2017-11-27	22:24:49	-15.08902	-173.73824	***1587.1***	0.0	272.6	Appears to be an intact pillow lave with a broken lava on top. Lava and sand about 15 cm thick sitting on top the lava.	223
2017-11-27	22:25:22	-15.08903	-173.73825	***1586.3***	4.4	272.6	Circular depressions (sink holes). Seeing more pillows in place.	224
2017-11-27	22:26:20	-15.08909	-173.73825	***1585.4***	4.0	271.9	The long skinny things in the depression are not "spicules".	225
2017-11-27	22:26:45	-15.08911	-173.73826	***1585.4***	6.5	272.9	In place pillow lavas. Beautiful disgorged in front of us.	226
2017-11-27	22:27:06	-15.08913	-173.73827	***1585.4***	6.3	272.7	Viscous hot lava when it forms. Crystals; gas bubbles and lava. Flows in a more viscous way than lava without the crystal.	227
2017-11-27	22:27:55	-15.08917	-173.73826	***1585.2***	7.5	261.9	Viscosity; diffusion rate and slope control the size of the pillows. The slope also controls the size of the pillows.	228
2017-11-27	22:28:37	-15.08916	-173.73825	***1584.7***	9.4	226.0	Excellent pic of a pillow lava; with more lava flowing out of the bottom.	229
2017-11-27	22:29:15	-15.08916	-173.73825	***1584.1***	9.0	225.8	The pillow lavas are beautiful here.	230
2017-11-27	22:29:45	-15.08917	-173.73825	***1582.5***	9.3	226.0	Zooming in on this great strange pillow bulbous on right then comes up and flows down to the left.	231
2017-11-27	22:30:35	-15.08918	-173.73827	***1579.8***	5.9	226.2	We're at waypoint 8	232
2017-11-27	22:31:13	-15.08920	-173.73829	***1578.8***	3.9	225.9	More circular depressions. Two of them together.	233
2017-11-27	22:31:32	-15.08922	-173.73831	***1578.8***	2.7	225.9	Perhaps the orange stuff ended up in those holes because the currents carried it to the depressions.	234
2017-11-27	22:32:02	-15.08924	-173.73832	***1577.8***	2.1	225.8	The volcaniclastic sand is thick here - less microbial mat here.	235
2017-11-27	22:32:34	-15.08927	-173.73834	***1577.1***	1.7	226.1	Particularly deep and large sink hole here with dark volcaniclastic seds in the center.	236
2017-11-27	22:33:02	-15.08928	-173.73836	***1576.6***	1.5	226.4	Top of the lava flow is poking through in places.	237
2017-11-27	22:33:21	-15.08929	-173.73838	***1576.1***	1.4	226.0	Pillow off to the left.	238
2017-11-27	22:33:43	-15.08931	-173.73840	***1575.6***	1.4	226.4	Big depression at the end of a large pillow.	239
2017-11-27	22:34:24	-15.08933	-173.73842	***1573.9***	1.4	226.6	These pits have pillows in the center of them.	240
2017-11-27	22:34:40	-15.08934	-173.73844	***1573.8***	2.1	226.6	More broken fragment of pillows as we climb up a steeper slope.	241
2017-11-27	22:35:16	-15.08937	-173.73848	***1573.3***	2.1	226.7	We're starting to climb up a steep slope. Z=1590 at the bottom. Climbing up steep slope.	242
2017-11-27	22:36:22	-15.08940	-173.73853	***1571.5***	2.0	226.2	Seeing more rock poking out of the sediment.	243
2017-11-27	22:36:40	-15.08941	-173.73855	***1571.0***	2.2	225.9	We haven't seen much for microbial mat on this dive.	244

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S086 W Mata Logger Comments	Record #
2017-11-27	22:36:58	-15.08942	-173.73855	***1570.4***	2.2	225.1	The eruption yesterday was closer to the summit - may be why there was more extensive diffuse flow venting.	245
2017-11-27	22:37:22	-15.08944	-173.73857	***1569.3***	2.2	226.1	This flow is farther from the summit - could explain why we aren't seeing as much microbial activity.	246
2017-11-27	22:38:00	-15.08945	-173.73858	***1568.1***	2.0	226.5	Broken pillows beyond the thick sediments.	247
2017-11-27	22:38:41	-15.08947	-173.73860	***1566.0***	0.0	226.1	Moving up the steep slope. Looking at decapitated pillows and others that are not. Pit crater at the base.	248
2017-11-27	22:39:19	-15.08948	-173.73861	***1563.9***	2.5	226.0	Very coarse volcanic sediment.	249
2017-11-27	22:39:50	-15.08948	-173.73861	***1562.4***	4.6	225.9	In place pillows on this steep slope. Ken wants another rock without the orange or white mineralization.	250
2017-11-27	22:41:17	-15.08951	-173.73861	***1559.1***	8.5	226.3	Zooming in to find the perfect pillow for sampling.	251
2017-11-27	22:42:28	-15.08952	-173.73861	***1556.5***	10.4	225.8	Looking for a piece of pillow that includes the interior.	252
2017-11-27	22:42:51	-15.08952	-173.73860	***1555.1***	14.2	226.2	Lots of mineralization on these broken pillows.	253
2017-11-27	22:43:11	-15.08952	-173.73861	***1553.5***	12.9	226.3	More floc in the water than previously.	254
2017-11-27	22:43:38	-15.08953	-173.73861	***1551.3***	16.6	226.3	We're right at the top of that steep slope.	255
2017-11-27	22:44:20	-15.08953	-173.73863	***1550.0***	18.7	225.8	More glassy lavas to the left of this sedimented area.	256
2017-11-27	22:45:56	-15.08957	-173.73863	***1551.6***	0.0	226.7	Disgorged pillow lava ahead. The interior flowed out.. Scaleworm.	257
2017-11-27	22:46:20	-15.08955	-173.73863	***1551.5***	0.0	226.3	**S86-rock-06**. Rim of disgorged pillow lava. Crumbly; sediment cover; Z=1565. Good grab. Crystals and crumbly. Glassy outer rind of disgorged pillow.	258
2017-11-27	22:48:52	-15.08955	-173.73864	***1551.5***	0.0	226.8	S86-rock-06 cont. Stowed in biobox partition 1. 15d 5' 22.372" 173d 44' 19.042".	259
2017-11-27	22:52:12	-15.08955	-173.73865	***1551.6***	0.0	226.7	Going to lateral to the west a bit and see the ledge that is sticking out to the SW of us.	260
2017-11-27	22:55:32	-15.08972	-173.73854	***1560.3***	17.7	151.4	Changing of the guard. Ken is handing the baton to Bill.	261
2017-11-27	22:56:33	-15.08971	-173.73858	***1565.4***	0.0	308.8	We're on the south edge of this new eruption deposit.	262
2017-11-27	22:56:58	-15.08971	-173.73861	***1563.6***	0.0	309.0	We're on the edge of this large cliff.	263
2017-11-27	22:57:51	-15.08980	-173.73867	***1561.3***	0.0	306.2	We're going to lateral to WP9. Looking at this steep cliff edge.	264

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S086 W Mata Logger Comments	Record #
2017-11-27	22:58:57	-15.08988	-173.73873	***1557.0***	0.0	312.3	Broken pillow lavas with lots of mineralization in the centers.	265
2017-11-27	22:59:26	-15.08989	-173.73878	***1555.5***	0.0	311.8	Decapitated pillows on this steep slope - some unbroken pillows as well.	266
2017-11-27	23:00:15	-15.08993	-173.73885	***1553.5***	11.2	319.5	Thick accumulations of ash on top of the flows in some areas.	267
2017-11-27	23:00:37	-15.08994	-173.73888	***1552.2***	11.9	318.0	Elongated pillows parallel to the slope here. Broken pillows above the ledge.	268
2017-11-27	23:01:16	-15.08997	-173.73893	***1550.0***	19.9	317.7	Large area of pillows hanging down that look like elephant trunks hanging over the edge of this steep slope.	269
2017-11-27	23:02:11	-15.09001	-173.73899	***1547.7***	18.8	317.8	Rough surface to the lavas here.	270
2017-11-27	23:02:24	-15.09003	-173.73899	***1548.0***	16.0	317.8	Disgorged pillows here.	271
2017-11-27	23:02:52	-15.09006	-173.73901	***1547.8***	20.7	317.4	Lots of swirly tubes here.	272
2017-11-27	23:03:12	-15.09007	-173.73903	***1547.6***	0.0	317.8	Some intact pillows but mainly broken decapitated) pillows.	273
2017-11-27	23:03:42	-15.09009	-173.73907	***1547.2***	13.8	313.2	This flow is distinctive morphology. Like stair steps with a steep slope in between. We're looking at one of those steep platforms.	274
2017-11-27	23:04:29	-15.09013	-173.73912	***1548.0***	0.0	320.2	Moving into an area with more volcaniclastic sediments.	275
2017-11-27	23:04:50	-15.09014	-173.73914	***1548.8***	0.0	320.4	Large pillows above the sediments.	276
2017-11-27	23:05:07	-15.09016	-173.73915	***1549.9***	0.0	320.2	Most of these pillows are in place and not as broken up.	277
2017-11-27	23:05:28	-15.09019	-173.73917	***1550.6***	0.0	320.3	To the west here we see more broken pillow lavas that have fallen down slope.	278
2017-11-27	23:05:59	-15.09022	-173.73919	***1549.7***	0.0	317.9	We're ;going to start moving up the slope now. Lots of broken pillow fragments overlaying in place pillows.	279
2017-11-27	23:06:37	-15.09020	-173.73922	***1546.2***	4.7	317.7	The broken pillow fragments have lighter interiors (mineralization that occurred while they were cooling).	280
2017-11-27	23:07:29	-15.09015	-173.73925	***1543.6***	4.0	311.4	Talus rubble steep slope here.	281
2017-11-27	23:07:52	-15.09016	-173.73931	***1542.8***	4.2	312.9	To the left here it looks like some of the pillows may (?) be intact - the majority of this is pillow talus.	282
2017-11-27	23:09:03	-15.09018	-173.73939	***1538.8***	4.3	317.1	What a mess of broken up pillow lavas that have fallen down from above this steep slope.	283

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S086 W Mata Logger Comments	Record #
2017-11-27	23:10:28	-15.09017	-173.73946	***1533.7***	3.3	321.5	We're between waypoints 8 and 9 - coming up to the shallowest of these terraces (steps) up this steep slope.	284
2017-11-27	23:11:10	-15.09018	-173.73947	***1529.7***	5.9	320.5	Mostly-intact pillow tubes here. some decapitated; but most totally intact.	285
2017-11-27	23:11:55	-15.09019	-173.73948	***1525.4***	7.1	319.9	Coming up on the shoulder.	286
2017-11-27	23:12:31	-15.09018	-173.73952	***1523.3***	3.8	309.1	More volcaniclastic sands here now covering the pillows.	287
2017-11-27	23:12:58	-15.09017	-173.73955	***1521.9***	3.2	309.2	Lots more ash and sediment here. Gentler slope allows the ash to deposit on the pillows.	288
2017-11-27	23:14:04	-15.09012	-173.73958	***1517.6***	2.7	308.6	Up on the step now and it has flattened out. Seeing more of the pits here and lots of volcaniclastic sediments.	289
2017-11-27	23:14:47	-15.09009	-173.73965	***1517.0***	1.4	308.7	Thick pile of pillow lavas covered with this thick pile of volcanic ash.	290
2017-11-27	23:15:16	-15.09007	-173.73970	***1516.4***	1.5	308.8	Huge pillow (?) with striations.	291
2017-11-27	23:16:01	-15.09002	-173.73978	***1514.8***	2.1	308.3	Seeing more hydrothermal sediment.	292
2017-11-27	23:16:16	-15.09000	-173.73979	***1514.2***	2.7	314.6	Pillows sticking through with hydrothermal staining.	293
2017-11-27	23:16:43	-15.08998	-173.73982	***1513.5***	3.0	321.9	More hydrothermal staining in the background.	294
2017-11-27	23:17:06	-15.08998	-173.73986	***1512.8***	2.6	5.3	Hummocky terrain here.	295
2017-11-27	23:17:20	-15.08996	-173.73988	***1513.2***	2.9	11.5	Bright hydrothermal staining on large pillow. White and yellow staining.	296
2017-11-27	23:17:52	-15.08993	-173.73987	***1513.7***	1.7	346.5	No real sign of venting here. Lots of alteration.	297
2017-11-27	23:18:14	-15.08992	-173.73987	***1513.2***	1.7	344.6	We're at waypoint 10 now. We will head to the east - zigzag a bit.	298
2017-11-27	23:18:49	-15.08991	-173.73983	***1512.7***	2.8	11.1	We're up on the highest of the lava terraces. The new flow is deepest in this area. 20 - 30 m thick lava flow here.	299
2017-11-27	23:19:44	-15.08984	-173.73979	***1514.9***	1.6	10.9	Zoom in on big expanded cracked pillow. Orange staining is probably iron. Some microbial mat here.	300
2017-11-27	23:20:23	-15.08983	-173.73978	***1514.0***	2.1	17.6	Lots of hydrothermal staining on these pillows under the ash. Probably following the expansion cracks.	301
2017-11-27	23:20:54	-15.08983	-173.73972	***1512.4***	1.3	20.5	More hydrothermal staining on what looks like rolling hills.	302
2017-11-27	23:21:43	-15.08985	-173.73962	***1513.3***	3.8	36.7	Putting down a nav marker called "Painted Hills". Looks like a Monet painting.....	303

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S086 W Mata Logger Comments	Record #
2017-11-27	23:22:15	-15.08987	-173.73955	***1514.1***	3.6	36.8	All covered in volcanic ash - with white hydrothermal staining on the sharp edges and lots of yellow staining down lower.	304
2017-11-27	23:23:20	-15.08980	-173.73938	***1515.9***	4.4	24.1	Amazing tower in front of us. Looks like Devils Tower. Hornito is an eruptive structure.	305
2017-11-27	23:24:26	-15.08970	-173.73922	***1515.3***	10.7	311.2	Putting down a nav marker calling it Devils Tower.	306
2017-11-27	23:24:53	-15.08969	-173.73924	***1514.9***	7.7	5.7	Devils Tower is about 5 m high at least with lots of yellow staining. Some microbial mat and lots of yellow floc. It's a Hornito.	307
2017-11-27	23:27:29	-15.08971	-173.73925	***1513.0***	9.8	318.3	Devils Tower is the little peak we're seeing in the bathy. The vehicle is about 10m to the SW of the bathymetry feature.	308
2017-11-27	23:28:33	-15.08974	-173.73936	***1515.8***	4.5	15.7	Intact pillows flowing down the side. Don't see a whole lot of venting happening. Going to pick up a piece of rock here looking for something with no staining.	309
2017-11-27	23:30:06	-15.08969	-173.73937	***1516.8***	2.6	79.8	**S86-rock-07**. Piece of pillow crust - not intact from Devils Tower Hornito.	310
2017-11-27	23:32:11	-15.08969	-173.73935	***1515.3***	3.0	78.1	S86-rock-7 cont. Tetragonal with vesicles and crystals. 30+ cm long - nearly half of a pillows rind. Glass on both ends. Lots of phenocrysts. Pipe-like elongated vesicles. In marker box. Z=1529. From Devils Tower Hornito.	311
2017-11-27	23:34:44	-15.08967	-173.73933	***1514.1***	4.7	80.7	Will drop down and try a push core in the sediment to the side of the tower.	312
2017-11-27	23:35:27	-15.08960	-173.73934	***1520.2***	4.4	81.2	S86-rock-07 cont. 15d 5'22.869" 173d 44' 21.599.	313
2017-11-27	23:36:04	-15.08957	-173.73934	***1520.4***	0.0	63.7	Going to try a push core to collect some of this volcaniclastic sediment at the base of the tower.	314
2017-11-27	23:37:22	-15.08957	-173.73937	***1520.1***	2.5	327.8	Crazy-looking pattern in the sediments. White mat at the sharp edges of the pillows. Darker yellow seds in between.	315
2017-11-27	23:38:58	-15.08961	-173.73926	***1517.2***	3.5	309.6	Going to go up to the top of this slope. We've stirred up a lot of floc from the sediments.	316
2017-11-27	23:39:54	-15.08963	-173.73937	***1512.4***	7.1	211.0	Cleared out.. We're to the west of the tower. The small depressions are where the ash settles down.	317
2017-11-27	23:40:37	-15.08978	-173.73949	***1512.2***	5.0	222.3	Lunar-esque landscape here. We're about 10-15m SW of Devils Tower. It's obviously warm here. Lots of staining.	318

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S086 W Mata Logger Comments	Record #
2017-11-27	23:42:25	-15.08982	-173.73953	***1516.0***	0.0	223.6	There's a little bit of a crust on the surface. White and yellow bacterial mat.	319
2017-11-27	23:43:02	-15.08981	-173.73953	***1516.0***	0.0	221.1	Amphipods are jumping around on the surface of this crust. This formed as the lava flow beneath the ash was cooling.	320
2017-11-27	23:43:39	-15.08981	-173.73954	***1516.0***	0.0	221.3	Going to use the temperature probe here.	321
2017-11-27	23:45:53	-15.08984	-173.73944	***1516.0***	0.0	220.1	Temperature probe here. Highest is 2.6C. The ash is really dark right below the surface (where we put the temp probe) Temp is less than 1C warmer than ambient.	322
2017-11-27	23:47:25	-15.08992	-173.73931	***1516.0***	0.0	220.9	Setting up to sample here with push core 1.	323
2017-11-27	23:50:45	-15.08981	-173.73953	***1516.1***	0.0	221.1	**S86-Sed-08** in same spot where we put the temperature probe. Grabbing push core 1 (no catcher). Big sample. Very coarse. Would not stay in tube so will revert to scoop method.	324
2017-11-27	23:52:34	-15.08981	-173.73953	***1516.1***	0.0	219.1	S86-Sed-08 cont. Full core of coarse volcanic ash and crystals. Bubble wall fragments; glass; hair. Pouring it into tube 3 in the basket on the porch. It's in there.	325
2017-11-27	23:55:14	-15.08982	-173.73951	***1516.1***	0.0	221.2	S86-Sed-08 cont. Z=1529m. 15d 5' 23.332" 173d 44' 22.344".	326
2017-11-27	23:58:19	-15.08981	-173.73951	***1512.3***	2.2	244.8	Going to drive back north a bit. Still on the shallowest of the terraced platform.	327
2017-11-27	23:58:57	-15.08976	-173.73962	***1511.4***	4.4	308.0	Some pillows are poking through the sediments a bit. More yellow hydrothermal staining.	328
2017-11-28	00:00:07	-15.08955	-173.73957	***1516.9***	3.1	26.8	The sediments could be up to a meter thick - but no way to really know.	329
2017-11-28	00:00:45	-15.08953	-173.73952	***1517.7***	1.3	25.4	Looking at the white biological crust but don't see any shimmer.	330
2017-11-28	00:01:28	-15.08949	-173.73948	***1516.4***	3.9	13.4	Moving on.	331
2017-11-28	00:02:04	-15.08945	-173.73939	***1520.5***	9.4	307.7	From here we're going to drive to the northeast.	332
2017-11-28	00:02:24	-15.08942	-173.73937	***1523.8***	6.9	273.3	We're going down one of the lava terraces - from the shallowest one we're moving down.	333
2017-11-28	00:02:52	-15.08937	-173.73936	***1525.3***	0.0	273.8	Moving down this terrace. See lava pillows hanging down the slope.	334
2017-11-28	00:03:45	-15.08934	-173.73935	***1528.5***	8.3	245.0	Going in to grab a piece of pillow here.	335
2017-11-28	00:04:45	-15.08935	-173.73933	***1529.7***	4.3	247.6	Area of thick orange sediment here. Saw a small swimming worm.	336

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S086 W Mata Logger Comments	Record #
2017-11-28	00:05:19	-15.08936	-173.73934	***1529.8***	4.0	250.1	**S86-rock-09**. Grabbing the rind of a disgorged pillow. Very thin piece of rind. Crumbly. Will put it in the biobox to preserve it on the way up. Small fragment of pillow crust. Fist-sized. Going into partition 4.	337
2017-11-28	00:08:28	-15.08933	-173.73933	***1529.8***	6.1	259.7	S86-rock-09 cont. Going back for another piece of this pillow rind.	338
2017-11-28	00:10:26	-15.08940	-173.73929	***1529.8***	3.8	259.6	S86-rock-09 cont. Going in for a second grab of this pillow rind. Second piece is glass fragments and vesicular rock. 2nd piece is ~15 cm long.	339
2017-11-28	00:12:53	-15.08938	-173.73933	***1529.8***	3.9	259.4	S86-rock-09 cont. Going in for 3rd piece of this crumbly pillow rind. We are ~15m east of waypoint 11.Good piece. Angular glassy rind ~ 15cm long. Thicker than the previous 2 pieces.	340
2017-11-28	00:18:09	-15.08936	-173.73931	***1533.2***	7.2	259.5	Moving down this steep slope to the next terrace (step).	341
2017-11-28	00:18:36	-15.08934	-173.73929	***1535.7***	4.3	250.0	Pillows are in place here.	342
2017-11-28	00:18:57	-15.08933	-173.73926	***1536.6***	3.8	250.2	Lots of yellow probably bacterial sediments draped over black volcaniclastic sediments.	343
2017-11-28	00:19:46	-15.08933	-173.73922	***1538.1***	2.4	292.3	More of a gentle slope here. See small pockets of yellow and white staining.	344
2017-11-28	00:20:37	-15.08926	-173.73922	***1540.4***	1.9	339.1	The sediments here are darker than the sediments one step up.	345
2017-11-28	00:21:31	-15.08918	-173.73918	***1543.4***	1.4	12.7	Darker sediments here. Can hardly see the bottom. It's really flat here.	346
2017-11-28	00:22:35	-15.08908	-173.73906	***1550.3***	1.9	15.7	We're at the edge of the second terrace. Going into a steeper slope with exposed pillows.	347
2017-11-28	00:23:34	-15.08903	-173.73897	***1551.9***	9.0	238.6	Turning around to look into the slope. Will try to sample a pillow here.	348
2017-11-28	00:24:31	-15.08897	-173.73899	***1557.5***	6.1	217.5	Hydrothermal sediment hanging out between the pillows.	349
2017-11-28	00:25:22	-15.08898	-173.73898	***1558.1***	4.5	220.4	Going in for a sample here. See some little lava buds. We have sampling options here.	350
2017-11-28	00:26:03	-15.08899	-173.73898	***1559.7***	1.2	216.3	**S86-rock-10**. On base of the slope on the 3rd terrace down - facing the slope of the 2nd terrace.	351
2017-11-28	00:28:17	-15.08899	-173.73898	***1559.7***	1.4	220.2	Attempting to sample disgorged pillow. So far no success.	352

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S086 W Mata Logger Comments	Record #
2017-11-28	00:35:05	-15.08898	-173.73899	***1559.1***	1.7	222.2	S86-rock-10. Flow front of 2nd terrace. (at the base of the slope). Odd disgorged pillow. Z=1574m. Crumbly. Still haven't got the sample.	353
2017-11-28	00:36:46	-15.08899	-173.73898	***1559.1***	1.8	222.2	S86-rock-10 cont. Piece of pillow rind (from the top of a weird-misshapen pillow. ~ 10cm long - almost cube-shaped we think. Going into partition 7. A few flakes got into 8.	354
2017-11-28	00:38:52	-15.08899	-173.73899	***1559.2***	1.8	222.5	S86-rock-10. 15d 5' 20.371" 173d 44' 20.304"	355
2017-11-28	00:39:31	-15.08899	-173.73899	***1559.4***	1.5	224.1	We're facing SW into this flow front. Lots of yellow floc stirred up.	356
2017-11-28	00:40:25	-15.08894	-173.73896	***1562.2***	1.4	303.1	Took the lights off manual and put them on auto and all of a sudden "let there be light". Yippee.	357
2017-11-28	00:40:57	-15.08889	-173.73895	***1563.8***	0.6	2.0	Heading toward a little rocky outcrop in the distance. Lots of those pockmarks with yellow staining.	358
2017-11-28	00:41:26	-15.08883	-173.73896	***1564.3***	1.8	2.5	We're looking at an outcrop that could probably be older West Mata. On the very northern edge of this eruption site. Coral on the rock indicates that it's older lava. Sponges there too.	359
2017-11-28	00:42:45	-15.08877	-173.73895	***1566.6***	3.3	337.7	Turning to the right and will continue to move downslope - on the newer lava presumably.	360
2017-11-28	00:43:19	-15.08878	-173.73888	***1568.4***	2.2	27.4	Rocks that have probably fallen down from above - they are very angular.	361
2017-11-28	00:43:41	-15.08878	-173.73882	***1569.0***	2.2	43.5	Pockmarks with yellow floc.	362
2017-11-28	00:43:56	-15.08876	-173.73879	***1569.1***	2.5	44.2	Little pillow poking up through the sediment are probably part of the new eruption.	363
2017-11-28	00:44:20	-15.08873	-173.73873	***1570.4***	2.6	44.0	Polka dot seafloor (yellow floc in black depressions)	364
2017-11-28	00:44:52	-15.08868	-173.73866	***1574.2***	2.6	43.6	Looks like we're at the next flow front.	365
2017-11-28	00:46:00	-15.08861	-173.73852	***1580.2***	3.2	332.5	Going down a very steep flow front here.	366
2017-11-28	00:46:34	-15.08856	-173.73850	***1576.8***	8.5	271.4	Pillows on steep slope.	367
2017-11-28	00:46:52	-15.08855	-173.73854	***1578.5***	7.3	234.1	THE BATHY IS ABOUT 10M NORTHEAST OF THE SUBASTIAN NAV.	368
2017-11-28	00:47:26	-15.08856	-173.73854	***1579.5***	5.2	234.1	Big chubby intact pillows.	369
2017-11-28	00:48:58	-15.08855	-173.73853	***1582.7***	6.6	235.1	These are some big pillows - because of the viscosity of the lavas.	370
2017-11-28	00:50:11	-15.08855	-173.73853	***1583.3***	4.8	245.9	"Pre-fractured" piece of pillow hanging out in front of us just begging for us to sample it. Has internal structure and no hydrothermal staining.	371

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S086 W Mata Logger Comments	Record #
2017-11-28	00:51:15	-15.08854	-173.73853	***1583.4***	4.7	249.3	We're going to try to sample that thing.	372
2017-11-28	00:51:59	-15.08855	-173.73854	***1583.4***	4.5	248.6	**S86-rock-11**. Beautiful piece of pillow hanging down this flow front. Great pillow cross section. 30 cm. Glass on the top and bottom. Vesicular angular. Shape of large piece of pie.	373
2017-11-28	00:54:06	-15.08855	-173.73854	***1583.4***	4.4	248.6	S86-rock-11. Into partition 8. At least 30cm long by ~ 15 cm across. Sort of pie shaped. Z=1598. 15d 5' 18.888" 173d 44' 18.771".	374
2017-11-28	00:56:56	-15.08849	-173.73850	***1588.2***	0.5	268.9	Moving on toward waypoint 12; skirting along the NW section of the new lava flow.	375
2017-11-28	00:57:57	-15.08836	-173.73848	***1587.0***	1.4	284.0	We're facing the north wall of the landslide scar that the new lava flow formed within.	376
2017-11-28	00:58:37	-15.08831	-173.73851	***1586.0***	1.9	285.0	We're at the contact between the older cliff face and newer lava to the right of us.	377
2017-11-28	00:59:56	-15.08822	-173.73855	***1578.6***	2.8	288.3	Moving up talus field toward older lavas.	378
2017-11-28	01:00:22	-15.08820	-173.73859	***1575.0***	3.0	290.4	At the top of the talus slope looking at some big thick pillows.	379
2017-11-28	01:01:08	-15.08819	-173.73862	***1567.7***	7.8	299.2	Beautiful huge pillows as we head up this steep wall looking at the older broken pillows.	380
2017-11-28	01:02:48	-15.08816	-173.73872	***1550.1***	12.9	298.7	Still continuing up this steep cliff.	382
2017-11-28	01:03:05	-15.08815	-173.73876	***1548.5***	0.0	298.7	At the top of this steep pit.	383
2017-11-28	01:03:18	-15.08815	-173.73877	***1549.1***	14.2	298.8	test	384
2017-11-28	01:04:05	-15.08810	-173.73877	***1550.4***	0.0	295.8	Going in for another rock sample.	385
2017-11-28	01:04:42	-15.08806	-173.73878	***1550.7***	0.0	297.7	Older lava with soft corals and octocorals.	386
2017-11-28	01:05:25	-15.08797	-173.73880	***1551.7***	2.1	322.9	Going in to sample this big huge pillow.	387
2017-11-28	01:06:22	-15.08816	-173.73880	***1551.7***	1.0	322.7	Soft coral anthomanthus on this large pillow.	388
2017-11-28	01:06:51	-15.08817	-173.73880	***1551.7***	1.1	322.7	Stalked sponge? Not sure what it is.	389
2017-11-28	01:07:32	-15.08817	-173.73880	***1551.7***	1.2	322.7	A stalked sponge of some type - probably (Walter is not sure because it's flat).	390
2017-11-28	01:08:10	-15.08817	-173.73880	***1551.7***	1.2	322.6	It may be a sponge. Walter thinks it looks like the top of a sponge - missing its top. Amphipods? on the attack.	391
2017-11-28	01:09:49	-15.08818	-173.73881	***1551.7***	1.1	322.5	**S86-rock-12**. On the old lavas above the new lava flows. At the top of a cliff. Sampling huge old pillow.S86-rock-12.	392
2017-11-28	01:11:03	-15.08818	-173.73880	***1551.7***	1.4	322.0	S86-rock-12 cont. Going in for the grab. At the edge of this broken pill. Going for the rind. Rind if mineralized (weathered). Seen its better days.	393

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2017-11-28	01:13:22	-15.08818	-173.73880	***1551.7***	1.1	322.4	S86-rock-12 cont. Vesicular rind and brownish-yellow stain with lava drips. ~ 10cm x 10cm. Putting it into partition 2 in the biobox. Sort of shaped like a fashionable boot.	394
2017-11-28	01:17:23	-15.08818	-173.73880	***1551.2***	1.6	324.0	S86-rock-12 cont. 15d 5' 17.636" 173d 44' 19.725" Z=1566m.	395
2017-11-28	01:18:31	-15.08816	-173.73880	***1551.5***	4.2	285.8	Zooming in on the biota in the hollows of this huge pillow. Will try to take a biology sample.	396
2017-11-28	01:20:32	-15.08816	-173.73881	***1551.7***	6.6	269.6	**S86-bio-13**. Corals with mysid's on them. 15d 5' 17.636" 173d 44' 19.725" Z=1566m. Same location. Collected from pillow sample 12. Put in biobox #2.	397
2017-11-28	01:23:18	-15.08815	-173.73881	***1550.8***	1.6	278.9	Previous sample was a gorgonian coral with mysids.	398
2017-11-28	01:25:10	-15.08814	-173.73882	***1550.3***	0.0	267.9	We're up on the rim of this old lava flow. Hoping to see a row of these pit craters. I mean large pit craters or collapse features.	399
2017-11-28	01:27:05	-15.08813	-173.73885	***1550.6***	0.0	294.8	Lots of sediment on top of this platform. Looks like the craters of the moon but not as colorful.	400
2017-11-28	01:27:47	-15.08812	-173.73888	***1551.3***	1.3	277.0	Seeing depressions on this older surface as well.	401
2017-11-28	01:28:48	-15.08810	-173.73895	***1552.4***	1.1	278.2	The edge of the collapse pit is coming up. Dropping down into this collapse area - about 20 m across.	402
2017-11-28	01:29:40	-15.08816	-173.73902	***1556.8***	2.2	219.5	Floor of collapse pit with the smaller depressions (dark black).	403
2017-11-28	01:30:13	-15.08822	-173.73904	***1556.6***	1.4	223.6	Similar to what we saw on the new lavas - just not as colorful (lacking the white and yellow hydrothermal mat).	404
2017-11-28	01:30:51	-15.08828	-173.73909	***1556.0***	1.4	226.6	Coming up on the other side of this collapse pit.	405
2017-11-28	01:31:51	-15.08834	-173.73913	***1555.9***	1.4	240.6	Eel in the background. Hagfish?	406
2017-11-28	01:32:33	-15.08834	-173.73914	***1556.0***	0.9	243.2	Zooming in on a coral(?) of some kind.	407
2017-11-28	01:33:19	-15.08834	-173.73913	***1555.9***	1.0	242.6	Attempting to sample In area just to the SW of the easternmost collapse pit. Looks pretty solid. Piece of old pillow. Crumbly.	408
2017-11-28	01:35:28	-15.08833	-173.73913	***1555.9***	0.9	241.6	**S86-rock-14**. From the outer surface of the pillow. Very crystal-rich. Tube-like vesicles "Weathered". Don't see any glass. 10 cm long. Into biobox 3.	409
2017-11-28	01:39:38	-15.08833	-173.73914	***1555.9***	0.9	240.7	S86-rock-14 cont. 15d 5' 18.193" 173d 44' 21.026" Z=1570m.	410

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S086 W Mata Logger Comments	Record #
2017-11-28	01:40:51	-15.08834	-173.73918	***1551.4***	2.9	228.9	Continuing on. Coming out of collapse pit and heading over more sedimented slope.	411
2017-11-28	01:41:34	-15.08836	-173.73922	***1548.6***	2.1	228.8	Dropping down into another pit as soon as got over that rim.	412
2017-11-28	01:42:05	-15.08838	-173.73925	***1550.8***	2.0	226.2	Smooth soft sediment cover in the pit.	413
2017-11-28	01:42:21	-15.08841	-173.73928	***1550.3***	1.3	226.8	Large round pillow; left pillow broken in half.	414
2017-11-28	01:43:31	-15.08847	-173.73935	***1546.7***	1.0	226.7	Heavily sedimented with collapse pit	415
2017-11-28	01:45:21	-15.08855	-173.73945	***1541.6***	1.1	226.8	Coming into an area with a lot of microbial deposits	416
2017-11-28	01:46:33	-15.08862	-173.73953	***1543.6***	0.3	226.1	Approaching slope break with partially covered pillow debris	417
2017-11-28	01:47:17	-15.08866	-173.73958	***1542.0***	0.7	225.9	Rocks are fairly heavily altered here. Probably older flows.	418
2017-11-28	01:48:58	-15.08871	-173.73966	***1536.2***	3.7	226.7	Outcropping of older lava. Lots of secondary mineralization.	419
2017-11-28	01:49:54	-15.08872	-173.73966	***1534.0***	7.7	228.3	Many broken and drained pillows in the background. Sulfide and iron oxides common.	420
2017-11-28	01:54:30	-15.08872	-173.73968	***1533.9***	6.3	232.6	**S86-rock-15**. Hollow tube-like inside with yellow staining. Part of the sample broke off on top the marker box - two small pieces; might be further fractured.	421
2017-11-28	01:57:52	-15.08872	-173.73966	***1532.7***	8.8	232.6	Telemetry problems with arm; working again	422
2017-11-28	01:58:24	-15.08872	-173.73966	***1533.6***	8.3	231.8	Sample S86-rock-15 into sample box 10. A piece or two of this sample previously broke off into the marker box.	423
2017-11-28	02:00:45	-15.08862	-173.73957	***1540.9***	2.6	231.6	We are searching for a nearby flat area where we can put down the ROV for diagnostics of arm telemetry issue.	424
2017-11-28	02:01:21	-15.08860	-173.73954	***1542.8***	1.2	229.4	Sample S86-rock-15 location is 15d5m19.495s 173d44m22.891s depth 1557m	425
2017-11-28	02:03:38	-15.08860	-173.73954	***1542.2***	1.6	231.3	Capture resume after brief pause to reset problem with ROV arm	426
2017-11-28	02:06:05	-15.08868	-173.73962	***1533.3***	8.3	210.7	We are moving again and off the sedimentary flat	427
2017-11-28	02:06:59	-15.08877	-173.73968	***1529.9***	5.8	211.5	En route from waypoint 13 to waypoint 25 to look for edge of the new lava flow. Skipping 14.	428
2017-11-28	02:08:14	-15.08884	-173.73975	***1527.1***	1.0	211.6	More sedimentary flat with small collapse pits	429
2017-11-28	02:09:08	-15.08889	-173.73980	***1526.6***	0.5	218.3	Large crack or fracture in this lava flow. Fairly well sedimented	430
2017-11-28	02:09:41	-15.08892	-173.73985	***1525.2***	1.6	227.9	Small extrusions along the sides of this lobate flow	431

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S086 W Mata Logger Comments	Record #
2017-11-28	02:10:07	-15.08897	-173.73985	***1525.5***	1.1	209.5	Abundant microbial deposits in shallow depressions and between ripple marks in the sediment.	432
2017-11-28	02:10:45	-15.08903	-173.73987	***1524.8***	0.9	211.3	Lots of older lava flows with sponges growing on them	433
2017-11-28	02:11:06	-15.08904	-173.73989	***1524.8***	0.8	245.4	Sponges and other life on this old lava flow in foreground. We are still on the older lava flow and have not yet reached the new one.	434
2017-11-28	02:11:39	-15.08904	-173.73989	***1524.8***	0.9	251.7	Closer view of the sponges.	435
2017-11-28	02:11:58	-15.08905	-173.73989	***1524.8***	0.9	251.9	Deep-sea corals atop old lava flow.	436
2017-11-28	02:12:48	-15.08906	-173.73987	***1523.5***	0.5	199.3	More collapse features and microbe colony infill.	437
2017-11-28	02:13:16	-15.08909	-173.73987	***1522.4***	2.2	192.3	Pits are abundant in this area. Pillows becoming visible in the background.	438
2017-11-28	02:13:45	-15.08913	-173.73987	***1521.5***	1.5	202.7	Exposed pillows might be younger but we have not yet confirmed.	439
2017-11-28	02:15:51	-15.08927	-173.73994	***1516.1***	1.4	208.9	Collapse pits, broken lava flows, and a lot of volcaniclastics. Slightly less microbial colonization at this site.	440
2017-11-28	02:16:39	-15.08936	-173.73997	***1515.9***	1.6	208.4	Entering an area with newer hydrothermal deposits.	441
2017-11-28	02:17:45	-15.08946	-173.74001	***1515.6***	1.3	208.9	Lots of microbial mats and deposits.	442
2017-11-28	02:18:37	-15.08954	-173.74004	***1516.1***	1.1	208.4	Collapse pits and abundant microbial mat deposition in this small basin. Lots of volcaniclastics still.	443
2017-11-28	02:19:28	-15.08961	-173.74007	***1515.5***	2.0	209.2	Partially exposed broken pillow or lobate lava flow.	444
2017-11-28	02:20:44	-15.08973	-173.74014	***1514.8***	1.9	209.0	Approaching the small cone at waypoint 25. Lots of pillow flows.	445
2017-11-28	02:21:21	-15.08978	-173.74016	***1514.9***	1.6	208.9	Pillow lavas and microbial mats. Most are intact and in place, but some are broken open.	446
2017-11-28	02:22:34	-15.08982	-173.74017	***1514.7***	2.8	208.7	Lavas look fresh. Little sediment but some signs of hydrothermal activity are visible.	447
2017-11-28	02:25:33	-15.08984	-173.74018	***1515.0***	1.7	219.6	**Sample S86-rock-16**. Distinctive red altered streak at glass-groundmass transition. 20-25cm wide.	448
2017-11-28	02:27:12	-15.08984	-173.74017	***1514.3***	1.6	219.5	Sample S86-rock-16 placed into gas tight box.	449
2017-11-28	02:28:08	-15.08980	-173.74017	***1514.4***	2.5	220.6	Sample notes continued. Location is 15d05m23.429s 173d44m24.704s depth 1529m	450
2017-11-28	02:30:29	-15.08981	-173.74036	***1510.2***	4.0	244.2	Large microbial community formed in response to hydrothermal activity.	451

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S086 W Mata Logger Comments	Record #
2017-11-28	02:33:01	-15.08981	-173.74036	***1509.4***	4.6	248.6	Deploying temperature probe to see whether this area is still hydrothermally active.	452
2017-11-28	02:34:14	-15.08981	-173.74040	***1511.1***	1.0	248.5	Ambient temperature from probe is ~1.8C.	453
2017-11-28	02:35:13	-15.08982	-173.74040	***1511.1***	1.1	248.7	Temperature in deposit is 11.5C. 10 degrees above background.	454
2017-11-28	02:36:35	-15.08981	-173.74040	***1511.1***	1.0	248.4	Temperature at second spot reads 9.5C. 8 degrees above ambient temperature.	455
2017-11-28	02:37:27	-15.08982	-173.74040	***1511.1***	1.0	248.3	Close-up of the microbial colony. Microbes grew in place here and filaments can be seen waving in the water slightly.	456
2017-11-28	02:38:30	-15.08982	-173.74040	***1511.0***	1.0	248.4	Macro view of bacterial filaments.	457
2017-11-28	02:40:29	-15.08982	-173.74042	***1509.0***	1.1	247.7	Extrusions partially exposed above sediments.	458
2017-11-28	02:41:34	-15.08980	-173.74044	***1506.5***	3.0	300.1	More signs of hydrothermal activity here on flank of lava flow.	459
2017-11-28	02:42:01	-15.08975	-173.74044	***1506.1***	2.4	291.1	Pillow lava and rubbly slope.	460
2017-11-28	02:42:42	-15.08968	-173.74050	***1504.7***	1.9	291.6	Abundant broken surfaces at edge of lava flow.	461
2017-11-28	02:43:05	-15.08964	-173.74051	***1504.1***	2.8	289.5	Biota on flows indicates this is from an older eruption.	462
2017-11-28	02:43:46	-15.08961	-173.74051	***1503.3***	3.1	314.6	Corals growing on strata.	463
2017-11-28	02:44:40	-15.08958	-173.74050	***1502.8***	3.6	309.8	Examples of different coral and sponge species growing on older lava flows.	464
2017-11-28	02:49:54	-15.08952	-173.74050	***1500.8***	0.0	319.4	**S86-bio-17** bamboo coral; white with nodules and small rock attached to base.	465
2017-11-28	02:51:00	-15.08949	-173.74048	***1500.7***	0.0	319.5	S86-bio-17 is in biobox 1. Location 15d5m22.254s 173d44m25.862s Depth 1515m	466
2017-11-28	02:55:33	-15.08957	-173.74048	***1500.7***	3.2	319.2	**S86-rock-18**, sampled from older lava flow that also hosted the previous sample (coral). Rock has a sponge attached. Sample size roughly 10 cm. Into at least two pieces in box 10.	467
2017-11-28	02:57:46	-15.08954	-173.74050	***1500.2***	3.2	319.2	Sample S86-rock-18 location is same as previous. 15d5m22.254s 173d44m25.862s depth 1515m.	468
2017-11-28	02:59:12	-15.08950	-173.74054	***1496.5***	1.6	310.8	Moving along volcanic ridge toward more lava flows; possibly similar age as previous sample and hosting various biology.	469
2017-11-28	03:00:56	-15.08949	-173.74059	***1495.8***	1.1	277.7	Trifecta of a coral (octocoral?) and sea anemone and some extremely long-armed squat lobster.	470
2017-11-28	03:03:33	-15.08949	-173.74060	***1495.6***	1.4	279.3	**Sample S86-bio-19**. Coral and TWO squat lobsters. Into biobox 2.	471

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S086 W Mata Logger Comments	Record #
2017-11-28	03:05:57	-15.08947	-173.74062	***1493.6***	4.0	266.4	Sample S86-bio-19 location is 15d5m22.136s 173d44m26.306 depth 1500m estimated.	472
2017-11-28	03:08:07	-15.08939	-173.74062	***1493.4***	8.2	195.1	Corals and sponges growing on the side of an older lava flow by waypoint 14.	473
2017-11-28	03:10:04	-15.08940	-173.74069	***1494.0***	4.7	205.9	Nearly vertical wall.	474
2017-11-28	03:13:04	-15.08940	-173.74063	***1494.0***	8.5	185.5	Deploying suction (out of frame).	475
2017-11-28	03:14:20	-15.08943	-173.74063	***1493.2***	5.2	190.0	Attempting to sample a yellow anemone	476
2017-11-28	03:14:43	-15.08942	-173.74065	***1493.4***	5.9	208.5	Attempt unsuccessful, trying an alternative.	477
2017-11-28	03:15:24	-15.08942	-173.74068	***1493.3***	4.1	190.5	Second attempt unsuccessful.	478
2017-11-28	03:15:50	-15.08941	-173.74069	***1494.1***	5.3	177.5	Third target.	479
2017-11-28	03:16:05	-15.08942	-173.74068	***1494.1***	4.9	178.9	Third attempt. Captured a partial anemone. S86-bio-20. Into suction jar 4.	480
2017-11-28	03:17:34	-15.08943	-173.74070	***1493.7***	4.3	153.1	**Sample S86-bio-20** depth 1511m.	481
2017-11-28	03:18:42	-15.08945	-173.74071	***1493.4***	2.1	123.2	Whole anemone sample. Sample jar also 4. Also sample S86-bio-20. Location 15d5m21.910s 173d44m26.521 depth 1511m.	482
2017-11-28	03:20:37	-15.08938	-173.74067	***1492.9***	8.6	183.7	Last view of lava flow where biology samples were taken. ROV off bottom and ascending. End of survey.	483

S087 W Mata

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S087 W Mata Logger Comments	Record #
2017-11-28	18:39:02	-15.10239	-173.74842	***1630.9***	5.1	288.2	Bottom in sight	2
2017-11-28	18:39:35	-15.10239	-173.74842	***1628.8***	12.9	289.4	Here at the small feature called the South Rift Zone.	3
2017-11-28	18:40:20	-15.10239	-173.74845	***1633.4***	0.0	292.2	Keeps pausing the feed.	4
2017-11-28	18:41:02	-15.10240	-173.74848	***1634.3***	11.2	341.0	Looking at some sedimented older pillow lavas here south of the possible newer lavas.	5
2017-11-28	18:41:54	-15.10235	-173.74846	***1631.0***	3.8	341.0	We want some older lava here. Orange and brown staining. Probably extruded within the last several hundred years.	6
2017-11-28	18:42:38	-15.10229	-173.74851	***1628.5***	3.0	340.7	Want an example of these older lavas first.	7
2017-11-28	18:42:59	-15.10226	-173.74852	***1627.1***	2.9	341.0	Heavily sedimented and brown staining.	8
2017-11-28	18:43:30	-15.10223	-173.74854	***1625.2***	2.3	341.1	The brown staining is on most all surfaces. Not like the hydrothermal sediments we saw near the summit.	9

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S087 W Mata Logger Comments	Record #
2017-11-28	18:44:04	-15.10220	-173.74855	***1622.2***	2.2	341.0	Coral on the rock. Also anemones. Biota on this lava indicates it's older.	10
2017-11-28	18:44:54	-15.10216	-173.74855	***1618.7***	3.6	341.1	Soft coral (anthomastus) and sponges.	11
2017-11-28	18:47:04	-15.10212	-173.74856	***1617.7***	2.5	354.2	Looking for a rock to sample.	12
2017-11-28	18:47:21	-15.10211	-173.74856	***1617.7***	2.1	354.5	Setting up to sample.	13
2017-11-28	18:48:18	-15.10211	-173.74856	***1617.7***	2.8	355.0	**S087-rock-01**. Grabbing a large piece of in place lava on this slope. Fairly altered with manganese and iron oxides. Layer of glass as well.	14
2017-11-28	18:50:40	-15.10211	-173.74856	***1617.8***	2.7	355.0	S87-rock-01. Lots of iron staining. Probably several hundred years old. Rock is greater than fist size into partition 5. Pillow lava fragment. Radially cracked. 20 cm in diameter.	15
2017-11-28	18:52:59	-15.10212	-173.74857	***1617.8***	2.6	354.9	S087-rock-01 cont. 15.1021 173.7456 Z=1634	16
2017-11-28	18:54:26	-15.10212	-173.74856	***1617.7***	2.5	354.7	Moving onwards and upwards.	17
2017-11-28	18:55:13	-15.10211	-173.74857	***1613.9***	3.6	353.3	Bamboo corals; whip corals; Some lobate lavas here. Glass gets dull and falls off these older lavas.	18
2017-11-28	18:55:55	-15.10208	-173.74856	***1612.0***	3.5	2.9	Won't see rocks like this up at the summit. Weathered and old-looking lavas.	19
2017-11-28	18:56:31	-15.10204	-173.74855	***1608.9***	3.6	12.8	Holothurian .	20
2017-11-28	18:56:52	-15.10203	-173.74856	***1608.0***	0.0	13.3	Soft coral (anthomastus).	21
2017-11-28	18:57:35	-15.10199	-173.74855	***1604.8***	2.3	13.0	Zooming in on a pink coral on this weathered old lava. Walter wants to collect it. We're stopping. Bubble gum coral with ophioroid (brittle star).	22
2017-11-28	18:59:26	-15.10198	-173.74854	***1603.9***	3.9	13.0	**S87-bio-02**. Bubble gum coral with ophioroid (brittle star) on old pillow. Z=1619. -15.1019743 -173.748563.	23
2017-11-28	19:02:08	-15.10200	-173.74853	***1603.9***	2.6	12.5	Sampling the coral.	24
2017-11-28	19:02:21	-15.10199	-173.74852	***1603.9***	2.6	12.3	S87-bio-02 cont . Grabbing the Bubble gum coral with ophioroid (brittle star) on old pillow.	25
2017-11-28	19:03:30	-15.10200	-173.74855	***1603.9***	3.8	10.4	S87-bio-02 cont. Still going in for the grab.	26
2017-11-28	19:05:42	-15.10195	-173.74856	***1603.4***	2.5	11.8	S87-bio-02 cont. Got the coral.	27
2017-11-28	19:06:07	-15.10195	-173.74856	***1603.4***	0.0	12.3	The sample.	28
2017-11-28	19:06:19	-15.10191	-173.74860	***1603.4***	0.0	12.0	S87-bio-02 cont. Going into biobox partition 1.	29
2017-11-28	19:07:05	-15.10179	-173.74859	***1603.4***	2.2	10.5	Continuing up slope. Brittle star or sea star of some kind. Pink thing is probably an octocoral. A big colony.	30
2017-11-28	19:08:18	-15.10180	-173.74850	***1600.3***	4.0	12.6	Pillows / lobate-ish lavas here that are heavily sedimented and colonized with various sponges corals and other biota.	31

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S087 W Mata Logger Comments	Record #
2017-11-28	19:10:22	-15.10191	-173.74861	***1594.4***	4.0	12.5	We're expecting to head into some younger lavas before we reach waypoint 1.	32
2017-11-28	19:11:13	-15.10181	-173.74860	***1592.5***	2.4	12.6	Stalked coral.	33
2017-11-28	19:11:30	-15.10182	-173.74863	***1591.4***	0.0	12.6	We're still below the depth anomaly.	34
2017-11-28	19:12:50	-15.10171	-173.74859	***1586.4***	4.5	27.8	Still looking at older pillow lavas ; some of which have a patina of iron oxides	35
2017-11-28	19:13:40	-15.10173	-173.74863	***1583.6***	4.2	27.3	Soft coral and fish a top of older pillow lava flow; probably several hundred years old.	36
2017-11-28	19:14:46	-15.10166	-173.74864	***1580.3***	3.2	52.5	Large pillow with corals.	37
2017-11-28	19:15:06	-15.10164	-173.74864	***1579.0***	3.4	51.2	Different variety of corals sponges on elongated pillow tube.	38
2017-11-28	19:16:05	-15.10160	-173.74863	***1574.6***	6.6	20.9	Relatively massive lava flow with clear pillows.	39
2017-11-28	19:16:51	-15.10159	-173.74869	***1572.0***	7.3	21.1	Older truncated pillow.	40
2017-11-28	19:18:04	-15.10157	-173.74866	***1566.1***	16.4	20.9	The area of the depth anomaly varies in depth from 38 to 43 meters of new lava added. We'll see soon.	41
2017-11-28	19:18:40	-15.10154	-173.74869	***1563.0***	0.0	20.8	Crinoids and bamboo corals; Anemones. Brysingids (the big guys are like sun stars).	42
2017-11-28	19:19:23	-15.10156	-173.74868	***1559.4***	0.0	12.1	Corals take hundreds of years to form so these lavas are older than that.	43
2017-11-28	19:19:46	-15.10153	-173.74869	***1557.6***	0.0	12.4	Moving up slope. Approaching a mound-like structure on the bathy.	44
2017-11-28	19:20:27	-15.10151	-173.74869	***1554.9***	0.0	12.4	Coming up what looks almost like steps. More of these lava terraces.	45
2017-11-28	19:20:48	-15.10150	-173.74870	***1553.3***	0.0	12.7	Continuing to move over these old lavas that are broken up in places along cleavages and cracks.	46
2017-11-28	19:22:11	-15.10145	-173.74871	***1546.9***	0.0	15.9	Whip coral.	47
2017-11-28	19:22:30	-15.10145	-173.74872	***1546.0***	0.0	16.1	Very different than what we observed yesterday on the young lavas. These lavas are heavily colonized with non-vent biota.	48
2017-11-28	19:23:15	-15.10146	-173.74874	***1542.7***	0.0	16.2	Another Anthomastus.	49
2017-11-28	19:23:28	-15.10145	-173.74874	***1541.7***	0.0	15.9	Sediments are looking a little more stained. Maybe be a difference in grain size.	50
2017-11-28	19:24:11	-15.10142	-173.74875	***1539.2***	0.0	18.7	The majority of these sediments are volcanic - the dominant seds here are volcanic.	51
2017-11-28	19:24:34	-15.10139	-173.74876	***1538.5***	0.0	26.7	We're at our second waypoint.	52
2017-11-28	19:25:09	-15.10139	-173.74874	***1536.1***	0.0	26.4	Seeing drained out pillows.	53
2017-11-28	19:25:31	-15.10139	-173.74873	***1534.3***	0.0	26.2	We are seeing a lot of black volcanic sand that is coarser than what we saw downslope.	54

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S087 W Mata Logger Comments	Record #
2017-11-28	19:26:05	-15.10137	-173.74870	***1532.4***	0.0	25.6	Little nubbin of pillow lava to the left with corals.	55
2017-11-28	19:26:19	-15.10136	-173.74869	***1531.8***	2.1	25.6	Thick sandy volcanoclastic sand.	56
2017-11-28	19:26:30	-15.10135	-173.74869	***1531.3***	2.2	25.6	The seabed is totally covered with sand - lots of ripples.	57
2017-11-28	19:26:52	-15.10133	-173.74868	***1530.2***	2.5	26.4	White materials on the sand. Shells or balls of sulfur - see some yellow balls as well.	58
2017-11-28	19:27:45	-15.10130	-173.74867	***1527.4***	3.4	25.8	Still just tons of sand.	59
2017-11-28	19:28:33	-15.10124	-173.74865	***1524.7***	2.8	25.7	Vast sandy plain.	60
2017-11-28	19:28:46	-15.10123	-173.74865	***1524.0***	2.6	25.6	Possible that the depth change is a sediment deposit.	61
2017-11-28	19:29:21	-15.10120	-173.74864	***1521.8***	3.0	25.6	Blacker deposits to the left of the screen.	62
2017-11-28	19:29:36	-15.10118	-173.74863	***1520.8***	3.1	25.6	Ripple patterns in the sand here.	63
2017-11-28	19:29:47	-15.10117	-173.74862	***1519.7***	3.5	25.3	Little bit of rock poking through. It's old with lots of corals growing on the rocks.	64
2017-11-28	19:30:34	-15.10114	-173.74859	***1514.9***	5.6	46.1	Less sediment here.	65
2017-11-28	19:31:03	-15.10111	-173.74857	***1512.8***	4.9	46.1	These rocks have oxidized crust and biota. Older lavas.	66
2017-11-28	19:31:48	-15.10106	-173.74856	***1511.2***	3.1	55.2	Another Anthomastus.	67
2017-11-28	19:32:09	-15.10105	-173.74856	***1509.9***	4.0	56.7	Too many corals to name them all.	68
2017-11-28	19:32:41	-15.10103	-173.74853	***1506.9***	4.9	56.4	Gorgeous branching corals all over the place.	69
2017-11-28	19:33:12	-15.10101	-173.74851	***1504.7***	4.7	56.1	Heavily sedimented slope with the occasional lava poking out.	70
2017-11-28	19:33:43	-15.10099	-173.74849	***1503.7***	3.0	56.6	Not sure how deep these sediments are - probably tens of centimeters.	71
2017-11-28	19:34:41	-15.10095	-173.74848	***1499.7***	4.7	57.4	Darker sands here. Lots of ripples. Much darker than the sediments farther down slope.	72
2017-11-28	19:35:14	-15.10090	-173.74845	***1497.5***	4.1	56.3	Thicker sediments on this depth anomaly.	73
2017-11-28	19:35:54	-15.10084	-173.74841	***1495.7***	2.5	47.1	Sand and ripples as far as the eye can see.	74
2017-11-28	19:36:28	-15.10078	-173.74837	***1493.1***	3.6	42.8	Don't see much except sand.	75
2017-11-28	19:37:15	-15.10066	-173.74831	***1491.9***	2.7	39.9	Zooming in again to look at the sediments....	76
2017-11-28	19:37:36	-15.10060	-173.74830	***1491.5***	2.3	32.2	Zooming in on little bits of depressions in the sand with collections of sand or sulfur.	77
2017-11-28	19:38:20	-15.10051	-173.74824	***1488.4***	3.1	32.4	Where's the rock?	78
2017-11-28	19:39:17	-15.10038	-173.74817	***1485.4***	1.4	32.4	The sonar is pretty bland. Don't see anything hard in that.	79
2017-11-28	19:39:41	-15.10035	-173.74815	***1483.2***	2.9	31.9	Continuing upslope.	80
2017-11-28	19:40:31	-15.10028	-173.74813	***1481.4***	2.3	32.1	Ken is explaining all the different screens in the control room.	81

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S087 W Mata Logger Comments	Record #
2017-11-28	19:41:51	-15.10012	-173.74804	***1476.6***	2.1	32.7	Approaching waypoint 3. Didn't see anything but volcanic sand. Huh?	82
2017-11-28	19:43:04	-15.10000	-173.74795	***1472.2***	3.2	32.3	Going to work our way up to the summit. Didn't see any new lava. Only endless sand.....	83
2017-11-28	19:43:58	-15.09995	-173.74791	***1472.5***	1.5	355.9	We're going to scoot upslope.	84
2017-11-28	19:45:19	-15.09987	-173.74795	***1470.0***	1.7	349.3	Moving on up the slope. Not even seeing a rock. It's all buried in sand.	85
2017-11-28	19:47:32	-15.09981	-173.74800	***1468.5***	1.6	355.1	Not moving as quickly as we would like because the ship is having trouble keeping up.	86
2017-11-28	19:48:36	-15.09981	-173.74799	***1469.5***	0.5	354.4	Zooming in on the volcanic sand as we wait for the ship to catch up. Orange balls are volcanic in nature.	87
2017-11-28	19:49:21	-15.09982	-173.74799	***1469.6***	0.4	345.6	Shrimp Opaepele.	88
2017-11-28	19:50:12	-15.09982	-173.74799	***1469.6***	0.4	343.9	Polka dot pockets with material that is of vent origin.	89
2017-11-28	19:51:14	-15.09982	-173.74799	***1469.6***	0.4	343.7	It will be a long trek up to the summit. We don't plan to stop unless we see something along the way.	90
2017-11-28	19:52:13	-15.09982	-173.74798	***1469.2***	1.0	343.2	We're moving again.	91
2017-11-28	19:53:42	-15.09972	-173.74800	***1467.0***	1.0	343.5	Sand; sand; sand.....	92
2017-11-28	19:54:04	-15.09972	-173.74800	***1466.7***	1.0	343.3	Not much action here. See some shrimp swimming through the water column.	93
2017-11-28	19:55:53	-15.09973	-173.74801	***1467.1***	0.6	342.5	The ship is holding us up. The current is quite strong and they are having a problem holding heading.	94
2017-11-28	19:58:06	-15.09974	-173.74801	***1467.2***	0.6	342.9	Skid-mark on the seafloor from the vehicle.	95
2017-11-28	19:58:25	-15.09974	-173.74801	***1467.2***	0.6	342.9	The connection to the ship is one of the downfalls of an ROV. But the upside is also great.	96
2017-11-28	19:59:45	-15.09980	-173.74796	***1456.5***	13.9	281.0	The deep blue ... waiting for the ship to preposition ...	97
2017-11-28	20:04:11	-15.10062	-173.74782	***1488.5***	6.4	173.6	It will be another 10 Min or so to re position using DP.	98
2017-11-28	20:08:30	-15.10055	-173.74787	***1491.1***	1.6	345.0	Back into sedimentary terrain; small depression filled with microbial material...~60 m S of WP3	99
2017-11-28	20:12:05	-15.10054	-173.74787	***1492.0***	0.6	345.2	Still standing by ...	100
2017-11-28	20:17:45	-15.10053	-173.74786	***1492.0***	0.6	345.4	Maximum zoom into sedimentary depression ; orange iron oxides; microbial fluff and shale fragments ...	101

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S087 W Mata Logger Comments	Record #
2017-11-28	20:18:55	-15.10053	-173.74786	***1492.0***	0.6	345.3	Still looking at this little pile of mixed seds etc. in this little depression.	102
2017-11-28	20:19:41	-15.10053	-173.74787	***1492.0***	0.6	345.4	Seeing some hydrothermal bacterial mat balls (yellow). Also lots of shell debris.	103
2017-11-28	20:21:00	-15.10054	-173.74786	***1492.0***	0.6	345.4	The pointy spicules are biological in origin.	104
2017-11-28	20:25:17	-15.10054	-173.74787	***1492.0***	0.6	345.7	Ken is describing the two new sampling bags to collect volcanic sand.	106
2017-11-28	20:25:38	-15.10054	-173.74787	***1492.0***	0.7	345.7	There is a competition between the ROV team and the ship's engineers for which bag will work best.	107
2017-11-28	20:26:31	-15.10054	-173.74786	***1491.9***	0.8	345.6	We're going to start moving again at a half a knot. The ship has almost caught up with us.	108
2017-11-28	20:27:29	-15.10047	-173.74789	***1488.4***	1.9	345.1	We're screaming up the slope now.	109
2017-11-28	20:27:43	-15.10044	-173.74789	***1486.9***	2.5	348.1	Yippee. We're moving again up this highly sedimented slope.	110
2017-11-28	20:28:50	-15.10022	-173.74793	***1479.3***	1.8	348.1	Disappointed we did not see any young lava and we were stalled out for too long there. But we're moving on now.	111
2017-11-28	20:32:57	-15.09956	-173.74804	***1461.5***	2.0	351.7	Gentle slope here. The view hasn't changed much.	112
2017-11-28	20:33:14	-15.09954	-173.74806	***1460.6***	1.9	351.8	2.9C is ambient temp here.	113
2017-11-28	20:33:55	-15.09949	-173.74808	***1457.5***	2.1	352.1	White shell fragments on the crest of these ripples.	114
2017-11-28	20:35:12	-15.09941	-173.74810	***1452.7***	2.2	352.0	We're seeing some little pockets in the seafloor. Big shrimp with huge legs and tentacles.	115
2017-11-28	20:35:54	-15.09940	-173.74812	***1452.8***	1.1	352.3	Big shrimp with huge legs and tentacles.	116
2017-11-28	20:36:14	-15.09940	-173.74812	***1453.0***	0.8	352.2	Ken says that the depth anomaly could be re-deposited sand?	117
2017-11-28	20:36:48	-15.09939	-173.74812	***1453.1***	0.6	351.6	Deep-sea shrimp moving (walking) along the seafloor)	118
2017-11-28	20:38:08	-15.09939	-173.74812	***1453.2***	0.6	350.9	The things that we were calling spicules are pteropod shells.	119
2017-11-28	20:40:47	-15.09936	-173.74811	***1452.6***	0.7	352.3	Moving on upslope.	120
2017-11-28	20:41:32	-15.09931	-173.74808	***1450.8***	1.6	352.5	Seeing ripples with hydrothermal sediments.	121
2017-11-28	20:41:49	-15.09929	-173.74807	***1450.5***	1.3	352.6	A bit of a linear fissure in the sand here.	122
2017-11-28	20:42:47	-15.09919	-173.74806	***1448.8***	0.7	338.2	Not all seafloor changes are eruption deposits says Ken.	123
2017-11-28	20:43:16	-15.09913	-173.74807	***1446.4***	1.5	337.9	Rocks covered with lots of Anthomastus (red soft corals)	124
2017-11-28	20:44:04	-15.09908	-173.74807	***1442.0***	3.0	338.1	Corals on any area where there is a rocky outcrop.	125
2017-11-28	20:44:25	-15.09904	-173.74808	***1439.2***	2.9	340.8	No surface manifestations of an eruption on the depth anomaly below.	126

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S087 W Mata Logger Comments	Record #
2017-11-28	20:45:07	-15.09898	-173.74809	***1435.2***	2.7	340.0	Heading toward waypoint 4. It's still > 50 m north.	127
2017-11-28	20:47:36	-15.09881	-173.74810	***1427.4***	1.8	340.9	Ken is trying to keep it lively here - which is difficult with this endless sandy seafloor.	128
2017-11-28	20:49:44	-15.09859	-173.74814	***1412.8***	1.8	342.2	Copious volcanic sand.	129
2017-11-28	20:50:07	-15.09855	-173.74814	***1409.8***	2.5	351.3	Rock outcrop. Older lavas covered in soft corals.	130
2017-11-28	20:50:31	-15.09852	-173.74813	***1407.6***	3.2	350.1	We bumped the seabed.	131
2017-11-28	20:50:46	-15.09854	-173.74812	***1407.9***	4.6	351.1	The seabed is changing.	132
2017-11-28	20:50:56	-15.09854	-173.74811	***1408.4***	4.4	350.2	There was a hydroid on that last frame as well.	133
2017-11-28	20:51:15	-15.09853	-173.74809	***1408.3***	3.5	351.2	Yellow anemone with all those anthomastus.	134
2017-11-28	20:51:32	-15.09851	-173.74808	***1407.9***	2.8	351.2	Old lava pillows now visible.	135
2017-11-28	20:52:01	-15.09848	-173.74807	***1405.9***	4.3	347.6	We're out of the monotonous slope of sand to area of some rocky outcrops covered in soft corals and other biota. Hydroid is the little fan-looking guy.	136
2017-11-28	20:53:16	-15.09846	-173.74804	***1408.4***	2.9	345.1	Ken would like a sample of this older lava with lots of biota.	137
2017-11-28	20:54:06	-15.09843	-173.74804	***1407.8***	1.9	305.1	Area of sand between rocky outcrop.	138
2017-11-28	20:55:01	-15.09844	-173.74806	***1407.4***	1.7	317.4	Settling in to collect a rock sample. Probably will get some biota as well.	139
2017-11-28	20:55:24	-15.09844	-173.74806	***1407.8***	1.4	324.2	Looking at a pillow lava with extruded lava.	140
2017-11-28	21:02:44			***1363.8***			We lost power to the ROV at 2056 UTC. Scrambled and now it seems things are coming back up. USBL back up at 2100.	141
2017-11-28	21:05:08			***1421.8***			Seeing the seafloor again.	142
2017-11-28	21:06:14			***1417.6***			Moving upslope again.	143
2017-11-28	21:09:02			***1405.9***			Red soft corals and squat lobsters on older pillow lavas	144
2017-11-28	21:12:57	-15.09837	-173.74789	***1403.4***	4.9	318.9	Decision to attempt sampling at this site. Maneuvering into position.	145
2017-11-28	21:17:54	-15.09834	-173.74797	***1404.5***	3.2	308.9	**Sample S87-rock-03**. About 8cm pillow rind with some iron-manganese coating. Fragile with glass. Several pieces into biobox 2. Location 15.0987168 173.7465791 depth 1420m	146
2017-11-28	21:20:45	-15.09832	-173.74804	***1399.0***	3.4	307.6	Volcaniclastic sediments channeling downhill. Not solid enough strata for biology to grow on.	147
2017-11-28	21:21:16	-15.09829	-173.74807	***1393.8***	6.0	309.0	Topping local crest or ridge here with exposed older pillow where corals and sponges can grow.	148

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S087 W Mata Logger Comments	Record #
2017-11-28	21:23:06	-15.09811	-173.74817	***1390.5***	9.1	2.6	Moving up along a steep slope with many broken pillows and volcanoclastic sediments. Some lavas are in place. Similar in age to previous sample site based on biological growth.	149
2017-11-28	21:24:05	-15.09796	-173.74813	***1379.9***	4.8	2.7	Age of lavas estimated in excess of 100 years	150
2017-11-28	21:26:28	-15.09784	-173.74805	***1363.8***	16.3	347.5	Moving up section toward summit and the pillows are larger in diameter as well as mostly intact and in place	151
2017-11-28	21:27:42	-15.09786	-173.74813	***1355.3***	0.0	330.0	Interstitial sedimentation and some nearly vertical lava flows	152
2017-11-28	21:28:06	-15.09787	-173.74819	***1353.0***	6.6	330.3	Hydrothermal staining on some large-diameter lava flows. Fewer corals on some flows. Lots of sediments.	153
2017-11-28	21:29:06	-15.09769	-173.74814	***1349.3***	3.2	330.1	Slight increase in red soft coral population at crest of lava pile	154
2017-11-28	21:29:27	-15.09767	-173.74814	***1350.2***	2.5	329.7	Current depth 1360m	155
2017-11-28	21:30:07	-15.09759	-173.74812	***1351.1***	3.5	348.0	Pillow lava fragments in cantaloupe to watermelon sized chunks	156
2017-11-28	21:30:30	-15.09752	-173.74809	***1351.6***	5.5	350.4	Large cracks and broken faces	157
2017-11-28	21:30:57	-15.09746	-173.74808	***1349.5***	7.8	351.4	Part of a southerly-oriented feature that runs from base to summit of West Mata. This is a feature not previously explored.	158
2017-11-28	21:32:02	-15.09732	-173.74808	***1343.2***	8.9	348.7	Cracks and white staining visible on many pillow lavas comprising this feature. Some red corals present.	159
2017-11-28	21:32:46	-15.09723	-173.74809	***1339.5***	4.1	335.4	Apple-to-watermelon sized volcanic talus on flanks of this feature.	160
2017-11-28	21:33:08	-15.09721	-173.74810	***1338.1***	5.5	336.2	Elongate pillow tubes. Less striated than some other tubes seen further down section.	161
2017-11-28	21:33:58	-15.09714	-173.74810	***1334.8***	2.9	340.2	Significant iron staining on broken surfaces. Current depth about 1345m. Another 140m or so to get to the summit.	162
2017-11-28	21:34:33	-15.09703	-173.74815	***1331.4***	4.5	348.7	Lavas starting to look younger and fresher here. Less coating and less biological growth.	163
2017-11-28	21:36:14	-15.09692	-173.74817	***1321.7***	0.0	335.9	Small patch of iron oxide staining on some rock. Dominantly volcanoclastic talus on approach to nearby waypoint 5.	164

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S087 W Mata Logger Comments	Record #
2017-11-28	21:38:04	-15.09676	-173.74816	***1313.9***	3.7	308.7	Rocks here are older. No changes in depth on surveys in the past few years. Traversing a steep sedimented slope.	165
2017-11-28	21:39:18	-15.09671	-173.74819	***1306.6***	8.9	310.9	Intact and broken/drained pillow tubes on slope approaching waypoint 5.	166
2017-11-28	21:40:39	-15.09670	-173.74820	***1301.1***	12.4	318.1	Slope break nearly on top of waypoint 5.	167
2017-11-28	21:42:12	-15.09667	-173.74822	***1301.2***	7.0	323.1	White rebalance for camera calibration.	168
2017-11-28	21:43:05	-15.09661	-173.74819	***1303.0***	4.7	314.3	Traversing up the south ridge of West Mata. In view areold lava flows covered in red soft corals.	169
2017-11-28	21:43:50	-15.09657	-173.74815	***1300.6***	4.9	309.7	Thin sheet like lava flows	170
2017-11-28	21:44:13	-15.09654	-173.74815	***1299.8***	4.4	322.4	Jabba the pillow	171
2017-11-28	21:46:01	-15.09651	-173.74817	***1299.7***	3.2	307.0	Jabba the pillow contains a lot of volcanoclastic sediment and may have a small dune formation in the cavity.	172
2017-11-28	21:48:40	-15.09652	-173.74816	***1299.6***	3.2	306.5	**Sample S87-rock-04**. AKA Jabba the sample	173
2017-11-28	21:49:18	-15.09653	-173.74817	***1299.6***	3.1	306.6	Close-up of top surface of S87-rock-04. Amygdules on surface described as "lizard skin" texture. Sample is currently huge and we may break it in half.	174
2017-11-28	21:53:12	-15.09656	-173.74827	***1299.6***	0.0	305.8	Split the sample and keeping the right-hand half. Less iron staining. Sample S87-rock-04 placed into position 6.	175
2017-11-28	21:55:01	-15.09659	-173.74866	***1299.6***	3.0	306.0	S87-rock-04 into box 6.	176
2017-11-28	21:55:56	-15.09659	-173.74830	***1299.7***	4.8	305.8	Sample S87-rock-04 position 15.0965078 173.7481593 depth 1313m.	177
2017-11-28	21:57:20	-15.09662	-173.74834	***1297.4***	6.1	314.2	Continuing up slope. Still have a ways to go.	178
2017-11-28	21:58:09	-15.09655	-173.74839	***1294.1***	1.6	326.5	We're at waypoint 5 now.	179
2017-11-28	21:59:03	-15.09644	-173.74846	***1296.0***	1.5	331.9	Still climbing up over broken talus slope.	180
2017-11-28	21:59:32	-15.09639	-173.74849	***1295.6***	2.3	352.2	Slope is steepening here.	181
2017-11-28	22:00:53	-15.09628	-173.74849	***1289.7***	1.8	3.9	Large pillow blocks scattered on this sandy slope.	182
2017-11-28	22:01:19	-15.09622	-173.74848	***1287.7***	1.9	7.9	The lavas we see here are old and weathered.	183
2017-11-28	22:01:55	-15.09613	-173.74847	***1282.7***	2.3	7.8	More talus and sand slope.	184
2017-11-28	22:03:46	-15.09589	-173.74848	***1266.8***	2.3	355.9	Some older lavas poking out of the thick sediments here.	185
2017-11-28	22:04:27	-15.09581	-173.74849	***1260.4***	2.7	354.5	Big huge pillows here. They could be in place.	186
2017-11-28	22:05:08	-15.09575	-173.74847	***1255.7***	2.8	353.0	Can see the radial symmetry in the broken pillows.	187
2017-11-28	22:05:51	-15.09567	-173.74847	***1251.3***	1.8	352.1	Little shrimp.	188
2017-11-28	22:06:03	-15.09565	-173.74847	***1249.7***	2.2	352.5	Volcaniclastic sands and broken pillow debris.	189
2017-11-28	22:06:27	-15.09560	-173.74846	***1246.5***	1.5	349.3	Seeing little pits (depressions) in the sand.	190

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S087 W Mata Logger Comments	Record #
2017-11-28	22:06:49	-15.09556	-173.74846	***1243.5***	1.8	347.0	We're diving up the center of this ridge that may be a rift zone on the southern side of West Mata.	191
2017-11-28	22:07:24	-15.09552	-173.74846	***1239.4***	3.0	344.7	Not seeing any of the soft corals or sponges attached to the rocks here.	192
2017-11-28	22:08:15	-15.09549	-173.74845	***1236.4***	3.3	344.3	There's a bit of a fissure we are following with hollow spaces in between.	193
2017-11-28	22:08:38	-15.09548	-173.74845	***1237.0***	2.5	342.4	Could be a small amount of schleren coming out of this hole.	194
2017-11-28	22:09:00	-15.09547	-173.74845	***1236.3***	2.7	347.4	Alvinocaris shrimp and zoarcid vent fish here. We did possibly see some shimmering water.	195
2017-11-28	22:09:45	-15.09545	-173.74844	***1234.2***	3.2	346.7	Our path is covered in volcanoclastic sand with larger rocky debris on the side of the screen.	196
2017-11-28	22:10:30	-15.09539	-173.74845	***1230.0***	3.0	345.8	Rock fragments to the west of this ridge appear fresher than what we have seen earlier.	197
2017-11-28	22:10:58	-15.09535	-173.74848	***1227.6***	3.6	347.3	The pillows to the right are in place - to the left are not.	198
2017-11-28	22:11:32	-15.09534	-173.74851	***1223.1***	8.1	353.9	We're moving over to the west of the rift zone. Lots of wedge-shaped talus of pillow lavas.	199
2017-11-28	22:12:33	-15.09519	-173.74857	***1216.5***	2.5	341.3	Slope is increasing. More rubbly slope here.	200
2017-11-28	22:12:57	-15.09514	-173.74858	***1213.7***	2.0	340.5	Lots of talus slope.	201
2017-11-28	22:13:08	-15.09512	-173.74860	***1212.9***	2.1	340.0	Transition from angular fragmental debris to a rock breccia. Large intact piece.	202
2017-11-28	22:13:45	-15.09510	-173.74864	***1212.2***	4.0	4.9	Weird surface coating on this large intact lava tower.	203
2017-11-28	22:14:19	-15.09506	-173.74866	***1211.6***	2.2	346.2	not as much biology here as farther down slope on this debris avalanche area.	204
2017-11-28	22:14:37	-15.09504	-173.74867	***1209.5***	3.4	334.9	Coming upon in place younger lavas.	205
2017-11-28	22:15:02	-15.09506	-173.74871	***1210.4***	4.7	6.4	Long pillow that looks like an elephant with a very long trunk.	206
2017-11-28	22:15:34	-15.09504	-173.74871	***1210.3***	4.4	3.0	Bizarre looking pillow lavas that are relatively fluid.	207
2017-11-28	22:16:04	-15.09500	-173.74872	***1205.9***	0.0	4.3	Youngest rocks we have seen on the dive so far. Volcaniclastic sediment on top.	208
2017-11-28	22:16:34	-15.09495	-173.74871	***1202.3***	0.0	3.9	We're at waypoint 5 now.	209
2017-11-28	22:16:47	-15.09494	-173.74871	***1201.7***	0.0	16.2	Seeing some smokiness in the water now. More vent shrimp and squat lobsters as we progress upslope.	210
2017-11-28	22:18:09	-15.09483	-173.74869	***1197.3***	3.8	0.7	Correction: We're at waypoint 6 not too far from the summit.	211

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S087 W Mata Logger Comments	Record #
2017-11-28	22:18:30	-15.09481	-173.74869	***1197.8***	2.9	1.6	**S87-rock-05**. Broken rock face at WP6. See white microbial mat material on the rock faces.	212
2017-11-28	22:19:25	-15.09481	-173.74869	***1198.6***	2.4	4.0	S87-rock-05 cont. Piece of lava on this "cliff" face (pillows stacked on top of each other".	213
2017-11-28	22:20:18	-15.09481	-173.74869	***1198.6***	2.5	3.9	S87-rock-05. Olivine crystals on fresh rock surfaces. Glassy rind. Trianglish shape. ~15 cm longest. 3cm glass rind. Tan color. Boninite lava. These lavas are much younger than the previous samples.	214
2017-11-28	22:22:05	-15.09481	-173.74869	***1198.6***	2.6	4.2	S87-rock-05. 15.094810S 173.74869W Z=1210m Went into partition 7.	215
2017-11-28	22:23:56	-15.09483	-173.74867	***1196.7***	2.5	335.1	Stack of pillow lavas and free-swimming shrimp	216
2017-11-28	22:25:32	-15.09476	-173.74880	***1201.5***	7.4	281.7	Pillow on a slope with lots of sulfur buildup in cracks	217
2017-11-28	22:26:00	-15.09474	-173.74886	***1203.2***	7.2	275.9	Center of pillow is altered to a buff color. Indicates that there was probably fluid moving through this for some time.	218
2017-11-28	22:27:13	-15.09479	-173.74887	***1197.1***	14.0	258.9	Extensive altered debris and shrimp colonies - two species. Squat lobsters present.	219
2017-11-28	22:27:54	-15.09473	-173.74881	***1192.7***	15.0	259.0	Sulfur deposits in background - yellow balls on slope.	220
2017-11-28	22:28:44	-15.09474	-173.74883	***1191.3***	0.0	281.0	Highly altered pillow fragments with more shrimp and crabs. Large eel and some other deep-sea fish.	221
2017-11-28	22:29:18	-15.09474	-173.74874	***1191.0***	1.8	274.5	A delicate ballet of shrimp.	222
2017-11-28	22:29:43	-15.09474	-173.74876	***1191.1***	2.1	278.8	Microbial mat on volcanic sand.	223
2017-11-28	22:30:21	-15.09476	-173.74876	***1191.0***	10.0	300.3	Glassy rind to altered interior of pillow lavas obvious in this outcropping.	224
2017-11-28	22:30:49	-15.09478	-173.74887	***1191.7***	0.0	313.6	Overlooking the edge of the pit crater on West Mata. Approaching from the south ridge.	225
2017-11-28	22:31:30	-15.09473	-173.74893	***1200.1***	0.0	302.7	Volcanic breccia with lots of iron and sulfur coating. Agglutinated spatter.	226
2017-11-28	22:32:12	-15.09474	-173.74899	***1205.6***	30.0	348.5	Interior of a pillow flow displaying subparallel cooling fractures at bottom.	227
2017-11-28	22:32:46	-15.09475	-173.74902	***1209.0***	0.0	5.7	Tall columns of fractured and fragmented pillow lava interior forming scarp. Possible feeder dike feature.	228
2017-11-28	22:33:18	-15.09470	-173.74904	***1210.0***	0.0	36.3	Additional angle of possible feeder dike feature.	229
2017-11-28	22:33:35	-15.09469	-173.74904	***1211.7***	0.0	11.8	Talus/brecciated slope and smoke in the water.	230
2017-11-28	22:33:56	-15.09457	-173.74902	***1213.3***	0.0	351.7	Smoke increasing.	231

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S087 W Mata Logger Comments	Record #
2017-11-28	22:34:37	-15.09462	-173.74910	***1217.0***	49.0	196.2	Flying above seabed at rim of pit crater.	232
2017-11-28	22:36:06	-15.09485	-173.74895	***1218.7***	0.0	10.1	Rock wall on pit crater rim. Highly altered agglutinated spatter and brecciated fragments. Lots of sulfur and iron secondary coatings.	233
2017-11-28	22:36:43	-15.09472	-173.74902	***1214.5***	0.0	355.7	"Pinnacles" beneath the former Hades vent.	234
2017-11-28	22:37:12	-15.09465	-173.74906	***1212.0***	0.0	355.1	Vertical cracking and loose sulfur.	235
2017-11-28	22:37:31	-15.09461	-173.74910	***1211.0***	0.0	349.6	Vertically-trending dike.	236
2017-11-28	22:38:37	-15.09468	-173.74914	***1207.0***	55.1	285.1	Flying over pit then turning around to descend and survey the crater wall. Craggy wall poses risks to tether otherwise.	237
2017-11-28	22:40:09	-15.09471	-173.74910	***1227.4***	39.8	59.6	Vertical cracks in spires forming southern pit crater wall. Some pillows present.	238
2017-11-28	22:40:42	-15.09470	-173.74906	***1229.0***	0.0	62.8	Spatter and breccia common higher up. Further down section sees more pillows in wall.	239
2017-11-28	22:41:32	-15.09470	-173.74909	***1236.8***	0.0	63.4	Less smoke in water here compared to further up section by rim.	240
2017-11-28	22:42:58	-15.09471	-173.74911	***1255.4***	23.6	55.3	Crack/fissure continuous so far throughout descent along wall. Speculation whether this hosted a dike originally.	241
2017-11-28	22:44:07	-15.09471	-173.74913	***1272.4***	17.2	54.5	Odd radial jointing pattern on left side of image.	242
2017-11-28	22:44:41	-15.09470	-173.74914	***1283.7***	12.8	68.8	Largely massive rock/breccia like features with occasional coherent lava flow.	243
2017-11-28	22:45:34	-15.09467	-173.74915	***1295.4***	2.6	92.0	Hit bottom of the pit at 1309m.	244
2017-11-28	22:46:18	-15.09465	-173.74913	***1295.6***	2.9	22.8	Contact between pit crater wall and talus/sediments on the crater floor.	245
2017-11-28	22:47:38	-15.09468	-173.74923	***1293.3***	3.8	213.8	Rocky debris field with cantaloupe-sized chunks transitioning into loose sediment and sulfur balls.	246
2017-11-28	22:48:04	-15.09474	-173.74921	***1293.6***	4.0	187.5	Sediments and microbial mat.	247
2017-11-28	22:48:26	-15.09475	-173.74919	***1293.5***	4.1	131.7	Another rocky face overhanging crater floor.	248
2017-11-28	22:49:09	-15.09472	-173.74915	***1295.0***	3.2	115.1	Lava flow with columnar cooling joints.	249
2017-11-28	22:51:30	-15.09475	-173.74919	***1293.1***	4.6	178.6	Broken lava flow under sediment pile?	250
2017-11-28	22:51:46	-15.09477	-173.74920	***1291.7***	5.3	195.6	Sediment and microbial mat again.	251
2017-11-28	22:53:06	-15.09476	-173.74922	***1291.5***	5.1	52.6	Deciding next series of ROV movements out of this pit crater. Not much to see right now.	252
2017-11-28	22:55:35	-15.09487	-173.74926	***1290.3***	3.0	199.9	Starting to transit up gentle sedimented slope.	253
2017-11-28	22:56:07	-15.09493	-173.74930	***1287.6***	3.6	202.3	Shimmering water near waypoint 8.	254
2017-11-28	22:56:52	-15.09496	-173.74933	***1288.1***	1.3	199.5	Shimmering water; orange and white microbial mats. Stopping to take a temperature probe and measure temperatures of both mat types.	255

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S087 W Mata Logger Comments	Record #
2017-11-28	22:57:55	-15.09496	-173.74933	***1289.1***	0.0	200.2	Filaments visible on white mats. Orange mats have some filaments; mostly appear "balled up".	256
2017-11-28	23:00:07	-15.09489	-173.74932	***1289.1***	0.0	199.8	Deploying temperature probe with port arm.	257
2017-11-28	23:01:29	-15.09498	-173.74933	***1289.1***	0.0	199.6	Probing white bacterial mat. Probe temperature 16.7C versus ambient of 3C.	258
2017-11-28	23:03:39	-15.09496	-173.74933	***1289.1***	0.0	199.5	The temp probe got up to 16.7C - ambient here is about 3.C.	259
2017-11-28	23:04:24	-15.09496	-173.74933	***1289.1***	0.0	199.4	Temperature probe now in the area of orangish seds - not moved very far.	260
2017-11-28	23:04:59	-15.09496	-173.74933	***1289.1***	0.0	199.2	Temp probe stabilized at zone of half white and half orange is 10.4C.	261
2017-11-28	23:05:27	-15.09497	-173.74933	***1289.1***	0.0	199.2	Now moving the probe to the area of orange seds (iron oxide mats). Black volcanoclastic seds right underneath. T=11C. Not much gradient between the different colored mats.	262
2017-11-28	23:09:45	-15.09498	-173.74937	***1267.9***	18.2	137.2	Not sure what will happen next.	263
2017-11-28	23:11:25	-15.09509	-173.74939	***1266.1***	0.0	157.8	We're moving around in the pit now. We're looking to the north.	264
2017-11-28	23:13:40	-15.09490	-173.74943	***1283.8***	3.9	8.5	We're moving into the center of the pit now with the pit wall to our left.	265
2017-11-28	23:14:35	-15.09478	-173.74927	***1291.2***	2.6	21.3	Moving to the north within the pit.	266
2017-11-28	23:15:03	-15.09467	-173.74927	***1291.3***	0.0	337.6	Had a little issue with the logging there.	267
2017-11-28	23:15:28	-15.09463	-173.74931	***1288.2***	3.3	312.0	Covered with yellow bacterial mat. White mat in the distance.	268
2017-11-28	23:16:05	-15.09459	-173.74937	***1284.0***	3.2	284.1	Some shimmer coming out of the bottom here.	269
2017-11-28	23:16:29	-15.09456	-173.74939	***1281.6***	3.2	308.8	Looking over the bottom of the pit.	270
2017-11-28	23:16:49	-15.09454	-173.74940	***1279.3***	4.3	329.0	Serious orange staining on the tocks on the NW wall.	271
2017-11-28	23:17:31	-15.09449	-173.74933	***1275.7***	0.0	348.9	Coming up to the north wall.	272
2017-11-28	23:18:02	-15.09437	-173.74927	***1276.8***	3.5	27.1	Turning to the east now. Lots of cloudy water here in the pit.	273
2017-11-28	23:18:26	-15.09439	-173.74928	***1277.9***	1.7	77.8	The marker is ahead. Will suction shrimp first then do some water and gas sampling.	274
2017-11-28	23:19:05	-15.09441	-173.74926	***1277.5***	8.9	77.9	Marker on the edge of the pit. Our sampling site ahead.	275
2017-11-28	23:20:51	-15.09441	-173.74924	***1277.4***	8.3	74.9	Marker 224 ahead sitting on N/NE the slope of the pit.	276

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S087 W Mata Logger Comments	Record #
2017-11-28	23:21:48	-15.09442	-173.74923	***1277.5***	9.3	74.7	The slope here is covered in white bacterial mat. The pit is much larger than it was in 2012 - when the ROV could barely turn around in it.	277
2017-11-28	23:22:25	-15.09442	-173.74921	***1276.9***	11.0	76.3	Zooming in on the marker suction hose in hand.	278
2017-11-28	23:23:06	-15.09441	-173.74918	***1278.5***	8.5	82.0	Taking a few HD framegrabs.	279
2017-11-28	23:23:34	-15.09439	-173.74917	***1280.2***	5.4	85.9	Where did the shrimp go?	280
2017-11-28	23:24:32	-15.09438	-173.74915	***1280.1***	4.9	83.6	Lots of shimmering water but not much biota.	281
2017-11-28	23:25:29	-15.09435	-173.74915	***1280.8***	3.6	96.9	Lots of white and yellow bacterial mat.	282
2017-11-28	23:27:42	-15.09440	-173.74912	***1281.2***	3.6	79.7	No bio sample yet. It seems that the shrimp knew we were coming and disappeared.	283
2017-11-28	23:28:45	-15.09438	-173.74909	***1281.2***	1.8	75.5	Bag creatures - mucopolysaccharides - on this white wavy bacterial mat. Hair-like bacterial mat.	284
2017-11-28	23:29:46	-15.09439	-173.74906	***1278.8***	4.1	80.0	Now we're moving in with the temperature probe.	285
2017-11-28	23:30:34	-15.09438	-173.74908	***1280.8***	2.5	79.7	Dropping down to the base of this outcrop.	286
2017-11-28	23:31:41	-15.09440	-173.74910	***1283.1***	1.6	82.7	Looking for a good water sampling site.	287
2017-11-28	23:32:44	-15.09442	-173.74909	***1283.2***	1.5	80.2	The flow and the pit size have increased dramatically since 2012.	288
2017-11-28	23:33:35	-15.09441	-173.74910	***1283.2***	1.5	79.7	Still setting up with the temperature probe.	289
2017-11-28	23:33:56	-15.09441	-173.74910	***1283.2***	1.2	79.7	Temp probe inserted in a small crack here.	290
2017-11-28	23:35:09	-15.09441	-173.74909	***1283.2***	1.5	79.8	Moving down the wall a bit to the base of the wall into the rocks.	291
2017-11-28	23:35:33	-15.09441	-173.74908	***1283.3***	1.0	80.3	Temp got up to 11 at one point.	292
2017-11-28	23:36:00	-15.09441	-173.74908	***1283.3***	1.3	81.4	Temp increased to 21C when pushed the probe farther into the seds.	293
2017-11-28	23:37:14	-15.09441	-173.74909	***1283.4***	1.3	80.0	Trying for a crack between rocks at the bottom of this ledge.	294
2017-11-28	23:38:34	-15.09441	-173.74908	***1283.4***	1.3	80.2	Moving the probe around a bit and burying it in the white rock zone. T=24.02C.	295
2017-11-28	23:39:34	-15.09441	-173.74909	***1283.3***	1.3	80.3	CORRECTION - never took bio sample (S87-bio-06 is being scratched and will be replaced by S87-fluid-06)	296
2017-11-28	23:40:50	-15.09441	-173.74908	***1283.3***	1.3	80.3	**S87-fluid-06** at site at bottom of cliff beneath Mkr-224 (about 20m SE of the marker). Setting up to sample with the Major-1 sampler.	297
2017-11-28	23:43:31	-15.09441	-173.74907	***1283.4***	1.2	80.1	S87-fluid-06 cont. Major sampler #1. In area of white and orange bacterial mat. Want to put the nozzle down in the area of white (hotter) mat.	298
2017-11-28	23:44:53	-15.09441	-173.74909	***1283.4***	1.3	80.1	S87-fluid-06 cont. 15.09441S 173.74909W Z=1294. Still setting up.	299

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S087 W Mata Logger Comments	Record #
2017-11-28	23:46:15	-15.09441	-173.74910	***1283.3***	1.3	80.4	S87-fluid-06 cont. Still looking for a better angle.	300
2017-11-28	23:47:17	-15.09441	-173.74909	***1283.4***	1.3	79.7	S87-fluid-06 cont. Fired at 234749.	301
2017-11-28	23:48:34	-15.09441	-173.74909	***1283.4***	1.3	80.8	S87-fluid-06 cont. Looks like a good sampling spot under this red rock with white hair like bacterial mat.	302
2017-11-28	23:49:53	-15.09441	-173.74909	***1283.3***	1.4	80.9	S87-fluid-06 cont. The ram only came up part way. Going to try again to ignite the ram.	303
2017-11-28	23:51:20	-15.09442	-173.74909	***1283.3***	1.0	80.8	S87-fluid-06 cont. Sample finished. Looks like it worked. 2351:30	304
2017-11-28	23:51:51	-15.09441	-173.74909	***1283.4***	1.3	79.3	Storing major sampler 1.	305
2017-11-28	23:52:49	-15.09441	-173.74909	***1283.4***	1.3	79.3	The handle of the major sampler is quite orange-stained now.	306
2017-11-28	23:54:24	-15.09441	-173.74909	***1283.4***	1.3	79.2	Having trouble putting the sampler back in the holster.	307
2017-11-28	23:55:34	-15.09441	-173.74909	***1283.5***	1.3	79.0	Bungeeing the major into its holster.	308
2017-11-28	23:56:06	-15.09441	-173.74909	***1283.4***	1.3	78.7	Want to compare the silica and methane content of the 2 samples (major and gas).	309
2017-11-28	23:56:40	-15.09441	-173.74909	***1283.4***	1.3	78.6	Next sample will be in the very same place. It will be a gastight bottle. Sample S87-Gas 07. Gastight bottle (green and yellow bottle GT12)	310
2017-11-28	23:58:39	-15.09441	-173.74909	***1283.4***	1.4	79.1	Working to get the gastight out of the basket.	311
2017-11-29	00:02:36	-15.09441	-173.74909	***1283.5***	1.3	77.7	Got it.	312
2017-11-29	00:02:45	-15.09441	-173.74909	***1283.4***	1.3	77.8	**S87-Gas 07**. Same location as major sample 6. 15.09441S 173.74909W Z=1294m. Moving in on exact same sampling site.	313
2017-11-29	00:04:00	-15.09442	-173.74909	***1283.4***	1.3	77.7	This is a 2manipulator operation.	314
2017-11-29	00:05:05	-15.09442	-173.74909	***1283.5***	0.0	77.9	S87-Gas 07 cont. Now have the ram plunger under control.	315
2017-11-29	00:06:01	-15.09442	-173.74909	***1283.5***	1.3	78.1	S87-Gas 07 cont. Still working on placement.	316
2017-11-29	00:06:44	-15.09442	-173.74909	***1283.5***	1.3	78.1	S87-Gas 07 cont. Fired at 0006:57.	317
2017-11-29	00:07:03	-15.09442	-173.74909	***1283.5***	1.3	78.1	Going to take the temp in the same spot we have sampled the water and gas.	318
2017-11-29	00:09:42	-15.09441	-173.74910	***1283.4***	1.5	78.3	Working to stow the gastight sampler in the far to port partition in the front milk crate basket.	319
2017-11-29	00:12:47	-15.09441	-173.74910	***1283.5***	1.1	78.8	Still stowing the gastight sampler back in the "Swiss" milk crate.	320
2017-11-29	00:14:32	-15.09442	-173.74910	***1283.4***	1.5	78.8	Still stowing the gastight.	321

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S087 W Mata Logger Comments	Record #
2017-11-29	00:15:20	-15.09442	-173.74910	***1283.5***	1.5	79.2	Going in for the temperature in the same hole as the previous 2 samples (fluid and gas) here in Hades pit crater (what looks like ~15m SE of Mkr-224).	322
2017-11-29	00:18:57	-15.09442	-173.74910	***1283.6***	1.3	78.9	Water temperature was ~ 7 degrees C at the sampling site.	323
2017-11-29	00:19:34	-15.09442	-173.74910	***1283.6***	1.0	78.9	Nearby on the white mat the temperature was 22C. (sampling site was white and orange mat area).	324
2017-11-29	00:20:38	-15.09442	-173.74910	***1283.6***	1.3	78.2	Going to take another major sampler in the white mat area where the temperature measured 22C.	325
2017-11-29	00:21:19	-15.09442	-173.74910	***1283.6***	1.3	78.1	Doing housekeeping on the gastight holder.	326
2017-11-29	00:22:30	-15.09442	-173.74910	***1283.6***	1.3	77.9	Going in for another major sample in the white rocks where the temp was 22C.	327
2017-11-29	00:22:52	-15.09442	-173.74910	***1283.6***	1.2	78.4	**S87-fluid-08**. Will take major sampler in 22C area of white bacterial floc. Same position as previous 2 samples (6 and 7).	328
2017-11-29	00:25:09	-15.09442	-173.74910	***1283.6***	1.2	78.5	S87-fluid-08. Using major sampler #2. Setting up for sample.	329
2017-11-29	00:26:37	-15.09442	-173.74910	***1283.6***	1.3	79.1	S87-fluid-08. Fired at 0028:17.	330
2017-11-29	00:28:41	-15.09442	-173.74910	***1283.6***	1.0	79.0	S87-fluid-08 cont. Had to hit the ram twice.	331
2017-11-29	00:30:18	-15.09441	-173.74910	***1283.6***	1.2	77.9	S87-fluid-08 cont. Sample finished. Storing the major.	332
2017-11-29	00:32:56	-15.09442	-173.74909	***1282.2***	2.9	44.4	We're making our way up to the summit ridge now.	333
2017-11-29	00:33:13	-15.09440	-173.74910	***1279.2***	4.9	23.4	Moving around the northern remnants of the summit.	334
2017-11-29	00:33:43	-15.09432	-173.74911	***1275.9***	3.8	38.7	Heading up the center high to E/SE of Hades pit crater.	335
2017-11-29	00:35:06	-15.09422	-173.74898	***1264.0***	2.8	82.4	Heading up this wall. Contact between the pillows and the talus slope.	336
2017-11-29	00:36:15	-15.09422	-173.74886	***1254.9***	4.6	93.0	Thicker microbial mat.	337
2017-11-29	00:36:30	-15.09425	-173.74885	***1252.5***	6.6	90.5	Dike here with higher lava flow to the right. Hollow pillows to the lower right.	338
2017-11-29	00:37:03	-15.09425	-173.74885	***1252.4***	7.2	96.6	Looks like this was a lava flow that flowed into the pit crater from above.	339
2017-11-29	00:37:48	-15.09427	-173.74886	***1249.4***	8.5	93.3	The massive sheet ahead of us is the remnant of a dike. There are pillows around in both sides that have fallen away.	340
2017-11-29	00:38:23	-15.09426	-173.74885	***1246.8***	14.6	127.6	That's an amazing feature.	341

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S087 W Mata Logger Comments	Record #
2017-11-29	00:38:57	-15.09426	-173.74881	***1243.5***	7.9	133.2	This is a huge dyke that is more solid than the surrounding lavas.	342
2017-11-29	00:39:24	-15.09426	-173.74877	***1239.8***	8.9	173.7	We're going along the old summit ridge (on the west side of the summit) it's even steeper to the east of us.	343
2017-11-29	00:40:14	-15.09425	-173.74869	***1234.0***	4.4	128.5	We are looking at what might be another dyke in front of us.	344
2017-11-29	00:40:37	-15.09423	-173.74868	***1233.3***	4.2	149.6	Looks like a sheet flow.	345
2017-11-29	00:40:55	-15.09424	-173.74866	***1233.4***	3.1	151.2	Sheets surrounded by pillows.	346
2017-11-29	00:41:43	-15.09424	-173.74866	***1233.1***	3.2	172.6	Really broken up fractured pillows.	347
2017-11-29	00:42:21	-15.09425	-173.74866	***1230.4***	7.9	119.2	Some intact pillows on the right.	348
2017-11-29	00:42:35	-15.09425	-173.74865	***1229.0***	8.5	121.3	More intact huge pillows.	349
2017-11-29	00:43:12	-15.09425	-173.74863	***1222.2***	7.6	123.3	More intact huge pillows.	350
2017-11-29	00:43:28	-15.09425	-173.74862	***1220.3***	7.7	122.6	Not as much mat as we climb up the volcano.	351
2017-11-29	00:43:59	-15.09426	-173.74859	***1215.3***	0.0	128.7	Not as much fluid flow here.	352
2017-11-29	00:44:15	-15.09424	-173.74858	***1213.1***	5.0	131.4	The lavas here are really fractured up here.	353
2017-11-29	00:44:30	-15.09423	-173.74858	***1211.2***	5.5	139.6	We're at waypoint 12 which was the former Shrimp City.	354
2017-11-29	00:44:52	-15.09422	-173.74860	***1211.1***	8.6	132.4	We're just getting out of the pit and the slope is more gentle here.	355
2017-11-29	00:45:23	-15.09423	-173.74857	***1209.1***	5.8	131.4	We're in the vicinity of former Shrimp City before the pit crater formed.	356
2017-11-29	00:45:47	-15.09427	-173.74853	***1205.9***	4.6	125.1	Swirly lobate lavas here.	357
2017-11-29	00:46:11	-15.09427	-173.74852	***1205.8***	4.3	136.5	We're up there traversing this awesome summit ridge.	358
2017-11-29	00:47:10	-15.09419	-173.74852	***1199.8***	3.1	92.5	Looks like a lot of those old sites have fallen away.	359
2017-11-29	00:47:26	-15.09416	-173.74849	***1199.2***	0.0	106.1	Massive lava in the wall on the right.	360
2017-11-29	00:47:51	-15.09415	-173.74844	***1198.3***	0.0	129.9	The summit is to our right (east).	361
2017-11-29	00:48:15	-15.09416	-173.74838	***1197.5***	7.3	139.7	Looking down into a small depression .	362
2017-11-29	00:48:28	-15.09418	-173.74835	***1196.2***	3.0	111.1	Lots of shrimp here and venting.	363
2017-11-29	00:49:10	-15.09417	-173.74831	***1191.8***	12.6	110.8	Spectacular views of this fractured up convoluted summit of West Mata.	364
2017-11-29	00:49:41	-15.09415	-173.74827	***1191.7***	6.5	102.6	Some solid pillow lavas that have been truncated and fallen in the pit.	365
2017-11-29	00:50:17	-15.09412	-173.74827	***1191.8***	12.3	73.4	Lots of shrimp here. Alvinocaris and Opaepale swimming around through the water.	366
2017-11-29	00:51:09	-15.09410	-173.74823	***1190.2***	10.9	82.9	Still moving along on the west side of the summit ridge approaching Shrimp Suburbia.	367
2017-11-29	00:52:33	-15.09406	-173.74815	***1189.9***	5.8	115.1	Zooming in on this area near Shrimp Suburbia.	368

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S087 W Mata Logger Comments	Record #
2017-11-29	00:55:17	-15.09405	-173.74814	***1189.1***	0.0	117.8	**S87-bio-09**. 15.094047S 173.749133 Z=1198m. Into chamber 8. ~10 - 15 Opaepele and 1 zoarcid.	369
2017-11-29	00:55:17	-15.09405	-173.74814	***1189.1***	0.0	117.8	S87-bio-09. Suctioning shrimp on the side of this steep cliff in the area of Shrimp Suburbia.	370
2017-11-29	00:58:50	-15.09402	-173.74811	***1189.2***	5.4	107.5	That sample was taken right at waypoint 13.	371
2017-11-29	00:59:09	-15.09401	-173.74810	***1189.4***	4.5	108.1	The amount of venting is increasing here as we go farther north along this ridge. More and more cloudy water and tons of shrimp.	372
2017-11-29	00:59:56	-15.09397	-173.74802	***1189.6***	7.1	110.0	We're at about 1200 meters.	373
2017-11-29	01:00:35	-15.09393	-173.74795	***1190.3***	8.3	110.7	We're seeing several sites of venting here and tons of shrimp.	374
2017-11-29	01:01:14	-15.09393	-173.74792	***1191.0***	6.0	109.2	Dark pillows on the top and really altered rock underneath.	375
2017-11-29	01:01:32	-15.09393	-173.74792	***1191.1***	3.5	109.5	Lots of diffuse flow coming up everywhere along the west side of the summit ridge. Z=1201 here.	376
2017-11-29	01:02:23	-15.09389	-173.74791	***1192.1***	4.5	107.0	Lasers have been on where just to zoomed out can't see it.	377
2017-11-29	01:02:58	-15.09388	-173.74792	***1192.6***	5.0	108.3	We're on the north side of the summit ridge.	378
2017-11-29	01:03:15	-15.09387	-173.74792	***1193.2***	4.9	107.6	Broken off lavas (lobate and pillows). Lots of broken pillows and pillow pieces. Shrimp covering the slopes - everywhere in this place.	379
2017-11-29	01:04:14	-15.09383	-173.74790	***1193.8***	3.6	108.8	We've stirred up the shrimp.	380
2017-11-29	01:04:42	-15.09381	-173.74789	***1193.8***	2.9	123.4	Shrimp ballet. The main species here at West Mata are Opapele (smaller and whiter) and Alvinocaris (larger red carnivores.	381
2017-11-29	01:05:41	-15.09377	-173.74782	***1195.0***	0.0	129.0	Large fresh-looking pillows.	382
2017-11-29	01:06:02	-15.09375	-173.74780	***1195.8***	0.0	129.8	We're rounding the corner toward Kohu.	383
2017-11-29	01:09:00	-15.09383	-173.74760	***1201.5***	24.0	237.5	We've moved around the north/northeast point of the summit now..	385
2017-11-29	01:09:31	-15.09385	-173.74759	***1201.4***	38.0	237.8	We really didn't notice Kohu vent here.	386
2017-11-29	01:10:26	-15.09389	-173.74759	***1201.4***	0.0	254.4	Going around the nose of the northern summit ridge.	387
2017-11-29	01:10:46	-15.09389	-173.74759	***1199.8***	24.5	264.8	Moving up to about 1200 m depth. Steep cliffs everywhere.	388
2017-11-29	01:11:22	-15.09390	-173.74760	***1195.1***	0.0	264.9	Looking around here.	389
2017-11-29	01:11:43	-15.09391	-173.74761	***1192.6***	0.0	264.3	test	390
2017-11-29	01:12:15	-15.09390	-173.74761	***1190.7***	0.0	263.8	Big thick lava flow up here on the top of the ridge. Barely hanging off of the cliff.	391

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2017-11-29	01:12:50	-15.09397	-173.74767	***1190.7***	0.0	251.3	Moving around the nose and now seeing the south side of the summit.	392
2017-11-29	01:13:13	-15.09405	-173.74765	***1190.7***	25.2	280.9	Seeing quite a lot of molten sulfur here.	393
2017-11-29	01:13:51	-15.09413	-173.74766	***1190.7***	17.8	290.9	Sulfur splatter on the surface of these lavas.	394
2017-11-29	01:15:20	-15.09435	-173.74769	***1189.6***	20.4	287.1	We're looking at the sulfur on the rock face and looks like deposits of molten sulfur on the pillows here.	395
2017-11-29	01:15:48	-15.09444	-173.74771	***1189.1***	21.7	284.3	The lovely bands of different colors probably represent different modes of alteration.	396
2017-11-29	01:17:32	-15.09489	-173.74765	***1186.3***	82.4	312.8	We're at the top of the landslide area here.	397
2017-11-29	01:17:54	-15.09403	-173.74757	***1176.8***	89.6	301.7	We're rising up to take the turn out of the tether.	398
2017-11-29	01:18:13	-15.09400	-173.74760	***1169.6***	0.0	63.8	Tons of smoke in the water.	399
2017-11-29	01:19:12	-15.09405	-173.74760	***1178.6***	0.0	296.1	Dropping back down to about 1192 meters.	400
2017-11-29	01:19:46	-15.09406	-173.74762	***1182.8***	28.0	297.8	Moving on closer to the cliff. On the SE summit ridge.	401
2017-11-29	01:20:16	-15.09407	-173.74769	***1183.0***	0.0	312.5	We're near the area where the landslide occurred before 2012.	402
2017-11-29	01:21:25	-15.09409	-173.74776	***1183.0***	18.9	310.6	Not much microbial growth here and not many animals.	403
2017-11-29	01:21:43	-15.09409	-173.74777	***1182.9***	11.4	310.6	Continuing along the south side of the summit.	404
2017-11-29	01:22:59	-15.09413	-173.74784	***1182.9***	0.0	335.2	Not much venting here.	405
2017-11-29	01:23:14	-15.09413	-173.74785	***1182.9***	24.1	358.9	Rising shrimp and a ctenophore.	406
2017-11-29	01:24:41	-15.09410	-173.74792	***1183.0***	10.1	333.6	Moving around this area with lots of shrimp aggregated here.	407
2017-11-29	01:25:16	-15.09408	-173.74792	***1183.4***	4.8	332.3	Moving in to get a view of these white opaepele shrimp on the rock. Not much mat and not much flow.	408
2017-11-29	01:26:44	-15.09413	-173.74789	***1182.8***	0.0	307.5	In general we're seeing more and more shrimp and diffuse flow.	409
2017-11-29	01:27:21	-15.09414	-173.74792	***1182.2***	0.0	306.1	These shrimp are loving life. Lots of bacterial mat and diffuse flow.	410
2017-11-29	01:28:21	-15.09416	-173.74794	***1182.1***	59.2	280.1	We're moving around this projecting cliff.	411
2017-11-29	01:29:05	-15.09417	-173.74797	***1182.1***	27.3	282.9	We're in the vicinity of the former Prometheus.	412
2017-11-29	01:29:32	-15.09415	-173.74799	***1179.8***	28.6	285.8	Heading to the summit here at former Prometheus site.	413
2017-11-29	01:31:08	-15.09424	-173.74798	***1178.3***	0.0	326.7	This is the location of the former Prometheus vent.	415
2017-11-29	01:31:32	-15.09424	-173.74802	***1176.5***	0.0	346.1	We're at the former site of Prometheus. Still really hot here.	416

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S087 W Mata Logger Comments	Record #
2017-11-29	01:32:19	-15.09419	-173.74803	***1175.7***	1.2	344.9	We're looking at a shrimp ballet.	417
2017-11-29	01:33:14	-15.09421	-173.74804	***1175.9***	0.0	343.8	Prometheus doesn't have all the fire it had in the past but now it's erupting crustaceans.	418
2017-11-29	01:34:22	-15.09421	-173.74804	***1175.9***	0.0	344.4	Bringing out the temperature probe.	419
2017-11-29	01:34:45	-15.09421	-173.74804	***1176.0***	0.8	343.1	Position of this lovely place (Prometheus of the past). 15.09421S 173.74804w z=1185. Tmax for first attempt was 24C.	420
2017-11-29	01:38:31	-15.09421	-173.74804	***1176.0***	0.0	344.3	Continuing temperature measurements.	421
2017-11-29	01:39:14	-15.09421	-173.74804	***1176.0***	0.8	343.0	Highest temp: 28.7C.	422
2017-11-29	01:40:06	-15.09421	-173.74805	***1175.3***	1.3	358.6	Gorgeous view of this summit area with smoke wafting off in the distance.	423
2017-11-29	01:40:26	-15.09420	-173.74805	***1174.9***	0.0	31.5	Knife-edge ridge.	424
2017-11-29	01:41:36	-15.09420	-173.74805	***1175.7***	0.0	47.9	Want to probe around in a couple more spots before taking samples.	425
2017-11-29	01:42:39	-15.09420	-173.74805	***1175.7***	0.0	47.4	Probe reading 27.2C	426
2017-11-29	01:44:21	-15.09420	-173.74807	***1175.6***	0.0	48.6	28.42C is final temperature reading	427
2017-11-29	01:46:12	-15.09421	-173.74806	***1175.7***	0.0	49.5	13.33C at probe site - crack in rocks	428
2017-11-29	01:47:10	-15.09420	-173.74805	***1175.7***	0.0	49.4	25.4C	429
2017-11-29	01:51:34	-15.09423	-173.74803	***1175.7***	0.0	49.2	Preparing to take gas sample	430
2017-11-29	01:55:58	-15.09420	-173.74804	***1175.7***	0.0	49.2	**Sample S87-gas-10** gt 6 (yellow). Location - 15.09420 -173.74805 depth 1185m Temperature of 27.55degC. Taken at Prometheus site.	431
2017-11-29	02:00:55	-15.09420	-173.74806	***1175.6***	0.0	49.2	GT 6 (yellow) resecured in basket	432
2017-11-29	02:01:55	-15.09420	-173.74805	***1175.6***	0.0	49.1	The sample was taken in the area where the temperature was 27.55C. That was gastight 6 (yellow). Sample number S87-GAS-10.	433
2017-11-29	02:03:50	-15.09420	-173.74806	***1175.6***	0.0	49.6	The next sample will be a major fluid sample in the same place as the gastight and temp probe.	434
2017-11-29	02:05:33	-15.09421	-173.74804	***1175.6***	0.0	49.6	Working on retrieving the major sampler from its holder.	435
2017-11-29	02:08:39	-15.09420	-173.74805	***1175.6***	0.0	49.4	Have the major sampler #3 in the port claw.	436
2017-11-29	02:09:05	-15.09421	-173.74805	***1175.6***	0.0	49.5	**S87-Fluid-11**. Major sampler #3. In same position as previous gas sample. 15.09420S 173.74805W Z=1185m. Moving in for the sample.	437
2017-11-29	02:11:28	-15.09420	-173.74805	***1175.6***	0.0	49.4	S87-Fluid-11. Start 0212. Sample is within a couple centimeters of the previous sample.	438
2017-11-29	02:13:30	-15.09419	-173.74806	***1175.6***	0.0	49.4	S87-Fluid-11. Finished with that sample. Stowing the sampler now.	439

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2017-11-29	02:14:42	-15.09421	-173.74805	***1175.7***	0.0	49.4	This is still a sulfur-dominated volcano. Don't see a lot of sulfur or sulfides here; but nonetheless.	440
2017-11-29	02:17:31	-15.09421	-173.74805	***1175.8***	0.0	49.4	Bungeeing the major in.	441
2017-11-29	02:20:47	-15.09420	-173.74805	***1175.8***	0.0	49.4	Next we will suction some shrimp here in the same area where we took water and gas samples.	442
2017-11-29	02:21:15	-15.09420	-173.74806	***1175.8***	0.0	49.4	**S87-Bio-12**. Suction of shrimp here at Prometheus. The shrimp are trying to scatter. Sampled the top of the pillow here. Sampled into canister 1. Mostly Opaepele ~20.	443
2017-11-29	02:25:46	-15.09421	-173.74806	***1175.8***	0.0	50.6	Next, going for a rock with sulfur on it in this same place as previous 3 samples.	444
2017-11-29	02:27:11	-15.09420	-173.74805	***1175.8***	0.0	49.8	**S87-Rock-13**. Grabbing black rock with lots of sulfur coating. Piece of boninite pillow with some sulfur coating. Same location as previous Prometheus samples.	445
2017-11-29	02:32:51	-15.09421	-173.74805	***1175.9***	0.0	53.6	S87-Rock-13 cont. Still trying to pick up the rock. Not sure how much sulfur coating is left.	446
2017-11-29	02:35:06	-15.09419	-173.74804	***1175.9***	0.0	49.6	S87-Rock-13. Have a small piece of this pillow lava in the claw. Glass rind and sulfur coating on the outside. Whitish surface. . 10cm x 15 cm. Sort of like an elf's cap. Conical.	447
2017-11-29	02:37:12	-15.09420	-173.74805	***1176.0***	0.0	49.9	S87-Rock-13 cont. Expecting low levels of alteration on this one when we get on deck. Went into partition 8.	448
2017-11-29	02:38:15	-15.09419	-173.74805	***1176.0***	0.0	49.7	S87-Rock-13. 15.09420S 173.74805W Z=1185.	449
2017-11-29	02:39:09	-15.09419	-173.74803	***1172.6***	0.0	74.5	Going to move to the east as quickly as we can. Can move off the bottom if we need to.	450
2017-11-29	02:40:24	-15.09418	-173.74797	***1172.0***	0.0	190.3	Moving through the water column to waypoint 18 - 19 on the new lava flow (between 2012 and 2016).	451
2017-11-29	02:48:11	-15.09484	-173.74697	***1283.0***	5.0	104.5	After transit approaching waypoint 18. Encountered a stack of striated pillow basalts on a relatively gentle slope.	452
2017-11-29	02:49:00	-15.09491	-173.74682	***1280.5***	6.1	105.1	Pillow lavas are interspersed with volcaniclastic sediments	453
2017-11-29	02:50:00	-15.09497	-173.74669	***1275.9***	6.4	105.0	Microbial mats forming in place among pillow lavas and sediments	454
2017-11-29	02:50:41	-15.09498	-173.74663	***1275.1***	4.6	68.4	We're going to head toward waypoint 19 and then on to Bubba Gump site.	455

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2017-11-29	02:51:12	-15.09496	-173.74657	***1272.3***	4.9	68.1	Beautiful new in place boninite pillows with ash and microbial sediments.	456
2017-11-29	02:51:58	-15.09493	-173.74646	***1271.0***	3.8	67.0	Squat lobsters on the huge bulbous pillows.	457
2017-11-29	02:52:30	-15.09490	-173.74642	***1270.1***	2.7	68.4	Young pillow lavas with some microbial mat and sulfury stain. Some lobates in the distance.	458
2017-11-29	02:53:09	-15.09489	-173.74640	***1270.1***	2.4	67.6	We're going in for a scoop sample with the new bags that the crew and Subastian crew devised.	459
2017-11-29	02:53:55	-15.09489	-173.74640	***1270.0***	2.3	67.1	Looking around for the perfect scoop site.	460
2017-11-29	02:55:33	-15.09490	-173.74642	***1270.9***	0.0	67.5	Preparing to sample.	461
2017-11-29	02:55:46	-15.09490	-173.74642	***1270.9***	0.0	67.6	**S87-Sed-14**. Getting ready to scoop up these volcaniclastic seds. 15.094893S 173.746422W Z=1281m.	462
2017-11-29	02:57:16	-15.09491	-173.74642	***1270.9***	0.0	67.6	S87-Sed-14. Bag #1 "team engineering". Going in for a scoop of the mixed variation of light and dark volcaniclastic seds here. Probably some shell fragments and sulfur particles.	463
2017-11-29	02:59:05	-15.09488	-173.74644	***1270.9***	0.0	67.7	S87-Sed-14 cont. We're over here on the new mound. This is sediment bag @!.	464
2017-11-29	03:00:09	-15.09490	-173.74642	***1270.9***	0.0	67.9	S87-Sed-14 cont. Twist the top. No sign of tearing of the bag or handle.	465
2017-11-29	03:04:28	-15.09489	-173.74641	***1270.8***	0.0	68.5	Trying to decide what to do with this scoop bag. Time's a wasting here.....	466
2017-11-29	03:06:49	-15.09490	-173.74642	***1270.8***	0.0	67.3	Still trying to put the scoop bag somewhere.	467
2017-11-29	03:08:06	-15.09490	-173.74642	***1270.7***	0.0	68.3	S87-Sed-14. Scoop bag #1 finally in partition 9.	468
2017-11-29	03:09:40	-15.09490	-173.74642	***1270.7***	0.0	67.3	Heading to Bubba Gump now for fluid sampling.	469
2017-11-29	03:11:05	-15.09490	-173.74642	***1270.6***	0.0	66.7	Finally picking up and heading on over to waypoint 19 then will turn north to Bubba Gump.	470
2017-11-29	03:11:42	-15.09488	-173.74638	***1267.6***	4.4	67.0	Lots of microbial mat with staining between the ridges.	471
2017-11-29	03:12:17	-15.09484	-173.74633	***1267.7***	2.4	66.9	The flows are inflated? And tilted here.	472
2017-11-29	03:12:46	-15.09482	-173.74632	***1267.2***	2.2	90.4	Truncated stack of what appears to be several lava flows. Possible inflation OR pillow morphology at center of stack. Some volcanic sediments here but not as thick as slightly downslope.	473
2017-11-29	03:14:19	-15.09482	-173.74631	***1266.6***	3.0	296.1	Volcaniclastics covering lobate pillow lavas and in situ microbial mats	474
2017-11-29	03:14:57	-15.09479	-173.74631	***1265.4***	4.1	344.9	Exposed pillow lavas with squat lobsters. Axial cracking suggests some inflation and subsequent draining of still-warm lava inside lobate flow.	475

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S087 W Mata Logger Comments	Record #
2017-11-29	03:16:03	-15.09469	-173.74634	***1265.2***	3.4	345.1	Lots of shrimp in addition to squat lobsters. Pink and white shrimp species	476
2017-11-29	03:16:35	-15.09463	-173.74635	***1264.1***	3.3	345.1	Vent sending out warm water with plethora of shrimp just above it	477
2017-11-29	03:17:11	-15.09462	-173.74633	***1264.3***	3.1	337.5	Shrimp spring. Smoky	478
2017-11-29	03:19:27	-15.09461	-173.74635	***1265.8***	0.9	337.3	Direct angle of vent	479
2017-11-29	03:20:56	-15.09461	-173.74635	***1265.8***	0.7	337.1	Deploying temperature probe into vent	480
2017-11-29	03:21:27	-15.09461	-173.74634	***1265.8***	0.8	334.4	9C	481
2017-11-29	03:24:09	-15.09461	-173.74636	***1265.8***	0.8	334.0	9C again	482
2017-11-29	03:27:30	-15.09462	-173.74635	***1265.7***	0.9	334.5	Deploying GT 2 (green)	483
2017-11-29	03:37:50	-15.09461	-173.74635	***1265.7***	0.9	334.9	**S87-gas-15** at shrimpy vent. Green GT 2 temp in vent is 9C. Location 15.0946175 173.7463428 Depth 1276m	484
2017-11-29	03:40:57	-15.09461	-173.74635	***1265.7***	0.9	336.0	GT 2 (green) resecured in basket	485
2017-11-29	03:41:56	-15.09461	-173.74635	***1265.8***	0.9	335.6	Deploying major-4 (green)	486
2017-11-29	03:45:55	-15.09463	-173.74636	***1265.7***	0.9	335.0	Sample **S87-fluid-16** in major 4	487
2017-11-29	03:46:56	-15.09464	-173.74637	***1265.7***	0.9	334.9	S87-Fluid-16 cont. Here at the Shrimp Canyon. 15.0846175S 173.7463428W Z=1276m. Stowing major sampler #4.	488
2017-11-29	03:50:28	-15.09467	-173.74639	***1265.7***	0.9	334.1	Stowing the major.	489
2017-11-29	03:51:30	-15.09469	-173.74640	***1265.7***	0.9	333.9	Suction sample coming up for shrimp here at Shrimp Canyon.	490
2017-11-29	03:51:55	-15.09469	-173.74640	***1265.7***	0.0	334.5	**S87-Bio-17** here at Shrimp Canyon. Suctioning into chamber 2. Got them. Looks like there are both types of shrimp here; but it's hard to tell. Got some shrimp and a couple scale worms. Polynoids.	491
2017-11-29	03:54:33	-15.09469	-173.74641	***1265.7***	0.9	335.0	S87-Bio-17 Same position as previous samples here at Shrimp Canyon.	492
2017-11-29	03:55:02	-15.09470	-173.74641	***1265.7***	0.0	333.9	Next will deploy a seafloor marker here.	493
2017-11-29	03:56:11	-15.09471	-173.74641	***1265.7***	0.9	335.1	**DEPLOYING marker here. Marker-284**. Shrimp Canyon on the new flow that occurred between 2012 and 2016. 15.0946175S 173.7463428W. Z=1276m	494
2017-11-29	03:58:19	-15.09471	-173.74641	***1265.7***	0.9	335.1	Moving over somewhere where there is more ash.	495
2017-11-29	04:00:26	-15.09463	-173.74644	***1266.6***	0.9	289.4	We moved a little bit SW of the last sampling site.	496
2017-11-29	04:00:45	-15.09464	-173.74644	***1266.8***	0.6	289.3	**S87-Sed-18**. This is the actual sample of volcaniclastic sediments here in the dip between the "rolling hills" Pillow lobes. This is scoop bag #2. 15.0946339S -173.7464384 Z=1277m.	497

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S087 W Mata Logger Comments	Record #
2017-11-29	04:02:43	-15.09464	-173.74645	***1266.9***	0.6	285.6	S87-Sed-18 snuggling all in tight with the major samplers.	498
2017-11-29	04:03:43	-15.09463	-173.74644	***1266.5***	1.1	288.6	Leaving the bottom now snapping a few frame grabs as we go.	499
2017-11-29	04:04:16	-15.09465	-173.74644	***1264.6***	3.0	289.7	Pillow lavas covered in ash and still warm in the image.	500
2017-11-29	04:04:40	-15.09466	-173.74647	***1264.0***	3.4	282.7	End of dive S87 at West Mata.	501

S088 W Mata "Muffin"

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S088 W Mata "Muffin" Logger Comments	Record #
2017-11-29	19:02:11	-15.05622	-173.69266	***2665.2***	6.5	302.4	S88 - seafloor is in sight ... here we go again!	2
2017-11-29	19:02:50	-15.05620	-173.69269	***2662.3***	8.2	299.2	We are 2662 m deep - the deepest dive on this trip so far ...	3
2017-11-29	19:04:17	-15.05615	-173.69266	***2666.0***	6.3	300.9	Dive is near the NE flank of NW Mata; a pillow lava flow with thin sedimentary cover	4
2017-11-29	19:05:42	-15.05608	-173.69271	***2671.6***	3.7	302.1	Nice layer of pillows; looking gooey ..	5
2017-11-29	19:06:54	-15.05612	-173.69259	***2663.9***	11.2	289.8	Still at the landing site - waiting to get going.	6
2017-11-29	19:07:53	-15.05613	-173.69254	***2671.2***	4.4	291.8	We go for a sample while waiting - yay! Rocks in the bucket soon :)	7
2017-11-29	19:10:09	-15.05613	-173.69258	***2673.7***	0.9	290.1	Parking the vehicle to get some rock - the deepest rock sample from West Mata so far ...	8
2017-11-29	19:11:45	-15.05614	-173.69258	***2673.6***	0.9	290.1	Sample grab 1st attempt unsuccessful	9
2017-11-29	19:12:30	-15.05613	-173.69258	***2673.6***	1.1	291.6	**S88-Rock-01**. Fresh and black on the interior.	10
2017-11-29	19:13:27	-15.05613	-173.69258	***2674.0***	0.9	292.1	S88-Rock-01 cont. Really crumbly fragile lava. Here at the landing site. 15.0561 173.6926 (bad pos) Z=2674m.	11
2017-11-29	19:16:06	-15.05622	-173.69256	***2673.6***	0.7	297.7	S88-Rock-01 cont. Very thin sedimentary cover here. Going in for another grab with glass. Got rid of other piece.	12
2017-11-29	19:17:29	-15.05644	-173.69261	***2673.6***	0.6	298.1	S88-Rock-01 cont. Upper piece of pillow crust. 40cm long. Tabular piece. Orange stain inside with vesicles. Ken guess it's a century or two old.	13
2017-11-29	19:18:48	-15.05661	-173.69271	***2673.6***	0.6	297.5	S88-Rock-01 cont. Staining on the bottom. Iron and manganese staining? Partition 5.	14
2017-11-29	19:19:49	-15.05674	-173.69279	***2673.6***	0.6	297.3	Doesn't look that old here. Not much living on the lava here. Small coral in background.	15

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S088 W Mata "Muffin" Logger Comments	Record #
2017-11-29	19:20:48	-15.05687	-173.69286	***2673.6***	0.0	297.9	Squat pillows striated. High end of diffusion rate. Exterior are chilled with bread crust texture.	16
2017-11-29	19:22:13	-15.05713	-173.69295	***2673.6***	0.0	296.6	Covered in thin sediment.	17
2017-11-29	19:22:44	-15.05725	-173.69298	***2673.6***	0.0	297.1	Stalked biota of some type.	18
2017-11-29	19:23:29	-15.05749	-173.69302	***2673.6***	0.0	297.2	Tiny and stalked something with cilia or hairs.	19
2017-11-29	19:24:24	-15.05787	-173.69304	***2673.6***	0.0	297.2	Not a bamboo coral. That's a deep sea coral. Calling it a whip coral.	20
2017-11-29	19:25:39	-15.05861	-173.69303	***2673.6***	0.0	296.9	Either this lava is younger than the lavas on the SRZ which were much more colonized - or the environment is not favorable for colonization.	21
2017-11-29	19:26:40	-15.05945	-173.69298	***2673.6***	0.0	297.4	Seeing some black shiny boninitic glass shards on the sediment deposited on these pillows.	22
2017-11-29	19:27:15	-15.06004	-173.69293	***2673.6***	0.0	297.0	Zooming in on the rocks here. Green crystals are probably pyroxene.	23
2017-11-29	19:28:11	-15.06114	-173.69281	***2673.6***	0.0	296.8	Zenning out on sediment patterns while we wait to get our navigation back to the vehicle.	24
2017-11-29	19:28:53	-15.06215	-173.69270	***2673.6***	0.0	297.0	Zooming in on the seafloor sediments.	25
2017-11-29	19:30:27			***2673.6***		297.7	Bread crust texture pillow lavas with light sediment coating.	26
2017-11-29	19:31:02	-15.04972	-173.69990	***2673.6***	0.0	297.4	Crazy-looking ripple pattern to these draped sediments.	27
2017-11-29	19:31:29	-15.05126	-173.70025	***2673.6***	0.0	297.9	Small organisms on the pillows.	28
2017-11-29	19:32:19	-15.04992	-173.70010	***2672.7***	1.3	298.6	Zooming out and looking in another direction.	29
2017-11-29	19:32:49	-15.05099	-173.70026	***2672.9***	3.5	224.9	This small mound is probably 30m high pillows. A fair amount of sediment on it.	30
2017-11-29	19:33:18	-15.05103	-173.70028	***2672.5***	3.2	216.7	All the pillows are sediment draped.	31
2017-11-29	19:34:20	-15.05109	-173.70032	***2672.6***	2.2	216.1	Sediment-draped pillow lavas on this mound.	32
2017-11-29	19:36:44	-15.05113	-173.70034	***2671.0***	2.3	217.7	Still hanging out waiting for navigational issues to be sorted out.	33
2017-11-29	19:37:37	-15.05113	-173.70033	***2671.5***	1.3	219.7	Zooming in on happy birthday wishes on the biobox lid.	34
2017-11-29	19:38:06	-15.05113	-173.70033	***2671.5***	1.4	220.0	Panning around the new vista. Another stalked coral.	35
2017-11-29	19:38:46	-15.05113	-173.70033	***2671.5***	1.3	219.6	A few things living on this surface.	36
2017-11-29	19:39:09	-15.05113	-173.70033	***2671.5***	1.2	219.9	Zooming in on another coral.	37
2017-11-29	19:39:36	-15.05113	-173.70033	***2671.5***	1.4	219.5	Ripply sand in the foreground.	38
2017-11-29	19:40:12	-15.05112	-173.70035	***2671.5***	1.4	219.3	Nice pillow lava with cracked surface - isn't it beautiful	39

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S088 W Mata "Muffin" Logger Comments	Record #
2017-11-29	19:40:50	-15.05112	-173.70035	***2671.5***	1.2	219.9	Unfortunately we don't know what the age of the pillows is... it looks somewhat older as there is some biology living on these rocks.	40
2017-11-29	19:42:03	-15.05112	-173.70035	***2671.5***	1.2	219.1	Peculiar sediment structure - looks pretty cool; lots ridges with some depressions containing coarser grained sediments.	41
2017-11-29	19:43:20	-15.05112	-173.70035	***2671.5***	1.4	219.5	Beautiful patches of pillows sticking out of the sedimentary cover ... isn't it looking awesome!	42
2017-11-29	19:44:18	-15.05112	-173.70034	***2670.0***	3.2	216.2	Looking at older pillow mounts - flying over it now.	43
2017-11-29	19:45:10	-15.05115	-173.70023	***2668.3***	5.7	216.7	OK folks we are moving around to check out the area ... lots of older pillow mounts.	44
2017-11-29	19:45:56	-15.05126	-173.70021	***2670.0***	3.2	217.3	Coral in sight - probably bamboo?	45
2017-11-29	19:46:31	-15.07067	-173.70655	***2670.4***	1.3	217.4	Crinoid and coral in the top right.	46
2017-11-29	19:47:03	-15.07068	-173.70657	***2670.1***	1.5	217.7	Moving on over larger pillow large with bread crust.	47
2017-11-29	19:48:14	-15.07074	-173.70662	***2667.4***	2.2	244.8	Moving straight to WP 2 now ... sediment crevasses between pillow lava.	48
2017-11-29	19:49:12	-15.07078	-173.70678	***2664.3***	2.4	264.8	Reset navigation 30m shift.	49
2017-11-29	19:50:00	-15.07080	-173.70697	***2664.0***	2.7	264.5	Lots of ripply sediment as we moving along; cracks and holes in the pillows (squad).	50
2017-11-29	19:51:08	-15.07080	-173.70703	***2665.9***	1.2	265.2	Hollow pillow; drained?	51
2017-11-29	19:51:35	-15.07081	-173.70705	***2666.2***	0.8	264.8	Moving on above round ball shaped pillows.	52
2017-11-29	19:52:26	-15.07082	-173.70710	***2667.0***	0.8	264.9	Pillow may have formed two steps - first cooling lava then secession injection lifting the first crust up.	53
2017-11-29	19:53:07	-15.07082	-173.70714	***2667.0***	1.4	264.7	Ion S navigation; normal good mode of navigation.	54
2017-11-29	19:53:51	-15.07081	-173.70719	***2667.1***	2.9	284.3	lying over rugged terrain of older lava - expect to find younger lava later.	55
2017-11-29	19:55:23	-15.07075	-173.70738	***2675.6***	1.7	284.3	Moving on over a deeper 'channel' towards WP2 toward new volcanic structure.	56
2017-11-29	19:56:15	-15.07072	-173.70747	***2679.5***	7.8	283.6	Dropping down in to the valley now ...	57
2017-11-29	19:56:52	-15.07069	-173.70750	***2687.0***	2.6	285.2	Pillow lava sat the bottom of the valley; squad pillows; jumbled.	58
2017-11-29	19:57:48	-15.07061	-173.70766	***2694.9***	6.4	285.3	Moving up out of the valley now onto the new lava flow.	59
2017-11-29	19:58:23	-15.07058	-173.70769	***2697.7***	4.6	284.3	Cold out there 1.8C degrees...	60
2017-11-29	19:58:43	-15.07057	-173.70771	***2698.7***	3.3	284.8	Pillow lavas now seem to have less sediment on them; keep moving up slope.	61
2017-11-29	19:59:40	-15.07055	-173.70775	***2697.5***	3.6	284.7	More broken up pillow lava here.	62
2017-11-29	20:00:08	-15.07055	-173.70778	***2697.8***	2.2	284.2	Less sediment here with more broken pillows.	63

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S088 W Mata "Muffin" Logger Comments	Record #
2017-11-29	20:00:29	-15.07054	-173.70780	***2697.5***	1.8	284.3	Broken up pillow fragments here.	64
2017-11-29	20:00:45	-15.07054	-173.70781	***2697.4***	1.2	284.3	Starting to climb up the "Muffin mound".	65
2017-11-29	20:01:17	-15.07052	-173.70785	***2696.5***	2.1	284.0	Striated pillows. Dropped from above.	66
2017-11-29	20:01:40	-15.07051	-173.70788	***2695.6***	2.4	284.2	That pillow is weathered. Not young.	67
2017-11-29	20:01:55	-15.07050	-173.70789	***2695.6***	2.0	284.6	Striated pillows with varied sediment depths.	68
2017-11-29	20:02:29	-15.07049	-173.70790	***2691.1***	6.4	283.3	This area is inflated so not sure if will see new lavas on top of it or not.	69
2017-11-29	20:02:57	-15.07047	-173.70795	***2692.9***	2.9	283.4	Sparse colonization here. Crinoid.	70
2017-11-29	20:03:12	-15.07047	-173.70798	***2692.2***	2.9	283.1	This looks different than the rock below.	71
2017-11-29	20:03:31	-15.07047	-173.70802	***2691.8***	2.4	283.0	Nice inflated pillows with orange alteration in the cracks.	72
2017-11-29	20:03:50	-15.07046	-173.70805	***2690.7***	2.5	283.8	Don't see any tell-tail signs that it is new.	73
2017-11-29	20:04:13	-15.07045	-173.70809	***2689.4***	1.8	283.9	Old man pillow. That's the type of alteration that happens over time. Iron oxide alteration.	74
2017-11-29	20:05:47	-15.07044	-173.70817	***2685.9***	2.5	282.4	Lots of pillow tubes; with stains along cracks..	75
2017-11-29	20:07:36	-15.07039	-173.70829	***2683.5***	2.6	284.5	Looking at smaller diameter pillow lavas with sediment coating.	76
2017-11-29	20:07:54	-15.07039	-173.70832	***2682.2***	3.0	285.1	Some orange staining here that may indicate fluid flow??	77
2017-11-29	20:08:13	-15.07037	-173.70834	***2682.4***	1.9	285.7	Evidence that a little bit of warm water may have been flowing through it.	78
2017-11-29	20:08:33	-15.07036	-173.70836	***2680.2***	3.3	285.2	The sediment cover seems to be decreasing and the lavas look a bit fresher.	79
2017-11-29	20:09:20	-15.07033	-173.70840	***2679.8***	2.5	283.4	These lavas have more whitish stain on the lavas. Some orange staining in the cracks.	80
2017-11-29	20:09:51	-15.07032	-173.70842	***2680.4***	2.0	278.3	Jagged broken uplifted piece of pillow.	81
2017-11-29	20:10:06	-15.07030	-173.70844	***2678.5***	2.9	300.2	Smaller expanded cracked pillows with bread crust texture.	82
2017-11-29	20:10:27	-15.07026	-173.70849	***2677.2***	3.4	312.5	Huge inflated cracked pillow. Some sediments on it. Some orange-colored staining in the cracks.	83
2017-11-29	20:11:04	-15.07024	-173.70851	***2676.9***	3.0	338.6	Probably newer lavas. Haven't seen anything living on this flow - white staining in the cracks.	84
2017-11-29	20:11:49	-15.07015	-173.70860	***2674.2***	2.5	314.1	Looking for a place to sample here.	85
2017-11-29	20:12:09	-15.07013	-173.70864	***2674.3***	2.3	331.2	Hard to tell if they are old or new lavas.	86
2017-11-29	20:12:37	-15.07012	-173.70866	***2676.0***	1.0	8.9	See some manganese oxide staining in the cracks.	87
2017-11-29	20:13:14	-15.07011	-173.70866	***2675.9***	1.0	9.3	This pillow doesn't look particularly young.	88
2017-11-29	20:13:54	-15.07011	-173.70865	***2676.5***	0.0	7.3	**S88-rock-02**. Grabbing a piece of this large cracked pillow. Looking at this fragile crust.	89

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S088 W Mata "Muffin" Logger Comments	Record #
2017-11-29	20:15:02	-15.07011	-173.70865	***2676.4***	0.0	13.6	S88-rock-02 cont. Black glass with some crystals. Very crystal rich and glassy. Some orange staining. From a flat pillow - almost lobate transitional.	90
2017-11-29	20:16:09	-15.07010	-173.70866	***2676.4***	0.0	13.6	S88-rock-02 cont. Glassy rock fragment 15 cm irregularly shaped mostly glass upper rind of pillow lava. Very crystal rich.	91
2017-11-29	20:17:10	-15.07010	-173.70864	***2672.8***	3.9	342.3	S88-rock-02 cont. 15.07011S 173.70865W Z=2677.	92
2017-11-29	20:17:50	-15.07008	-173.70871	***2672.7***	2.7	303.7	Moving on here.	93
2017-11-29	20:18:10	-15.07007	-173.70876	***2671.6***	3.3	299.6	Still in pillow lavas but looking more like lobates.	94
2017-11-29	20:18:28	-15.07006	-173.70880	***2673.7***	1.7	299.2	No tell-tale signs of a super hot lava.	95
2017-11-29	20:19:01	-15.06997	-173.70887	***2674.6***	2.2	320.1	Rough bumpy texture on the map is being interpreted as lava that was extruded. This lava looks a lot younger than the lavas at the start of the dive.	96
2017-11-29	20:20:02	-15.06973	-173.70903	***2673.5***	2.8	320.9	Elongate pillows.	97
2017-11-29	20:20:22	-15.06965	-173.70908	***2670.5***	3.7	319.6	We're at a sediment contact.	98
2017-11-29	20:20:32	-15.06964	-173.70907	***2670.7***	3.6	296.6	The lava looks like it on-laps onto the sediment - not vice-versa.	99
2017-11-29	20:21:04	-15.06961	-173.70908	***2672.6***	1.2	224.1	Going to grab a piece of this lava at the lava/sediment contact.	100
2017-11-29	20:21:33	-15.06960	-173.70908	***2673.7***	0.0	221.1	**S88-rock-03**. Grabbing a piece of long lava lobe/pillow. Fine sediment on this . Curvilinear external crust.	101
2017-11-29	20:22:45	-15.06960	-173.70908	***2673.7***	0.0	221.8	S88-rock-03 cont. Olivine and clinopyroxine. Center is gray. Glassy exterior. 50% crystal. Lack of vesicles here. Beautiful rock. Orthopyroxine and olivine.	102
2017-11-29	20:23:52	-15.06959	-173.70909	***2673.7***	0.0	221.7	S88-rock-03 cont. 15 cm. Radial piece of pillow bud. Very glassy and full of crystals. Porphyritic. Went into partition 7.	103
2017-11-29	20:25:17	-15.06957	-173.70911	***2673.7***	0.0	221.6	Beautiful sample. Confusing because some of the surfaces have alteration. The rock looked young.	104
2017-11-29	20:25:52	-15.06960	-173.70908	***2672.1***	1.8	243.5	Odd elongate lavas with bumpy surface.	105
2017-11-29	20:26:10	-15.06960	-173.70910	***2672.0***	1.9	262.1	S88-rock-03 cont. Z=2674 for that sample. 15.0696 173.70908.	106
2017-11-29	20:27:24	-15.06953	-173.70931	***2669.5***	2.5	238.0	Looking at the lavas here. Huge cracked pillow and lobate-type flows.	107

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S088 W Mata "Muffin" Logger Comments	Record #
2017-11-29	20:28:15	-15.06950	-173.70941	***2669.6***	1.9	213.9	Odd jagged piece of broken uplifted cracked pillow fragment here at the margin between lava flow and sediment.	108
2017-11-29	20:29:11	-15.06951	-173.70941	***2668.0***	3.8	206.7	We're heading toward waypoint 4 now along this contact.	109
2017-11-29	20:29:36	-15.06954	-173.70938	***2668.1***	3.7	207.9	Waypoint 4 is an uplifted linear feature with a crack down the middle.	110
2017-11-29	20:30:15	-15.06962	-173.70941	***2668.6***	3.4	216.3	Now flying above smaller pillow youngish?	111
2017-11-29	20:30:58	-15.06971	-173.70948	***2669.5***	3.3	217.5	Large uplifted part of a pillow lava flow.	112
2017-11-29	20:31:43	-15.06984	-173.70957	***2669.1***	4.6	222.5	Coming up on to a cracked inflated pillow; white orange stain with flow structures.	113
2017-11-29	20:32:55	-15.06990	-173.70973	***2665.1***	6.7	252.2	Flying over valley towards the two parallel ridges at WP 4.	114
2017-11-29	20:33:34	-15.06996	-173.70988	***2666.5***	4.9	241.9	Lots of smaller pillows now; some small tubes on the seabed.	115
2017-11-29	20:34:51	-15.06996	-173.71004	***2664.9***	4.2	265.2	Continuing to fly over smaller pillow and tubes .	116
2017-11-29	20:35:34	-15.07001	-173.71012	***2664.9***	3.6	248.7	Technical term for pushed up pillow lavas is tumulas at WP 4.	117
2017-11-29	20:37:01	-15.07020	-173.71028	***2664.5***	6.0	225.4	Just went across boundary between lavas and older sediment (much smoother).	118
2017-11-29	20:37:41	-15.07031	-173.71039	***2665.8***	4.4	227.0	We've just passed from younger to older lavas now based on the texture we see in the AUV bathymetry.	119
2017-11-29	20:38:16	-15.07036	-173.71040	***2665.6***	4.5	210.0	The AUV bathymetry is corresponding well with what we're seeing on the seafloor.	120
2017-11-29	20:38:48	-15.07045	-173.71043	***2663.2***	6.8	213.8	The tumulis structure is up ahead.	121
2017-11-29	20:39:04	-15.07049	-173.71043	***2663.4***	6.5	203.4	Crack in the middle and very chaotic lavas. Probably older material.	122
2017-11-29	20:39:33	-15.07053	-173.71047	***2661.3***	6.4	212.2	This is older lava. Looks like a jumbled flow with some colonization.	123
2017-11-29	20:40:02	-15.07057	-173.71051	***2661.5***	4.5	187.7	Ken interprets this as a near-vent feature. Scoria (jumbled) lavas.	124
2017-11-29	20:40:35	-15.07058	-173.71050	***2663.5***	2.6	186.4	Lots of organisms on this. So it's older lavas.	125
2017-11-29	20:40:58	-15.07058	-173.71050	***2663.4***	2.7	186.2	**S88-rock-04**. Exterior of this older lava on tumuli. Pie shaped. Not as crystal rich as previous sample. More iron staining. Glass in the interior. Not nearly as many crystals. Some vesicles. Brownish rind (MnOX) 20cm long from folded ripple on surface of jumbled lava.	126

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2017-11-29	20:42:58	-15.07058	-173.71050	***2663.4***	2.8	185.8	S88-rock-04 cont. Going into partition 8. Still has some glassy surface. 15.07058 173.7105 Z=2665m.	127
2017-11-29	20:45:12	-15.07060	-173.71045	***2661.9***	4.8	228.0	Looking into the center of this tumuli. Steeper on one side than the other and sedimented on one side.	128
2017-11-29	20:45:51	-15.07064	-173.71046	***2664.0***	2.9	226.8	Distinctive feature about 50 m long by 5 m high.	129
2017-11-29	20:46:12	-15.07070	-173.71056	***2663.7***	3.4	231.0	Nav offset. AUV SuBastian is 10-20m south of AUV bathymetry.	130
2017-11-29	20:46:49	-15.07083	-173.71066	***2664.5***	2.5	180.6	Older lavas with corals etc.	131
2017-11-29	20:48:02	-15.07071	-173.71054	***2665.6***	1.2	34.8	Asymmetric crack/sedimentation with coarse sediments accumulating.	132
2017-11-29	20:49:32	-15.07069	-173.71055	***2664.7***	2.8	277.8	Sea cucumber.	133
2017-11-29	20:49:58	-15.07071	-173.71055	***2663.5***	3.2	241.8	Moving southwest.	134
2017-11-29	20:51:51	-15.07081	-173.71077	***2665.9***	3.5	255.6	Transiting SW to next waypoint.	135
2017-11-29	20:54:01	-15.07073	-173.71099	***2667.6***	4.1	261.0	Sediment outside of the lava flow. Suggests the current favors a specific direction but quickly transitions to more turbulent ripples.	136
2017-11-29	20:54:41	-15.07065	-173.71114	***2669.3***	3.1	258.9	Contact between sediment and young lava flow.	137
2017-11-29	20:55:44	-15.07062	-173.71133	***2668.8***	3.5	258.6	Rough-textured high standing lava pillows.	138
2017-11-29	20:58:14	-15.07073	-173.71163	***2666.6***	4.8	231.7	More sediment atop pillow lavas. Either it was deposited after being stirred up or is directly affiliated with the eruption event.	139
2017-11-29	20:59:01	-15.07071	-173.71160	***2666.3***	5.3	210.8	Holding position while the ship catches up to the ROV position.	140
2017-11-29	20:59:39	-15.07070	-173.71159	***2659.7***	12.1	210.8	Momentarily off seabed. Dog at the end of the leash syndrome.	141
2017-11-29	21:03:37	-15.07095	-173.71172	***2671.0***	3.3	223.0	Inflated pillow with whitish staining on exposed edges sitting atop a stack of smaller pillows.	142
2017-11-29	21:04:48	-15.07094	-173.71175	***2670.2***	4.1	222.7	Elongated pillow flow emerging from a stalled inflated larger flow.	143
2017-11-29	21:05:23	-15.07097	-173.71178	***2672.4***	1.7	223.1	Detail of sediment ripple marks on flow surface.	144
2017-11-29	21:07:22	-15.07106	-173.71190	***2670.0***	4.4	224.3	Pillow cross-section with some secondary sulfur and iron deposits.	145
2017-11-29	21:09:40	-15.07112	-173.71193	***2673.3***	2.1	250.7	Rock is fresh (black) under sediment draping. Visible on sides.	146
2017-11-29	21:11:25	-15.07118	-173.71191	***2675.6***	0.5	244.7	Set ROV down to attempt a sediment scoop.	147
2017-11-29	21:14:05	-15.07118	-173.71191	***2675.6***	0.5	246.2	Grabbing sediment scoop 1 to attempt a sample.	148
2017-11-29	21:16:46	-15.07120	-173.71189	***2675.5***	0.5	244.2	Freeing up bag.	149

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2017-11-29	21:20:50	-15.07120	-173.71189	***2675.6***	0.5	246.1	Attempt 1 collected some sediment. Lining up for another scoop.	150
2017-11-29	21:21:14	-15.07120	-173.71189	***2675.6***	0.0	243.7	Second attempt successful. **S88-sed-05**. Location 15.0711771 173.7119118 depth 2675m.	151
2017-11-29	21:22:36	-15.07120	-173.71189	***2675.6***	0.0	246.3	Took a third scoop.	152
2017-11-29	21:25:19	-15.07116	-173.71193	***2675.6***	0.0	246.2	Trying for one more scoop.	153
2017-11-29	21:25:34	-15.07115	-173.71193	***2675.6***	0.0	246.3	These sediments are extremely fine and hard to collect. Multiple attempts are necessary to ensure we return some sample to the surface. Possible co-ignimbrite-like feature.	154
2017-11-29	21:27:37	-15.07052	-173.71161	***2675.6***	0.0	246.5	**Sample S88-sed-05** into sample box 9. Losing some fines as bag settled into box.	155
2017-11-29	21:30:55	-15.07069	-173.71174	***2672.8***	3.3	249.9	Resuming transit to waypoint 5 across lava flow.	156
2017-11-29	21:31:37	-15.07075	-173.71180	***2674.0***	2.0	250.4	Sediment-lava flow contact with small tumulus structure.	157
2017-11-29	21:33:01	-15.07082	-173.71195	***2674.6***	2.1	250.9	Lava ball. Looks like a popover.	158
2017-11-29	21:34:11	-15.07089	-173.71203	***2675.1***	2.8	249.8	Smaller diameter pillow lava with azimuthal crack. Fine example of lava-sediment interaction.	159
2017-11-29	21:34:46	-15.07091	-173.71209	***2675.9***	2.5	248.9	Possibility the ambient sediment is the same as what has settled on the lava flow. Ripple pattern indicates high turbulence when sediments were settling back out.	160
2017-11-29	21:35:57	-15.07096	-173.71220	***2676.7***	2.5	245.0	Miground pillow in center-right of screen has undergone some expansion before freezing.	161
2017-11-29	21:36:54	-15.07101	-173.71222	***2677.9***	1.7	229.9	Sponges appearing on sediment floor.	162
2017-11-29	21:37:55	-15.07110	-173.71227	***2679.6***	1.2	229.8	Micro canyon with more of our lovely sediment.	163
2017-11-29	21:38:16	-15.07111	-173.71229	***2679.0***	2.2	229.4	Potholes in the sedimented ambient floor not unlike Michigan roads.	164
2017-11-29	21:39:09	-15.07117	-173.71232	***2680.3***	1.7	230.1	Lone pillow fragment	165
2017-11-29	21:41:54	-15.07124	-173.71245	***2679.5***	1.9	229.5	Dune-forming processes in response to prevailing current around volcanic flows.	166
2017-11-29	21:45:44	-15.07133	-173.71258	***2676.5***	2.4	229.5	Pillow-sediment interface with some biology. Older lava flow?	167
2017-11-29	21:46:24	-15.07134	-173.71261	***2677.6***	1.3	227.5	Fine grain size variations in sediment deposit.	168
2017-11-29	21:46:51	-15.07133	-173.71261	***2678.6***	0.0	228.1	These patterns are probably controlled by grain size distribution in the sediments - coarser-grained sediments to finer ash particles.	169
2017-11-29	21:47:21	-15.07133	-173.71261	***2678.6***	0.0	227.8	Close-up of the ripple patterns.	170
2017-11-29	21:48:08	-15.07133	-173.71261	***2678.7***	0.0	227.6	Sea anemone and sponge? on pillow.	171

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2017-11-29	21:48:32	-15.07133	-173.71261	***2678.6***	0.0	227.9	Close up of the sponge(?)	172
2017-11-29	21:48:54	-15.07132	-173.71262	***2678.6***	0.0	227.7	Anemone.	173
2017-11-29	21:50:28	-15.07139	-173.71264	***2674.6***	3.4	223.9	The navigation is dropping out here and there.	174
2017-11-29	21:51:05	-15.07140	-173.71264	***2675.5***	2.0	224.2	Stalked crinoid.	175
2017-11-29	21:51:16	-15.07141	-173.71264	***2676.0***	1.3	224.0	**S88-rock-06** Going in for a grab of this inflated cracked pillow on the north rift of the West Mata ERZ.	176
2017-11-29	21:53:26	-15.07141	-173.71264	***2676.5***	0.9	226.7	S88-rock-06 Older lavas with corals. It does have the ash color on it.	177
2017-11-29	21:54:21	-15.07141	-173.71264	***2676.6***	0.7	227.0	S88-rock-06 cont. Large piece of pillow with attached coral. 47 cm pillow interior fragment. Manganese coating with some fresh glass. Not many phenocrysts visible.	178
2017-11-29	21:55:36	-15.07141	-173.71263	***2676.7***	0.6	226.7	S88-rock-06 cont. Putting it in the center unpartitioned basket. Z=2675m 15d 4' 19.6" 173d 42' 46.02".	179
2017-11-29	21:58:18	-15.07135	-173.71273	***2674.4***	4.4	294.4	Back on the bottom. At the base of the West Mata ERZ. Fractured lobate lavas transitioning into pillows.	180
2017-11-29	21:59:06	-15.07126	-173.71274	***2678.7***	1.3	345.9	Lots of sediment here on these lobate/pillows.	181
2017-11-29	21:59:38	-15.07116	-173.71276	***2680.9***	1.9	346.3	Whip coral on these lavas but really not much biota present.	182
2017-11-29	22:00:21	-15.07109	-173.71277	***2681.3***	1.8	345.2	Zooming in on these broken pillows.	183
2017-11-29	22:00:53	-15.07103	-173.71278	***2678.9***	5.2	346.8	Some white staining.	184
2017-11-29	22:01:13	-15.07098	-173.71278	***2680.1***	3.3	346.2	Looking at the seafloor - we have any idea where we are.	185
2017-11-29	22:02:37	-15.07082	-173.71277	***2678.6***	3.4	349.8	Ken thinks we are on young beautiful pillow lavas. Yellow material in the cracks is orange staining from hydrothermal heat.	186
2017-11-29	22:03:22	-15.07069	-173.71276	***2678.4***	3.5	351.4	These lavas look really young. Microbial mat (yellow). Some expanded pillows broken with bread crust texture.	187
2017-11-29	22:04:07	-15.07061	-173.71274	***2675.0***	4.4	354.4	Small thin lava tubes with larger crenulated pillows on top.	188
2017-11-29	22:04:36	-15.07056	-173.71272	***2674.1***	3.3	354.9	No sediment on these pillow lavas. The nav is still off.	189
2017-11-29	22:05:04	-15.07054	-173.71271	***2672.9***	4.0	354.9	We're heading toward a waypoint 6.	190
2017-11-29	22:06:29	-15.07038	-173.71266	***2669.5***	3.1	354.9	We're just passing over some spectacular pillows.	191

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2017-11-29	22:15:28			***2664.9***			Nav reset temporarily stopped Squidle capture. Back up now.	192
2017-11-29	22:17:16			***2665.4***			More signs of light patchy alteration on some pillows where sulfur and iron deposits present. Deciding on sample site in this area.	193
2017-11-29	22:18:12			***2667.1***			Jagged thing in front of us - multiple textures and degrees of inflation in a small area of stacked lava flows.	194
2017-11-29	22:20:05			***2667.8***			Attempted sample of outer pillow crust and it slid backward. Try again.	195
2017-11-29	22:21:38			***2667.8***			**S88-rock-07.**	196
2017-11-29	22:22:10			***2667.8***			S88-rock-07 detail. Roughly 10x15cm with nice glassy rind and high crystalline content.	197
2017-11-29	22:26:48	-15.06672	-173.70027	***2667.8***	1.0	154.3	S88-rock-07 close-up.	198
2017-11-29	22:27:59	-15.06672	-173.70027	***2667.8***	0.9	154.2	Sample S88-rock-07 into biobox 1.	199
2017-11-29	22:30:03	-15.06673	-173.70028	***2666.5***	2.2	151.3	Approaching what looks like a tumulus structure sticking up above the lava flow.	200
2017-11-29	22:33:11	-15.06684	-173.70029	***2662.0***	6.6	74.7	S88-rock-07 location 15d4m16.256s 173d42m14.167s depth 2669m.	201
2017-11-29	22:34:05	-15.06687	-173.70029	***2659.5***	9.3	112.1	ROV off bottom for a minute. At waypoint 6 and nav currently behaving with Jimbo in the room.	202
2017-11-29	22:34:51	-15.06693	-173.70014	***2663.7***	4.9	112.0	Flying over lobate lava flows with iron and sulfur staining in cracks and surfaces. Microbial depositions near where warm fluids are coming off of pillows.	203
2017-11-29	22:35:33	-15.06694	-173.70003	***2660.0***	5.2	103.6	More frequent staining on the broken and fragmented pillow flows abundant just east of waypoint 6. Nav uncertain so cannot tell precisely how many meters east.	204
2017-11-29	22:36:21	-15.06693	-173.69995	***2659.1***	4.2	105.5	Pillow talus ~1m relief here with no sediment deposition.	205
2017-11-29	22:36:52	-15.06694	-173.69991	***2659.6***	3.2	98.3	Some pillow lava present atop fragments.	206
2017-11-29	22:37:38	-15.06693	-173.69986	***2659.9***	2.7	97.1	Cross section showing alternating bands of rock and glass. This can form sometimes in flows near the vent where lava can pulse through.	207
2017-11-29	22:38:45	-15.06693	-173.69987	***2659.2***	3.6	62.2	Light sedimentation on some pillow fragments in frame. ROV appears to be on top of mound.	208
2017-11-29	22:41:21	-15.06697	-173.69924	***2661.6***	5.3	79.6	Stacks of fragmental debris intercalated with pillow lavas.	209

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2017-11-29	22:41:46	-15.06701	-173.69925	***2661.9***	5.0	69.0	Lava flow stacks in cross section in background.	210
2017-11-29	22:42:08	-15.06704	-173.69925	***2662.3***	5.6	42.2	Pushed up structure which appears to be part of a tumulus along a lobate lava flow. Possible local vent source; high standing mound feature at the base of the muffin.	211
2017-11-29	22:43:01	-15.06711	-173.69922	***2663.6***	5.8	49.3	Pahoehoe structures on tumulus surface.	212
2017-11-29	22:43:42	-15.06716	-173.69915	***2661.0***	8.8	73.4	Moving off of mound. Hydrothermally related staining is dropping off in frequency although still present in patches. Possibly more sediment visible.	213
2017-11-29	22:44:52	-15.06713	-173.69896	***2665.2***	1.7	63.1	Locally more iron staining from hot water venting out of lava flows. Lobate morphology.	214
2017-11-29	22:45:22	-15.06710	-173.69890	***2664.4***	3.1	63.5	Landscape like Pu'u'o'o flows.	215
2017-11-29	22:46:13	-15.06705	-173.69881	***2666.5***	2.0	64.2	Lobate morphology controlled by relatively slow movement across a flat slope. More random hummocky morphology and inflation results. Not seeing much life on these flows.	216
2017-11-29	22:47:03	-15.06701	-173.69871	***2668.0***	1.6	64.4	Back into pillows. These are heavily cracked and possibly drained to where they are fairly hollow. Sedimented.	217
2017-11-29	22:47:52	-15.06697	-173.69862	***2668.4***	2.0	64.7	Transitioning into either stacked lobate flows or elongate pillows.	218
2017-11-29	22:48:16	-15.06695	-173.69857	***2667.5***	4.1	64.0	Smoother surface textures of these more lobate flows contrasts the blocky fractured popover-like pillows.	219
2017-11-29	22:54:18	-15.06654	-173.69799	***2668.0***	3.2	44.1	Shelly lava flows	220
2017-11-29	22:55:19	-15.06647	-173.69797	***2666.2***	4.1	44.3	Note that the Squidle log for this dive appears to be missing an entry for Sample 04. Furthermore Sample 03 is initially correctly labeled and subsequent information entries refer to it as Sample 02 and should be corrected.	221
2017-11-29	22:56:37	-15.06999	-173.71187	***2667.2***	1.4	43.5	Flying over more smooth sedimented flat inflated pillow and lobate flows	222
2017-11-29	22:57:00	-15.06998	-173.71185	***2666.9***	1.1	72.2	Bright orange and white staining on exposed interior surfaces.	223
2017-11-29	22:58:23	-15.07002	-173.71173	***2666.0***	3.0	82.4	A few striated pillows appearing.	224
2017-11-29	23:03:22	-15.06317	-173.69170	***2662.9***	4.5	10.4	We're now at Waypoint 7. A huge tumulis. The navigation is basically non-existent.	225
2017-11-29	23:04:55	-15.06303	-173.69184	***2661.2***	3.1	21.2	Taking frame grabs of this tumulis at Waypoint 7.	226

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2017-11-29	23:05:43	-15.06308	-173.69189	***2659.2***	4.3	19.6	Nice dipping lava flow pushed up in the center. It's a dipping feature that dips toward the younger lavas.	227
2017-11-29	23:06:48	-15.06314	-173.69205	***2660.0***	4.7	25.7	Huge crack in between the two sections of this tumulis with a SW/NE orientation.	228
2017-11-29	23:07:22	-15.06319	-173.69212	***2659.5***	6.8	5.2	We don't know how this happened. If the younger lava is lapping around the base.	229
2017-11-29	23:08:55	-15.06320	-173.69215	***2661.9***	4.6	32.5	We see lava that is flowing out of the base. So this lava flow created it. Pushed it up and is flowing out of each end.	230
2017-11-29	23:11:35	-15.06313	-173.69207	***2660.4***	4.6	41.1	The tumulis is all the young lava that got pushed up during the eruption and cracked open with younger lavas in the center.	231
2017-11-29	23:12:12	-15.06309	-173.69200	***2661.6***	3.2	37.4	Moving through this tumulis and taking highlight photos. It probably took some time to form.	232
2017-11-29	23:13:50	-15.06305	-173.69189	***2660.9***	3.4	40.0	Beautiful mineral alteration on the raised lavas here at this tumulus.	233
2017-11-29	23:15:14	-15.06294	-173.69176	***2659.7***	3.9	25.1	We're still traveling along this long tumulus. It's at least 90m long.	234
2017-11-29	23:16:56	-15.06273	-173.69161	***2661.6***	3.4	53.6	Moving along the interior crack in this tumulus. Beautiful banded massive lavas	235
2017-11-29	23:17:33	-15.06269	-173.69156	***2662.1***	3.9	86.0	We're coming to a low point in the tumulus	236
2017-11-29	23:18:10	-15.06267	-173.69150	***2662.0***	3.8	83.8	Big pillows here that tried to cross over this big inflation feature.	237
2017-11-29	23:19:00	-15.06267	-173.69139	***2660.8***	5.5	84.9	The surfaces used to be flat and have been inflated to these crazy angles.	238
2017-11-29	23:20:08	-15.06269	-173.69131	***2660.6***	4.0	97.9	Going to go for a piece of this tumulus. We're seeing stratigraphy in this feature; not pillow lavas.	239
2017-11-29	23:20:56	-15.06270	-173.69131	***2661.7***	2.1	104.0	**S88-rock-08**. A piece of the tumulus crust. Z=2662. The nav fix will be approximate; we're probably a bit north of the fix.	240
2017-11-29	23:22:11	-15.06270	-173.69131	***2661.9***	2.1	107.9	S88-rock-08. Upper crust of this tumulus features. Weathered with vesicles mitten shaped. 30cm round and egg shaped roundish. No obvious glassy crust. Crystalline and not a lot of vesicles.	241
2017-11-29	23:24:08	-15.06270	-173.69131	***2661.9***	1.6	107.9	S88-rock-08 cont. placed in bin 2. Z=2772m. In the crack between the tumulus's ~ 10m W of WP8. 15d 4' 9.693" 173d 42' 38.043".	242
2017-11-29	23:26:55	-15.06268	-173.69115	***2660.9***	3.6	6.0	We're at the other end of the tumulus	243

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S088 W Mata "Muffin" Logger Comments	Record #
2017-11-29	23:27:45	-15.06267	-173.69110	***2662.8***	3.7	287.4	The axis of the crack is on the left.	244
2017-11-29	23:28:01	-15.06268	-173.69108	***2662.7***	5.2	282.2	Taking some highlight grabs of the crack in the tumulus.	245
2017-11-29	23:28:43	-15.06271	-173.69105	***2665.2***	2.5	271.9	Can see pillows farther out - it's all the same lava surface.	246
2017-11-29	23:29:39	-15.06269	-173.69105	***2665.0***	3.2	328.5	We're now looking at the new lavas off the tumulus.	247
2017-11-29	23:30:09	-15.06261	-173.69109	***2663.4***	4.2	329.3	The sediment was here to begin with - the lava flow just pushed it up.	248
2017-11-29	23:30:31	-15.06256	-173.69112	***2666.3***	1.6	331.5	Broad pillow lobes.	249
2017-11-29	23:30:46	-15.06252	-173.69113	***2665.5***	2.6	331.9	The slower the water flows underwater the more pillow-like they are. These are more like lobate lavas that flow faster.	250
2017-11-29	23:31:27	-15.06242	-173.69118	***2666.5***	1.7	331.1	Ashy-sediment on these new lavas. Not sure where the ash came from. It's more sediment than would accumulate from just marine snow.	251
2017-11-29	23:32:17	-15.06230	-173.69124	***2665.0***	3.8	331.9	We're at the edge of the "muffin". We're on total sediment now.	252
2017-11-29	23:32:39	-15.06225	-173.69126	***2664.1***	5.1	316.5	We're turning to the W/SW (E/SE?) to travel along the edge of the slope where the lava lapped up against the sediment.	253
2017-11-29	23:33:26	-15.06222	-173.69135	***2665.8***	3.2	139.1	What came first?	254
2017-11-29	23:33:46	-15.06220	-173.69139	***2665.9***	2.7	111.1	Great images here of the edge of the new lava lapping up against the sediments.	255
2017-11-29	23:34:08	-15.06220	-173.69141	***2667.8***	0.8	114.6	Hard to tell if the lava intruded out from under the sediment?	256
2017-11-29	23:34:48	-15.06220	-173.69141	***2667.5***	1.0	137.0	We do know that the lava flowed around the sediment - well actually it was probably all sediment here before (of course it overlaid older lava flows).	257
2017-11-29	23:37:32	-15.06223	-173.69143	***2668.7***	0.3	135.0	We're going to take a push core here. in this sediment next to the lavas ~30m SW of WP 9.	258
2017-11-29	23:38:27	-15.06223	-173.69143	***2668.7***	0.3	137.9	Going to try a push core with no catcher here. It's push core 4. We want to see the layers of this sediment so a core is the best way to tell that.	259
2017-11-29	23:41:11	-15.06223	-173.69143	***2668.7***	0.3	136.7	The sediment fell out of the core.	260
2017-11-29	23:41:33	-15.06223	-173.69143	***2668.7***	0.3	136.8	Going to try again.	261
2017-11-29	23:42:14	-15.06222	-173.69143	***2668.6***	0.3	134.7	The sediments are really fine grained.	262

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S088 W Mata "Muffin" Logger Comments	Record #
2017-11-29	23:43:26	-15.06223	-173.69143	***2668.7***	0.0	135.7	**J88-Sed-09**. Push core 4. Made it into the tube; but lots of the sediment is escaping. Approximate position here is: 15d 4' 7.85" 173d 42' 38.04'. Z=2669m.	263
2017-11-29	23:46:13	-15.06223	-173.69138	***2662.3***	6.8	131.8	We're heading back to the bottom.	264
2017-11-29	23:46:54	-15.06223	-173.69138	***2662.4***	6.7	245.3	Lava / sediment contact here.	265
2017-11-29	23:48:04	-15.06221	-173.69152	***2666.2***	3.3	262.4	Some massive jumbled up pillow-type lavas.	266
2017-11-29	23:48:28	-15.06219	-173.69159	***2665.1***	3.9	254.4	Now seeing more elongate lobate lavas to the west of us.	267
2017-11-29	23:49:08	-15.06221	-173.69167	***2666.7***	3.2	237.1	The sediment to the east has formed a bit of a ridge.	268
2017-11-29	23:49:23	-15.06223	-173.69170	***2667.9***	2.2	235.9	Big huge pillow ahead of us laying on more lobate lavas.	269
2017-11-29	23:50:24	-15.06228	-173.69177	***2668.2***	1.9	234.1	We're actually SW of WP9 according to Bill.	270
2017-11-29	23:50:47	-15.06231	-173.69180	***2668.7***	1.3	235.9	Beautiful image of lava lapping over the sediments.	271
2017-11-29	23:51:13	-15.06233	-173.69182	***2668.8***	1.2	235.7	Clearly the stratigraphy has the sediment on top of the lava in places.	272
2017-11-29	23:51:57	-15.06235	-173.69189	***2668.2***	2.0	263.3	It's a mixed bag. In some places the sediment overlaps the lava and in others the lava overlaps the sediment.	273
2017-11-29	23:52:29	-15.06233	-173.69192	***2668.3***	2.0	335.9	We're now on total sediments.	274
2017-11-29	23:52:48	-15.06229	-173.69193	***2669.2***	0.6	19.7	Looks like sand dunes on land.	275
2017-11-29	23:53:29	-15.06221	-173.69196	***2668.6***	0.9	38.9	It's not all fine sediments. We see black glassy seds and a piece of sulfur??	276
2017-11-29	23:54:09	-15.06215	-173.69193	***2668.2***	1.8	49.3	Zooming in on this rock that is not sulfur after all. Black glass on top.	277
2017-11-29	23:54:44	-15.06213	-173.69189	***2666.7***	3.1	63.0	Beautiful view of this odd landscape with sand ripples; scattered rocks on top and poking out here and there.	278
2017-11-29	23:55:47	-15.06210	-173.69177	***2667.9***	3.0	67.6	This is the area where the ORP sensor saw a small signal so may be a bit of heat here.	279
2017-11-29	23:56:43	-15.06198	-173.69167	***2666.7***	2.4	55.1	Bizarre looking landscape.	280
2017-11-29	23:57:23	-15.06196	-173.69160	***2667.5***	1.1	65.6	No animals to speak of on these sediments.	281
2017-11-29	23:57:40	-15.06195	-173.69160	***2668.2***	0.4	67.1	Zooming in on the ripples. Black seds along the crests of the ripples.	282
2017-11-29	23:58:57	-15.06195	-173.69159	***2668.1***	0.4	60.2	We're SW of waypoint 9. Going to try push core #3 with a core catcher.	283

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S088 W Mata "Muffin" Logger Comments	Record #
2017-11-29	23:59:44	-15.06195	-173.69159	***2668.1***	0.4	59.6	**S88-Sed-10**. In thick sediments on the muffin. 15d 4' 7.85" 173d 42' 38.6" Z=2668m. The Core is over half full. Light-colored layer on the top.	284
2017-11-30	00:03:30	-15.06195	-173.69160	***2668.2***	0.0	50.7	That was a great push core.	285
2017-11-30	00:03:45	-15.06196	-173.69161	***2668.2***	0.0	53.0	Going to look around a bit here.	286
2017-11-30	00:04:12	-15.06196	-173.69161	***2668.2***	0.0	56.5	Something has been digging around and messing up the beautiful sand here - and it's not us.	287
2017-11-30	00:06:35	-15.06168	-173.69131	***2660.7***	3.3	58.6	CORRECTION: Location for last sample (S88-Sed-10) is: 15d 4' 7.99" 173d 42' 39.35".	288
2017-11-30	00:07:59	-15.06147	-173.69103	***2661.2***	2.4	61.4	Undulating and non-descript landscape. Some lavas poking out of the sediments here.	289
2017-11-30	00:09:53	-15.06115	-173.69078	***2659.3***	1.5	67.8	We're on "the muffin". Where's the Muffin Man?	290
2017-11-30	00:10:10	-15.06112	-173.69076	***2658.9***	1.8	75.3	One big red shrimp.	291
2017-11-30	00:10:20	-15.06110	-173.69074	***2659.4***	1.4	74.4	Bright red shrimp.	292
2017-11-30	00:10:38	-15.06107	-173.69073	***2659.5***	1.3	76.0	Bright red shrimp moving over this sandy bottom with some pillow and fragments strewn about.	293
2017-11-30	00:11:21	-15.06109	-173.69069	***2657.9***	1.5	63.7	Moving on.	294
2017-11-30	00:11:52	-15.06103	-173.69064	***2657.5***	2.2	57.2	The sand has a lot of ash in it; but also some fine-grained sediments at the top.	295
2017-11-30	00:12:25	-15.06096	-173.69058	***2656.6***	2.4	53.7	Weird purple slug-like creature. It's got 1 horn??	296
2017-11-30	00:13:22	-15.06085	-173.69051	***2656.6***	2.9	48.7	Clearly older lava here because it has things growing on it.	297
2017-11-30	00:13:57	-15.06077	-173.69046	***2658.5***	1.9	77.1	Bill thinks that all the lava rocks we are seeing on this sandy plain have come from some type of debris flows up above.	298
2017-11-30	00:14:43	-15.06068	-173.69028	***2657.3***	1.7	81.0	This ridge has to be in place.	299
2017-11-30	00:15:42	-15.06069	-173.69025	***2654.4***	3.2	151.6	Bill thinks the stratigraphy was consolidated sediments. Still not sure.	300
2017-11-30	00:16:19	-15.06082	-173.69018	***2653.1***	2.0	156.5	Coming to the top of this high ridge. .	301
2017-11-30	00:17:00	-15.06091	-173.69010	***2651.7***	1.6	182.5	You should see older lavas tilted with the new intrusion with a veneer of sediments over it.	302
2017-11-30	00:18:57	-15.06086	-173.69023	***2648.8***	6.3	338.6	Bill thinks it is all inflated sediments hundreds of meters thick.	303
2017-11-30	00:21:09	-15.06061	-173.69042	***2659.4***	0.7	341.4	We're going back to the ridge we saw earlier.	304
2017-11-30	00:21:54	-15.06053	-173.69048	***2659.7***	1.1	333.5	We're going back to the ridge we saw previously. Just passed that big red shrimp again.	305
2017-11-30	00:22:54	-15.06042	-173.69046	***2659.5***	1.8	57.0	Rattail.	306
2017-11-30	00:24:06	-15.06061	-173.69029	***2657.4***	1.1	146.3	We're zig-zagging along these ridges.	307
2017-11-30	00:24:28	-15.06066	-173.69025	***2656.1***	2.7	137.9	It's a bit of consolidated sediment layer. Not rock.	308

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2017-11-30	00:25:30	-15.06065	-173.69022	***2656.5***	1.7	140.6	I'm believing Bill now. It's consolidated sediment. Looks like "sandstone" - but it's "sediment".	309
2017-11-30	00:26:52	-15.06070	-173.69019	***2655.1***	0.8	137.0	Big monstrous lava block here. Sea slug of some type. Pretty clearish purple guy.	310
2017-11-30	00:27:53	-15.06072	-173.69014	***2654.3***	1.1	141.4	Monstrous big lava rock between the ridges.	311
2017-11-30	00:28:50	-15.06083	-173.69006	***2651.8***	1.2	135.2	Some really large lava blocks here. They don't look like they are in place....	312
2017-11-30	00:29:31	-15.06091	-173.68999	***2652.6***	2.0	98.7	Large lava rocks strewn about on this sandy surface.	313
2017-11-30	00:30:41	-15.06089	-173.68992	***2649.2***	5.1	60.0	Going to continue along the long axis of the muffin.	314
2017-11-30	00:31:11	-15.06080	-173.68984	***2652.2***	1.5	62.6	Eel pout resting on the sand.	315
2017-11-30	00:31:30	-15.06075	-173.68981	***2652.1***	2.3	63.5	Facing NE along this series of ridges and trough.	316
2017-11-30	00:31:59	-15.06067	-173.68970	***2649.3***	5.8	63.3	Traveling over sediment with some debris scattered here and now.	317
2017-11-30	00:32:55	-15.06058	-173.68951	***2653.6***	1.8	68.1	Sediment layer in the walls of the trough.	318
2017-11-30	00:33:55	-15.06048	-173.68936	***2651.8***	3.1	70.5	We're in one of the troughs up near the high point of the muffin.	319
2017-11-30	00:34:26	-15.06039	-173.68930	***2652.8***	2.7	23.4	There is some hydrothermal staining here.	320
2017-11-30	00:34:51	-15.06035	-173.68928	***2653.3***	2.4	353.9	Seeing older truncated sediment layers covered up by this newer sediments.	321
2017-11-30	00:35:35	-15.06032	-173.68927	***2655.7***	0.4	323.3	Yellow iron oxide bacterial mats??	322
2017-11-30	00:37:11	-15.06031	-173.68926	***2655.3***	0.7	314.6	Ambient is 1.03C. Going to take the temperature in these yellow fluffy sediments.	323
2017-11-30	00:38:25	-15.06031	-173.68925	***2655.8***	0.0	322.7	Temp going up to 14C; 15.1C; Here in this fluffy yellow microbial mat.	324
2017-11-30	00:40:00	-15.06032	-173.68923	***2655.5***	0.6	320.9	Going to take the temperature at the top of the ridge.	325
2017-11-30	00:43:13	-15.06028	-173.68933	***2651.1***	0.7	71.1	Going for the temperature here on top of this ridge away from the orange/yellow bacterial mat.	326
2017-11-30	00:44:00	-15.06028	-173.68933	***2651.7***	0.0	75.6	Temperature 7C and increasing. 8C is the high temp at the top of this ridge.	327
2017-11-30	00:46:12	-15.06025	-173.68935	***2649.5***	2.0	26.2	Going to continue along these ridges and troughs a little further since we did see evidence of hydrothermal flow.	328
2017-11-30	00:47:41	-15.06025	-173.68922	***2652.4***	3.9	40.6	This is probably the deepest of these ridges and troughs.	329
2017-11-30	00:48:06	-15.06020	-173.68918	***2652.8***	3.5	37.0	Odd-looking stratigraphy. Lots of beautiful layering.	330
2017-11-30	00:48:35	-15.06016	-173.68912	***2653.9***	3.3	30.2	This feature is like 2 m high.	331
2017-11-30	00:49:02	-15.06015	-173.68909	***2654.7***	3.1	22.1	It looks like a Pagoda.	332

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2017-11-30	00:49:24	-15.06014	-173.68907	***2655.3***	2.4	358.8	This looks like rock that is in place.	333
2017-11-30	00:50:37	-15.06873	-173.70560	***2657.0***	1.7	332.1	Let's poke it and find out.	334
2017-11-30	00:51:31	-15.06872	-173.70560	***2657.8***	1.0	322.4	Sulfur(?) mat on this feature that is very strange looking.	335
2017-11-30	00:52:33	-15.06872	-173.70560	***2658.1***	0.7	322.6	**S88-rock-11** from the base of Pagoda-looking stratographic feature. 5cm cubic piece of probably ash (white colored).	336
2017-11-30	00:53:55	-15.06872	-173.70560	***2658.1***	0.7	322.7	S88-rock-11 cont. 5 cm cubic piece of what is probably ash? White color. Into biobox 3. Broke into 2 pieces.	337
2017-11-30	00:55:37	-15.06872	-173.70560	***2658.2***	0.7	323.5	S88-rock-11 cont. Going for the darker colored piece now - but he grabbed another white-colored piece. Z=2658	338
2017-11-30	00:58:49	-15.06872	-173.70560	***2658.2***	0.7	323.0	S88-rock-11 cont. The structure is white underneath when scraped with the arm.	339
2017-11-30	01:00:03	-15.06873	-173.70561	***2655.9***	2.6	322.3	S88-rock-11 cont. In area of volcanoclastic sedimentation. No ROV nav. Back of the ship position: 15d 4' 0.386" 173d 42' 29.63"	340
2017-11-30	01:01:37	-15.06872	-173.70560	***2655.4***	3.2	26.2	S88-rock-11 cont. The sample 11 was chalky - probably layers of former volcanic eruptions.	341
2017-11-30	01:03:14	-15.06854	-173.70545	***2659.7***	0.7	30.5	Poor lonesome shrimp again.	342
2017-11-30	01:03:33	-15.06851	-173.70542	***2658.8***	1.8	28.4	Turning to the NW and driving along the trough between the sediment ridges. Heading NE.	343
2017-11-30	01:04:35	-15.06841	-173.70538	***2656.8***	2.4	36.5	Could be more hydrothermal staining here.	344
2017-11-30	01:05:32	-15.06837	-173.70531	***2657.8***	1.6	12.3	Lots of staining; but doesn't appear to be growing bacterial mat.	345
2017-11-30	01:06:04	-15.06835	-173.70528	***2658.3***	0.8	357.9	This could be lava here; instead of the sandy stuff.	346
2017-11-30	01:07:04	-15.06827	-173.70521	***2658.9***	0.8	1.8	Ken thinks that lava was here and was pushed up as the muffin inflated. Not from the new eruption.	347
2017-11-30	01:07:57	-15.06818	-173.70527	***2655.7***	1.6	287.6	We're now turning to the west and heading over this series of ridges and troughs.	348
2017-11-30	01:08:43	-15.06816	-173.70545	***2656.7***	0.9	286.4	This is a part of the ridge that was older lava and pushed up by the inflated sediment dome.	349
2017-11-30	01:09:31	-15.06818	-173.70559	***2658.0***	2.1	302.9	What is this chute and what are the layers within the lavas.	350
2017-11-30	01:10:55	-15.06817	-173.70559	***2659.0***	1.2	348.6	Looking at this odd shaped tilted block.	351
2017-11-30	01:11:43	-15.06817	-173.70558	***2659.1***	1.1	346.8	This looks like layers of volcanic glass.	352
2017-11-30	01:12:06	-15.06817	-173.70558	***2660.0***	0.4	346.7	Layers of volcanic glass.	353
2017-11-30	01:12:33	-15.06817	-173.70558	***2659.7***	0.8	347.0	You can see pillows in the side of this.	354

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S088 W Mata "Muffin" Logger Comments	Record #
2017-11-30	01:12:54	-15.06817	-173.70558	***2658.7***	1.6	344.9	Did the orientation of this block change? It's really glassy-looking	355
2017-11-30	01:13:56	-15.06817	-173.70558	***2659.0***	1.2	345.7	Is it old rock caught up in this? Or is it younger rock that has stained?	356
2017-11-30	01:14:25	-15.06817	-173.70558	***2659.7***	0.6	346.4	**S88-rock-12**. Trying to grab a piece of this layered volcanic rock. It's difficult to sample.	357
2017-11-30	01:17:09	-15.06817	-173.70558	***2660.2***	0.4	333.6	S88-rock-12 cont. Still trying. Ken wants a piece of this banded surface.	358
2017-11-30	01:21:27	-15.06815	-173.70560	***2660.2***	0.0	345.6	S88-rock-12. Still trying to get a banded piece.	359
2017-11-30	01:23:08	-15.06812	-173.70562	***2660.1***	0.0	342.8	Pulling out the stbd arm.	360
2017-11-30	01:24:54	-15.06809	-173.70566	***2660.1***	0.0	340.9	S88-rock-12. 15-10 cm. Crystal-rich vesicular lava. Mineralization on the surface. Some vesicles. Orange staining. Pie shaped. Going into partition 7. Multi-colored green yellow and orange-stained rock from striped glassy background. Irregular shape. Brown on one face.	361
2017-11-30	01:29:27	-15.06814	-173.70576	***2654.8***	3.0	320.8	S88-rock-12 cont. From the sides of one of those ridges. Navigators estimated location: 15d 3' 58.57' 173d 42' 30.294". Z=2665.	362
2017-11-30	01:33:08	-15.06804	-173.70625	***2666.2***	3.9	262.8	We're heading west now and will eventually end up on the new lava flow.	363
2017-11-30	01:33:41	-15.06805	-173.70635	***2669.6***	6.0	266.7	We're in blue water as we go down the western slope of the muffin inflated sedimented ridge.	364
2017-11-30	01:34:16	-15.06806	-173.70642	***2674.2***	3.7	263.1	Bottom is back in site now.	365
2017-11-30	01:34:32	-15.06806	-173.70641	***2675.9***	1.7	262.3	We're still on the sediment.	366
2017-11-30	01:35:11	-15.06805	-173.70650	***2677.9***	3.0	283.3	This could be the edge of the new lava flow.	367
2017-11-30	01:35:25	-15.06803	-173.70654	***2678.6***	4.0	280.6	Contact of lava flow up along the sediment ridge.	368
2017-11-30	01:35:42	-15.06802	-173.70658	***2680.5***	2.8	267.9	Pillows along the edge appear cracked and stained.	369
2017-11-30	01:36:09	-15.06801	-173.70664	***2680.8***	3.0	266.2	Was logging some of the previous few entries as samples - and should have just been entries.	370
2017-11-30	01:36:44	-15.06802	-173.70666	***2682.4***	1.1	259.0	We're going to go in for a grab of a piece of this pillow on the new flow.	371
2017-11-30	01:37:11	-15.06803	-173.70666	***2682.4***	1.0	254.8	Not sampling yet., Setting up for the sample.	372
2017-11-30	01:40:39	-15.06801	-173.70667	***2682.9***	1.0	213.4	Attempting sample. Glass looks relatively fresh but cored with red-brown altered material	373
2017-11-30	01:42:07	-15.06801	-173.70667	***2682.9***	1.0	208.8	Second sampling attempt	374

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S088 W Mata "Muffin" Logger Comments	Record #
2017-11-30	01:44:29	-15.06801	-173.70667	***2682.9***	1.0	208.9	**Sample S88-rock-13** 20x15cm roughly. Phyric with thick glass rind and large vesicles up to cm scale. Sampled from the NW muffin contact	375
2017-11-30	01:47:12	-15.06801	-173.70667	***2682.8***	0.0	207.4	S88-rock-13 into box 9 on top of sed scoop 1. Location 15.0680 173.70667 depth 2682m	376
2017-11-30	01:49:59	-15.06804	-173.70667	***2678.4***	4.4	212.0	Repositioning to nearby ledge to sample sediment on flat	377
2017-11-30	01:50:28	-15.06808	-173.70671	***2678.5***	2.0	188.1	Vertical ripple marks on slope above flat where proposed sample will be attempted	378
2017-11-30	01:54:35	-15.06804	-173.70676	***2680.1***	0.0	183.1	Getting sed scoop 2 out	379
2017-11-30	01:57:55	-15.06699	-173.70883	***2680.1***	0.0	183.3	Scoop secured in manipulator	380
2017-11-30	01:59:11	-15.06545	-173.70980	***2680.1***	0.0	183.0	First scoop	381
2017-11-30	01:59:38	-15.06509	-173.71010	***2680.1***	0.0	183.1	**Sample S88-sed-14** in scoop 2. Location 15.0681 173.70671 depth 2680m.	382
2017-11-30	02:01:08	-15.06373	-173.71124	***2680.1***	0.0	183.0	S88-sed-14 placed between biobox and center sample box next to marker.	383
2017-11-30	02:04:46	-15.06403	-173.71092	***2675.8***	5.6	155.7	Off seabed and transiting upsection	384
2017-11-30	02:05:28	-15.06438	-173.71071	***2672.9***	5.9	161.9	Slope has fines topped with coarser volcanoclastic and some igneous rubble. Indicates more further uphill somewhere.	385
2017-11-30	02:07:10	-15.06452	-173.71052	***2676.8***	2.7	278.6	Locally turbulent current. Mostly sediment with some rubble.	386
2017-11-30	02:07:45	-15.06449	-173.71060	***2679.7***	1.3	283.8	Approaching pile of fairly young broken pillows.	387
2017-11-30	02:08:21	-15.06447	-173.71067	***2679.8***	2.1	279.5	Pillows are cracked and drained with signs of alteration on exposed interior surfaces. Some life - crab.	388
2017-11-30	02:08:59	-15.06447	-173.71075	***2681.4***	1.8	275.6	Pile of thin broken pillow lavas with a lot of sulfur and iron staining. Behind foreground is rougher-textured lava.	389
2017-11-30	02:09:48	-15.06445	-173.71085	***2683.1***	2.8	271.1	Moving quickly back into smoother lava flows. Skirting the NW edge of the muffin and starting to move slightly off the margin.	390
2017-11-30	02:10:29	-15.06443	-173.71094	***2685.9***	3.0	277.6	Slight increase in sediment on pillows.	391
2017-11-30	02:10:41	-15.06443	-173.71097	***2687.1***	2.4	275.1	Sediment-lava contact at a flow margin.	392
2017-11-30	02:11:09	-15.06441	-173.71106	***2687.0***	3.7	281.7	Broken pillow with complex inflation and draining structure.	393
2017-11-30	02:11:40	-15.06438	-173.71112	***2688.1***	2.7	275.8	Stack of smallish and lightly sedimented pillows. Topped with inflated and drained pillow. And a small shrimp out for a swim.	394

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S088 W Mata "Muffin" Logger Comments	Record #
2017-11-30	02:13:12	-15.06555	-173.70941	***2687.0***	2.6	278.8	Smoother small diameter lava flows intercalated with larger more striated popover-like pillows.	395
2017-11-30	02:14:44	-15.06549	-173.70945	***2685.4***	3.4	269.3	Large pillows are unusually spherical here.	396
2017-11-30	02:15:47	-15.06547	-173.70940	***2681.2***	8.5	335.9	Off bottom and looking down at slope with dominantly smoother and narrower lava flows.	397
2017-11-30	02:17:57	-15.06540	-173.70938	***2686.4***	3.6	312.2	Pumpkin patch.	398
2017-11-30	02:19:16	-15.06539	-173.70945	***2684.5***	3.9	290.6	Smooth lavas mantling rough lavas.	399
2017-11-30	02:24:24	-15.06537	-173.70959	***2679.6***	2.8	271.5	Striated lava flows are becoming more elongate upsection.	400
2017-11-30	02:26:52	-15.06538	-173.70974	***2671.9***	1.9	267.6	Atilla the Hut. Local high surrounded by smooth lava flows.	401
2017-11-30	02:28:04	-15.06537	-173.70979	***2671.4***	1.9	271.8	Is Atilla a small local vent?	402
2017-11-30	02:29:22	-15.06595	-173.71047	***2669.9***	1.3	233.7	Close-up of Atilla the Hut. Giant pillow maybe?	403
2017-11-30	02:30:02	-15.06595	-173.71047	***2669.9***	1.5	233.3	The many textures of Atilla the Hut.	404
2017-11-30	02:32:21	-15.06598	-173.71047	***2669.3***	2.3	261.0	Preparing to sample Atilla the Hut.	405
2017-11-30	02:35:49	-15.06598	-173.71046	***2669.4***	2.3	261.3	Very friable rock. Sampling is difficult.	406
2017-11-30	02:37:28	-15.06598	-173.71045	***2669.4***	2.2	261.0	**S88-rock-15**. Multiple jagged pieces of rock from the side of Atilla the Hut. Placed into biobox 4.	407
2017-11-30	02:38:47	-15.06598	-173.71045	***2669.4***	2.2	260.8	S88-rock-15 biobox 4. Appears to be 2 pieces. Going back to attempt another piece to compare textures back in the lab.	408
2017-11-30	02:40:13	-15.06598	-173.71045	***2669.4***	2.2	260.9	S88-rock-15b 15x10cm with cm-scale elongate vesicles. Also into biobox 4.	409
2017-11-30	02:40:39	-15.06598	-173.71045	***2669.3***	2.2	260.7	Dropping off S88-rock-15b.	410
2017-11-30	02:41:20	-15.06597	-173.71044	***2669.4***	2.2	260.9	S88-rock-15 a and b location 15.06598 173.71047 depth 2669m.	411
2017-11-30	02:43:36	-15.06590	-173.71056	***2667.9***	1.4	276.6	In this region it appears that the smoother lobate to elongate pillow flows are more common. The striated larger spherical pillows are more like local highs.	412
2017-11-30	02:44:54	-15.06589	-173.71072	***2665.5***	2.6	275.6	Now have moved into a field that is dominantly striated lava.	413
2017-11-30	02:45:28	-15.06589	-173.71080	***2666.1***	2.4	274.3	Flows have orange staining on undersides.	414
2017-11-30	02:46:17	-15.06588	-173.71080	***2665.6***	2.7	273.9	Many cracked and hollowed pillows.	415
2017-11-30	02:48:16	-15.06587	-173.71085	***2666.2***	1.0	271.7	Partial collapse.	416
2017-11-30	02:50:30	-15.06584	-173.71088	***2665.2***	1.9	317.9	Waypoint 11.	417

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S088 W Mata "Muffin" Logger Comments	Record #
2017-11-30	02:50:59	-15.06580	-173.71088	***2663.4***	3.9	331.5	Top of the pillow mound. Signs of hydrothermal staining on the undersides of many flows, but no obvious evidence of warm water coming from these anymore.	418
2017-11-30	02:52:18	-15.06567	-173.71088	***2667.1***	1.1	348.6	Still seeing frequent broken and drained pillows among smaller smooth lava flows. Ripple marks on lava flow tops still common. Moving away from waypoint 11 along track to waypoint 12.	419
2017-11-30	02:53:45	-15.06550	-173.71085	***2673.3***	1.8	346.6	Abundant drained pillows. Roof collapses fairly common.	420
2017-11-30	02:57:01	-15.06521	-173.71098	***2678.6***	2.6	336.5	Endless pillows. No specific flow direction in this patch.	421
2017-11-30	02:59:18	-15.06497	-173.71103	***2683.6***	1.4	339.1	Fish. Have seen a couple of these near waypoint 11.	422
2017-11-30	03:00:34	-15.06485	-173.71110	***2682.0***	2.2	329.4	Approaching waypoint 12.	423
2017-11-30	03:09:41	-15.06475	-173.71110	***2681.4***	1.6	339.6	**S88-rock-16** off of collapsed pillow. Large scoop like underside with large several cm bubble. Into fore marker box.	424
2017-11-30	03:12:03	-15.06468	-173.71107	***2679.1***	2.7	339.1	Sampling bottom water in basket. **S88-fluid-17** in major 2.	425
2017-11-30	03:13:04	-15.06463	-173.71108	***2677.8***	2.7	338.5	Location 15.064678 173.711072 depth 2682m. THIS APPLIES TO BOTH S88-rock-16 AND S88-fluid-17.	426
2017-11-30	03:14:28	-15.06455	-173.71109	***2680.2***	1.7	332.9	Approaching waypoint 12 and continuing to see intercalated smooth pillow lavas and larger striated collapsed pillows.	427
2017-11-30	03:15:47	-15.06447	-173.71113	***2681.7***	1.2	326.8	Edge of the flow in background.	428
2017-11-30	03:16:22	-15.06442	-173.71114	***2682.2***	2.2	313.6	Edge of flow.	429
2017-11-30	03:16:53	-15.06438	-173.71117	***2683.7***	1.1	351.4	Sloped sedimentary seabed.	430
2017-11-30	03:18:08	-15.06432	-173.71108	***2684.7***	1.0	69.6	Contact.	431
2017-11-30	03:19:47	-15.06431	-173.71098	***2685.7***	0.7	68.6	Possible blocks/bombs in sed bed.	432
2017-11-30	03:21:54	-15.06429	-173.71090	***2686.5***	0.7	71.6	Brittle star.	433
2017-11-30	03:23:12	-15.06427	-173.71085	***2686.5***	0.7	51.2	Undefined biological material. "Burned hash browns".	434
2017-11-30	03:23:44	-15.06427	-173.71084	***2686.8***	0.5	51.7	Kelp wut.	435
2017-11-30	03:31:08	-15.06414	-173.71064	***2686.5***	0.5	27.9	Sample **S88-rock-18**. Roughly 10x5cm into box 10. Very glassy and highly phyric 40-50% with large phenos.	436

Date	Time	Latitude	Longitude	*Depth*	Altitude	Heading	S088 W Mata "Muffin" Logger Comments	Record #
2017-11-30	03:32:33	-15.06434	-173.71056	***2686.5***	0.6	25.0	S88-rock-18 location 15.06443 173.710656 depth 2686m.	437
2017-11-30	03:35:44	-15.06433	-173.71084	***2682.2***	2.5	244.0	End of dive	438
2017-11-30	03:39:07	-15.06486	-173.71105	***2682.4***	3.0	230.9	CORRECTION/OMISSION: **SAMPLE S-88-Rock-04** was not logged in Squiddle previously. Will log it now in following entries.	440
2017-11-30	03:40:40	-15.06502	-173.71109	***2680.7***	2.9	208.5	S-88-Rock-04. Collected at WP4 parallel ridge. 15.07058S 173.7105W Z=2665m. Placed in partition 8.	441
2017-11-30	03:42:41	-15.06511	-173.71097	***2676.9***	4.5	223.6	S-88-Rock-04. Sample of ridge; plenty of crystals; staining; less glass. Low vesicularity; brownish rind. 20 cm. From folded ripple.	442
2017-11-30	03:44:53	-15.06530	-173.71095	***2675.8***	1.9	222.8	Still on the seafloor doing tether management.	443
2017-11-30	03:45:59	-15.06535	-173.71097	***2675.6***	1.5	222.2	Looking at these beautiful new lavas on the seafloor to the north of the inflated sedimented ridge.	444
2017-11-30	03:48:12	-15.06547	-173.71095	***2640.1***	31.6	222.3	Subastian is off the seafloor and heading up. End of dive S88.	445

S089 Mata Ua

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S089 Mata Ua Logger Comments	Record #
11/30/2017	19:06:50	-15.01621	-173.78791	2388.7	10.8	146.3	Vehicle at Seabed	18
11/30/2017	19:08:15	-15.01614	-173.78791	2396.2	4.9	137.5	We're on the bottom here at Mata Ua. Start of dive S89.	19
11/30/2017	19:08:51	-15.01619	-173.78791	2394.0	6.2	137.3	Steep slope with volcaniclastic sediments and rock debris - talus.	20
11/30/2017	19:10:41	-15.01625	-173.78785	2391.3	4.9	137.1	Loose debris on this steep slope.	21
11/30/2017	19:11:05	-15.01625	-173.78785	2391.0	5.0	136.8	Zooming in to look at the biology on these rocks.	22
11/30/2017	19:11:12	-15.01625	-173.78785	2391.1	4.3	137.1	Limpets it is.	23
11/30/2017	19:11:45	-15.01625	-173.78786	2391.6	3.9	136.4	Lots of alteration on the rocks. Limpets; snails; and possibly a bit whelk and snails.	24
11/30/2017	19:12:25	-15.01626	-173.78786	2390.5	5.2	136.7	Huge (looks big at least) what we're calling a whelk. Bigger than the squat lobster in the view.	25
11/30/2017	19:13:00	-15.01628	-173.78783	2387.9	5.0	136.9	Crinoid.	26
11/30/2017	19:13:24	-15.01629	-173.78780	2385.8	6.6	136.9	Sulfide chimney debris on the slope here?	27
11/30/2017	19:13:44	-15.01632	-173.78779	2384.2	5.8	137.6	Could also be just heavily stained rock.	28

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S089 Mata Ua Logger Comments	Record #
11/30/2017	19:14:04	-15.01634	-173.78779	2382.6	6.6	141.9	We're moving up slope.	29
11/30/2017	19:14:22	-15.01636	-173.78779	2381.6	6.0	142.3	In place rock. Massive outcrop. Boninite.	30
11/30/2017	19:14:44	-15.01634	-173.78781	2380.7	5.3	140.6	The big white snail (whelk?) we saw was also seen at the Mariana back arc.	31
11/30/2017	19:14:56	-15.01632	-173.78781	2380.5	5.9	142.7	Here on a bit of a platform. Outcrop.	32
11/30/2017	19:15:03	-15.01632	-173.78780	2380.4	6.0	145.4	Fish of some type.	33
11/30/2017	19:15:37	-15.01630	-173.78772	2380.6	7.6	179.3	Zoarcids. Whip corals. Squat lobsters.	34
11/30/2017	19:15:49	-15.01630	-173.78772	2380.9	4.7	178.8	There are also non-vent organisms living here.	35
11/30/2017	19:16:09	-15.01633	-173.78773	2380.7	4.6	179.9	Weathered yellow sediments indicate there are sulfides here.	36
11/30/2017	19:16:34	-15.01635	-173.78776	2380.2	4.8	179.7	Ken wants to go in for an in place rock. Could be chimney material.	37
11/30/2017	19:17:10	-15.01635	-173.78777	2380.2	4.5	179.7	Premonitory sticking out from the slope. A stable place to sample.	38
11/30/2017	19:17:20	-15.01635	-173.78777	2380.4	4.2	179.9	Nav looks all right today.	39
11/30/2017	19:18:01	-15.01635	-173.78776	2380.9	0.0	180.4	Looks like this was a pretty big chimney site and just collapsed and falling down.	40
11/30/2017	19:18:33	-15.01634	-173.78776	2380.9	0.0	180.4	Zooming in to find a piece that is "just right".	41
11/30/2017	19:19:14	-15.01635	-173.78775	2381.0	1.8	181.6	Squat lobster on the chimney debris here.	42
11/30/2017	19:21:53	-15.01636	-173.78776	2380.9	0.0	181.0	Grabbing top of this weathered sulfide (?) on this sedimented slope. Crumbly (friable). Looks like glassy rock.	43
11/30/2017	19:25:13	-15.01632	-173.78775	2380.9	0.0	180.7	**S89-rock-01**. Grabbing crumbly oxidized rock. Chimney? Orange staining. Mineral rich. Roundish black and orange. May be oxidized sulfide. 8-10cm in longest direction.	45
11/30/2017	19:26:33	-15.01636	-173.78776	2380.9	0.0	181.3	The first sample got pulverized. Christian said that's not an optimal sample.	47
11/30/2017	19:26:49	-15.01636	-173.78776	2380.9	0.0	181.3	Ken wants a little nob next to our sample.	48
11/30/2017	19:27:39	-15.01634	-173.78775	2380.9	0.0	181.5	15.0164S 173.7878 Z=2382m. Will be the lat long for sample 2 as well.	49
11/30/2017	19:35:15	-15.01635	-173.78775	2381.0	0.0	181.4	**S89-rock-02**. Grabbing a piece of weathered grayish lava (on the surface). Not intact but probably in place. 15.0164S 173.7878 Z=2382m.	50

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S089 Mata Ua Logger Comments	Record #
11/30/2017	19:37:02	-15.01635	-173.78774	2380.9	0.0	181.2	More sample 2 info. Stained rock. Oxidized and crumbly. Microbial material on it. Vesicular and angular pie shaped. 30 - 35 cm. No glass. Tabular fragment.	51
11/30/2017	19:37:26	-15.01634	-173.78775	2380.9	0.0	181.2	Squidle is frozen up. Will restart.	52
11/30/2017	19:39:12	-15.01639	-173.78777	2377.6	5.6	117.0	Squidle is still frozen up after restart.	53
11/30/2017	19:39:32	-15.01642	-173.78777	2376.6	4.8	87.6	We're moving along this narrow ridge with scattered rock debris.	54
11/30/2017	19:39:47	-15.01642	-173.78777	2377.0	4.1	89.0	May have been sulfide in the past. Orange staining on the rocks.	55
11/30/2017	19:39:55	-15.01643	-173.78776	2377.4	3.4	86.3	Quite a lot of biota.	56
11/30/2017	19:40:48	-15.01647	-173.78773	2374.3	4.0	87.7	Christian wants something that is tubular and has fluid outflow zones.	57
11/30/2017	19:40:48	-15.01647	-173.78773	2374.3	4.0	87.7	Christian wants something that is tubular and has fluid outflow zones.	58
11/30/2017	19:41:11	-15.01647	-173.78771	2373.8	3.5	89.2	These rocks have stalked barnacles on them. Diffuse flow coming out.	59
11/30/2017	19:41:36	-15.01648	-173.78771	2373.5	4.1	87.6	Shimmering water and stalked barnacles; squat lobsters. Not a lot of flow.	60
11/30/2017	19:41:46	-15.01648	-173.78771	2373.4	4.3	85.9	Chimneys up slope of us.	61
11/30/2017	19:41:58	-15.01648	-173.78770	2373.3	3.7	87.3	We're just beneath the sulfide chimneys now.	62
11/30/2017	19:42:17	-15.01649	-173.78769	2372.9	3.5	87.7	Rubble on the slope from the chimneys above.	63
11/30/2017	19:42:37	-15.01650	-173.78768	2372.2	3.0	87.5	Seeing a bit of flow coming out of the smaller chimneys. lots more biota now.	64
11/30/2017	19:43:20	-15.01650	-173.78768	2371.5	3.1	86.6	A massive network of sulfide chimneys. At least 20 sulfide chimneys in this complex.	65
11/30/2017	19:43:50	-15.01651	-173.78768	2370.7	3.9	87.7	Mixture of extinct and active chimneys here.	66
11/30/2017	19:44:06	-15.01651	-173.78768	2370.2	4.1	89.3	Seeing black smoke coming out of this chimney with beehives.	67
11/30/2017	19:44:50	-15.01652	-173.78767	2369.7	4.9	87.1	Biota on chimney: scaleworms palm worms; crabs; opaepele shrimp; snails.	68
11/30/2017	19:45:28	-15.01652	-173.78768	2369.3	3.9	87.1	Lots of hot orifices with diffuse flow and hot black smoke coming out.	69
11/30/2017	19:45:46	-15.01652	-173.78768	2368.9	4.2	89.1	We're going to scan around the area and take a look.	70
11/30/2017	19:46:22	-15.01654	-173.78768	2367.2	4.5	87.8	This is a large complex of chimneys as we travel upslope.	71

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S089 Mata Ua Logger Comments	Record #
11/30/2017	19:46:55	-15.01655	-173.78767	2365.9	4.8	86.6	Lots of white bacterial mat on the chimneys and seafloor.	72
11/30/2017	19:47:19	-15.01656	-173.78766	2365.3	4.4	86.7	Zoom on stalked barnacles. Some open and some closed. Live on the periphery.	73
11/30/2017	19:48:02	-15.01656	-173.78766	2364.6	4.8	87.3	Black snails here. Zoarcid fish; brachyuran crabs.	74
11/30/2017	19:48:27	-15.01656	-173.78764	2364.2	4.7	88.1	Chimney field is on a really steep slope.	75
11/30/2017	19:49:09	-15.01657	-173.78761	2363.1	4.4	87.0	Continuing upslope. Can't see all the extent of the complex.	76
11/30/2017	19:49:28	-15.01658	-173.78761	2361.6	4.1	87.5	Lots of low-standing features here with less hot water.	77
11/30/2017	19:49:57	-15.01660	-173.78759	2359.3	4.8	100.3	Huge amount of barnacles in this diffuse area.	78
11/30/2017	19:50:42	-15.01663	-173.78759	2355.9	8.5	102.8	Approaching the top of this slope - spire of chimneys above.	79
11/30/2017	19:50:49	-15.01662	-173.78759	2355.5	8.4	106.9	Bounty of barnacles.	80
11/30/2017	19:51:14	-15.01658	-173.78756	2353.7	10.8	123.5	Spanning around and looking at this extensive spires. Small black smoker here.	81
11/30/2017	19:51:23	-15.01657	-173.78755	2353.2	12.2	137.0	Huge aggregation of chimneys.	82
11/30/2017	19:51:42	-15.01655	-173.78752	2352.9	10.8	160.1	Spanning around and looking at these chimneys.	83
11/30/2017	19:51:57	-15.01653	-173.78750	2352.8	15.9	178.8	These look pretty tall. At least 5 meter range.	84
11/30/2017	19:52:06	-15.01653	-173.78750	2352.3	17.4	179.0	Can see chimneys in the background.	85
11/30/2017	19:52:21	-15.01654	-173.78752	2350.8	0.0	176.0	This is bigger than the site we visited in 2912.	86
11/30/2017	19:52:45	-15.01657	-173.78753	2350.0	19.7	175.5	Let's keep looking around before we decide on a sampling site.	87
11/30/2017	19:53:33	-15.01665	-173.78756	2349.3	17.5	177.3	We've traveled at least 30m upslope and have seen chimneys and venting over the entire slope.	88
11/30/2017	19:53:47	-15.01666	-173.78757	2349.1	16.9	176.5	Soft-shaped spires are covered with barnacles.	89
11/30/2017	19:54:08	-15.01669	-173.78757	2348.4	18.6	176.7	Large smoker in front of us.	90
11/30/2017	19:54:45	-15.01674	-173.78757	2348.7	15.2	176.5	Big tall black smokier in front of us. Z=2348m.	91
11/30/2017	19:55:08	-15.01674	-173.78755	2349.7	10.3	176.2	Barnacles on lots of the chimneys here. Black smoker have less biota.	92
11/30/2017	19:55:26	-15.01674	-173.78755	2350.0	10.6	176.4	Water column work pointed us to this site..	93
11/30/2017	19:55:37	-15.01674	-173.78755	2350.0	10.6	176.3	Zooming in on black snail and fish;	94
11/30/2017	19:56:16	-15.01671	-173.78757	2350.0	7.1	176.4	There has got to be a hundred chimneys in this complex.	95
11/30/2017	19:56:40	-15.01672	-173.78758	2349.9	10.4	176.6	The hundred mentioned previously doesn't include the more diffuse chimneys covered in barnacles.	96

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S089 Mata Ua Logger Comments	Record #
11/30/2017	19:57:47	-15.01670	-173.78760	2348.5	15.7	176.2	We're going to keep looking around this huge complex of chimneys.	97
11/30/2017	19:58:27	-15.01665	-173.78763	2344.7	23.2	176.8	The altitude here is 20m. These chimneys are probably at least 10m high and probably higher.	98
11/30/2017	19:59:28	-15.01672	-173.78762	2350.1	13.6	167.8	Black smokers are down below us as well. Closer to the seabed are easier for sampling purposes.	99
11/30/2017	19:59:43	-15.01671	-173.78763	2351.1	13.6	167.8	A little black smoke coming out of this chimney	100
11/30/2017	20:00:05	-15.01670	-173.78764	2351.9	7.7	166.6	A smaller chimney about a meter tall looks samplable.	101
11/30/2017	20:00:39	-15.01669	-173.78759	2351.6	10.4	167.5	This is probably too close to the ground.	102
11/30/2017	20:01:15	-15.01667	-173.78758	2351.7	9.7	167.1	Searching around. See a really black smoker down there.	103
11/30/2017	20:01:44	-15.01667	-173.78759	2352.4	11.4	167.6	We're going to scan around a bit for the perfect chimney.	104
11/30/2017	20:02:07	-15.01668	-173.78760	2353.1	9.6	168.0	Wow this place is spectacular.	105
11/30/2017	20:02:26	-15.01669	-173.78760	2353.7	6.0	167.8	Dubbing this site: Temple of Smoke.	106
11/30/2017	20:05:14	-15.01672	-173.78765	2356.1	4.2	191.1	This "Temple of Smoke" chimney complex covers at least an area of at least 40 meters relief - as we moved up slope. Don't know how extensive it is yet along slope	107
11/30/2017	20:05:37	-15.01672	-173.78763	2356.1	3.2	190.7	Looking at the chimney we want to sample.	108
11/30/2017	20:05:49	-15.01673	-173.78763	2356.1	3.1	191.1	Huge hairy crab and stalked barnacles.	109
11/30/2017	20:06:58	-15.01675	-173.78762	2356.1	3.1	191.8	Temple of Smoke sampling location: 15.01535S 173.78713W Z=2355. Probably at least 100 chimneys in the complex - so far.	110
11/30/2017	20:07:49	-15.01676	-173.78761	2356.1	3.1	191.4	What's the green mineral? Copper precipitate mineral is making the green.	111
11/30/2017	20:08:33	-15.01677	-173.78761	2356.1	3.1	191.6	Zoom on hairy crab.	112
11/30/2017	20:09:05	-15.01676	-173.78762	2356.1	3.1	191.6	This is where all the life is. W	113
11/30/2017	20:09:21	-15.01676	-173.78761	2356.1	3.1	191.9	Zooming in on white bac mat area with tons of life.	114
11/30/2017	20:10:11	-15.01676	-173.78760	2356.1	3.1	191.8	Ifremeria snails; polynoids; brachyuran crabs; zoarcids; stalked and non-stalked barnacles; squat lobsters.	115
11/30/2017	20:10:52	-15.01676	-173.78762	2356.1	3.1	191.7	First we'll grab the chimney first. Then the temp probe. Then fluid and gas sampling.	116

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S089 Mata Ua Logger Comments	Record #
11/30/2017	20:13:35	-15.01680	-173.78764	2356.1	2.9	193.5	**S89-sulfide-03**. Grabbing this black smoker beehive chimney. Friable. Spewing out hot water and black smoke.	117
11/30/2017	20:18:33	-15.01675	-173.78761	2356.1	3.1	193.5	Sulfide black smoker. Looks like it's flashing. Crumbling young chimney. Trying for the base. Chalcopyrite in the center. 10 cm piece.	118
11/30/2017	20:20:28	-15.01676	-173.78764	2356.1	2.9	193.1	Nice little piece of the base of the chimney. The chimney itself is ~0.5m or less across. Chimney side wall. Chalcopyrite? and pyrite along fluid upflow zone.	119
11/30/2017	20:22:36	-15.01674	-173.78762	2356.1	2.8	193.6	Second piece of sample 3. Sample 3b. Crumbly. More grayish material on it. Sulfide and participates of barium. ~15 cm probably broken.	120
11/30/2017	20:23:04	-15.01674	-173.78763	2356.1	4.1	193.6	Now we can see the boiling again. Curious squat lobster.	121
11/30/2017	20:23:21	-15.01676	-173.78760	2356.1	4.1	193.5	The hole has been widened by breaking off the chimney.	122
11/30/2017	20:24:07	-15.01676	-173.78761	2356.0	3.1	193.1	Ambient temp here is 1.7C. Taking the temp in the base.	123
11/30/2017	20:25:16	-15.01678	-173.78764	2356.1	4.2	193.9	Temp=598?? Boiling is at 380C here. Temp says 599C. That can't be. It defies physics.	124
11/30/2017	20:26:08	-15.01679	-173.78772	2356.0	2.8	193.5	Walter wants to poke around and see what the temp is at the base of these barnacles. Temp probe says its -1C. That's also not possible.	125
11/30/2017	20:26:39	-15.01673	-173.78768	2356.1	2.5	194.0	The temperature probe is not working.	126
11/30/2017	20:27:54	-15.01659	-173.78753	2356.1	2.8	193.7	Now going to hone in and take a gas sample.	127
11/30/2017	20:30:21	-15.01667	-173.78762	2356.1	4.0	193.5	NOTE: Chris got a different lat/long than Susan: Chris's location was: 15.0168 173.7876. Will go with the first location for now (Susan's)	128
11/30/2017	20:33:54	-15.01667	-173.78775	2356.0	4.3	193.7	**S89-gas-04.** Gastight (yellow #6) in orifice of black smoker that was broken off - sample 3 location. Fired at 2934. May not have been in the direct flow??	129
11/30/2017	20:35:28	-15.01674	-173.78765	2356.0	4.1	194.2	Looked like a good sample after all. The tip of the snorkel is black. Here at Temple of Smoke complex. 15.01535S 173.78713W Z=2356.	130
11/30/2017	20:36:07	-15.01678	-173.78761	2356.1	2.8	193.8	Stowing the gastight - bungeeing it up.	131

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S089 Mata Ua Logger Comments	Record #
11/30/2017	20:37:18	-15.01674	-173.78763	2356.1	0.0	193.7	Next we'll get a fluid sample with the Major sampler in the same orifice as the previous gastight sample.	132
11/30/2017	20:38:16	-15.01682	-173.78766	2356.1	2.4	194.1	Grabbing the major now.	133
11/30/2017	20:41:03	-15.01676	-173.78765	2356.0	0.0	193.8	**S89-fluid-05.** Major sampler #1 in same black smoker orifice as the previous samples (3 and 4). Nozzle in the flow. Looks good. Here at Temple of Smoke complex in small black smoker orifice.	134
11/30/2017	20:41:36	-15.01674	-173.78769	2356.1	0.0	194.4	The sample looks great. Textbook samples there - except the temperature.	135
11/30/2017	20:42:08	-15.01664	-173.78768	2356.1	0.0	194.0	The nozzle on the major is also completely stained. Great sample.	136
11/30/2017	20:42:57	-15.01658	-173.78769	2356.0	3.9	193.9	Next will get a biology sample for Walter.	137
11/30/2017	20:44:25	-15.01659	-173.78768	2356.0	2.8	193.8	We want a biological grab without moving.	138
11/30/2017	20:47:02	-15.01661	-173.78769	2356.0	3.8	193.4	**S89-bio-06.** Stalked barnacles just to the right of the black smoker chimney just sampled. Nice grab of several stalked barnacles	139
11/30/2017	20:52:56	-15.01660	-173.78769	2356.0	2.5	191.5	Did not get that bio sample. The crabs don't want to be grabbed..	140
11/30/2017	20:53:27	-15.01660	-173.78769	2356.0	4.1	192.3	Stopped chasing the crabs.	141
11/30/2017	20:54:49	-15.01660	-173.78768	2355.6	0.0	191.4	Backing out of this view. Gave up on those bio samples.	143
11/30/2017	20:59:06	-15.01661	-173.78768	2354.9	3.6	190.9	CORRECTION FOR THE SAMPLE 3-5 LOCATION: 15.01668 173.78761 navigator target for Temple of Smoke.	144
11/30/2017	21:01:32	-15.01659	-173.78767	2355.4	0.0	191.7	**S89-bio-07**. Just upslope from black smoker sampled earlier. 3 Ifremer snails.	145
11/30/2017	21:08:33	-15.01680	-173.78786	2355.8	2.5	196.3	**Deploying Marker 226.** Temple of Smoke. Location 15.0168340 173.7878775 along steep slope in smoker field.	146
11/30/2017	21:11:40	-15.01684	-173.78780	2347.0	6.2	195.5	Spectacular spire formations in vent field. Heavily populated with what look like barnacles.	147
11/30/2017	21:13:18	-15.01691	-173.78769	2335.7	0.0	195.8	Off bottom and transiting upslope toward a pile of rocks and rubble (onslope).	148
11/30/2017	21:15:49	-15.01687	-173.78762	2338.8	16.4	198.3	Transit to Waypoint 2. Indirect as we are assessing seafloor beneath us. Looking for extent of venting.	149
11/30/2017	21:17:09	-15.01681	-173.78750	2342.9	2.7	165.3	Overlooking large barnacle field on slope.	150

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S089 Mata Ua Logger Comments	Record #
11/30/2017	21:19:37	-15.01682	-173.78744	2334.5	10.7	163.2	Surveying spires on slope while transiting to waypoint 2. Some are actively venting but many also quiet. Heavily populated with barnacles. crabs. and anemones.	151
11/30/2017	21:20:08	-15.01683	-173.78742	2334.9	4.2	171.9	Transiting somewhat along contour toward waypoint 2 as terrain allows.	152
11/30/2017	21:21:35	-15.01696	-173.78739	2337.7	1.9	185.6	2338m depth left chimney zone.	153
11/30/2017	21:21:55	-15.01698	-173.78739	2337.8	1.4	190.2	Entering zone of diffuse flow with more rock fragments and sediment.	154
11/30/2017	21:22:34	-15.01702	-173.78740	2336.4	1.6	214.8	All barnacles populating slope.	155
11/30/2017	21:25:33	-15.01717	-173.78741	2328.7	1.3	222.9	Since last visiting this site. the number of stock barnacles has increased.	156
11/30/2017	21:27:20	-15.01723	-173.78742	2322.2	5.6	198.7	Observing what looks like some microbial buildup on rocky slope.	157
11/30/2017	21:28:28	-15.01727	-173.78743	2314.5	12.5	212.4	Steep slope here suggests that the original volcanic wall has faulted. Vertical subsidence.	158
11/30/2017	21:30:45	-15.01745	-173.78748	2316.1	4.8	224.9	Transition into field with far less barnacles and generally more barren. Increase in coral stalks - probably dead. Squat lobsters present.	159
11/30/2017	21:31:19	-15.01747	-173.78757	2319.4	4.3	224.5	Likely lots of diffuse flow through this field at some point and might still be the case. Microbial communities on sediments and rock debris.	160
11/30/2017	21:32:00	-15.01745	-173.78763	2322.7	4.6	225.0	Moving slightly upslope. More sediment and less rock debris at 2320m.	161
11/30/2017	21:35:57	-15.01747	-173.78787	2329.2	7.6	224.7	Continuing along contour and currently near waypoint 8.	162
11/30/2017	21:36:59	-15.01746	-173.78790	2335.4	2.7	225.4	Slope at 2333m has more rocky debris as well as sediment. Abundant microbial colonies.	163
11/30/2017	21:38:17	-15.01742	-173.78792	2335.0	4.9	238.4	ROV paused to wait for ship to reposition. ROV location 15.017440 173.787917 depth 2335m	164
11/30/2017	21:40:35	-15.01731	-173.78793	2344.5	1.0	305.4	Overlooking field of chimneys. Looking north and downslope.	165
11/30/2017	21:41:38	-15.01714	-173.78799	2348.2	8.2	279.3	High-altitude flyover to reposition ROV and survey vent field.	166
11/30/2017	21:44:21	-15.01710	-173.78805	2358.3	3.7	180.3	Sampling with Starboard Manipulator.	167
11/30/2017	21:44:26	-15.01709	-173.78805	2358.3	3.7	176.9	Sampling with Starboard Manipulator.	168
11/30/2017	21:44:35	-15.01710	-173.78806	2358.2	4.1	179.6	**Deploying Marker 239** at location 15.017082 173.788059 depth 2358m at edge of vent field. Sownslope Chimney Extent.	169

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S089 Mata Ua Logger Comments	Record #
11/30/2017	21:45:27	-15.01714	-173.78807	2358.0	3.5	180.3	Marker 239 dropped.	170
11/30/2017	21:46:21	-15.01716	-173.78807	2356.1	5.0	179.9	Vents are largely inactive but show some signs of diffuse flow.	171
11/30/2017	21:48:41	-15.01716	-173.78807	2355.7	0.0	153.3	Two events "Sampling with Starboard Manipulator." were accidental clicks at ROV control. Disregard.	172
11/30/2017	21:58:14	-15.01716	-173.78804	2356.0	0.0	154.1	**S89-bio-09.** Going in for sulfide worms and polynoids instead. Got them. Location 15.017165 173.788083 depth 2356m. Canister 6.	173
11/30/2017	21:58:14	-15.01716	-173.78805	2356.0	3.3	154.2	Going in for sulfide worms and polynoids instead. Got them. Location 15.017165 173.788083 depth 2356m. Canister 6.	174
11/30/2017	22:02:09	-15.01712	-173.78807	2355.9	0.0	154.9	Now suctioning Ifremeria snails into canister 6. Also getting white bac mat; Possibly got Opapele shrimp. Several large snails going into biobox 3.	175
11/30/2017	22:04:17	-15.01721	-173.78806	2355.9	3.4	153.8	CORRECTION: The Ifremer snails are being logged as a separate sample. Went into biobox 3. 15.0171667 173.7880572 Z=2356.	176
11/30/2017	22:05:20	-15.01715	-173.78806	2355.9	3.5	152.6	Going in for a grab of the mussel next.	178
11/30/2017	22:06:55	-15.01718	-173.78808	2355.9	3.3	153.4	**S89-bio-10**. Large single mussel with barnacles and limpets attached. Same location as previous 2 bio samples.	179
11/30/2017	22:09:17	-15.01717	-173.78808	2355.9	0.0	153.0	**S89-sulfide-11**. Weathered extinct small sulfide chimney with mat and scaleworms on top. Bulgy; orange/gray. Huge piece. Got the top portion.	180
11/30/2017	22:13:43	-15.01717	-173.78807	2355.9	3.2	153.3	> 40cm long and 20cm wide. Old weathered sulfide chimney top. Inactive. Sulfide on exterior.	181
11/30/2017	22:14:53	-15.01716	-173.78808	2355.9	0.0	154.0	This location is upslope from the 2012 Flashing site. Into partition 9.	182
11/30/2017	22:16:52	-15.01715	-173.78805	2351.1	10.3	182.0	Pirouetting ROV to see what's behind us.	183
11/30/2017	22:18:17	-15.01712	-173.78801	2349.9	9.3	123.8	Talus slope.	184
11/30/2017	22:19:14	-15.01712	-173.78805	2350.9	10.2	203.1	Spires on slope ~5m tall.	185
11/30/2017	22:20:29	-15.01715	-173.78812	2352.1	17.0	189.4	Barnacles and squat lobsters populating what appear to be cooler parts of the vent field.	186
11/30/2017	22:22:45	-15.01728	-173.78828	2354.4	15.7	167.7	Looking along contour to see what's ahead of us. Lots of barnacle colonies and smokers with various levels of activity.	187
11/30/2017	22:24:13	-15.01732	-173.78837	2352.2	15.2	170.6	2353m overlooking tall chimneys. Not very active here but some diffuse venting visible.	188

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S089 Mata Ua Logger Comments	Record #
11/30/2017	22:25:09	-15.01742	-173.78842	2351.5	13.8	171.1	Chimneys reaching ~ 15m height.	189
11/30/2017	22:29:11	-15.01732	-173.78820	2351.8	9.7	135.8	Overlooking what may be a small landslide in background slope. Sparsely populated compared to the smokers and other regions of the prevailing slope in the survey area.	190
11/30/2017	22:31:03	-15.01734	-173.78805	2344.4	8.0	136.8	Lots of microbial mats on sedimented slope. Intermittent smaller chimneys but not a lot of activity.	191
11/30/2017	22:31:32	-15.01727	-173.78807	2346.8	7.7	143.8	Backing away from slope to move downslope safely.	192
11/30/2017	22:32:41	-15.01730	-173.78806	2348.6	4.1	67.8	Downslope found a nicely active smoker. Relatively small ~2m.	193
11/30/2017	22:35:56	-15.01732	-173.78805	2350.1	1.9	29.7	Boiling water at vent of active smoker indicated by white "flames" inside vent.	194
11/30/2017	22:40:56	-15.01730	-173.78805	2349.9	1.9	29.9	Deploying temperature probe into active smoker. Tmax ~405C ambient ~0.3C. Probe not calibrated so temperature readings probably too high.	195
11/30/2017	22:47:20	-15.01729	-173.78805	2349.9	1.9	29.1	**S89-fluid-12**. Majors-2 water sample from active black smoker. Location 15.01729 173.7880455 depth 2350m. Halfway between waypoints 6 and 8.	196
11/30/2017	22:48:56	-15.01730	-173.78805	2349.9	1.9	29.5	Small shrimp at base of smoker where sampled.	197
11/30/2017	22:50:23	-15.01731	-173.78805	2349.9	1.9	29.1	Smoke bumped by majors-2 and collapsed. Makes fluid sampling a bit easier	198
11/30/2017	22:51:43	-15.01729	-173.78805	2349.9	1.4	30.6	CONTINUED: Sampling started	199
11/30/2017	22:55:26	-15.01732	-173.78805	2349.9	1.9	28.7	Securing majors-2 into basket	200
11/30/2017	23:01:34	-15.01731	-173.78806	2350.0	1.2	31.0	Preparing to deploy gastight	201
11/30/2017	23:01:59	-15.01730	-173.78804	2350.0	1.2	31.1	We're probably in the general vicinity of the chimneys that we visited in 2012 (near flashing)?	202
11/30/2017	23:05:48	-15.01731	-173.78805	2350.0	1.2	30.7	Gastight sampler (white GT17) in same black smoker orifice as previous major here. Vigorous black smoker flow.	203
11/30/2017	23:06:52	-15.01731	-173.78806	2350.0	1.2	31.6	**S89-gas-13**. Gastight fired at 230622. 15.01728967 173.788046 Z=2350m	204
11/30/2017	23:08:02	-15.01730	-173.78805	2350.0	1.5	29.3	What's happening now? Dave's trying to make up his mind whether or not to take another major here. He's not sure of the quality of his last sample.	205
11/30/2017	23:08:59	-15.01730	-173.78805	2350.0	1.2	30.6	Stowing the gastight sampler in the front milk crate.	206

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S089 Mata Ua Logger Comments	Record #
11/30/2017	23:11:18	-15.01730	-173.78805	2350.0	1.9	29.6	This position is actually about halfway between the 2012 Flashing position and the Barnacle covered "Christmas tree" chimneys.	207
11/30/2017	23:12:38	-15.01731	-173.78803	2350.0	1.5	29.2	Looks like the gastight sampler will be safe. It was a bit precarious there earlier.	208
11/30/2017	23:13:56	-15.01730	-173.78804	2350.0	1.3	30.9	Going to take a sulfide sample of the chimney that was knocked over when it was bumped with the major sampler.	209
11/30/2017	23:14:51	-15.01731	-173.78803	2350.0	1.9	33.3	Bungeeing the gastight back in its crate.	210
11/30/2017	23:16:09	-15.01730	-173.78804	2350.1	2.0	31.3	Zooming in on that chimney to get a good view of the venting. The fluid is pouring out and it looks like it's flashing.	211
11/30/2017	23:16:46	-15.01730	-173.78806	2350.2	1.6	30.8	The thing is probably 15 - 29 cm across on the bottom.	212
11/30/2017	23:17:25	-15.01732	-173.78806	2350.2	1.0	31.1	Zooming over to get a look at the snails on the next chimney over. There's flow coming up from the bottom of the chimney.	213
11/30/2017	23:17:43	-15.01732	-173.78805	2350.3	0.8	31.0	We're going to grab one of the pieces of chimney that fell down during water sampling.	214
11/30/2017	23:20:48	-15.01730	-173.78804	2350.3	0.7	32.0	**S89-sulfide-14**. Piece of chimney that fell down during sampling (black smoker pieces). Whitish piece(s) of chimney base.	215
11/30/2017	23:22:31	-15.01732	-173.78805	2350.2	1.3	30.6	Chimney with lots of silica and cement with black sulfides in between. Crumbly craggy 15 cm in longest distance. Same location as previous fluid and gas samples.	216
11/30/2017	23:23:24	-15.01731	-173.78803	2350.2	1.4	31.1	We're going to do another major sampler in the same hole for a duplicate.	217
11/30/2017	23:29:00	-15.01731	-173.78804	2350.2	1.7	32.3	**S89-fluid-15**. Major sampler #3 in same location and same black smoker orifice. Start at 2327 UTC. Z=2350m. This vent is boiling. Great sample.	218
11/30/2017	23:29:22	-15.01730	-173.78803	2350.3	1.0	32.2	Stowing the major sampler.	219
11/30/2017	23:30:03	-15.01729	-173.78803	2350.3	1.0	33.0	Next activity at this site will be a little biological sampling.	220
11/30/2017	23:32:27	-15.01729	-173.78805	2350.3	1.1	32.5	Next are going for a scoop sample of snails.	221
11/30/2017	23:33:18	-15.01729	-173.78803	2350.3	0.9	32.7	Going for a scoop of the Ifremeria snails.	222
11/30/2017	23:34:23	-15.01732	-173.78806	2350.3	1.7	31.2	Have the scoop bag out and look intent on catching some snails here.	223

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S089 Mata Ua Logger Comments	Record #
11/30/2017	23:36:09	-15.01728	-173.78792	2350.3	1.5	31.1	**S89-bio-16**. Scoop bag of Ifremeria snails on chimney just to the left of the black smoker previously sampled. Same sample position as previous.	224
11/30/2017	23:38:29	-15.01727	-173.78774	2350.3	1.6	31.0	Still using the scoop bag #1 on the Ifremeria snails. Probably 3 or 4 in the bag.	225
11/30/2017	23:38:51	-15.01727	-173.78771	2350.3	1.5	30.7	We have a "sack of snails".	226
11/30/2017	23:40:19	-15.01730	-173.78804	2350.3	1.5	31.6	We have bio in the bag.	227
11/30/2017	23:41:13	-15.01730	-173.78806	2350.3	2.2	32.5	Stowing the sack of snails into partition 10.	228
11/30/2017	23:42:19	-15.01729	-173.78801	2350.3	1.8	29.3	Next task is to suck some shrimp into the suction sampler canister.	229
11/30/2017	23:42:39	-15.01729	-173.78802	2350.3	1.8	29.3	The shrimp are at the base of the black smoker chimney that was previously sampled.	230
11/30/2017	23:43:59	-15.01731	-173.78804	2350.3	1.7	29.0	Noting bio 8 went into suction chamber 6 - earlier in the dive.	231
11/30/2017	23:45:50	-15.01731	-173.78807	2350.3	1.7	31.8	**S89-bio-17.** Opapele shrimp and whatever else going into chamber 8. Sucking on the volcaniclastic seds next to the black smoker orifice.	232
11/30/2017	23:48:33	-15.01731	-173.78803	2350.4	1.8	30.6	Continuing to attempt shrimp suction. Got quite a few of the slow ones...	233
11/30/2017	23:51:43	-15.01732	-173.78803	2350.5	0.8	32.3	**DEPLOY Marker 274** at Black Smoker Sampling site. 15.0172897S 173.7880458W Z=2350 m.	234
11/30/2017	23:54:02	-15.01731	-173.78805	2350.3	2.8	32.0	PUT A NAV MARKER DOWN FOR MARKER-274. CHECK FOR BEST POSITION POST CRUISE.	235
11/30/2017	23:54:56	-15.01735	-173.78804	2348.7	2.8	67.6	We're leaving this "Flashing-vicinity" area. And will travel along the slope to get an estimate of the extent of this field.	236
11/30/2017	23:55:20	-15.01735	-173.78804	2347.9	3.4	100.7	We're at the upper end of this chimney field.	237
11/30/2017	23:56:27	-15.01739	-173.78810	2346.7	5.0	201.4	We are going to drive SW for a bit to get a feeling for the extent of this field. Right now we're half way between WP 6 and WP 8 (not at WP7).	238
11/30/2017	23:56:49	-15.01739	-173.78813	2347.5	5.9	222.5	More chimneys down slope. Continuing on in a westerly direction.	239
11/30/2017	23:57:13	-15.01740	-173.78815	2350.1	4.2	228.5	There are chimneys above and below us. =2393m.	240
11/30/2017	23:58:15	-15.01740	-173.78814	2347.4	0.0	190.6	Awesome-looking row of sulfide chimneys.	241

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S089 Mata Ua Logger Comments	Record #
11/30/2017	23:58:57	-15.01739	-173.78811	2346.9	6.6	190.2	Some of these chimneys are huge. Diffuse flow all along the slope indicated by seafloor covered in barnacles.	242
11/30/2017	23:59:50	-15.01740	-173.78815	2348.2	6.7	232.6	The chimney in front of us to the left is over 10m high.	243
12/1/2017	0:00:36	-15.01737	-173.78819	2350.6	7.7	255.2	We're now approaching WP7. We're about 15m NE of the waypoint.	244
12/1/2017	0:02:27	-15.01725	-173.78832	2354.1	15.5	214.0	We're floating out in clue water.	245
12/1/2017	0:03:50	-15.01736	-173.78838	2360.1	8.3	114.4	We're further SW of where we sampled. Lots of older chimneys that are not as active. Lots of stalked barnacles so diffuse venting.	246
12/1/2017	0:05:43	-15.01749	-173.78845	2358.7	8.2	130.6	Large diffuse field beneath us. See bac mat and barnacles covering the seafloor - mostly barnacles.	247
12/1/2017	0:06:07	-15.01747	-173.78847	2357.7	10.7	144.8	Huge cooler chimneys to the east of us.	248
12/1/2017	0:06:49	-15.01752	-173.78853	2357.8	10.3	155.9	These are some big sulfide mounds.	249
12/1/2017	0:07:16	-15.01754	-173.78854	2358.6	8.7	155.7	Only seeing diffuse venting here. Lots of barnacles on the sulfide structures - and squat lobsters.	250
12/1/2017	0:08:52	-15.01760	-173.78856	2358.7	9.8	153.3	Enormous sulfide structure here.	251
12/1/2017	0:09:13	-15.01763	-173.78857	2357.5	8.9	156.2	Barnacles and diffuse venting as far as the eye can see as we look upslope.	252
12/1/2017	0:10:01	-15.01771	-173.78856	2357.9	5.1	154.3	We're farther to the east than we traveled in 2012.	253
12/1/2017	0:10:19	-15.01772	-173.78855	2358.7	4.3	155.5	Yellow bacterial balls on the seafloor now.	254
12/1/2017	0:10:48	-15.01772	-173.78854	2358.3	3.8	156.1	Those are not bacterial balls - they are snails.	255
12/1/2017	0:11:24	-15.01772	-173.78852	2357.9	3.5	157.2	Biofilm covering the snails make them appear yellow.	256
12/1/2017	0:11:31	-15.01772	-173.78852	2358.0	3.9	156.5	Lots of diffuse flow here.	257
12/1/2017	0:12:00	-15.01772	-173.78851	2358.5	3.0	155.7	Anemones; barnacles; crabs in the diffuse flow.	258
12/1/2017	0:13:00	-15.01772	-173.78852	2358.4	3.1	157.1	Looking at the white hairy snails and the Ifremeria snails.	259
12/1/2017	0:13:22	-15.01772	-173.78851	2358.4	3.4	156.4	So what I thought was snails with bac mat was the white hairy snail.	260
12/1/2017	0:14:18	-15.01774	-173.78852	2358.7	2.4	156.8	Little sulfide worms down in the holes.	261
12/1/2017	0:15:19	-15.01774	-173.78851	2359.9	0.9	158.0	We're settling in for a bunch of sampling: major; gastight; scoop bags; etc. Video of the site first.	262
12/1/2017	0:16:28	-15.01774	-173.78852	2359.9	1.0	156.4	We're SW of the previous sampling site by ~ 50m.	263

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S089 Mata Ua Logger Comments	Record #
12/1/2017	0:19:13	-15.01773	-173.78852	2359.9	1.0	157.0	**S89-fluid-18**. Major sampler #4 at diffuse site with lots of biota. 15.017736 S 173.7885168 W. Z=2340m	264
12/1/2017	0:20:17	-15.01773	-173.78851	2359.9	1.1	156.1	Diffuse vent flow area. See a huge variety of species incl. anemones; both hairy white and Ifremeria dark snails; Opapele shrimp; etc....	265
12/1/2017	0:23:06	-15.01773	-173.78852	2359.9	1.0	156.2	Sampling fluid (major#4) right next to the pile of hairy snails; etc. all types of life here. Fired at 0022 UTC.	266
12/1/2017	0:24:22	-15.01774	-173.78852	2360.0	1.0	156.6	Stowing the major in its holster.	267
12/1/2017	0:27:32	-15.01773	-173.78852	2360.0	0.0	155.5	Going for the last gastight next.	268
12/1/2017	0:30:59	-15.01773	-173.78852	2360.0	1.0	155.9	**S89-gas-19**. Gastight sampler (green #2) in diffuse flow with lots of snails. Same position as previous sample. Here at "Snail Fusion"	269
12/1/2017	0:33:38	-15.01774	-173.78852	2360.0	1.0	156.7	Gastight at "Snail Fusion". In same spot as Major sampler. Diffuse flow in area of lots of snails. Fired at 0033:45.	270
12/1/2017	0:35:08	-15.01774	-173.78852	2360.0	0.9	156.1	The sampling site is at the "Fusion" spot where the Ifremer (black) snails and the Alvinoconcha (white) snails meet.	271
12/1/2017	0:36:10	-15.01774	-173.78852	2360.0	0.9	156.1	These snails generally prefer different temperature regimes and pH levels. Here they are clustered in groups near each other.	272
12/1/2017	0:36:31	-15.01774	-173.78853	2360.0	1.1	154.4	Doing a little housekeeping as we try to stow the gastight.	273
12/1/2017	0:38:21	-15.01774	-173.78852	2360.0	1.1	154.8	Large diffuse area here.... Probably 10's of meters and covered with biota.	274
12/1/2017	0:40:08	-15.01774	-173.78852	2360.0	1.1	155.6	Taking quite a lot of time to stow the gastight.	275
12/1/2017	0:43:25	-15.01774	-173.78852	2360.0	1.1	154.7	Still trying to get the gastight samplers secured in the milk crate. It's a mess.	276
12/1/2017	0:47:11	-15.01774	-173.78851	2360.0	0.9	156.1	Pulling the milk crate in. Ready for the next sample.	277
12/1/2017	0:49:00	-15.01775	-173.78850	2360.1	1.0	155.1	Pulling out the scoop bag for a biology sample at "Snail Fusion". Walter wants some of each species.	278
12/1/2017	0:50:18	-15.01775	-173.78851	2360.1	1.0	155.3	Scoop bag #2 coming down.	279
12/1/2017	0:52:26	-15.01776	-173.78854	2360.1	0.0	156.1	**S89-bio-20.** Both species of snails collected (we think) into Scoop bag #2. That bag is nearly full.	280

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S089 Mata Ua Logger Comments	Record #
12/1/2017	0:54:13	-15.01775	-173.78854	2360.0	1.1	154.3	Same position as previous samples here at "Snail Fusion". Marker-250 to be deployed here next.	281
12/1/2017	0:55:52	-15.01776	-173.78854	2360.1	0.9	155.7	**DEPLOY Marker-250** here at Snail Fusion. Z=2360 m. 15.0177356 S 173.788517 W.	282
12/1/2017	0:56:11	-15.01776	-173.78854	2360.1	0.9	159.4	Nice image of this diffuse venting site.	283
12/1/2017	0:57:10	-15.01775	-173.78855	2359.2	2.5	154.7	Looking at this large area of diffuse flow with lots of snails; and all sorts of other biota.	284
12/1/2017	0:57:39	-15.01776	-173.78855	2357.7	3.9	156.7	We're looking at the vertical structure that we saw briefly on dive 328.	285
12/1/2017	0:58:09	-15.01777	-173.78853	2355.3	5.7	156.1	Barnacles cover this slope as we ascent.	286
12/1/2017	0:58:39	-15.01774	-173.78852	2352.7	9.3	154.4	We want to look at this feature from the side.	287
12/1/2017	0:59:17	-15.01774	-173.78851	2352.0	9.6	154.6	This feature seems to merge with the slope to the left.	288
12/1/2017	0:59:31	-15.01775	-173.78851	2351.8	9.1	154.3	Going around to the east side of this feature.	289
12/1/2017	1:00:56	-15.01779	-173.78859	2351.8	8.7	87.7	Looking at a bit of a ridge in front of us now with a bit of an indentation.	290
12/1/2017	1:02:18	-15.01781	-173.78853	2353.2	7.3	132.3	Barnacle "fur" covering the slopes and anything else that has a bit of diffuse flow.	291
12/1/2017	1:02:39	-15.01782	-173.78856	2352.0	8.6	153.5	Spider crab in distance.... gone...	292
12/1/2017	1:03:06	-15.01782	-173.78859	2353.3	8.4	168.0	Squat lobsters covering these sheets of diffuse flow.	293
12/1/2017	1:03:44	-15.01781	-173.78863	2358.1	4.2	169.9	Coming down to the base of the slope now.	294
12/1/2017	1:04:20	-15.01780	-173.78868	2357.9	4.1	169.5	Diffuse venting on the lavas.	295
12/1/2017	1:04:47	-15.01783	-173.78871	2357.7	3.2	170.2	Sort of a mounded wall in front of us. It's parallel to the slope.	296
12/1/2017	1:05:10	-15.01787	-173.78873	2357.0	3.6	170.3	We're at waypoint 3 and starting to get out of the diffuse flow.	297
12/1/2017	1:05:21	-15.01789	-173.78875	2356.6	4.6	163.1	Looks like a wall of sulfide here.	298
12/1/2017	1:06:30	-15.01792	-173.78879	2355.5	7.2	161.7	Brysingid sea star.	299
12/1/2017	1:07:00	-15.01792	-173.78880	2357.2	6.5	160.3	Still seeing some signs of venting - but the biota is changing over to non-vent species.	300
12/1/2017	1:08:07	-15.01791	-173.78884	2359.8	6.5	192.1	Looks like some diffuse flow and alteration in the cracks here.	301
12/1/2017	1:08:22	-15.01790	-173.78885	2359.5	6.4	232.1	Stalked corals; etc.	302
12/1/2017	1:09:03	-15.01786	-173.78887	2365.4	3.6	345.9	We're turning to drive downslope to waypoint 3 and then will head to the summit.	303
12/1/2017	1:09:12	-15.01785	-173.78886	2365.1	4.2	347.9	We're still surveying the extent of venting here.	304

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S089 Mata Ua Logger Comments	Record #
12/1/2017	1:10:03	-15.01771	-173.78881	2370.1	4.7	29.7	We're driving downslope from waypoint 3 to waypoint 4 on the western end of our survey.	305
12/1/2017	1:10:25	-15.01765	-173.78879	2370.7	6.8	38.2	Not seeing any venting here. What we saw earlier was to the east of us.	306
12/1/2017	1:11:05	-15.01757	-173.78879	2376.3	5.8	38.2	There's obviously some heat here because we are seeing yellow mats.	307
12/1/2017	1:12:00	-15.01747	-173.78874	2382.2	2.8	38.5	Some bacterial mat staining. We're SW of the area of venting.	308
12/1/2017	1:13:17	-15.01739	-173.78871	2382.0	4.1	75.4	There was venting and chimneys all the way from waypoint 1 to waypoint 2.	309
12/1/2017	1:13:39	-15.01739	-173.78868	2381.0	3.4	78.9	We're seeing bacterial mat and staining on the talus slope here.	310
12/1/2017	1:13:48	-15.01739	-173.78866	2380.5	2.9	78.7	No signs of the big chimneys here.	311
12/1/2017	1:14:29	-15.01738	-173.78859	2378.2	2.1	78.9	White patches in the distance.	312
12/1/2017	1:14:40	-15.01738	-173.78857	2377.3	2.5	80.4	Getting into the periphery of the venting zone.	313
12/1/2017	1:15:39	-15.01736	-173.78850	2374.8	3.0	108.1	The orangish staining earlier on this route was probably just altered rock.	314
12/1/2017	1:16:05	-15.01735	-173.78847	2373.5	3.4	108.0	Now we're traveling over white bacterial mat.	315
12/1/2017	1:16:34	-15.01733	-173.78844	2373.2	4.0	111.2	Seeing barnacles upslope.	316
12/1/2017	1:16:55	-15.01730	-173.78842	2372.8	5.2	108.3	This vent field is at least 100 m across.....	317
12/1/2017	1:17:52	-15.01720	-173.78839	2372.2	3.3	107.7	The zone of chimneys was from 2355 to 2380 m.	318
12/1/2017	1:18:46	-15.01718	-173.78837	2371.1	4.5	107.7	This looks like broken up fallen over sulfide chimneys.	319
12/1/2017	1:18:58	-15.01718	-173.78836	2371.1	3.3	108.0	Black smoker to the left on the screen.	320
12/1/2017	1:20:09	-15.01718	-173.78834	2370.5	2.4	91.5	Zooming in on a really high temperature black smoker that is flashing. Looks like a flame.	321
12/1/2017	1:21:29	-15.01716	-173.78834	2370.2	3.2	92.2	This one is boiling - can tell by the light color at the base of the black smoke.	322
12/1/2017	1:22:12	-15.01716	-173.78836	2369.7	6.3	116.3	Nice old extinct small chimney in front of us just begging for Chris to take it home.	323
12/1/2017	1:22:59	-15.01714	-173.78826	2368.9	5.0	154.1	Beautiful complex of chimneys here - some big old sulfide that don't appear active.	324
12/1/2017	1:23:25	-15.01713	-173.78825	2368.9	2.5	150.2	Looking at the base of what is probably a huge sulfide mound.	325
12/1/2017	1:25:22	-15.01710	-173.78816	2363.1	5.7	95.4	There's our marker 239 at our previous sampling site.	327

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S089 Mata Ua Logger Comments	Record #
12/1/2017	1:26:54	-15.01711	-173.78803	2359.2	1.8	84.7	Still moving along and heading further up slope now.	328
12/1/2017	1:27:15	-15.01710	-173.78800	2357.9	1.5	85.8	Moving over talus debris slope with a thin coating of white bacterial mat.	329
12/1/2017	1:27:28	-15.01709	-173.78797	2357.6	1.6	85.7	Seeing a few barnacles here but not nearly what we saw earlier.	330
12/1/2017	1:28:20	-15.01698	-173.78783	2355.7	1.5	77.1	Rattails?	331
12/1/2017	1:28:30	-15.01697	-173.78782	2355.6	1.4	57.4	Barnacles got a lot thicker all of a sudden.	332
12/1/2017	1:29:00	-15.01694	-173.78780	2354.8	2.9	55.8	We're on the SW edge of the Temple of Smoke Vent field.	333
12/1/2017	1:29:37	-15.01692	-173.78782	2353.3	6.2	54.3	SW edge 15.016925 173.7878W Z=2358.	334
12/1/2017	1:30:04	-15.01694	-173.78782	2352.4	5.9	45.7	Wow - Big fat sulfide chimneys some diffuse and others with black smoker chimneys.	335
12/1/2017	1:30:40	-15.01694	-173.78783	2355.5	3.4	37.3	Some of these huge old cooler sulfides have black smoker bee hives on top.	336
12/1/2017	1:31:42	-15.01691	-173.78785	2357.2	3.7	48.8	Lots of black smoke pouring out of some of the little spigots.	337
12/1/2017	1:32:02	-15.01691	-173.78784	2356.5	3.8	48.0	Ken thinks the largest chimneys he's seen are 15 - 20 m high.	338
12/1/2017	1:32:14	-15.01691	-173.78783	2356.0	3.3	48.1	Mussels for hats on these chimney top.	339
12/1/2017	1:32:51	-15.01691	-173.78784	2355.0	3.9	48.5	What a beautiful scene here. A forest of chimneys.	340
12/1/2017	1:33:38	-15.01691	-173.78781	2353.1	6.0	48.8	Surreal landscape here on the ocean floor at Mata Ua.	341
12/1/2017	1:34:04	-15.01694	-173.78781	2350.9	6.9	48.5	Let's turn now and cut off this view of the extensive chimney field here.	342
12/1/2017	1:34:27	-15.01697	-173.78778	2346.8	9.0	48.8	We're driving over the temple of smoke chimney complex.	343
12/1/2017	1:34:43	-15.01696	-173.78776	2344.2	12.0	52.7	Cutting off now and heading to the NE and the summit.	344
12/1/2017	1:35:12	-15.01688	-173.78770	2342.3	14.8	55.0	Bottom out of site.	345
12/1/2017	1:36:48	-15.01675	-173.78763	2348.3	13.5	56.0	Background pH in the ocean is around 8. The pH at West Mata is about 2. It's highly acidic.	346
12/1/2017	1:37:07	-15.01677	-173.78762	2348.3	14.0	53.8	Still maneuvering around these chimneys.	347
12/1/2017	1:37:35	-15.01676	-173.78760	2350.2	9.9	54.4	The pH here around these vent fields are about pH 5.	348
12/1/2017	1:38:41	-15.01677	-173.78762	2346.4	10.6	108.2	Beautiful vista looking at the Temple of Smoke.	350

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S089 Mata Ua Logger Comments	Record #
12/1/2017	1:40:17	-15.01695	-173.78752	2332.6	16.4	147.9	Huge sulfides here. The altitude here is 17m so the chimney is about 17m tall.	351
12/1/2017	1:40:43	-15.01700	-173.78747	2333.4	7.6	147.1	We're now 10.5 m off the seafloor.	352
12/1/2017	1:41:46	-15.01704	-173.78736	2333.6	2.4	125.5	Looks like the chimneys have ended. NE limit: 5.01702 S 173.7874W Z=2336.	353
12/1/2017	1:42:16	-15.01706	-173.78731	2332.3	1.7	125.1	Now we're moving on toward the summit.	354
12/1/2017	1:42:57	-15.01708	-173.78726	2330.3	2.2	122.8	Evidence of warm water . Light bacterial mat cover. Some barnacles; squat lobsters; shrimp.	355
12/1/2017	1:43:22	-15.01709	-173.78723	2329.3	2.5	123.0	Orange anemone	356
12/1/2017	1:44:27	-15.01711	-173.78714	2325.6	3.0	122.8	These rocks are not in place. They have fallen down slope from above.	357
12/1/2017	1:44:52	-15.01712	-173.78712	2324.2	2.7	123.1	Still seeing stalked barnacles and squat lobsters. Still some diffuse flow.	358
12/1/2017	1:45:45	-15.01714	-173.78706	2321.3	2.7	123.1	About 1000 m to the summit - or less.	359
12/1/2017	1:46:54	-15.01716	-173.78699	2315.5	3.4	113.0	We won't stop for sampling until we get near the top. Ken wants a sample from each of the summit peaks.	360
12/1/2017	1:47:22	-15.01717	-173.78695	2313.1	3.3	112.6	Actually - they are not exactly "peaks" - more like summit highs.	361
12/1/2017	1:48:35	-15.01721	-173.78685	2306.5	3.1	112.5	Now we're seeing whip corals.	362
12/1/2017	1:48:47	-15.01722	-173.78684	2305.6	3.0	112.2	Still a very light coating of bacterial mat.	363
12/1/2017	1:48:55	-15.01722	-173.78683	2305.0	2.8	112.2	Pretty yellow anemone.	364
12/1/2017	1:49:44	-15.01724	-173.78676	2300.6	2.2	105.4	Broken lava rocks on this steep slope heading toward the summit.	365
12/1/2017	1:50:10	-15.01726	-173.78670	2298.1	1.9	106.3	Big whelk(?) snail?	366
12/1/2017	1:50:15	-15.01726	-173.78668	2297.6	1.8	106.1	Whip coral.	367
12/1/2017	1:51:13	-15.01730	-173.78655	2292.9	1.7	110.7	Most of the rocks here are a garden variety boninite - similar to W Mata. 3 flavors of boninite in this area.	368
12/1/2017	1:52:38	-15.01732	-173.78641	2288.8	2.6	93.1	West Mata has a lot less boninite variation throughout the volcano. The North Matas have more variation in their boninite "flavors".	369
12/1/2017	1:53:21	-15.01731	-173.78631	2284.3	2.7	94.7	We're looking at a 45 degree slope here *just eyeballing it".	370
12/1/2017	1:55:01	-15.01732	-173.78610	2276.0	2.0	95.8	Rock debris and weathered sediment covering this steep slope on the WE side of Mata Ua.	371
12/1/2017	1:55:36	-15.01732	-173.78603	2273.0	3.0	95.2	Big boulder.	372

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S089 Mata Ua Logger Comments	Record #
12/1/2017	1:58:03	-15.01731	-173.78588	2270.5	1.6	92.6	We're far away from the hydrothermal zone 0 but still see a wisp of mat here and there.	373
12/1/2017	1:58:20	-15.01730	-173.78585	2270.1	1.9	93.3	Larger rock fragments as we travel up slope.	374
12/1/2017	1:59:02	-15.01731	-173.78579	2267.0	3.9	93.8	Moving along a bit of a fracture here?	375
12/1/2017	1:59:51	-15.01732	-173.78573	2263.2	2.6	93.4	Looks like we have in place rock here.	376
12/1/2017	1:59:59	-15.01732	-173.78571	2262.6	2.4	93.3	Looks like pillow dykes.	377
12/1/2017	2:00:29	-15.01732	-173.78570	2258.2	5.1	93.3	Looking at a series of dikes here.	378
12/1/2017	2:01:07	-15.01731	-173.78563	2247.5	11.5	92.4	This is amazing now. The stock work of the south side of the volcano?	379
12/1/2017	2:01:31	-15.01730	-173.78558	2239.9	0.0	94.8	A series of dikes on the north side of the summit.	380
12/1/2017	2:02:38	-15.01734	-173.78537	2228.4	10.0	102.8	A series of beautiful steep dike intrusions	381
12/1/2017	2:02:57	-15.01738	-173.78532	2225.9	0.0	113.6	Seem to be relatively fresh and not heavily sedimented.	382
12/1/2017	2:03:11	-15.01740	-173.78528	2224.4	3.4	117.5	The source of all the rubble we saw down slope.	383
12/1/2017	2:04:06	-15.01746	-173.78528	2216.6	12.7	154.4	Ridge here.	384
12/1/2017	2:04:25	-15.01745	-173.78528	2215.3	14.9	151.9	Heading up this lava ridge to the summit.	385
12/1/2017	2:04:47	-15.01745	-173.78528	2214.9	4.0	143.1	It's possible the venting continues further to the NE and could be the source of the microbial mats.	386
12/1/2017	2:04:59	-15.01747	-173.78527	2213.7	0.0	134.2	This is a beautiful dike.	387
12/1/2017	2:06:12	-15.01757	-173.78518	2207.6	4.1	141.4	We're missing not having the Sentry bathymetry.	388
12/1/2017	2:06:26	-15.01758	-173.78517	2206.0	7.7	140.8	Series of dikes on this north side of the summit.	389
12/1/2017	2:07:28	-15.01764	-173.78518	2200.4	5.6	143.9	The extreme topography was quite a surprise to us because we couldn't see these features in the EM302 ship multibeam.	390
12/1/2017	2:08:28	-15.01766	-173.78516	2195.6	6.7	152.5	Still seeing evidence of warm water.	391
12/1/2017	2:12:18	-15.01785	-173.78505	2173.3	0.0	152.9	Seeing a lot of small pillows and feeder dikes in steeply sloping walls.	392
12/1/2017	2:13:08	-15.01794	-173.78501	2169.4	0.0	154.0	Seeing a few sponges at the top of the current rock wall or spire that we're ascending.	393
12/1/2017	2:14:24	-15.01803	-173.78500	2166.6	3.1	155.5	Back into talus pile.	394
12/1/2017	2:15:05	-15.01806	-173.78499	2165.2	0.0	147.8	Seeing some in-place rock above talus.	395
12/1/2017	2:15:41	-15.01806	-173.78499	2165.5	2.2	148.8	Sponge growth on in-place rock wall. Going to attempt a sample here.	396
12/1/2017	2:21:03	-15.01806	-173.78502	2164.3	2.6	165.7	**S89-rock-21**. 10x5cm roughly triangular rough surface with some orange sediment or discoloration.	397

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S089 Mata Ua Logger Comments	Record #
12/1/2017	2:22:01	-15.01804	-173.78501	2164.3	2.4	165.2	Sample S89-rock-21 Location 15.018014 173.785015 depth 2164m.	398
12/1/2017	2:23:03	-15.01807	-173.78497	2161.3	0.0	165.5	Resuming transit upsection along NE trending ridge.	399
12/1/2017	2:25:36	-15.01815	-173.78488	2150.2	3.1	139.3	Mix of debris and in place dikes and pillows. Sponge and what looks like microbial mats/filaments on some surfaces.	400
12/1/2017	2:27:09	-15.01824	-173.78478	2143.1	2.3	125.6	Coming up on summit. Lots of rubble and a squat lobster.	401
12/1/2017	2:28:23	-15.01824	-173.78471	2139.2	2.7	109.6	High particle load in water column even at summit/crest near waypoint 9.	402
12/1/2017	2:30:38	-15.01825	-173.78447	2136.0	1.9	92.2	More rubble and squat lobsters than anything else along this crest.	403
12/1/2017	2:31:26	-15.01826	-173.78439	2135.4	1.2	93.7	Encountering a pile of sediment.	404
12/1/2017	2:32:30	-15.01829	-173.78431	2131.7	2.0	95.8	Another sediment pile.	405
12/1/2017	2:35:09	-15.01823	-173.78408	2129.3	2.9	92.2	Saw a sea star and sea urchin in close proximity to each other. Probably best friends.	406
12/1/2017	2:35:45	-15.01821	-173.78405	2127.0	3.6	86.0	Coming on some in-place rocks and another urchin.	407
12/1/2017	2:36:25	-15.01819	-173.78399	2125.2	2.1	83.6	Urchin city. All three of them.	408
12/1/2017	2:37:38	-15.01816	-173.78391	2120.3	3.6	90.4	Rubble.	409
12/1/2017	2:38:28	-15.01817	-173.78386	2117.8	1.9	90.0	Six-pointed sea star. Approaching summit.	410
12/1/2017	2:40:26	-15.01814	-173.78368	2118.8	2.0	76.2	Rubble pile giving way to sediment at top of volcanic mound. Depth 2118m and still ascending slightly.	411
12/1/2017	2:41:22	-15.01810	-173.78363	2119.0	1.5	72.7	Pillow pieces sitting atop ridge with talus below. Nothing looks exactly in place but must be close.	412
12/1/2017	2:42:31	-15.01803	-173.78353	2118.9	1.4	57.3	Seeing lots of sediment down the SE flank and pebble-sized rubble rather than boulder-size at ridge crest.	413
12/1/2017	2:43:04	-15.01808	-173.78361	2118.1	1.8	34.0	NOTE: Still boulders as well as pebbles - just fewer of them. Sedimentary ripples visible on SE flank.	414
12/1/2017	2:43:43	-15.01790	-173.78355	2117.9	2.5	46.0	Current sea urchin count: 6.	415
12/1/2017	2:46:28	-15.01794	-173.78354	2118.4	1.4	107.3	ROV set down for rock sample.	416
12/1/2017	2:48:46	-15.01794	-173.78353	2118.3	1.9	106.5	**S89-rock-22**. 20x15cm piece with radial fracture and possible glass rind.	417
12/1/2017	2:49:19	-15.01796	-173.78352	2117.5	2.8	104.3	Sample S89-rock-22 Location 15.0179515 173.783525 depth 2118m on the nose.	418

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S089 Mata Ua Logger Comments	Record #
12/1/2017	2:51:08	-15.01798	-173.78324	2124.5	2.1	92.8	Off bottom and transiting to waypoint 10.	419
12/1/2017	2:51:26	-15.01796	-173.78317	2127.1	2.1	91.4	Seeing some talus and a lot of sediment on slope.	420
12/1/2017	2:55:51	-15.01799	-173.78243	2146.6	1.8	98.7	Transiting across sedimented bottom with many pieces of cracked rough textured pillow fragments. Rock pieces tend to be boulder-sized and are partially covered with sediments ~1-2 cm and occasionally more.	421
12/1/2017	2:56:22	-15.01798	-173.78237	2145.9	1.8	99.7	Seeing some dunelike formation covering some pillow boulders.	422
12/1/2017	2:58:15	-15.01807	-173.78222	2144.8	1.2	116.9	Starting to see more complete pillows among sediment.	423
12/1/2017	2:58:38	-15.01808	-173.78220	2144.0	1.2	116.7	Aww yeah.	424
12/1/2017	2:59:22	-15.01807	-173.78218	2144.2	0.4	119.5	Came across what appears to be a flow contact with abundant in place striated and smooth pillow lavas under sediment.	425
12/1/2017	2:59:41	-15.01807	-173.78218	2144.2	0.4	119.5	Attempting sample.	426
12/1/2017	3:06:12	-15.01808	-173.78218	2144.2	0.4	122.3	**S89-rock-23**. 30x30cm square blocky pillow fragment and some orange sediment.	427
12/1/2017	3:07:39	-15.01808	-173.78217	2144.2	0.4	122.2	Sample S89-rock-23 Location 15.018083 173.782169 depth 2144m.	428
12/1/2017	3:09:14	-15.01809	-173.78218	2144.2	0.4	122.1	Inaugural deployment of Scoop-3 at same site as Sample S89-rock-23.	429
12/1/2017	3:15:13	-15.01810	-173.78221	2144.2	0.4	116.9	**S89-sed-24**. Sediment at base of lava flow where sample 23 was collected.	431
12/1/2017	3:18:31	-15.01807	-173.78218	2144.2	0.4	117.5	Sampling completed and resuming transit uphill toward summit and waypoint 10.	432
12/1/2017	3:20:17	-15.01815	-173.78192	2138.2	2.3	120.8	Out of lava flow and into sediment and talus.	433
12/1/2017	3:21:32	-15.01822	-173.78178	2138.1	3.9	58.2	Cleared small ridge and now ascending up a slope with in-place pillow lavas and sediment topping them.	434
12/1/2017	3:21:55	-15.01820	-173.78176	2138.2	3.1	173.2	Turning ROV around counterclockwise to pan area we just flew across.	435
12/1/2017	3:22:11	-15.01820	-173.78174	2138.6	2.9	120.5	Resuming upsection transit to waypoint 10.	436
12/1/2017	3:22:44	-15.01822	-173.78170	2136.0	2.5	129.6	Urchin count: 7.	437
12/1/2017	3:23:13	-15.01824	-173.78167	2133.6	0.0	128.2	Lots of sediment and pillow talus.	438
12/1/2017	3:24:13	-15.01825	-173.78163	2129.1	3.5	134.6	Numerous in place and broken/drained pillows.	439
12/1/2017	3:24:44	-15.01828	-173.78163	2126.9	3.0	120.2	Urchin count: 8.	440

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S089 Mata Ua Logger Comments	Record #
12/1/2017	3:25:25	-15.01827	-173.78165	2123.2	0.0	101.2	Urchin count: 9.	441
12/1/2017	3:26:16	-15.01831	-173.78149	2117.3	3.4	97.8	Topping local crest of lava pillows.	442
12/1/2017	3:27:30	-15.01831	-173.78136	2122.1	2.6	99.0	Sediment cover thickening over pillow lavas.	443
12/1/2017	3:28:40	-15.01833	-173.78125	2118.6	2.4	107.0	Ascending over a sediment/talus contact.	444
12/1/2017	3:29:37	-15.01833	-173.78115	2114.9	3.0	95.8	Sediment have given way to large sedimented talus field.	445
12/1/2017	3:30:39	-15.01833	-173.78100	2112.1	3.6	95.0	Coral.	446
12/1/2017	3:31:53	-15.01831	-173.78082	2108.0	2.2	95.9	Continuing transit up to waypoint 10. Lots of talus.	447
12/1/2017	3:33:47	-15.01834	-173.78071	2105.3	1.0	98.0	Setting down ROV ~30m west of waypoint 10 to pick up sample from summit.	448
12/1/2017	3:38:30	-15.01832	-173.78067	2101.9	3.7	94.2	**S89-rock-25**. 50cm half-pillow large irregular vesicles with patchy orange alteration. Possibly glass crust.	449
12/1/2017	3:38:51	-15.01832	-173.78066	2101.3	4.5	91.7	End of dive 89. Off bottom.	450

S090 Mata Fitu

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S090 Mata Fitu Logger Comments	Record #
12/1/2017	19:00:48	-14.91594	-173.79879	2519.0	8.7	225.3	Vehicle at Seabed.	21
12/1/2017	19:01:02	-14.91595	-173.79882	2518.7	9.0	220.0	Waypoint 1 here is to the SW of the cleft on the western part of the volcano.	22
12/1/2017	19:01:39	-14.91598	-173.79896	2518.8	11.8	179.3	Rubbly slope here with sediment cover.	23
12/1/2017	19:02:10	-14.91605	-173.79903	2518.4	15.2	154.5	Going in for a grab of a rock.	24
12/1/2017	19:02:26	-14.91608	-173.79905	2518.8	7.7	158.2	Looks young to the geologists in the room.	25
12/1/2017	19:02:43	-14.91612	-173.79906	2519.6	0.0	157.7	Not a lot of biology - whip corals here - so not that young.	26
12/1/2017	19:03:05	-14.91614	-173.79903	2519.5	0.0	157.6	Mata Fitu. Ropey pillow lavas here.	27
12/1/2017	19:03:13	-14.91613	-173.79902	2519.5	0.0	157.7	Some broken up stuff here.	28
12/1/2017	19:03:32	-14.91612	-173.79899	2520.0	4.9	158.1	The bulk of the rock unit we're going for looks to be in place.	29
12/1/2017	19:04:55	-14.91610	-173.79896	2520.5	3.1	157.7	Going in for a rock sample with nice striated outer glass surface.	30
12/1/2017	19:05:38	-14.91609	-173.79904	2520.5	3.1	157.6	Squiddle is frozen up.	31
12/1/2017	19:07:28	-14.91613	-173.79896	2520.4	0.0	158.6	Rock with some sediment cover and organisms. Faulted up. Glassy. Nice grab.	32

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S090 Mata Fitu Logger Comments	Record #
12/1/2017	19:08:33	-14.91620	-173.79896	2520.5	3.0	158.1	**S90-rock-01**. Fine sediment coating. 20 cm radially fractured pillow fragment with iron staining on the exterior. 1 glassy rind layer 1cm thick.	33
12/1/2017	19:09:33	-14.91610	-173.79901	2520.4	0.0	158.0	14.91609S 173.79896 Z=2520m. Here at waypoint 1 - our landing spot.	34
12/1/2017	19:10:20	-14.91608	-173.79901	2520.3	4.0	158.1	Sample is in partition 5 in the rock box.	35
12/1/2017	19:11:08	-14.91602	-173.79896	2520.3	4.0	158.1	Pillow lavas here. They look a bit worse for wear. Bread-crust texture. Dullish-brown patina is manganese oxide.	36
12/1/2017	19:11:35	-14.91611	-173.79906	2520.3	4.0	157.8	These rocks are not young because they do have some organisms growing on them including whip corals.	37
12/1/2017	19:11:53	-14.91612	-173.79904	2520.3	0.0	158.2	Not a lot of biology here. Could be for any number of reasons.	38
12/1/2017	19:12:20	-14.91608	-173.79896	2518.0	5.8	158.3	Moving on to waypoint 2. Stalked corals on these lavas.	39
12/1/2017	19:12:31	-14.91604	-173.79898	2517.4	4.8	158.8	Lots of broken rock fragments here.	40
12/1/2017	19:12:47	-14.91603	-173.79900	2516.5	0.0	157.7	Squiddle is still frozen up.	41
12/1/2017	19:14:19	-14.91617	-173.79896	2507.0	8.1	157.0	Lots of younger tube like pillow lavas as we move up the slope; large whip coral	42
12/1/2017	19:14:56	-14.91620	-173.79894	2504.3	5.5	156.1	Another ~1 m high whip coral on nicely shaped round pillows	43
12/1/2017	19:16:00	-14.91630	-173.79890	2502.1	2.7	142.4	We see quite a bit of fine sediment deposited between the pillows as we nose around these pillow features.	44
12/1/2017	19:16:31	-14.91636	-173.79884	2502.6	2.7	131.9	Another Gorgonian as we move up the hill.	45
12/1/2017	19:17:00	-14.91639	-173.79878	2504.4	2.7	129.1	Pile of pillow rubble as we come over a nose; possible a pillow ridgeline.	46
12/1/2017	19:17:45	-14.91649	-173.79872	2512.9	6.9	248.5	The deep blue ... black; some marine snow.	47
12/1/2017	19:18:33	-14.91658	-173.79870	2516.2	9.2	291.6	Another view of the pillow ridge ; lots of broken up fragments; fragmental debris.	48
12/1/2017	19:19:14	-14.91657	-173.79873	2518.5	6.2	294.8	Fragments and in place pillow tubes ...	49
12/1/2017	19:19:36	-14.91656	-173.79871	2518.9	4.3	297.6	Syneruptive formation of pillow tube and fragmentation.	50
12/1/2017	19:20:36	-14.91649	-173.79862	2518.8	3.7	292.7	More fragmented pillows ...	51
12/1/2017	19:21:52	-14.91645	-173.79856	2519.6	3.2	182.3	Continuing to fly above slopes of entirely fragmented pillows.	52
12/1/2017	19:22:16	-14.91648	-173.79856	2519.9	4.2	144.0	Pillow lavas come into sight as we turned around.	53

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S090 Mata Fitu Logger Comments	Record #
12/1/2017	19:23:21	-14.91649	-173.79852	2520.8	1.5	146.0	Beautiful pillows with bread crust texture. Landing for sampling.	54
12/1/2017	19:24:34	-14.91648	-173.79852	2521.2	1.2	142.8	Vehicle landed - attempting to sample pillows.	55
12/1/2017	19:27:04	-14.91648	-173.79853	2521.2	1.0	141.7	Pillow lava near WP2. In place. Shelly- outer rind of pillow lava. Broken up interior texture.	56
12/1/2017	19:28:44	-14.91649	-173.79855	2521.2	0.0	141.7	Breaking rock (it's too big) 14.91649S 173.79853 Z=2521.	57
12/1/2017	19:30:36	-14.91652	-173.79852	2521.1	1.2	141.6	**S90-rock-02**. Brownish patina on surface. Glassy surface with lots of vesicles. Grayish interior. Taking big piece.	58
12/1/2017	19:31:40	-14.91651	-173.79854	2521.1	1.1	141.7	Older more altered rock. Large very vesicular 50 cm arcuate shape. Pillow lava crust. more than 1 cm glass. Manganese staining.	59
12/1/2017	19:32:02	-14.91650	-173.79853	2521.2	1.0	141.7	Went into the big unpartitioned box.	60
12/1/2017	19:32:37	-14.91649	-173.79852	2521.1	1.1	142.7	Started sampling about 1925 UTC. Finished now.	61
12/1/2017	19:33:09	-14.91648	-173.79852	2520.6	1.5	143.7	We're at 2520 m right now. Old and cold lavas so far.	62
12/1/2017	19:34:30	-14.91654	-173.79848	2517.9	3.3	125.2	Gassy lavas here.	63
12/1/2017	19:34:43	-14.91657	-173.79846	2517.5	3.6	123.0	Coming down slope and to ridgeline.	64
12/1/2017	19:35:05	-14.91660	-173.79845	2517.3	3.9	120.4	Looking at some relatively small pillows here with a fine coating of sediment on it.	65
12/1/2017	19:35:15	-14.91661	-173.79845	2517.2	3.8	119.6	More sediment here.	66
12/1/2017	19:35:29	-14.91663	-173.79844	2517.7	3.0	119.6	Seeing lots of marine snow.	67
12/1/2017	19:37:43	-14.91682	-173.79821	2520.2	4.5	119.6	Lots of heavily sedimented pillow lavas here.	68
12/1/2017	19:37:56	-14.91684	-173.79819	2520.2	4.5	109.6	Bread-crust textures on the pillows.	69
12/1/2017	19:38:10	-14.91686	-173.79818	2519.4	4.5	81.7	Fragments of lava on this heavily sedimented slope.	70
12/1/2017	19:38:25	-14.91686	-173.79815	2518.0	6.4	70.2	The pillows are poking out over half the slope.	71
12/1/2017	19:38:37	-14.91687	-173.79813	2517.1	5.0	70.5	Not a lot grown on these rocks. Coral.	72
12/1/2017	19:38:52	-14.91688	-173.79810	2516.7	5.2	70.1	Jumbled and broken up lavas here.	73
12/1/2017	19:39:22	-14.91691	-173.79804	2516.5	6.7	70.3	Very broken up textures that indicate that they were formed near-vent.	74
12/1/2017	19:39:57	-14.91691	-173.79797	2519.9	3.6	71.4	Moving into even more heavily-sedimented territory with small ripples in the seds.	75
12/1/2017	19:40:22	-14.91693	-173.79792	2520.0	5.7	90.1	Lots of sediment and just a little bit of rock.	76
12/1/2017	19:40:58	-14.91700	-173.79785	2518.0	7.1	137.6	Coming on more smaller pillow lavas and some larger disgorged pillows with bread crust texture.	77
12/1/2017	19:41:20	-14.91702	-173.79782	2515.9	8.9	138.0	Expanded pillow.	78
12/1/2017	19:41:35	-14.91704	-173.79781	2515.2	0.0	138.5	Smaller elongate pillow tubes on this slope.	79

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S090 Mata Fitu Logger Comments	Record #
12/1/2017	19:41:53	-14.91706	-173.79778	2514.3	0.0	137.8	The pillows here are a little bit old.	80
12/1/2017	19:42:16	-14.91708	-173.79776	2512.8	4.2	137.8	Corals on their side - broken up.	81
12/1/2017	19:42:26	-14.91709	-173.79775	2512.6	3.7	137.4	Corals on their side - broken up.	82
12/1/2017	19:43:02	-14.91712	-173.79772	2512.4	2.4	133.4	Squiddle looks like it's working now.	83
12/1/2017	19:43:11	-14.91713	-173.79770	2512.5	2.6	133.7	We had to refresh the page.	84
12/1/2017	19:43:37	-14.91717	-173.79765	2511.6	5.3	133.6	Coming upon a slope with pillow fragments that have fallen down from above.	85
12/1/2017	19:43:54	-14.91720	-173.79761	2510.0	6.6	124.1	Moving up the slope now.	86
12/1/2017	19:44:10	-14.91718	-173.79759	2508.9	5.8	123.7	Sedimented slope with rock fragments.	87
12/1/2017	19:44:36	-14.91721	-173.79756	2506.7	5.2	124.0	Here on the edge of a ridge. In place large pillows.	88
12/1/2017	19:44:56	-14.91723	-173.79752	2504.4	6.2	93.9	Unstable slopes cause the rocks to break apart and fall downslope.	89
12/1/2017	19:45:34	-14.91723	-173.79744	2500.5	6.5	37.4	Also lots of pillows and unusual textured lavas. Chaotic jumbly sharp lavas.	90
12/1/2017	19:45:44	-14.91724	-173.79743	2499.7	7.6	48.2	Lots of sediment on these slopes.	91
12/1/2017	19:45:51	-14.91724	-173.79742	2499.1	8.3	48.8	Ken wants another rock.	92
12/1/2017	19:46:01	-14.91725	-173.79741	2498.8	8.8	56.9	Bamboo coral?	93
12/1/2017	19:46:30	-14.91725	-173.79739	2500.2	5.1	61.2	Correction: healthy large gorgonian coral with an anemone as the base.	94
12/1/2017	19:47:01	-14.91724	-173.79739	2500.3	6.1	62.7	Zooming in on the gorgonian polyps.	95
12/1/2017	19:47:22	-14.91725	-173.79739	2500.0	7.0	59.1	Polyps are white with a few pinkish polyps.	96
12/1/2017	19:47:46	-14.91727	-173.79735	2498.8	7.2	72.6	Walter thinks it could be a bamboo coral.	97
12/1/2017	19:49:43	-14.91733	-173.79719	2507.0	1.8	119.8	Large bamboo coral on pillow fragments.	98
12/1/2017	19:50:35	-14.91733	-173.79721	2505.5	6.0	127.9	Coral at least a meter across.	99
12/1/2017	19:51:23	-14.91740	-173.79720	2508.8	6.5	129.5	At waypoint 3 now.	100
12/1/2017	19:53:11	-14.91745	-173.79726	2516.4	1.6	211.1	Looking up slope we see sedimented flanks with fragmented pillows.	102
12/1/2017	19:53:49	-14.91750	-173.79723	2518.9	1.7	218.9	Broken up pillow fragments with a few whip corals and sediments.	103
12/1/2017	19:55:10	-14.91752	-173.79712	2519.5	2.3	226.5	Continuing to see sediments with broken up pillow fragments; some sediment ripples - probably some seafloor currents.	104
12/1/2017	19:55:23	-14.91754	-173.79710	2518.1	2.4	229.9	Another large whip coral.	105
12/1/2017	19:55:50	-14.91758	-173.79706	2516.8	2.9	209.6	Lots of broken fragments here with sediment patch at the bottom.	106
12/1/2017	19:56:32	-14.91765	-173.79708	2515.3	2.7	190.1	Following the contour now - still lots of fragmented pillows with some intact pillows in between.	107
12/1/2017	19:56:54	-14.91767	-173.79705	2514.1	3.4	176.5	Large whip coral.	108

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S090 Mata Fitu Logger Comments	Record #
12/1/2017	19:58:16	-14.91771	-173.79690	2511.1	2.5	147.4	Lots of angular rock fragments here -unstable slope.	109
12/1/2017	19:59:06	-14.91773	-173.79687	2510.3	2.9	147.3	Highly vesicular pillow fragments as we reach the top of a little step - lots of sediments covering platy lavas.	110
12/1/2017	19:59:39	-14.91774	-173.79686	2510.1	2.7	145.9	Landing vehicle - attempting to samples	111
12/1/2017	20:00:06	-14.91775	-173.79687	2511.0	0.7	126.8	Flat platy lava here. Flows and collapses afterward.	112
12/1/2017	20:00:18	-14.91775	-173.79687	2510.8	1.4	128.3	Swirling texture on some of these lavas.	113
12/1/2017	20:01:15	-14.91776	-173.79687	2511.3	0.0	106.2	Beautiful lobate crust on these lavas - unusual for here. Really flat-looking - not your usual lobates.	114
12/1/2017	20:03:06	-14.91781	-173.79701	2511.3	0.0	106.3	Flat- lobate-like lava. Striated crust. Sedimented. Outer surface has striations. Top of a lobate crust.	115
12/1/2017	20:04:21	-14.91787	-173.79716	2511.3	0.0	106.3	Looks like their is a glass crust 15cm thick rock fragment. Lobate-sheet lavas. Not many vesicles or large phenocrysts.	116
12/1/2017	20:05:32	-14.91795	-173.79735	2511.3	0.0	106.3	**S90-rock-03**. Rock is probably 20-25 cm long. Into partition 6. 14.91776 173.79687 Z=2511.	117
12/1/2017	20:06:46	-14.91774	-173.79683	2509.7	1.7	107.8	Last sample was just SE of waypoint 3.	118
12/1/2017	20:07:23	-14.91778	-173.79680	2510.1	1.9	115.6	Lavas are jumbled here some pillows and also a cross between lobate and sheet flow patches.	119
12/1/2017	20:08:24	-14.91788	-173.79667	2513.3	1.8	103.8	Some whip corals; purple sea cucumber. Weird animal of unidentified type....	120
12/1/2017	20:08:57	-14.91782	-173.79657	2516.1	1.4	104.6	Continuing over these sedimented lavas. Sandy seabed with lavas poking out.	121
12/1/2017	20:09:30	-14.91795	-173.79655	2519.2	1.3	104.8	Sandy sediments. NE/SW faulting on these volcanoes - Mata Fitu shows this pattern.	122
12/1/2017	20:10:58	-14.91797	-173.79624	2526.4	1.1	104.3	More sediment / sand on the seafloor with jumbled lavas poking out here and there.	123
12/1/2017	20:12:02	-14.91810	-173.79603	2530.1	2.8	90.2	Looks like we're in the depression between the ridges so lots of sediment.	124
12/1/2017	20:12:32	-14.91806	-173.79613	2532.0	4.3	69.6	Coming out of sandy gully and looking at wall with in place pillow lavas. Elongated tubes.	125
12/1/2017	20:12:58	-14.91825	-173.79609	2528.8	6.7	64.4	Some of the tubes are parallel; but most of this appear to be moving down slope.	126
12/1/2017	20:13:22	-14.91817	-173.79600	2527.5	4.2	67.8	Flat-capped pillow. This lava was relatively low in viscosity.	127

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12/1/2017	20:14:09	-14.91799	-173.79603	2529.3	2.4	85.9	When we get over about 40% crystals it causes the lava to flow slower and pile up. Here looks like there were less crystals and lavas are possibly less viscous.	128
12/1/2017	20:14:21	-14.91801	-173.79600	2529.7	3.3	93.4	Correction: less viscous.	129
12/1/2017	20:14:41	-14.91799	-173.79590	2528.7	5.1	69.1	Seeing some inflated pillows and fragments now.	130
12/1/2017	20:15:29	-14.91796	-173.79586	2528.7	3.4	60.1	Another large deep-sea coral here. Probably a bamboo coral.	131
12/1/2017	20:16:18	-14.91797	-173.79586	2528.6	3.7	58.3	Pretty pink polyps on this coral.	132
12/1/2017	20:16:46	-14.91800	-173.79582	2530.8	3.2	98.7	The presence of that coral indicated that these lavas are much older. Corals take a long time to grow.	133
12/1/2017	20:17:35	-14.91812	-173.79573	2534.5	3.0	115.9	We're looking at broken up - talus slope in between some large inflated pillows here and there.	134
12/1/2017	20:17:52	-14.91817	-173.79574	2534.7	2.8	122.2	We're probably the first set of eyes to see this terrain.	135
12/1/2017	20:18:20	-14.91818	-173.79573	2533.9	3.5	135.6	Sea cucumber on rocky fragments.	136
12/1/2017	20:18:52	-14.91825	-173.79569	2533.3	3.4	141.0	Large pillows with cantaloupe sized rock fragments surrounding their base.	137
12/1/2017	20:19:41	-14.91835	-173.79569	2533.0	2.6	161.5	Coming to the crest of this ridge. Broken up pillows and lots of fragments here.	138
12/1/2017	20:20:18	-14.91840	-173.79565	2533.0	2.3	131.5	We just passed waypoint 4.	139
12/1/2017	20:20:39	-14.91837	-173.79566	2530.4	5.3	128.8	Cracked pillow tubes at the base of the screen. Above lots of cracked fragments of pillow.	140
12/1/2017	20:21:06	-14.91837	-173.79566	2531.1	4.0	133.1	The summit of this volcano is probably fractured and faulted - consistent with all the rocky fragments we're seeing down here.	141
12/1/2017	20:21:32	-14.91841	-173.79561	2533.0	1.7	131.8	Lots much sediment here but we are starting up a slope. Sediments don't accumulate as much on steep slopes.	142
12/1/2017	20:22:13	-14.91846	-173.79554	2528.6	3.7	131.7	Bulbous pillows and fragments. Large pillows are probably in place and the fragments have fallen from above around them.	143
12/1/2017	20:23:01	-14.91854	-173.79546	2524.2	3.6	124.1	The occasional sea cucumber here and there.	144
12/1/2017	20:23:25	-14.91855	-173.79540	2520.6	4.2	121.7	Really broken up rock below the rock face above.	145
12/1/2017	20:23:46	-14.91854	-173.79538	2517.8	4.6	125.8	The rock is in place at the top. Huge pillow to the right.	146

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S090 Mata Fitu Logger Comments	Record #
12/1/2017	20:24:11	-14.91856	-173.79535	2515.7	3.3	123.5	On the top of the ridge we are seeing lots of sediment again. Fragments of rock scattered about.	147
12/1/2017	20:24:20	-14.91856	-173.79534	2516.4	2.7	121.2	We're on the nose of one of these ridge lines.	148
12/1/2017	20:25:17	-14.91863	-173.79527	2519.9	0.9	129.8	Sedimented flattish area here with rock fragments and in place lobate/sheet flat lavas in place.	149
12/1/2017	20:25:22	-14.91863	-173.79526	2520.0	1.4	130.9	Another large coral ahead.	150
12/1/2017	20:26:18	-14.91866	-173.79522	2520.0	1.6	128.8	Ridge of in-place lavas here. Strangely flat. They look like squished; flattened; pillows.	151
12/1/2017	20:26:55	-14.91873	-173.79522	2522.6	1.5	163.3	On the top of the ridges we are seeming to get these platy lobate/sheet type lavas.	152
12/1/2017	20:27:39	-14.91884	-173.79523	2525.5	2.6	162.7	Now we're back in the sand/sediment. Probably a lot of pelagic sediments here as well. Quite a lot of marine snow in the water column.	153
12/1/2017	20:27:52	-14.91883	-173.79525	2523.5	4.3	161.3	The ship is having issues holding because of the weather.	154
12/1/2017	20:28:03	-14.91882	-173.79526	2521.7	5.3	150.7	Coming off the bottom for a moment.	155
12/1/2017	20:29:19	-14.91881	-173.79526	2520.3	6.4	143.8	We're coming upon waypoint 5. May skip WP6 and head straight to WP7. That will have us traveling along this southern-most ridge top.	156
12/1/2017	20:30:05	-14.91882	-173.79526	2522.6	4.3	125.4	We're going to follow the ridge line next so will start heading to the NE when we get squared away.	157
12/1/2017	20:30:52	-14.91883	-173.79520	2526.0	1.2	120.2	Lots of sediment here. Some jumbled up and broken lavas exposed here and there.	158
12/1/2017	20:31:51	-14.91882	-173.79516	2525.0	3.0	116.2	We will edge off the nose of this ridge and look at it from the side where it is less sedimented.	159
12/1/2017	20:32:58	-14.91890	-173.79500	2528.6	3.0	113.8	Moving down to waypoint 5 before we head NE.	160
12/1/2017	20:33:22	-14.91892	-173.79492	2529.6	3.2	99.9	Pillow tubes here. More rock debris.	161
12/1/2017	20:33:56	-14.91892	-173.79486	2531.6	1.4	103.1	Looking at flat pillow tubes on the E side of this ridge. Nice coral on top of a bulbous broken pillow.	162
12/1/2017	20:34:05	-14.91891	-173.79487	2531.9	0.9	102.2	We're going to collect a rock here.	163
12/1/2017	20:34:32	-14.91891	-173.79488	2530.4	2.3	108.3	The ship wants to hold position here for a moment - so of course it's time to sample a rock.	164
12/1/2017	20:34:45	-14.91891	-173.79488	2531.2	1.6	111.2	Wants to grab a nub at the edge of a pillow.	165
12/1/2017	20:35:40	-14.91892	-173.79486	2532.2	1.1	109.1	Want a rock-lip - something we can grab.	166
12/1/2017	20:36:11	-14.91893	-173.79487	2533.0	0.4	110.9	We want a rock that includes outer glassy rind and part of the interior that forms more slowly than the outer rind.	167

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S090 Mata Fitu Logger Comments	Record #
12/1/2017	20:38:01	-14.91894	-173.79487	2533.1	0.4	111.1	**S90-rock-04**. Sedimented pillow lava with bread-crust surface. Cracked and radial morphology.	168
12/1/2017	20:39:35	-14.91917	-173.79474	2533.1	0.4	111.1	Big rock sample. Manganese crust and iron oxide staining on broken surface. 30 cm long. Don't see much of vesicles or crystals. Glass rind.	169
12/1/2017	20:41:27	-14.91906	-173.79481	2533.1	0.4	111.1	Exterior surface has plenty of glass. 14.91893 173.79487 Z=2533. Sitting on top of partition 7. Too big to fit inside.	170
12/1/2017	20:41:51	-14.91884	-173.79511	2533.1	0.4	111.1	This is an older lava and didn't want to break.	171
12/1/2017	20:43:31	-14.91910	-173.79477	2529.6	5.5	96.0	Blue water.	172
12/1/2017	20:43:45	-14.91903	-173.79474	2528.4	6.1	71.3	We're bouncing around here at waypoint 5.	173
12/1/2017	20:44:53	-14.91895	-173.79467	2530.5	3.7	45.9	Sedimented / sandy slope here with lavas poking out here and there. Mainly jumbled looking rocks and pillow fragments strewn upon this slope.	174
12/1/2017	20:45:10	-14.91892	-173.79462	2530.9	3.3	46.3	Moving on.	175
12/1/2017	20:45:47	-14.91884	-173.79453	2529.9	2.8	48.3	Some rock fragments; some in place lavas with squat flat striated surfaces.	176
12/1/2017	20:46:38	-14.91877	-173.79443	2527.9	3.4	50.3	Bill is calling this a sheet flow.	177
12/1/2017	20:47:18	-14.91870	-173.79434	2527.9	2.7	48.3	These flows look like a cross between lobate and sheet flows. Then we see perfect pillow lavas and pillow tubes.	178
12/1/2017	20:47:28	-14.91869	-173.79433	2527.5	3.0	47.7	There's a little bit of everything here.	179
12/1/2017	20:47:45	-14.91867	-173.79432	2525.1	4.9	47.5	Lots of rock debris on this slope.	180
12/1/2017	20:47:58	-14.91864	-173.79431	2524.6	5.0	48.7	Some elongate pillows / lobates.	181
12/1/2017	20:48:13	-14.91862	-173.79428	2523.7	4.0	49.9	Flat-ish sheet lavas.	182
12/1/2017	20:48:40	-14.91862	-173.79424	2523.4	3.8	49.9	The sediments here are light colored which makes us think that they could be mainly pelagic sediments.	183
12/1/2017	20:49:16	-14.91865	-173.79417	2526.9	6.5	52.6	Saw a small; but still measurable; water column anomaly here on leg 1.	184
12/1/2017	20:49:39	-14.91862	-173.79413	2526.3	5.7	51.3	The purpose of this dive is to poke around a large area of the summit.	185
12/1/2017	20:50:43	-14.91859	-173.79403	2529.6	3.2	61.9	Crinoid?	186
12/1/2017	20:51:33	-14.91857	-173.79395	2528.7	4.6	62.3	Moving up and over a sedimented ridge with in place rocks and also small fragments scattered about.	187
12/1/2017	20:51:49	-14.91856	-173.79395	2528.4	3.4	62.8	We're at the edge of this ridge crest traveling to the NE.	188
12/1/2017	20:52:41	-14.91852	-173.79387	2528.4	3.9	62.9	Not much life here. Lots of marine snow.	189

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S090 Mata Fitu Logger Comments	Record #
12/1/2017	20:52:56	-14.91850	-173.79383	2530.9	2.5	63.4	Brecciated angular lavas.	190
12/1/2017	20:53:45	-14.91844	-173.79369	2531.2	3.3	61.3	Talus-covered slope here. Seeing less in place lavas - but could be covered with the debris/sediment flow we see here.	191
12/1/2017	20:54:03	-14.91842	-173.79366	2531.3	2.8	62.7	Scree slope. Rocky fragments that are poorly sorted.	192
12/1/2017	20:54:16	-14.91841	-173.79361	2531.3	3.3	63.1	Single whip coral on this rocky scree slope.	193
12/1/2017	20:54:20	-14.91841	-173.79360	2531.4	3.2	63.1	Brittle star.	194
12/1/2017	20:54:48	-14.91836	-173.79355	2530.7	2.9	61.8	Moving NE along the east side of this southern ridge.	195
12/1/2017	20:54:57	-14.91835	-173.79353	2530.5	2.7	61.9	No in place rock here says Ken.	196
12/1/2017	20:55:07	-14.91833	-173.79351	2529.4	3.1	53.7	Some sediments but mainly rocky debris.	197
12/1/2017	20:55:31	-14.91827	-173.79346	2525.9	3.4	48.4	That's a STEEP slope on this volcanic wasteland here.	198
12/1/2017	20:56:10	-14.91819	-173.79340	2522.1	3.0	43.0	Following along the ridge line but also moving up slope as well.	199
12/1/2017	20:56:26	-14.91817	-173.79338	2521.1	4.0	44.0	Lots of angular rock fragments. Not much looks like it is in place.	200
12/1/2017	20:56:59	-14.91813	-173.79337	2519.3	2.8	44.2	This slope looks like it's at least 45 degrees. That's steep.	201
12/1/2017	20:57:20	-14.91809	-173.79334	2518.6	2.6	13.3	Crumbly broken up rock fragments on this slope.	202
12/1/2017	20:57:30	-14.91809	-173.79334	2518.6	0.0	2.7	We see the occasional stalked coral.	203
12/1/2017	21:02:45	-14.91781	-173.79299	2505.3	0.7	46.4	Sea anemone could use some cowbell too.	204
12/1/2017	21:06:09	-14.91796	-173.79306	2516.3	3.1	58.8	Still transiting along contour of sedimented talus slope.	205
12/1/2017	21:06:30	-14.91793	-173.79304	2515.6	1.8	52.8	Solitary swimming shrimp.	206
12/1/2017	21:09:32	-14.91780	-173.79284	2505.3	2.6	48.5	More scree.	207
12/1/2017	21:11:53	-14.91766	-173.79269	2496.0	2.9	26.9	Moving upsection. Less sediment and more talus.	208
12/1/2017	21:12:14	-14.91764	-173.79269	2496.1	2.3	31.2	Urchin count: 1.	209
12/1/2017	21:13:26	-14.91756	-173.79268	2489.5	3.7	31.4	2491m shallowest depth of dive so far as we follow ridgeline NE uphill.	210
12/1/2017	21:13:54	-14.91752	-173.79267	2485.8	3.7	25.6	Barney Rubble would be happy here.	211
12/1/2017	21:14:09	-14.91749	-173.79266	2483.2	3.9	19.9	Stalked coral.	212
12/1/2017	21:15:12	-14.91741	-173.79263	2476.1	4.7	3.8	Sea cucumber and stalked coral.	213
12/1/2017	21:20:21	-14.91731	-173.79307	2469.3	3.6	6.3	Big old gorgonian (or some sort of deep-sea coral).	214
12/1/2017	21:24:49	-14.91720	-173.79302	2461.7	4.6	25.2	Big chunk of pillow lava ~1m long . . . biggest rock we've seen in a while.	215
12/1/2017	21:25:28	-14.91714	-173.79300	2457.8	3.5	24.7	Sponge with spicules like a drunk umbrella.	216
12/1/2017	21:25:52	-14.91711	-173.79300	2456.5	2.4	35.3	Another tall coral.	217

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S090 Mata Fitu Logger Comments	Record #
12/1/2017	21:26:17	-14.91710	-173.79300	2455.8	3.2	43.8	Coral has an anemone on it.	218
12/1/2017	21:28:56	-14.91705	-173.79296	2451.9	3.3	32.8	Approaching waypoint 7.	219
12/1/2017	21:31:40	-14.91688	-173.79262	2444.5	1.2	11.9	Another bamboo coral.	220
12/1/2017	21:33:14	-14.91680	-173.79238	2440.8	5.6	13.0	Increase in sediment as we head upslope toward waypoint 7.	221
12/1/2017	21:34:15	-14.91680	-173.79226	2444.8	4.1	9.8	Seeing a few large pillow lava boulders. Do not appear to be in place.	222
12/1/2017	21:36:26	-14.91676	-173.79226	2443.5	4.1	2.8	Water is a little cloudy here.	223
12/1/2017	21:36:43	-14.91676	-173.79227	2443.8	3.1	2.7	Starting to see an increase in larger pillow fragments.	224
12/1/2017	21:37:21	-14.91667	-173.79224	2442.8	1.4	347.6	Urchin count: 2.	225
12/1/2017	21:40:07	-14.91665	-173.79230	2440.1	2.1	337.4	Bit of a breadcrust texture visible on some of the larger pillow fragments - probably glass rind.	226
12/1/2017	21:43:24	-14.91656	-173.79254	2431.2	3.3	333.2	No definitive sign of anything in place yet where we can take a good sample.	227
12/1/2017	21:44:33	-14.91654	-173.79236	2434.3	3.2	1.5	A few brittle stars visible on sedimented surface.	228
12/1/2017	21:47:02	-14.91650	-173.79228	2435.4	2.9	3.3	Waypoint 7. Looking for rocks in place along summit and saddle for a sample.	230
12/1/2017	21:49:07	-14.91648	-173.79227	2436.9	0.8	4.0	Coral with something wispy on it as well as a possible worm attached. Scale worm at base of coral stalk.	231
12/1/2017	21:50:39	-14.91644	-173.79228	2434.1	2.5	344.3	Heavily sedimented at summit.	232
12/1/2017	21:52:44	-14.91628	-173.79232	2429.3	2.2	344.7	Talus at summit.	233
12/1/2017	21:55:23	-14.91601	-173.79246	2430.1	1.1	344.7	No obviously in place rocks whatsoever at summit at waypoint 7.	234
12/1/2017	21:57:27	-14.91576	-173.79254	2450.6	1.3	345.0	Water still kind of smoky.	235
12/1/2017	22:02:29	-14.91528	-173.79275	2461.2	2.7	344.2	Huge whip coral is coming into sight ... still flying over endless rocky rubble.	236
12/1/2017	22:04:15	-14.91518	-173.79280	2454.6	2.5	344.6	We're in the valley between two ridges here.	237
12/1/2017	22:04:29	-14.91517	-173.79280	2454.0	2.3	344.9	About half way between waypoint 7 and waypoint 8.	238
12/1/2017	22:04:45	-14.91516	-173.79282	2452.6	2.8	344.8	Rubble-strewn slope here.	239
12/1/2017	22:05:00	-14.91514	-173.79282	2452.0	2.3	344.9	Scanning around and hoping to find a rock that's in place.	240
12/1/2017	22:05:08	-14.91513	-173.79282	2451.7	2.3	344.9	Doesn't look like there is much in place here.	241
12/1/2017	22:05:49	-14.91510	-173.79283	2449.6	2.3	344.1	This is the northernmost of the Mata group.	242
12/1/2017	22:06:00	-14.91508	-173.79283	2449.2	2.0	344.5	Ken thinks this pillow may be in place.	243
12/1/2017	22:06:56	-14.91506	-173.79287	2448.4	2.3	349.4	In place?	244

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S090 Mata Fitu Logger Comments	Record #
12/1/2017	22:07:36	-14.91506	-173.79288	2448.9	1.1	5.6	Looking at a piece of rock that is in place. It's an old pillow lava. Striated altered surface.	245
12/1/2017	22:08:01	-14.91506	-173.79288	2449.2	0.7	4.7	There are little animals on this lava.	246
12/1/2017	22:08:55	-14.91507	-173.79285	2449.2	0.8	5.2	**S90-rock-05**. Old weathered pillow lava on this steep slope just to the north of the middle ridge.	247
12/1/2017	22:10:17	-14.91507	-173.79284	2448.9	1.2	5.4	Crumbly exterior. Weathered. Largish piece with glass on 2 surfaces. Old and fuzzy. 15 cm with sediment adhering.	248
12/1/2017	22:11:35	-14.91506	-173.79282	2448.4	2.0	351.8	Lots of alteration. Not a lot of vesicles visible from here. Can't see any minerals. Lots of coating. Into partition 8.	249
12/1/2017	22:13:06	-14.91505	-173.79282	2447.4	2.9	342.9	Z=2448m. 14.91506 S 173.79287 W. Taken from slope that is about half sedimented. Lots of rock debris here.	250
12/1/2017	22:13:36	-14.91503	-173.79283	2446.9	1.8	337.2	Continuing on to the NW. Not seeing any fish here.	251
12/1/2017	22:15:16	-14.91497	-173.79289	2442.4	1.8	333.2	Moving on - Still seem to be climbing.	252
12/1/2017	22:15:32	-14.91496	-173.79290	2441.6	1.7	333.3	Working our way up slope now. to a more substantial mound.	253
12/1/2017	22:15:54	-14.91493	-173.79290	2440.3	1.9	334.3	An old piece of coral on the seafloor. Sea cucumber next to it.	254
12/1/2017	22:16:32	-14.91490	-173.79293	2439.0	1.6	333.6	That animal looks more like a sea slug than a sea cucumber.	255
12/1/2017	22:17:02	-14.91487	-173.79293	2437.7	1.1	334.1	The purple guy was a sea cucumber *holothurian".	256
12/1/2017	22:17:38	-14.91484	-173.79295	2435.8	1.4	327.4	Coming upon a big in place pillow and some busted up pillows.	257
12/1/2017	22:17:51	-14.91483	-173.79295	2435.0	1.7	335.2	Another holothurian to the left.	258
12/1/2017	22:18:09	-14.91481	-173.79294	2434.7	1.6	334.6	Starting to see more in place rock.	259
12/1/2017	22:19:09	-14.91475	-173.79296	2431.9	1.8	334.0	Driving up on a more circular structural feature up ahead at waypoint 9. We're approaching waypoint 8 shortly.	260
12/1/2017	22:19:51	-14.91470	-173.79298	2429.3	2.2	333.6	We want to understand the fusion of environment and habitats on these volcanoes. That's why we go to the older; more boring parts of the volcano.	261
12/1/2017	22:20:22	-14.91468	-173.79300	2427.8	2.2	332.8	Rocks and sediment.....	262
12/1/2017	22:20:52	-14.91466	-173.79301	2426.3	2.2	332.9	More rock on this slope now.	263
12/1/2017	22:21:11	-14.91464	-173.79302	2425.3	2.2	333.0	Lots of pillow fragments; broken up debris. Poorly sorted.	264
12/1/2017	22:21:36	-14.91462	-173.79303	2423.5	2.6	332.6	More rocky debris here.	265
12/1/2017	22:23:36	-14.91454	-173.79308	2417.5	2.7	333.0	More talus	266

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S090 Mata Fitu Logger Comments	Record #
12/1/2017	22:26:09	-14.91433	-173.79319	2410.6	2.5	333.1	Where's all the coral? "Somewhere else."	267
12/1/2017	22:27:38	-14.91420	-173.79328	2406.0	2.6	332.2	Coral next to dead coral.	268
12/1/2017	22:27:47	-14.91419	-173.79329	2405.9	2.0	332.8	Brittle stars.	269
12/1/2017	22:30:24	-14.91407	-173.79335	2402.4	1.1	2.5	Finally found a possibly-in-place pillow but it's not going to be easy to sample.	270
12/1/2017	22:30:48	-14.91408	-173.79336	2402.5	0.6	5.2	That rock looks like a Gertrude or a Bertha	271
12/1/2017	22:36:14	-14.91408	-173.79338	2400.9	2.6	343.8	**S90-rock-06**. 15x10cm blocky with oxide coating and maybe some Fe-Mn crust.	272
12/1/2017	22:36:53	-14.91407	-173.79337	2401.3	1.8	324.3	Sample S90-rock-06 location 14.9140858 173.7933445 depth 2402m.	273
12/1/2017	22:37:20	-14.91406	-173.79337	2399.8	3.0	324.6	Sample 06 was a recently-spalled-off piece of Big Bertha the pillow.	274
12/1/2017	22:38:03	-14.91397	-173.79338	2399.3	2.0	325.0	Dead corals in area. At waypoint 8.	275
12/1/2017	22:40:53	-14.91360	-173.79351	2407.1	2.9	325.6	Some sea cucumbers among the talus. Seeing a few more complete pillows than in previous areas. Depth 2406m and moving upslope.	276
12/1/2017	22:41:42	-14.91351	-173.79355	2404.9	4.8	324.4	Reached a near-vertical face with truncated pillows. Maybe seeing some in-place rocks but not yet sure.	277
12/1/2017	22:42:38	-14.91345	-173.79364	2398.7	5.1	322.2	Slope decreasing at about 2399 meters. Leveling off into more talus.	278
12/1/2017	22:42:59	-14.91343	-173.79368	2397.5	0.0	319.5	Possible metallogorgia coral? Dead stalk corals.	279
12/1/2017	22:47:01	-14.91339	-173.79373	2391.4	5.5	314.2	Stunning Gorgonian coral found halfway between waypoints 8 and 9.	280
12/1/2017	22:48:48	-14.91331	-173.79383	2388.4	2.7	313.9	Moving over several stalked corals on overall boulder-sized pillow debris	281
12/1/2017	22:51:01	-14.91324	-173.79392	2385.0	2.6	317.5	Urchin count: 3	282
12/1/2017	23:01:10	-14.91313	-173.79402	2378.6	4.1	317.0	**S90-rock-07**. 40m SE of waypoint 9. Roughly 10x15cm some orange sediment in vesicles and possible glass rind? Fe-Mn staining on crust.	283
12/1/2017	23:01:59	-14.91312	-173.79404	2379.8	2.8	317.9	S90-rock-07 location 14.9131206 173.1940099 depth 2383m.	284
12/1/2017	23:02:21	-14.91312	-173.79404	2377.4	4.9	318.0	Broken up rock here. Looks like some of it is in place.	285
12/1/2017	23:02:41	-14.91309	-173.79406	2376.3	3.4	319.8	We're approaching waypoint9.	286
12/1/2017	23:03:01	-14.91310	-173.79410	2375.9	2.4	318.2	The same rubbly surface we saw yesterday is what we're seeing today.	287
12/1/2017	23:03:49	-14.91305	-173.79412	2373.5	2.5	319.3	More huge rubble blocks as we approach the top of this ridge.	288

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S090 Mata Fitu Logger Comments	Record #
12/1/2017	23:04:45	-14.91301	-173.79416	2373.1	2.4	319.2	Going over a small ridge.	289
12/1/2017	23:05:09	-14.91296	-173.79420	2373.5	3.2	326.3	Still climbing up this more gentle slope.	290
12/1/2017	23:06:55	-14.91283	-173.79431	2373.8	1.7	330.3	A patch of sediment (?) here in the midst of this rubble-strewn slope.	291
12/1/2017	23:07:03	-14.91282	-173.79432	2373.8	2.1	329.7	Nothing in place that we can see.	292
12/1/2017	23:07:30	-14.91279	-173.79432	2375.2	1.7	341.3	Quite devoid of life here; possibly due to the unstable environment on this slope.	293
12/1/2017	23:07:43	-14.91279	-173.79432	2376.2	0.9	357.8	Speak of the devil - seeing a coral in the distance.	294
12/1/2017	23:08:35	-14.91276	-173.79427	2376.3	1.2	0.8	Hanging out here for a moment.	295
12/1/2017	23:08:49	-14.91275	-173.79426	2375.8	2.1	6.7	Mostly not in place rocks here.	296
12/1/2017	23:09:31	-14.91268	-173.79427	2378.5	0.0	353.8	Pieces of broken radially fractured pillows ahead.	297
12/1/2017	23:11:01	-14.91260	-173.79430	2381.6	2.8	340.4	The ship is repositioning so we're sort of in a holding pattern there in the vicinity of waypoint 9.	298
12/1/2017	23:11:34	-14.91256	-173.79435	2385.1	2.2	336.5	Broken talus covering the slope.	299
12/1/2017	23:11:55	-14.91252	-173.79437	2386.7	2.0	334.7	Passing a beautiful coral.	300
12/1/2017	23:12:09	-14.91250	-173.79438	2388.1	1.4	334.8	More broken lavas.	301
12/1/2017	23:12:16	-14.91249	-173.79439	2388.4	1.4	334.1	Facing north right now.	302
12/1/2017	23:13:07	-14.91248	-173.79439	2388.3	2.1	334.3	Looking at a broken up pile of rock at the summit of this center ridge between the cleft. Larger faulted ridge and summit to the north.	303
12/1/2017	23:13:29	-14.91248	-173.79440	2387.9	2.5	333.5	We're not going to visit the summit peak on this dive.	304
12/1/2017	23:13:53	-14.91248	-173.79440	2386.7	3.4	333.3	We're here to discover what this volcano is made up of - and that starts with the rocks.	305
12/1/2017	23:14:30	-14.91247	-173.79439	2387.8	2.8	330.0	Still waiting on the ship before we can move on.	306
12/1/2017	23:16:32	-14.91246	-173.79439	2389.2	0.0	323.9	Currently at 2388 meters.	307
12/1/2017	23:17:11	-14.91244	-173.79442	2390.6	1.7	324.1	Chill Bill will be taking over for Jazzy Ken on our "Tour de Rubble".	308
12/1/2017	23:17:42	-14.91243	-173.79442	2390.0	2.5	324.4	We're getting ready to start to dive east.	309
12/1/2017	23:18:24	-14.91240	-173.79442	2391.5	2.2	324.7	This whole volcano is all tectonized. Broken up.	310
12/1/2017	23:18:42	-14.91240	-173.79441	2391.6	2.0	323.2	Looking at a small-ish pillow.	311
12/1/2017	23:20:33	-14.91233	-173.79442	2393.5	2.4	345.5	We're just going up to the base of the next ridge (the big one with the SW/NE fault).	312
12/1/2017	23:20:54	-14.91230	-173.79442	2395.1	2.1	347.2	We are not going to the top of the largest ridge. Just taking a peek.	313
12/1/2017	23:21:09	-14.91228	-173.79442	2395.5	1.9	346.9	Broken pillow' strewn slope.	314
12/1/2017	23:21:44	-14.91223	-173.79442	2398.3	1.2	346.3	Looking at the steep slope base.	315
12/1/2017	23:21:53	-14.91222	-173.79441	2399.4	0.0	349.0	Looks like a steeper slope of rubble.	316
12/1/2017	23:22:22	-14.91219	-173.79442	2400.6	1.3	348.2	That's a whole bunch of rubble on that steep slope.	317

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S090 Mata Fitu Logger Comments	Record #
12/1/2017	23:22:42	-14.91219	-173.79442	2399.7	2.1	346.6	The slope ahead of us appears to be nearly vertical on the bathymetry map.	318
12/1/2017	23:23:03	-14.91216	-173.79442	2400.8	2.6	347.1	It's no wonder that we're seeing all these large rubble blocks on the slope.	319
12/1/2017	23:24:56	-14.91206	-173.79444	2396.0	7.6	346.2	This slope has to be over 60 degrees.	320
12/1/2017	23:25:21	-14.91207	-173.79442	2395.1	8.7	346.1	Lone coral on one of the lavas that fell downslope. It looks worse for the wear.	321
12/1/2017	23:26:08	-14.91202	-173.79444	2396.5	5.5	346.4	Poor lowly coral - all by itself.	322
12/1/2017	23:26:41	-14.91200	-173.79442	2398.7	1.7	344.2	Seeing some small biology on these blocky pieces of lava strewn about on the slope.	323
12/1/2017	23:30:29	-14.91180	-173.79449	2388.3	1.5	341.8	Rubble everywhere..	324
12/1/2017	23:31:55	-14.91173	-173.79452	2380.4	4.1	334.6	Moving up this steep southern slope of the summit ridge.	325
12/1/2017	23:32:31	-14.91168	-173.79452	2376.7	4.8	334.0	Lava blocks large and small covering this slope. Pillow pieces; talus on this slope.	326
12/1/2017	23:33:14	-14.91163	-173.79455	2374.0	3.3	333.9	Seeing some ship corals on these pillow pieces.	327
12/1/2017	23:34:06	-14.91161	-173.79456	2372.7	3.2	328.9	Looking at a beautiful coral (?) spiraled.	328
12/1/2017	23:34:44	-14.91158	-173.79457	2370.5	3.3	326.7	Seeing more corals on the rocks here.	329
12/1/2017	23:35:22	-14.91157	-173.79458	2369.6	3.3	326.5	Brittle stars and some odd-looking jelly of some kind.	330
12/1/2017	23:35:40	-14.91156	-173.79458	2369.4	3.0	326.6	Spacecraft with a brittle star in the background.	331
12/1/2017	23:36:53	-14.91153	-173.79461	2365.0	4.2	320.1	Bill says that the corals are here because the slope is stable enough on coral time - but unstable on geological time...	332
12/1/2017	23:37:41	-14.91159	-173.79457	2371.8	1.6	165.6	We've decided to head back down slope to waypoint 9 again.	333
12/1/2017	23:38:28	-14.91170	-173.79451	2380.6	2.5	163.2	The water here is murky with marine snow.	334
12/1/2017	23:40:00	-14.91187	-173.79441	2394.4	1.9	153.2	Heading back down this rubble-covered south slope of the highest ridge on Mata Fitu. Seems to be just more rubble.	335
12/1/2017	23:41:15	-14.91193	-173.79431	2400.9	2.8	122.4	Mike	336
12/1/2017	23:41:46	-14.91195	-173.79428	2401.9	3.0	128.5	We're looking at the base of the small cone we were previously upon.	337
12/1/2017	23:42:37	-14.91198	-173.79423	2404.6	3.2	128.5	Broken pillow tubes in the camera now.	338
12/1/2017	23:43:59	-14.91206	-173.79411	2400.4	4.1	128.7	We're skirting around the ship's "circle of death". Don't want to get too close to the ship with the ROV.	339
12/1/2017	23:44:02	-14.91206	-173.79411	2400.0	5.0	128.8	Whip coral.	340

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S090 Mata Fitu Logger Comments	Record #
12/1/2017	23:45:10	-14.91216	-173.79396	2398.1	3.1	123.7	More broken-up lavas. Some nice looking pillows here but hard to believe that any of them are in place.	341
12/1/2017	23:45:53	-14.91224	-173.79380	2399.4	2.8	100.7	Straight slaked coral. Looking good.	342
12/1/2017	23:46:16	-14.91224	-173.79376	2400.5	2.6	90.9	Pillows and possible in place lavas.	343
12/1/2017	23:47:19	-14.91220	-173.79374	2400.6	1.9	112.7	We're looking at some pillows (somewhat flattened) in the upper right of the screen.	344
12/1/2017	23:47:33	-14.91220	-173.79371	2400.6	2.6	146.4	Those pillows ahead look like they are in place.	345
12/1/2017	23:47:50	-14.91221	-173.79369	2400.9	2.5	148.7	Recognizable pillow lavas.	346
12/1/2017	23:48:06	-14.91222	-173.79368	2401.4	2.2	148.1	Pillow tubes that were leaking out of this bigger pillow that cracked open.	347
12/1/2017	23:48:21	-14.91221	-173.79368	2402.0	1.5	149.0	Beautiful large pillow to the upper left of the screen.	348
12/1/2017	23:49:10	-14.91223	-173.79371	2401.4	1.9	144.3	Nice looking pillow tubes her and larger pillows in the background.	349
12/1/2017	23:49:50	-14.91226	-173.79371	2402.8	1.1	133.6	The pillow pubes have some swirly patterns on some of them.	350
12/1/2017	23:50:00	-14.91226	-173.79371	2403.3	0.8	133.8	Sedimented.	351
12/1/2017	23:50:49	-14.91226	-173.79371	2403.5	0.6	132.9	Deciding what part of this intact pillow mound to sample.	352
12/1/2017	23:51:15	-14.91226	-173.79372	2403.3	0.8	133.9	Biology on the upper pillows so they have been here a while.	353
12/1/2017	23:51:32	-14.91225	-173.79373	2402.6	1.3	132.9	Nice view.	354
12/1/2017	23:52:23	-14.91225	-173.79370	2402.1	1.1	154.5	Subastian is positioning itself for another sample.	355
12/1/2017	23:53:22	-14.91225	-173.79370	2402.4	0.0	147.8	We are seeing 2 different textures. The top pillow is striated and cracked. The pillow lava tubes below are smoother (non-striated).	356
12/1/2017	23:53:39	-14.91225	-173.79370	2402.4	1.1	146.4	They probably oozed out from the larger pillow area above.	357
12/1/2017	23:54:43	-14.91220	-173.79372	2402.4	1.0	147.6	We're about 90 m NE of waypoint 9 (top of smaller cone).	358
12/1/2017	23:57:10	-14.91216	-173.79376	2402.4	0.0	147.6	In place pillow piece from top of this small mound. Striated outer crust on the large pillows.	359
12/2/2017	0:01:13	-14.91218	-173.79378	2402.2	0.7	162.1	Repositioning to grab a lip of this big pillow. There's a brownish sediment coating on these pillows.	360
12/2/2017	0:05:09	-14.91220	-173.79374	2402.2	0.0	164.3	Still don't have the sample. It keeps crumbling in the claw.	361
12/2/2017	0:05:55	-14.91225	-173.79377	2402.2	0.0	163.7	Looking around a bit for a better piece to grab. Switching arms.	362

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S090 Mata Fitu Logger Comments	Record #
12/2/2017	0:07:04	-14.91225	-173.79377	2402.1	0.8	164.7	Going for a flatter plate down the pillow. Got a small piece. Going in for a bigger piece instead.	363
12/2/2017	0:07:45	-14.91225	-173.79380	2402.2	0.7	164.3	The piece fell out of the claw.	364
12/2/2017	0:09:01	-14.91218	-173.79375	2402.2	0.0	162.4	Really friable. Keeps breaking up and crumbling.	365
12/2/2017	0:10:16	-14.91218	-173.79375	2402.2	0.8	156.0	Not giving up. Still attempting to sample S0090-Rock-8. Don't have it yet.	366
12/2/2017	0:12:07	-14.91222	-173.79373	2402.2	0.0	160.7	**S90-rock-08**. Piece of pillow. Vesicular. 10cm x 5cm. Narrower. lightly sedimented pillow fragment. Banded in the center. Orange weathered layer under the glass.	367
12/2/2017	0:13:54	-14.91222	-173.79372	2399.8	2.8	161.2	Into partition 3. Broke into a couple pieces. Should be mostly intact. Came from intact pillow. 14.912193 173.793729. Z=2403.	368
12/2/2017	0:14:17	-14.91222	-173.79371	2400.1	1.8	157.5	We are finished at this sampling site.	369
12/2/2017	0:15:19	-14.91228	-173.79364	2397.1	2.7	149.8	We'll come down and rejoin the line toward waypoint 10.	370
12/2/2017	0:16:32	-14.91232	-173.79353	2399.3	1.6	146.7	Moving south toward the dive plan line. Then will turn to the E/NE and continue on.	371
12/2/2017	0:18:29	-14.91244	-173.79331	2409.0	4.2	103.9	We are almost back on the line to continue our traverse.	372
12/2/2017	0:19:24	-14.91247	-173.79313	2410.8	2.0	85.8	Interesting coral that fell downslope with the pillow.	373
12/2/2017	0:19:57	-14.91246	-173.79308	2411.4	2.7	86.1	We're continuing over more rubble. We should be getting deeper here soon.	374
12/2/2017	0:20:22	-14.91246	-173.79302	2411.0	4.4	81.9	Slope is flattening out here as we travel to the E/NE	375
12/2/2017	0:21:19	-14.91244	-173.79292	2415.3	2.0	77.2	5 corals here in a group.	376
12/2/2017	0:21:29	-14.91242	-173.79289	2415.1	3.1	77.2	The corals look a little beat up here.	377
12/2/2017	0:21:49	-14.91241	-173.79283	2415.2	4.3	77.1	Looks like bamboo coral.	378
12/2/2017	0:22:12	-14.91240	-173.79277	2419.5	2.9	76.9	Now just back in a rubble-strewn seafloor environment.	379
12/2/2017	0:22:46	-14.91239	-173.79272	2423.9	1.3	77.1	Pretty large bamboo coral to the right; Whip coral center screen. Sea star ahead.	380
12/2/2017	0:23:34	-14.91235	-173.79264	2424.0	3.7	76.4	More and more broken up lavas here. Hard to see.	381
12/2/2017	0:24:03	-14.91233	-173.79256	2429.1	3.6	76.9	We're moving downslope so we're farther off the bottom and its pretty tough to see anything.	382
12/2/2017	0:25:37	-14.91228	-173.79236	2439.0	4.7	77.1	Seeing a few sediment patches coming up.	383
12/2/2017	0:25:44	-14.91227	-173.79234	2440.3	4.3	77.2	More sediment ahead.	384
12/2/2017	0:26:21	-14.91224	-173.79224	2443.8	4.4	77.6	Lots of rock debris on the seafloor again.	385
12/2/2017	0:26:40	-14.91224	-173.79216	2445.1	4.5	76.8	About half rock and half sediment. Mata Rubble....	386

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S090 Mata Fitu Logger Comments	Record #
12/2/2017	0:27:10	-14.91222	-173.79204	2448.0	3.9	77.4	Sandy area here.	387
12/2/2017	0:27:25	-14.91221	-173.79200	2447.8	4.8	76.6	Those on the bottom look intact.	388
12/2/2017	0:28:10	-14.91219	-173.79188	2443.9	5.0	77.7	We're going to speed up a little bit.	389
12/2/2017	0:28:20	-14.91219	-173.79186	2442.7	6.1	76.9	Little pillow mound that seems to be in place.	390
12/2/2017	0:29:13	-14.91217	-173.79174	2445.8	8.3	76.3	Blue water.	391
12/2/2017	0:29:58	-14.91215	-173.79168	2446.0	9.3	77.4	We're 6 m above the seafloor and can't see much.	392
12/2/2017	0:30:59	-14.91211	-173.79160	2447.8	8.3	76.4	Bill wants to go a little further before we sample again.	393
12/2/2017	0:31:25	-14.91209	-173.79154	2448.9	6.7	76.0	In place pillow tubes on this pillow mound.	394
12/2/2017	0:31:55	-14.91208	-173.79153	2451.4	4.1	75.8	We're over 7m above the bottom so we're not seeing much.	395
12/2/2017	0:32:40	-14.91207	-173.79148	2450.4	6.1	77.0	Lots of intact pillows here that are also in place.	396
12/2/2017	0:33:29	-14.91204	-173.79138	2455.7	7.5	43.4	Blue water - no seafloor in place.	397
12/2/2017	0:33:49	-14.91202	-173.79133	2460.1	6.4	59.3	Still 6 m off the bottom.	398
12/2/2017	0:34:32	-14.91191	-173.79123	2464.3	5.7	65.4	There's a wall in front of us now. Actually not exactly a wall but its in place.	399
12/2/2017	0:35:07	-14.91199	-173.79113	2460.9	3.8	63.2	Smaller patch of lavas than it appeared.	400
12/2/2017	0:35:20	-14.91201	-173.79109	2460.5	4.1	65.0	Seafloor here.	401
12/2/2017	0:35:42	-14.91203	-173.79104	2460.5	3.3	71.9	Rubble strewn with some of the sediment throughout.	402
12/2/2017	0:37:53	-14.91200	-173.79080	2461.6	7.5	31.0	Nice intact pillows on this ridge-type features. Some staining on the pillows.	403
12/2/2017	0:38:37	-14.91195	-173.79073	2463.8	0.0	70.0	Somewhat intact ridge. Fault scarp.	404
12/2/2017	0:39:00	-14.91197	-173.79062	2463.8	21.5	83.9	We're jumping off the cliff with the ROV.	405
12/2/2017	0:40:13	-14.91198	-173.79037	2463.0	31.3	87.2	Blue water.	406
12/2/2017	0:41:24	-14.91198	-173.79036	2471.9	23.1	83.4	We're 28 meters off the bottom right now.	407
12/2/2017	0:41:59	-14.91200	-173.79045	2478.3	15.5	82.4	Coming down now.	408
12/2/2017	0:42:22	-14.91204	-173.79041	2481.8	10.9	82.9	12 meters above the bottom.	409
12/2/2017	0:42:44	-14.91201	-173.79032	2484.7	7.0	78.3	There's the bottom - at least on the science screen.	410
12/2/2017	0:42:51	-14.91200	-173.79030	2485.8	6.5	79.5	Bottom in sight now.	411
12/2/2017	0:43:17	-14.91198	-173.79021	2490.9	4.3	76.4	We're moving along at 0.5 knots.	413
12/2/2017	0:43:31	-14.91198	-173.79016	2494.2	2.6	80.5	We're at the base of the cliff face.	414
12/2/2017	0:43:41	-14.91196	-173.79011	2495.3	2.8	77.8	Lots of broken rock and sediment here.	415
12/2/2017	0:43:58	-14.91195	-173.79003	2494.1	5.7	100.2	Quite a lot of sediment here.	416
12/2/2017	0:44:11	-14.91195	-173.79003	2494.4	5.8	111.8	Looks like these rocks may be in place here.	417
12/2/2017	0:44:28	-14.91196	-173.79004	2494.4	5.6	114.3	Small pillow tubes and some larger pillows here.	418

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S090 Mata Fitu Logger Comments	Record #
12/2/2017	0:45:04	-14.91199	-173.79002	2494.9	3.5	114.3	Will hopefully get an intact piece on this small ridge with intact pillows.	419
12/2/2017	0:45:38	-14.91199	-173.79001	2496.7	0.0	112.8	Halfway between waypoint 9 and waypoint 10. There is a rubble slope in the background.	420
12/2/2017	0:45:56	-14.91199	-173.79001	2496.8	1.5	112.1	This will be rock 9.	421
12/2/2017	0:46:26	-14.91200	-173.79001	2496.9	1.5	112.3	The pillow in the upper right has distinct striations.	422
12/2/2017	0:49:06	-14.91201	-173.78999	2496.8	1.7	112.7	**S90-rock-09**. Cracked pillow on ridge top. Grabbing small-ish piece wedged in crack.	423
12/2/2017	0:50:51	-14.91200	-173.79000	2496.9	1.5	112.3	This piece tumbled off from slightly farther up the extrusion. ~40 cm long. Some vesicles. Outer surface. Extensive magnesium coating and sediment.	424
12/2/2017	0:52:24	-14.91205	-173.78994	2493.0	3.8	105.5	Big rock. Mostly-in place. Into the gastight milk crate. 14.9119862 173.7900082 Z=2499.	425
12/2/2017	0:53:17	-14.91202	-173.78980	2495.0	3.1	82.5	Back into rubble.	426
12/2/2017	0:56:13	-14.91194	-173.78930	2493.2	4.1	19.1	Patches of in-places pillows as gradient steepens slightly. Talus still dominant.	427
12/2/2017	1:00:17	-14.91181	-173.78921	2486.1	6.8	9.8	Talus is thinning out along this steep slope we're traversing and some in-place pillows are cropping out.	428
12/2/2017	1:08:51	-14.91161	-173.78894	2494.3	3.1	49.8	Resuming ROV transit.	429
12/2/2017	1:12:28	-14.91153	-173.78865	2503.5	5.4	46.2	Transiting along a talus-sedimentary contact.	430
12/2/2017	1:15:06	-14.91147	-173.78828	2504.0	4.2	48.0	Intact pillow lavas on steep slope among talus.	431
12/2/2017	1:15:19	-14.91145	-173.78826	2504.5	3.9	42.9	Intact volcanic pile.	432
12/2/2017	1:22:38	-14.91121	-173.78802	2511.5	2.2	89.1	Continuing transit to waypoint 10 and into a swath of high-res bathy. Seeing lots of in-place pillows here.	433
12/2/2017	1:29:13	-14.91127	-173.78799	2515.3	0.0	250.4	**S90-rock-10**. 30x10cm pillow rind with some alteration in core to slight yellow-green color. Large internal vesicles grading to smaller at edge.	434
12/2/2017	1:29:41	-14.91128	-173.78801	2514.2	1.9	255.5	S90-rock-10 location 14.91126 173.78801 depth 2515m.	435
12/2/2017	1:31:38	-14.91141	-173.78829	2498.8	5.7	302.3	Out of coherent flows again and into some talus as we resume transit to waypoint 10.	436
12/2/2017	1:32:53	-14.91124	-173.78845	2493.8	2.4	326.1	Into outcrop of older pillow lavas with coral growths. Highly fractured.	437
12/2/2017	1:33:57	-14.91104	-173.78856	2495.9	3.5	332.4	Stalk corals of various heights throughout this flatter area.	438
12/2/2017	1:35:33	-14.91064	-173.78872	2498.6	2.1	357.5	Into some larger lobate smooth-textured flows.	439

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12/2/2017	1:36:08	-14.91047	-173.78871	2495.5	3.6	3.0	Back into talus.	440
12/2/2017	1:37:54	-14.91008	-173.78857	2475.1	3.8	18.8	Transition from talus to elongate pillow lavas to sediments.	441
12/2/2017	1:38:33	-14.90996	-173.78847	2475.9	2.1	25.3	Elongate lavas.	442
12/2/2017	1:39:12	-14.90982	-173.78837	2479.8	3.0	25.5	Microbial mats - white patches.	443
12/2/2017	1:41:57	-14.90957	-173.78811	2477.6	4.4	347.0	Possible volcaniclastic sediment next to pillow lavas with coral stalks growing on them.	444
12/2/2017	1:46:58	-14.90920	-173.78835	2474.6	4.6	348.0	Talus.	445
12/2/2017	1:48:35	-14.90905	-173.78820	2469.4	1.9	348.3	Beautiful stack of pillows with tube like flow texture.	446
12/2/2017	1:52:04	-14.90878	-173.78810	2457.1	2.1	348.0	Setting ROV down for a sediment scoop and a rock.	447
12/2/2017	1:54:10	-14.90877	-173.78811	2459.0	0.0	348.1	Sediment pile we are evaluating appears to have a volcaniclastic origin.	448
12/2/2017	1:59:27	-14.90962	-173.78844	2459.0	0.0	347.3	Volcaniclastic/pelagic sediment.	449
12/2/2017	2:00:03	-14.90983	-173.78851	2459.0	0.0	347.2	**Sample S90-sed-11** location 14.90877 173.78811 depth 2459m.	450
12/2/2017	2:10:10	-14.90787	-173.78786	2459.0	0.0	306.8	**S90-rock-12**. Flat-topped altered pillow lava crust with whip coral attached. Dual rock-bio sample. 10x15cm approx.	452
12/2/2017	2:10:57	-14.90762	-173.78774	2459.0	0.0	306.8	Sample S90-rock-12 location 14.90877 173.78811 depth 2459m plus or minus 1m. Nav funky again.	453
12/2/2017	2:14:17	-14.90797	-173.78795	2455.9	1.4	350.1	Resuming transit.	454
12/2/2017	2:15:52	-14.90815	-173.78805	2464.7	3.0	351.0	Large talus pile.	455
12/2/2017	2:31:20	-14.90701	-173.78832	2490.2	1.4	273.9	Burrow in sediments next to lava flows.	456
12/2/2017	2:34:29	-14.90701	-173.78832	2490.4	1.1	280.0	Piece of pillow toe with large olivines and <1cm glass rind. Fresh. 10-15cm on a side.	457
12/2/2017	2:35:14	-14.90701	-173.78832	2490.5	1.0	280.2	Sample **S90-rock-13** location 14.90701 173.78832 depth 2490m.	458
12/2/2017	2:41:59	-14.90701	-173.78832	2490.6	1.3	278.4	Second piece of lava flow from same spot as 13A. Giant olivine and lots of sediment. Slightly smaller than 13A approx. 10x10cm or smaller.	459
12/2/2017	2:42:47	-14.90701	-173.78832	2490.2	0.0	274.2	CORRECTION: Sample S90-rock-13 now S90-rock-13A. Samples are from the same location. same pillow toe.	460
12/2/2017	2:44:03	-14.90700	-173.78841	2485.0	3.7	274.6	Some inflated pillows.	461
12/2/2017	2:44:46	-14.90699	-173.78844	2485.3	3.5	273.9	Pilots liken the inflated flows to whale baleen.	462
12/2/2017	2:46:26	-14.90697	-173.78852	2483.3	2.4	273.8	Waypoint 11.	463

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S090 Mata Fitu Logger Comments	Record #
12/2/2017	2:48:45	-14.90689	-173.78877	2475.9	1.9	274.5	Fractured pillow flows between waypoints 11 and 12.	464
12/2/2017	3:00:02	-14.90685	-173.78901	2473.7	2.2	295.2	Highly vesicular chunk with Mn crust and glassy rind. ~35cm across.	465
12/2/2017	3:00:43	-14.90681	-173.78902	2472.7	2.2	314.0	Sample **S90-rock-14** location 14.90685 173.78901 depth 2474m.	466
12/2/2017	3:02:36	-14.90658	-173.78912	2478.9	3.3	320.9	Blue water.	467
12/2/2017	3:03:47	-14.90640	-173.78915	2486.4	3.3	318.4	Ropey lavas here.	469
12/2/2017	3:03:59	-14.90639	-173.78914	2487.2	2.9	317.9	We're at another sampling site it looks like.	470
12/2/2017	3:04:14	-14.90638	-173.78914	2488.1	2.4	301.4	Ropey / jumbled lavas here on a bit of a mound.	471
12/2/2017	3:04:43	-14.90638	-173.78915	2488.9	1.7	302.5	We're going to take a sample of this spackly lava.	472
12/2/2017	3:05:09	-14.90637	-173.78915	2489.5	1.3	302.2	Still coated in sediment so it has been here a while.	473
12/2/2017	3:05:38	-14.90637	-173.78915	2489.6	1.3	301.6	Ropey lava here.	474
12/2/2017	3:08:07	-14.90637	-173.78915	2489.6	1.3	301.4	Ropey lava. Must have been really fluid when it came out. Baby rock. Thin glassy surface. Altered. Manganese and iron crust.	475
12/2/2017	3:09:19	-14.90636	-173.78915	2488.1	3.1	308.4	Irregularly shaped. 15 cm long. Went into gastight box. 14.906373 14.789151 Z=2490m.	476
12/2/2017	3:09:49	-14.90632	-173.78920	2487.4	2.0	308.7	We're heading on along our final segment of this traverse. Very ropey lavas here.	477
12/2/2017	3:12:08	-14.90620	-173.78934	2485.8	4.3	270.6	Moved over this ropey ridge into a valley.	478
12/2/2017	3:12:41	-14.90619	-173.78939	2483.3	5.6	325.4	Heading from waypoint 12 to waypoint 13.	479
12/2/2017	3:13:27	-14.90603	-173.78945	2484.7	4.5	325.6	The sonar is showing a steep slope in front of us.	480
12/2/2017	3:14:10	-14.90598	-173.78947	2482.0	3.6	326.1	Steep slope here.	481
12/2/2017	3:15:00	-14.90591	-173.78953	2481.0	1.9	337.6	More rubble with sand patches.	482
12/2/2017	3:15:20	-14.90587	-173.78955	2483.0	1.5	340.2	Still looks like a fluid lava flow. Jumbled looking lavas.	483
12/2/2017	3:15:33	-14.90584	-173.78955	2483.5	1.8	343.2	Unusual for this place which is generally pillows.	484
12/2/2017	3:15:43	-14.90582	-173.78955	2483.6	1.7	343.3	Looks like scrambled eggs here.	485
12/2/2017	3:15:55	-14.90580	-173.78957	2483.7	1.6	344.2	Have a little fault scarp in front of us.	486
12/2/2017	3:16:21	-14.90578	-173.78960	2482.4	1.9	344.3	Bigger odd-looking pillowish looking feature; but still really jumbled.	487
12/2/2017	3:17:18	-14.90565	-173.78957	2487.0	4.2	346.9	Passing over the ridge and not seeing the bottom	488
12/2/2017	3:17:28	-14.90566	-173.78956	2488.2	2.8	345.1	Bottom coming back in sight.	489
12/2/2017	3:17:32	-14.90565	-173.78956	2488.5	2.6	344.2	Sea whip.	490
12/2/2017	3:17:53	-14.90566	-173.78956	2489.7	1.4	345.2	Just a mess of what was trying to be a pillow - but looks more like a jumbled mess.	491
12/2/2017	3:18:56	-14.90564	-173.78944	2492.1	2.0	273.8	There are pieces of jumbled flow and talus slope.	492

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S090 Mata Fitu Logger Comments	Record #
12/2/2017	3:19:38	-14.90560	-173.78941	2493.1	2.4	272.6	We're on our last planned line now.	493
12/2/2017	3:20:17	-14.90559	-173.78944	2496.0	1.3	255.2	This slope is covered in jumbled up lavas. Some in place. Most are laying like rubble along the slope.	494
12/2/2017	3:20:27	-14.90559	-173.78943	2496.3	0.9	255.4	Waiting for the ship.	495
12/2/2017	3:20:55	-14.90559	-173.78943	2493.0	3.3	297.3	The flow is sort of a jumbled flow - that that's not talus.	496
12/2/2017	3:21:23	-14.90557	-173.78948	2495.2	2.0	332.5	The crust deforms as the flow is moving and gets contorted.	497
12/2/2017	3:21:52	-14.90554	-173.78949	2496.8	1.7	333.4	This may indicate a different temperature or mineralogy here.	498
12/2/2017	3:22:14	-14.90556	-173.78951	2498.8	1.1	333.2	Another small fault scarp.	499
12/2/2017	3:22:41	-14.90551	-173.78954	2499.9	5.3	334.1	A large casm below us and another wall ahead of us.	500
12/2/2017	3:23:02	-14.90548	-173.78955	2504.5	3.5	333.2	Seems to agree with the AUV bathymetry.	501
12/2/2017	3:23:17	-14.90542	-173.78957	2504.3	4.9	332.7	Going up this jumbled lava scarp.	502
12/2/2017	3:23:49	-14.90536	-173.78961	2504.0	3.6	333.8	A bit chopped up here.	503
12/2/2017	3:24:07	-14.90533	-173.78961	2503.0	4.1	334.1	Large jumbled flow. It's a mess.	504
12/2/2017	3:24:33	-14.90529	-173.78961	2504.1	3.4	333.5	Pillows on the other side of this jumbled ridge.	505
12/2/2017	3:25:10	-14.90524	-173.78963	2507.1	3.1	333.6	Now the jumbled flow has ended and were back into smoothish pillows.	506
12/2/2017	3:25:23	-14.90523	-173.78964	2507.3	2.9	334.5	Can see the transition in the AUV bathymetry.	507
12/2/2017	3:26:18	-14.90509	-173.78963	2507.0	6.6	343.7	We just transitioned from jumbled flow to pyroclasts.	508
12/2/2017	3:27:02	-14.90502	-173.78967	2512.3	3.7	340.7	Elongated pillow tubes and pillow stacks.	509
12/2/2017	3:28:31	-14.90494	-173.78974	2515.4	1.7	339.5	The pillows are now looking a bit flatter like we saw earlier.	510
12/2/2017	3:29:00	-14.90489	-173.78979	2516.5	3.2	340.9	Pillows laying parallel to the slope here.	511
12/2/2017	3:29:21	-14.90488	-173.78980	2518.3	2.6	341.2	These flows are probably a century or two years old.	512
12/2/2017	3:30:28	-14.90483	-173.78975	2524.2	3.3	339.1	We're almost 7 meters off the bottom so not seeing much.	513
12/2/2017	3:30:43	-14.90481	-173.78972	2526.0	4.3	339.6	Back closer to the seafloor now.	514
12/2/2017	3:31:01	-14.90475	-173.78968	2527.9	5.0	341.8	These pillows are more jumbled up but obviously pillows.	515
12/2/2017	3:31:13	-14.90470	-173.78969	2529.2	4.1	341.1	Seeing the flattened pillows that we saw earlier on the dive now.	516
12/2/2017	3:31:40	-14.90468	-173.78968	2531.6	1.5	341.4	Pillows in chaotic patterns - parallel and perpendicular to the slope .	517

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S090 Mata Fitu Logger Comments	Record #
12/2/2017	3:32:01	-14.90468	-173.78967	2530.6	2.3	340.2	More of the larger inflated pillows here with the bread crust texture.	518
12/2/2017	3:32:56	-14.90467	-173.78967	2529.7	3.0	357.9	We're going to take a sample here. We're about 70 meters south of the final waypoint.	519
12/2/2017	3:33:43	-14.90466	-173.78970	2531.7	1.7	7.5	Some nice smooth short pillow tubes here. Also some larger pillows with more textured surfaces.	520
12/2/2017	3:33:54	-14.90466	-173.78970	2532.2	1.1	24.6	Sediment layer covering all these lavas.	521
12/2/2017	3:34:01	-14.90466	-173.78971	2532.8	0.0	21.1	Contact.	522
12/2/2017	3:34:49	-14.90466	-173.78971	2532.4	1.5	24.5	We're looking for something to sample here that's not too large. We've filled up all the partitions.	523
12/2/2017	3:35:14	-14.90464	-173.78971	2531.1	2.9	25.9	Seeing a whip coral here and there.	524
12/2/2017	3:35:39	-14.90463	-173.78970	2531.3	2.4	26.2	Broken off crust here and there.	525
12/2/2017	3:35:57	-14.90463	-173.78970	2531.8	1.9	25.4	Going in for a grab.	526
12/2/2017	3:40:37	-14.90492	-173.78983	2533.4	0.0	23.8	Not in place but from this flow. Weathered interior. Orange wedge shaped. 20 cm. Manganese and iron oxide coating. Outer rounded surface of a pillow. Glass?	528
12/2/2017	3:42:08	-14.90494	-173.78979	2527.0	3.1	45.3	That went in the basket behind the majors. Sample 16 location: Z=~2535 14.964995 173.789874.	529
12/2/2017	3:42:24	-14.90491	-173.78974	2526.9	2.3	43.1	Still heading north toward the next waypoint.	530
12/2/2017	3:42:38	-14.90487	-173.78970	2528.4	3.3	46.3	Going down another ridge.	531
12/2/2017	3:42:53	-14.90484	-173.78965	2527.6	4.5	45.0	Top of another little pillowish mound.	532
12/2/2017	3:43:22	-14.90478	-173.78957	2526.0	2.0	22.9	Lava comes through the top inflates and flows down the sides of these small mounds.	533
12/2/2017	3:43:35	-14.90474	-173.78955	2526.9	2.4	12.6	Intact pillow lava flows here again.	534
12/2/2017	3:43:55	-14.90471	-173.78953	2527.6	1.9	11.9	All sedimented. Not much life on these old lavas.	535
12/2/2017	3:44:24	-14.90466	-173.78950	2526.5	3.5	10.9	The orientation of these pillow tubes are all over the place.	536
12/2/2017	3:45:04	-14.90457	-173.78949	2527.5	2.2	11.2	The little bumps that we saw in the AUV bathymetry were probably these little pillow mounds.	537
12/2/2017	3:45:24	-14.90454	-173.78949	2528.7	2.2	11.2	This is old man river says Ken.	538
12/2/2017	3:45:50	-14.90449	-173.78948	2530.5	1.6	4.1	Moving up another little ridge again.	539
12/2/2017	3:46:13	-14.90445	-173.78947	2531.1	1.7	4.9	Sort of undulating topography here. Up and down.	540
12/2/2017	3:46:36	-14.90441	-173.78946	2532.2	2.0	4.7	Another one of those large pillows with smaller pillows squirted out the bottom.	541
12/2/2017	3:47:49	-14.90424	-173.78944	2536.0	2.8	4.8	Big individual bread crust pillows on top of smaller elongate pillows. Small pillow tubes and little pillows in place.	542

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S090 Mata Fitu Logger Comments	Record #
12/2/2017	3:48:09	-14.90419	-173.78945	2536.6	3.2	3.2	Sort of long pillow lobes coming out of that big pillow mound.	543
12/2/2017	3:48:25	-14.90416	-173.78945	2535.5	3.9	5.7	We made it all the way along our traverse today.	544
12/2/2017	3:48:41	-14.90413	-173.78946	2536.9	2.6	6.1	This traverse was over 3 kilometers. We worked Subastian.	545
12/2/2017	3:49:41	-14.90411	-173.78946	2538.4	0.6	6.6	This is a beautiful little piece of pre-broken lava. Came off the larger inflated striated pillow at the top of this mound.	546
12/2/2017	3:49:57	-14.90411	-173.78946	2538.4	0.6	6.6	Nav has been pretty solid today.	547
12/2/2017	3:52:09	-14.90411	-173.78946	2538.4	0.7	6.9	Piece of pillow that is chicken-breast shaped. Large piece with altered crust. Huge sample. 45-50 cm long. Glass all around with 2 broken surfaces.	548
12/2/2017	3:53:05	-14.90412	-173.78946	2537.2	2.2	2.7	Huge pillow toe - more like a pillow foot. Set behind the main box in the center.	549
12/2/2017	3:53:49	-14.90419	-173.78961	2535.4	2.1	300.4	End of dive S90 at Mata Fitu. We will be lifting off the bottom soon.	550
12/2/2017	3:54:16	-14.90425	-173.78965	2530.8	6.9	299.5	Z=2536 here at the take-off site.	551
12/2/2017	3:54:32	-14.90425	-173.78964	2522.5	15.4	295.0	Vehicle is off the bottom.	552

S091 Mata Tolu

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S091 Mata Tolu Logger Comments	Record #
12/2/2017	19:12:40	-15.00740	-173.80239	2145.5	14.5	352.8	We're on the bottom here at Mata TOLU. Start of dive S91.	25
12/2/2017	19:13:51	-15.00737	-173.80243	2145.4	6.9	352.4	Beautiful old pillow lava; probably slightly older as covered with sediment.	26
12/2/2017	19:14:23	-15.00736	-173.80242	2146.2	4.5	352.7	Working on taking the first sample at the touchdown site. Waypoint 1	27
12/2/2017	19:14:45	-15.00736	-173.80242	2146.9	3.4	352.1	Big old in place pillow lavas here. Sediment cover.	28
12/2/2017	19:15:13	-15.00736	-173.80242	2147.1	3.5	352.1	Some broken up pillows in the foreground.	29
12/2/2017	19:15:30	-15.00736	-173.80242	2147.1	3.5	351.8	More intact pillows in the background - some intact pillow tubes.	30
12/2/2017	19:15:58	-15.00736	-173.80242	2147.1	3.1	352.1	Going for lip where there is some crust and glass.	31
12/2/2017	19:16:47	-15.00735	-173.80242	2147.2	3.4	352.2	Lip of lava pillow. Has stuff that flowed out beneath it. Disgorged pillow.	32
12/2/2017	19:20:27	-15.00736	-173.80242	2147.3	3.6	351.0	**S91-rock-01.** Crumbly. Disgorged striated pillow. Angular flat piece. Crust 25cm slab 5-6 cm thick. Lava trips. Mn oxide coating.	33

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S091 Mata Tolu Logger Comments	Record #
12/2/2017	19:22:46	-15.00724	-173.80253	2147.3	3.6	351.3	Into partition 9. Z=2148m 15.00736 S 173.80242 W. Some vesicles. Heavy manganese coating.	34
12/2/2017	19:23:11	-15.00723	-173.80251	2147.2	3.1	350.6	The rock is in the partition (9).	35
12/2/2017	19:23:45	-15.00725	-173.80253	2147.3	3.1	350.7	Area of pillow lavas with breadcrust exterior. Smoother pillow tubes underneath.	36
12/2/2017	19:24:17	-15.00725	-173.80253	2147.3	3.2	350.3	We're going to move on straight north to waypoint 2.	37
12/2/2017	19:24:49	-15.00727	-173.80256	2146.1	2.3	352.1	These pillows are more than a meter in diameter. Bulbous lavas.	38
12/2/2017	19:24:53	-15.00727	-173.80256	2145.9	2.1	352.0	Whip coral.	39
12/2/2017	19:25:00	-15.00726	-173.80256	2145.7	0.0	352.4	Heading upslope.	40
12/2/2017	19:25:58	-15.00720	-173.80256	2141.6	3.0	352.7	Big pillows. Coral and brittle star. Light dusting of sediment on these lavas.	41
12/2/2017	19:26:07	-15.00720	-173.80256	2141.4	3.2	353.0	These lavas are all in place.	42
12/2/2017	19:26:54	-15.00716	-173.80254	2138.0	4.5	352.3	This volcano has a much more constructional form. Rift zones SW to NE and summit cone feature.	43
12/2/2017	19:27:07	-15.00716	-173.80253	2137.4	4.8	352.0	These lavas are probably a couple hundred years old.	44
12/2/2017	19:27:18	-15.00715	-173.80252	2136.8	3.2	351.5	Striated somewhat squat pillows.	45
12/2/2017	19:27:32	-15.00715	-173.80250	2136.1	3.3	351.6	See longer tubular lavas to the right of the screen.	46
12/2/2017	19:28:21	-15.00713	-173.80250	2133.6	4.4	352.0	Rocks have a slightly different character than most submarine lavas because of the boninite composition.	47
12/2/2017	19:30:03	-15.00704	-173.80248	2127.4	3.5	352.0	Passing over some crumbled lavas with striations and bread crust rinds.	48
12/2/2017	19:30:32	-15.00702	-173.80244	2126.4	2.8	352.1	Broken pillow fragments up ahead.	49
12/2/2017	19:31:29	-15.00698	-173.80246	2124.0	2.8	352.7	Sea cucumbers (purple) and urchins (small white guys)	50
12/2/2017	19:32:04	-15.00700	-173.80247	2120.0	7.2	352.8	Mike	51
12/2/2017	19:32:22	-15.00699	-173.80247	2122.1	5.3	352.1	Nice coral - chrysogorgia.	52
12/2/2017	19:33:21	-15.00695	-173.80245	2117.7	8.8	352.6	The slope is steepening.	53
12/2/2017	19:33:34	-15.00692	-173.80247	2116.2	7.0	352.2	In place pillows with elongated tubes.	54
12/2/2017	19:33:55	-15.00685	-173.80248	2116.4	4.5	352.4	Let there be light.	55
12/2/2017	19:34:10	-15.00682	-173.80247	2116.5	3.3	352.6	More elongated pillows. Some broken and crumbled.	56
12/2/2017	19:34:44	-15.00679	-173.80245	2117.2	2.2	353.0	Anemone - pink guy. Bamboo coral.	57
12/2/2017	19:35:08	-15.00675	-173.80245	2115.6	2.5	352.4	The bamboo corals are "faster growing" probably a couple hundred years old.	58

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S091 Mata Tolu Logger Comments	Record #
12/2/2017	19:35:18	-15.00675	-173.80246	2114.5	3.5	352.5	Flatter squat pillows here.	59
12/2/2017	19:35:54	-15.00670	-173.80246	2114.5	2.6	352.2	Lobate-ish. Plobates - Pillow lavas that are almost lobate.	60
12/2/2017	19:36:24	-15.00665	-173.80245	2113.1	3.6	352.2	Elongated flowing down slope pillows. Plobates to jumbled lavas here.	61
12/2/2017	19:36:40	-15.00662	-173.80245	2112.3	3.1	351.8	Scoria.	62
12/2/2017	19:37:01	-15.00661	-173.80244	2111.8	3.3	352.1	Folded sheet flow here. High effusion rate forms	63
12/2/2017	19:37:15	-15.00659	-173.80244	2111.8	2.7	351.4	Flat pillow tubes - curtain form.	64
12/2/2017	19:37:27	-15.00658	-173.80245	2111.8	2.6	351.8	We find these on the margins of lava channels on land.	65
12/2/2017	19:37:40	-15.00657	-173.80244	2112.0	1.8	352.3	Jumbled sheet flow - flat platy to the right.	66
12/2/2017	19:37:49	-15.00656	-173.80245	2112.3	1.7	352.5	Hollow interiors. Fragile.	67
12/2/2017	19:38:05	-15.00656	-173.80246	2111.8	1.9	352.7	Quick; chaotic flow rate for these lavas.	68
12/2/2017	19:38:22	-15.00655	-173.80245	2111.9	1.6	357.8	We're still not on the rift zone. We're to the south of it.	69
12/2/2017	19:38:57	-15.00655	-173.80244	2112.1	1.4	357.9	Curtain / like; ribbon folded; jumbled sheet flows.	70
12/2/2017	19:39:28	-15.00655	-173.80245	2112.6	0.0	0.0	Hole in sheet flow.	71
12/2/2017	19:39:45	-15.00655	-173.80243	2112.6	0.0	355.3	Fairly extensive area of folded sheet flows.	72
12/2/2017	19:40:07	-15.00654	-173.80240	2112.6	0.0	355.4	Coherent bands of folded sheet flow here at Mata Tolu.	73
12/2/2017	19:40:29	-15.00654	-173.80234	2112.6	0.0	355.4	We will sample here.	74
12/2/2017	19:40:59	-15.00657	-173.80233	2112.6	0.0	355.6	May take 2 samples here.	75
12/2/2017	19:42:16	-15.00663	-173.80223	2112.6	0.0	356.0	S91-rock-02. Hollowed out - outer shell of folded sheet flow. Shelly part of flow. Black glass. Outer Mn oxide crust. Black shiny lava with phenocrysts. Area of coherent bands of folded sheet flow.	76
12/2/2017	19:43:05	-15.00653	-173.80246	2112.6	0.0	355.9	10 cm long and 5 cm thick. Squarish slab of sheet flow crust that was drained out underneath.	77
12/2/2017	19:43:54	-15.00653	-173.80244	2112.6	0.0	355.9	Into partition 5. Z=2113. 15.00654 S 173.80239 W.	78
12/2/2017	19:44:12	-15.00654	-173.80243	2112.6	0.0	355.9	Ken wants another piece of rock here.	79
12/2/2017	19:44:17	-15.00655	-173.80243	2112.6	0.0	355.9	Scanning around.	80
12/2/2017	19:44:27	-15.00654	-173.80243	2112.6	0.0	355.9	Coral.	81
12/2/2017	19:45:11	-15.00649	-173.80277	2112.6	0.0	355.9	Piece of lava that is draped (folded) above the previous sample site.	82
12/2/2017	19:47:35	-15.00655	-173.80244	2112.7	0.0	348.1	We haven't moved so are naming this rock 2b. The rock is long and skinny from this folded sheet flow.	83
12/2/2017	19:50:49	-15.00653	-173.80244	2112.6	0.0	351.2	Crystal-rich rock. 6-7 cm. Conical. Crystals. Going in for 1 more piece.	84

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S091 Mata Tolu Logger Comments	Record #
12/2/2017	19:52:58	-15.00656	-173.80246	2112.6	0.0	351.4	Larger piece from exact same place as 2b. Glassy. Larger piece than previous 2b. Will break. 20 cm circular-ish. Fracture pattern on base.	85
12/2/2017	19:53:27	-15.00652	-173.80247	2112.6	0.0	351.3	The rib of this folded sheet. It fell apart.	86
12/2/2017	19:54:29	-15.00655	-173.80240	2112.6	0.0	351.4	All of those grabs are a part of Rock-2 - just a lot of pieces (a b and c). It's all just S91-Rock-2.	87
12/2/2017	19:55:39	-15.00656	-173.80244	2112.6	0.0	351.4	Zooming in to look at the underside of this rock. Very crystalline. Huge olivine crystals in these rocks.	88
12/2/2017	19:55:57	-15.00656	-173.80242	2112.6	0.0	351.4	These kinds of rocks are only known in this part of the world. We love boninites.	89
12/2/2017	19:56:08	-15.00654	-173.80246	2112.6	0.0	351.7	Beautiful view of folded sheet flow.	90
12/2/2017	19:56:33	-15.00654	-173.80246	2112.1	0.0	355.8	This sheet flow is folded and somewhat jumbled in the distance.	91
12/2/2017	19:56:54	-15.00653	-173.80250	2111.7	1.6	355.4	This is probably a near-vent deposit.	92
12/2/2017	19:57:10	-15.00654	-173.80254	2111.8	1.1	357.1	More jumbled lavas as we head upslope.	93
12/2/2017	19:57:52	-15.00652	-173.80260	2109.9	2.5	356.5	There are a few pillows within this jumbled sheet flow.	94
12/2/2017	19:58:17	-15.00649	-173.80264	2107.9	3.7	357.0	All of this is certainly part of the same eruption - could have been different episodes.	95
12/2/2017	19:58:25	-15.00648	-173.80265	2107.6	3.7	0.9	Very jumbled sheet flow.	96
12/2/2017	19:58:29	-15.00647	-173.80266	2107.5	3.9	2.9	Stalked coral.	97
12/2/2017	19:58:56	-15.00645	-173.80239	2107.4	3.4	27.8	Coming to the edge of 15-20 m wide channel. of striated sheet flow.	98
12/2/2017	19:59:22	-15.00642	-173.80239	2107.8	2.4	37.9	Working our way up slope.	99
12/2/2017	19:59:47	-15.00632	-173.80242	2107.8	2.1	46.9	Fragmentation of the pillows.	100
12/2/2017	20:00:14	-15.00640	-173.80240	2108.1	2.3	46.5	Jumbled chaotic flow.	101
12/2/2017	20:00:46	-15.00629	-173.80242	2107.8	4.9	47.2	Intact pillows to the right. More chaotic pillow fragments ahead now.	102
12/2/2017	20:01:06	-15.00626	-173.80242	2107.4	5.7	49.4	Rock fragments - apple sized to watermelon sized.	103
12/2/2017	20:01:11	-15.00626	-173.80243	2107.2	6.2	49.5	Mostly intact pillow.	104
12/2/2017	20:01:23	-15.00624	-173.80243	2106.9	6.3	47.9	Lateraling along slope to waypoint 2.	105
12/2/2017	20:01:31	-15.00623	-173.80242	2106.7	6.1	48.0	In place pillows and fragments.	106
12/2/2017	20:01:48	-15.00622	-173.80242	2106.7	0.0	50.5	Pillow in center of screen has 3 lobes spilling out of it.	107
12/2/2017	20:02:41	-15.00617	-173.80242	2106.6	4.0	51.5	In place lavas now. Pillow tubes and some inflated pillows.	108
12/2/2017	20:02:52	-15.00613	-173.80243	2106.6	3.0	50.6	Beautiful coral to the left.	109

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S091 Mata Tolu Logger Comments	Record #
12/2/2017	20:03:46	-15.00607	-173.80242	2106.7	3.5	57.5	Looks like a bamboo coral here according to Walter.	110
12/2/2017	20:04:03	-15.00607	-173.80243	2106.9	3.6	57.2	The base is sticking out horizontally from the rock.	111
12/2/2017	20:04:26	-15.00605	-173.80244	2106.8	4.5	62.8	The iris is too bright so couldn't get the color of it.	112
12/2/2017	20:04:36	-15.00603	-173.80243	2106.8	3.3	65.0	The pillows are more bulbous here.	113
12/2/2017	20:04:43	-15.00601	-173.80243	2106.7	3.4	59.2	Coming up on a flatter platform.	114
12/2/2017	20:04:56	-15.00599	-173.80242	2106.9	3.8	57.5	The rock here is generally coherent and unbroken.	115
12/2/2017	20:05:10	-15.00597	-173.80241	2106.7	5.3	59.0	Come large pillows with bread crust outer surface.	116
12/2/2017	20:05:43	-15.00598	-173.80236	2107.1	4.9	57.4	Crinoid or hydroid that looks like a palm tree.	117
12/2/2017	20:05:49	-15.00598	-173.80235	2106.7	5.3	57.1	Another beautiful coral.	118
12/2/2017	20:06:30	-15.00601	-173.80231	2105.8	4.0	56.3	Anemone.	119
12/2/2017	20:06:54	-15.00599	-173.80226	2105.1	4.3	48.1	Coming up on a flat platform now.....	120
12/2/2017	20:07:18	-15.00596	-173.80224	2104.7	3.2	49.4	The AUV map is not matching the bottom.	121
12/2/2017	20:07:38	-15.00593	-173.80224	2103.7	3.1	52.9	We're still on a gentle slope here.	122
12/2/2017	20:08:19	-15.00591	-173.80222	2100.3	0.0	56.4	Elongate pillows to the left - fractured pillow pieces to the right.	123
12/2/2017	20:08:35	-15.00591	-173.80219	2100.1	5.2	56.6	Steep slope with broken pillows.	124
12/2/2017	20:08:38	-15.00591	-173.80219	2100.0	4.2	56.4	Anemone.	125
12/2/2017	20:09:04	-15.00590	-173.80216	2097.8	5.4	56.6	Anemone to the left. Broken pillows in front of us.	126
12/2/2017	20:09:51	-15.00588	-173.80212	2095.5	3.5	58.1	Broken pillow lavas. Lots of pillow fragments.	127
12/2/2017	20:10:47	-15.00589	-173.80209	2094.0	4.0	59.3	Coral up ahead. Pink and beautiful. Squat lobster on the pretty coral is a chrysogorgia.	128
12/2/2017	20:11:56	-15.00585	-173.80204	2090.2	3.1	64.1	Stalked coral here in this area of broken pillows and pillow fragments.	129
12/2/2017	20:12:16	-15.00583	-173.80204	2089.1	3.9	68.2	Ship is having problems holding position because it's heading into the current.	130
12/2/2017	20:12:43	-15.00581	-173.80201	2087.0	0.0	68.3	Broken up pillow fragments - large and jagged.	131
12/2/2017	20:12:56	-15.00582	-173.80201	2086.9	3.3	69.2	Occasional in place pillow tubes.	132
12/2/2017	20:13:45	-15.00582	-173.80199	2085.4	3.1	68.7	More stalked coral.	133
12/2/2017	20:14:53	-15.00576	-173.80202	2082.9	2.6	69.1	Looks like a chrysogorgia coral from here. Pink color.	134
12/2/2017	20:15:33	-15.00576	-173.80201	2081.3	2.7	69.7	The chrysogorgia corals generally have thinner stalks than the bamboo corals.	135
12/2/2017	20:16:02	-15.00576	-173.80201	2080.4	3.3	69.3	Jumbled pieces of broken pillows.	136
12/2/2017	20:16:40	-15.00577	-173.80201	2077.8	3.9	68.9	The slope seems to be leveling out a bit.	137
12/2/2017	20:17:11	-15.00578	-173.80198	2077.1	2.8	68.8	This is a gentler slope than what we saw yesterday - but we're still seeing lots of pieces of pillows.	138

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S091 Mata Tolu Logger Comments	Record #
12/2/2017	20:17:36	-15.00580	-173.80197	2075.3	3.8	68.4	Coming up on some pillows that look to be in place.	139
12/2/2017	20:18:11	-15.00581	-173.80198	2073.6	6.1	68.7	Back into in place pillow lavas. Large pillows - some with broken faces.	140
12/2/2017	20:18:35	-15.00583	-173.80196	2071.9	4.2	68.3	Pillow tubes.	141
12/2/2017	20:18:45	-15.00583	-173.80195	2071.3	0.0	68.2	Broken big pillow.	142
12/2/2017	20:18:54	-15.00582	-173.80194	2070.7	6.8	68.5	Still slowly coming up slope.	143
12/2/2017	20:19:20	-15.00581	-173.80192	2069.7	0.0	68.9	The slope is flattening out here. Not nearly as steep as a few minutes ago.	144
12/2/2017	20:19:46	-15.00580	-173.80190	2068.6	1.9	68.3	Pillow lavas and some chaotic jumbly lobes.	145
12/2/2017	20:20:32	-15.00582	-173.80188	2067.2	2.0	69.3	Big pillows here. Beautiful coral here probably a chrysogorgia.	146
12/2/2017	20:20:57	-15.00581	-173.80184	2066.3	2.2	68.3	The slope here is probably a 5% grade.	147
12/2/2017	20:21:26	-15.00580	-173.80181	2065.5	1.8	68.6	Pillow lavas here - some broken. Fragments scattered about.	148
12/2/2017	20:22:04	-15.00579	-173.80176	2065.1	2.0	67.8	Coherent pillow lavas. Flowed down and made a right turn.	149
12/2/2017	20:22:11	-15.00579	-173.80175	2064.8	2.5	67.7	Light sediment dusting on the rocks.	150
12/2/2017	20:22:22	-15.00579	-173.80174	2064.2	3.0	68.7	Brittle star.	151
12/2/2017	20:22:34	-15.00578	-173.80174	2063.4	3.5	68.8	Broken truncated faces on some of these pillows.	152
12/2/2017	20:23:05	-15.00575	-173.80171	2061.5	3.5	68.8	Weird pink creature a minute ago.	153
12/2/2017	20:23:37	-15.00572	-173.80169	2061.4	2.0	68.5	Long pillow that is almost a lobe.	154
12/2/2017	20:23:56	-15.00572	-173.80167	2060.9	2.2	68.0	Little white sea urchin.	155
12/2/2017	20:24:43	-15.00571	-173.80161	2057.9	3.8	68.7	Another coral here. Either bamboo or chrysogorgia.	156
12/2/2017	20:24:48	-15.00571	-173.80160	2057.6	4.0	68.7	Urchin.	157
12/2/2017	20:25:05	-15.00571	-173.80158	2056.9	4.0	67.2	That last coral was probably a bamboo according to Walter.	159
12/2/2017	20:25:31	-15.00572	-173.80158	2056.6	3.9	66.2	Now we're on a flatter surface with drain-out features. Sheety lobate lavas.	160
12/2/2017	20:25:40	-15.00572	-173.80155	2055.3	4.8	65.5	The roof caved in here.	161
12/2/2017	20:25:51	-15.00572	-173.80154	2056.7	2.9	65.6	These are sheet transitional to lobate lavas.	162
12/2/2017	20:25:57	-15.00572	-173.80153	2056.9	2.6	65.2	Flat slabs.	163
12/2/2017	20:26:00	-15.00572	-173.80153	2056.8	2.7	65.0	Anemone.	164
12/2/2017	20:26:33	-15.00571	-173.80149	2057.7	1.4	65.0	Large stalk coral with a bizarre flower-like looking head.	165
12/2/2017	20:27:28	-15.00570	-173.80147	2057.2	1.6	62.3	Looking at this long lava slabby sheet flow.	166
12/2/2017	20:28:03	-15.00570	-173.80146	2056.9	1.7	59.7	This is similar to the piece 2 that we collected earlier.	167

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S091 Mata Tolu Logger Comments	Record #
12/2/2017	20:28:23	-15.00570	-173.80146	2057.1	1.6	58.5	Swirly sheet lobate flow.	168
12/2/2017	20:29:18	-15.00570	-173.80147	2058.3	0.0	33.6	Going to grab this thing that looks like a mini palm tree - Walter thinks it's probably a coral. Stalked coral in the background.	169
12/2/2017	20:31:20	-15.00566	-173.80150	2058.4	0.0	33.0	**S91-bio-03**. Coral (?) that looks like a palm tree. Intact in the claw. Long narrow stalk with what looks like palm fronds on top (obviously it's an animal).	170
12/2/2017	20:33:17	-15.00570	-173.80149	2058.3	0.0	33.5	Taller than the biobox partition 1. At waypoint 3. 15.0057 S 173.80148 W Z=2058m.	171
12/2/2017	20:33:55	-15.00569	-173.80149	2058.3	0.0	33.5	Going in for rock sample right next to where we took the coral (sample 3)	172
12/2/2017	20:34:08	-15.00568	-173.80148	2058.3	0.0	33.5	Lava whirl to the left of this next sample site.	173
12/2/2017	20:39:40	-15.00571	-173.80147	2058.3	0.0	8.1	**S91-rock-04**. In place fragile "Ribbon" of lobate/sheet lava just downslope of lava slabs. Pretty crunchy rock.	174
12/2/2017	20:43:41	-15.00571	-173.80146	2058.3	0.0	9.5	Slab from top of lobate ribbon. Large crystals. Vesicles. Manganese oxide coating. Green crystals. 30 cm long 19 cm thick.	175
12/2/2017	20:45:26	-15.00570	-173.80146	2058.3	0.0	9.5	Crusty part of sheet flow. Large sample. Very near sample 3 position - within meters. 15.0057 S 173.80146 W Z=2058m.	176
12/2/2017	20:46:11	-15.00571	-173.80146	2058.3	0.0	9.5	Placing massive slab from top of lobate lava into partition 10.	177
12/2/2017	20:46:51	-15.00571	-173.80146	2058.3	0.0	9.5	The last 2 samples were taken just east of waypoint 3.	178
12/2/2017	20:47:19	-15.00569	-173.80146	2056.9	1.7	11.8	We're off. Heading upslope.	179
12/2/2017	20:48:06	-15.00560	-173.80145	2056.9	1.5	37.0	The video seems to be over-saturated.	180
12/2/2017	20:48:33	-15.00556	-173.80140	2056.7	1.4	43.3	In place flattened pillow lobes.	181
12/2/2017	20:49:02	-15.00552	-173.80133	2057.5	1.8	43.3	In place lobates with sky lights.	182
12/2/2017	20:49:18	-15.00550	-173.80130	2057.4	1.4	43.2	Another one of those palm tree corals.	183
12/2/2017	20:49:36	-15.00549	-173.80128	2057.7	1.7	6.8	Large pillow in front of us. The lid popped off of that one.	184
12/2/2017	20:50:02	-15.00548	-173.80128	2057.9	1.6	359.7	Squat lobster in chrysogorgia coral.	185
12/2/2017	20:50:14	-15.00548	-173.80128	2057.0	2.5	20.9	Shelly pillow lavas. Hollow spaces.	186
12/2/2017	20:50:35	-15.00546	-173.80124	2057.5	1.6	42.0	Striated sheet / lobates.	187
12/2/2017	20:50:56	-15.00545	-173.80121	2057.5	2.1	42.1	Crusty.	188
12/2/2017	20:51:31	-15.00543	-173.80115	2057.2	1.9	51.6	In place pillow tubes - lobates.	189
12/2/2017	20:51:44	-15.00543	-173.80114	2057.0	2.6	47.0	Platy lava that fell in place.	190

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S091 Mata Tolu Logger Comments	Record #
12/2/2017	20:52:19	-15.00540	-173.80108	2057.1	1.9	54.4	Flattened pillow lobes with some jumbled fractured lavas on top.	191
12/2/2017	20:52:29	-15.00539	-173.80106	2057.7	1.5	54.7	Had to reboot DVRO. It was getting jumpy and refusing to take screenshots.	192
12/2/2017	20:53:40	-15.00537	-173.80099	2059.1	2.2	18.8	Coral skeleton with brittle star hanging out. Stalked sponge (lollipop) n the background.	193
12/2/2017	20:53:58	-15.00534	-173.80097	2059.4	2.3	42.8	Broken surfaces.	194
12/2/2017	20:54:36	-15.00531	-173.80092	2059.2	3.0	24.1	Palm tree coral. Flattened pillow lobes in the background.	195
12/2/2017	20:55:19	-15.00526	-173.80089	2060.9	1.5	57.0	Anemone and another coral ahead.	196
12/2/2017	20:55:53	-15.00524	-173.80085	2060.0	1.5	66.6	Pillow plates - jagged and angular. Transition between lobate and pillow lava.	197
12/2/2017	20:56:09	-15.00524	-173.80084	2060.2	1.6	72.4	Large lava pillow with a coral on top. Probably a coral.	198
12/2/2017	20:56:42	-15.00523	-173.80083	2059.5	2.6	62.5	This palm tree coral has more fronds than the others we have seen.	199
12/2/2017	20:56:56	-15.00522	-173.80082	2059.4	2.5	53.2	Some sedimentation on the pillows.	200
12/2/2017	20:57:28	-15.00516	-173.80077	2056.9	4.1	45.4	Striated ribbon sheet lava flowing down over elongate pillow lavas.	201
12/2/2017	20:57:49	-15.00514	-173.80074	2053.2	5.9	45.4	Mostly intact lavas here. Thin tubes sub-parallel.	202
12/2/2017	20:58:23	-15.00502	-173.80076	2048.2	5.5	47.3	Lots of elongated pillows here - tubular.	203
12/2/2017	20:58:50	-15.00498	-173.80072	2045.1	4.5	43.2	Striated lobates with ribbon-type texture here overlaid on other pillows.	204
12/2/2017	20:58:56	-15.00498	-173.80070	2045.1	3.8	36.4	Anemone and pillow. Beautiful.	205
12/2/2017	20:59:24	-15.00497	-173.80068	2045.4	2.6	344.6	Color in the endless lava field..	206
12/2/2017	20:59:46	-15.00497	-173.80068	2044.2	4.0	344.8	Anemone and little shrimp in the crack to the bottom left of it.	207
12/2/2017	21:00:14	-15.00495	-173.80071	2041.5	7.3	17.8	Lineated sheet-flow looking low squat pillow.	208
12/2/2017	21:00:25	-15.00493	-173.80070	2040.4	5.9	30.0	More jumbled coherent flows here.	209
12/2/2017	21:00:36	-15.00492	-173.80070	2039.9	6.0	31.7	Flat sheet-like flows to the right.	210
12/2/2017	21:01:15	-15.00485	-173.80070	2036.8	6.1	48.7	Elongate pillows. Slope is steepening.	211
12/2/2017	21:01:36	-15.00485	-173.80068	2037.0	4.8	41.3	Ribs of jumbled sheet flow. Delicate lavas.	212
12/2/2017	21:02:02	-15.00481	-173.80061	2033.8	4.4	37.5	Elongate pillow tubes now. All in place.	213
12/2/2017	21:02:05	-15.00480	-173.80061	2033.7	4.1	40.7	Anemone.	214
12/2/2017	21:03:01	-15.00478	-173.80051	2034.0	1.4	9.6	A nice pillow toe in front of us. Pillow toe extruded from the round breadcrust pillow above.	215
12/2/2017	21:03:19	-15.00475	-173.80051	2034.1	1.3	10.2	Seeing a little orange floc in the material in the cracks here.	216
12/2/2017	21:03:52	-15.00474	-173.80049	2034.7	0.9	3.8	Elongate flat pillow tubes here.	217

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S091 Mata Tolu Logger Comments	Record #
12/2/2017	21:08:38	-15.00477	-173.80041	2032.5	0.7	8.8	Sample attempt unsuccessful. Too big to grab onto and break. Will attempt a toe elsewhere?	218
12/2/2017	21:10:38	-15.00477	-173.80041	2032.3	1.4	332.6	Sample attempt unsuccessful. Too big to grab onto and break. Will attempt a toe elsewhere?	219
12/2/2017	21:11:34	-15.00476	-173.80042	2032.8	0.5	331.8	Found a new pillow toe to attempt a sample.	220
12/2/2017	21:11:54	-15.00475	-173.80043	2032.9	0.0	332.1	Sea anemones fairly abundant here.	221
12/2/2017	21:17:56	-15.00547	-173.80043	2033.0	0.0	332.3	10x15cm chunk of pillow. Vesicular with large olivines and patchy Fe staining.	222
12/2/2017	21:18:44	-15.00474	-173.80042	2024.8	8.3	1.9	Sample **S91-rock-05** location 15.0047529 173.8004329 depth2033m.	223
12/2/2017	21:19:34	-15.00468	-173.80032	2025.0	5.3	51.9	Resuming transit to NE toward waypoint 4.	224
12/2/2017	21:20:24	-15.00462	-173.80017	2018.1	4.2	72.1	Taffylike pillow lavas erupting from pillowlike lump with sheet lava behind.	226
12/2/2017	21:21:15	-15.00461	-173.80007	2017.5	2.2	71.5	Quickly moving back into pillow and lobate lavas.	227
12/2/2017	21:23:25	-15.00457	-173.79990	2010.5	2.5	34.5	Number of organisms increasing - seeing some sea stars and crabs.	228
12/2/2017	21:23:37	-15.00453	-173.79989	2009.7	2.8	53.1	Slope has a lot of squat lobsters.	229
12/2/2017	21:27:03	-15.00449	-173.79975	2005.3	1.4	82.7	Rough textured. knobby lavas suggesting fast-moving lavas erupting on slope. Overgrown a bit and probably older than the larger pillows we've seen previously.	230
12/2/2017	21:27:40	-15.00449	-173.79975	2005.6	0.9	85.9	Sediments are patchy with microbial growth and little orange balls again and this area is probably "riddled with diffuse flow".	231
12/2/2017	21:27:44	-15.00449	-173.79975	2005.7	0.8	87.7	Attempting sample.	232
12/2/2017	21:32:08	-15.00447	-173.79976	2003.2	3.6	101.3	10x15cm chunk relatively fresh interior with biological stuff on crust. Orange alteration under glass and large olivines	233
12/2/2017	21:33:20	-15.00443	-173.79969	2003.1	5.7	92.5	**S91-rock-06** location 15.0044862 173.7997561 depth 2007m	234
12/2/2017	21:37:35	-15.00440	-173.79945	2006.9	1.8	119.2	Eels. shrimp. and various fish living in taffy-like lava flows. Shimmering water - diffuse flow. Lots of eels hanging out.	235
12/2/2017	21:41:13	-15.00441	-173.79946	2005.5	3.6	117.6	Deploy digital marker 15.0044050 173.799455 depth 2006m at vent with large eel population	236
12/2/2017	21:41:58	-15.00441	-173.79941	2003.9	3.5	87.9	Digital marker ~20m east of waypoint 4. Resuming transit to waypoint 5	237
12/2/2017	21:42:23	-15.00438	-173.79938	2002.8	3.9	84.6	Overlooking pillow and lobate lavas. Cloudy water.	238

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S091 Mata Tolu Logger Comments	Record #
12/2/2017	21:43:52	-15.00436	-173.79926	2000.9	3.6	97.1	Large anemones. White stalks with pink-red tentacles.	239
12/2/2017	21:45:12	-15.00430	-173.79908	1998.7	3.1	71.0	Terrain is dominantly lobate flows and lenses of fairly thick sediment.	240
12/2/2017	21:49:16	-15.00410	-173.79886	1998.3	1.6	60.9	Continuing transit to waypoint 5 and moving upsection. Lots of pillow; lobate flows and sediment.	241
12/2/2017	21:50:06	-15.00406	-173.79878	1996.5	3.0	92.5	Gorgonian coral and sponges.	242
12/2/2017	21:54:38	-15.00413	-173.79849	1994.6	3.0	113.2	Seeing a lot of brittle stars hanging out on some of the stalk corals.	243
12/2/2017	21:54:47	-15.00414	-173.79847	1994.5	3.1	108.4	Approaching waypoint 5.	244
12/2/2017	21:55:15	-15.00412	-173.79839	1995.4	1.6	105.4	Seeing a few different sponges.	245
12/2/2017	21:59:45	-15.00421	-173.79821	1995.6	0.0	134.8	We're going in for another sample.	247
12/2/2017	22:00:18	-15.00421	-173.79820	1995.6	0.8	135.6	Large pillow with striations and bread crust rind.	248
12/2/2017	22:06:44	-15.00422	-173.79821	1995.6	0.9	134.3	**S91-rock-07**. Tip of pillow lobe. 8 cm or so. A little manganese coating. Vesicular. Z=1995m. 15.00421 S 173.79821 W.	249
12/2/2017	22:07:17	-15.00422	-173.79821	1995.6	0.9	131.4	We're finished up with that sample.	250
12/2/2017	22:07:52	-15.00423	-173.79818	1992.0	3.7	134.5	Beautiful coral on the nearby rocks. Probably bamboo.	251
12/2/2017	22:08:18	-15.00427	-173.79814	1991.2	3.1	134.7	Black coral; then a branching bamboo with chrysogorgia in the distance.	252
12/2/2017	22:08:23	-15.00428	-173.79813	1991.0	3.3	129.5	Palm tree pine.	253
12/2/2017	22:08:32	-15.00429	-173.79812	1990.5	3.4	129.8	Glass sponges.	254
12/2/2017	22:08:51	-15.00431	-173.79809	1990.1	3.3	129.9	Slope is flattening out with more sediment here. Seeing some floc in the water.	255
12/2/2017	22:09:08	-15.00433	-173.79807	1990.5	2.9	130.7	Just passed waypoint 5.	256
12/2/2017	22:09:38	-15.00437	-173.79805	1991.1	2.2	129.3	This looks more like coarse volcanic sand.	257
12/2/2017	22:09:52	-15.00439	-173.79803	1990.3	2.8	128.9	Coming on jumbled lavas now. Large pillow to the left.	258
12/2/2017	22:10:18	-15.00440	-173.79800	1987.8	4.5	129.2	Coming up a large mound of massive jumbled lava here.	259
12/2/2017	22:11:07	-15.00445	-173.79794	1987.7	3.4	123.7	Jumbled up broken lavas here Rock fragments covering the slope.	260
12/2/2017	22:11:30	-15.00445	-173.79791	1988.8	1.6	123.0	Fragmented jumbled flow to the right - move intact pillow tubes to the left.	261
12/2/2017	22:11:41	-15.00445	-173.79790	1989.2	1.5	123.5	The jumbled flow overlays the pillows.	262
12/2/2017	22:11:51	-15.00446	-173.79789	1989.5	1.4	123.5	Another coral.	263
12/2/2017	22:12:30	-15.00447	-173.79784	1988.4	2.6	123.6	We're continuing up this steepening slope.	264

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S091 Mata Tolu Logger Comments	Record #
12/2/2017	22:12:46	-15.00447	-173.79780	1987.0	3.2	123.4	Jumbled sheet flow in front of us. Coral	265
12/2/2017	22:12:58	-15.00446	-173.79780	1986.2	3.7	123.8	Almost a lava swirl here.	266
12/2/2017	22:13:16	-15.00448	-173.79779	1985.0	3.5	124.1	Sheety ribbon flow to the right.	267
12/2/2017	22:13:33	-15.00450	-173.79776	1983.9	2.8	120.8	Lava braided sheet flow.	268
12/2/2017	22:14:21	-15.00454	-173.79769	1980.7	3.0	121.9	Seeing more marine snow in the water column but also probably seeing the hydrothermal influence as we approach the summit.	269
12/2/2017	22:14:55	-15.00456	-173.79766	1977.3	3.4	121.1	Debris and small rock fragments here. Large in place pillow-like form to right.	270
12/2/2017	22:15:11	-15.00457	-173.79764	1975.6	4.0	121.7	Much smaller rock debris here. Talus slope.	271
12/2/2017	22:15:26	-15.00458	-173.79763	1975.2	2.7	121.4	Not seeing as many intact lavas now.	272
12/2/2017	22:15:45	-15.00459	-173.79760	1974.0	2.1	121.5	Debris slope with fine fragmental rock and a fair amount of sediment.	273
12/2/2017	22:15:56	-15.00460	-173.79759	1972.8	2.4	121.9	We may want to scoop the seds.	274
12/2/2017	22:16:01	-15.00460	-173.79759	1972.2	2.8	121.3	Glass sponge.	275
12/2/2017	22:16:40	-15.00465	-173.79755	1968.6	3.2	119.7	The sponge we saw was probably about 25 cm tall.	276
12/2/2017	22:16:50	-15.00466	-173.79754	1967.6	3.5	119.1	We're on a much steeper slope now.	277
12/2/2017	22:17:03	-15.00466	-173.79752	1966.7	3.0	120.4	Rocky debris with some larger fragments in place.	278
12/2/2017	22:17:19	-15.00467	-173.79750	1965.7	3.1	120.3	Anemone at least 20 cm across.	279
12/2/2017	22:17:50	-15.00470	-173.79746	1963.2	3.1	120.2	Still progressing up this steep slope. Rock fragments.	280
12/2/2017	22:19:21	-15.00478	-173.79735	1958.6	3.8	94.6	Extensive slope here. Looking for a place where there are not many rocks.	281
12/2/2017	22:20:31	-15.00479	-173.79739	1962.0	1.2	48.4	Looking for a place to scoop some sediment on this debris-strewn slope. Lots of small rock fragments in this area.	282
12/2/2017	22:20:51	-15.00478	-173.79739	1962.0	1.5	45.8	Coarse deposit of sand and gravel-sized particles.	283
12/2/2017	22:20:59	-15.00478	-173.79739	1962.0	1.5	45.9	Squat lobster here now.	284
12/2/2017	22:21:09	-15.00478	-173.79738	1961.9	1.6	46.0	Pulling out the scoop next.	285
12/2/2017	22:22:08	-15.00478	-173.79737	1961.9	1.7	47.0	Going in for a scoop sample of this coarse sediment on this debris-strewn slope.	286
12/2/2017	22:27:43	-15.00475	-173.79731	1961.9	1.6	46.8	Black sediment with rock fragments - volcaniclastic?	287
12/2/2017	22:28:31	-15.00477	-173.79729	1961.9	1.4	48.1	Sample **S91-sed-08** location 15.00478 173.79737 depth 1962m.	288
12/2/2017	22:30:06	-15.00476	-173.79719	1957.3	1.9	88.8	Transiting along contour to waypoint 6.	289
12/2/2017	22:34:48	-15.00493	-173.79656	1947.9	6.8	109.7	Moving upslope over pillows and elongate flows. Approaching a plateau near waypoint 6.	290

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S091 Mata Tolu Logger Comments	Record #
12/2/2017	22:35:37	-15.00496	-173.79649	1941.9	5.5	111.2	In talus further upslope on steep gradient right before waypoint 6.	291
12/2/2017	22:36:29	-15.00508	-173.79642	1932.4	8.4	97.8	Intact pillows with broken faces on cliff wall.	292
12/2/2017	22:37:32	-15.00505	-173.79629	1924.8	5.3	98.2	Decrease in truncated pillows.	293
12/2/2017	22:37:46	-15.00504	-173.79627	1924.8	3.7	97.9	About 20m east of waypoint 6.	294
12/2/2017	22:45:52	-15.00506	-173.79626	1925.6	0.9	116.8	40 cm long arrowhead shaped with Mn crust and lots of oxide staining.	295
12/2/2017	22:47:07	-15.00508	-173.79620	1920.9	4.2	107.0	**S91-rock-09** location 15.0050402 173.7962329 depth 1927m.	296
12/2/2017	22:54:51	-15.00510	-173.79517	1882.9	7.4	87.1	Mix of talus and in-place flows as we approach waypoint 7.	297
12/2/2017	22:55:02	-15.00510	-173.79514	1882.1	7.3	87.3	Urchin count: 1	298
12/2/2017	22:55:57	-15.00508	-173.79502	1876.1	5.2	87.1	Waypoint 7. Lots of rubble and some anemones.	299
12/2/2017	23:02:45	-15.00507	-173.79476	1861.9	1.4	79.4	**S91-rock-10**. 7x7cm two glass rinds with green-grey groundmass center. Abundant mm-scale olivines more typical of boninite.	300
12/2/2017	23:04:08	-15.00506	-173.79476	1861.9	1.4	79.9	Crust from same site as 10 (now 10A) thin crust ~7cm across.	301
12/2/2017	23:04:45	-15.00507	-173.79476	1860.8	2.8	79.0	Samples S91-rock-10A and 10B location 15.0050741 173.7947198 depth 1863m.	302
12/2/2017	23:06:19	-15.00502	-173.79461	1856.6	2.9	79.2	We've swapped out the nav underlays - using the summit one now.	303
12/2/2017	23:07:33	-15.00497	-173.79445	1848.5	4.6	78.5	Moving up the slope toward waypoint 8.	304
12/2/2017	23:08:12	-15.00495	-173.79433	1842.5	3.9	78.0	Debris-covered slope now.	305
12/2/2017	23:08:52	-15.00494	-173.79426	1838.9	3.2	79.2	Crinoid? or Brittle star here.	306
12/2/2017	23:09:06	-15.00494	-173.79423	1837.4	3.4	78.8	Rubble-strewn slope. Pillow pieces.	307
12/2/2017	23:09:34	-15.00493	-173.79420	1834.4	3.8	78.5	Coming on the crest of this slope.	308
12/2/2017	23:09:45	-15.00492	-173.79418	1833.5	3.7	68.6	Hoping to see some hydrothermal activity.	309
12/2/2017	23:10:19	-15.00491	-173.79412	1834.3	3.0	69.4	We're on the western side of a pit/basin crater. Looking east we're seeing an area of white mat - probably hydrothermal.	310
12/2/2017	23:10:59	-15.00488	-173.79404	1836.2	4.7	62.5	This "pit" is more of a depression.	311
12/2/2017	23:11:14	-15.00488	-173.79401	1837.5	4.2	85.9	We're on the northern side of this depression.	312
12/2/2017	23:11:29	-15.00489	-173.79400	1838.1	3.9	86.0	Yellow and white hydrothermal staining. Shimmer.	313
12/2/2017	23:11:36	-15.00490	-173.79399	1838.5	3.9	85.6	Eel to the lower left.	314
12/2/2017	23:11:48	-15.00490	-173.79399	1839.1	3.7	85.1	Lots of squat lobsters and other crabs here.	315
12/2/2017	23:12:42	-15.00495	-173.79401	1841.3	1.6	92.6	Lots of snails here. They are dead. It's a snail graveyard. Some shimmer here.	316
12/2/2017	23:13:10	-15.00496	-173.79399	1841.2	1.9	91.0	The larger crabs are probably brachyuran.	317

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S091 Mata Tolu Logger Comments	Record #
12/2/2017	23:13:42	-15.00496	-173.79399	1839.9	3.3	131.0	Barnacles and lots of other biota here.	318
12/2/2017	23:13:56	-15.00498	-173.79399	1838.7	3.9	179.9	We're going to look around here before we do any sampling.	319
12/2/2017	23:15:03	-15.00501	-173.79403	1836.4	2.5	322.6	Lots of diffuse flow here. Tons of vent animals. No samples yet. We're going to look around.	320
12/2/2017	23:16:15	-15.00498	-173.79405	1837.2	4.1	220.7	The ROV's position is plotting 30m to the SW of where the map indicates.	321
12/2/2017	23:16:35	-15.00499	-173.79405	1837.0	3.8	258.0	So. the map is mis-located 30 m to the NE.	322
12/2/2017	23:17:15	-15.00499	-173.79406	1837.6	1.8	349.3	We're looking to the NW now. The western wall is broken up pillow lavas. Rubble on the pit flow.	323
12/2/2017	23:17:38	-15.00498	-173.79404	1839.4	1.4	22.4	Now we're looking at the NE will. Looks like it's a sulfide wall.	324
12/2/2017	23:17:52	-15.00496	-173.79401	1838.8	3.5	52.1	On the lower right we're seeing white bacterial mat here.	325
12/2/2017	23:18:17	-15.00495	-173.79399	1840.2	2.6	61.9	Dark (black) eel on the bac mat.	326
12/2/2017	23:19:59	-15.00497	-173.79402	1840.3	2.5	80.1	Crabs; barnacles; Irfemeria snails; brachyuran crabs. Alvinoconcha snails in the flow. They look alive.	327
12/2/2017	23:20:21	-15.00497	-173.79402	1839.9	2.7	78.7	Alvinocaris shrimp.	328
12/2/2017	23:20:27	-15.00497	-173.79402	1840.2	2.6	78.8	Lasers on.	329
12/2/2017	23:21:05	-15.00497	-173.79402	1839.6	3.3	79.6	Paralomis crab.	330
12/2/2017	23:21:14	-15.00498	-173.79402	1839.5	3.2	80.8	Non-stalked barnacles.	331
12/2/2017	23:21:25	-15.00497	-173.79401	1840.1	2.8	78.7	Now looking at the east wall of the pit.	332
12/2/2017	23:21:43	-15.00496	-173.79399	1839.4	3.8	85.6	We're going to come straight up out of it to the east - climbing the wall.	333
12/2/2017	23:22:22	-15.00495	-173.79394	1835.0	6.7	85.6	Rubble covered wall. Sulfide blocks? Bacterial mat.	334
12/2/2017	23:22:45	-15.00495	-173.79390	1833.0	5.0	85.6	Driving up facing east. This wall is higher than the west wall.	335
12/2/2017	23:22:52	-15.00495	-173.79389	1832.5	6.4	85.8	See sulfide chimneys up ahead.	336
12/2/2017	23:23:38	-15.00496	-173.79384	1828.3	7.7	86.0	Lots of squat lobsters.	337
12/2/2017	23:23:43	-15.00496	-173.79384	1827.9	7.2	85.3	Zoarcids.	338
12/2/2017	23:24:20	-15.00497	-173.79378	1825.6	2.4	85.1	Yellowish floc on the slope here.	339
12/2/2017	23:24:38	-15.00499	-173.79373	1823.8	2.3	85.7	Steep wall of this "pit" on the eastern edge.	340
12/2/2017	23:24:44	-15.00499	-173.79372	1823.0	2.6	85.6	Squat lobster.	341
12/2/2017	23:25:08	-15.00499	-173.79370	1820.4	4.4	85.6	Coming up to the top of the eastern portion of this "pit".	342
12/2/2017	23:25:34	-15.00498	-173.79366	1818.5	3.0	80.6	Only regular barnacles in the pit - not stalked barnacles.	343

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S091 Mata Tolu Logger Comments	Record #
12/2/2017	23:25:53	-15.00500	-173.79365	1816.6	4.2	78.5	We are seeing a row of chimneys on the edge of the pit.	344
12/2/2017	23:26:09	-15.00499	-173.79364	1815.4	4.9	78.7	Venting.	345
12/2/2017	23:26:27	-15.00496	-173.79366	1814.4	5.0	78.9	Active venting up on the top and snails on the side here.	346
12/2/2017	23:26:40	-15.00495	-173.79368	1813.5	6.4	78.4	Lots of opaepele shrimp. More barnacles on the rocks.	347
12/2/2017	23:26:54	-15.00492	-173.79367	1812.6	6.1	79.1	Wow; what a beautiful place.	348
12/2/2017	23:27:09	-15.00491	-173.79367	1811.5	7.7	82.0	Sulfide chimney covered in snails.	349
12/2/2017	23:28:50	-15.00485	-173.79363	1808.1	15.2	146.8	Snail Alcove at east summit of pit. About 20 m above the pit bottom. 15.0048605 173.793636. Approximate position. Double check with nav target.	350
12/2/2017	23:29:20	-15.00485	-173.79362	1809.6	14.2	166.8	The map is actually putting us on the east side of the pit now.	351
12/2/2017	23:30:01	-15.00486	-173.79362	1809.5	11.2	150.7	We're up at the rim of the pit - and probably to the east.	352
12/2/2017	23:30:45	-15.00489	-173.79358	1810.6	11.8	163.8	Large chimney with shimmer out the side. "Smoker Chimney" target from Quest dive?	353
12/2/2017	23:31:10	-15.00491	-173.79359	1815.3	2.5	65.6	We are facing SE. The chimney is off to our right.	354
12/2/2017	23:31:25	-15.00492	-173.79359	1816.1	1.6	27.7	We're turning around to the NE.	355
12/2/2017	23:31:48	-15.00491	-173.79359	1816.8	2.5	353.9	This is probably what we called Pagoda chimney in 2012.	356
12/2/2017	23:33:38	-15.00488	-173.79353	1817.8	5.2	20.7	Now we're looking to the north. Pagoda Chimney is to our east. 15.0048823 173.7935252. Z=1819 Alt-5m. Pagoda Chimney?	357
12/2/2017	23:33:44	-15.00488	-173.79353	1817.4	5.0	20.9	Put in a nav target.	358
12/2/2017	23:34:01	-15.00488	-173.79353	1816.0	6.9	20.3	We're zooming in on this sulfide chimney with little spires on the top.	359
12/2/2017	23:34:08	-15.00488	-173.79354	1815.6	7.0	19.8	Lots of shimmer coming out along the crack.	360
12/2/2017	23:35:11	-15.00485	-173.79356	1813.9	8.7	15.9	Up above the chimneys now.	361
12/2/2017	23:36:05	-15.00474	-173.79350	1822.1	5.9	64.4	We will head north next. Another big sulfide chimney ahead. Lots of spicules on this one.	362
12/2/2017	23:37:47	-15.00474	-173.79353	1819.5	8.5	63.6	This one looks like a pagoda too. The altitude is about 8 meters. Put in dive target Pagoda Chimney 2.	363
12/2/2017	23:38:03	-15.00473	-173.79353	1818.3	10.8	65.2	Lots of biota on this one and clear flow.	364
12/2/2017	23:38:28	-15.00476	-173.79351	1816.8	9.1	25.8	Beehive with darker fluids but no black smoke.	365

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S091 Mata Tolu Logger Comments	Record #
12/2/2017	23:40:15	-15.00474	-173.79339	1817.2	9.9	336.6	Lots of shimmer at the base of this chimney. Snails; scaleworm; squat lobsters; etc. The whole plethora of animals.	366
12/2/2017	23:40:37	-15.00470	-173.79335	1817.0	11.1	306.8	We're seeing something off to our left now. Could be the 2012 target "Smoker Chimney". We'll see.	367
12/2/2017	23:41:13	-15.00466	-173.79330	1821.8	11.3	313.7	These are some big sulfides. Most of them look older and colder than what we saw at Mata Tolu.	368
12/2/2017	23:41:46	-15.00466	-173.79328	1822.6	10.8	311.5	This chimney is shimmering from the base.	369
12/2/2017	23:42:04	-15.00467	-173.79328	1818.7	14.8	313.6	Squat lobsters.	370
12/2/2017	23:42:32	-15.00468	-173.79332	1818.3	11.9	318.4	Doesn't appear to be active at the top. So; that's not the 2012 target "Smoker Chimney".	371
12/2/2017	23:42:51	-15.00470	-173.79333	1819.7	11.3	284.8	We're looking to the NW now.	372
12/2/2017	23:43:06	-15.00475	-173.79336	1819.5	8.2	282.8	We looked at this one a while back.	373
12/2/2017	23:43:52	-15.00483	-173.79339	1814.7	9.2	226.8	We're back at the edge of the little pit. Looking toward the SW now.	374
12/2/2017	23:44:56	-15.00482	-173.79353	1814.4	9.4	298.4	We're turning around now.	375
12/2/2017	23:45:07	-15.00480	-173.79356	1815.8	8.1	296.9	We're driving a little to the NW.	376
12/2/2017	23:46:03	-15.00481	-173.79358	1816.2	8.7	296.5	There's a fairly big beehive here. All the usual vent biota for this area.	377
12/2/2017	23:46:34	-15.00480	-173.79361	1813.3	9.3	295.9	Beehive at the top. Some smoke coming out of it - as well as out of a smaller beehive to the side.	378
12/2/2017	23:47:20	-15.00473	-173.79362	1815.4	9.2	301.6	Calling it beehive.15.0047885 173.7936215	379
12/2/2017	23:47:46	-15.00469	-173.79363	1818.0	5.0	302.3	Seeing smokers in the background.	380
12/2/2017	23:48:15	-15.00467	-173.79364	1817.2	6.2	302.0	Small chimlets on top of this fat sulfide structures.	381
12/2/2017	23:48:43	-15.00466	-173.79369	1817.4	5.2	302.2	This one is 6 meters tall.	382
12/2/2017	23:49:15	-15.00469	-173.79370	1815.7	7.4	301.4	Squat fat sulfide mound with white beehives on top.	383
12/2/2017	23:50:09	-15.00469	-173.79375	1818.3	6.6	323.3	Heading to the north. Tall bac-coated chimney to the right (east). Just passed another one to the west.	384
12/2/2017	23:50:55	-15.00463	-173.79378	1820.2	4.5	322.9	Lots of beehives on this one. Several beehives with black smoke. Taller and skinnier.	385
12/2/2017	23:52:11	-15.00470	-173.79383	1819.8	7.0	272.6	Facing west now. We're going around the north part of the pit.	386
12/2/2017	23:52:24	-15.00469	-173.79386	1819.9	6.2	271.1	And have been for a bit now.	387
12/2/2017	23:52:34	-15.00467	-173.79385	1819.7	8.0	270.6	Complex of chimneys and lots of diffuse flow.	388
12/2/2017	23:53:10	-15.00470	-173.79384	1818.3	7.8	267.0	There's a bit of black smoke coming out of a tiny beehive.	389

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S091 Mata Tolu Logger Comments	Record #
12/2/2017	23:54:21	-15.00469	-173.79385	1821.0	3.2	268.3	Lots of older beehives (not active). A complex of beehives. Called Lowboy in the nav target. Lowboy has a about a dozen chimneys on top.	390
12/2/2017	23:54:50	-15.00465	-173.79388	1822.5	2.0	263.1	Lots of diffuse flow coming out of the base.	391
12/2/2017	23:55:08	-15.00466	-173.79388	1822.8	1.8	261.8	Lots of biology here.	392
12/2/2017	23:55:18	-15.00467	-173.79388	1823.0	1.8	262.7	We're on the north side of the pit.	393
12/2/2017	23:55:47	-15.00467	-173.79385	1818.8	7.8	263.3	This is probably the furthest extent of these smokers on the NW side of the pit.	394
12/2/2017	23:56:36	-15.00466	-173.79386	1820.8	5.2	270.7	Possible sampling site later.	395
12/2/2017	23:58:17	-15.00469	-173.79387	1821.5	3.0	248.8	We're getting ourselves oriented here.	396
12/2/2017	23:59:08	-15.00465	-173.79389	1823.5	0.0	253.3	We're probably on the westernmost bump to the north of the pit - dubbed "Lowboy" because it's a low wide sulfide chimney with lots of spires.	397
12/3/2017	0:01:05	-15.00467	-173.79391	1823.5	0.0	253.0	I think the offset is more like 20m to the NE instead of 30m - we'll see...	398
12/3/2017	0:02:45	-15.00466	-173.79389	1823.5	1.2	252.9	We're going to head to the north now to get some perspective.	399
12/3/2017	0:03:09	-15.00465	-173.79388	1823.5	1.2	252.9	Smooth round snails Ifremeria and Alvinoconcha snails here.	400
12/3/2017	0:04:16	-15.00464	-173.79388	1821.9	3.4	263.6	Walter says we're seeing opaepele shrimp here. Mata Ua is only 500m to the north of Tolu but a lot of the species are different.	401
12/3/2017	0:04:54	-15.00462	-173.79389	1822.8	3.1	310.8	Tmax here is less than at Ua; and we are shallower than Ua here at Tolu.	402
12/3/2017	0:05:22	-15.00456	-173.79387	1824.1	7.5	276.4	We're going to head north next.	403
12/3/2017	0:06:24	-15.00452	-173.79399	1836.2	2.3	271.6	Heading north and not seeing big chimneys. Diffuse area	404
12/3/2017	0:06:55	-15.00452	-173.79401	1837.0	1.9	271.3	Both species of snails and lots of shimmer. Crabs and squat lobsters.	405
12/3/2017	0:08:49	-15.00445	-173.79402	1837.4	4.4	38.2	Single short to the NW extent of chimneys. Short single chimney in diffuse flow with lots of biota.	406
12/3/2017	0:09:04	-15.00441	-173.79402	1837.5	8.1	95.2	Extinct chimney here.	407
12/3/2017	0:09:33	-15.00436	-173.79401	1838.9	7.0	154.2	We're on the north flank of the summit. We're looking back at the summit.	408
12/3/2017	0:10:01	-15.00440	-173.79402	1839.4	4.5	156.0	Peter	409
12/3/2017	0:10:42	-15.00447	-173.79393	1838.6	5.3	150.4	On the north side of the volcano.	410
12/3/2017	0:11:07	-15.00450	-173.79387	1836.9	5.3	149.1	Rubble strewn up here. Squat lobster on rubble with diffuse flow.	411
12/3/2017	0:11:50	-15.00452	-173.79381	1834.8	4.7	149.6	Lots of squat lobsters and barnacles. Diffuse flow.	412

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S091 Mata Tolu Logger Comments	Record #
12/3/2017	0:12:14	-15.00452	-173.79380	1833.0	5.4	149.6	Long skinny fish. Hagfish?	413
12/3/2017	0:12:40	-15.00457	-173.79382	1831.1	4.5	149.2	Coming upslope from the north. See the summit above us.	414
12/3/2017	0:13:19	-15.00458	-173.79377	1828.7	0.0	149.3	Looking up at the summit peak.	415
12/3/2017	0:13:42	-15.00459	-173.79379	1827.4	4.0	148.3	Lots of snails.	416
12/3/2017	0:14:40	-15.00460	-173.79380	1826.2	5.1	146.2	This could be that tall skinny chimney. Lots of smoke.	417
12/3/2017	0:15:42	-15.00455	-173.79377	1825.1	7.9	130.1	Snail Tower nav target. Looking to the SE.	418
12/3/2017	0:15:59	-15.00453	-173.79375	1824.9	8.3	128.7	Snail Tower is tall with a wide base after all.	419
12/3/2017	0:18:00	-15.00460	-173.79368	1826.5	4.8	138.3	We're on the north side of the summit on the north flank. It's on the unstable slope edge. North-tall-handsome chimney. Z=	420
12/3/2017	0:19:18	-15.00464	-173.79361	1825.5	7.5	134.2	15.0046025 173.7936711 Z~1830 on this steep slope. North-Tall Handsome chimney. Lots of shimmering - spigots.	421
12/3/2017	0:20:24	-15.00451	-173.79360	1823.3	5.2	136.9	Covered in biota. Many spires. It's got everything. The beehives are not putting out totally black smoke - more clear fluids.	422
12/3/2017	0:21:10	-15.00450	-173.79359	1822.5	7.0	133.9	Opaepele shrimp Both types of snails. Hairy crab. Scaleworms. Awesome flange.	423
12/3/2017	0:22:07	-15.00450	-173.79359	1823.0	9.3	135.1	Funny-looking little flange at the top.	424
12/3/2017	0:23:20	-15.00449	-173.79359	1824.1	4.7	134.6	We're looking at Tall-North-Handsome Chimney.	425
12/3/2017	0:24:13	-15.00459	-173.79358	1823.9	3.5	120.9	Now we're looking to the east at some tall extinct chimneys.	426
12/3/2017	0:26:13	-15.00464	-173.79368	1819.4	8.9	140.5	We're on the north side of the slope but on the map we're 30m farther south. The offset is probably 10m between the nav and map. The map needs to be moved to the south.	427
12/3/2017	0:26:50	-15.00464	-173.79366	1818.2	11.3	290.8	We're taking a twist out of the cable.	428
12/3/2017	0:28:21	-15.00464	-173.79366	1819.1	0.0	169.0	Ooh that's some dark gray smoke coming out of this smaller chimney.	429
12/3/2017	0:29:19	-15.00462	-173.79362	1817.6	21.8	163.7	The one on the left is the inactive one we were just looking at.	430
12/3/2017	0:30:12	-15.00465	-173.79365	1818.7	7.8	167.0	We're on the north face of the summit. Gray smoke there.	431
12/3/2017	0:30:34	-15.00465	-173.79366	1820.0	1.9	167.4	Lots of biota. Short squat double chimney structure here.	432

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S091 Mata Tolu Logger Comments	Record #
12/3/2017	0:33:01	-15.00452	-173.79373	1819.3	13.1	140.6	Saguaro Cactus nav target. Has a cactus look to the top of it. The one with the gray smoker.is just off to the east end of Saguaro.	433
12/3/2017	0:34:08	-15.00457	-173.79363	1822.0	5.7	138.1	We're going to continue to the east along the northern summit to make sure we've seen it all here.	434
12/3/2017	0:34:48	-15.00460	-173.79353	1825.8	8.8	139.7	We're looking at an inactive chimney here.	435
12/3/2017	0:34:58	-15.00462	-173.79350	1827.4	7.2	140.2	Z-1830.	436
12/3/2017	0:36:29	-15.00466	-173.79346	1824.6	3.6	120.1	This is a less active sulfide with fuzzy mat on it. There is some diffuse flow coming out of the white chimney.	437
12/3/2017	0:37:17	-15.00460	-173.79343	1826.9	6.5	100.0	We're going to continue looking east. Lots of chimneys. These ones to the north east of the summit are less active. Still beautiful.	438
12/3/2017	0:38:18	-15.00457	-173.79339	1830.3	5.5	141.4	Lots of snails at the base of some of these big cooler sulfide chimneys. Crabs and squat lobsters.	439
12/3/2017	0:38:58	-15.00454	-173.79334	1831.3	9.2	135.7	Swarm of snails - not supposed to say that because it's "behavior".	440
12/3/2017	0:39:35	-15.00454	-173.79328	1834.8	5.9	134.7	Row of sulfide chimneys along the slope. These don't look active but could have some shimmer going on. Diffuse?	441
12/3/2017	0:40:37	-15.00458	-173.79327	1836.5	1.9	142.7	We're on the NE side of the summit now (at waypoint 13).	442
12/3/2017	0:41:03	-15.00458	-173.79327	1835.7	2.0	142.7	These inactive sulfides continue on for a while.	443
12/3/2017	0:43:11	-15.00461	-173.79326	1836.6	0.6	141.2	Calling this place "Deadwood". 15.0046031 173.7932566. Z=1837 at the base of this structure.	444
12/3/2017	0:43:23	-15.00461	-173.79326	1836.6	0.0	141.8	We'll grab a chimney sample for Chris here at Deadwood.	445
12/3/2017	0:44:56	-15.00465	-173.79310	1836.8	0.0	141.6	**S91-sulfide-11**. Sulfide spire. Manganese coating. Large extinct chimney sample. Colorful. 15.0046031 173.7932566. Z=1837	446
12/3/2017	0:46:48	-15.00463	-173.79319	1836.8	0.0	143.4	Copper (blues and greens) and purple. 40 cm long and 15 wide. Colorful mineral-rich. Some cavities inside.	447
12/3/2017	0:48:50	-15.00466	-173.79315	1835.4	3.3	144.0	We're on the northeast slope of the summit. Are going to travel to the east a bit more for another chimney crab.	448

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S091 Mata Tolu Logger Comments	Record #
12/3/2017	0:50:01	-15.00472	-173.79309	1836.5	4.3	143.4	Sea stars (brisingid) and stalked lollipop sponges on these old cold sulfide chimneys. They are not vent species.	449
12/3/2017	0:51:16	-15.00470	-173.79306	1838.9	3.2	88.3	"Star mound" this sulfide chimney with no venting and the sea stars.	450
12/3/2017	0:51:52	-15.00469	-173.79303	1839.7	3.5	135.2	This is the official eastern / northeastern edge of the venting on the north side of the summit.	451
12/3/2017	0:52:36	-15.00471	-173.79300	1840.2	4.1	175.5	We're on rubble here with some intact pillows. Another little extinct sulfide mount to the right of us.	452
12/3/2017	0:53:13	-15.00478	-173.79299	1838.4	2.8	185.0	The venting extends quite far down the northeast slope.	453
12/3/2017	0:55:26	-15.00497	-173.79301	1828.0	1.7	196.1	We're going over broken lavas as we move around the summit ridge.	454
12/3/2017	0:55:49	-15.00499	-173.79301	1827.7	1.1	264.3	We're going up slope and turning west so that we get back into the venting.	455
12/3/2017	0:57:47	-15.00497	-173.79310	1825.9	0.0	264.0	We just drove down south and now are heading to the west. to get back into the vent field.	456
12/3/2017	0:58:10	-15.00498	-173.79312	1826.4	0.7	264.2	We're on the SE edge of the summit and driving west.	457
12/3/2017	0:58:20	-15.00498	-173.79313	1826.5	0.7	264.5	Fish? Eel?	458
12/3/2017	0:59:00	-15.00499	-173.79313	1826.4	0.8	264.3	Moon-walking eel? Swimming backwards away from us.	459
12/3/2017	1:00:56	-15.00501	-173.79323	1824.7	1.4	270.0	Moving over a field of rubble heading west on the south side of the summit.	460
12/3/2017	1:02:06	-15.00503	-173.79334	1823.3	1.2	270.1	There were vents at this depth and deeper.	461
12/3/2017	1:02:16	-15.00503	-173.79336	1823.0	1.4	270.0	Seeing some sulfide-like structures now.	462
12/3/2017	1:02:31	-15.00503	-173.79338	1822.6	1.4	269.7	The water is cloudy. Seeing more squat lobsters here.	463
12/3/2017	1:03:07	-15.00505	-173.79343	1821.7	2.1	269.4	Signs of venting bac mat on the rocks.	464
12/3/2017	1:03:23	-15.00504	-173.79345	1821.4	1.9	269.5	Looking west and we are coming on a line of chimneys ahead.	465
12/3/2017	1:04:00	-15.00504	-173.79348	1820.1	2.1	269.8	This is the southern edge of the vent field.	466
12/3/2017	1:04:42	-15.00503	-173.79347	1819.5	2.6	270.1	Map needs to shift ~20-25 m to the SW.	467
12/3/2017	1:05:41	-15.00502	-173.79347	1818.8	3.0	295.8	A small amount if flow on this massive sulfide complex. Thin coating of bacmat.	468
12/3/2017	1:06:06	-15.00501	-173.79347	1818.8	3.4	331.5	We were facing west and now are gently turning to the north.	469

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S091 Mata Tolu Logger Comments	Record #
12/3/2017	1:06:39	-15.00497	-173.79346	1817.9	4.4	336.7	That's a massive sulfide ahead of us. Looks mostly inactive.	470
12/3/2017	1:07:38	-15.00480	-173.79352	1819.9	7.1	307.2	We're probably driving up to the big red complex in the middle.	471
12/3/2017	1:08:43	-15.00475	-173.79354	1820.7	5.6	345.8	Lots of chimneys ahead. We're looking at the beehive chimney. So Pagoda should be to our right.	472
12/3/2017	1:09:10	-15.00469	-173.79354	1822.4	6.8	346.3	Antimora deep sea fish.	473
12/3/2017	1:11:29	-15.00457	-173.79347	1823.7	11.7	271.9	I'm lost.	474
12/3/2017	1:12:15	-15.00469	-173.79346	1826.6	5.3	165.4	Supposedly that was Big-Tall and Handsome.	475
12/3/2017	1:13:36	-15.00476	-173.79346	1823.2	5.4	150.6	We're trying to look at the NE side of summit.	476
12/3/2017	1:13:46	-15.00474	-173.79346	1823.3	5.6	142.9	We're looking at one of the pagoda vents here.	477
12/3/2017	1:14:39	-15.00467	-173.79341	1822.8	6.0	117.4	The Subastian nav is working quite well.	478
12/3/2017	1:14:46	-15.00466	-173.79340	1822.8	5.5	133.9	We haven't seen this one yet.	479
12/3/2017	1:15:39	-15.00465	-173.79337	1824.7	4.7	166.2	So we're to the east of where we were before. We're in between Pagoda and Deadwood. On the south side of the summit.	480
12/3/2017	1:16:00	-15.00467	-173.79337	1824.6	6.2	167.3	Lots of beehives. A little bit of grayish smoke.	481
12/3/2017	1:18:42	-15.00468	-173.79333	1824.7	5.3	219.3	Angor Wat nav target. 15.004659 173.793340 Z=~1830 at the base. It's probably a good 8 meters tall.	482
12/3/2017	1:18:50	-15.00468	-173.79333	1824.5	6.4	219.6	Difficult place to sample.	483
12/3/2017	1:19:32	-15.00471	-173.79332	1826.7	5.6	197.8	We're going to turn left and go a little bit more to the east.	484
12/3/2017	1:20:19	-15.00479	-173.79331	1825.1	2.6	197.4	Pillow lavas on the seafloor. Mostly broken up. Mussels.	485
12/3/2017	1:20:43	-15.00479	-173.79332	1823.8	3.3	230.2	Big mounds with white tops.	486
12/3/2017	1:21:14	-15.00478	-173.79336	1822.7	4.3	235.5	Striated boninite pillars at the bottom of the base.	487
12/3/2017	1:22:56	-15.00479	-173.79345	1821.6	6.3	112.5	Christmas tree - massive sulfide: The base is probably 10 meters wide. Christmas tree pos: 15.00476 173.79344. Z=1820 at top and > 6 m tall.	488
12/3/2017	1:23:23	-15.00481	-173.79344	1821.6	4.9	99.4	Lots of white floc. The Christmas tree has squat lobsters for decorations.	489
12/3/2017	1:24:25	-15.00482	-173.79344	1822.0	3.9	76.9	There are some mussels here and snails. Opaepele shrimp; swimming scaleworm. Sulfide worm and scale worm (polynoids).	490
12/3/2017	1:24:53	-15.00482	-173.79345	1822.1	3.7	79.6	Ifremeria and Opaepele snails. Tiny limpets on the snail shells.	491
12/3/2017	1:25:18	-15.00484	-173.79344	1822.1	2.8	79.5	Alvinocaris (?) shrimp.	492

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S091 Mata Tolu Logger Comments	Record #
12/3/2017	1:25:41	-15.00484	-173.79344	1822.1	2.6	112.8	Going a little farther to the south to make sure that we have seen all the chimneys.	493
12/3/2017	1:26:14	-15.00487	-173.79340	1821.8	1.6	118.8	We're looking at lava blocks here. Rubble - strewn slope with lots of big lava blocks.	494
12/3/2017	1:26:57	-15.00488	-173.79332	1822.2	1.1	129.1	Looks like we've seen it all - or at least most of it.	495
12/3/2017	1:27:27	-15.00489	-173.79330	1821.3	2.0	256.4	We're going to head to Saguaro	496
12/3/2017	1:28:24	-15.00491	-173.79342	1820.1	2.4	290.2	We've turned back around and are moving on toward Saguaro eventually.	497
12/3/2017	1:29:44	-15.00475	-173.79353	1821.1	5.2	301.1	Beehives in the distance. Have one of the beehive chimneys here.	498
12/3/2017	1:30:07	-15.00476	-173.79353	1821.9	3.7	301.3	Can see sulfide chimney mounds in every direction.	499
12/3/2017	1:30:39	-15.00477	-173.79356	1821.6	4.1	301.2	One of the beehive chimneys in front of us.	500
12/3/2017	1:32:54	-15.00479	-173.79360	1820.4	3.9	359.7	We're going to grab an inactive spire from one of the "Beehive" chimneys.	501
12/3/2017	1:33:15	-15.00479	-173.79361	1820.7	3.6	0.8	We're sitting north of Snail Alcove and between the 2 Beehive nav targets.	502
12/3/2017	1:34:59	-15.00478	-173.79362	1821.4	2.0	9.4	Position here is:15.0047842 173.7936157 1821 m. Sample site for Chris's next extinct sulfide.	503
12/3/2017	1:37:05	-15.00478	-173.79362	1821.5	2.6	9.6	**S91-sulfide-12**. Sulfide chimney grab. Highly oxidized on the outside (orange crust) Roundish 10 cm. Sparkling gray center with 2 central fluid outflow zones. Into biobox partition 2.	504
12/3/2017	1:38:23	-15.00478	-173.79362	1821.5	2.6	9.7	That's one dead chimney. Didn't seem like it broke up that much.	505
12/3/2017	1:41:20	-15.00477	-173.79362	1822.0	1.2	13.8	Grabbing a piece of this sulfide that is extending down (not up) from the massive structure. Piece of sulfide.	507
12/3/2017	1:42:51	-15.00478	-173.79361	1822.0	1.6	14.1	25 cm squarish piece of sulfide from side of larger mound - Orange coating. Gray center. Nice large piece. Minerals in there.	508
12/3/2017	1:43:15	-15.00478	-173.79362	1822.1	1.6	13.7	This is one of the Pagoda Chimney targets.	509
12/3/2017	1:45:22	-15.00475	-173.79367	1818.8	5.4	61.4	CORRECTION: This sample was taken at the base of the Bee Hive Chimney complex.	510
12/3/2017	1:46:07	-15.00472	-173.79365	1819.3	4.8	182.5	Looking at that beehive. That's a big one. Lots of crabs here and lots of opaepele shrimp.	511
12/3/2017	1:47:32	-15.00472	-173.79365	1820.6	4.2	185.8	Polynoids; brachyuran; opaepele shrimp; Ifremeria; etc. Lots of life on this Bee Hive chimney complex.	512

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S091 Mata Tolu Logger Comments	Record #
12/3/2017	1:47:41	-15.00472	-173.79365	1819.9	4.9	190.8	Lots of bio zones that we're looking at.	513
12/3/2017	1:48:27	-15.00472	-173.79369	1819.2	5.7	149.0	Taking lots of frame grabs and some video highlights (?) of that.	514
12/3/2017	1:48:58	-15.00471	-173.79366	1819.5	5.1	3.4	Behind us we should see Saguaro Chimney.	515
12/3/2017	1:49:32	-15.00469	-173.79368	1819.6	5.5	345.1	There we are at Saguaro chimney. We want to approach it from the downslope side.	516
12/3/2017	1:50:07	-15.00467	-173.79373	1819.6	5.5	57.3	The slope is really steep here. This Saguaro chimney is right at the summit. The slope is steeper to the north than to the south.	517
12/3/2017	1:50:34	-15.00466	-173.79372	1820.1	3.6	66.9	Z=1820 at the top of chimney - It's about 3 m tall.	518
12/3/2017	1:51:22	-15.00463	-173.79363	1818.7	0.0	8.9	This is still a part of Saguaro. There was a nice black smoker there.	519
12/3/2017	1:52:31	-15.00458	-173.79366	1819.0	5.9	190.7	Getting snaps of this Saguaro complex. Chimneys to the east and west side with a flatter portion in the middle.	520
12/3/2017	1:52:42	-15.00460	-173.79366	1819.2	6.1	187.3	That's the blackest smoke we've seen today.	521
12/3/2017	1:53:39	-15.00462	-173.79365	1818.7	5.7	178.7	Black smoker bee hives are tall and skinny. We will try to sample the sulfide; fluids; gas; biology; and place a marker.	522
12/3/2017	1:53:54	-15.00462	-173.79364	1819.2	0.0	181.3	That's some nice black smoke.	523
12/3/2017	1:54:27	-15.00459	-173.79368	1818.7	6.2	143.5	The audio channel is in and out and sounding weird. They're going to try to fix it.	524
12/3/2017	1:57:15	-15.00463	-173.79359	1816.0	11.8	238.4	The sulfide fell over. We'll see if there is anything left to it.	525
12/3/2017	1:58:12	-15.00466	-173.79363	1819.0	4.2	309.8	The black smoker one is behind this taller one.	526
12/3/2017	1:58:33	-15.00464	-173.79366	1819.0	3.4	15.8	The top of the beehive fell off and the black smoke is pouring out.	527
12/3/2017	1:59:37	-15.00464	-173.79367	1819.8	2.0	38.9	Lots of flow going on there. The beehives are so friable.	528
12/3/2017	2:01:07	-15.00463	-173.79366	1820.5	1.3	45.5	Going to try to grab a chimney piece again before se start sampling at this site.	529
12/3/2017	2:01:37	-15.00463	-173.79366	1820.6	0.5	45.5	Lots of polynoids and brachyuran crabs.	530
12/3/2017	2:02:50	-15.00465	-173.79365	1820.5	1.1	45.4	15.004629 173.79366 Z=1820 on Saguaro chimney sampling site. Going in for another chimney grab.	531
12/3/2017	2:05:15	-15.00465	-173.79368	1820.6	1.2	45.5	Nor sure if the claw is wide enough for this sampling attempt of active chimney.	532
12/3/2017	2:06:12	-15.00464	-173.79367	1820.6	1.4	45.2	Those are some big fat scaleworms.	533

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S091 Mata Tolu Logger Comments	Record #
12/3/2017	2:07:42	-15.00464	-173.79367	1820.7	1.3	45.3	The chimney is really fragile and keeps breaking as they try to sample it.	534
12/3/2017	2:09:01	-15.00464	-173.79367	1820.7	1.6	45.8	Going to try to get a piece of the top instead of the whole circumference.	535
12/3/2017	2:09:08	-15.00464	-173.79366	1820.7	1.2	45.8	That didn't work.	536
12/3/2017	2:09:51	-15.00464	-173.79367	1820.7	1.2	45.6	That didn't work.	537
12/3/2017	2:10:07	-15.00464	-173.79367	1820.7	1.3	45.8	We're moving on to temperature next.	538
12/3/2017	2:11:09	-15.00464	-173.79366	1820.7	1.2	45.8	OK - our next task is to measure the temperature in the sampling orifice.	539
12/3/2017	2:14:53	-15.00464	-173.79368	1820.8	1.4	45.6	Deploying T probe now to measure how hot the fluids in the central upflow zone is.	540
12/3/2017	2:20:03	-15.00465	-173.79368	1820.8	1.7	45.0	Measurement 1; Temperature max = 297 C.	541
12/3/2017	2:22:54	-15.00464	-173.79368	1820.8	1.7	45.1	Measurement 2 same vent; Temperature max = 314 C.	542
12/3/2017	2:26:44	-15.00464	-173.79367	1820.9	1.7	45.4	Measurement 3. different vent; Temperature max = 279 C.	543
12/3/2017	2:28:30	-15.00465	-173.79367	1820.9	1.7	45.5	Measurement 4. chimlet; Temperature max = 250 C.	544
12/3/2017	2:35:02	-15.00464	-173.79365	1820.9	1.7	45.6	The hottest orifice is top center at 314C. Next hottest is same height to the right 15 279C. The little chimlet on the lower left is 250C.	545
12/3/2017	2:35:34	-15.00464	-173.79366	1820.9	1.7	45.6	Going to sample in the hottest orifice.	546
12/3/2017	2:41:44	-15.00465	-173.79366	1821.0	1.7	46.0	**S91-gas-13**. Sample from vent of black smoker. Location 15.004629 173.79366 depth 1820m.	547
12/3/2017	2:52:09	-15.00465	-173.79366	1821.0	1.7	44.1	**S91-fluid-14**. Water sample from same vent as gas-13. Same location.	548
12/3/2017	3:06:34	-15.00465	-173.79366	1821.1	1.7	45.6	**S91-bio-15**. Two crabs plus at least one scale worm and some shrimp	549
12/3/2017	3:08:39	-15.00465	-173.79367	1821.1	1.6	47.0	NOTE that S91-bio-15 also includes a mollusk going into biobox 2.	550
12/3/2017	3:18:40	-15.0046	-173.793695	1819.41	3.1	27.2351	**S91-sulfide-16**. Piece of sulfide broken off of vent where gas and fluid samples were taken. Dark grey and less than 10x10cm. Broke into several small pieces.	551
12/3/2017	3:20:20	-15.0047	-173.7936793	1820.67	2.8	350.799	**Deploying Marker 277** at black smoker where fluid-gas-bio-sulfide samples (13-16) were taken. Location 15.004629 173.79366 depth 1820m.	552
12/3/2017	3:21:26	-15.0047	-173.7936454	1813.54	10.8	329.722	Moving on to the next vent site NW of Saguaro vent.	553

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S091 Mata Tolu Logger Comments	Record #
12/3/2017	3:30:10	-15.0047	-173.7939024	1821.85	4.7	97.9266	Arrived at Low Smoker vent to sample	554
12/3/2017	3:39:59	-15.00465	-173.79391	1824.0	0.0	139.9	Deploying temperature probe into black smoker vent. Tmax=260C.	555
12/3/2017	3:43:39	-15.00466	-173.79391	1824.0	0.0	140.4	Still poking around with the temperature probe trying to get a good temperature here.	556
12/3/2017	3:44:33	-15.00465	-173.79391	1824.0	0.0	140.4	Terry and Val saw 260 C in this orifice. So - 260 C it is.	557
12/3/2017	3:48:25	-15.00464	-173.79390	1824.0	0.0	141.4	At Low Smoker site where the temp got up to 260 C - briefly. Z=1824. Approx. location 15.0046505 S 173.793932 W. for next samples.	559
12/3/2017	3:48:54	-15.00464	-173.79390	1824.0	0.0	141.5	Coming up on dinner time.	560
12/3/2017	3:49:42	-15.00465	-173.79391	1824.1	0.0	141.8	Working on removing the gastight sampler from the Swiss milk crate.	561
12/3/2017	3:50:59	-15.00465	-173.79391	1824.0	2.8	141.0	The next sample will be S91-Fluid-17.	562
12/3/2017	3:54:11	-15.00466	-173.79390	1824.0	0.0	140.4	**S91-fluid-17**. Major sampler 4 in the black smoker orifice where the temp spiked up to 260C. Fired at 0353.	563
12/3/2017	3:55:22	-15.00465	-173.79391	1824.0	2.7	141.2	Sampling with port manipulator.	564
12/3/2017	3:55:38	-15.00465	-173.79391	1824.1	2.7	141.3	Low Smoker Vent Site.	565
12/3/2017	3:56:28	-15.00465	-173.79391	1824.1	2.5	141.4	Stowing major sampler 4 back in the holster.	566
12/3/2017	4:03:25	-15.00464	-173.79390	1823.7	1.9	167.3	Deploying gas tight with port arm.	567
12/3/2017	4:24:19	-15.00463	-173.79388	1823.8	0.0	183.1	**S91-gas-18**. Gas tight from Low Smoker.	568
12/3/2017	4:27:00	-15.00462	-173.79388	1823.8	0.0	181.3	GT resecured in box.	569
12/3/2017	4:30:09	-15.00463	-173.79388	1823.1	0.0	191.5	**Deploying Marker 203** at location 15.00464 173.78389 depth 1823m at Low Smoker vent.	570
12/3/2017	4:36:19	-15.00464	-173.79385	1824.6	0.0	245.2	**S91-bio-19**. Big old scoop of snails.	571
12/3/2017	4:37:52	-15.00465	-173.79384	1820.8	6.2	251.0	Off seabed. End of Dive 91.	572

S092 Dacite South Flow

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S092 Dacite Flow Logger Comments	Record #
12/3/2017	19:20:59	-15.18140	-173.90513	2564.6	1.0	215.7	Vehicle at Seabed	52
12/3/2017	19:21:35	-15.18140	-173.90512	2564.5	1.1	215.9	Switched from deployment descent menu to science menu.	53
12/3/2017	19:22:55	-15.18140	-173.90513	2564.6	0.9	217.2	Jumbled sheet flow.15.1814 173.90512 Z=2564. Coarse sediment coating - light colored pelagic seds.	54

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S092 Dacite Flow Logger Comments	Record #
12/3/2017	19:24:10	-15.18141	-173.90511	2564.7	0.8	216.8	Spun-glass lava types on the surface of these lavas - known from dredged rocks. Iron staining on side of rock. Black portion on bottom.	55
12/3/2017	19:25:12	-15.18141	-173.90511	2564.7	0.8	216.7	**S92-rock-01**. Black glassy rock. Nearly aphyric (no crystals). This piece is all glass. Looks more like obsidian. Large sample.	56
12/3/2017	19:27:17	-15.18140	-173.90511	2564.7	1.1	215.4	Sharp angular surfaces. Very thick glass coating. 26 cm long 15 cm in diameter. All black glass aphyric.	57
12/3/2017	19:28:34	-15.18140	-173.90512	2564.7	1.0	215.7	This rock sample (#1) is going into partition 9. Thick sediment coating on this rock.	58
12/3/2017	19:28:57	-15.18141	-173.90512	2564.7	0.9	217.0	That was a big sample.	59
12/3/2017	19:29:34	-15.18141	-173.90511	2564.7	0.9	216.8	This pit is a km in diameter. About 30 - 40 m tall.	60
12/3/2017	19:30:15	-15.18139	-173.90512	2564.7	1.1	215.7	We don't expect to see any venting today. The event that formed this pit was probably ~ 500 years ago according to Ken.	61
12/3/2017	19:30:42	-15.18139	-173.90513	2563.0	2.4	215.2	Beautiful glassy looking rock in are where we took the sample.	62
12/3/2017	19:31:00	-15.18138	-173.90515	2562.3	2.9	215.5	Rough-textured surface. Sediment is probably 5 cm thick.	63
12/3/2017	19:31:06	-15.18138	-173.90516	2562.0	3.3	215.6	Stalked corals.	64
12/3/2017	19:31:29	-15.18138	-173.90522	2561.8	3.6	215.0	These lavas need to be several decades to a century old.	65
12/3/2017	19:31:51	-15.18139	-173.90528	2562.1	3.0	216.1	Since we're not seeing a lot of stalked corals that could indicate that these rocks aren't that old.	66
12/3/2017	19:32:11	-15.18139	-173.90533	2562.2	3.1	229.1	Stalked corals on jumbled sheet flow surface.	67
12/3/2017	19:32:33	-15.18137	-173.90538	2562.3	2.9	237.4	Flat sheety pillow-ish features.	68
12/3/2017	19:32:58	-15.18139	-173.90544	2562.2	2.9	242.0	These flows aren't associated with the volcanoes in the area - at least not as far as we know.	69
12/3/2017	19:33:47	-15.18144	-173.90560	2563.6	2.2	242.0	The working hypothesis is that these rocks are not associated with Niuatahi because they are a different composition.	70
12/3/2017	19:34:00	-15.18146	-173.90562	2563.4	2.6	241.0	A lot of this rock seems to have been formed in place.	71
12/3/2017	19:34:31	-15.18147	-173.90568	2563.5	2.3	241.1	This little swale is probably a meter high. Stretched taffy-esque texture.	72
12/3/2017	19:34:45	-15.18148	-173.90570	2563.6	1.7	239.7	A bit more relief now on the seabed.	73
12/3/2017	19:35:02	-15.18150	-173.90572	2563.2	3.2	230.0	Lobe piles of jumbled sheet flow.	74
12/3/2017	19:35:39	-15.18155	-173.90575	2564.7	2.4	231.8	Stalked coral. Walter says it's a bamboo coral.	75

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S092 Dacite Flow Logger Comments	Record #
12/3/2017	19:36:02	-15.18156	-173.90575	2564.6	2.5	231.9	Bamboos are faster growing corals - on the century scale.	76
12/3/2017	19:36:33	-15.18159	-173.90578	2563.6	3.4	231.9	Still jumbled sheet flow.	77
12/3/2017	19:37:19	-15.18166	-173.90585	2561.1	5.0	232.2	Slightly more relief here - jumbled sheet flow. Going up a slight flow with slightly less sediment.	78
12/3/2017	19:37:54	-15.18168	-173.90587	2560.6	4.9	231.2	Seeing more striated surface on the rocks - Ken thinks it has "spun glass" on the "buffalo-head" surface.	79
12/3/2017	19:39:03	-15.18172	-173.90594	2558.7	2.8	232.5	At the crest of this little ridge - about 1 meter high - in the center of this jumbled sheet flow.	80
12/3/2017	19:39:45	-15.18176	-173.90599	2558.8	3.3	232.5	Sandy swale (swell?) on the other side.	81
12/3/2017	19:39:57	-15.18177	-173.90600	2558.8	3.0	232.4	Coming up on another little mound here.	82
12/3/2017	19:40:06	-15.18178	-173.90601	2558.6	3.1	232.3	A little more broken up at the bottom.	83
12/3/2017	19:40:25	-15.18179	-173.90602	2556.7	4.5	232.4	Seeing plenty more of the jumbled sheet slow here.	84
12/3/2017	19:40:50	-15.18183	-173.90607	2554.9	3.8	233.1	Don't have any reason to believe this is any different than the rock we sampled earlier.	85
12/3/2017	19:41:15	-15.18187	-173.90612	2553.8	3.2	232.6	Swales.	86
12/3/2017	19:42:05	-15.18192	-173.90619	2553.6	3.9	232.1	Coming upon a much more angular fragmented rock here with more whip corals.	87
12/3/2017	19:42:21	-15.18193	-173.90621	2552.6	3.8	232.1	Lots more fragments at the base of this in place lava unit.	88
12/3/2017	19:42:46	-15.18195	-173.90623	2551.6	3.5	232.2	Rocky fragmented lavas here.	89
12/3/2017	19:43:03	-15.18196	-173.90625	2550.9	3.2	232.3	We're probably looking at a small ridge. Striated lavas here.	90
12/3/2017	19:43:13	-15.18197	-173.90626	2550.9	3.5	231.7	Transition from rubble to rock.	91
12/3/2017	19:44:09	-15.18197	-173.90628	2552.4	1.1	231.5	We're still in the pit and Ken thinks this is only a small unit.	92
12/3/2017	19:44:48	-15.18197	-173.90628	2552.5	1.1	231.5	Blocky interior. Subparallel lines (ribs). Rough exterior texture of the dacite lava. More coherent part of the flow.	93
12/3/2017	19:45:04	-15.18197	-173.90628	2552.5	1.1	231.6	Slower "oozing" lavas. This is an intact flow.	94
12/3/2017	19:45:23	-15.18197	-173.90628	2552.4	1.1	231.7	The white thing we saw earlier was a sponge.	95
12/3/2017	19:47:07	-15.18196	-173.90627	2552.5	1.1	232.3	From blocky; ribbed coherent flow just above rubbled area. 15.18197 173.90628 Z=2553m.	96
12/3/2017	19:48:51	-15.18195	-173.90627	2552.5	1.1	232.4	**S92-rock-02**. Crumbly lava. Hole in the middle. 10 cm upper surface fragment of pressure ridge. Striated dacite lava on side. Thick blocky glass.	97

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S092 Dacite Flow Logger Comments	Record #
12/3/2017	19:50:09	-15.18196	-173.90627	2552.5	1.2	231.2	These glasses are 70% silicon. Boninites are 55% silica. Basalts are 50% silica. The other half are other elements like mangnesium and aluminum; etc.	98
12/3/2017	19:55:51	-15.18196	-173.90626	2552.4	1.3	232.1	2nd piece from same site. Yellow-brown staining on inner surface. Huge glassy rind. 20 cm thick glassy outer surface. Angular flat-ish. Big.	99
12/3/2017	19:56:14	-15.18196	-173.90627	2552.5	1.0	230.2	Went into partition 5 with the first piece. 2 pieces of that sample.	100
12/3/2017	19:57:06	-15.18196	-173.90627	2552.5	1.0	230.7	The rock here has some hollows in the interior here at the foot of this pressure ridge.	101
12/3/2017	19:58:06	-15.18196	-173.90627	2549.9	3.9	232.2	Going up this ridge.	102
12/3/2017	19:58:54	-15.18196	-173.90627	2544.9	8.9	232.3	Striated; overlapping lavas. Almost ribbon-like sheets overlapping.	103
12/3/2017	19:59:05	-15.18196	-173.90628	2543.9	8.8	231.9	This is not a pressure ridge after all.	104
12/3/2017	19:59:22	-15.18197	-173.90628	2541.9	9.0	231.8	Large blocks as we move up.	105
12/3/2017	19:59:29	-15.18197	-173.90629	2541.1	10.7	232.0	We're moving up the wall.	106
12/3/2017	19:59:42	-15.18197	-173.90630	2540.3	7.5	232.6	Striated parallel to floor of pit lavas as we move up.	107
12/3/2017	19:59:58	-15.18198	-173.90632	2539.1	0.0	231.7	Blocky angular poorly sorted deposit here.	108
12/3/2017	20:00:22	-15.18197	-173.90634	2537.4	0.0	232.0	We're coming up to the top - all blocky fragments. Stalked corals.	109
12/3/2017	20:00:39	-15.18200	-173.90635	2536.0	3.5	231.3	Pile of debris piled all the way to the top of the wall?	110
12/3/2017	20:01:01	-15.18204	-173.90640	2535.6	3.1	231.6	Climbed about 10 m up the "wall".	111
12/3/2017	20:01:20	-15.18207	-173.90643	2534.8	2.8	231.6	We're still in the pit. When we're out of the pit we'll be at 2500 m.	112
12/3/2017	20:01:35	-15.18208	-173.90644	2533.3	3.3	231.9	Looking at more coherent rocks here but still lots of rubble.	113
12/3/2017	20:01:45	-15.18209	-173.90645	2532.7	3.1	231.5	More coherent rock here.	114
12/3/2017	20:01:53	-15.18211	-173.90646	2532.3	2.8	231.5	In place pillow lavas coming up.	115
12/3/2017	20:02:26	-15.18214	-173.90647	2531.5	3.1	231.6	Large bulbous pillow lave here at the top of this ridge. Broken lavas below.	116
12/3/2017	20:02:49	-15.18214	-173.90649	2531.4	3.8	231.8	This is a pretty standard-looking pillow - 1 meter in diameter.	117
12/3/2017	20:03:20	-15.18213	-173.90652	2531.4	3.5	231.5	Long singular pillow here at the top of a ridge as we move up slope. In place pillow at the top of this slope.	118

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S092 Dacite Flow Logger Comments	Record #
12/3/2017	20:05:32	-15.18210	-173.90647	2531.4	3.5	232.7	**S92-rock-03**. Sample 3 will be from large elongated pillow at top of slope. We didn't expect to see a pillow in this pit. Behind the pillow we see sediments and then more jumbled lava.	119
12/3/2017	20:09:28	-15.18212	-173.90648	2531.3	2.9	232.8	Crust / upper plate from elongated pillow lava tube. Small piece. Fragile; glassy; 5 cm spherical piece of glass from pillow exterior.	120
12/3/2017	20:10:46	-15.18215	-173.90645	2531.3	3.3	232.7	First piece is probably all surface stuff. Into partition 6.15.182128 173.90649 Z=2531.	121
12/3/2017	20:15:24	-15.18212	-173.90649	2531.1	3.4	231.6	2nd piece of elongate pillow lobe: Upper surface with interior. Glass on the side. Bulbous piece with ridges. No evidence of vesicles or crystals. 20 cm x 15 cm. Wedge-shaped rounded on side.	122
12/3/2017	20:16:05	-15.18212	-173.90648	2530.3	0.0	231.9	Looking at the pillow lava. Sitting on top of broken fragments lavas. This pillow is sitting right on top.	123
12/3/2017	20:16:21	-15.18212	-173.90650	2530.1	3.5	208.2	Several elongate pillows parallel to the slope.	124
12/3/2017	20:16:47	-15.18214	-173.90650	2529.5	0.0	178.8	Sitting right on top of fragmented lavas on the edge of this ridge.	125
12/3/2017	20:16:56	-15.18216	-173.90649	2529.3	2.8	179.3	More jumbled lavas up slope.	126
12/3/2017	20:17:27	-15.18221	-173.90649	2528.6	1.6	178.3	Pillow lavas buttressing this slope at ridge edge. Fairly broken and cracked at the end of the series.	127
12/3/2017	20:17:43	-15.18223	-173.90647	2528.3	2.4	180.1	Pillows abruptly end.	128
12/3/2017	20:18:35	-15.18231	-173.90642	2528.2	4.8	291.1	Can see a complement on the other side of this fissure (?). Wow - that's awesome.	129
12/3/2017	20:18:55	-15.18230	-173.90644	2528.4	4.2	289.4	Looking into a fissure - About 5 m wide.	130
12/3/2017	20:19:28	-15.18229	-173.90647	2527.6	5.6	271.6	Above the pillows are jumbled sheet flow.	131
12/3/2017	20:20:01	-15.18233	-173.90649	2527.8	4.5	250.3	Fairly evident the pit crater may have formed in a single event; subsequently the walls calved away.	132
12/3/2017	20:20:10	-15.18236	-173.90649	2527.8	5.0	243.7	This is a relatively small step up.	133
12/3/2017	20:20:23	-15.18236	-173.90648	2527.6	4.8	244.3	Going to continue up the slope.	134
12/3/2017	20:20:45	-15.18233	-173.90650	2526.2	5.6	243.4	Juxtaposition of pillow flow and jumbled lavas.	135
12/3/2017	20:21:24	-15.18231	-173.90656	2526.3	4.3	244.2	Looking at some pillow fronts here - Striated sheet-like.	136
12/3/2017	20:22:01	-15.18226	-173.90659	2525.5	5.4	237.0	We're on a platform area here moving up the slope. Went from sheety-looking lavas. Now more jumbled-looking.	137
12/3/2017	20:22:28	-15.18225	-173.90663	2527.1	5.4	207.7	Over the crest now we're seeing a steep down drop.	138

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S092 Dacite Flow Logger Comments	Record #
12/3/2017	20:23:00	-15.18227	-173.90670	2529.6	7.5	164.1	Another one of these fissures (actually probably same fissure just viewed from the other side of the flow).	139
12/3/2017	20:23:23	-15.18229	-173.90673	2531.9	5.5	163.2	Jumbled up fragments on the back side .	140
12/3/2017	20:23:38	-15.18230	-173.90675	2533.9	4.8	163.8	Thin sediment. Large blocky structure that is intact here.	141
12/3/2017	20:23:57	-15.18230	-173.90677	2536.2	2.8	190.3	Debris at the base of the ridge.	142
12/3/2017	20:24:29	-15.18236	-173.90685	2540.5	2.7	220.1	Moving down onto a flatter seafloor now.	143
12/3/2017	20:24:40	-15.18239	-173.90687	2542.4	1.7	219.8	Jumbled in place sheet flow now.	144
12/3/2017	20:24:52	-15.18241	-173.90688	2542.9	1.4	219.6	Cracks in the flow.	145
12/3/2017	20:25:29	-15.18244	-173.90692	2542.0	2.1	219.9	Larger blocks in the bottom of what looks almost like a collapse feature.	146
12/3/2017	20:25:37	-15.18245	-173.90693	2542.2	2.4	219.9	Going over another fissure.	147
12/3/2017	20:25:59	-15.18249	-173.90695	2542.1	2.8	195.4	Now back on smoother seafloor with ropey / linear sheet flow.	148
12/3/2017	20:26:41	-15.18255	-173.90701	2544.7	1.3	217.6	More coherent sheet flow here - flatter sheets / but still jumbled. Long coherent sections of sheets.	149
12/3/2017	20:26:58	-15.18257	-173.90704	2544.4	2.1	217.8	Occasional corals here and there.	150
12/3/2017	20:27:05	-15.18258	-173.90705	2544.1	2.9	217.8	Codey	151
12/3/2017	20:27:11	-15.18258	-173.90707	2544.3	2.9	217.6	More sediment on this flattish seafloor.	152
12/3/2017	20:27:23	-15.18260	-173.90709	2545.4	1.9	217.8	Heavily sedimented flow here.	153
12/3/2017	20:27:36	-15.18262	-173.90711	2545.2	2.2	217.6	Coming upon more jumbled lavas now.	154
12/3/2017	20:27:52	-15.18264	-173.90713	2545.3	2.4	217.9	Several corals in a row. Possibly bamboo.	155
12/3/2017	20:28:05	-15.18267	-173.90715	2545.1	2.7	217.8	Small fissure. Still in jumbled sheet flow.	156
12/3/2017	20:28:14	-15.18268	-173.90716	2546.2	1.7	217.6	Small crack in seafloor.	157
12/3/2017	20:28:24	-15.18270	-173.90717	2545.9	2.1	218.0	Holothurian ahead.	158
12/3/2017	20:28:35	-15.18273	-173.90720	2546.8	1.4	217.9	Low-relief part of lava flow.	159
12/3/2017	20:28:52	-15.18275	-173.90721	2546.6	1.7	217.6	Sponge to left and some stalked corals. Seeing a burrow here and there.	160
12/3/2017	20:29:08	-15.18276	-173.90723	2547.7	0.7	218.0	Stalked coral.	161
12/3/2017	20:29:18	-15.18276	-173.90724	2547.2	1.2	215.8	We may try a push core soon.	162
12/3/2017	20:29:54	-15.18279	-173.90726	2548.0	0.3	213.7	Going to try the "dip stick" to see how deep the sediments are here.	163
12/3/2017	20:31:09	-15.18273	-173.90725	2548.1	0.0	213.3	Pulling out T-handled rod to see how deep the seds are here.	164
12/3/2017	20:31:20	-15.18272	-173.90724	2548.1	0.0	213.3	Doing a white-adjust on the video.	165
12/3/2017	20:31:38	-15.18273	-173.90725	2548.1	0.0	213.3	White-balance on the video.	166
12/3/2017	20:33:36	-15.18282	-173.90725	2548.1	0.0	213.3	We're at LL-B lava flow - Embley's name.	167

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12/3/2017	20:34:36	-15.18275	-173.90724	2548.1	0.0	213.3	That's some deep seds - maybe 19 - 15 cm. Deep enough for push-core action.	168
12/3/2017	20:35:49	-15.18278	-173.90728	2548.1	0.0	213.3	Going for sediment push core without the catcher. Here in deep sediments on flat-ish area.	169
12/3/2017	20:37:05	-15.18274	-173.90722	2548.1	0.0	213.3	**S92-sed-04**. Push core #4 into fine-grained sediment on flat-ish highly sedimented plain here. The core is full (~25 cm in there).	170
12/3/2017	20:38:32	-15.18279	-173.90724	2547.6	0.0	213.6	Core tube is about half full when in the quiver. Fairly light buff-colored material. In the pit. 15.18279 173.90726 Z=2548m.	171
12/3/2017	20:39:06	-15.18284	-173.90728	2545.7	2.5	213.8	Heading on to the NE over sedimented flat area here. See lavas poking out here and there.	172
12/3/2017	20:39:25	-15.18289	-173.90732	2545.8	2.0	213.7	Look like elongate tube-ish lavas.	173
12/3/2017	20:39:51	-15.18296	-173.90737	2544.8	2.6	213.7	Criss-crossing small fractures - perpendicular cracks. Relatively low-relief flattish lavas.	174
12/3/2017	20:40:08	-15.18301	-173.90741	2544.9	2.2	222.6	Curtain-folded sheet flow. Not nearly as jumbled as lavas we saw earlier.	175
12/3/2017	20:40:28	-15.18306	-173.90746	2545.0	1.9	231.0	Narrow 15-20 cm cracks in the folded sheets.	176
12/3/2017	20:40:57	-15.18307	-173.90747	2545.5	1.2	235.7	The cracks are small-ish fractures that allow us to see down into the lava flow.	177
12/3/2017	20:41:24	-15.18307	-173.90752	2544.9	1.4	235.9	Cracks and a stalked coral.	178
12/3/2017	20:41:41	-15.18308	-173.90756	2543.9	2.3	237.2	Ahead we're seeing more of a jumbled flow as the slope increases a little bit.	179
12/3/2017	20:41:48	-15.18309	-173.90759	2543.6	2.3	237.7	Jumbly now.	180
12/3/2017	20:42:07	-15.18311	-173.90764	2542.4	2.6	235.8	Folded jumbled / sheet flow. Ribbon-like textures.	181
12/3/2017	20:42:39	-15.18316	-173.90773	2540.3	2.4	238.1	Stalked sponge? to left. Corals; holothurian.	182
12/3/2017	20:42:53	-15.18317	-173.90777	2538.6	3.3	242.4	Blocky massive lavas here now. Rubbled at base of slope.	183
12/3/2017	20:43:13	-15.18317	-173.90779	2538.1	3.5	244.3	In place large lava blocks. Fractured blocks.	184
12/3/2017	20:43:37	-15.18316	-173.90779	2534.8	6.8	250.6	Steep rock face. Folded sheet flow at the top.	185
12/3/2017	20:43:54	-15.18315	-173.90782	2533.4	4.2	250.0	Large pillow form in the background after small fault offset.	186
12/3/2017	20:44:15	-15.18316	-173.90785	2534.6	1.7	249.4	Vertical offsets - on near vertical faces - dip/slip variety.	187
12/3/2017	20:44:37	-15.18317	-173.90789	2534.2	2.6	250.4	Large pillows at the base here. Fissures have cracked the rocks.	188
12/3/2017	20:45:15	-15.18319	-173.90796	2531.8	3.9	249.7	Large lava blocks strewn about this steeper rubble-esque slope.	189

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12/3/2017	20:45:35	-15.18320	-173.90797	2530.5	4.3	262.7	Lots of blocky angular fragments; some sheet flow pieces.	190
12/3/2017	20:46:00	-15.18319	-173.90800	2530.7	3.2	265.4	Coming up to the top of this sequence is another pillow. About a 5 me vertical offset on that sequence.	191
12/3/2017	20:46:14	-15.18318	-173.90800	2530.7	4.0	261.4	Another large pillow at the top of the sequence.	192
12/3/2017	20:46:28	-15.18316	-173.90801	2530.7	4.3	229.7	The interiors of these pillows are very massive.	193
12/3/2017	20:47:32	-15.18319	-173.90804	2526.5	4.3	238.3	Flat-ish lava pillows here. Massive pillows with sheety flatter lava plates to the side.	194
12/3/2017	20:47:49	-15.18322	-173.90806	2526.7	1.5	237.4	These are more like lobate lavas in the distance.	195
12/3/2017	20:48:16	-15.18324	-173.90809	2526.0	2.7	233.4	Cracked lava now. Blocky interior. 3D texture to the glass.	196
12/3/2017	20:48:43	-15.18327	-173.90813	2526.2	1.4	232.8	More cracked "plobates"	197
12/3/2017	20:49:05	-15.18327	-173.90815	2524.9	2.7	233.4	Big cracks in these squat pillows - higher effusion rate than in bulbous lavas.	198
12/3/2017	20:49:27	-15.18330	-173.90817	2524.7	2.4	233.6	Lots of cracks in these pillows - long lateral cracks.	199
12/3/2017	20:49:41	-15.18331	-173.90819	2523.9	3.2	233.7	Sort of plates of lavas left behind.	200
12/3/2017	20:49:58	-15.18332	-173.90823	2523.8	3.0	233.1	Low-relief surface on these lava lobes.	201
12/3/2017	20:50:38	-15.18336	-173.90830	2524.3	1.9	233.7	Rolling lava lobes with large fractures between the lobes.	202
12/3/2017	20:51:00	-15.18338	-173.90834	2525.1	1.7	233.7	Small portion of localized jumbled lavas with more of the plobates behind it.	203
12/3/2017	20:51:19	-15.18339	-173.90836	2524.6	2.6	233.5	Looking at some sponges here (stalked).	204
12/3/2017	20:51:44	-15.18339	-173.90838	2525.0	2.2	228.8	Sponge that is not stalked. More conical but upside down-ish.	205
12/3/2017	20:52:01	-15.18342	-173.90841	2525.1	1.5	227.2	Fractured lavas. Smooth surface.	206
12/3/2017	20:52:30	-15.18343	-173.90842	2525.5	0.0	226.0	There's the sponge again. White with holes in it - cupped cone sponge - silicious.	207
12/3/2017	20:53:21	-15.18342	-173.90842	2523.9	2.5	231.3	Pretty conical sponge with some yellow organisms living in it. Walter?	208
12/3/2017	20:53:29	-15.18344	-173.90842	2523.6	2.5	231.2	We want to get to the wall.	209
12/3/2017	20:54:03	-15.18346	-173.90845	2524.4	1.3	232.0	More bulbous pillows in the background. More lobate-looking with bulbous pillows on the edge of this series.	210
12/3/2017	20:54:55	-15.18350	-173.90853	2523.5	3.4	232.2	Looking at bulbous pillows - undulating topography.	211
12/3/2017	20:55:10	-15.18352	-173.90856	2524.7	2.7	232.4	We're still a good 50 - 100 m from the wall of the pit.	212
12/3/2017	20:55:17	-15.18353	-173.90858	2524.4	3.3	232.2	Fractured pillow lavas here.	213

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S092 Dacite Flow Logger Comments	Record #
12/3/2017	20:55:43	-15.18355	-173.90863	2525.1	2.2	232.2	Most dominant form of variation in topography on the seafloor appear to be faults.	214
12/3/2017	20:55:59	-15.18357	-173.90866	2524.8	2.5	232.5	More "plobates" here. Large elongated pillows.	215
12/3/2017	20:56:12	-15.18359	-173.90869	2524.8	2.3	232.3	Striated flat surface here.	216
12/3/2017	20:56:46	-15.18362	-173.90876	2525.3	1.6	232.4	Inflated cracked pillow ahead. Striations on these pillows.	217
12/3/2017	20:57:10	-15.18365	-173.90880	2524.7	1.7	232.1	We're out of the pit.	218
12/3/2017	20:57:20	-15.18365	-173.90882	2524.8	1.9	232.5	We have been out of the pit for awhile.	219
12/3/2017	20:57:34	-15.18366	-173.90885	2523.9	2.2	232.3	We're on the lava surfaces outside of the pit.	220
12/3/2017	20:57:47	-15.18367	-173.90887	2524.0	1.6	232.5	We're on high ground now.	221
12/3/2017	20:58:00	-15.18369	-173.90889	2523.9	1.4	231.9	Looking at pillow lava / jumbled sheet flow boundary now.	222
12/3/2017	20:58:16	-15.18371	-173.90892	2524.0	2.4	232.4	We're at 2524 m now.	223
12/3/2017	20:58:39	-15.18374	-173.90897	2523.1	3.8	232.1	We're several hundred meters away from the pit wall now.	224
12/3/2017	20:58:49	-15.18375	-173.90899	2523.4	3.1	232.1	More jumbled up lavas here.	225
12/3/2017	20:59:15	-15.18375	-173.90902	2522.9	3.1	232.1	Transitioning from pillow to jumbled sheet flow.	226
12/3/2017	20:59:27	-15.18375	-173.90903	2522.6	3.1	221.0	These jumbled lavas are in place.	227
12/3/2017	21:10:42	-15.18377	-173.90905	2524.6	0.0	213.0	**S92-rock-05**. 15x10 piece of dacite from edge of jumbled lava flow. Angular and glassy; vesicular. Likely will have orange sediment stuck to it.	228
12/3/2017	21:15:39	-15.18358	-173.90876	2512.3	14.1	208.2	Off bottom to clean mud off ROV.	229
12/3/2017	21:17:04	-15.18364	-173.90885	2524.1	2.5	216.2	Resettling ROV on the pillow lavas sitting just under jumbled sheet flow.	230
12/3/2017	21:18:10	-15.18366	-173.90890	2525.0	0.0	163.8	Found a bottle.	231
12/3/2017	21:24:19	-15.18367	-173.90888	2525.0	0.4	150.3	**S92-rock-06**. 10x10cm glassy edge of pillow. Some sediment and microbial filament on surface. One tiny extra piece.	232
12/3/2017	21:27:19	-15.18355	-173.90897	2522.2	4.2	167.5	**S92-bottle-07**. Antique wide-mouth bottle 5x20cm.	233
12/3/2017	21:29:29	-15.18384	-173.90895	2518.2	5.3	220.8	Resuming transit across ropy jumbled lava sheet flow. Relatively flat bathy.	234
12/3/2017	21:32:00	-15.18399	-173.90920	2519.2	2.2	222.0	Traversing across slope with ~1m swales. Still covered in blanket of fine sediment.	235
12/3/2017	21:32:44	-15.18403	-173.90928	2522.2	1.5	222.1	Crossing jumbled sheetflow back into slightly lower-section pillow flows. Common pattern for the day.	236
12/3/2017	21:33:17	-15.18406	-173.90935	2523.8	2.7	221.9	Sheet flows are highstanding features on top of pillows. Thought to be part of the same eruption.	237

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12/3/2017	21:34:17	-15.18409	-173.90945	2523.4	2.8	220.3	Approaching bulbous striated pillow with smooth pillow flows coming off of it. First one we've encountered today so setting down for a sample.	238
12/3/2017	21:43:30	-15.18410	-173.90946	2524.8	1.3	214.2	**S92-rock08**. Piece of highstanding striated pillow; first encountered in this dacite flow. 10x15cm angular w brown stain on side. Couple of 0.5cm vesicles.	240
12/3/2017	21:50:05	-15.18446	-173.91004	2525.3	2.5	225.1	Continuing across lobate pillows and seeing a lot of striated pillow mounds.	241
12/3/2017	21:53:39	-15.18470	-173.91033	2522.5	3.4	221.8	Blocky lavas - with striations and cracks.	242
12/3/2017	21:53:51	-15.18471	-173.91035	2523.0	3.3	222.2	More sedimentation on these pillows.	243
12/3/2017	21:54:21	-15.18473	-173.91040	2523.2	3.3	221.9	These are looking more like regular pillows now - except that they are heavily striated and cracked.	244
12/3/2017	21:54:44	-15.18474	-173.91043	2523.0	3.1	221.9	We really haven't changed in depth at all.	245
12/3/2017	21:54:55	-15.18475	-173.91045	2523.6	2.3	222.3	Pillows abutted with more sheety platy lavas here.	246
12/3/2017	21:55:22	-15.18475	-173.91048	2523.6	2.4	222.7	Slabby lavas. Parallel striations on these sheet-y slows.	247
12/3/2017	21:56:14	-15.18482	-173.91055	2522.7	2.6	214.5	Jumbled flow off to the left - Inflated "plobates" in front of us.	248
12/3/2017	21:56:43	-15.18486	-173.91056	2522.5	2.3	213.2	Jumbled flow to the NW are butting up against these long pillows / lobate lavas.	249
12/3/2017	21:56:54	-15.18490	-173.91058	2521.4	2.9	212.0	Jumbled lavas have a higher eruption rate.	250
12/3/2017	21:57:04	-15.18492	-173.91060	2520.8	3.5	209.8	Jumbled up flow here.	251
12/3/2017	21:57:23	-15.18491	-173.91064	2522.4	2.5	218.3	Going to try to fly along the jumbled / pillow edge.	252
12/3/2017	21:58:10	-15.18493	-173.91080	2522.3	2.0	230.7	Two very different lava forms butting up against each other here.	253
12/3/2017	21:58:23	-15.18493	-173.91084	2522.5	2.4	230.2	Fracture here that fall off a meter or so.	254
12/3/2017	21:58:52	-15.18496	-173.91093	2522.4	3.4	230.7	Sheety inflated more smooth lavas at the edge of the jumbled lavas - with fracture in between.	255
12/3/2017	22:00:12	-15.18509	-173.91106	2522.8	2.9	219.1	Transitioning now back into broad pillows. Some stalked corals on top.	256
12/3/2017	22:00:22	-15.18513	-173.91108	2523.0	3.2	217.0	Broken inflated pillow ahead.	257
12/3/2017	22:01:15	-15.18519	-173.91114	2523.4	2.4	217.6	Dacites on land are usually associated with lava domes (like Mt. St. Helens).	258
12/3/2017	22:01:42	-15.18524	-173.91119	2523.0	2.8	215.0	These pillows are rather flattened. With some platy-looking surfaces.	259
12/3/2017	22:02:55	-15.18532	-173.91126	2523.5	2.7	220.8	Bulbous pillows.	260
12/3/2017	22:03:17	-15.18534	-173.91128	2524.0	2.8	221.0	Now running into flatter pillow lobes that are sediment colored.	261

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S092 Dacite Flow Logger Comments	Record #
12/3/2017	22:04:01	-15.18540	-173.91133	2524.2	2.3	221.5	Continuing on in a NW direction.	262
12/3/2017	22:04:06	-15.18541	-173.91134	2524.0	2.3	221.2	Corals.	263
12/3/2017	22:04:30	-15.18546	-173.91138	2493.8	2.2	223.6	A series of hill-ish features with bulbous pillow lavas. Some cracked up and broken.	264
12/3/2017	22:04:54	-15.18548	-173.91142	2524.3	3.4	222.2	Fractures in these latter pillow lobes.	265
12/3/2017	22:05:18	-15.18552	-173.91145	2493.6	4.3	221.7	Scattered larger bulbous pillows on top of the more lobate-looking flatter pillows.	266
12/3/2017	22:06:48	-15.18569	-173.91153	2523.4	4.4	213.7	Elongate lobe with large pillow at the end of the lobe.	267
12/3/2017	22:07:24	-15.18573	-173.91157	2524.7	2.6	228.3	Stalked corals are thicker here.	268
12/3/2017	22:07:44	-15.18574	-173.91160	2524.6	3.1	228.4	Huge striated pillow to left.	269
12/3/2017	22:08:03	-15.18577	-173.91165	2524.6	3.2	228.0	Large fracture here that split up this lobate ridge.	270
12/3/2017	22:08:27	-15.18580	-173.91170	2524.1	4.1	226.2	Real lobate-looking pillows in the background with the occasional large bulbous pillow at the ends.	271
12/3/2017	22:09:01	-15.18585	-173.91178	2524.4	5.1	226.9	These pillows look really large compared to others we have seen.	272
12/3/2017	22:09:12	-15.18585	-173.91179	2523.6	6.1	225.5	Now the flow looks a bit more sheety-platy.	273
12/3/2017	22:15:01	-15.18615	-173.91223	2537.3	2.1	224.4	Back into jumbled lava with thick sediment.	274
12/3/2017	22:15:07	-15.18615	-173.91223	2537.3	2.3	224.4	Brittle star.	275
12/3/2017	22:15:27	-15.18617	-173.91226	2537.2	1.9	224.3	Shrimp and fish.	276
12/3/2017	22:16:18	-15.18622	-173.91233	2536.7	1.9	224.8	Lots of small burrows in the thicker sediments between boulders of jumbled lava.	277
12/3/2017	22:17:00	-15.18625	-173.91238	2535.5	2.4	224.8	~50 NE past waypoint 3.	278
12/3/2017	22:21:34	-15.18664	-173.91271	2532.1	2.7	214.2	Urchin count: 1.	279
12/3/2017	22:35:05	-15.18679	-173.91313	2537.9	0.0	231.6	**S92-rock09.** Piece of ropy jumbled lava. Brown-red surface staining with patchy exposed glass. 1cm ropes on surface. 5x15cm.	280
12/3/2017	22:35:44	-15.18680	-173.91314	2536.3	1.9	233.1	Sample S92-rock-09 location 15.18681 173.91312 depth 2534m.	281
12/3/2017	22:37:41	-15.18699	-173.91331	2529.6	3.6	217.7	Moving across a small pile of rubble and back into lobate flows.	282
12/3/2017	22:40:46	-15.18727	-173.91358	2524.6	2.4	217.1	Seeing some fish.	283
12/3/2017	22:44:22	-15.18762	-173.91399	2531.0	5.0	217.7	Lots of brecciated lavas and some tubes.	284
12/3/2017	22:45:30	-15.18777	-173.91411	2530.1	5.1	213.4	Brecciation was probably syn-eruptive based on stratigraphic position both above and below the lobate flows.	285
12/3/2017	22:46:36	-15.18788	-173.91420	2525.7	8.3	214.1	Nice broken rock face.	286
12/3/2017	22:50:00	-15.18820	-173.91451	2526.3	3.4	214.0	Into a bed of thick sediment and approaching another set of pillow flows. Looks like a flow edge.	287

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S092 Dacite Flow Logger Comments	Record #
12/3/2017	22:51:49	-15.18840	-173.91469	2522.2	3.6	213.2	Flow has mixture of spherical striated pillows and smoother lobate flows. Similar pattern to emplacement on previous dives although striated pillows are more severely fractured.	288
12/3/2017	22:54:43	-15.18849	-173.91484	2521.7	1.2	190.9	Branching corals.	289
12/3/2017	22:54:52	-15.18849	-173.91483	2522.2	0.7	190.8	Setting ROV down for some sediments.	290
12/3/2017	22:56:17	-15.18848	-173.91484	2520.8	2.4	180.1	Nope. Still moving.	291
12/3/2017	22:56:58	-15.18847	-173.91483	2520.4	2.8	178.1	Small area we are surveying has a larger frequency of spherical striated pillows.	292
12/3/2017	23:00:14	-15.18850	-173.91480	2522.9	0.4	163.6	We're going to do a sediment scoop here next.	293
12/3/2017	23:00:54	-15.18849	-173.91480	2522.8	0.4	163.6	The dip stick is out to measure the sediment thickness here at the base of striated pillows.	294
12/3/2017	23:01:24	-15.18849	-173.91481	2522.8	0.4	163.6	Just a thin veneer of sediment here.	295
12/3/2017	23:01:45	-15.18849	-173.91481	2522.8	0.4	163.8	Just off to the side of the last one - only about 10 cm here.	296
12/3/2017	23:02:04	-15.18849	-173.91481	2522.9	0.4	164.5	There is a lava surface underneath that is just buried.	297
12/3/2017	23:02:15	-15.18849	-173.91481	2522.9	0.4	164.5	A sediment scoop would be wiser in this area.	298
12/3/2017	23:02:41	-15.18849	-173.91481	2522.8	0.4	164.5	Worm casing?	299
12/3/2017	23:02:53	-15.18849	-173.91480	2522.8	0.4	164.5	Seeing some burrows in the sediment here.	300
12/3/2017	23:03:15	-15.18849	-173.91480	2522.8	0.4	164.5	It's pretty thin sediments here - we'll go for a scoop bag.	301
12/3/2017	23:04:25	-15.18849	-173.91480	2522.8	0.4	164.5	Grabbing the sediment scoop bag.	302
12/3/2017	23:04:49	-15.18849	-173.91480	2522.8	0.4	164.5	Pulling out scoop bag 4. Beautiful scoop bag.	303
12/3/2017	23:06:17	-15.18849	-173.91480	2522.8	0.4	167.9	**S92-sed-10**. Scoop bag 4 into the sediments at the base of these bulbous pillows. Fine thin sediments wafting off in he current.	304
12/3/2017	23:08:28	-15.18850	-173.91480	2522.8	0.4	168.8	There's hard rock under the thin veneer of seds.15.1884931 173.914804 Z=2523 m.	305
12/3/2017	23:09:14	-15.18850	-173.91480	2522.8	0.4	168.9	S0092-Sed-10 - housekeeping because part of the bag is hooked in the claw.	306
12/3/2017	23:11:55	-15.18850	-173.91480	2522.8	0.0	180.0	Sediments are fine; beige-ish in color; Going for a bit more. Stirred up a cloud of light brownish seds on the seafloor here.	307
12/3/2017	23:13:47	-15.18849	-173.91479	2522.8	0.0	184.6	Scoop bag 4 is almost full - pushing it down into the milk crate behind the gastight.	308
12/3/2017	23:14:55	-15.18850	-173.91490	2516.6	4.8	213.1	Continuing to the NW again. Large bulbous cracked pillows on top of sedimented pillow lobes.	309

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S092 Dacite Flow Logger Comments	Record #
12/3/2017	23:16:26	-15.18847	-173.91493	2516.0	5.4	207.6	What's that? Walter not sure what it is. Walter thinks it's a worm. Bulbous body with multiple wings. Little plates.	310
12/3/2017	23:17:46	-15.18841	-173.91496	2513.2	8.1	192.3	Looks like it has a little mouth in front. It's segmented. A marine polychaete. It's a squid worm.	311
12/3/2017	23:18:20	-15.18838	-173.91496	2511.9	11.1	184.3	It has cilia on the side that are like paddles that allows it to swim.	312
12/3/2017	23:19:55	-15.18834	-173.91500	2511.3	11.4	185.2	Beautiful - a couple curly-cue legs. Some 6 long non-curly legs. Beautiful color: Teuthidodrilus (squid worm).	313
12/3/2017	23:20:42	-15.18846	-173.91512	2514.9	3.0	217.9	Moving upslope now. Glass sponge to the right.	314
12/3/2017	23:20:59	-15.18849	-173.91515	2514.7	2.7	215.4	Moving over striated pillow lavas again.	315
12/3/2017	23:22:00	-15.18852	-173.91518	2514.1	2.2	212.6	Seeing another swimming polychaete in the distance.	316
12/3/2017	23:22:53	-15.18856	-173.91519	2513.0	1.8	209.6	So we're moving to the SW (correction from previous entry).	317
12/3/2017	23:23:17	-15.18859	-173.91520	2512.2	1.7	211.5	Heading to one of the dacite domes to the SW of the lava collapse pit.	318
12/3/2017	23:24:34	-15.18866	-173.91527	2508.9	2.1	211.0	We're about half way along the traverse from the lava pond to the lava domes to the SW.	319
12/3/2017	23:25:09	-15.18869	-173.91529	2509.3	1.8	212.0	Elongate flattened pillow lobes that are sedimented - nothing different than what we have been seeing in the past.	320
12/3/2017	23:25:43	-15.18872	-173.91531	2509.0	2.0	211.5	Odd-looking truncated flat-ish lava in front of the elongate pillows.	321
12/3/2017	23:26:22	-15.18877	-173.91535	2508.7	2.0	211.6	We're somewhere near (or upon?) a bench.	322
12/3/2017	23:26:47	-15.18880	-173.91538	2508.0	2.7	211.5	Coming upslope. Large lineated broken up pillow lava group to the left.	323
12/3/2017	23:27:28	-15.18885	-173.91544	2507.5	2.1	211.4	The pillows here are more lobate-swirly striated with large bulbous pillow tubes at the end of some.	324
12/3/2017	23:28:56	-15.18896	-173.91556	2507.7	2.0	211.2	More of the same. Flat-ish pillow lobes - some platy sheets broken up on top of the lobes.	325
12/3/2017	23:29:49	-15.18902	-173.91562	2506.5	2.7	211.5	Flat sheety plates on the top of somewhat flat pillow lobes.	326
12/3/2017	23:30:01	-15.18904	-173.91562	2506.4	2.6	211.5	The occasional bulbous pillow here.	327
12/3/2017	23:30:31	-15.18907	-173.91567	2506.0	2.3	211.6	Larger little mound of pushed up pillows - tumulus pillow pile in front of us.	328
12/3/2017	23:31:08	-15.18910	-173.91571	2506.8	2.5	211.9	Some whip corals.	329

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S092 Dacite Flow Logger Comments	Record #
12/3/2017	23:34:03	-15.18926	-173.91587	2507.5	1.9	211.3	Looking at the same flat-ish pillow lobes with sediment cover (mostly marine snow?).	330
12/3/2017	23:35:58	-15.18939	-173.91595	2507.9	1.4	194.5	We're looking at the top of a pillow to sample. Could just be a huge crusty lavas.	331
12/3/2017	23:36:43	-15.18941	-173.91597	2508.1	1.2	174.5	Lots of good crust here.	332
12/3/2017	23:37:49	-15.18942	-173.91599	2508.1	1.2	174.6	Seeing some burrows and worm trails here. on this large lava pillow with cracked striated cruse.	333
12/3/2017	23:42:00	-15.18942	-173.91598	2508.3	1.1	173.0	S92-rock-11. Piece of striated broken pillow crust (plate). Z=2509 15.189418 173.916857.	335
12/3/2017	23:45:35	-15.18941	-173.91600	2508.7	0.8	172.5	Fine sediment coating. Fragile; crumbly; 10 x 15 cm. Orange staining. Crumbled - 2 pieces. Angular. Brown staining on 1 side.	336
12/3/2017	23:45:51	-15.18941	-173.91599	2508.8	0.8	172.8	Went into biobox 2.	337
12/3/2017	23:47:03	-15.18936	-173.91598	2508.6	0.8	172.3	**S92-bio-12**. Coral - stalked coral; probably a bamboo coral. Exact same position as sample 11. Z=2509 15.189418 173.916857. Went into biobox with the rock.	338
12/3/2017	23:47:32	-15.18937	-173.91599	2508.6	0.9	169.9	Lollipop sponges ahead.	339
12/3/2017	23:48:35	-15.18937	-173.91600	2507.1	2.2	184.0	Swimming sea cucumber. Spanish dancer. Actually quite beautiful.	340
12/3/2017	23:49:08	-15.18939	-173.91601	2505.6	3.4	165.2	This is what's "depositing" all over the seafloor.	341
12/3/2017	23:49:11	-15.18940	-173.91601	2505.4	3.1	174.4	Crinoid.	342
12/3/2017	23:50:17	-15.18965	-173.91601	2508.0	4.6	194.8	Back in large pillows / lobates. Big large cracked pillow at the end. Radially broken surface at top.	343
12/3/2017	23:51:05	-15.18977	-173.91609	2509.9	2.1	194.6	Holothurian and lollipop sponges; Purple sea star in crack; whip coral.	344
12/3/2017	23:51:50	-15.18985	-173.91617	2509.8	2.3	205.0	Lavas here are similar to what we've been seeing. Long lobes and big cracked; striated pillows scattered about - mostly at the end of these big lobes.	345
12/3/2017	23:52:12	-15.18987	-173.91620	2509.8	1.4	219.5	Looking to the right now. Anemone.	346
12/3/2017	23:53:11	-15.18992	-173.91623	2508.9	3.6	223.3	This lava that is striated. Looks like a ridge (tumuli) of pillow rinds.	347
12/3/2017	23:53:28	-15.18997	-173.91625	2509.5	2.8	223.3	Long pillow lobe here.	348
12/3/2017	23:53:50	-15.19003	-173.91629	2510.3	2.6	222.0	Really striated pillows.	349
12/3/2017	23:55:16	-15.19020	-173.91643	2507.1	3.2	223.4	You can make the boninite into dacite.	350
12/3/2017	23:57:27	-15.19045	-173.91679	2505.6	3.3	220.4	Keeping water dissolved in the dacite allows it to flow into these long lava pillow / lobes.	351
12/3/2017	23:57:45	-15.19047	-173.91679	2507.7	1.2	220.0	Spattery- features on the top of pillow lobes.	352

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S092 Dacite Flow Logger Comments	Record #
12/4/2017	0:00:16	-15.19047	-173.91683	2508.5	0.7	196.8	Zooming in on a shrimp that is zooming in on something that looks like a spider web (microbial-colonial animal).	353
12/4/2017	0:04:54	-15.19049	-173.91679	2508.5	0.7	196.4	**S92-rock-13**. More fluid looking - Chunk of jumbled flow with striations. Black glass interior with hollow areas. Angular.	354
12/4/2017	0:06:42	-15.19049	-173.91678	2508.5	0.7	196.4	15-30 cm on long side. Glassy with ropey surface texture. Plate of color on surface of glass. Rougher texture on outside. Chonchoidal fracture on inside. From thin pancakey flow.	355
12/4/2017	0:08:51	-15.19048	-173.91676	2508.5	0.7	196.4	No visible vesicles. Going into biobox 4. 15.190484 1733.916801 Z=2589. May have fractured on storage but the big piece is intact.	356
12/4/2017	0:10:58	-15.19046	-173.91675	2507.7	1.2	197.9	Finished sampling here and we're moving on.	357
12/4/2017	0:11:23	-15.19047	-173.91677	2504.8	4.4	195.3	Swales.	358
12/4/2017	0:11:39	-15.19050	-173.91679	2504.4	4.5	197.9	Going to estimate the size of some of these lasers.	359
12/4/2017	0:12:07	-15.19060	-173.91685	2506.0	2.6	197.8	Diameter of that tube is about 2 m across.	360
12/4/2017	0:12:20	-15.19065	-173.91688	2505.0	3.5	197.5	Pillow domes are probably 3 m in diameter.	361
12/4/2017	0:12:41	-15.19070	-173.91691	2502.8	3.9	206.0	Coming up a sedimented ridge - no pillows visible.	362
12/4/2017	0:12:50	-15.19072	-173.91693	2501.8	3.6	205.0	Looks like the dunes.	363
12/4/2017	0:12:59	-15.19076	-173.91695	2501.2	2.2	205.4	Might just be a local high here.	364
12/4/2017	0:13:09	-15.19082	-173.91699	2501.2	1.9	207.0	Solitary exposed rock with corals.	365
12/4/2017	0:13:44	-15.19101	-173.91706	2501.9	1.7	209.5	Ridge of ribbony lavas to the right. Lots of sediment here with barely a visible rock.	366
12/4/2017	0:14:04	-15.19107	-173.91708	2500.0	1.5	210.9	Coming up to the top of this highly sedimented slope.	367
12/4/2017	0:14:47	-15.19112	-173.91714	2499.4	0.9	191.6	Brittle stars just hanging out on the sand.	368
12/4/2017	0:15:04	-15.19112	-173.91715	2499.7	0.8	191.3	More sedimented plain as far as we can see.	369
12/4/2017	0:15:32	-15.19111	-173.91715	2500.2	0.3	192.3	Brittle star off to the right.	370
12/4/2017	0:16:18	-15.19111	-173.91715	2500.1	0.4	191.3	There are 2 kinds of brittle stars. Some that like rocky substrate and some that like sediment / sand.	371
12/4/2017	0:16:34	-15.19111	-173.91715	2500.1	0.4	191.1	Going to grab the dip stick and see how deep the sediment is here.	372
12/4/2017	0:18:24	-15.19111	-173.91715	2500.1	0.4	191.0	Endlessly deep sands / seds here. The dip stick went in way up to the top. It's about 14 inches - 30 cm long.	373
12/4/2017	0:20:33	-15.19111	-173.91717	2500.1	0.5	186.6	Here comes the push core.	374

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S092 Dacite Flow Logger Comments	Record #
12/4/2017	0:22:39	-15.19110	-173.91720	2500.3	0.3	189.1	**S92-sed-14**. Push core 1 all the way into the sediments here on this dune-like environment. Light brown - sandy colored seds. Fine-grained with no visible ash.	375
12/4/2017	0:24:02	-15.19110	-173.91721	2500.3	0.3	189.3	Push core 70 m SW of sample 13. 15.1911129 173.9121803 Z=2500m.	376
12/4/2017	0:24:32	-15.19110	-173.91721	2500.3	0.3	189.2	We're going to suction up some sand here in search of biota?	377
12/4/2017	0:25:09	-15.19110	-173.91721	2500.3	0.3	188.9	Curious to know if there's anything living in these thick seds - and want to test the slurp.	378
12/4/2017	0:27:24	-15.19107	-173.91724	2499.9	2.6	146.2	Going to back up a bit.	379
12/4/2017	0:28:20	-15.19111	-173.91720	2499.6	0.9	125.3	Coming to the top of another ridge. More brittle stars here.	380
12/4/2017	0:29:09	-15.19111	-173.91719	2499.7	0.7	126.1	These are the brittle stars we saw earlier. Stalked corals in the area as well. Palm tree corals.	381
12/4/2017	0:31:55	-15.19112	-173.91717	2495.8	4.8	128.5	**S92-bio-15**. Grabbed the big brittle star with the slurp. It's big. and stretched out across the segments. Z=2500 m 15.191109 173.917197.	382
12/4/2017	0:32:15	-15.19115	-173.91713	2494.4	6.5	128.2	Moving over this ridge crest. Coming down the other side.	383
12/4/2017	0:32:58	-15.19124	-173.91713	2498.8	3.3	194.1	We're into dune country now - no pillows that aren't covered up.	384
12/4/2017	0:33:17	-15.19133	-173.91720	2501.3	3.8	200.2	There's a little pillow ridge.	385
12/4/2017	0:33:53	-15.19150	-173.91735	2501.6	2.3	217.0	We're at the edge of a ridge - rather sharp edge with platy lavas exposed at the ridge top.	386
12/4/2017	0:34:14	-15.19158	-173.91743	2502.0	2.3	217.6	Those hills are old says Ken.	387
12/4/2017	0:34:30	-15.19163	-173.91750	2502.9	1.4	219.3	When we see something in place Ken would like to sample again.	388
12/4/2017	0:35:46	-15.19167	-173.91760	2504.2	0.0	199.2	**S92-rock-16**. Going to grab a piece of this ropey texture lava plate on top of pillow lobe??? Can't tell for sure because the sediments cover nearly all of it.	389
12/4/2017	0:38:03	-15.19190	-173.91748	2504.2	0.0	200.4	Ropey outer crust of lava rock. Large rock with large visible hollow (eye) in rock center. Rolled up lava.	390
12/4/2017	0:39:45	-15.19208	-173.91751	2504.2	0.0	200.4	Small stretched vesicles. Almost aphyric. Manganese coating on outside. 25 - 30 cm long; width at bottom is ~25 cm across.	391

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S092 Dacite Flow Logger Comments	Record #
12/4/2017	0:41:44	-15.19237	-173.91758	2504.2	0.0	200.4	Looks like a big log. It's at least 50 cm long. Into marker box. Z=2504. 15.191967 173.917338. Sandy slope environment.	392
12/4/2017	0:42:38	-15.19220	-173.91753	2501.9	2.8	199.9	Sporadic rocks exposed at surface here and there; but mainly just seeing rolling sedimented slopes.	393
12/4/2017	0:43:45	-15.19196	-173.91740	2505.7	0.6	175.5	Crack in the sedimented surfaces exposes the layers of lava beneath. Blocky; striated sediments.	394
12/4/2017	0:44:06	-15.19185	-173.91756	2505.6	0.7	201.6	Not that much sediment on top of this lava dome.	395
12/4/2017	0:44:21	-15.19179	-173.91781	2505.2	0.7	224.5	Ropey lavas on top of the blockier lavas beneath.	396
12/4/2017	0:44:45	-15.19208	-173.91780	2505.7	0.9	273.1	Huge pillow between cracks - surrounded by 3 cracks.	397
12/4/2017	0:45:20	-15.19191	-173.91790	2506.3	0.0	255.6	This is more of a fissure than a crack.	398
12/4/2017	0:45:33	-15.19184	-173.91795	2506.0	1.2	252.0	And just beyond this we're back in the pillows.	399
12/4/2017	0:46:06	-15.19183	-173.91780	2507.1	2.8	240.3	These pillows (plobates) are sitting on top of the flow farther down hill.	400
12/4/2017	0:46:18	-15.19190	-173.91790	2507.0	3.1	236.3	More elongated; flattened pillows here.	401
12/4/2017	0:47:02	-15.19209	-173.91821	2508.0	2.5	209.7	Pressure ridge with broken up huge pillow / pillows.	402
12/4/2017	0:47:53	-15.19195	-173.91820	2508.1	4.1	196.1	Crazy-looking large pillow crust (sheets).	403
12/4/2017	0:48:07	-15.19200	-173.91826	2509.0	2.5	196.5	Now back into more sedimented pillow lavas.	404
12/4/2017	0:49:17	-15.19226	-173.91817	2505.0	4.2	199.7	Moving over jumbled and broken lava ridge with more solid pillows to the right.	405
12/4/2017	0:49:51	-15.19245	-173.91822	2506.6	3.8	207.4	Area of jumbled up lavas to the left - more sedimented flat pillows to the right.	406
12/4/2017	0:50:42	-15.19257	-173.91830	2506.5	3.8	211.8	Large crack in this elongate pillow. Radial striations. Lava plates.	407
12/4/2017	0:50:54	-15.19255	-173.91838	2506.9	3.0	212.1	Striated large pillows.	408
12/4/2017	0:51:02	-15.19251	-173.91843	2506.8	3.7	212.1	Corals on pillows.	409
12/4/2017	0:51:21	-15.19246	-173.91853	2506.9	2.8	212.3	Huge lavas with striations.	410
12/4/2017	0:51:49	-15.19270	-173.91856	2506.8	4.2	212.7	Getting into area of more bulbous pillows. 2 - 3 meters across. Large and spherical.	411
12/4/2017	0:53:39	-15.19267	-173.91891	2507.7	3.5	230.9	Big pillows now but still seeing more flattened elongate pillows (the majority of what we're seeing).	412
12/4/2017	0:55:09	-15.19274	-173.91896	2510.5	2.5	232.1	More elongate pillows parallel to the slope. Busted up in places.	413
12/4/2017	0:56:53	-15.19284	-173.91922	2509.5	3.8	215.8	Striated platy lavas coming up. Big slabby uplifted feature (giant pillow) with big crack down the side. Pillow is maybe 4 m long.	414
12/4/2017	0:57:32	-15.19307	-173.91922	2508.2	4.5	146.9	We're seeing expansion in 2 directions perpendicular to each other.	415

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S092 Dacite Flow Logger Comments	Record #
12/4/2017	0:58:38	-15.19301	-173.91930	2506.8	4.7	239.4	On the other side of that feature and we are seeing more of the broken up plates to the right now.	416
12/4/2017	0:59:00	-15.19294	-173.91933	2506.6	4.2	273.1	On jumbled up "push-up" ridge.	417
12/4/2017	1:00:02	-15.19299	-173.91945	2505.2	4.0	303.0	We're going to go for a sample of this jumbled up small pressure ridge.	420
12/4/2017	1:01:54	-15.19306	-173.91949	2506.3	0.0	269.6	Going in for a sample on this pressure ridge of jumbly type dacite lava.	421
12/4/2017	1:05:16	-15.19298	-173.91945	2506.3	1.3	268.5	**S92-rock-17**. Arcuate fracture pattern on this blocky ridge. Sediment coating. 10x10 cm with arcuate fracture surfaces. Softball sized.	422
12/4/2017	1:06:24	-15.19297	-173.91943	2506.4	1.0	269.8	Z=2506. In front stbd corner of the box. 15.192998 173.91937.	423
12/4/2017	1:09:24	-15.19308	-173.91954	2508.1	3.4	253.5	Ropy. glassy flow overlying the large pillows.	424
12/4/2017	1:15:41	-15.19379	-173.92061	2507.5	4.0	231.5	Increase in sediment on pillows as we approach the edge of the plateau. Pillows are very large and show signs of inflation here. Several meters wide at minimum	425
12/4/2017	1:22:07	-15.19390	-173.92110	2504.2	6.4	226.9	Darren	426
12/4/2017	1:23:08	-15.19380	-173.92129	2504.6	6.2	227.4	Seeing a couple of hummocks of ropy/jumbled flows over pillows	427
12/4/2017	1:24:08	-15.19404	-173.92160	2504.5	5.7	226.8	Tumulus	428
12/4/2017	1:46:42	-15.19421	-173.92140	2508.4	0.9	247.7	**S92-rock18**. Edge of broken inflated tumuli-like lava flow sitting on top of lobate pillows. Trapezoidal 10x12cm. Vesicular with Mn-coat. Corner with Fe-staining	429
12/4/2017	1:49:28	-15.19434	-173.92159	2505.7	3.1	248.9	S92-rock-18 location 15.19427 173.92141 depth 2508m	430
12/4/2017	1:53:39	-15.19429	-173.92177	2509.3	1.5	248.9	Sediment drape is considerably thicker. Nearing edge of elevated lava flow	431
12/4/2017	1:54:25	-15.19430	-173.92189	2508.3	3.4	249.2	Purple cucumber and anemone on sediment apron	432
12/4/2017	1:55:30	-15.19448	-173.92197	2507.2	5.3	196.2	Driving along edge of last clearly visible lava flow before heading uphill	433
12/4/2017	1:55:39	-15.19450	-173.92200	2509.3	3.4	196.7	Found some old pop cans	434
12/4/2017	1:56:06	-15.19448	-173.92194	2511.6	0.7	197.3	Apparently this is a spot where garbage accumulated?	435
12/4/2017	1:57:06	-15.19447	-173.92198	2512.2	0.0	196.7	Cnidarian	436
12/4/2017	2:03:07	-15.19432	-173.92184	2508.2	3.6	249.6	Came back around to where we first saw the thickened sediment and anemone	437

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S092 Dacite Flow Logger Comments	Record #
12/4/2017	2:07:20	-15.19448	-173.92189	2507.7	3.2	263.9	Decided against sampling at the pop can contact and are heading up onto the sedimented hill	438
12/4/2017	2:07:58	-15.19439	-173.92189	2510.0	1.8	263.0	Third time seeing the same anemone. We're pretty much best friends now	439
12/4/2017	2:11:39	-15.19445	-173.92214	2512.6	0.9	257.5	Flying over what looks like volcaniclastics	440
12/4/2017	2:13:30	-15.19461	-173.92227	2506.0	2.0	256.5	Blocks of dacite lying atop the sediment	441
12/4/2017	2:17:30	-15.19460	-173.92265	2484.6	1.3	225.0	Still thick sediment drape with clasts up to boulder size sourced from somewhere uphill	442
12/4/2017	2:23:29	-15.19506	-173.92317	2464.5	1.0	223.5	Settled on small dune to take sediment scoop sample	443
12/4/2017	2:34:46	-15.19503	-173.92320	2464.3	1.4	223.8	**S92-sed-19**. Scoop-2 of volcaniclastic/pelagic sediment and some VERY viscous mud	444
12/4/2017	2:35:19	-15.19510	-173.92325	2464.4	2.2	222.9	S92-sed-19 location 15.19506 173.92317 depth 2464m	445
12/4/2017	2:44:27	-15.19617	-173.92405	2433.6	1.8	201.0	Moving over these undulating "hills".	446
12/4/2017	2:44:38	-15.19620	-173.92406	2432.2	2.1	201.1	Thick sediment covered seafloor.	447
12/4/2017	2:45:57	-15.19637	-173.92407	2424.8	1.7	201.7	These blocks of lava don't appear to be in place.	448
12/4/2017	2:47:36	-15.19654	-173.92410	2419.1	3.1	180.9	We're going to move to the south a bit to try to come up to the summit of one of these smaller hill features to the NE of the dacite domes.	449
12/4/2017	2:48:35	-15.19663	-173.92407	2416.8	5.7	180.4	Adam	450
12/4/2017	2:49:00	-15.19660	-173.92403	2419.1	3.4	180.0	Glass sponge.	451
12/4/2017	2:49:42	-15.19663	-173.92403	2419.3	2.7	184.9	Sediment / volcanic sand everywhere with the occasional rock - which doesn't appear in place.	452
12/4/2017	2:50:35	-15.19672	-173.92403	2418.8	1.2	185.4	This is the most rock we've seen for awhile.	453
12/4/2017	2:52:04	-15.19673	-173.92402	2419.0	0.0	180.0	This is the most rock we've seen on these hills.	454
12/4/2017	2:56:34	-15.19693	-173.92404	2419.0	0.0	180.1	**S92-rock-20**. Sheety-platy lava on highly sedimented seafloor. 15-20 cm piece relatively soft rock. Might be welded ash or fine grained volcanic rock. Crumbly.	455
12/4/2017	2:59:48	-15.19759	-173.92397	2419.0	0.0	180.1	Going in for 2nd grab. Altered - log shaped. Dark banded layer. Staining? 35 cm long? Into partition 10. A couple pieces fell into partition 9.	456
12/4/2017	3:00:54	-15.19673	-173.92400	2418.5	0.8	180.0	Long piece of rock (?) held together. 15.196728 173.924008 Z=2419.	457
12/4/2017	3:01:44	-15.19677	-173.92402	2417.9	1.0	186.4	Of bottom continuing upslope toward waypoint 5.	458
12/4/2017	3:01:59	-15.19679	-173.92405	2417.2	1.1	186.3	Spackle catcher up here?	459
12/4/2017	3:02:10	-15.19685	-173.92404	2417.4	0.8	186.5	Crust of something up here. Platy crust.	460
12/4/2017	3:02:20	-15.19686	-173.92421	2417.3	1.2	187.3	Looks like volcanic rocks ahead.	461

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S092 Dacite Flow Logger Comments	Record #
12/4/2017	3:03:00	-15.19699	-173.92405	2417.9	2.8	186.0	Going up and down these swales.	462
12/4/2017	3:03:37	-15.19710	-173.92391	2420.6	2.0	184.4	Sea cucumber.	463
12/4/2017	3:04:00	-15.19712	-173.92398	2420.3	1.8	175.1	More animal tracks - probably a sea cucumber.	464
12/4/2017	3:04:25	-15.19715	-173.92407	2420.3	1.4	173.2	What is that? A sponge on little skinny leg-like things...	465
12/4/2017	3:04:57	-15.19704	-173.92401	2419.5	2.2	181.5	This is a weird-looking guy. ~14 cm across.	466
12/4/2017	3:05:36	-15.19706	-173.92393	2421.9	1.6	201.3	Coming up on a steeper hill. Exposed crust of some type.	467
12/4/2017	3:05:58	-15.19721	-173.92418	2420.4	2.3	200.4	Looks like loose spatter to Ken.	468
12/4/2017	3:06:04	-15.19725	-173.92425	2420.4	2.2	200.4	This unit is in place.	469
12/4/2017	3:06:33	-15.19733	-173.92425	2419.9	2.3	201.0	It looks more massive.	470
12/4/2017	3:07:03	-15.19730	-173.92422	2419.5	2.6	211.3	It looks to me (Susan) like the stuff we have been picking up .	471
12/4/2017	3:07:50	-15.19728	-173.92419	2420.2	2.1	213.1	We're going to try to sample this.	472
12/4/2017	3:08:38	-15.19729	-173.92413	2420.3	1.9	259.8	On this steep-ish slope with possible volcanic outcrops on top of all this sand.....	473
12/4/2017	3:10:08	-15.19735	-173.92401	2419.8	1.6	263.0	Sheety-slabby rock here. See more crust at the top of the hill.	474
12/4/2017	3:10:42	-15.19739	-173.92411	2418.3	1.2	252.4	Look at all those rocks in the distance. We're moving upslope.	475
12/4/2017	3:12:38	-15.19720	-173.92405	2418.1	0.8	238.1	Much more rock exposed here. Some large rubble pieces and some in place lavas here.	476
12/4/2017	3:14:38	-15.19742	-173.92391	2418.2	0.8	238.8	**S92-rock-21**. In-place (or darn near) piece of rock near the summit of the largest hill so far. Well-consolidated.	477
12/4/2017	3:17:14	-15.19724	-173.92426	2418.2	0.8	238.7	Orange-stained outer coating. Rock has a bit of a point at the end. 10x10 angular. Some black stain? Lighter colored and in weight.	478
12/4/2017	3:17:53	-15.19734	-173.92423	2415.3	3.0	209.5	Moving on up the slope. Looks like we're nearly at the top of this local high.	479
12/4/2017	3:18:25	-15.19755	-173.92428	2415.5	2.7	192.6	Interesting looking craggy feature on the right.	480
12/4/2017	3:19:25	-15.19760	-173.92435	2416.1	1.9	179.1	Still moving up this slope.	481
12/4/2017	3:19:57	-15.19769	-173.92425	2417.6	0.4	176.3	Brittle star and lollipop sponge?	482
12/4/2017	3:21:10	-15.19785	-173.92421	2416.2	2.0	180.1	There is a blanket of sediment on top of the rock.	483
12/4/2017	3:21:46	-15.19790	-173.92436	2415.2	2.8	179.8	We're now at waypoint 5.	484
12/4/2017	3:22:02	-15.19789	-173.92441	2415.3	2.3	181.9	Seeing more exposed rock here. Broken up but probably in place.	485

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S092 Dacite Flow Logger Comments	Record #
12/4/2017	3:22:20	-15.19796	-173.92437	2414.7	2.2	182.4	The thing ahead of us looks like the pillow lava cruses we were looking at earlier.	486
12/4/2017	3:23:00	-15.19806	-173.92428	2414.0	1.9	182.6	Going to take another rock sample and a sediment scoop.	487
12/4/2017	3:23:40	-15.19803	-173.92435	2413.6	1.6	224.5	Cracked upper surface - hard baked. Fractured.	488
12/4/2017	3:24:55	-15.19805	-173.92437	2414.6	0.6	250.1	Odd-looking platy stuff. Rhombohedral cracks in this rock.	489
12/4/2017	3:27:57	-15.19813	-173.92446	2414.8	0.5	247.9	Near the summit of this mound at Waypoint 5. Top crust - Sandstone-looking interior. Yellow interior. Putting it in partition 5.	490
12/4/2017	3:30:41	-15.19815	-173.92410	2414.8	0.5	248.8	**S92-rock-22**. Cracked down the middle. 15x8 cm. Stayed together well. Z=2415m. That's buff colored. 15.198077 173.924377.	491
12/4/2017	3:31:11	-15.19804	-173.92434	2414.8	0.5	249.0	Next will take a scoop bag here.	492
12/4/2017	3:33:09	-15.19836	-173.92437	2415.0	0.0	157.9	Scooping below the place where we took the last sample. Out on the sedimented / sandy slope. Close to last sample.	493
12/4/2017	3:36:34	-15.19832	-173.92417	2415.1	0.0	156.9	**S92-sed-23**. Scoop bag #1 in sediments. Sticky somewhat consolidated gelatinous seds. Nothing dark in those seds. Z=2415m. 15.196985 173.925006.	494
12/4/2017	3:37:12	-15.19808	-173.92406	2415.1	0.0	156.9	Stowing the sed scoop behind the marker box.	495
12/4/2017	3:38:26	-15.19861	-173.92451	2413.7	2.0	175.9	Ending our dive here at the lava pond and up on the giant dacite lava dome. Did not make it near the top of the dome.	496
12/4/2017	3:39:51	-15.19845	-173.92425	2411.7	2.1	180.9	Smooth Bill signing off the mic.	497
12/4/2017	3:40:50	-15.19839	-173.92441	2407.6	10.2	176.7	Leaving the bottom now.	498

S093 W Mata

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S093 W Mata Logger Comments	Record #
12/4/2017	18:49:36	-15.06500	-173.72728	2544.8	13.5	223.2	Vehicle at Seabed	22
12/4/2017	18:50:27	-15.06396	-173.72695	2560.2	1.9	224.9	Bottom in site.	24
12/4/2017	18:50:49	-15.06485	-173.72740	2561.1	1.9	225.0	Near waypoint 1.	25
12/4/2017	18:51:00	-15.06485	-173.72740	2561.8	1.4	225.0	Ripples in the sedimented seafloor.	26
12/4/2017	18:52:03	-15.06480	-173.72711	2562.8	1.5	225.1	We're on the SW edge of the ridge of the edifice we've been calling "the ridge that will not be named". Changing that to Noname today.	27

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S093 W Mata Logger Comments	Record #
12/4/2017	18:52:32	-15.06483	-173.72783	2561.1	3.2	224.6	Looks like volcaniclastic sediments here. Lots of darker color to the seds.	28
12/4/2017	18:53:16	-15.06483	-173.72783	2559.9	3.7	224.8	Dark blotches in the volcaniclastic seds.	29
12/4/2017	18:55:10	-15.06483	-173.72783	2535.2	0.0	224.5	Having issues with the nav again. The ROV position is at 0 lat 0 long. Depth here is 2534. Now we're reading 0 depth as well.	30
12/4/2017	18:56:05	-15.06483	-173.72783	2535.4	0.0	226.2	Current induced (?) ripples on the seafloor. Grooves in the sediments. Lighter and darker colored seds.	31
12/4/2017	18:56:11	-15.06483	-173.72783	2535.4	0.0	226.3	Depth is back.	32
12/4/2017	18:56:21	-15.06483	-173.72783	2535.4	0.0	226.5	We're at 2535 m.	33
12/4/2017	18:57:14	-15.06483	-173.72783	2535.4	0.0	226.4	For some reason the descent did not get logged to the Leighton logger for this dive.	34
12/4/2017	18:57:24	-15.06483	-173.72783	2535.4	0.0	226.4	Mottled light and dark ripples in the seafloor.	35
12/4/2017	18:58:11	-15.06483	-173.72783	2535.4	0.0	226.4	Polychaete on the seafloor. Little tentacles sticking out of this thing that looks like a tube.	36
12/4/2017	18:58:56	-15.06483	-173.72783	2535.4	0.0	226.3	The little wispy stuff coming out of the tube are cirri maybe?	37
12/4/2017	18:59:12	-15.06483	-173.72783	2535.4	0.0	225.9	Pteropods (long skinny things) on the seafloor.	38
12/4/2017	18:59:29	-15.06483	-173.72783	2535.4	0.0	226.0	Some coarse seds in the depressions.	39
12/4/2017	18:59:55	-15.06483	-173.72783	2535.3	0.0	226.0	Tim thinks the tube we're seeing is carnivorous sponge.	40
12/4/2017	19:01:11	-15.06483	-173.72783	2535.4	0.0	226.2	Bill thinks we were close to WP 1 when we landed on the seafloor. We're going to presume that's the case and head down the line to WP 2.	41
12/4/2017	19:01:17	-15.06483	-173.72783	2535.4	0.0	226.2	Rippled sand.	42
12/4/2017	19:02:16	-15.06483	-173.72783	2535.0	1.0	225.6	They greased the nav pole yesterday. Is that the issue?	43
12/4/2017	19:02:49	-15.06483	-173.72783	2535.3	1.1	224.4	DVRO not logging. Rebooting. Taking highlight recording instead.	44
12/4/2017	19:03:05	-15.06483	-173.72783	2535.3	1.1	224.1	Stalked sponge? Glass sponge probably. Circular with a hole in the bottom.	45
12/4/2017	19:03:34	-15.06483	-173.72783	2534.6	2.2	223.9	Zooming in on these stalks in the seabed in coarser sand.	46
12/4/2017	19:05:12	-15.06483	-173.72783	2536.5	1.4	224.5	Jimbo's working on the navigation.....	47
12/4/2017	19:05:37	-15.06483	-173.72783	2536.5	1.9	224.1	Field of stick corals ahead.	48
12/4/2017	19:06:17	-15.06483	-173.72783	2538.3	0.3	225.9	Correction - not corals - they are carnivorous sponges.	49
12/4/2017	19:06:48	-15.06483	-173.72783	2538.5	0.0	230.1	DVRO now recording	50

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S093 W Mata Logger Comments	Record #
12/4/2017	19:07:12	-15.06483	-173.72783	2538.5	0.0	229.4	Going to take a push core here in this dark / light mottled volcaniclastic sand somewhere near WP1 (SW ~15m).	51
12/4/2017	19:08:31	-15.06483	-173.72783	2538.5	0.0	229.2	Grabbing push core 1. Sedimented area of rippled sand. There are areas where the sands are much blacker.	52
12/4/2017	19:09:43	-15.06483	-173.72783	2538.5	0.0	226.0	In volcaniclastic (?) mottled sand. Some fine particulates but mainly dark. Coarse sand here.	53
12/4/2017	19:11:03	-15.06483	-173.72783	2538.5	0.0	226.9	**S93-sed-01**. Coarse volcanic sand. Black grains. Fresh and black with buff-colored pelagic seds on top. Looks like most of it dumped out.	54
12/4/2017	19:12:18	-15.06483	-173.72783	2537.5	0.0	224.3	Hopefully only the fine sand escaped. Hoping we have some of the coarse seds in there. We've probably moved ~30 m SW of WP1. Z=2538.	55
12/4/2017	19:13:26	-15.06483	-173.72783	2535.7	3.6	4.2	Ship position: 15.06358 173.72694. We're probably at least 100m SW of the ship position.	56
12/4/2017	19:14:10	-15.06483	-173.72783	2537.9	1.4	358.9	Rippled sandy seabed with coloration varying from black volcaniclastic sand to buff pelagic seds.	57
12/4/2017	19:14:33	-15.06483	-173.72783	2537.6	1.5	358.3	Lots of the stalked carnivorous sponges on the sediments here.	58
12/4/2017	19:14:54	-15.06483	-173.72783	2537.5	1.8	4.4	Something else swimming by.	59
12/4/2017	19:15:36	-15.06483	-173.72783	2537.4	2.0	358.7	Zooming in on the sands. Could be white flocculent material in the ripple creases.	60
12/4/2017	19:16:06	-15.06483	-173.72783	2537.9	2.0	358.7	Also seeing some of those cylindrical topped stalked sponges.	61
12/4/2017	19:16:56	-15.06483	-173.72783	2537.7	2.3	1.5	More of the stalked sponges blowing in the current (tubular tops with hollows in the bottom. Looks like a butterfly net on top of a stalk.	62
12/4/2017	19:18:47	-15.06519	-173.72788	2539.4	0.6	358.6	Oh my goodness there is the ROV on the nav screen.	63
12/4/2017	19:19:43	-15.06505	-173.72768	2539.4	0.6	359.8	15.06519 173.72797 lat / long position. The jumping around of the ROV on the nav is about 20 m.	64
12/4/2017	19:20:43	-15.06526	-173.72785	2539.4	0.7	360.0	We're on the SW base of the "Noname" Ridge.	65
12/4/2017	19:22:59	-15.06523	-173.72783	2539.1	1.0	241.5	We're getting another fix: 15.06523 173.72783 Z=2539.	66
12/4/2017	19:23:10	-15.06523	-173.72783	2539.1	1.0	233.0	Going to start moving to the SW now.	67

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S093 W Mata Logger Comments	Record #
12/4/2017	19:24:28	-15.06493	-173.72776	2567.8	1.0	231.9	Approximate position for S92-Sed-01 sample:15.06519 173.72797 lat / long position for first sample.	68
12/4/2017	19:25:00	-15.06496	-173.72775	2567.8	1.0	232.9	Field of sponges - stalked animals. Butterfly net and carnivorous sponges.	69
12/4/2017	19:26:12	-15.06503	-173.72772	2566.6	1.5	232.2	Stalked sponges and polychaetes. Correction. The skinny tubes are a polychaete. The "butterfly net" stalked organism is a sponge.	70
12/4/2017	19:27:31	-15.06511	-173.72767	2566.0	0.9	233.6	Down here on the seabed the majority of sponges we see are "glass sponges".	71
12/4/2017	19:28:03	-15.06515	-173.72764	2565.5	1.1	228.8	Again; the little stalked organisms with "cilia" wisps out the top are a polychaete (worm).	72
12/4/2017	19:28:46	-15.06518	-173.72762	2565.1	1.4	228.6	Clusters of biota in a zone. See a swath that looks like "dandelions and grass". Could be a rocky substrate just below the sand.	73
12/4/2017	19:29:04	-15.06519	-173.72762	2564.9	1.6	228.1	The push core only went in 7 or 8 cm so that indicates the rock is not far below.	74
12/4/2017	19:29:16	-15.06519	-173.72762	2565.0	1.6	229.1	Coarse seds in and among the stalks.	75
12/4/2017	19:29:56	-15.06523	-173.72759	2566.0	2.0	229.6	The stalked organisms now are possibly tubed anemones??? Walter is changing his mind.	76
12/4/2017	19:30:25	-15.06525	-173.72760	2566.9	1.8	228.4	A suggestion that some of the critters on the sticks look like tunicates. Obviously all speculation at this point.	77
12/4/2017	19:30:58	-15.06527	-173.72762	2566.8	2.7	227.7	Slowly working our way down this gentle slope heading to the SW to the base of "Noname" ridge.	78
12/4/2017	19:32:53	-15.06532	-173.72764	2569.6	1.2	228.3	Looks like the logged events are about 2.5 seconds behind UTC time.	82
12/4/2017	19:33:46	-15.06533	-173.72765	2570.1	1.2	228.6	The ship is catching up with the ROV now.	83
12/4/2017	19:34:28	-15.06534	-173.72765	2570.5	1.4	228.7	Lovely ripples in the sand. Dark grains on the steeper facing slopes. Coarse black shiny sands. May be associated with the young pillow ridge to the SW.	84
12/4/2017	19:34:47	-15.06535	-173.72764	2570.8	1.3	228.6	Some orange balls on the stalked "butterfly net" sponges.	85
12/4/2017	19:35:44	-15.06535	-173.72765	2570.4	1.8	228.5	Lots of yellow "stuff" on the stalked sponges. The sponges are living in an area of the slope where the ripples are not as defined.	86

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S093 W Mata Logger Comments	Record #
12/4/2017	19:37:05	-15.06537	-173.72762	2571.9	0.7	228.5	The stalked organisms are on an area of the slope that is less rippled - actually no ripples to speak of - sand chute with no ripples..	87
12/4/2017	19:37:28	-15.06537	-173.72761	2572.1	0.0	228.6	Sort of like sand chutes with area of large defined ripples in between.	88
12/4/2017	19:39:15	-15.06539	-173.72763	2572.3	1.1	228.1	Sponge? polychaete?	89
12/4/2017	19:39:34	-15.06540	-173.72763	2572.2	1.3	228.6	Not fast enough Walter.	90
12/4/2017	19:39:45	-15.06540	-173.72764	2572.2	1.4	228.0	Walter thinks that could have been a barnacle.	91
12/4/2017	19:41:38	-15.06547	-173.72769	2573.1	1.7	272.6	Moving on; shrimp coming downslope from a sedimented ridge.	92
12/4/2017	19:44:34	-15.06548	-173.72781	2571.9	1.2	274.0	Sea urchin ~ 30 sec ago ...	93
12/4/2017	19:46:10	-15.06552	-173.72785	2572.7	0.7	274.1	Slowly coming up to the top of the ridge feature. Lots of ripples finer and more evenly distributed than on steeper parts of the slope.	94
12/4/2017	19:49:23	-15.06557	-173.72790	2573.0	1.2	274.6	Zooming in on the ripples. Fairly coarse seds here - some material could be more than a mm.	95
12/4/2017	19:50:02	-15.06557	-173.72791	2572.7	1.4	274.0	Seeing little rock fragments here (~mm size)	96
12/4/2017	19:50:38	-15.06557	-173.72795	2573.5	1.1	274.2	Light patches.	97
12/4/2017	19:51:09	-15.06558	-173.72796	2574.4	1.1	273.8	When you zoom in on these ripples they almost look like pillow lobes (but they're not).	98
12/4/2017	19:51:25	-15.06557	-173.72797	2574.8	1.2	273.7	Those are some intense ripples - more mottled here.	99
12/4/2017	19:52:00	-15.06559	-173.72802	2575.1	1.4	274.0	Depressions in the ripples with more dark seds.	100
12/4/2017	19:52:21	-15.06559	-173.72803	2575.5	0.8	274.3	Stalked polychaetes on the ripples here.	101
12/4/2017	19:52:59	-15.06560	-173.72805	2575.9	0.6	274.3	We're waiting for the ship again.	102
12/4/2017	19:53:47	-15.06560	-173.72805	2575.8	0.8	274.3	Zooming in on coarser seds. Looks like some small rock fragments. The light stuff is not rock fragments. It's probably sediments.	103
12/4/2017	19:54:23	-15.06560	-173.72805	2576.3	0.0	274.9	That looks like a piece of rock. Small rock fragments.	104
12/4/2017	19:54:43	-15.06560	-173.72805	2576.2	0.0	274.7	This ridge line is high backscatter so there's rock there somewhere.	105
12/4/2017	19:55:41	-15.06561	-173.72806	2576.3	0.0	274.1	Ripples are perpendicular to the slope on this transect.	106
12/4/2017	19:56:20	-15.06562	-173.72807	2576.5	0.6	274.6	The rock isn't very far beneath the sand here. We know that from the last push core and the high backscatter in the multibeam data.	107
12/4/2017	19:56:37	-15.06561	-173.72808	2576.6	0.7	274.0	Z=2576.	108

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S093 W Mata Logger Comments	Record #
12/4/2017	19:57:13	-15.06561	-173.72809	2576.6	1.3	273.7	Larger ripples here as we zoom out. Blacker grained volcanic seds in the troughs.	109
12/4/2017	19:57:37	-15.06560	-173.72812	2577.0	1.3	272.1	Ripples forever. They are quite large.	110
12/4/2017	20:00:55	-15.06581	-173.72833	2585.5	1.0	234.3	Shiny-looking ripples. Young volcanic sand. Not sure where it came from. The summit of W Mata? The deeper pillow ridge?	111
12/4/2017	20:02:31	-15.06588	-173.72840	2586.0	1.4	234.4	Now is looks like the ripples are moving parallel to the slope. We're headed straight to the SW along the ridge line and the ripples are flowing down slope with us.	112
12/4/2017	20:02:51	-15.06591	-173.72841	2586.6	1.0	235.1	Follow the crests of the ripples and we will get to the bottom of this ridge.	113
12/4/2017	20:03:49	-15.06596	-173.72845	2587.1	1.5	234.9	This are taller and deeper ripples than what we saw up higher. Black volcaniclastic seds in the trough between the ripples.	114
12/4/2017	20:05:58	-15.06607	-173.72854	2590.0	0.9	234.5	These ripples are a bit more flat on top.	115
12/4/2017	20:06:19	-15.06609	-173.72858	2590.6	1.6	234.8	Maybe not "flat"; but flatter than the upslope ripples	116
12/4/2017	20:06:32	-15.06610	-173.72860	2590.7	2.3	235.0	More buff-colored seds there for a minute.	117
12/4/2017	20:06:50	-15.06613	-173.72863	2592.0	1.9	234.8	We're now into an area with less defined ripples.	118
12/4/2017	20:07:02	-15.06615	-173.72866	2592.5	2.6	235.2	Back into the defined ripples.	119
12/4/2017	20:07:35	-15.06618	-173.72871	2594.3	2.6	234.9	Field of stalked organisms coming up. Mainly the stalked polychaete.	120
12/4/2017	20:07:55	-15.06619	-173.72874	2595.2	2.4	234.8	Dense grouping of these stalked polychaetes.	121
12/4/2017	20:08:45	-15.06623	-173.72879	2598.9	0.6	235.4	Seeing some burrows in the seds here.	122
12/4/2017	20:08:55	-15.06622	-173.72879	2598.9	0.6	239.8	Some yellow balls on the seds here.	123
12/4/2017	20:09:31	-15.06625	-173.72884	2598.4	2.7	234.4	More orange flocculant patches of material on the seafloor here.	124
12/4/2017	20:09:57	-15.06629	-173.72888	2600.7	1.7	233.8	More orange material - looks like bacterial mat balls.	125
12/4/2017	20:11:31	-15.06638	-173.72901	2604.1	1.4	234.3	We've come down off of the "Noname" ridge and are now almost between the 2 possible eruptions - at least depth anomalies...	126
12/4/2017	20:11:49	-15.06640	-173.72903	2604.5	1.5	234.3	These seds have less of the dark color to them.	127
12/4/2017	20:12:13	-15.06642	-173.72906	2604.8	1.9	234.5	Rock on the seafloor! Yipee!	128
12/4/2017	20:13:03	-15.06648	-173.72914	2605.8	2.1	234.5	Lots and lots of the stalked animals on the seafloor.	129
12/4/2017	20:13:15	-15.06649	-173.72916	2606.5	1.8	234.5	Pretty polychaete just behind us.	130
12/4/2017	20:13:34	-15.06652	-173.72919	2607.2	1.4	234.4	Some burrows in the seds.	131

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S093 W Mata Logger Comments	Record #
12/4/2017	20:14:00	-15.06655	-173.72921	2607.0	1.8	226.4	Still in area of lots of stalked polychaetes. More yellow staining...	132
12/4/2017	20:14:49	-15.06661	-173.72928	2606.4	3.2	183.8	First sight of cracks on the sedimentary cover.	133
12/4/2017	20:19:01	-15.06685	-173.72951	2610.6	1.4	181.8	Sediment now looks like 'rice' terraces with some burrows indicating shallow sub-seafloor bioturbation.	134
12/4/2017	20:21:37	-15.06695	-173.72976	2614.4	1.6	182.8	We're about 100 m NE of waypoint 2.	135
12/4/2017	20:21:46	-15.06696	-173.72976	2615.0	1.0	182.8	Orange materials are iron flocculents.	136
12/4/2017	20:21:55	-15.06697	-173.72978	2615.3	1.0	181.3	Small circular depressions with black glass.	137
12/4/2017	20:22:47	-15.06700	-173.72984	2615.7	1.2	182.1	Little bits of black glass and small rocks and orange floc gathered in the depressions.	138
12/4/2017	20:23:10	-15.06701	-173.72986	2616.3	1.0	182.2	We're still heading downslope. A=2616 m.	139
12/4/2017	20:24:33	-15.06703	-173.72989	2587.8	0.9	182.0	Just changed the depth to the Paro depth. Much more accurate. Depth changed from 2616 m to 2588 m. That's a 30m difference in the depth sensors!!	140
12/4/2017	20:24:52	-15.06703	-173.72989	2587.6	1.2	181.6	Looks like we may have an old rock here.	141
12/4/2017	20:25:00	-15.06705	-173.72990	2587.2	1.7	183.8	In place older lavas here.	142
12/4/2017	20:25:16	-15.06707	-173.72989	2587.0	1.7	182.5	We're coming on some bigger blocky lavas now.	143
12/4/2017	20:25:31	-15.06709	-173.72989	2587.8	0.9	183.3	Did they roll down hill? They are older rocks. Crinoids.	144
12/4/2017	20:25:43	-15.06709	-173.72989	2588.0	0.6	182.2	Seeing a little bit of hard rocky substrate.	145
12/4/2017	20:26:03	-15.06710	-173.72990	2587.9	0.7	180.2	Stalked organism. Palm tree coral.	146
12/4/2017	20:26:11	-15.06710	-173.72990	2587.9	0.7	179.0	These are massive lavas here.	147
12/4/2017	20:26:58	-15.06709	-173.72989	2588.2	0.3	183.2	So we're close to the base of Noname SW rift zone. The map shows us somewhat in the saddle between Noname and West Mata.	148
12/4/2017	20:27:09	-15.06709	-173.72989	2588.2	0.6	181.7	Large blocky rocks here.	149
12/4/2017	20:27:27	-15.06709	-173.72989	2588.0	0.5	190.8	Older lavas with ripples on them.	150
12/4/2017	20:27:42	-15.06710	-173.72989	2588.0	0.5	200.2	Small coral; Crinoids; etc.	151
12/4/2017	20:28:33	-15.06717	-173.72987	2587.8	0.4	263.6	Looking at the palm tree coral - it's a stalked crinoid.	152
12/4/2017	20:28:41	-15.06717	-173.72987	2587.9	0.3	261.3	Bamboo at the base of this massive rock.	153
12/4/2017	20:29:23	-15.06716	-173.72987	2587.9	0.3	259.8	Going to attempt to sample this old lava in the saddle.	154
12/4/2017	20:29:32	-15.06716	-173.72987	2587.8	0.3	259.7	Zooming in on the little coral.	155
12/4/2017	20:30:11	-15.06716	-173.72986	2587.9	0.4	272.5	Lots of biota on this massive rock so another indicator that it's old.	156

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S093 W Mata Logger Comments	Record #
12/4/2017	20:31:23	-15.06716	-173.72986	2588.0	0.4	274.6	The rock is covered in some type of sediment; coating??	157
12/4/2017	20:34:14	-15.06715	-173.72990	2588.8	0.3	234.5	We're repositioning. We've stirred up the bottom.	158
12/4/2017	20:34:38	-15.06716	-173.72991	2588.8	0.0	228.3	Must be quite a current today - everyone seems to be having trouble holding position.	159
12/4/2017	20:35:21	-15.06716	-173.72991	2587.2	2.0	215.4	We can see this patch of rocks in the AUV bathy.	160
12/4/2017	20:36:35	-15.06718	-173.72989	2586.5	2.4	171.7	Massive rock on the seabed.	161
12/4/2017	20:37:09	-15.06718	-173.72985	2587.0	1.2	171.2	Any of this rock is fine.	162
12/4/2017	20:37:31	-15.06718	-173.72986	2587.4	1.1	173.4	These rocks are altered already. They've been here a long time from the looks of it.	163
12/4/2017	20:37:53	-15.06719	-173.72986	2588.2	0.0	176.8	There are small balls of orange flocculant iron oxide on the seafloor.	164
12/4/2017	20:38:59	-15.06719	-173.72986	2588.1	0.5	174.1	Going to try for that sample again after getting pulled off the seafloor and wandering around.....	165
12/4/2017	20:42:01	-15.06723	-173.72989	2588.0	0.6	175.6	***S93-rock-02***. Coating of precipitates out of sea water. Cracked. Fragile. Crystal-rich. Huge olivine crystal. > 1cm in diameter. Orange/grown staining on outside. Angular and small vesicles. Crystal rich. No glass to speak of.	166
12/4/2017	20:43:10	-15.06723	-173.72989	2588.0	0.6	175.6	Rock interior is fresh into partition 5. Going for another grab. 15.06719 173.72986 Z=2589 m.	167
12/4/2017	20:47:02	-15.06724	-173.72989	2588.0	0.6	178.1	Porphorytic. More crystal then rock. Deep green clinopyroxene. 2nd piece: Sliver of the same rock. Cracked. Orange staining. Black manganese coating.	168
12/4/2017	20:47:23	-15.06725	-173.72989	2588.0	0.6	178.1	The rock broke up when it fell into the basket.	169
12/4/2017	20:50:35	-15.06725	-173.72990	2587.9	0.6	178.1	3rd piece: Lots of huge crystals. Small roundish fragment with lots of large crystals. Porphyritic.	170
12/4/2017	20:52:34	-15.06725	-173.72990	2587.9	0.6	178.0	3rd piece with huge megacrysts (either one crystal or a combination of many fused crystals). Another small piece with big crystals. Less than 5 cm. See cleavage in the crystals.	171
12/4/2017	20:53:12	-15.06725	-173.72990	2587.9	0.6	178.0	Clinopyroxene and olivine crystals. Not that old. Probably < 500 years.	172
12/4/2017	20:54:13	-15.06726	-173.72993	2587.9	0.6	176.0	Grabbing the big lunker rock that's fairly circular. May have some glass which is why we're collecting it. More exterior orange iron oxide staining.	173

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S093 W Mata Logger Comments	Record #
12/4/2017	20:55:31	-15.06726	-173.72993	2587.9	0.6	171.4	Huge crystals. Iron staining on the face. Just adjacent to previous pieces. Vesicles. Clinopyroxene. Not seeing glass.	174
12/4/2017	20:56:14	-15.06726	-173.72994	2587.7	0.9	178.0	4 pieces of rock in that sample. Into partition 5.	175
12/4/2017	20:56:22	-15.06726	-173.72994	2586.6	2.1	176.6	Rocky outcrop.	176
12/4/2017	20:58:55	-15.06727	-173.73027	2591.5	1.9	234.4	Back into sediment drape with boulders. possibly some in place rocks?	177
12/4/2017	21:03:57	-15.06775	-173.73060	2596.6	1.7	223.9	Rippled volcanic sand with dune features around volcanic boulders.	178
12/4/2017	21:04:29	-15.06778	-173.73061	2597.7	1.0	223.9	Crinoids and gorgonians with squat lobsters on them. Rooted to boulders.	179
12/4/2017	21:10:16	-15.06799	-173.73096	2596.8	2.0	224.5	Just spotted some pillow lavas. Edge of lava flow and going to get a rock sample. Additionally either a scoop or a push core.	180
12/4/2017	21:20:33	-15.06837	-173.73080	2598.6	0.0	224.3	**S93-rock-03**. Sampling at edge of pillow flow in sedimented basin ~30m from approach to waypoint 2. 7x3cm wedge-shaped crust.	181
12/4/2017	21:23:08	-15.06959	-173.73024	2598.6	0.0	228.5	Second piece of crust of this young pillow flow. 10x3cm with ribbon of white stain through center of crust.	182
12/4/2017	21:24:48	-15.07073	-173.72969	2598.6	0.0	228.1	Third chunk of crust from pillow. Greenish-white stain on top surface. 4x6cm and squarish.	183
12/4/2017	21:25:50	-15.06882	-173.73069	2597.1	1.4	265.5	S93-rock-03 samples location 15.0683890173.7307615 depth 2598m.	184
12/4/2017	21:26:42	-15.06882	-173.73069	2598.2	0.3	277.6	Moving away from sampled outcrop a few meters and looking at flows under a blanket of sediment	185
12/4/2017	21:29:41	-15.06886	-173.73067	2598.2	0.0	269.5	Deploying scoop-2	186
12/4/2017	21:35:25	-15.06703	-173.73121	2598.1	0.0	269.3	Scoop of volcanic sediment immediately at base of young distal lava flow at NE flank of West Mata Volcano. Two scoops.	187
12/4/2017	21:35:59	-15.06683	-173.73124	2597.6	0.8	273.8	**S93-sed-04** location 15.0688935 173.7306471 depth 2598m.	188
12/4/2017	21:44:09	-15.06825	-173.73117	2594.4	2.9	209.1	Adam	189
12/4/2017	21:46:08	-15.06827	-173.73112	2592.4	2.6	217.3	We're flying over a stack of pillows with less ash deposition on them. Pillows have a smaller diameter than at the edge where sediments were thicker.	190
12/4/2017	21:47:37	-15.06854	-173.73076	2589.3	2.6	211.4	Sea anemone. Early colonizer of the lava flow.	191

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S093 W Mata Logger Comments	Record #
12/4/2017	21:51:18	-15.06844	-173.73127	2587.1	3.1	201.2	**S93-rock-05**. Chunk of overhanging crust 10x15cm. Lots of glass and olivine and wedge-shaped. Delaware-looking with some groundmass.	192
12/4/2017	21:51:48	-15.06859	-173.73132	2586.0	2.8	202.8	**S93-rock-05** location 15.0684032 173.7314553 depth 2588m.	193
12/4/2017	21:53:34	-15.06849	-173.73143	2583.6	2.0	212.7	Seeing some substantial inflation in some lobes.	194
12/4/2017	21:54:07	-15.06855	-173.73154	2582.6	1.9	213.3	Halfway between waypoints 2 and 3.	195
12/4/2017	21:58:09	-15.06871	-173.73169	2575.7	4.4	219.9	Beautiful fresh lava flows here.	196
12/4/2017	21:58:16	-15.06873	-173.73170	2575.2	3.7	219.7	Mostly elongate pillows.	197
12/4/2017	21:58:25	-15.06874	-173.73167	2574.8	3.1	219.7	Disgorged pillow to right.	198
12/4/2017	21:59:08	-15.06900	-173.73174	2571.5	0.0	234.1	Zooming in on some of the bigger seds.	199
12/4/2017	21:59:21	-15.06884	-173.73180	2569.5	5.0	256.7	Elongated pillow pile. Some bac mat in the cracks.	200
12/4/2017	22:00:21	-15.06842	-173.73193	2565.8	3.0	223.0	Pillow tubes coming down the slope.	201
12/4/2017	22:00:45	-15.06840	-173.73180	2564.5	0.0	223.0	Not sure if we're on the bigger mound yet. Doesn't look like it according to the Sentry data.	202
12/4/2017	22:01:06	-15.06861	-173.73183	2564.3	2.4	222.8	We're on the outer edge of this flow - the NE edge.	203
12/4/2017	22:01:36	-15.06882	-173.73178	2564.5	2.8	222.4	The new flow is probably less than 20 m thick here.	204
12/4/2017	22:02:17	-15.06880	-173.73191	2563.1	5.1	221.1	Large pillows at the base of a nearly elongate slope. The AUV nav and the Sentry map seem to be right on.	205
12/4/2017	22:02:53	-15.06869	-173.73201	2560.0	0.0	217.0	Nearly vertical pillow slope.	206
12/4/2017	22:03:17	-15.06888	-173.73193	0.0	5.5	215.2	Lots of in place elongate pillow lobes flowing down slope.	207
12/4/2017	22:03:36	-15.06888	-173.73193	0.0	8.0	214.8	Larger bulbous pillows at the end of some of these elongate pillow tubes.	208
12/4/2017	22:04:01	-15.07112	-173.73100	0.0	10.4	213.4	The dominate pillow flow here is a series of long; subparallel pillow tubes that flowed down slope.	209
12/4/2017	22:04:19	-15.07112	-173.73100	2552.0	0.0	213.4	Lots of volcanic sand on top of the pillows.	210
12/4/2017	22:04:34	-15.06895	-173.73195	2551.1	11.7	210.3	Large bulbous striated pillow in the screen now.	211
12/4/2017	22:05:38	-15.06909	-173.73231	2547.2	8.7	209.9	This flow happened sometime between 2011 to 2016.	212
12/4/2017	22:06:10	-15.06903	-173.73204	2544.4	5.0	207.3	Beautiful pillows. Some of them are truncated.	213
12/4/2017	22:06:27	-15.06893	-173.73186	2543.5	4.2	207.3	Broken crust on that lobe.	214
12/4/2017	22:06:37	-15.06876	-173.73186	2542.8	4.5	205.7	Decapitated pillow.	215
12/4/2017	22:06:49	-15.06899	-173.73195	2541.9	3.6	207.4	Most of these pillows are in place.	216
12/4/2017	22:07:02	-15.06899	-173.73195	2571.9	4.4	206.7	These pillows are mostly less than a meter in diameter.	217
12/4/2017	22:07:11	-15.06899	-173.73195	2571.3	0.0	206.5	Another disgorged pillow.	218
12/4/2017	22:07:21	-15.06899	-173.73195	2539.9	5.0	206.6	Not particularly well ordered pillows.	219

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S093 W Mata Logger Comments	Record #
12/4/2017	22:07:42	-15.06906	-173.73173	2539.0	0.0	206.3	Navigation is jumping around.	220
12/4/2017	22:08:13	-15.06914	-173.73203	2536.0	5.4	223.9	We're less than 199 m from the top of this deeper lava mound.	221
12/4/2017	22:08:32	-15.06903	-173.73213	2535.0	5.8	223.7	Large bulbous pillow at the end of some of these tubes.	222
12/4/2017	22:09:19	-15.06903	-173.73213	2531.8	0.0	222.9	This is a steep slope.	223
12/4/2017	22:09:33	-15.06903	-173.73213	2531.0	0.0	219.1	Can see some of these pillows have void spaces on them.	224
12/4/2017	22:09:45	-15.06903	-173.73213	2530.7	0.0	214.5	Near-vertical pillow lavas.	225
12/4/2017	22:10:05	-15.06903	-173.73213	2530.2	0.0	213.8	Not seeing many broken lava tubes even though we're on a nearly-vertical slope.	226
12/4/2017	22:10:34	-15.06903	-173.73213	2529.0	3.5	219.3	The nav is not doing well..... Don't even see Subastian on the nav screen.	227
12/4/2017	22:11:35	-15.06903	-173.73213	2525.8	0.0	217.7	We're still moving up the mound. Z=2526m. No nav.	228
12/4/2017	22:12:31	-15.06903	-173.73213	2523.3	2.6	220.1	The last piece of rock we got was an outer crust so will wait for another sample.	229
12/4/2017	22:12:49	-15.06855	-173.73228	2522.4	4.6	219.5	More pillow tubes - that one is slightly disgorged.	230
12/4/2017	22:13:22	-15.06855	-173.73228	2519.7	8.0	218.7	Beautiful pillow lavas. Black and fresh.	231
12/4/2017	22:14:12	-15.06855	-173.73228	2520.5	0.0	218.3	Not much iron staining. Ken thinks this lava formed more recently - 2015 or 2016 - rather than earlier in the 2011 - 2016 cycle.	232
12/4/2017	22:14:46	-15.06855	-173.73228	2516.1	0.0	217.9	No signs of diffuse venting. Seeing some eruptive-type mat in some of the cracks in the pillows.	233
12/4/2017	22:15:03	-15.06855	-173.73228	2514.5	4.4	218.4	Pretty warm? Can stay warm for several years.	234
12/4/2017	22:15:36	-15.06855	-173.73237	2512.6	3.4	228.5	Looks like we're getting near the top of this large mound.	235
12/4/2017	22:16:01	-15.06869	-173.73239	2511.4	2.8	228.8	Still long linear pillow tubes. 2567 - 2512 m from base of this mound to here.	236
12/4/2017	22:16:15	-15.06869	-173.73240	2510.9	2.6	228.5	Cracked and fractured pillows now.	237
12/4/2017	22:16:32	-15.06871	-173.73242	2510.8	1.2	225.4	Squat elongate pillows parallel to the slope.	238
12/4/2017	22:16:44	-15.06872	-173.73243	2510.6	1.8	224.9	More big bulbous pillows.	239
12/4/2017	22:17:08	-15.06875	-173.73246	2508.7	3.8	224.6	We're seeing a little more extensive staining. Looks like it could be eruptive mat.	240
12/4/2017	22:17:29	-15.06877	-173.73248	2507.2	4.3	224.6	That yellow mat looks hydrothermal in origin.	241
12/4/2017	22:17:39	-15.06878	-173.73249	2506.7	4.5	222.1	Rock is flatter and squatter here.	242
12/4/2017	22:18:05	-15.06882	-173.73252	2507.2	1.9	218.5	Flatter lava at the top of this mound.	243
12/4/2017	22:18:35	-15.06887	-173.73255	2505.8	3.2	218.2	More cracking in the rock and squat flatter pillow lavas.	244

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S093 W Mata Logger Comments	Record #
12/4/2017	22:18:54	-15.06889	-173.73258	2505.3	4.1	218.2	Seeing some white and orange staining between these pillow lobes.	245
12/4/2017	22:19:38	-15.06895	-173.73264	2506.7	3.5	218.6	The Subastian vehicle is back on the nav screen - but doesn't look like it's in the right place.	246
12/4/2017	22:19:56	-15.06897	-173.73265	2508.0	1.4	218.9	Big flattish mound of pillows parallel to the slope.	247
12/4/2017	22:20:04	-15.06897	-173.73266	2508.3	1.2	218.7	Fatter pillows here.	248
12/4/2017	22:24:28	-15.06897	-173.73266	2508.4	0.0	221.8	Top of the mound approx. waypoint 3. Nav is misbehaving again	249
12/4/2017	22:27:06	-15.06897	-173.73266	2508.4	0.0	222.5	Chunk of very vesicular porphyritic glassy rind from inflated pillow at top of mound. 10x17cm	250
12/4/2017	22:28:35	-15.06897	-173.73266	2508.4	0.0	222.5	Sample **S93-rock-06** at top of mound close to or at waypoint 3. Nav off so precise location uncertain. Depth estimated at 2508m.	251
12/4/2017	22:34:06	-15.06897	-173.73266	2516.6	1.2	177.9	Some microbial staining on undersides of flows. Hard to tell but either yellow or orange deposits.	252
12/4/2017	22:37:11	-15.06897	-173.73266	2520.0	1.6	176.1	Attempted a niskin sample but the bottle did not trigger. Sample attempt failed.	253
12/4/2017	22:40:59	-15.06897	-173.73266	2521.1	2.5	176.7	Resuming transit and should start moving downslope on other side of mound past waypoint 3.	254
12/4/2017	22:43:41	-15.06897	-173.73266	2531.0	4.0	189.0	Thick pile of narrower pillow lavas.	255
12/4/2017	22:45:03	-15.06897	-173.73266	2534.9	2.8	182.8	Edge of flow and sediments. Lots of small toes.	256
12/4/2017	22:55:09	-15.07057	-173.73293	2525.5	2.3	260.5	5x10cm vesicular with fresh glass and ropy surface. Grey groundmass. Blocky with large fresh olivines.	257
12/4/2017	22:58:34	-15.07074	-173.73325	2543.7	1.8	266.3	Location for **S93-rock-07** 15.0706076 173.7329052 depth 2525m.	258
12/4/2017	23:00:51	-15.07075	-173.73337	2537.1	4.3	283.1	JRod	260
12/4/2017	23:00:57	-15.07074	-173.73338	2537.3	4.1	286.7	Waypoint 4.	261
12/4/2017	23:07:38	-15.07050	-173.73371	2528.3	3.4	265.4	Seeing lots of detached pillow fragments in pile. Probably dripped out from overhanging pillows. "Lava turds".	262
12/4/2017	23:08:37	-15.07050	-173.73373	2526.3	2.6	255.6	Some pillows are truncated but many are intact and in place.	263
12/4/2017	23:09:16	-15.07048	-173.73375	2524.9	3.1	257.5	Spongy lavas with coalesced very large vesicles within glassy rind layer. Extremely gassy lavas.	264
12/4/2017	23:11:54	-15.07032	-173.73394	2521.6	0.0	235.0	Slope steepening and seeing more truncated pillows.	265

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S093 W Mata Logger Comments	Record #
12/4/2017	23:16:49	-15.07042	-173.73417	2525.4	13.7	229.8	Free-hanging pillow toe 50-60 cm and shaped like hairy mushroom. ROV team sampled while free-floating and deserves all the cookies.	266
12/4/2017	23:19:33	-15.07037	-173.73436	2527.7	5.8	272.7	S93-rock-08 location 15.0704083 173.7343028 depth 2526m.	267
12/4/2017	23:19:48	-15.07034	-173.73437	2528.0	9.1	269.7	S93-rock-08 "telescoping pillow".	268
12/4/2017	23:20:10	-15.07031	-173.73440	2528.2	16.2	258.4	Nearly vertical pillow wall with many truncated flows.	269
12/4/2017	23:20:50	-15.07028	-173.73444	2528.8	17.1	254.1	Full vertical wall with truncated pillows.	270
12/4/2017	23:21:01	-15.07028	-173.73445	2530.4	16.6	245.6	Scarp?	271
12/4/2017	23:22:23	-15.07022	-173.73453	2543.1	5.7	239.6	Debris pile at bottom of cliff.	272
12/4/2017	23:23:37	-15.07023	-173.73480	2552.1	3.4	240.8	Suddenly out of talus and into intact pillows.	273
12/4/2017	23:24:41	-15.07025	-173.73485	2551.3	3.0	241.3	Seeing some sediment and surface discoloration on pillows here. Probably some post-eruptive hydrothermal activity at some point here.	274
12/4/2017	23:24:53	-15.07026	-173.73489	2551.3	3.5	239.7	Back into talus.	275
12/4/2017	23:25:46	-15.07033	-173.73500	2546.9	3.2	241.3	Staining pattern on talus suggest hydrothermal activity happened syn-deposition or after.	276
12/4/2017	23:27:41	-15.07041	-173.73526	2540.3	3.9	242.7	Back into intact pillows with intercalated talus.	277
12/4/2017	23:27:45	-15.07042	-173.73528	2540.4	4.0	244.3	Cloudy water.	278
12/4/2017	23:27:54	-15.07043	-173.73531	2540.8	4.7	241.0	Intact pillows.	279
12/4/2017	23:38:50	-15.07047	-173.73540	2544.0	0.9	212.7	Vesicular pillow crust from field showing signs of hydrothermal alteration near base of mound. Orange and white stripe on edge 25x15cm.	280
12/4/2017	23:42:33	-15.07046	-173.73575	2547.8	2.1	253.8	Sample **S93-rock-09** location 15.0704700 173.7353916 depth 2545m.	281
12/4/2017	23:43:35	-15.07053	-173.73578	2547.0	1.7	185.2	At base of mound among some small pillow piles. Deviated from dive track. Starting transit to waypoint 6.	282
12/4/2017	23:43:53	-15.07054	-173.73578	2546.9	2.0	184.8	Nice fracture and inflation structures in pillows	283
12/4/2017	23:50:43	-15.07135	-173.73576	2520.1	2.6	181.9	Heading back upslope across a lot of intact pillows. Seeing few truncations	284
12/4/2017	23:50:59	-15.07141	-173.73578	2520.3	2.7	182.1	Crossing into talus	285
12/4/2017	23:54:10	-15.07173	-173.73578	2497.3	4.7	180.2	Talus-intact lava flow contact at top of talus pile	286
12/4/2017	23:56:49	-15.07184	-173.73581	2469.3	0.0	169.5	We're heading up to waypoint 6.	287
12/4/2017	23:57:12	-15.07185	-173.73583	2465.8	0.0	169.7	Moving south after a little diversion off to the west to check what those lavas look like.	288
12/4/2017	23:57:39	-15.07191	-173.73581	2462.3	4.4	182.1	It was all new lava - even off the big mounds in the AUV data.	289

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S093 W Mata Logger Comments	Record #
12/4/2017	23:57:59	-15.07193	-173.73579	2460.7	4.2	190.5	When we get to the top of this mound we will want to collect another rock sample.	290
12/4/2017	23:58:29	-15.07194	-173.73577	2458.0	0.0	183.3	Coming up the largest mound.	291
12/4/2017	23:58:52	-15.07194	-173.73575	2456.6	0.0	189.7	Larger bulbous pillows here.	292
12/4/2017	23:59:12	-15.07196	-173.73577	2455.3	3.9	189.2	Striated ridges on bread crust type crust.	293
12/4/2017	23:59:23	-15.07196	-173.73577	2454.9	0.0	197.1	Now coming on lavas with a much smoother surface.	294
12/4/2017	23:59:31	-15.07196	-173.73578	2455.1	5.2	190.2	That was "surface".	295
12/4/2017	23:59:55	-15.07196	-173.73581	2455.8	0.0	186.4	Smooth pillow tubes with very few striations in the middle of the flow upslope.	296
12/5/2017	0:00:59	-15.07196	-173.73584	***2428.8***	4.0	190.0	We're going to sample a piece of this broken-up messed up pillow in front of us.	297
12/5/2017	0:01:13	-15.07193	-173.73585	***2428.3***	0.0	179.8	Several of these pillows are cracked upon.	298
12/5/2017	0:01:25	-15.07192	-173.73585	***2427.9***	6.9	176.0	We're going to look for a small little pillow toe.	299
12/5/2017	0:01:57	-15.07194	-173.73587	***2426.8***	23.5	188.3	Scaleworm just went zooming by.	300
12/5/2017	0:02:09	-15.07195	-173.73588	***2426.3***	0.0	187.9	Squiddle feed had stopped for a bit. It's going now.	301
12/5/2017	0:02:21	-15.07195	-173.73588	***2425.5***	3.8	186.4	Continuing up this steep slope.	302
12/5/2017	0:02:34	-15.07198	-173.73588	***2424.4***	3.6	185.7	Large bulbous pillow in the midst of smoother elongate tubes.	303
12/5/2017	0:03:03	-15.07201	-173.73589	***2422.9***	2.4	185.6	A light dusting of sediment on these pillows on a less steep slope as we reach the top of this pillow mound.	304
12/5/2017	0:03:26	-15.07204	-173.73587	***2422.7***	1.0	189.9	We're at the thickest part of this pillow ridge.	305
12/5/2017	0:04:25	-15.07206	-173.73585	***2422.1***	1.4	136.1	We're now on the top of this pillow mound.	306
12/5/2017	0:04:39	-15.07207	-173.73585	***2422.5***	1.0	134.5	Looking for a sample site.	307
12/5/2017	0:05:25	-15.07208	-173.73587	***2422.4***	1.1	133.4	Going to try to sample the crust on the top of this bulbous lava pillow - striations and cracks.	308
12/5/2017	0:06:13	-15.07207	-173.73587	***2421.8***	1.6	131.9	Grab of top plate on bulbous pillow with cracks and striations.	309
12/5/2017	0:09:17	-15.07208	-173.73590	***2422.0***	1.1	116.0	**S93-rock-10**. Z=2448m. Inflated pillow crust with striae at the surface. 7 cm x 12cm piece. Lots of minerals; dark and glassy. Angular with striations.	310

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S093 W Mata Logger Comments	Record #
12/5/2017	0:11:02	-15.07209	-173.73590	***2422.0***	1.1	115.7	Banding is the flow on the outer edge. Into front of partition 10. Terry says it is 20x15cm. 15.072079 173.735872.	311
12/5/2017	0:12:00	-15.07209	-173.73590	***2421.7***	1.2	116.7	We're at the top of this pillow mound. Z=2448. Actually will move to waypoint 6.	312
12/5/2017	0:12:14	-15.07209	-173.73590	***2420.9***	2.1	143.1	White staining on the rock.	313
12/5/2017	0:12:47	-15.07214	-173.73590	***2419.5***	1.4	160.5	Large lobate pillows on the top of this pillow mound. Some large more circular pillows as well.	314
12/5/2017	0:13:31	-15.07219	-173.73589	***2419.1***	1.2	158.2	We're going to try to get a sediment scoop in a depression between large pillow lobes.	315
12/5/2017	0:15:12	-15.07218	-173.73589	***2419.6***	0.0	157.3	May be able to get a scoop in here. There is some sediment in there - but not much we're sure.	316
12/5/2017	0:15:33	-15.07219	-173.73588	***2419.6***	0.0	157.4	Going for sediment scoop #4.	317
12/5/2017	0:16:07	-15.07220	-173.73589	***2419.6***	0.0	158.1	Have the sediment scoop in hand.	318
12/5/2017	0:21:41	-15.07220	-173.73583	***2419.6***	0.0	157.9	**S93-sed-11**. Volcaniclastic sediment from pocket nearly surrounded by large pillow tubes. Dark sparkly grains. Z=2446 m.	319
12/5/2017	0:26:07	-15.07216	-173.73592	***2419.6***	0.0	156.7	15.072198 173.735591. Gray dust rising. Black shiny sediment crystals. The volcaniclastic seds are really black beneath the pelagic marine snow area.	320
12/5/2017	0:27:27	-15.07220	-173.73586	***2419.6***	0.0	156.6	CORRECTION: First called this sample S93-Sed-11; then I called it S98-Sed-4. The sample name is: S93-Sed-11.	321
12/5/2017	0:28:22	-15.07218	-173.73586	***2419.6***	0.0	155.6	Have about 3 inches of sediment in this bag (there's a small hole in the bottom so hope it's all there at the surface).	322
12/5/2017	0:29:04	-15.07218	-173.73586	***2419.6***	0.0	156.9	Stowed behind the marker box - right were it started out.	323
12/5/2017	0:29:24	-15.07219	-173.73587	***2419.6***	0.0	159.3	Lots of black volcaniclastic sand exposed after sediment scoop.	324
12/5/2017	0:29:50	-15.07219	-173.73588	***2419.6***	0.0	159.2	Looking for signs of shimmer here.	325
12/5/2017	0:30:31	-15.07220	-173.73587	***2418.3***	1.3	157.9	Going to pull up and look around a little.	326
12/5/2017	0:30:42	-15.07222	-173.73586	***2417.9***	1.5	157.3	Flat-ish pillows up here.	327

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S093 W Mata Logger Comments	Record #
12/5/2017	0:31:26	-15.07232	-173.73584	***2416.4***	1.4	168.0	Hydrothermal staining between the pillow lavas.	328
12/5/2017	0:31:47	-15.07233	-173.73582	***2415.8***	2.2	191.5	Right up to the tippy top of this pillow mound.	329
12/5/2017	0:32:38	-15.07240	-173.73582	***2415.2***	1.5	204.0	Yellow hydrothermal staining here. That's what's left of the eruptive mat.	330
12/5/2017	0:33:41	-15.07234	-173.73599	***2419.3***	0.9	281.3	Going to head down the pillow ridge to the west.	331
12/5/2017	0:34:24	-15.07230	-173.73607	***2421.7***	0.9	280.6	Polynoids ballet.	332
12/5/2017	0:34:45	-15.07229	-173.73609	***2421.8***	1.4	280.6	Polynoids ballet.	333
12/5/2017	0:36:21	-15.07225	-173.73618	***2426.7***	2.6	280.8	These lavas are still flatter and fatter up here at the top of this pillow mound at 2454 m water depth.	334
12/5/2017	0:37:00	-15.07219	-173.73627	***2434.3***	0.0	217.6	Heading downslope about 10m above the bottom.	335
12/5/2017	0:37:49	-15.07223	-173.73636	***2445.8***	0.0	188.9	Flying quite high as we head down slope.	336
12/5/2017	0:37:59	-15.07225	-173.73637	***2448.5***	4.7	184.8	More pillows tubes as we head down slope.	337
12/5/2017	0:38:09	-15.07227	-173.73640	***2449.8***	0.0	183.5	Steep section now.	338
12/5/2017	0:38:50	-15.07231	-173.73643	***2456.1***	4.3	137.8	Moving down - closer to the slope now so the view is improving. I'm 10.5 m above the lower lava ledge and still dropping.	339
12/5/2017	0:39:44	-15.07225	-173.73644	***2458.3***	9.8	138.2	A few broken pillow pieces on the slope - just most of the lavas are in place.	340
12/5/2017	0:40:45	-15.07221	-173.73647	***2468.7***	5.9	138.0	Long pillows running down slope. Most have more bulbous pillows at the end extension.	341
12/5/2017	0:41:36	-15.07222	-173.73651	***2470.5***	6.1	126.9	Getting to the bottom of the slope now. Seeing more broken pillow pieces down here. Z=1207	342
12/5/2017	0:42:54	-15.07221	-173.73655	***2473.8***	2.5	239.1	Bill thinks the lower lobes probably erupted first; followed by the larger pillow mounds on top.	343
12/5/2017	0:43:37	-15.07216	-173.73661	***2475.3***	1.2	295.5	Moderate slope here; instead of the steep slope we just descended.	344
12/5/2017	0:44:17	-15.07212	-173.73667	***2476.9***	0.0	296.1	Cracked pillow tops here and there - with lines through them that appear white.	346
12/5/2017	0:44:17	-15.07212	-173.73667	***2476.9***	0.0	296.1	Cracked pillow tops here and there - with lines through them that appear white.	345

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S093 W Mata Logger Comments	Record #
12/5/2017	0:45:46	-15.07203	-173.73694	***2480.0***	1.8	267.3	We're out on the apron of the flow now where the lava is less thick. Seeing a little bit more sediment here and there.	347
12/5/2017	0:46:07	-15.07203	-173.73703	***2480.6***	2.8	242.2	Massively big pillows sticking up above the slope here.	348
12/5/2017	0:46:48	-15.07202	-173.73711	***2481.0***	3.0	244.1	Spongy texture pillow crust. That's under the outer crust - meaning the outer crust broke out.	349
12/5/2017	0:48:48	-15.07199	-173.73749	***2481.9***	3.7	265.1	Seeing a little bit of jumbled flow here. More like pillows than jumbled.	350
12/5/2017	0:49:08	-15.07197	-173.73754	***2481.0***	5.3	274.1	Seeing some broken pillows now. Pillow pieces laying at their bases.	351
12/5/2017	0:49:50	-15.07190	-173.73762	***2487.1***	2.0	303.5	We're possibly at the edge of a flow.	352
12/5/2017	0:49:58	-15.07187	-173.73762	***2487.2***	2.9	289.1	Contact.	353
12/5/2017	0:51:24	-15.07188	-173.73763	***2489.2***	0.5	293.1	Looks like we have crossed over the contact zone.	354
12/5/2017	0:52:05	-15.07188	-173.73763	***2489.3***	0.0	295.5	Thicker sediments at the edges of this flow. There are thin flows on the edges here and we see thicker sediments.	355
12/5/2017	0:52:21	-15.07187	-173.73763	***2489.3***	0.0	295.4	Seeing long flat tubes at the edges of these flows.	356
12/5/2017	0:52:50	-15.07187	-173.73768	***2489.3***	0.0	296.1	The long flat lobe is part of the pound flow.	357
12/5/2017	0:54:20	-15.07189	-173.73761	***2489.3***	0.0	296.1	Looking at long flat lava lobe in the background. New flow. Deeper sediments. Getting to the edge of the new flow - but still in it.	358
12/5/2017	0:55:55	-15.07188	-173.73762	***2489.3***	0.0	295.3	Going for the dip stick. 10 cm intervals on the tape action.	359
12/5/2017	0:56:49	-15.07188	-173.73762	***2489.3***	0.0	295.3	20 cm sed thickness. That's some black volcanic ash underneath the sed.	360
12/5/2017	0:57:19	-15.07187	-173.73763	***2489.3***	0.0	294.6	The ash layer we're seeing is probably from this eruption.	361
12/5/2017	0:58:25	-15.07189	-173.73760	***2489.3***	0.0	294.5	Consistent 20 cm measurement of the volcaniclastic sediment thickness here.	362
12/5/2017	1:00:44	-15.07189	-173.73760	***2489.3***	0.0	295.1	Going in for the sediment core here on the western edge of the main lava flow (at waypoint 7).	363
12/5/2017	1:03:08	-15.07188	-173.73762	***2489.3***	0.0	295.0	**S93-sed-12**. Using the push core #2 with the core catcher in this very black volcaniclastic ash / sed layer. Z=2517 m Core is ~ 1/3 full.	364

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S093 W Mata Logger Comments	Record #
12/5/2017	1:04:12	-15.07187	-173.73761	***2489.3***	0.0	301.8	15.0718871 173.7376096 Z=2560. Position for sample 12.	365
12/5/2017	1:06:13	-15.07185	-173.73763	***2490.2***	0.4	331.8	Going to take a rock sample next.	366
12/5/2017	1:06:37	-15.07186	-173.73762	***2490.2***	0.4	332.7	Peter	367
12/5/2017	1:06:53	-15.07186	-173.73762	***2490.2***	0.4	332.8	Sampling right near where we took the sediment sample. Thin lobe on the edge of the flow. It's wide and flat as well.	368
12/5/2017	1:08:28	-15.07186	-173.73762	***2490.2***	0.4	334.1	**S93-rock-13.** Small piece of new flow on edge. 5cm thin wedge. Lots of olivines. Small vesicles. Glass rind. Super fresh. Into biobox 1.	369
12/5/2017	1:11:43	-15.07186	-173.73762	***2490.2***	0.4	337.4	Another piece to add. Flat-ish rind from the top edge of long flat pillow. Glassy rind; Irregular shape. Some vesicles. Lots of green minerals. 8-10cm across.	370
12/5/2017	1:12:48	-15.07186	-173.73762	***2490.2***	0.4	337.5	15.0718559 173.7376237 Z=2517. Position for sample 13.	371
12/5/2017	1:13:50	-15.07186	-173.73762	***2490.2***	0.4	337.5	Going to the north a little bit to see if this is really the near-edge of the flow to see if this is a kipuka or it extends out.	372
12/5/2017	1:14:47	-15.07182	-173.73762	***2490.2***	1.1	335.5	Moving north to check things out again.	373
12/5/2017	1:15:58	-15.07171	-173.73767	***2490.6***	3.7	231.3	Still in the new flow. A little jumbly stuff here. Staining in the cracks.	374
12/5/2017	1:17:04	-15.07186	-173.73761	***2488.1***	2.2	169.8	We've turned around now and are going to continue on our proposed route toward WP 8.	375
12/5/2017	1:17:28	-15.07191	-173.73759	***2485.8***	2.1	169.4	Back where we were before. Lots of sediment between the pillows.	376
12/5/2017	1:17:58	-15.07195	-173.73758	***2484.2***	2.9	174.3	Looks like we're seeing more floc / marine snow in the water column.	377
12/5/2017	1:18:42	-15.07199	-173.73757	***2482.5***	3.0	174.2	We've zoomed out a bit.	378
12/5/2017	1:19:07	-15.07200	-173.73756	***2481.7***	2.6	174.2	Big old broken pillow here.	379
12/5/2017	1:19:35	-15.07203	-173.73756	***2480.8***	1.7	175.0	Heading up slope a bit now.	380
12/5/2017	1:19:58	-15.07206	-173.73756	***2480.0***	1.7	183.2	The pillows are more pillow tubes here. Still a bit larger and flatter than what we saw on the higher slope.	381

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S093 W Mata Logger Comments	Record #
12/5/2017	1:21:20	-15.07212	-173.73755	***2476.6***	2.3	182.7	Pillows are getting a little narrower now - with larger bulbous pillows at the end of the pillow tubes.	382
12/5/2017	1:22:15	-15.07221	-173.73757	***2472.9***	1.9	182.8	Large pillow lava to the right. Broken	383
12/5/2017	1:22:43	-15.07225	-173.73758	***2471.3***	2.3	182.7	Some broken up lavas.	384
12/5/2017	1:22:48	-15.07226	-173.73758	***2470.9***	2.5	182.9	Cracked large pillow top.	385
12/5/2017	1:23:03	-15.07228	-173.73758	***2469.2***	3.0	183.2	Smoother elongate pillow tubes with pillow buds	386
12/5/2017	1:24:26	-15.07238	-173.73759	***2461.0***	4.5	183.0	Getting steeper now. More elongate pillows now. Small striations on surface	387
12/5/2017	1:24:34	-15.07238	-173.73759	***2460.4***	5.2	182.9	Top hat pillow to the right.	388
12/5/2017	1:25:39	-15.07244	-173.73759	***2456.2***	3.3	182.9	Disgorged pillow.	389
12/5/2017	1:26:00	-15.07245	-173.73760	***2454.8***	3.6	182.8	Seeing some broken pillow pieces as well on this steep slope.	390
12/5/2017	1:27:33	-15.07254	-173.73760	***2449.0***	1.7	182.5	Moving upslope and the lavas are getting thicker and larger.	391
12/5/2017	1:28:59	-15.07263	-173.73759	***2444.4***	2.2	182.4	The slope is decreasing now.	392
12/5/2017	1:29:05	-15.07264	-173.73759	***2444.4***	1.6	182.7	More cracking of the pillows.	393
12/5/2017	1:29:22	-15.07266	-173.73759	***2444.0***	1.4	182.5	More pillows that are perpendicular to the slope - as well as parallel.	394
12/5/2017	1:29:46	-15.07269	-173.73759	***2442.6***	2.1	182.2	Large bulbous pillows at the ends of the lava tubes.	395
12/5/2017	1:29:51	-15.07270	-173.73759	***2442.8***	1.5	181.7	Big pillows ahead.	396
12/5/2017	1:30:16	-15.07273	-173.73758	***2442.6***	1.4	182.7	Radially fractured pillows.	397
12/5/2017	1:30:40	-15.07276	-173.73758	***2441.3***	1.6	152.8	We're pretty much at waypoint 8.	398
12/5/2017	1:31:08	-15.07278	-173.73757	***2440.2***	2.7	148.6	Big bulbous pillows here at the top of this pillow ridge.	399
12/5/2017	1:31:55	-15.07284	-173.73756	***2438.6***	3.7	76.7	We are now at waypoint 8 and will head to the SE up slope.	400
12/5/2017	1:33:01	-15.07290	-173.73741	***2438.7***	6.2	143.1	Moving from pillow lavas to talus as we move up steeper slope here.	401

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S093 W Mata Logger Comments	Record #
12/5/2017	1:33:39	-15.07300	-173.73735	***2436.7***	0.0	147.6	Broken up pillow pieces on this steep slope.	402
12/5/2017	1:34:14	-15.07305	-173.73732	***2433.8***	3.3	146.9	Lots of broken pillow lava pieces littering the steep slope here.	403
12/5/2017	1:36:08	-15.07320	-173.73722	***2420.9***	3.4	146.5	Large pillow pieces here that have rolled down this steep slope.	404
12/5/2017	1:36:48	-15.07324	-173.73718	***2417.5***	2.8	147.5	Big blocky pillow talus slope. Are angular because they break along the cooling cracks on the outer surfaces.	405
12/5/2017	1:37:43	-15.07332	-173.73716	***2412.4***	3.0	147.1	We're approaching the rim of a crater type feature.	406
12/5/2017	1:37:59	-15.07336	-173.73716	***2410.4***	3.0	177.6	It's much steeper here.	407
12/5/2017	1:38:18	-15.07340	-173.73718	***2407.8***	3.5	178.1	The talus is right up against the edge of the steep cliff.	408
12/5/2017	1:39:20	-15.07355	-173.73720	***2402.1***	6.8	187.0	All the lava is intact on the lava wall ahead.	409
12/5/2017	1:39:46	-15.07352	-173.73716	***2401.1***	11.6	168.2	Intact pillows on this wall - decapitated pillows along this spectacularly steep slope.	410
12/5/2017	1:39:57	-15.07351	-173.73715	***2400.1***	14.3	167.3	We're at the V in the AUV data.	411
12/5/2017	1:40:10	-15.07350	-173.73715	***2398.2***	16.0	167.2	Hydrothermal staining on these pillows.	412
12/5/2017	1:40:37	-15.07351	-173.73715	***2392.9***	21.0	166.5	Pillows stacked upon pillows. Most are horizontal to the slope.	413
12/5/2017	1:41:10	-15.07354	-173.73714	***2387.8***	0.0	163.1	Now we're approaching the top of this part of the slope.	414
12/5/2017	1:41:25	-15.07356	-173.73711	***2386.9***	0.0	161.0	We're still moving upslope but the slope has decreased.	415
12/5/2017	1:41:46	-15.07355	-173.73707	***2386.0***	3.2	161.2	The pillows are bigger up here - as we've seen at other areas on this flow.	416
12/5/2017	1:42:40	-15.07354	-173.73705	***2385.6***	2.8	160.3	Larger pillow / lobates up here. Some cracks and broken tops here and there.	417
12/5/2017	1:43:32	-15.07360	-173.73705	***2383.8***	1.5	160.5	Continuing up. Seeing some scaleworms swimming above the bottom.	418
12/5/2017	1:43:48	-15.07361	-173.73704	***2383.1***	1.3	160.5	There must be some warm water somewhere but we haven't seen it yet.	419
12/5/2017	1:44:01	-15.07363	-173.73704	***2382.3***	1.7	159.8	Great big pillows ahead.	420

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S093 W Mata Logger Comments	Record #
12/5/2017	1:44:32	-15.07366	-173.73701	***2380.6***	2.1	160.2	Big broken up pillows up here.	421
12/5/2017	1:44:39	-15.07367	-173.73700	***2380.4***	2.0	160.3	Lots of ash on the pillows up here.	422
12/5/2017	1:45:24	-15.07371	-173.73697	***2378.9***	1.7	160.4	We're almost at the top. We'll try to take a rock sample up here.	423
12/5/2017	1:46:13	-15.07375	-173.73697	***2379.5***	1.2	160.5	Zooming in on this rock that we want to sample	424
12/5/2017	1:46:53	-15.07376	-173.73698	***2379.9***	0.8	160.0	**S93-rock-14**. Large pillow with platy exterior. A small hole in the bottom. Some striated surfaces. Seems it may be hollow?	425
12/5/2017	1:49:50	-15.07373	-173.73696	***2380.0***	0.7	160.0	Crust with striations and banding at WP 9. 3 cm in longest dimension. Into biobox 2.	426
12/5/2017	1:52:19	-15.07373	-173.73696	***2380.0***	0.7	159.1	Another grab of this platy crumbly crust. Long narrow piece. 25 cm slab of glassy pillow rind. Can't see crystals from this side.	427
12/5/2017	1:53:09	-15.07373	-173.73696	***2380.0***	0.7	162.4	Z=2406 15.073788 173.736938 position for that sample.	428
12/5/2017	1:53:57	-15.07375	-173.73696	***2378.6***	1.6	193.5	We will be heading to the W/SW next toward a large pillow collapse - at least in the AUV bathymetry.	429
12/5/2017	1:54:07	-15.07376	-173.73698	***2379.0***	2.9	194.6	Scaleworms.	430
12/5/2017	1:56:00	-15.07379	-173.73718	***2387.0***	4.0	194.9	Seeing lots of marine snow (??) in the water column.	431
12/5/2017	1:56:10	-15.07379	-173.73721	***2388.2***	4.2	194.1	Dancing scale worm.	432
12/5/2017	1:56:49	-15.07382	-173.73730	***2394.4***	3.2	195.0	Maybe a little more ash on these pillows than on the other mounds?	433
12/5/2017	1:57:19	-15.07386	-173.73738	***2396.2***	3.9	233.5	Moving down the slope. Pillow tubes and bit pillows scattered about.	434
12/5/2017	1:57:35	-15.07387	-173.73742	***2397.2***	1.9	242.8	That pillow collapsed and left its center empty.	435
12/5/2017	1:59:08	-15.07393	-173.73758	***2391.1***	3.5	242.4	We're already down to the bottom of that last mound and climbing up another one with what looks like a collapse pit at the top of it. We'll see soon.	436
12/5/2017	2:00:01	-15.07396	-173.73765	***2386.3***	3.4	248.6	Pillows = and pillow tubes.	437

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S093 W Mata Logger Comments	Record #
12/5/2017	2:01:33	-15.07399	-173.73778	***2380.6***	2.9	250.2	Pillow boulders on the side of this steepening slope.	438
12/5/2017	2:01:56	-15.07400	-173.73781	***2379.0***	2.6	250.6	More pillow tubes. and some broken up larger pillows.	439
12/5/2017	2:02:00	-15.07400	-173.73782	***2378.8***	2.5	250.4	Scaleworm.	440
12/5/2017	2:03:41	-15.07404	-173.73795	***2372.3***	1.6	250.0	We're off the edge of the pit that we see in the AUV data.	442
12/5/2017	2:04:28	-15.07404	-173.73803	***2370.5***	3.4	230.9	We need to go down into the pit. Flying out over the abyss here.	443
12/5/2017	2:04:55	-15.07403	-173.73808	***2371.5***	14.6	160.3	Awesome view of decapitated pillows.	444
12/5/2017	2:05:05	-15.07403	-173.73807	***2372.4***	13.8	160.8	Russ	445
12/5/2017	2:05:35	-15.07402	-173.73807	***2375.0***	11.2	158.9	The pit is maybe 13 m deep.	446
12/5/2017	2:05:59	-15.07402	-173.73809	***2376.8***	9.1	158.0	Looking at the wall here with all these broken pillow lavas. Staining on the broken edges.	447
12/5/2017	2:06:46	-15.07401	-173.73808	***2379.9***	7.1	159.1	This is a cross-section of a pillow mound as viewed from inside the pit.	448
12/5/2017	2:07:01	-15.07402	-173.73808	***2380.6***	6.3	157.9	Parallel stack of pillow on pillow here.	449
12/5/2017	2:07:30	-15.07403	-173.73807	***2382.8***	4.6	154.2	There's some rubble at the bottom.	450
12/5/2017	2:08:01	-15.07402	-173.73812	***2383.5***	4.3	157.9	Talus blocks at the bottom of the pit.	451
12/5/2017	2:08:15	-15.07400	-173.73812	***2384.2***	4.1	159.3	Can see the wall all around us.	452
12/5/2017	2:08:59	-15.07398	-173.73808	***2384.3***	2.2	255.3	Awesome. Get the feeling like being in a cave.	453
12/5/2017	2:10:59	-15.07395	-173.73809	***2381.2***	6.3	21.1	We're still in the pit. Looks like diffuse flow but is probably just what we stirred up.	454
12/5/2017	2:12:09	-15.07395	-173.73807	***2376.5***	8.5	37.7	Decapitated pillows with beautiful staining. The white stuff just forms on fracture surfaces as the lavas are cooling.	455
12/5/2017	2:13:06	-15.07391	-173.73806	***2377.4***	6.5	62.2	We just got out of the pit. Will take a sample here next.	456
12/5/2017	2:15:09	-15.07393	-173.73807	***2375.6***	7.9	66.6	Need to find a piece of pillow with a glass exterior for Val.	457
12/5/2017	2:15:17	-15.07393	-173.73806	***2375.8***	8.0	66.5	Repositioning.	458

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S093 W Mata Logger Comments	Record #
12/5/2017	2:15:39	-15.07393	-173.73804	***2376.3***	5.1	66.6	Re positioning indeed - says Chris.	459
12/5/2017	2:16:06	-15.07390	-173.73803	***2374.5***	4.0	132.1	Looking at the pit edge.	460
12/5/2017	2:17:13	-15.07392	-173.73800	***2376.6***	0.9	141.2	We're going in for a different pillow crust - we need glass.	461
12/5/2017	2:22:58	-15.07392	-173.73799	***2376.8***	0.0	140.1	5x10cm phyrric glass rind from pillow with some hydrothermal staining.	462
12/5/2017	2:24:31	-15.07393	-173.73800	***2376.8***	0.0	140.1	**S93-rock-15** location 15.0739351 173.7380091 depth 2402m	463
12/5/2017	2:28:00	-15.07393	-173.73799	***2376.3***	0.0	140.5	Did a close-up on a scaleworm and adjusted iris to slightly smaller setting.	464
12/5/2017	2:28:16	-15.07393	-173.73800	***2375.3***	2.5	165.5	Resuming transit.	465
12/5/2017	2:28:44	-15.07395	-173.73802	***2373.1***	3.9	198.1	Overlooking crater wall.	466
12/5/2017	2:29:00	-15.07402	-173.73807	***2372.6***	12.8	212.8	Water here is smoky. Lots of truncated pillows on near-vertical wall.	467
12/5/2017	2:30:48	-15.07419	-173.73832	***2367.0***	2.8	225.0	On other side of crater. Lots of fractured elongate smooth-textured pillows.	468
12/5/2017	2:31:18	-15.07425	-173.73839	***2369.8***	1.7	225.0	Sedimentation on pillows increasing away from crater.	469
12/5/2017	2:32:37	-15.07435	-173.73858	***2369.5***	4.6	225.3	Waypoint 11	470
12/5/2017	2:32:44	-15.07436	-173.73860	***2369.5***	5.9	213.7	Who wants to go spelunking?.	471
12/5/2017	2:33:33	-15.07439	-173.73865	***2371.8***	8.8	206.4	Looking into a hole with a pillow basalt roof and talus beneath.	472
12/5/2017	2:37:57	-15.07443	-173.73867	***2381.2***	0.8	209.0	Checking for shimmering water under beneath pillow overhang. No evidence.	473
12/5/2017	2:41:58	-15.07435	-173.73861	***2368.4***	6.9	214.8	Moving carefully backwards out of the lava grotto	474
12/5/2017	2:47:30	-15.07448	-173.73879	***2369.1***	0.9	221.1	Seeing a number of small (<1m) collapse pits on sedimented flows.	475
12/5/2017	2:53:26	-15.07449	-173.73882	***2369.7***	0.0	189.9	Scoop of volcaniclastic sediment/ash next to collapse pit. Two good scoops.	476
12/5/2017	2:54:13	-15.07451	-173.73883	***2368.4***	1.3	191.3	S93-sed-16 location 15.0744867 173.7388177 depth 2395m	477
12/5/2017	2:54:40	-15.07453	-173.73885	***2368.0***	1.3	176.8	Relocating to nearby crusty pillow to grab a rock sample.	478

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S093 W Mata Logger Comments	Record #
12/5/2017	2:59:13	-15.07462	-173.73886	***2369.5***	0.4	193.9	5x5cm half glass block with orange stripe at base. Vesicular and lots of olivine. Sampled from older crusty pillow with a lot of sediment.	479
12/5/2017	2:59:50	-15.07462	-173.73886	***2369.5***	0.0	197.6	Sample **S93-rock-17** location 15.0745617 173.7388695 depth 2394m	480
12/5/2017	3:00:45	-15.07467	-173.73885	***2368.1***	2.0	175.6	Sediment load is increasing as we approach waypoint 12.	481
12/5/2017	3:03:33	-15.07469	-173.73859	***2371.7***	0.0	291.0	Hollowed out fractured pillows.	482
12/5/2017	3:07:36	-15.07468	-173.73861	***2371.6***	0.5	293.9	10x5 cm columnar shaped chunk of collapsed pillow. Tall and skinny with an orange stain at base. Highly vesicular.	483
12/5/2017	3:09:53	-15.07461	-173.73871	***2368.0***	3.0	291.9	**S93-rock-18** location 15.0746771 173.7386187 depth 2397m	484
12/5/2017	3:10:55	-15.07451	-173.73866	***2369.4***	2.3	81.3	Water still very smoky.	485
12/5/2017	3:17:53	-15.07476	-173.73808	***2375.5***	0.0	50.8	50x25 mace-like piece of crust from older sedimented lobate flow. Monster pillow rind.	486
12/5/2017	3:18:58	-15.07474	-173.73800	***2372.9***	2.9	126.6	**S93-rock-19** location 15.074625 173.7380836 depth 2401m.	487
12/5/2017	3:19:10	-15.07475	-173.73800	***2370.1***	5.7	126.8	Off bottom. End of dive 93.	488

S094 Mata Tolu

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S094 Mata Tolu Logger Comments	Record #
12/5/2017	19:03:23	-14.99921	-173.79441	2183.1	6.1	151.4	Oh there's another fish - thank goodness.	29
12/5/2017	19:03:42	-14.99921	-173.79441	2183.2	6.8	151.4	We're at a small "cone" on the north side of the summit.	30
12/5/2017	19:04:00	-14.99919	-173.79442	2182.2	8.6	151.3	Little fish..	31
12/5/2017	19:04:25	-14.99918	-173.79443	2184.5	8.1	151.0	Looks like a deep sea fish - of course - since we're in the deep sea.	32
12/5/2017	19:04:35	-14.99918	-173.79444	0.0	5.2	151.2	Broken rocky here.	33
12/5/2017	19:04:38	-14.99918	-173.79444	0.0	6.6	151.2	Urchin.	34
12/5/2017	19:04:55	-14.99917	-173.79445	2200.8	5.1	151.2	Ken says the rock looks pretty fresh. Highly vesicular texture.	35
12/5/2017	19:04:58	-14.99917	-173.79445	2200.8	5.0	151.2	Anemone.	36

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S094 Mata Tolu Logger Comments	Record #
12/5/2017	19:05:19	-14.99918	-173.79444	2200.3	4.7	151.5	Setting up here.	37
12/5/2017	19:05:35	-14.99918	-173.79444	2199.6	5.3	151.3	Not a lot of sediment cover. Ken says possibly decades here.	38
12/5/2017	19:05:46	-14.99918	-173.79444	2199.7	5.7	151.2	Urchin - a fairly large one.	39
12/5/2017	19:06:20	-14.99918	-173.79444	2200.6	4.0	151.3	Coral on a rock fragment.	40
12/5/2017	19:06:55	-14.99917	-173.79443	2200.0	4.8	151.4	Lava blocks. Probably bigger than earlier predicted.	41
12/5/2017	19:07:10	-14.99917	-173.79444	2200.7	4.7	151.4	The ROV is on the nav screen.	42
12/5/2017	19:07:29	-14.99916	-173.79443	2200.2	5.2	144.0	We want to get off the scree slope and see what's on the top of this hill.	43
12/5/2017	19:07:40	-14.99917	-173.79442	2199.3	0.0	144.5	We're going to start heading up slope now.	44
12/5/2017	19:07:59	-14.99918	-173.79439	2198.2	5.1	144.9	Rocky debris slope. Not a lot of animals - but a few.	45
12/5/2017	19:08:31	-14.99920	-173.79434	2197.2	3.5	143.9	Mata Tolu - is the tallest of the North Mata group. This Mata is about 600 m tall.	46
12/5/2017	19:09:11	-14.99921	-173.79430	2195.8	2.9	144.4	Larger "intact" pillow.	47
12/5/2017	19:09:15	-14.99921	-173.79429	2195.5	2.7	145.0	Sea star.	48
12/5/2017	19:09:35	-14.99923	-173.79427	2194.0	3.2	144.0	Bat star - the fatter starfish.	49
12/5/2017	19:09:39	-14.99923	-173.79427	2193.7	2.6	144.3	Whip coral.	50
12/5/2017	19:09:51	-14.99923	-173.79426	2193.3	2.7	144.6	We may be seeing an in place lava pillow.	51
12/5/2017	19:10:00	-14.99923	-173.79425	2192.9	2.5	144.4	More urchins and stalk corals.	52
12/5/2017	19:10:26	-14.99924	-173.79423	2191.4	2.3	144.6	Larger lava pillow-esque feature here.	53
12/5/2017	19:10:32	-14.99925	-173.79423	2191.0	2.7	144.4	Moving up slope.	54
12/5/2017	19:10:39	-14.99925	-173.79423	2190.5	2.8	144.6	Still largely debris here.	55
12/5/2017	19:11:27	-14.99927	-173.79420	2188.2	2.0	144.5	We're heading to waypoint 2 upslope. We are about 30 m to the west of waypoint 1 when we started up slope.	56
12/5/2017	19:12:01	-14.99927	-173.79417	2185.6	2.8	144.4	Sponge or holothurian on the rock.	57
12/5/2017	19:12:19	-14.99928	-173.79416	2184.4	3.1	144.3	Pillow lavas ahead.	58
12/5/2017	19:12:34	-14.99929	-173.79414	2183.6	1.8	144.9	Some of those pillows might be in place - lots of fragments around.	59
12/5/2017	19:12:41	-14.99929	-173.79414	2183.2	2.1	144.2	Still questionable.	60
12/5/2017	19:12:54	-14.99929	-173.79412	2182.5	0.0	144.4	We want to see if the top of this mound is constructional.	61
12/5/2017	19:13:29	-14.99930	-173.79409	2180.2	2.3	144.6	Transitioning into an area with larger fragments of pillow lavas. The surfaces are intact with glass.	62

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S094 Mata Tolu Logger Comments	Record #
12/5/2017	19:13:50	-14.99931	-173.79408	2179.0	2.7	144.7	Polychaetes here and there.	63
12/5/2017	19:14:37	-14.99932	-173.79405	2176.3	2.3	145.0	Tolu is elongate; has a cone; it's primarily structural shape. Most active and tallest of the North Matas.	64
12/5/2017	19:14:53	-14.99933	-173.79405	2175.4	2.8	145.3	The summit of Tolu is at 1800 meters.	65
12/5/2017	19:15:22	-14.99935	-173.79404	2174.0	1.7	144.8	Still on debris slope.	66
12/5/2017	19:16:07	-14.99938	-173.79401	2171.7	2.0	145.0	Corals.	67
12/5/2017	19:17:41	-14.99943	-173.79397	2166.9	2.8	145.0	Whip coral (lepidisis) - could be bamboo coral.	68
12/5/2017	19:18:07	-14.99944	-173.79396	2165.3	2.9	144.8	Squiddle started a couple minutes ago.	69
12/5/2017	19:18:49	-14.99946	-173.79394	2163.2	2.0	150.2	Seeing some decapitated pillows here.	70
12/5/2017	19:19:08	-14.99946	-173.79394	2163.1	2.8	150.3	See a huge mound of pillows that are intact.	71
12/5/2017	19:19:22	-14.99947	-173.79394	2162.8	3.2	150.2	Still seeing scree slope below the in place lavas.	72
12/5/2017	19:19:38	-14.99947	-173.79394	2162.0	3.0	150.0	This is a little mound of hollowed pillow tubes.	73
12/5/2017	19:19:55	-14.99947	-173.79395	2161.3	3.9	150.1	High-standing collection of small diameter pillows.	74
12/5/2017	19:20:40	-14.99948	-173.79395	2162.2	2.4	150.3	We've seen these pillow lavas breaking while they erupt. So this is not necessarily something that happens over time.	75
12/5/2017	19:20:52	-14.99978	-173.79371	2161.7	3.4	149.9	Brown coating. Not perfectly fresh and young.	76
12/5/2017	19:21:13	-14.99978	-173.79371	2162.2	3.3	150.3	Some striations but relatively smooth pillows.	77
12/5/2017	19:21:41	-14.99978	-173.79371	2163.1	1.9	150.3	Trying to get something with glass on it and not too big.	78
12/5/2017	19:22:03	-14.99978	-173.79372	2164.3	0.0	150.8	Going to drive ahead here.	79
12/5/2017	19:22:56	-14.99978	-173.79372	2163.1	3.0	150.3	We're focusing on getting the vehicle in position to sample.	80
12/5/2017	19:23:37	-14.99979	-173.79372	2163.3	2.5	149.4	Nice pile of pillow lavas here. Many are decapitated.	81
12/5/2017	19:24:48	-14.99979	-173.79372	2163.3	2.5	151.0	It's a sea cucumber (stichypus) up in the top of the screen. The video is a bit washed out for identification.	82
12/5/2017	19:26:49	-14.99979	-173.79372	2163.3	2.5	151.3	**S94-rock-01**. Intact pillow knob. Quite large. Small diameter pillow - 15 cm across with glass. Some sediment coating.	83
12/5/2017	19:29:44	-14.99979	-173.79372	2151.2	2.4	151.2	Surficial sediment -some iron staining? Glassy surface. Lava bud - mostly intact. Has a crack in it. Broke into 2 pieces. Crust on outside. See some phenocrysts. Olivine. Some vesicles.	84

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S094 Mata Tolu Logger Comments	Record #
12/5/2017	19:30:43	-14.99976	-173.79370	2151.2	2.4	151.2	14.9997871 S 173.7937163 W Z=2151m.	85
12/5/2017	19:31:18	-14.99976	-173.79370	2151.2	2.4	151.2	Got a nice pillow bud. Lots of the interior in the sample and lots of glass visible.	86
12/5/2017	19:31:40	-14.99976	-173.79370	2150.8	2.7	150.2	Heading up slope - we're on a debris slope with some intact pillows.	87
12/5/2017	19:32:13	-14.99976	-173.79370	2148.8	3.4	150.2	We're about 20 m to the NE of waypoint 2.	88
12/5/2017	19:33:08	-14.99979	-173.79368	2145.8	0.0	150.0	That was a high-standing mound of pillows with a lot of debris around it.	89
12/5/2017	19:33:20	-14.99980	-173.79368	2145.4	2.8	150.0	Now we're back in a total debris slope.	90
12/5/2017	19:34:06	-14.99982	-173.79367	2144.0	2.7	150.3	On an older surface like this we could be seeing debris from multiple events.	91
12/5/2017	19:34:23	-14.99984	-173.79364	2143.4	3.0	150.3	Up above us we're seeing big pillows in place at the top of this hill.	92
12/5/2017	19:34:35	-14.99982	-173.79365	2142.8	2.2	150.2	They look like they might be a little bit younger.	93
12/5/2017	19:34:47	-14.99983	-173.79364	2142.0	2.4	150.2	Huge bulbous pillows in place at 2142 m.	94
12/5/2017	19:35:01	-14.99983	-173.79364	2141.2	3.0	150.2	Beautiful coral on top of that pillow.	95
12/5/2017	19:35:11	-14.99983	-173.79364	2140.5	0.0	150.3	There's a fair amount of debris here.	96
12/5/2017	19:35:22	-14.99984	-173.79363	2139.7	3.5	150.1	Large pillows here and there.	97
12/5/2017	19:35:49	-14.99986	-173.79361	2138.1	3.0	150.3	There are some broken pieces but most pillows appear to be in place.	98
12/5/2017	19:35:56	-14.99986	-173.79361	2137.6	3.1	147.4	Stalked corals.	99
12/5/2017	19:36:07	-14.99987	-173.79360	2136.9	2.9	147.6	Lots of these pillows are also decapitated.	100
12/5/2017	19:36:35	-14.99988	-173.79360	2135.4	3.0	139.0	Nice high standing pillow with a bunch of decapitated pillows beneath it. Part of the pillow that drained out.	101
12/5/2017	19:36:54	-14.99989	-173.79359	2135.8	2.8	127.8	Large bulbous nearly circular pillow on top.	102
12/5/2017	19:37:37	-14.99989	-173.79359	2135.7	1.9	123.7	Bulbous pillow that is split.	103
12/5/2017	19:38:05	-14.99989	-173.79359	2135.9	2.0	121.4	The elongate tubes under the large bulbous top pillow came out of its base.	104
12/5/2017	19:38:49	-14.99989	-173.79359	2135.9	2.0	122.4	Disgorged lava - at the base of the large bulbous pillow.	105
12/5/2017	19:40:53	-14.99987	-173.79360	2136.1	1.8	122.5	Disgorged lava from the base of large bulbous pillow. Nub at the base. Can see nice black interior after sampling. Thin glass rind on pillow. Spongier texture in center.	106

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S094 Mata Tolu Logger Comments	Record #
12/5/2017	19:43:08	-14.99987	-173.79360	2136.1	1.8	122.7	**S94-rock-02**. Gray-ish interior. Quadrant of pillow bud. Spongy texture with volcanic glass. Vesicular. Not a lot of phenocrysts. 10-15 cm (10 in perp dimension). Nice glassy upper surface.	107
12/5/2017	19:44:31	-14.99987	-173.79360	2136.0	1.8	122.8	Into partition 5. 14.999893 S 173.79359 W Z=2136. Disgorged pillow bud - beneath large bulbous pillow. Got a quadrant.	108
12/5/2017	19:44:42	-14.99987	-173.79360	2136.1	1.9	122.1	Onward and upward.	109
12/5/2017	19:45:36	-14.99987	-173.79359	2134.0	3.0	121.4	Really rough exterior glass surface on the large pillow lava we just sampled.	110
12/5/2017	19:45:43	-14.99987	-173.79359	2133.8	3.4	121.4	Smaller pillow tubes.	111
12/5/2017	19:45:48	-14.99987	-173.79358	2133.6	3.1	122.2	Big anemone.	112
12/5/2017	19:46:10	-14.99988	-173.79357	2132.8	2.4	120.5	That's a big orangish anemone.	113
12/5/2017	19:46:40	-14.99988	-173.79356	2131.5	2.8	120.4	Large bulbous pillows here surrounded by smaller pillows. Pillow in center is cracked and re-cracked.	114
12/5/2017	19:46:51	-14.99989	-173.79355	2130.9	3.2	120.5	Seeing more rubble on this slope now.	115
12/5/2017	19:47:16	-14.99989	-173.79354	2129.5	4.0	120.3	Some intact lavas - but also lots of broken debris.	116
12/5/2017	19:47:24	-14.99990	-173.79353	2129.1	3.1	120.9	Pillow plate.	117
12/5/2017	19:48:05	-14.99990	-173.79351	2127.3	2.5	120.3	More pillows that are in place (elongate tubes). Also lots of debris on this slope.	118
12/5/2017	19:48:37	-14.99990	-173.79350	2125.9	0.0	120.2	This pillow lava has a dusting of iron and manganese coating.	119
12/5/2017	19:49:24	-14.99991	-173.79348	2122.2	0.0	120.1	Combination of pillow lavas and fragments. Some stalked corals.	120
12/5/2017	19:49:41	-14.99991	-173.79347	2120.9	3.9	120.0	Whole variety of pillow lavas.	121
12/5/2017	19:49:49	-15.00011	-173.79340	2120.3	7.4	120.3	Another large anemone to the right.	122
12/5/2017	19:50:09	-15.00016	-173.79337	2118.6	0.0	120.5	Some stalked sponges (?) on pillow.	123
12/5/2017	19:50:30	-15.00021	-173.79334	2116.8	0.0	120.3	More intact elongated pillow tubes now.	124
12/5/2017	19:50:46	-15.00025	-173.79331	2115.6	0.0	120.4	Some bulbous pillows here as well.	125
12/5/2017	19:51:30	-14.99924	-173.79372	2112.7	2.9	120.4	These types of pillow eruptions can take weeks to months (pillows and tubes). Sheet flows are much faster than that.	126
12/5/2017	19:52:00	-14.99928	-173.79368	2110.1	4.3	120.4	Large pillow and long intact pillow tubes beneath it.	127
12/5/2017	19:52:38	-15.00019	-173.79325	2107.7	2.9	120.6	Heading to the SE now. The ROV is jumping all over the place.	128

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S094 Mata Tolu Logger Comments	Record #
12/5/2017	19:53:01	-15.00020	-173.79322	2105.6	3.5	120.7	The same..... Some intact pillows with large bulbous pillows.	129
12/5/2017	19:53:30	-15.00021	-173.79321	2102.8	4.2	120.6	We're beyond the pillow mound and now moving to the SE.	130
12/5/2017	19:53:39	-15.00022	-173.79320	2102.2	4.3	120.7	Saw a black coral back a bit.	131
12/5/2017	19:54:27	-14.99950	-173.79350	2099.4	3.4	120.6	We're somewhere around 2100 meters.	132
12/5/2017	19:54:56	-14.99930	-173.79358	2097.4	0.0	120.0	Lava taffy coming out of a drained pillow lava. Large pillows here as well - pillow tubes in the background.	133
12/5/2017	19:55:43	-15.00027	-173.79317	2094.2	2.9	120.2	Navigation is jumping all over the place.	134
12/5/2017	19:56:00	-15.00031	-173.79317	2093.1	3.1	119.8	Combination of elongate pillows and bulbous pillows.	135
12/5/2017	19:56:04	-15.00031	-173.79317	2092.9	3.2	120.6	Urchin.	136
12/5/2017	19:56:33	-14.99863	-173.79391	2091.6	5.6	125.0	Massive pillow - flatter tubes here.	137
12/5/2017	19:57:34	-14.99959	-173.79350	2088.9	3.7	111.9	We're at a flatter plain now. We're just cresting the summit of this ridge.	138
12/5/2017	19:59:15	-14.99974	-173.79346	2089.5	0.0	112.3	We're at the crest of the first mound and now moving down - coming across the small divide between the first cone and the next plain.	139
12/5/2017	19:59:35	-15.00004	-173.79331	2089.2	3.5	112.4	Broken up rubble - volcanic debris.	140
12/5/2017	19:59:43	-15.00017	-173.79325	2089.7	3.1	112.6	Nav is probably right at the moment.	141
12/5/2017	19:59:58	-15.00039	-173.79313	2091.1	3.1	112.9	Debris slope between these two highs.	142
12/5/2017	20:00:10	-15.00045	-173.79309	2091.8	3.2	112.6	Debris all over this slope.	143
12/5/2017	20:00:29	-14.99895	-173.79373	2091.4	4.1	111.7	See intact pillows at the top of this slope - again.	144
12/5/2017	20:01:08	-14.99437	-173.79584	2089.2	0.0	111.9	We're at another crest here.	145
12/5/2017	20:01:30	-14.99613	-173.79516	2089.3	3.2	124.7	Z=2089.	146
12/5/2017	20:01:44	-15.00031	-173.79310	2090.5	3.3	143.0	Glass sponge and large coral on the seabed.	147
12/5/2017	20:02:06	-14.99959	-173.79343	2093.8	3.8	133.2	Hovering - can't see the bottom well.	148
12/5/2017	20:02:17	-14.99981	-173.79330	2096.6	3.5	133.4	Mostly in place pillow lavas.	149
12/5/2017	20:02:54	-15.00018	-173.79309	2102.5	4.5	133.3	Flying high until get to the next slope.	150
12/5/2017	20:03:07	-15.00029	-173.79300	2104.0	4.4	133.5	Debris slope.	151
12/5/2017	20:03:25	-15.00013	-173.79303	2107.1	2.3	133.3	Approaching the main slope of the volcano....	152
12/5/2017	20:03:48	-15.00015	-173.79305	2109.3	4.2	131.5	Sediment in the background now.	153
12/5/2017	20:03:56	-14.99992	-173.79314	2109.8	5.2	130.6	The pillow mound was relatively new.	154

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S094 Mata Tolu Logger Comments	Record #
12/5/2017	20:04:18	-14.99362	-173.79604	2112.3	3.4	131.0	Looking at sandy sedimented slope. We're on the edifice of the slope itself.	155
12/5/2017	20:04:51	-15.00020	-173.79293	2112.9	3.1	134.7	Sediment on this slope. This looks older than the mound we just visited.	156
12/5/2017	20:05:17	-14.99999	-173.79299	2115.5	1.2	142.1	Our next waypoint is another smaller mound that sticks out of the slope.	157
12/5/2017	20:05:29	-15.00003	-173.79295	2115.2	1.5	141.7	Have about a 400 m transect to that target.	158
12/5/2017	20:05:41	-14.99984	-173.79303	2114.9	2.6	152.8	Sandy with burrows.	159
12/5/2017	20:06:07	-15.00040	-173.79272	2113.7	4.0	163.8	More small rocky debris. Scree. Poorly sorted of different sizes.	160
12/5/2017	20:06:14	-15.00034	-173.79278	2113.3	4.1	164.3	Sand and rocky fragments.	161
12/5/2017	20:06:55	-14.99486	-173.79528	2111.3	3.8	172.7	Large coral just went by. Actually - we just went by the large coral.	162
12/5/2017	20:07:00	-14.99446	-173.79544	2111.1	3.9	172.4	Burrows.	163
12/5/2017	20:07:06	-14.99678	-173.79437	2110.6	3.3	172.3	Angle of repose slope here.	164
12/5/2017	20:07:37	-15.00022	-173.79267	2108.3	3.7	177.2	The nav is bounding all over the place.	165
12/5/2017	20:08:28	-14.99986	-173.79282	2105.6	2.7	177.5	The nav is really bad. I'm told that it is something ship-side. Jimbo is working on it now.	166
12/5/2017	20:10:13	-15.00054	-173.79243	2097.4	3.0	178.1	Still on scree slope. Heading to constructional mound then on to the summit.	167
12/5/2017	20:12:03	-15.00082	-173.79227	2086.0	5.4	184.0	Coral on rock fragment.	168
12/5/2017	20:12:23	-15.00082	-173.79227	2084.4	4.9	186.3	Steep scree slope.	169
12/5/2017	20:13:19	-15.00037	-173.79250	2079.6	6.0	187.7	Some alteration. Iron staining.	170
12/5/2017	20:14:10	-15.00016	-173.79262	2076.6	3.4	186.7	Coral and stalked crinoid.	171
12/5/2017	20:14:34	-15.00046	-173.79247	2073.3	3.8	187.4	Debris is getting coarser. More rock fragments.	172
12/5/2017	20:14:41	-15.00059	-173.79249	2071.9	6.5	187.7	Glass sponge.	173
12/5/2017	20:15:29	-15.00079	-173.79238	2071.5	4.1	187.6	Anemone.	174
12/5/2017	20:15:55	-15.00513	-173.79055	2069.8	4.7	196.7	Nav still bad.	175
12/5/2017	20:16:48	-15.00094	-173.79231	2068.4	3.6	197.0	Possibly some diffuse flow. Can see some bacterial mats around small holes.	176
12/5/2017	20:18:25	-15.00143	-173.79193	2067.2	7.0	193.6	Sandy slope.	177
12/5/2017	20:18:46	-15.00183	-173.79174	2068.6	6.1	196.1	Debris slope.	178
12/5/2017	20:19:33	-15.00131	-173.79191	2071.9	5.8	198.4	Some rock fragments in debris slope.	179
12/5/2017	20:20:52	-15.00075	-173.79203	2074.8	5.2	191.5	Making a traverse along; use heading; but don't have good navigation.	180

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S094 Mata Tolu Logger Comments	Record #
12/5/2017	20:21:06	-15.00085	-173.79197	2075.4	5.2	194.1	Stop for a moment. to see if we can get better navigation.	181
12/5/2017	20:22:09	-15.00135	-173.79166	2075.5	5.3	206.5	Bad navigation - sort of like NO navigation.	182
12/5/2017	20:22:43	-15.00073	-173.79193	2077.7	5.0	207.6	Beautiful coral or sponge.	183
12/5/2017	20:23:03	-15.00072	-173.79190	2077.6	4.7	209.4	It is a coral.	184
12/5/2017	20:23:36	-15.00110	-173.79168	2076.9	4.2	205.5	It is probably a Chrysogorgia.	185
12/5/2017	20:24:16	-15.00047	-173.79204	2079.1	4.1	228.5	Sand with occasional rock fragments.	186
12/5/2017	20:24:39	-15.00115	-173.79173	2081.1	3.1	224.1	Sponge.	187
12/5/2017	20:25:05	-15.00115	-173.79173	2082.2	1.8	226.2	Gentle sand slope with older rock.	188
12/5/2017	20:25:12	-15.00133	-173.79165	2082.0	1.6	224.9	Silicious sponges.	189
12/5/2017	20:25:34	-15.00130	-173.79168	2081.8	2.5	224.4	Black coral next to the glass sponge.	190
12/5/2017	20:26:27	-15.00130	-173.79168	2079.9	3.0	223.7	Zoom Crysogorgia with squad lobster.	191
12/5/2017	20:27:03	-15.00130	-173.79168	2080.0	2.2	224.1	Still stationary waiting for better nav.	192
12/5/2017	20:27:44	-15.00130	-173.79168	2079.6	1.5	224.6	Pteropods. These are pelagic snails.	193
12/5/2017	20:28:00	-15.00130	-173.79168	2079.3	1.4	224.1	Sandy here.	194
12/5/2017	20:28:16	-15.00130	-173.79168	2079.0	1.4	229.5	Only a few rock fragments in the sand.	195
12/5/2017	20:28:55	-15.00130	-173.79168	2077.5	2.7	225.0	Polychaete	196
12/5/2017	20:29:55	-15.00130	-173.79168	2073.8	2.6	224.3	Looking around. moving slowly.	197
12/5/2017	20:30:03	-15.00130	-173.79168	2073.6	2.7	213.1	More rock fragments.	198
12/5/2017	20:30:31	-15.00130	-173.79168	2073.1	3.1	213.1	We are lateraling along the slope.	199
12/5/2017	20:30:46	-15.01008	-173.78758	2072.8	2.8	212.8	Debris on the slope.	200
12/5/2017	20:31:07	-15.00407	-173.79008	2072.5	3.2	212.9	Rock fragments in sandy slope.	201
12/5/2017	20:31:37	-15.00409	-173.79003	2071.9	2.8	206.8	Less rock fragments.	202
12/5/2017	20:32:05	-15.00116	-173.79154	2071.9	2.5	206.7	Smaller rock fragments again.	203
12/5/2017	20:33:07	-15.00073	-173.79168	2071.6	3.0	201.9	Still moving along slope.	204
12/5/2017	20:33:22	-15.00059	-173.79172	2071.6	3.1	202.7	Stalked coral on rock fragment.	205
12/5/2017	20:33:40	-15.00151	-173.79125	2071.7	3.2	203.4	No. it is a branching bamboo coral.	206
12/5/2017	20:34:49	-15.00121	-173.79129	2071.9	2.9	194.2	Iridogorgia a bit ago.	207
12/5/2017	20:35:02	-14.99879	-173.79254	2072.0	2.7	192.9	This is a coral.	208
12/5/2017	20:35:19	-15.00112	-173.79134	2072.0	2.7	183.2	Black coral on rock fragments.	209
12/5/2017	20:35:35	-15.00228	-173.79078	2072.2	3.5	180.9	Lots of pillow fragments in sand	210
12/5/2017	20:36:21	-15.00147	-173.79111	2073.5	3.0	170.5	We see the ROV on the NAV screen now.	211
12/5/2017	20:36:43	-15.00181	-173.79092	2073.6	3.2	165.9	ROV is jumping about 50 m on Nav.	212

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S094 Mata Tolu Logger Comments	Record #
12/5/2017	20:36:54	-15.00189	-173.79085	2073.4	3.3	164.2	Pillow fragments.	213
12/5/2017	20:37:24	-15.00148	-173.79104	2073.6	3.3	150.9	Adam	214
12/5/2017	20:37:55	-15.00164	-173.79094	2073.9	2.6	151.3	Black coral. Several of them.	215
12/5/2017	20:38:08	-15.00181	-173.79053	2073.9	2.5	151.2	Corals in the background.	216
12/5/2017	20:38:23	-15.00168	-173.79071	2074.2	1.7	151.6	Bamboo coral and a Crysogorgia.	217
12/5/2017	20:38:50	-15.00378	-173.78941	2074.3	2.2	151.3	Crysogorgia with two squad lobsters in it.	218
12/5/2017	20:39:02	-15.00394	-173.78943	2074.2	1.8	151.5	Not sure what the coral is.	219
12/5/2017	20:39:35	-15.00175	-173.79087	2072.0	4.1	150.3	ROV on and off from NAV screen.	220
12/5/2017	20:40:14	-15.00160	-173.79075	2073.2	4.8	145.5	Brittle star.	221
12/5/2017	20:40:24	-15.00095	-173.79123	2074.1	3.7	145.1	Brisingid.	222
12/5/2017	20:41:24	-15.00758	-173.78426	2077.2	4.7	124.6	Same black coral again.	223
12/5/2017	20:41:38	-15.00519	-173.78679	2076.5	5.8	124.9	Maybe a bamboo coral.	224
12/5/2017	20:42:47	-15.00077	-173.79146	2081.3	2.8	118.5	Not able to get NAV properly fixed. Might go on like this for a while.	225
12/5/2017	20:43:41	-15.00129	-173.79085	2084.4	2.7	117.1	Still in the slope. Seeing rock fragments. Small pieces. Some pebbles.	226
12/5/2017	20:44:16	-15.00141	-173.79067	2086.9	2.4	116.2	We are navigating by using a steady heading towards WP3. Upslope.	227
12/5/2017	20:44:36	-15.00156	-173.79048	2087.6	3.0	114.9	Got into an area covered by rock fragments. Less sediments.	228
12/5/2017	20:45:04	-15.00146	-173.79053	2088.3	3.5	117.3	Coming up to the second mound we want to look at.	229
12/5/2017	20:45:21	-15.00136	-173.79062	2087.3	3.8	125.6	Some pillow fragments and lava.	230
12/5/2017	20:45:30	-15.00111	-173.79084	2086.8	4.6	125.6	Stalked coral.	231
12/5/2017	20:45:54	-15.00158	-173.79069	2084.9	3.9	130.3	Now entirely lava fragments and some more intact pieces.	232
12/5/2017	20:46:10	-15.00141	-173.79050	2083.9	3.7	133.9	Pieces of jumbled sheet flow.	233
12/5/2017	20:46:31	-15.00140	-173.79048	2082.7	3.8	133.9	ROV seems to be on the track now.	234
12/5/2017	20:46:40	-15.00143	-173.79048	2082.0	3.8	134.2	Large lava debris on the slope.	235
12/5/2017	20:47:08	-15.00185	-173.79004	2080.6	3.8	134.2	About another 40 m to climb to the summit of this mound.	236
12/5/2017	20:47:46	-15.00154	-173.79026	2079.2	3.2	140.5	Possibly in place lava.	237
12/5/2017	20:48:03	-15.00154	-173.79029	2078.3	4.2	140.0	Some pillow in place but broken off pieces.	238
12/5/2017	20:48:30	-15.00791	-173.78442	2077.0	3.8	140.6	Another coral; like a Chrysogorgia; but a bit different.	239

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S094 Mata Tolu Logger Comments	Record #
12/5/2017	20:48:57	-15.00022	-173.79189	2075.9	3.2	141.2	Still heading towards the top of the mound.	240
12/5/2017	20:49:36	-15.00175	-173.79002	2074.1	2.6	143.4	Volcanic fragments.	241
12/5/2017	20:49:49	-15.00214	-173.78960	2073.0	4.3	137.8	Some of the rocks are in place. Probably.	242
12/5/2017	20:50:08	-15.00276	-173.78888	2072.0	3.6	139.7	Possibly near vent deposits.	243
12/5/2017	20:50:41	-15.00204	-173.78980	2070.2	4.7	139.5	We think we are still a little down the slope of the summit.	244
12/5/2017	20:50:48	-15.00204	-173.78980	2069.9	3.2	140.0	More angular fragments.	245
12/5/2017	20:51:19	-14.99627	-173.79547	2068.1	3.8	141.8	Poorly sorted deposit.	246
12/5/2017	20:52:17	-15.00573	-173.78565	2065.7	3.3	141.3	Not much sediment up here.	247
12/5/2017	20:52:28	-15.00573	-173.78565	2065.1	2.7	141.6	NAV bad.	248
12/5/2017	20:52:32	-15.00427	-173.78751	2065.0	2.6	142.5	Again.	249
12/5/2017	20:53:03	-15.00457	-173.78755	2063.2	2.6	142.4	Stalked coral.	250
12/5/2017	20:53:49	-15.00034	-173.79171	2060.5	3.0	148.1	Crysogorgia with a squad lobster.	251
12/5/2017	20:53:58	-15.00185	-173.78996	2060.0	2.5	148.0	Glass sponge.	252
12/5/2017	20:54:31	-15.00204	-173.78965	2058.0	3.3	143.4	Surface of a lava flow.	253
12/5/2017	20:54:45	-15.00173	-173.79007	2057.2	3.8	143.3	Most of it is fragmental.	254
12/5/2017	20:55:36	-15.00194	-173.78982	2054.4	4.6	153.6	Coarse rocky debris.	255
12/5/2017	20:55:40	-15.00205	-173.78965	2053.9	4.4	160.0	Dead coral.	256
12/5/2017	20:55:47	-15.00205	-173.78965	2053.6	3.5	168.5	Some of the lava is in place.	257
12/5/2017	20:56:06	-15.00211	-173.78958	2053.3	2.7	169.7	It appears so.	258
12/5/2017	20:57:18	-15.00751	-173.78279	2049.6	3.1	159.5	Lava looks in place. Ropey sheet flow.	259
12/5/2017	20:57:30	-15.00578	-173.78487	2049.5	3.1	178.4	We are close to the top of the mound.	260
12/5/2017	20:57:41	-15.01191	-173.77672	2049.3	3.6	179.1	Not good for sample.	261
12/5/2017	20:58:47	-15.00088	-173.79125	2047.0	2.2	185.0	In place blocky lava.	262
12/5/2017	20:59:13	-15.00214	-173.78965	2046.1	2.9	164.6	Looks like we are the edge.	263
12/5/2017	21:09:27	-15.00212	-173.78982	2042.9	3.7	222.2	**S94-rock-03**. Chunk of older shelly pahoehoe-like crust of jumbled sheet flow. Vesicular with thin glass. Med grey alt band under glass and pyric	264
12/5/2017	21:10:41	-15.00221	-173.78975	2045.3	6.5	177.3	Just sampled at waypoint 3. S94-rock-03 location 15.0022033 173.7896910 depth 2044m	265
12/5/2017	21:12:15	-15.00235	-173.78963	2053.8	4.2	165.3	Moving off of in place fast-moving jumbled pillow flow and into debris slope. Going to follow the slope upward toward summit.	266

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S094 Mata Tolu Logger Comments	Record #
12/5/2017	21:22:13	-15.00252	-173.78953	2050.5	3.0	180.2	**S94-rock-04**. Just above talus slope; in place bulbous pillow crust. Sampled 3 chunks of rock ranging from 5x7cm to 10x10cm. Vesicular sponge-like and pyric.	267
12/5/2017	21:23:54	-15.00254	-173.78951	2047.9	5.4	188.4	S94-rock-04 location 15.0024970 173.7895640 depth 2050m	268
12/5/2017	21:36:02	-15.00279	-173.78955	2014.5	0.0	179.5	Continuing through field of crenulated pillows	269
12/5/2017	21:36:16	-15.00279	-173.78954	2013.9	4.3	179.7	Val on the mic!	270
12/5/2017	21:36:35	-15.00279	-173.78953	2013.2	0.0	179.8	Lollipop sponges ahead.	271
12/5/2017	21:36:59	-15.00280	-173.78953	2012.3	6.8	179.8	Bulbous-expanded pillows.	272
12/5/2017	21:38:28	-15.00286	-173.78949	2008.7	3.2	173.8	Crossing the 2000 m contour.	273
12/5/2017	21:39:28	-15.00298	-173.78947	2005.6	4.6	173.8	Stack of pillows; some soot; some cracked.	274
12/5/2017	21:40:51	-15.00309	-173.78943	2002.6	2.0	173.5	Talus slope.	275
12/5/2017	21:41:21	-15.00313	-173.78943	2001.8	2.1	173.4	J-Rod	276
12/5/2017	21:42:00	-15.00316	-173.78942	2000.1	2.8	173.6	Talus continues.	277
12/5/2017	21:42:09	-15.00317	-173.78942	1999.8	2.8	173.6	Intact pillow lava flows here again.	278
12/5/2017	21:44:25	-15.00329	-173.78942	1992.6	2.4	173.9	Talus slope	279
12/5/2017	21:44:58	-15.00331	-173.78941	1991.3	2.7	173.8	Coral	280
12/5/2017	21:47:00	-15.00335	-173.78938	1988.4	2.8	173.8	Talus cont. as we move south on the north flank toward the rift zone.	281
12/5/2017	21:49:03	-15.00343	-173.78938	1983.8	2.0	181.2	Peter.	282
12/5/2017	21:50:32	-15.00348	-173.78940	1979.2	2.9	181.1	Talus continues.	283
12/5/2017	21:50:42	-15.00349	-173.78940	1978.6	2.4	181.1	Brittle star.	284
12/5/2017	21:50:59	-15.00351	-173.78940	1977.5	3.5	181.8	Contact with intact pillows.	285
12/5/2017	21:54:19	-15.00353	-173.78938	1974.2	3.9	211.6	Going in for a rock sample here about 70m north of waypoint 4.	286
12/5/2017	21:54:52	-15.00354	-173.78940	1974.1	5.4	213.0	Looks like a slightly older lava flow here.	287
12/5/2017	21:57:20	-15.00351	-173.78942	1974.1	4.5	211.1	**S94-rock-05**. Upper crust of top of pillow tube. Flattish with rind. Vesicular. Orange stain. Glass. Green olivine crystals. Pretty vesicular. 7cm across 10-15 cm on long side.	288
12/5/2017	21:58:56	-15.00337	-173.78958	1974.2	3.9	212.2	Correction 20cm on long side. Z=1974. A bit of alteration lightish gray to orangish. Into partition 7. 15.003534 173.789379. Z=1974.	289
12/5/2017	21:59:37	-15.00335	-173.78958	1973.5	5.1	182.8	Chrysogorgia on this older lava.	290

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S094 Mata Tolu Logger Comments	Record #
12/5/2017	22:00:52	-15.00338	-173.78954	1971.8	3.6	182.7	Waypoint 4 is at 1939 m. We won't be at the summit for quite some time.....	291
12/5/2017	22:01:36	-15.00341	-173.78952	1968.6	3.4	182.7	More pillow lavas flowing down slope.	292
12/5/2017	22:01:59	-15.00344	-173.78953	1968.5	2.2	182.8	Black coral coming up. Seeing some sponges as well.	293
12/5/2017	22:02:09	-15.00344	-173.78953	1968.3	1.9	182.7	Elongated pillows.	294
12/5/2017	22:02:24	-15.00345	-173.78953	1967.9	1.9	182.8	What's that blob on top of this lava.	295
12/5/2017	22:03:41	-15.00348	-173.78952	1966.4	2.4	182.7	What is that? It's a sponge with "stuff" on it. On the top of a flat pillow lobe. This is an unusual bell-shaped sponge with brittle stars.	296
12/5/2017	22:04:19	-15.00348	-173.78951	1966.0	5.5	182.6	Pretty little baby brittle stars. Little mysid's on sponge.	297
12/5/2017	22:04:48	-15.00353	-173.78947	1965.9	3.9	176.1	We still have about 25m when we reach our next waypoint and we won't be at the summit yet then.	298
12/5/2017	22:05:00	-15.00354	-173.78946	1966.4	2.8	176.4	Jumbled lavas on this slope.	299
12/5/2017	22:05:23	-15.00357	-173.78946	1965.8	3.0	176.4	Chrysogorgia and another stalked coral.	300
12/5/2017	22:05:33	-15.00358	-173.78946	1965.5	3.1	176.4	Sea pen off to the left.	301
12/5/2017	22:05:57	-15.00361	-173.78946	1964.3	3.0	176.5	Odd-looking coral.	302
12/5/2017	22:06:16	-15.00364	-173.78946	1963.1	2.9	176.7	Jumbled flows among the pillow lavas that are flowing down slope.	303
12/5/2017	22:06:43	-15.00367	-173.78945	1961.7	2.5	176.8	Sea star and coral.	304
12/5/2017	22:07:17	-15.00369	-173.78945	1960.7	2.0	176.7	Brysingid. on jumbled lava.	305
12/5/2017	22:07:32	-15.00371	-173.78945	1960.1	2.1	175.6	Long flat lava tubes - sort of lobate looking.	306
12/5/2017	22:07:48	-15.00373	-173.78944	1959.7	2.6	176.2	We're just creeping along up this slope.	307
12/5/2017	22:07:57	-15.00374	-173.78944	1959.0	3.0	176.3	Lots of pillows over here.	308
12/5/2017	22:08:28	-15.00378	-173.78942	1957.7	3.3	176.3	These lavas don't all look right in place.	309
12/5/2017	22:09:07	-15.00382	-173.78941	1955.4	2.8	176.0	Larger pillow tubes broken pieces; some are probably in place.	310
12/5/2017	22:09:18	-15.00384	-173.78940	1954.7	3.1	176.3	Big old lava ball there.	311
12/5/2017	22:09:58	-15.00387	-173.78939	1953.0	2.1	176.2	Nice anemone to the left and coral up ahead. These lavas are old-ish. Chrysogorgia.	312
12/5/2017	22:10:36	-15.00387	-173.78940	1952.5	3.0	176.4	Brittle stars on paramuricea coral.	313
12/5/2017	22:12:26	-15.00396	-173.78938	1948.4	3.3	176.3	Still traversing over fragmented pillow lavas as we head towards WP 4.	314
12/5/2017	22:13:09	-15.00399	-173.78938	1946.7	3.0	176.3	Two Chrysogorgias with squad lobsters and few Bamboo corals.	315

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S094 Mata Tolu Logger Comments	Record #
12/5/2017	22:13:43	-15.00402	-173.78937	1945.5	2.6	176.4	Sea cucumber ... hanging out waiting	316
12/5/2017	22:14:17	-15.00403	-173.78939	1944.2	2.4	176.2	Large m sized pillow fragment covering the seabed.	317
12/5/2017	22:16:18	-15.00408	-173.78941	1939.9	3.2	227.8	Some large pillow lava tube flow appear...	318
12/5/2017	22:17:21	-15.00415	-173.78943	1938.9	2.1	235.4	Two types of pillow here; jumbled lavas with pillow lava flow emplaced on top.	319
12/5/2017	22:18:21	-15.00420	-173.78948	1935.9	3.9	250.7	Large bamboo coral (probably says Walter).	320
12/5/2017	22:19:41	-15.00423	-173.78965	1937.9	1.8	276.3	We see a brisingid. as we move across lava flows.	321
12/5/2017	22:20:45	-15.00426	-173.78974	1938.3	0.5	274.5	We are now up on the central rift zone of Mata Tolu; northern flank.	322
12/5/2017	22:24:01	-15.00428	-173.78996	1930.0	2.3	266.9	Large mounts of jumbled lava and lobates as we move up the central rift.	323
12/5/2017	22:26:08	-15.00429	-173.79020	1927.1	2.4	267.5	Transiting from intact pillows into fragments now.	324
12/5/2017	22:26:32	-15.00428	-173.79022	1925.8	0.0	267.1	JRod.	325
12/5/2017	22:28:06	-15.00429	-173.79029	1922.1	2.5	267.5	Lots of fragmental debris here.	326
12/5/2017	22:30:16	-15.00432	-173.79038	1917.6	2.7	267.5	Coral critter looking like a pine tree... correction: Bathypathies with a squad lobster.	327
12/5/2017	22:31:20	-15.00432	-173.79043	1916.9	2.0	266.7	Chrysogorgia with squat lobster on cool rocks...pillows I mean...broken pillows.	328
12/5/2017	22:32:57	-15.00431	-173.79056	1913.4	2.3	272.3	Anthomastus coral.	329
12/5/2017	22:35:34	-15.00433	-173.79064	1910.7	1.7	262.0	Brisingid.	330
12/5/2017	22:37:21	-15.00435	-173.79074	1906.7	2.0	258.5	Mostly lobate low-lying pillows in this spot with coral growth and spotty evidence of diffuse flow.	331
12/5/2017	22:37:46	-15.00435	-173.79076	1906.3	1.0	258.7	Behind lobes are more jumbled flows. Going to attempt a sample.	332
12/5/2017	22:46:12	-15.00454	-173.79066	1906.2	0.5	318.6	**S94-rock-06**. Piece of ropy jumbled flow between two pillow deposits. Two pieces 5x7 and 5x7 should fit together and picked up a third. Large center vesicle and phyric.	333
12/5/2017	22:47:17	-15.00452	-173.79069	1905.2	1.1	327.7	S94-rock-06 location 15.0043754 173.7907996 depth 1906m	334
12/5/2017	22:47:24	-15.00452	-173.79069	1905.5	0.9	327.1	Taking a sed sample.	335
12/5/2017	22:56:08	-15.00451	-173.79069	1905.7	0.7	327.4	Sediment sitting on top of jumbled lava flow.	336
12/5/2017	22:57:19	-15.00451	-173.79069	1905.7	0.7	327.5	**S94-sed-07** location 15.0045126 173.7906951 depth 1905m.	337
12/5/2017	22:59:08	-15.00446	-173.79075	1901.8	2.1	281.4	A'a-like flow.	338

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S094 Mata Tolu Logger Comments	Record #
12/5/2017	23:00:46	-15.00442	-173.79090	1897.0	3.0	265.6	Sea anemones along rubbly boulders on this a'a flow.	339
12/5/2017	23:03:42	-15.00452	-173.79114	1885.5	2.2	245.8	Back into more normal talus with a few anemones.	340
12/5/2017	23:05:25	-15.00456	-173.79129	1878.3	2.0	257.1	Large anemones on this talus pile. Well sorted rock debris.	341
12/5/2017	23:06:08	-15.00460	-173.79130	1875.0	3.9	278.1	Old hydrothermal chimney.	342
12/5/2017	23:10:52	-15.00459	-173.79179	1862.4	2.1	273.0	Still seeing lots of talus populated with large anemones and spiked sea cucumbers.	343
12/5/2017	23:11:11	-15.00459	-173.79184	1861.6	2.1	270.9	Sea star.	344
12/5/2017	23:14:51	-15.00463	-173.79251	1847.0	2.9	272.0	Intact pillows.	345
12/5/2017	23:15:46	-15.00465	-173.79253	1845.5	2.3	273.1	Whelk on one of the intact pillows.	346
12/5/2017	23:17:06	-15.00464	-173.79255	1843.2	3.9	268.0	Orange barnacles on rocks and starting to see some squat lobsters.	347
12/5/2017	23:17:57	-15.00466	-173.79264	1841.5	2.1	259.6	1841m.	348
12/5/2017	23:18:21	-15.00468	-173.79266	1841.6	1.7	259.9	Whelk.	349
12/5/2017	23:19:01	-15.00467	-173.79271	1839.4	2.6	260.0	Starting to see talus again above the intact flows.	350
12/5/2017	23:20:24	-15.00469	-173.79297	1831.2	4.5	257.8	Chunk of sulfide among the talus.	351
12/5/2017	23:22:08	-15.00471	-173.79325	1824.5	3.4	251.9	Abundant hydrothermal staining. Many squat lobsters and orange eels.	352
12/5/2017	23:23:36	-15.00467	-173.79339	1822.1	4.9	236.4	A chimichanga of chimichunks.	353
12/5/2017	23:25:08	-15.00469	-173.79358	1819.0	4.5	283.0	We are doing a "tour de chimney" to make sure we are properly oriented.	354
12/5/2017	23:30:43	-15.00456	-173.79390	1822.2	0.0	263.1	Low Smoker vent. Determining sampling order.	355
12/5/2017	23:32:33	-15.00456	-173.79390	1823.5	0.8	260.2	Ken wants to slurp an eel.	356
12/5/2017	23:37:48	-15.00457	-173.79389	1823.4	0.8	259.2	**S94-bio-08**. Shrimp from Low Smoker.	357
12/5/2017	23:51:15	-15.00459	-173.79392	1823.9	2.0	141.9	**S94-sulfide-09**. Sample of chimney spire at Low Smoker. Nice little smoker. The top broke off. It was active. Not black smoke. Was 10 cm across but it broke. Into Partition 2. Broke into 3 pieces.	358
12/5/2017	23:53:29	-15.00460	-173.79391	1823.9	1.8	120.1	Black-ish smoke coming out of the orifice that was just opened up. Location is Low Boy marker position. Z=1824 at this height on the chimney.	359
12/5/2017	23:53:45	-15.00459	-173.79392	1823.6	2.8	116.8	Thruster wash.	360
12/5/2017	23:54:31	-15.00457	-173.79390	1823.3	0.0	159.2	Look at the smoke blasting out of the beehive that we pulled off 3 days ago and the thruster just knocked it off again.	361

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S094 Mata Tolu Logger Comments	Record #
12/5/2017	23:54:56	-15.00458	-173.79391	1823.4	3.5	139.5	Black smoke pouring out of the big beehive orifice. Just saw the marker in the background.	362
12/5/2017	23:55:39	-15.00460	-173.79392	1823.5	0.0	110.9	Going to sample in the big black beehive at the top.	363
12/5/2017	23:56:07	-15.00458	-173.79390	1823.4	1.9	160.2	Lots of mess in the water.	364
12/5/2017	23:58:10	-15.00461	-173.79386	1823.4	1.3	253.5	Tons of biota at this smoker complex at Low Boy. Seeing lots of every type of hydrothermal organism here.	365
12/5/2017	23:58:40	-15.00461	-173.79386	1823.4	1.3	253.9	The brachyuran crabs for everywhere.	366
12/5/2017	23:59:12	-15.00461	-173.79386	1823.4	1.3	254.4	Also seeing opaepele; both types of snails Alvinoconcha and Ifremeria.	367
12/6/2017	0:00:24	-15.00460	-173.79387	1823.4	1.3	253.9	Tamara did not get a good gastight here a few days ago so she will try again today. We have a fluid sample from the previous dive.	368
12/6/2017	0:01:36	-15.00460	-173.79386	1823.4	1.3	254.0	There are Alvinocaris shrimp here as well. They aren't as red as we're accustomed to seeing so it fooled us.	369
12/6/2017	0:02:14	-15.00461	-173.79386	1823.4	1.4	254.1	We're at 1823 meters here.	370
12/6/2017	0:03:30	-15.00461	-173.79385	1823.3	1.3	254.4	Going in for the gastight.	371
12/6/2017	0:10:23	-15.00459	-173.79387	1823.2	0.0	246.5	**S94-gas-10**. GT#6 in hot black beehive orifice at Low Boy-Mkr-203 area. Fired at 0009:50. Hopefully that was in the full flow.	372
12/6/2017	0:10:40	-15.00459	-173.79387	1823.3	2.2	246.8	The nozzle looks black so that's hopeful.	373
12/6/2017	0:11:07	-15.00459	-173.79387	1823.3	1.4	245.7	Adam.	374
12/6/2017	0:12:28	-15.00458	-173.79387	1823.3	2.0	245.6	The way the RAM is mounted on the Subastian arm does not allow them to maneuver the GTB tip into the hole.	375
12/6/2017	0:13:15	-15.00457	-173.79388	1823.3	1.9	244.8	Securing the gastight in the milk crate.	376
12/6/2017	0:13:33	-15.00457	-173.79388	1823.3	0.0	246.0	Going to take a temperature here.	377
12/6/2017	0:13:55	-15.00457	-173.79388	1823.3	1.5	244.4	The temp here was 260 C.	378
12/6/2017	0:15:19	-15.00457	-173.79388	1823.3	1.5	244.4	This sulfide is full of life. The Alvinocaris shrimp are larger than the brachyuran crabs.	379
12/6/2017	0:19:45	-15.00456	-173.79390	1823.2	2.1	245.4	Going for a temp reading in the black smoker orifice that was just sampled. So far the highest temp was 230 - possibly 278 (Walter). Probably should stick with 230C.	380
12/6/2017	0:20:01	-15.00456	-173.79390	1823.2	2.4	245.0	They are using the camera on the arm to see better.	381

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S094 Mata Tolu Logger Comments	Record #
12/6/2017	0:20:53	-15.00456	-173.79390	1823.2	2.0	244.4	The temperature is consistently over 100 C	382
12/6/2017	0:21:22	-15.00456	-173.79389	1823.2	2.4	245.3	Oh no - it fell down to negative numbers for a bit - now back up in the positive range.	383
12/6/2017	0:22:05	-15.00456	-173.79389	1823.2	2.1	245.2	Bagging that. Doesn't seem very reliable. 230 C was the highest today. We got 269 a few days ago.	384
12/6/2017	0:22:43	-15.00457	-173.79388	1823.3	2.1	244.6	Next we will try a new site on this chimney complex.	385
12/6/2017	0:23:26	-15.00458	-173.79388	1823.4	1.2	246.9	Going to pick the marker up and move it up a little so that it's more visible from various angles.	386
12/6/2017	0:25:08	-15.00459	-173.79387	1823.6	0.0	221.8	We first want to take a peek at the marker. It needs to be moved up the chimney a bit - and placed on the dead stuff.	387
12/6/2017	0:26:21	-15.00460	-173.79385	1823.2	2.6	131.7	**Re-positioning Mkr-203 here at Low Boy / Low Smoker**. Better position on top of the chimney in a dead zone. Just moved it up a few meters. Off the seafloor and on the sulfide structure.	388
12/6/2017	0:27:50	-15.00469	-173.79372	1822.3	3.2	150.9	Going to drape the nav map with our targets from dive 91 here a couple days ago.	389
12/6/2017	0:28:02	-15.00469	-173.79373	1822.7	3.1	152.4	Antimora fish.	390
12/6/2017	0:30:29	-15.00491	-173.79365	1818.8	1.8	127.1	We're going to the next waypoint and looking for another chimney to sample.	391
12/6/2017	0:32:41	-15.00476	-173.79359	1816.5	5.1	143.6	We're at a large chimney complex to the north of waypoint 7.	392
12/6/2017	0:33:03	-15.00475	-173.79356	1816.1	4.6	168.7	We could be at Snail Alcove? But not sure of that.	393
12/6/2017	0:33:20	-15.00476	-173.79354	1815.9	4.8	183.8	This is a large structure.	394
12/6/2017	0:35:16	-15.00486	-173.79350	1813.9	5.7	299.0	We are not positive where we are. Bill thinks it's at Snail Alcove. I'm not so sure.	395
12/6/2017	0:35:59	-15.00477	-173.79353	1811.6	9.2	231.5	Little black smoker at the top of this tall skinny chimney. Z=1812. This chimney is covered in Snails.	396
12/6/2017	0:36:37	-15.00483	-173.79361	1811.9	6.0	178.8	This could be Snail Alcove. But we don't have our previous navigation targets displayed on the nav screen so who knows?	397
12/6/2017	0:37:06	-15.00520	-173.79343	1813.8	4.0	173.5	Looking at a large complex 0 most of which appear inactive.	398
12/6/2017	0:38:06	-15.00497	-173.79364	1816.7	4.0	194.1	The top of Snail Alcove chimney was 1812m.	399
12/6/2017	0:38:39	-15.00504	-173.79366	1818.5	3.4	135.2	It seems that we are out of the venting area - even though it is the highest part of the summit - a large broad platform.	400

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S094 Mata Tolu Logger Comments	Record #
12/6/2017	0:39:19	-15.00505	-173.79362	1818.0	4.0	42.8	To the north - on this platform- is Pagoda Chimney. Not seeing it right now.	401
12/6/2017	0:39:49	-15.00500	-173.79359	1815.9	3.2	17.6	From Snail alcove it slopes down to the south.	402
12/6/2017	0:40:15	-15.00496	-173.79356	1814.8	4.6	19.4	The higher features on this map are old sulfides here.	403
12/6/2017	0:40:37	-15.00491	-173.79355	1813.8	3.9	5.9	The big high here is probably the biggest feature on the map.	404
12/6/2017	0:44:26	-15.00486	-173.79354	1813.4	4.0	326.9	We're back at "Snail Alcove". The highest thing in this area.	405
12/6/2017	0:44:55	-15.00487	-173.79354	1813.4	0.0	326.9	Clear fluid and looks very hot but doesn't exceed 200C. 201C max.	406
12/6/2017	0:46:16	-15.00505	-173.79347	1813.4	4.0	326.9	New S96 target for Snail Alcove: 15.0048215 S 173.7935434 W.	407
12/6/2017	0:47:14	-15.00513	-173.79341	1813.4	4.0	326.9	Right now the depth reads 1813.4 and Altitude reads 4 m. We're certainly a lot higher off the flat seafloor than that. Probably 4 m down to the next bench.	408
12/6/2017	0:50:05	-15.00566	-173.79317	1813.4	4.0	326.8	First we are stowing the temperature probe. It didn't quite make it earlier. Next we will do a gastight sample and then move slightly to do a major sample.	409
12/6/2017	0:50:51	-15.00585	-173.79309	1813.4	4.0	326.8	Alvinocaris is in the biobox. He'll get away when we open the box.	410
12/6/2017	0:53:32	-15.00754	-173.79287	1813.4	4.0	326.8	Snail Alcove's highest chimney is covered in Alvinoconcha and Ifremeria snails with a small black smoker at the top.	411
12/6/2017	0:55:39	-15.00684	-173.79298	1813.4	4.0	326.9	**S94-gas-11.** GT#2 green. At the top of Snail Alcove in small beehive with vigorous flow. This beehive got up to 200C. Fired at 0055:35. Looks like a good sample.	412
12/6/2017	0:56:17	-15.00489	-173.79348	1813.4	4.0	326.8	Tamara thinks that's a great sample. We saw a little poof when it fired.	413
12/6/2017	0:57:39	-15.00464	-173.79358	1813.4	4.0	326.9	Stowing the gastight in it's Swiss milk crate.	414
12/6/2017	1:00:06	-15.00437	-173.79368	1813.4	4.0	326.8	Next task will be to do a major or two; suction or two; scoop; and try to grab the sulfide knob on the top.	415

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S094 Mata Tolu Logger Comments	Record #
12/6/2017	1:07:28	-15.00496	-173.79349	1813.3	0.0	326.6	**S94-fluid-12.** Major sampler #3 in the same little smoker orifice where the gastight was taken. Snail Alcove. Looks good - right in the flow. Triggered at 01:07:21.	416
12/6/2017	1:08:15	-15.00511	-173.79350	1813.4	4.1	326.4	Still sampling the fluid. The biology are so fun to watch.	417
12/6/2017	1:09:32	-15.00537	-173.79345	1813.3	4.0	326.9	Going to suction snails and whatever else gets in the nozzle here near the gas/fluid sampling site.	418
12/6/2017	1:14:24	-15.00476	-173.79352	1813.3	4.0	326.9	**S94-bio-13**. Bio suction into Chamber #2. Opaepele shrimp; Alvinocaris (?). Shrimp Alcove top of chimney.	419
12/6/2017	1:16:10	-15.00466	-173.79356	1813.3	4.0	326.8	**S94-bio-14**. Scoop of larger biota. Going for the snails; but who knows what else may go in there. Snail Alcove position on dive S96: 15.0048215 17.7935434	420
12/6/2017	1:23:47	-15.00497	-173.79349	1813.4	3.8	326.9	Scoop bag #1 Alvinoconcha snails (~6) and Ifremeria snails (~?) Not as successful in collecting the white snails. To be continued....	421
12/6/2017	1:26:05	-15.00498	-173.79350	1813.4	4.7	336.7	Just got jerked off the structure. Going in for a sulfide grab at the top of this lovely chimney - that doesn't look quite as lovely anymore.	422
12/6/2017	1:30:47	-15.00487	-173.79352	1812.5	5.0	337.6	Tried to grab the top of the chimney here where sampled previously. Beautiful pyrite or chalcopyrite on the top. It fell.....	423
12/6/2017	1:33:40	-15.00485	-173.79353	1812.7	5.3	343.5	Next will stow the major sampler - then will take a bio sample (a continuation of scoop sample 14). Then will put out a marker.	424
12/6/2017	1:36:32	-15.00486	-173.79355	1811.3	6.8	1.8	Attempting to stow the major. Doesn't seem to be as much room for the snorkels as previously.	425
12/6/2017	1:38:41	-15.00484	-173.79355	1812.0	6.3	10.3	Having trouble storing the fluid sampler.	426
12/6/2017	1:40:23	-15.00478	-173.79354	1813.4	4.0	11.3	Going to go in for another major sampler somewhere on the side of the chimney where the Snails were sampled.	427
12/6/2017	1:43:52	-15.00482	-173.79353	1813.4	3.9	12.4	**S94-fluid-15**. Sample in the area where the snails were living near the top of the chimney. Z=1813.4. ~ 30 cm from the top of the chimney. Fired.	428
12/6/2017	1:45:00	-15.00482	-173.79353	1813.4	3.9	12.4	That fluid sample was ~30 cm from the top of the chimney in area where the snails were sampled.	429

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S094 Mata Tolu Logger Comments	Record #
12/6/2017	1:45:40	-15.00482	-173.79355	1812.5	5.0	28.4	The purpose of this sample was to get chemistry in the area where the snails were sampled.	430
12/6/2017	1:46:45	-15.00482	-173.79357	1812.2	5.3	45.3	The lat/long for sample 15 from the nav screen now is:15.0048225 173.793546. Will compare it to dive 96 target for Snail Alcove after the dive.	431
12/6/2017	1:46:56	-15.00482	-173.79357	1812.5	5.5	51.3	Stowing the major.	432
12/6/2017	1:48:14	-15.00481	-173.79357	1811.6	4.9	57.0	It's stowed now.	433
12/6/2017	1:49:15	-15.00479	-173.79355	1812.9	4.0	52.6	We're now going to try to get that little sulfide piece that is still at the top of the chimney. Will try to grab it with the port arm.	434
12/6/2017	1:52:52	-15.00478	-173.79352	1813.0	5.2	289.3	Going in for the grab behind all the shimmering water.	435
12/6/2017	1:55:19	-15.00493	-173.79351	1813.1	5.1	289.7	Codey.	436
12/6/2017	1:55:20	-15.00493	-173.79351	1813.1	5.1	289.7	**S94-sulfide-16**.Beautiful active sulfide piece from the very top of the chimney. Pyramid-shaped. Gold interior 8 cm tall. Fluid outflows. Z=1813m.	437
12/6/2017	1:57:58	-15.00516	-173.79350	1813.4	5.5	191.1	Going back for scoop bag 1 to attempt to get more snails - the white Ifremeria now. Moving to other side of chimney.	438
12/6/2017	2:04:12	-15.00514	-173.79351	1813.6	3.4	159.8	Want the white hairy snails from this same chimney. Got several of the white hairy snails. Snail Alcove.	439
12/6/2017	2:05:27	-15.00514	-173.79351	1813.6	3.3	159.3	Will store the scoop bag (#1). That was a tough sample. Those snails don't want to come off the chimney.	440
12/6/2017	2:09:09	-15.00513	-173.79351	1813.7	4.1	161.7	Next we will deploy a marker here at Snail Alcove. Nav here 15.0051347 S 173.7935058. That's the fix now while we're deploying it. Will compare it with other fixes at this site and determine the position.	441
12/6/2017	2:10:52	-15.00510	-173.79348	1814.3	8.1	213.9	**Deploying Mkr-296 Snail Alcove** in a flat spot behind the snails. Z=1514 Heading is 178m. Looking to the S/SW.	442
12/6/2017	2:11:10	-15.00510	-173.79351	1814.4	5.5	273.8	From here we will drive due west and go down into the pit.	443
12/6/2017	2:11:39	-15.00508	-173.79363	1817.4	4.5	280.7	We're almost immediately going down into the pit - that that was definitely Snail Alcove we were sampling.	444
12/6/2017	2:11:58	-15.00508	-173.79369	1821.6	5.7	359.8	Heading down over some fairly substantial sulfides.	445

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S094 Mata Tolu Logger Comments	Record #
12/6/2017	2:12:40	-15.00521	-173.79280	1824.7	4.7	259.0	The vehicle nav is quite off. It doesn't have us in the pit at all. Would not trust the nav fix for the marker that was entered in the log.	446
12/6/2017	2:13:29	-15.00514	-173.79392	1838.4	3.2	225.6	We're at the pit floor now. The ROV nav is bad. Doesn't even have us in the pit at all.	447
12/6/2017	2:13:47	-15.00519	-173.79393	1838.1	4.6	196.4	Searching around here.	448
12/6/2017	2:14:20	-15.00513	-173.79391	1838.8	2.4	139.3	Looking around this pit. Seeing lots of snails and shrimp.	449
12/6/2017	2:15:01	-15.00517	-173.79392	1839.2	3.2	169.2	Dense bacterial mat.	450
12/6/2017	2:15:11	-15.00518	-173.79391	1840.2	2.2	169.8	Lots of diffuse flow at the base of the pit wall.	451
12/6/2017	2:15:30	-15.00518	-173.79391	1841.4	1.2	161.5	Seeing shrimp; crabs; barnacles; and lots of shimmer.	452
12/6/2017	2:15:48	-15.00518	-173.79391	1841.2	1.4	166.0	There are a lot of mussels on the wall here as well.	453
12/6/2017	2:19:01	-15.00516	-173.79392	1842.3	0.5	183.8	We're going to take a temperature probe here first.	454
12/6/2017	2:19:41	-15.00516	-173.79391	1842.2	0.5	183.4	Stirred it up here.	455
12/6/2017	2:20:49	-15.00516	-173.79391	1842.3	0.5	184.0	Taking out the temp probe - for the temp at the sampling site.	456
12/6/2017	2:21:57	-15.00516	-173.79391	1842.3	0.5	183.9	We're looking at the wall and our heading is 184. So we're at the SE base of the wall?	457
12/6/2017	2:22:10	-15.00516	-173.79391	1842.3	0.5	183.9	Lots of flow right here.	458
12/6/2017	2:24:20	-15.00514	-173.79391	1842.3	0.5	183.9	1.9 C was ambient. Tmax was 43C in that crack between the rocks at the base of the pit.	459
12/6/2017	2:25:35	-15.00514	-173.79391	1842.3	0.5	183.7	Temp at a high flow area under the rocks was similar - got up to 44C. Got up to 65C there. That's a little too hot for diffuse flow.	460
12/6/2017	2:27:02	-15.00512	-173.79392	1842.3	0.5	184.0	Going for a crack above the previous temp. Tmax=24C.	461
12/6/2017	2:28:21	-15.00513	-173.79392	1842.2	0.5	184.5	Looking for another place to take the temp.	462
12/6/2017	2:29:36	-15.00513	-173.79392	1842.2	0.5	184.7	Dave wants it just right. Too hot or too cold so far.	463
12/6/2017	2:30:24	-15.00513	-173.79392	1842.3	0.5	184.2	Tmax = 23C that time. The water will be warmer than the mussels are in - but they can scale it down.	464
12/6/2017	2:30:50	-15.00513	-173.79392	1842.3	0.5	184.2	Storing the probe.	465
12/6/2017	2:32:09	-15.00514	-173.79392	1842.3	0.5	184.2	Grabbing major sampler for fluid sampling in the pit in area of mussels; shrimp; barnacles; squat lobsters; possible living snails as well.	466

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S094 Mata Tolu Logger Comments	Record #
12/6/2017	2:33:19	-15.00513	-173.79393	1842.4	0.5	184.2	Seeing Ifremeria snails here - not sure that there are Alvinoconcha here.	467
12/6/2017	2:33:35	-15.00513	-173.79392	1842.3	0.5	184.2	Lots of white fuzz on the rocks.	468
12/6/2017	2:34:52	-15.00513	-173.79392	1842.3	0.5	184.3	Have to go back to the exact same spot at the temp probe.	469
12/6/2017	2:39:55	-15.00512	-173.79392	1842.4	0.5	183.7	S94-sulfide-17. Major sampler #4. In crack beneath the mussels where the temp was 23C. Fired at 0236. 15.005142 173.793922 Z=1843.	470
12/6/2017	2:41:06	-15.00512	-173.79392	1842.4	0.5	183.7	The ROV position is about 10 m too far south - at least as far as the ROV nav is putting us. We're looking at the south wall right now.	471
12/6/2017	2:42:27	-15.00512	-173.79392	1842.4	0.5	183.7	Next task is to scoop up some mussels.	472
12/6/2017	2:49:28	-15.00513	-173.79393	1842.8	0.4	160.8	Just above the water sample. Attempting to scoop mussels off the rocks. Dropped it on the first attempt. Got a couple mussels by the abyssal threads. 2 big mussels and maybe 1 small one.	473
12/6/2017	2:53:24	-15.00508	-173.79393	1842.7	0.0	159.2	**S94-bio-18**. At the Pit site. Into biobox 3. Previous position for this sample is:15.005142 173.793922. Z=1843. Don't think there is anything in the bag.	474
12/6/2017	2:54:18	-15.00503	-173.79392	1842.7	0.0	159.2	We want to put a marker out here as well. After we slurp for biology.	475
12/6/2017	2:58:02	-15.00444	-173.79397	1842.8	0.0	158.7	**S94-bio-19**. Chamber 3 slurp: Opaepele shrimp. Alvinocaris shrimp; Ifremeria. The Pit site.	476
12/6/2017	2:58:39	-15.00431	-173.79397	1842.8	0.0	159.0	Next we will grab a marker and deploy it here.	477
12/6/2017	3:00:45	-15.00431	-173.79391	1842.7	0.0	156.5	The nav is putting us at the SE corner of the pit. Z=1843. Hdg158. **Marker 134 deployed** just to the right of our sampling site. This is a stubby one.	478
12/6/2017	3:02:58	-15.00416	-173.79377	1826.1	4.5	52.8	Mkr-134 deployed on S92. SE Pit 15.005142 173.793922 Z=1843.	479
12/6/2017	3:03:38	-15.00413	-173.79369	1820.1	4.2	70.7	Driving NE out of the pit going over sulfide blocks.	480
12/6/2017	3:03:53	-15.00410	-173.79368	1820.3	4.2	76.1	Guessing we're at one of the Beehive towers.	481
12/6/2017	3:04:19	-15.00232	-173.79461	1821.2	2.6	44.0	The Beehive towers are just to the NE of the pit.	482
12/6/2017	3:04:57	-15.00232	-173.79461	1821.6	2.0	44.8	Going to grab one of these inactive sulfides for Chris.	483
12/6/2017	3:07:06	-15.00404	-173.79363	1820.7	1.8	51.0	Spire from inactive sulfide with lots of little spires. Facing NE. Looks like Tall-North-Handsome is in the background.	484

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S094 Mata Tolu Logger Comments	Record #
12/6/2017	3:08:38	-15.00472	-173.79365	1820.3	3.7	65.3	S94-sulfide-20. 40 cm tall 10-15 cm diameter. Orange staining. Coating of iron oxide - gray interior Round spire with 2cm wide central fluid upflow zone.	485
12/6/2017	3:11:24	-15.00430	-173.79377	1818.3	0.0	103.5	Dead Guy Ale: 15.0042613 173.7936195 Z=1821 m This sulfide structure is ~ 5m high. Stored in partition 11. The sampling site was maybe Lawrence Whelk.	486
12/6/2017	3:12:40	-15.01712	-173.78561	1825.1	3.4	95.4	We're looking at Tall-North-Handsome. With the funny flange - tons of snails - lots of flow - little spigots of flow everywhere.	487
12/6/2017	3:13:26	-15.00481	-173.79323	1823.7	0.0	155.9	Seeing some black smoke and some clear smoke.	488
12/6/2017	3:14:42	-15.01159	-173.78970	1822.9	3.1	333.4	Crab going after shrimp. Hairy crab - huge compared to the other crabs.	489
12/6/2017	3:14:53	-15.00945	-173.79081	1822.5	5.2	332.9	Lots of clear flow coming out the top of this tower.	490
12/6/2017	3:15:25	-15.00452	-173.79358	1822.4	0.0	338.1	Huge polychaetes. .	491
12/6/2017	3:16:06	-15.00355	-173.79369	1822.5	3.5	338.6	These scaleworms are larger than the Opaepele shrimp.	492
12/6/2017	3:18:08	-15.00471	-173.79351	1822.2	3.1	348.6	Going to try to sample this active flow coming out of a tall spigot near the summit of Big-North-Handsome chimney Z=1822 at the top. Our heading is 338. Altitude varies from 3.5 to 6+ depending how far out on the slope we're sitting.	493
12/6/2017	3:19:59	-15.00470	-173.79352	1822.2	2.9	359.3	Going to take a temperature reading here.	494
12/6/2017	3:22:26	-15.00398	-173.79388	1822.6	2.9	359.9	Squat lobster hopping by.	495
12/6/2017	3:25:20	-15.00467	-173.79346	1822.4	3.1	344.2	Temp near the outflow of this spigot pouring out clear water. Tmax was 204 C but we are not far in the flow. It's probably hotter than that.	496
12/6/2017	3:27:11	-15.00005	-173.79624	1822.8	5.8	322.1	Squat lobsters on the temp probe.	497
12/6/2017	3:29:00	-14.99610	-173.79855	1824.0	0.0	324.1	This site is gorgeous. It has several tall spires. Tons of biota. The whole she-bang.	498
12/6/2017	3:29:33	-15.00450	-173.79364	1823.1	3.2	321.9	The major is stuck o the temperature probe.	499
12/6/2017	3:29:49	-15.00506	-173.79328	1822.8	7.2	323.1	Free at last.	500
12/6/2017	3:31:01	-15.00435	-173.79370	1822.4	3.2	318.9	Tall thick base on this sulfide. Looks like ~2185 at the base(?) on this SE side of the edifice.	501
12/6/2017	3:34:46	-15.00425	-173.79374	1822.3	8.1	301.7	**S94-fluid-21**. Major #2. near the top of Tall-North-Handsome. In clear vigorous fluids flowing from spigot. Fired 0333:30. Looks good.	502

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S094 Mata Tolu Logger Comments	Record #
12/6/2017	3:36:57	-15.00477	-173.79344	1822.5	7.8	318.6	Will use the S91 position for the samples here. Nav is not so good today. 15.00449 S 173.79359 W Our altitude was over 8 m briefly.	503
12/6/2017	3:37:45	-15.00412	-173.79356	1822.4	7.3	313.1	**S94-gas-22**. Gastight 12 yellow/green into same orifice.	504
12/6/2017	3:44:52	-15.00530	-173.79318	1824.0	13.1	262.6	Still maneuvering toward the orifice. It did trigger. Maybe it was OK? Not sure that it was a good sample. 03:43:30.	505
12/6/2017	3:48:30	-15.00408	-173.79386	1823.3	6.5	323.3	Next task will be a suction of shrimp; scaleworms; snails.	506
12/6/2017	3:48:40	-15.00423	-173.79371	1823.3	6.7	322.1	The nav is bounding around all over the place.	507
12/6/2017	3:48:59	-15.00793	-173.79160	1823.7	7.3	322.0	Some of this chimney is inactive. It's pretty darn big.	508
12/6/2017	3:48:59	-15.00793	-173.79160	1823.7	7.3	322.0	Adam	509
12/6/2017	3:49:29	-15.00793	-173.79160	1823.7	4.2	322.5	Looking at the SE side of the edifice and it's much cooler with more orange coating.	510
12/6/2017	3:51:06	-15.00386	-173.79398	1822.5	3.7	334.3	**S94-bio-23**. Canister 4. Shrimp; Lots of them.	511
12/6/2017	3:53:24	-15.00482	-173.79343	1821.3	7.2	323.4	**S94-bio-24**. Canister 5: Branchinotogluma (the scale worm); Snail stuck in the intake valve. Big-Tall-Handsome.	512
12/6/2017	3:55:09	-15.00481	-173.79343	1821.7	7.2	318.3	**S94-sulfide-25**. Spire from inactive portion of Big-Tall-Handsome. Sort of pagoda shaped piece. Got the little tip. with a nice point on the top.	513
12/6/2017	3:55:31	-15.00511	-173.79323	1820.9	9.7	313.1	Ended up in the box behind the gas tights.	514
12/6/2017	3:57:35	-15.00714	-173.79171	1822.1	0.0	248.9	**DEPLOYING Marker-253** on top of the adjacent dead chimney just up slope to the SW of Tall-Handsome site.	515

S095 W Mata

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S095 W Mata Logger Comments	Record #
12/6/2017	19:13:54	-15.11865	-173.80159	2998.9	12.5	159.6	Vehicle at Seabed	20
12/6/2017	19:14:02	-15.11756	-173.80476	3002.6	9.5	160.7	The bottom is in sight.	21
12/6/2017	19:15:35	-15.11448	-173.80143	3006.1	5.5	160.2	We're looking at pillows with some orange staining in the sediments. That orangish material is possibly hydrothermal diffuse iron-oxide seds.	22
12/6/2017	19:16:17	-15.12122	-173.79429	3007.9	3.8	158.7	The yellow seds are enigmatic.	23

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S095 W Mata Logger Comments	Record #
12/6/2017	19:16:52	-15.11812	-173.80241	3007.1	4.4	156.9	We're at the edge of a somewhat new flow? We should be out of the new lavas right now. Are seeing evidence of heat in the yellow seds.	24
12/6/2017	19:17:33	-15.11862	-173.80121	3010.3	1.4	161.1	Seeing the lavas under the seds here. So. seds can't be that deep.	25
12/6/2017	19:17:40	-15.11851	-173.80159	3010.6	1.1	160.6	Older lava on sediment.	26
12/6/2017	19:17:54	-15.11760	-173.80311	3011.2	0.5	152.5	Seeing some blackish sands - pyroclastic deposits.	27
12/6/2017	19:18:19	-15.11760	-173.80311	3011.7	0.0	151.4	We want to poke around with the dip stick to see how deep the seds are.	28
12/6/2017	19:19:19	-15.11771	-173.80365	3011.7	0.0	154.6	This looks like it could have fallen off the rock? Don't really know what we're looking at.	29
12/6/2017	19:19:39	-15.11772	-173.80366	3011.7	0.0	154.6	We are seeing the iron floc.	30
12/6/2017	19:20:21	-15.11773	-173.80367	3011.7	0.0	154.4	This is our 11th dive on this expedition.	31
12/6/2017	19:20:46	-15.11774	-173.80368	3011.7	0.0	154.4	We may be on the contact - according to Bill.	32
12/6/2017	19:22:20	-15.11780	-173.80372	3011.7	0.0	153.3	The older flow around the newer flow has a knobby appearance.	33
12/6/2017	19:23:04	-15.11784	-173.80375	3011.7	0.0	154.1	40+ cm of sediments. The seds are black under the thin pelagic lighter seds.	34
12/6/2017	19:23:49	-15.11789	-173.80378	3011.7	0.0	154.1	We're going to do a push core here at our landing site.	35
12/6/2017	19:25:10	-15.11803	-173.80385	3011.7	0.0	154.0	We're right at the edge of a heavily sedimented area that looks like a contact. Flatter pillow lobes that are heavily sedimented next to more bulbous pillows up slope (newer?)	36
12/6/2017	19:27:31	-15.11856	-173.80120	3011.8	0.0	149.1	**S95-sed-01**. Push core #3. Into the deep seds. Went in all the way. Coarse plug of dark volcanic seds. Upper part of tube has finer grain size.	37
12/6/2017	19:28:56	-15.11843	-173.80185	3011.7	0.0	148.9	Larger coarser grains on the bottom. ~3/4 full. 15.1181 173.801774 (nav is jumping around) Z=3011. At our landing site.	38
12/6/2017	19:31:04	-15.11852	-173.80138	3011.8	0.0	148.9	**S95-rock-02**. High-standing pillow nub that is attached. In sandy bottom. Olivine-phyric. Green phenocrysts. No vesicles evident. Spectacular rock.	39
12/6/2017	19:32:49	-15.11666	-173.80670	3011.8	0.0	149.0	Got it. Pillow bud. All glass. Porphoritic. Glassy shell. 10cm across 4cm thick. Lots of beautiful crystal. Into partition 5.	40

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S095 W Mata Logger Comments	Record #
12/6/2017	19:36:36	-15.11856	-173.80148	3011.8	0.0	156.9	Grabbing pieces that broke off when tried to grab a near-by rock. Really crystal-rich.	41
12/6/2017	19:39:10	-15.11871	-173.80095	3011.7	0.0	157.0	Small thin outer glass rind shard and a bundle of nuggets. Same rock. 15.118528 173.801425 Z=3012. That's a better fix for samples 1 and 2.	42
12/6/2017	19:39:40	-15.11862	-173.80133	3011.1	0.8	156.9	Ken thinks this could be the distal ridge of the new lava. Bill thinks it's older flow.	43
12/6/2017	19:40:55	-15.11419	-173.81094	3006.7	5.3	146.8	Moved a few meters. Intact pillow tubes. Most are smooth textured on the exterior. . Some bulbous pillows.	44
12/6/2017	19:41:08	-15.11792	-173.80555	3007.4	4.0	153.7	The jury is still out on whether or not this is old or new.	45
12/6/2017	19:41:15	-15.11792	-173.80555	3007.7	3.8	154.7	Nice trained pillow with a shell.	46
12/6/2017	19:41:20	-15.11792	-173.80555	3007.7	3.1	155.5	Anemone on that rock.	47
12/6/2017	19:41:36	-15.11948	-173.79802	3007.5	3.4	158.1	Not a whole lot growing on this flow. That's the first biota we've seen.	48
12/6/2017	19:41:49	-15.11898	-173.79953	3003.9	7.2	157.4	The skids are kicking up a lot of sediment.	49
12/6/2017	19:42:02	-15.11884	-173.80007	2999.5	11.9	156.7	Pulling up to get some of the sed off the vehicle.	50
12/6/2017	19:43:47	-15.12152	-173.79454	3006.1	2.6	157.1	Back near the seafloor.	51
12/6/2017	19:44:27	-15.11892	-173.80113	3007.1	1.5	156.5	We didn't know this flow was here in 2012 - until we looked at the flow later for the West Mata manuscript.	52
12/6/2017	19:46:09	-15.11882	-173.80115	3006.5	1.6	158.0	Bulbous pillows and some more tubular.	53
12/6/2017	19:46:15	-15.11864	-173.80150	3006.5	1.3	157.9	Cracked shell of a pillow.	54
12/6/2017	19:46:39	-15.12121	-173.79429	3006.9	0.9	158.0	Pillow-d unit with a dusting of sediment.	55
12/6/2017	19:46:54	-15.11852	-173.80181	3007.1	0.9	155.7	Not far from the previous samples.	56
12/6/2017	19:47:20	-15.11866	-173.80137	3007.1	1.0	155.1	This is sitting right next to the more sedimented area that we just sampled. Less sediment on these pillows.	57
12/6/2017	19:48:47	-15.11899	-173.80099	3007.0	0.8	154.2	Pillow bud-like feature sticking out from a more extruded bit of lava. Looks slightly disgorged.	58
12/6/2017	19:52:01	-15.11977	-173.79883	3007.1	1.0	156.4	**S94-rock-03**. Nice grab. Z=3007m. Huge pillow. Need to break it up. Still has lots of crystals with some orange staining. See crystals in the glass. About 10% vesicular.	59

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S095 W Mata Logger Comments	Record #
12/6/2017	19:54:31	-15.11788	-173.80448	3006.9	1.3	157.3	Have to break it up. It's at least 60 cm long right now - almost the entire pillow. 15.11843 173.802016. Z=3007m.	60
12/6/2017	19:58:26	-15.11868	-173.80124	3006.9	0.9	156.6	Piece of pillow toe. Glassy outer rind. More crystal rich. Looks as crystal-rich as sample 5 says Ken. Into partition 6.	61
12/6/2017	20:00:38	-15.11860	-173.80175	3006.9	1.2	157.5	2nd piece from the pillow toe. 7cm x 3cm thick. More exterior. Glassy.	62
12/6/2017	20:01:24	-15.11881	-173.80124	3005.3	3.1	158.2	We're going to look back at where we were to try to figure out the story here.	63
12/6/2017	20:02:24	-15.12573	-173.78122	3004.6	3.7	113.0	This looks like a young deposit to Ken.	64
12/6/2017	20:03:05	-15.11940	-173.79864	3004.8	2.7	104.7	We want to look a bit further afield to make sure we are on the new flow.	65
12/6/2017	20:03:19	-15.11939	-173.79861	3004.7	2.6	104.1	We're heading back toward the more sedimented area.	66
12/6/2017	20:04:42	-15.11857	-173.80119	3003.5	2.7	229.3	We want to drive to the west a bit - near where we started.	67
12/6/2017	20:05:22	-15.11832	-173.80214	3004.7	3.3	234.1	We want to get a look at the edge of this lava flow.	68
12/6/2017	20:06:15	-15.11870	-173.80134	3004.9	4.1	235.9	We want to understand the nature of the emplacement of the newer flow. It's best to find the actual contact.	69
12/6/2017	20:06:38	-15.11862	-173.80135	3005.1	3.9	234.5	Heading to the SW.	70
12/6/2017	20:06:57	-15.11852	-173.80177	3006.5	3.8	235.4	We're back in the sediment again. Anemone.	71
12/6/2017	20:07:18	-15.11869	-173.80133	3007.9	3.3	235.2	More of the yellow-orange staining on these seds.	72
12/6/2017	20:07:40	-15.11874	-173.79554	3008.8	3.3	235.3	Ken is convinced that we are at the edge of the flow here.	73
12/6/2017	20:08:24	-15.11896	-173.80067	3009.1	2.5	131.9	Ken thinks that the stuff at the edge is the newer lava under the seds. Extensive area of hydrothermal staining with some black on the edge.	74
12/6/2017	20:08:52	-15.11888	-173.80111	3008.4	2.2	87.1	Multiple generations of sedimentation.	75
12/6/2017	20:09:27	-15.11882	-173.80124	3008.4	1.7	82.2	Beautiful terrain. Sandy swale with lavas on top.	76
12/6/2017	20:09:40	-15.11869	-173.80160	3008.7	1.4	82.9	This is the contact area.	77
12/6/2017	20:09:58	-15.11884	-173.80121	3008.6	1.9	80.6	We can see that off to the edge here it looks different.	78
12/6/2017	20:10:24	-15.11835	-173.80247	3006.6	2.8	84.9	To be sure we will try to sample here. There is a large pillow lava in front of us.	79

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S095 W Mata Logger Comments	Record #
12/6/2017	20:10:59	-15.12052	-173.79549	3007.3	1.4	82.3	Cracked plates on this pillow that is rather flat on top. Lots of sediment on the top of it.	80
12/6/2017	20:11:55	-15.12066	-173.79725	3008.3	0.7	82.8	Trying to figure this out.	81
12/6/2017	20:12:55	-15.11903	-173.80075	3008.3	0.6	83.0	We're going to sample this cracked pillow that is highly sedimented. Is it older or did the lava burrow under the sediment?	82
12/6/2017	20:18:15	-15.11884	-173.80118	3008.3	0.6	83.7	**S95-rock-04**. 1-2cm of sediment cover. At contact? Grab of pillow rind. Extra flaky slab of glass. Less than cm thick 10-ish cm long. Upper surface of young sedimented coated pillow at the flow margin of 2010/2011 eruption.	83
12/6/2017	20:19:54	-15.11857	-173.80191	3008.3	0.7	83.4	Crystals on the surface. Several glass flakes are separating. 15.118725 173.8017258. Z=3008 m.	84
12/6/2017	20:22:44	-15.11878	-173.80130	3008.3	0.7	83.1	Codey	85
12/6/2017	20:24:50	-15.11878	-173.80147	3008.3	0.7	83.0	Different morphology created by being erupted into sediment? More flakes from surface. Slabby glass. Crystal rich. Olivine and clinopyroxene. Nice larger plate with a small amount of interior rock (or sediment?).	86
12/6/2017	20:25:08	-15.11860	-173.80205	3008.3	0.6	83.0	2 flaky pieces of the upper surface of pillow.	87
12/6/2017	20:26:04	-15.12012	-173.79805	3008.2	1.0	113.5	Just adjacent to the pillow we sampled last we see the bumpy pillow buds under this thick sediment that we sampled on rock-1.	88
12/6/2017	20:26:23	-15.11989	-173.79861	3008.9	0.3	109.4	Iron staining in the cracks.	89
12/6/2017	20:27:51	-15.11865	-173.80177	3009.0	0.0	114.1	**S94-rock-05**. Pillow bud under thick-ish seds. Next to larger bulbous pillow we sampled previously (rock-4).	90
12/6/2017	20:29:41	-15.11862	-173.80152	2970.7	2.4	116.0	Pillow bud in seds about 2 m away from rock-4. Got the whole bud.	91
12/6/2017	20:32:18	-15.11864	-173.80158	2960.6	11.2	93.6	Entire bud with sediment blowing off. Circular.15 cm long. Radial. Green crystals. Wow super packed with crystals. Porphoritic. Olivine and clinopyroxene. Small vesicles. Rocky interior. Into partition 8.	92
12/6/2017	20:33:31	-15.11892	-173.80049	2964.7	6.6	75.0	15.1187497 173.8010725 was a quick look by Chris at our nav screen in the location of Rock-5. Will compare all the fixes later to come up with sample locations.	93

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S095 W Mata Logger Comments	Record #
12/6/2017	20:33:46	-15.11873	-173.80103	2965.2	6.3	75.8	Some sediment cover here.	94
12/6/2017	20:34:24	-15.11878	-173.80072	2968.2	3.0	74.6	Broken up rock here at the margins. Angular jumbled fragment with sharp faces just adjacent to pillow lavas.	95
12/6/2017	20:34:28	-15.11881	-173.80063	2968.4	2.9	73.6	Pressure ridge?	96
12/6/2017	20:34:38	-15.11874	-173.80077	2968.6	2.2	73.0	More jumbled/lobates.	97
12/6/2017	20:35:00	-15.11849	-173.80117	2966.7	4.3	73.3	Now coming into more flat lava lobes/pillows. Squat and cracked.	98
12/6/2017	20:35:29	-15.11844	-173.80133	2968.9	2.6	69.0	Holothurian.	99
12/6/2017	20:35:47	-15.11842	-173.80110	2969.4	2.4	69.4	Longer smooth pillow tubes.	100
12/6/2017	20:36:03	-15.11844	-173.80099	2967.4	4.8	68.9	Blocky large pillows?	101
12/6/2017	20:36:11	-15.11845	-173.80068	2967.0	4.6	68.8	Extensive deposit here.	102
12/6/2017	20:36:34	-15.12536	-173.78164	2968.2	2.8	68.8	Still sedimented pillows in the foreground.	103
12/6/2017	20:37:01	-15.12669	-173.77910	2965.8	3.8	68.7	Pillow tubes flowing down slope.	104
12/6/2017	20:37:15	-15.12549	-173.78314	2966.3	1.7	68.6	Elongated pillows on a gentle slope.	105
12/6/2017	20:37:24	-15.12550	-173.78371	2965.9	1.5	69.0	A few sort of bulbous pillows.	106
12/6/2017	20:37:40	-15.12017	-173.79638	2964.7	2.3	68.5	We're still having some navigation issues.	107
12/6/2017	20:37:59	-15.11839	-173.80017	2964.5	3.2	74.7	Nav is jumpy.	108
12/6/2017	20:38:38	-15.11836	-173.80041	2966.6	5.1	67.6	We're heading to the E/NE with the nav jumping in and out.	109
12/6/2017	20:39:10	-15.11824	-173.79985	2969.2	4.7	74.1	Nice looking heavy seds to the left and pillows to the right.	110
12/6/2017	20:39:50	-15.11844	-173.79937	2969.4	5.1	73.9	Orange hydrothermally stained flocculant material suggests fluid flow through that sediment.	111
12/6/2017	20:40:01	-15.11852	-173.79916	2970.7	3.9	73.3	Back on the pillows.	112
12/6/2017	20:40:13	-15.11859	-173.79898	2970.5	3.6	73.4	Heading up slope.	113
12/6/2017	20:41:10	-15.11818	-173.80018	2963.8	4.5	72.3	Gentle slope of elongated pillow tubes.	114
12/6/2017	20:41:24	-15.11806	-173.80017	2963.7	4.5	70.5	Bulbous pillows as well as elongated tubes.	115
12/6/2017	20:42:01	-15.11838	-173.79897	2963.3	3.9	78.0	Longer pillow tube flowing out of more bulbous pillow up slope.	116
12/6/2017	20:43:36	-15.11785	-173.80014	2967.1	2.6	77.2	Young lavas - slightly sedimented. More than 7 years old.	117
12/6/2017	20:44:57	-15.11289	-173.81471	2968.0	2.4	78.5	This has an iron staining in some of the cracks. Suggests these lavas can be warm for years.	118
12/6/2017	20:45:30	-15.11777	-173.80008	2962.5	3.9	79.7	We are waiting for the ship so we will just slowly meander for now.	119

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S095 W Mata Logger Comments	Record #
12/6/2017	20:45:53	-15.11796	-173.79960	2960.7	3.3	79.4	Elongated flattened pillow tubes next to more rough textured pillows.	120
12/6/2017	20:46:21	-15.11797	-173.79956	2959.0	2.6	79.9	See a lot of these elongate tubes flowing out of larger more bulbous pillows.	121
12/6/2017	20:47:25	-15.12653	-173.77792	2957.9	2.3	80.7	We've only climbed 50 m since we started the dive.	122
12/6/2017	20:48:02	-15.12000	-173.79491	2955.0	2.8	79.7	More squat flat-lying sediment coated lavas here.	123
12/6/2017	20:48:31	-15.11780	-173.79942	2953.7	3.2	79.1	Jumbled sheet flow on the edge here. Tumulus-styled. Pressure ridge.	124
12/6/2017	20:48:57	-15.11802	-173.79884	2953.8	3.0	85.6	This is the first sheet flow phase we've seen. Jumbled up at the edges.	125
12/6/2017	20:49:34	-15.11778	-173.79949	2952.0	4.1	112.7	Transitioned out of squat pillows to the jumbled sheet. See more pillows in the distance.	126
12/6/2017	20:50:28	-15.11822	-173.79836	2953.6	2.6	111.7	Want a piece of this folded sheet.	127
12/6/2017	20:51:41	-15.11821	-173.79838	2954.3	1.2	110.3	Going to grab a piece of the jumbled lava.	128
12/6/2017	20:54:08	-15.11796	-173.79899	2953.3	2.9	105.4	**S94-rock-06**. Environment is at a Spur - small section of jumbled up curtain-folded sheets: Thicker rind on this lava: Frothier interiors.	129
12/6/2017	21:12:55	-15.11773	-173.79918	2953.0	4.3	81.1	Two pieces of a broken flow. 3x5cm and 10x15cm. Larger piece has a lot of hydrothermal staining.	130
12/6/2017	21:13:10	-15.11948	-173.79520	2952.0	5.9	81.5	Flying over flatter snaky pillow lavas.	131
12/6/2017	21:13:46	-15.11804	-173.79807	2952.9	3.8	82.0	Seeing some hydrothermal staining inside of fractures.	132
12/6/2017	21:16:43	-15.11767	-173.79800	2958.0	3.2	76.8	Some sediment seen on lowstanding pillows. Looking for a good place to get a sed sample on this flow.	133
12/6/2017	21:19:22	-15.11788	-173.79191	2963.6	2.4	74.1	Transitioning into a flatter. more planar lava surface. Crackly and lumpy surface like tapioca pudding. Probably a channelized sheet flow but not as jumbled as what we typically see.	134
12/6/2017	21:19:26	-15.11788	-173.79191	2963.9	2.6	74.1	Back into the pillows.	135
12/6/2017	21:22:38	-15.11884	-173.77525	2966.1	2.7	76.5	Seeing some inflation structures in some of the flows.	136
12/6/2017	21:24:00	-15.11735	-173.79719	2964.0	3.0	73.0	Flaky. glassy crust on larger pillow flows that have captured some sediment. Not a thick layer though.	137
12/6/2017	21:24:16	-15.11737	-173.79628	2965.0	2.1	73.6	Still seeing a fair amount of basal hydrothermal staining.	138
12/6/2017	21:27:58	-15.11722	-173.79548	2961.9	5.8	83.5	Interwoven pillow tubes as we move upslope.	139

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S095 W Mata Logger Comments	Record #
12/6/2017	21:28:57	-15.11693	-173.79676	2960.6	6.4	69.1	Smoky water - high sediment load?	140
12/6/2017	21:37:44	-15.11521	-173.80174	2959.5	4.5	74.7	Sheet flow...smooth!!!	141
12/6/2017	21:38:24	-15.11678	-173.79517	2958.9	5.2	74.3	Very flat. oblate pillows.	142
12/6/2017	21:38:42	-15.11672	-173.79538	2959.8	4.3	63.5	Fishy	143
12/6/2017	21:39:19	-15.11669	-173.79537	2960.7	2.7	67.2	Hydrothermal staining on the edges and cracks of pillows.	144
12/6/2017	21:39:51	-15.12345	-173.77111	2960.5	2.4	69.9	Nice inflation features and oblate to very flat pillows.	145
12/6/2017	21:40:19	-15.11916	-173.78984	2958.6	4.3	69.9	Very thin sed cover here...these flows are young.	146
12/6/2017	21:41:28	-15.11672	-173.79491	2957.2	6.1	69.8	Off the seabed about 8 m.	147
12/6/2017	21:42:07	-15.11681	-173.79460	2957.3	5.6	68.9	Striated. bulbous pillows fractured by inflation.	148
12/6/2017	21:43:07	-15.11648	-173.79590	2958.8	4.2	69.9	All of these pillows are making me sleepy.	149
12/6/2017	21:44:35	-15.11669	-173.79470	2957.7	3.9	69.5	Cracked. inflated pillows.	150
12/6/2017	21:45:40	-15.11672	-173.79455	2959.2	2.3	69.5	Eel pouts hanging in the distance.	151
12/6/2017	21:46:26	-15.11660	-173.79511	2960.9	0.0	68.7	Anemone.	152
12/6/2017	21:47:21	-15.11740	-173.79246	2960.9	0.0	68.5	Lightly sedimented surface in the foreground overlying lobate cracked pillows.	153
12/6/2017	21:49:27	-15.11663	-173.79494	2959.1	2.3	70.0	Lobate. Expanded pillows. Yummy.	154
12/6/2017	21:51:09	-15.11676	-173.79475	2958.1	3.1	69.7	Under 7 year old lava with cool jelly!	155
12/6/2017	21:51:29	-15.11657	-173.79490	2956.9	4.5	69.1	Tumulus of lava!!	156
12/6/2017	21:52:18	-15.11667	-173.79400	2958.3	2.8	69.4	Water quality seems a bit cloudy.	157
12/6/2017	21:53:18	-15.11510	-173.80014	2958.7	2.8	115.5	Lobate/sheet flows along with cracked pillows.	158
12/6/2017	21:53:45	-15.11564	-173.79722	2957.8	3.4	114.1	Microbial mats - white and yellow patches	159
12/6/2017	21:54:11	-15.11638	-173.79485	2958.0	2.3	115.1	Cool sheet flows draping a topo rise.	160
12/6/2017	21:54:33	-15.11636	-173.79480	2957.3	3.2	115.1	Large ropy features on the sheet flows.	161
12/6/2017	21:55:31	-15.11536	-173.80110	2954.4	2.8	115.3	Extensive sheet flows.	162
12/6/2017	21:56:40	-15.11644	-173.79366	2955.5	1.7	115.0	Fracture zone at the margin of the sheet flow	163
12/6/2017	21:56:55	-15.11496	-173.80334	2955.5	1.8	114.8	Light sediment dusting on the rocks.	164
12/6/2017	21:59:25	-15.11638	-173.79459	2955.4	1.5	114.7	Very altered and fragile rock on the margins on the fracture.	165
12/6/2017	22:06:50	-15.11643	-173.79400	2955.2	1.9	114.1	S95-rock-07. Sheet flow surface plate. Iron staining on the bottom. See fresh glass on the corner. Flat elongate slab - going to break it into a more reasonable size.	166

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S095 W Mata Logger Comments	Record #
12/6/2017	22:10:11	-15.11615	-173.80832	2955.2	1.9	115.2	We're w/in 20 m of waypoint 2. 15.1163662 173.8160746 (bad pos) Z=2956. Into marker box. Big 25 - 30 cm. Thick sheet plate.	167
12/6/2017	22:11:11	-15.11674	-173.78916	2954.4	2.7	115.8	Flat sheet flow with some cracks in the surface.	168
12/6/2017	22:11:34	-15.11701	-173.78704	2954.9	2.5	115.8	This is a tumulus structure that we saw in the bathy.	169
12/6/2017	22:11:54	-15.11610	-173.79132	2955.2	2.1	115.5	So far we haven't seen anything but a very fine dusting of sediment.	170
12/6/2017	22:12:12	-15.11520	-173.81423	2954.9	2.7	115.9	Here's a fracture - tumulus structure.	171
12/6/2017	22:13:11	-15.11648	-173.79368	2953.8	2.8	115.8	Flat lava surface with some cracking. This is the flattest lavas we've seen on this volcano.	172
12/6/2017	22:13:55	0.00000	0.00000	2953.5	1.7	206.7	We want to get a better look at the vicinity.	173
12/6/2017	22:14:30	-15.11637	-173.81437	2954.3	2.9	205.2	Looking down at a steeper slope here.	174
12/6/2017	22:14:57	-15.12369	-173.80391	2954.7	2.7	144.8	All the same rock and all the same flow.	175
12/6/2017	22:15:33	-15.11616	-173.79234	2954.4	2.6	122.2	A large fracture in the sheet.	176
12/6/2017	22:15:58	-15.11632	-173.79408	2954.6	2.1	70.1	We will head a little further east to see if there is another side to this (like a tumulus).	177
12/6/2017	22:16:18	-15.11639	-173.79467	2954.3	3.8	71.3	We're going to get off this sheet to see what's on the other side.	178
12/6/2017	22:16:33	-15.11639	-173.79508	2954.2	3.9	71.2	Large cracks in this sheet flow.	179
12/6/2017	22:16:41	-15.11638	-173.79565	2954.3	3.4	71.3	Looks slightly uplifted in the center.	180
12/6/2017	22:17:09	-15.11628	-173.79455	2953.9	1.7	71.3	Slightly undulating feature.	181
12/6/2017	22:17:18	-15.11627	-173.79441	2953.8	1.6	71.2	Heavily cracked - flat.	182
12/6/2017	22:17:50	-15.11630	-173.79372	2952.7	1.4	71.3	Coming to a more jumbly area in the sheet flow here.	183
12/6/2017	22:18:02	-15.11631	-173.79501	2952.3	1.4	85.0	Fissure in the lava. We want to look in it.	184
12/6/2017	22:18:12	-15.11633	-173.79444	2952.1	1.5	116.0	A little more curtain-folded sheet flow here.	185
12/6/2017	22:18:27	-15.11631	-173.79459	2952.1	1.4	116.6	Discontinuous crack in this slabby surface.	186
12/6/2017	22:18:58	-15.11660	-173.78522	2952.4	1.3	116.7	We're in a sort of "dome" of lava here in the jumbled sheet flow here by the fissure.	187
12/6/2017	22:19:44	-15.11544	-173.79346	2952.4	1.2	116.4	Another large crack/fissure - sub parallel cracks.	188
12/6/2017	22:20:36	-15.11635	-173.79423	2951.8	1.6	110.6	We're looking toward the SE. Want to get off the flow to look back at the feature.	189
12/6/2017	22:20:47	-15.11632	-173.79412	2951.6	1.7	108.8	This sheet flow is inflated.	190
12/6/2017	22:21:37	-15.11625	-173.79416	2951.3	1.0	113.5	This is the crack in the center of the tumulus here.	191

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S095 W Mata Logger Comments	Record #
12/6/2017	22:22:43	-15.11685	-173.78442	2950.7	3.7	140.4	Large crack structure Deep 8 - 10 m estimate of the depth of the crack. Heading is 135 m parallel to the surfaces on each side.	192
12/6/2017	22:23:00	-15.11632	-173.79273	2950.8	3.7	140.6	Sonar puts this crack to be 4 meters deep.	193
12/6/2017	22:23:20	-15.11611	-173.79715	2950.7	3.9	140.2	Thick coherent massive lavas here. Putter glassy crust about 10 cm thick.	194
12/6/2017	22:23:37	-15.11635	-173.79400	2949.8	4.0	140.4	This fissure stopped erupting lavas and then drained back.	195
12/6/2017	22:24:10	-15.11630	-173.79429	2948.9	4.4	141.1	The sheeted surface we saw earlier was to the west of where we are now.	196
12/6/2017	22:27:51	-15.11657	-173.79352	2948.7	5.2	117.6	Traversing through a pressure ridge. No evidence of significant hydrothermal activity here.	197
12/6/2017	22:30:21	-15.11653	-173.79441	2949.6	3.4	117.5	Ripples and hummocky surface with some sediment.	198
12/6/2017	22:31:55	-15.11656	-173.79422	2954.1	3.7	133.8	Moving into another flat surface with inflationary structures on its boundary.	199
12/6/2017	22:32:03	-15.11667	-173.79398	2954.3	4.0	134.0	Lobate lavas in background.	200
12/6/2017	22:33:34	-15.11663	-173.79367	2956.0	3.4	257.1	Spinning the vehicle to get a sonar reading on what we just passed over.	201
12/6/2017	22:35:32	-15.11671	-173.79342	2957.4	3.3	132.3	Back into lobate lavas.	202
12/6/2017	22:40:15	-15.11686	-173.79415	2961.0	3.4	133.2	Working upslope into what should be a thicker and taller part of the new lava flow.	203
12/6/2017	22:42:01	-15.11694	-173.79373	2961.2	2.0	133.2	Highstanding feature - perhaps pushed-up chunk of sheet flow with a tumulus-like crack in center.	204
12/6/2017	22:43:12	-15.11702	-173.79279	2959.6	3.5	154.8	Mini version of the same structure we passed over in the large sheet flow.	205
12/6/2017	22:50:14	-15.11722	-173.79223	2957.7	2.8	142.6	Extensive lobate pillow deposits here.	206
12/6/2017	22:52:35	-15.11738	-173.79176	2952.6	2.0	142.9	Moving upslope thick with pillow lavas.	207
12/6/2017	22:52:48	-15.11739	-173.79243	2952.6	2.4	143.1	~100m SE of waypoint 2.	208
12/6/2017	22:53:03	-15.11741	-173.79572	2952.1	2.2	143.2	Peter	209
12/6/2017	23:05:42	-15.11804	-173.79219	2930.0	4.4	139.8	Slope break as we start flying up the terrace to the higher standing platform.	210
12/6/2017	23:08:07	-15.11814	-173.79172	2927.3	4.1	141.2	Slope features narrower lobate flows compared to flatter surfaces.	211
12/6/2017	23:11:13	-15.11835	-173.79114	2916.4	2.8	140.6	Rattail fish.	212
12/6/2017	23:12:58	-15.11838	-173.79161	2911.7	2.1	140.8	Continuing upslope transit. Once it flattens we'll look for a sample site.	213

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S095 W Mata Logger Comments	Record #
12/6/2017	23:15:47	-15.11848	-173.79166	2898.5	2.4	140.3	Almost entirely smooth lobate pillows running parallel to each other. Steep enough that little meandering is occurring.	214
12/6/2017	23:17:21	-15.11852	-173.79141	2894.0	2.7	140.9	Flattening out into meandering lobes. Settling down soon for a sample	215
12/6/2017	23:23:16	-15.11864	-173.79129	2894.9	0.7	140.6	S95-rock-08. Crust of collapsed pillow. Phyric 5x20cm with very fresh glass rind.	216
12/6/2017	23:24:54	-15.11864	-173.79076	2892.8	2.1	65.9	S95-rock-08 location 15.11989484 173.79112205 (bad pos) depth 2895m.	217
12/6/2017	23:25:21	-15.11819	-173.78556	2892.8	2.5	66.2	Lots of drained pillows here.	218
12/6/2017	23:32:43	-15.11841	-173.79090	2898.2	2.2	76.2	Pillow lavas. Water column still foggy with fine sediment and/or bio matter.	219
12/6/2017	23:32:51	-15.11842	-173.79085	2898.1	2.6	76.2	Slope change - stack of cheetos.	220
12/6/2017	23:33:24	-15.11846	-173.79085	2895.3	4.8	76.8	Start of terrace up to second highstand.	221
12/6/2017	23:35:03	-15.11836	-173.79078	2890.9	3.6	76.8	Still haven't found a place for a sediment sample on this stack of lavas.	222
12/6/2017	23:36:54	-15.11835	-173.79060	2885.6	2.6	76.1	Darren	223
12/6/2017	23:39:13	-15.11835	-173.79006	2880.4	2.0	76.8	More pillow tubes - again - many of the pillow tubes see to originate in the area of larger bulbous pillows.	224
12/6/2017	23:39:34	-15.11833	-173.79011	2879.1	2.4	76.9	Slope is flattening out there. We're at the top of this pillow mound.	225
12/6/2017	23:39:42	-15.11833	-173.79011	2878.4	2.7	76.7	Ridge of pillows parallel to the slope.	226
12/6/2017	23:40:37	-15.11830	-173.79054	2878.8	1.8	77.0	The seafloor here is quite flat.	227
12/6/2017	23:41:25	-15.11830	-173.79043	2879.5	2.9	76.8	Pillow tubes with interspersed bulbous pillows.	228
12/6/2017	23:41:37	-15.11829	-173.79055	2880.4	2.7	77.0	These pillows tubes are quite mall.	229
12/6/2017	23:41:46	-15.11831	-173.78999	2880.2	3.1	77.2	Oh my.... more pillows.	230
12/6/2017	23:42:01	-15.11830	-173.78987	2881.1	2.9	76.6	The seafloor here is pretty much devoid of any life.	231
12/6/2017	23:42:13	-15.11829	-173.78983	2882.3	1.9	76.2	Iris up and now we are seeing more.	232
12/6/2017	23:42:44	-15.11823	-173.78954	2883.0	2.0	76.9	Dancing holothurian.	233
12/6/2017	23:43:00	-15.11825	-173.79015	2883.1	1.6	76.4	Spanish dancer holothurian.	234
12/6/2017	23:44:40	-15.11825	-173.78993	2884.6	1.6	76.7	So. the total biota observed so far is: 2 anemones and 2 holothurians (Spanish dancers).	235
12/6/2017	23:45:32	-15.11830	-173.79002	2883.6	3.0	76.1	This lava flow is only 6 to 7 years old - but even that doesn't explain the lack of any biota here.	236
12/6/2017	23:46:24	-15.11824	-173.78973	2881.2	4.0	76.7	Pillows here are getting a bit larger and flatter.	237

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S095 W Mata Logger Comments	Record #
12/6/2017	23:46:57	0.00000	0.00000	2879.4	3.9	76.5	Looks like a rock out of place.... It's a hole in a pillow.	238
12/6/2017	23:47:22	-15.11794	-173.79007	2878.6	3.5	76.8	Pillow lobes are getting larger and flatter here.	239
12/6/2017	23:47:41	-15.11914	-173.79737	2877.9	3.3	76.9	Flattened out pillows; even the larger ones.	240
12/6/2017	23:48:14	-15.11818	-173.78947	2876.5	3.7	76.9	The navigation sucks.	241
12/6/2017	23:49:33	-15.11814	-173.78954	2874.7	4.4	77.2	We seem to be approaching the top of this largest mound on the new lava flow.	242
12/6/2017	23:50:05	-15.11810	-173.79002	2876.3	2.1	76.0	Crinoid? in the pillow hollow ahead.	243
12/6/2017	23:51:24	-15.11826	-173.78865	2877.7	0.7	76.1	Crinoid it is!! Hanging out on this lava lip that we are going to sample.	244
12/6/2017	23:54:24	-15.11824	-173.78881	2877.8	0.8	75.8	**S95-rock09**. Outer edge / rind of collapsed lobate pillow. 7 cm thick. Pie sliced. Vesicles and crystals. Broken edge is black - exposed edge is brown.	245
12/6/2017	23:57:00	-15.11820	-173.79001	2877.7	0.7	75.8	We're near waypoint 4. On the little high ~25 m SE of waypoint 4 (that's the best we can do for nav). Z=2878 m.	246
12/6/2017	23:57:21	-15.11818	-173.78939	2877.6	0.7	77.9	No real navigation fix.	247
12/6/2017	23:59:22	-15.11847	-173.78928	2874.3	3.7	90.1	We plan to move to the NE off this younger flow. We want to see the boundary between the newer and older flows.	248
12/7/2017	0:02:43	-15.11840	-173.78938	2883.6	5.0	43.6	We're now at the edge of this younger flow. Contact here.! So we must be near the red line on the map.	249
12/7/2017	0:03:03	-15.11838	-173.78899	2885.7	2.9	43.8	Pillows lapping up against sediments.	250
12/7/2017	0:03:38	-15.11827	-173.78949	2886.8	2.2	40.3	Younger pillows on the left (west) - sedimented ridge to the right (east)	251
12/7/2017	0:03:50	-15.11824	-173.78963	2887.3	1.7	40.3	Some sea urchins on the rocks.	252
12/7/2017	0:04:24	-15.11825	-173.78927	2887.8	1.5	44.3	The rock in front of us must have fallen down hill from the NE (It has corals on it.)	253
12/7/2017	0:04:36	-15.11830	-173.78909	2888.3	1.1	86.2	Seeing rubble in the background.	254
12/7/2017	0:05:11	-15.11833	-173.78814	2889.1	0.8	98.8	Beautiful perfect small; deep; ripples that run into this new flow to the west.	255
12/7/2017	0:05:31	-15.11838	-173.78838	2889.1	0.7	98.7	We're going to take a scoop sample.	256
12/7/2017	0:05:55	-15.11830	-173.78869	2889.1	0.8	98.7	Anemone; bamboo coral; and ? on the older rock.	257
12/7/2017	0:07:03	-15.11825	-173.78917	2889.1	0.7	98.6	Beautiful sedimented steepish rippled slope.	258
12/7/2017	0:08:06	-15.11844	-173.78734	2889.1	0.7	98.6	Going to take a scoop in this beautiful sediment near the contact.	259

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S095 W Mata Logger Comments	Record #
12/7/2017	0:11:11	-15.11831	-173.78900	2889.1	0.7	96.9	**S95-sed-10**. Scoop bag 1. We're on the edge of this lava flow in sediments that are light and dark banded ripples.	260
12/7/2017	0:13:23	-15.11823	-173.78996	2889.1	0.8	96.9	Z=2890. 15.118405 S 173.788666 W.	261
12/7/2017	0:14:15	-15.11827	-173.78907	2889.1	0.8	96.9	Storing the sediment scoop bag 1.	262
12/7/2017	0:16:25	-15.11828	-173.78899	2889.1	0.7	96.9	We're facing die east with the new flow to the north and old flor to the south.	263
12/7/2017	0:16:54	-15.11902	-173.78111	2886.8	3.1	74.3	Wispy coral on that older rock.	264
12/7/2017	0:17:13	-15.11823	-173.78873	2888.2	1.5	74.3	Rock fragments on steep slope.	265
12/7/2017	0:17:39	-15.11828	-173.78607	2886.7	3.3	38.2	Edge of young lava flow in the foreground up against the edge of an older slope with large fragments.	266
12/7/2017	0:18:04	-15.11871	-173.77738	2889.1	1.7	38.5	The older lava is much more heavily sedimented.	267
12/7/2017	0:18:28	-15.11825	-173.78592	2890.3	1.3	58.6	The lavas on the right of the screen look much older and cracked compared to the lavas on the left.	268
12/7/2017	0:18:55	-15.11841	-173.79191	2890.0	1.8	58.3	That's a newer pillow overlapping the older flow.	269
12/7/2017	0:19:17	-15.11803	-173.78843	2888.8	3.2	75.0	We're going to head up this older wall to the east and look for something to sample.	270
12/7/2017	0:19:27	-15.11823	-173.78170	2887.8	3.6	75.0	Looks like pillows at the top.	271
12/7/2017	0:19:51	-15.11815	-173.78907	2886.3	4.2	75.3	These pillows are cracked and fractured.	272
12/7/2017	0:19:55	-15.11814	-173.78895	2886.0	3.2	74.8	Fish.	273
12/7/2017	0:20:30	-15.11811	-173.78846	2884.6	3.7	75.1	Older-looking lavas up here at the top of this ridge.	274
12/7/2017	0:20:58	-15.11815	-173.78845	2885.0	1.8	72.8	Steep slopes on either side.	275
12/7/2017	0:22:40	-15.11804	-173.78828	2885.9	1.3	75.4	Going in for a grab. Stalked crinoid; hydroids; Whip coral	276
12/7/2017	0:24:16	-15.11804	-173.78911	2885.9	0.9	75.6	**S95-rock-11**. Older lava flow to the east. Older broken up eroded pillow piece. Intact. Quite altered.	277
12/7/2017	0:26:03	-15.11810	-173.78823	2885.9	1.1	75.7	Nice glass rind. 20cm by 10cm. Plug - thick glass at the top. Some vesicles. Lots of the interior. Orange staining - has a pillow toe-like feature.	278
12/7/2017	0:27:47	-15.11813	-173.78823	2881.0	4.6	73.8	Into partition 9. 15.1181234 173.788716. Z=2886 m.	279
12/7/2017	0:28:52	-15.11797	-173.78851	2885.0	3.8	79.7	We're heading to the NE. We're still on the older sedimented flow.	280
12/7/2017	0:29:16	-15.11792	-173.78917	2884.0	3.6	79.7	We will head toward waypoint 5 next.	281

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S095 W Mata Logger Comments	Record #
12/7/2017	0:29:37	-15.11793	-173.78866	2883.8	3.5	80.1	Chrysogorgia.	282
12/7/2017	0:29:54	-15.11792	-173.78831	2883.2	4.0	80.2	We're looking at highly sedimented lavas.	283
12/7/2017	0:30:31	-15.11784	-173.78896	2882.5	3.5	80.5	Going from flattened pillow lobes to blocky rubbly lavas.	284
12/7/2017	0:30:38	-15.11787	-173.78826	2882.7	2.9	79.9	Corals in the background.	285
12/7/2017	0:32:43	-15.11774	-173.78827	2884.3	0.0	82.0	Heavily sedimented whirly slope with less sediments in the background farther up slope.	286
12/7/2017	0:33:55	-15.11803	-173.81043	2879.6	2.1	110.5	Continuing to the east? Want to make sure we're not under the ship too much.	287
12/7/2017	0:34:06	-15.11798	-173.80703	2878.5	2.8	110.3	Seeing lots of corals here.	288
12/7/2017	0:34:46	-15.11779	-173.78861	2874.1	8.0	111.2	Bamboo corals - Crinoids.	289
12/7/2017	0:35:20	-15.11784	-173.78829	2877.1	4.1	110.6	Up this slope these pillows are more intact.	290
12/7/2017	0:35:39	-15.11816	-173.77585	2876.9	3.8	110.3	Broad lobes that are fairly flat.	291
12/7/2017	0:35:47	-15.11807	-173.78008	2876.0	5.1	109.2	Pillow tubes flowing down slope.	292
12/7/2017	0:36:41	-15.11772	-173.78822	2879.2	3.0	99.6	Going to go in for another sample of this older lava.	293
12/7/2017	0:38:30	-15.11771	-173.78809	2881.3	1.0	104.4	A whip coral of some type. It's pretty twisty.	294
12/7/2017	0:44:37	-15.11770	-173.78793	2881.6	0.0	100.8	**S95-rock-12**. Piece of large cracked weathered older (Corals growing on it). pillow: Z=2882.	295
12/7/2017	0:46:46	-15.11771	-173.78735	2881.6	0.0	101.2	Outer piece: 10x8 cm piece. One nice fresh face. Crystals in there. Weathered seds and crud in to biobox 3.	296
12/7/2017	0:47:54	-15.11771	-173.78822	2880.7	2.3	105.8	15.117730 173.787951. Z=2882m.	297
12/7/2017	0:49:24	-15.11764	-173.78804	2883.7	0.7	128.5	Heading on the ROV is to the SE but we are lateraling to the north looking up at this older slope with lots of sediment and exposed pillows.	298
12/7/2017	0:49:37	-15.11760	-173.78829	2883.8	0.0	127.6	Seems like the sediment cover is increasing.	299
12/7/2017	0:51:17	-15.11762	-173.78708	2884.7	2.0	129.1	We're in an area of heavy sediments - seeing the occasional pillow here and there - but most of this area is sediment covered.	300
12/7/2017	0:53:53	-15.11747	-173.79039	2888.6	3.7	116.0	Seeing some animals here. That looks like a sand dollar on the sedimented slope. Walter - what is that?	301
12/7/2017	0:54:25	-15.11765	-173.78912	2888.7	2.3	116.1	Bits of sediment- fracture here exposing some black lavas.	302
12/7/2017	0:54:40	-15.11740	-173.78769	2888.5	1.7	116.1	Alternating layers of coarse and fine sediments.	303
12/7/2017	0:55:06	-15.11739	-173.78739	2888.8	0.7	116.0	We're looking into a gully here.	304

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S095 W Mata Logger Comments	Record #
12/7/2017	0:55:18	-15.11738	-173.78728	2888.1	2.1	115.9	We're sort of on the north edge of this ridge.	305
12/7/2017	0:56:09	-15.11737	-173.78737	2887.8	1.5	116.0	Edge of a younger (?) flow to the left; sedimented slope to the right.	306
12/7/2017	0:57:29	-15.11736	-173.78767	2889.1	0.0	115.3	We're going in for a grab of a rock.	307
12/7/2017	1:00:32	-15.11739	-173.78719	2888.7	0.0	138.6	Looking for another place to sample.	308
12/7/2017	1:00:40	-15.11737	-173.78726	2888.7	0.0	138.0	Beautiful paddling red shrimp.	309
12/7/2017	1:02:29	-15.11735	-173.78655	2888.7	0.0	136.5	Edge of rippled slope sheety / platey flow with some buds around the edge.	310
12/7/2017	1:03:27	-15.11737	-173.78719	2888.7	0.0	138.0	**S95-rock-13**. Platey sheet of the outer crust of this.	311
12/7/2017	1:06:26	-15.11729	-173.78819	2888.7	0.0	138.4	Seeing some crystals in this thin plate of glassy cruse. Circular- 10 cm by 1cm thick. 15.117412 173.786810 Z=2889m	312
12/7/2017	1:07:02	-15.11733	-173.78754	2886.0	2.6	143.4	Going in for a sediment core. We're heading up on top of this little ridge.	313
12/7/2017	1:07:08	-15.11734	-173.78743	2885.5	2.8	143.2	Mottled sediment ripples.	314
12/7/2017	1:08:08	-15.11744	-173.78764	2886.7	0.8	142.6	Pencil polychaetes (my name for them - sm).	315
12/7/2017	1:09:03	-15.11747	-173.78676	2886.8	0.7	142.4	Brittle star with a fat center in the ripples (little guys).	316
12/7/2017	1:09:43	-15.11742	-173.78695	2886.8	0.7	142.6	Going in with the dip stick to measure the sediment thickness here before we take the push core.	317
12/7/2017	1:12:48	-15.11745	-173.78680	2887.0	0.4	141.1	We're upslope about 25 m (?) just a wild guess - from our last sample.	318
12/7/2017	1:13:51	-15.11740	-173.78761	2887.0	0.4	141.4	Dipstick went in all the way to the 40 cm mark.	319
12/7/2017	1:18:09	-15.11736	-173.78736	2887.1	0.0	140.7	**S95-sed-14**. Push core #2 with the core catcher. Deep sediments on this flatish plain. That core is full - at least upon collection. Black volcanic seds. No internal stratigraphy.	320
12/7/2017	1:20:42	-15.11730	-173.78751	2884.8	5.9	115.0	JRod	321
12/7/2017	1:21:02	-15.11731	-173.78762	2883.7	5.9	88.3	Got the core Entrained about half of that. Uniform coarse volcanic sand. No apparent layering. Z=2887 15.117374 173.787272.	322
12/7/2017	1:21:17	-15.11728	-173.78758	2885.4	3.8	63.5	We're on the edge of this flow here up against the sedimented ridge.	323
12/7/2017	1:21:31	-15.11724	-173.78747	2886.6	3.0	57.6	We must be up against the new sedimented flow.	324
12/7/2017	1:21:41	-15.11719	-173.78778	2886.8	3.4	60.0	Jumbled up flow ridge.	325

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S095 W Mata Logger Comments	Record #
12/7/2017	1:22:10	-15.11712	-173.78745	2886.1	4.2	80.4	Is this an eruptive fissure. There's a big trough here. Very fluid lavas here with pillows on each side.	326
12/7/2017	1:23:04	-15.11723	-173.78716	2887.4	2.4	110.5	A jumbled mess with pillows off to either side.	327
12/7/2017	1:23:16	-15.11722	-173.78697	2888.3	2.2	110.0	Could be an eruptive fissure. Collapse ahead.	328
12/7/2017	1:24:10	-15.11714	-173.78666	2888.3	1.6	110.2	Drain-out features here. Horizontal shelves with collapsed jumbled lava here.	329
12/7/2017	1:24:29	-15.11721	-173.78651	2886.7	3.1	100.8	There are pillows on top of it.	330
12/7/2017	1:24:58	-15.11725	-173.78711	2885.6	4.3	91.5	We're looking down into the eruptive fissure.	331
12/7/2017	1:25:48	-15.11707	-173.78345	2888.0	0.0	93.8	Plan to grab one of the jumbled slabs along the side of this fissure.	332
12/7/2017	1:29:42	-15.11718	-173.78692	2889.5	0.0	92.5	**S95-rock-15**. Jumbled sheet flow with drain-out bathtub features (shelves). Z=2890 m. Slab is 7 cm thick. 2 layers. Lava drips. Ridged pattern. Very crystal rich. Olivine and some pyroxine.	333
12/7/2017	1:33:41	-15.11719	-173.78728	2889.5	0.0	92.9	Ridges along one side. 35-40 cm long. Going into the back of the marker box. 15.117259 173.786498.	334
12/7/2017	1:34:43	-15.11719	-173.78723	2889.5	0.0	93.0	We want to talk about the back wall. Lava drips on the far wall. Under the upper crust. Shelf plates and lava drips.	335
12/7/2017	1:35:21	-15.11719	-173.78766	2889.5	0.0	92.9	This drain-out crust is a bit uplifted in the area of the lava drips (stalactites).	336
12/7/2017	1:36:26	-15.11720	-173.78690	2889.5	0.0	92.8	LAVA DRIPS IN DRAIN-OUT FEATURE.	337
12/7/2017	1:36:59	-15.11714	-173.78689	2889.5	0.0	92.8	Some obvious large pillow lobes in the fissure wall too.	338
12/7/2017	1:37:02	-15.11714	-173.78689	2889.5	0.0	92.9	Anemone	339
12/7/2017	1:38:39	-15.11713	-173.78744	2888.2	1.9	93.5	Awesome feature.	340
12/7/2017	1:39:03	-15.11731	-173.78788	2888.4	1.5	93.8	Pretty fluid looking large pillow lobes on both sides of this pillow lobe.	341
12/7/2017	1:39:55	-15.11720	-173.78744	2887.5	2.8	93.7	Light coating of sediment here.	342
12/7/2017	1:40:15	-15.11714	-173.78767	2886.3	2.9	94.1	On top of this collapse feature we see large striated pillows.	343
12/7/2017	1:40:27	-15.11719	-173.78712	2886.1	2.9	94.7	Huge lava lobes come together here.	344
12/7/2017	1:40:57	-15.11723	-173.78650	2886.1	0.6	95.0	Hollows beneath us. We want to follow this for a while if we can.	345
12/7/2017	1:41:33	-15.11716	-173.78719	2885.0	1.4	83.2	Totally broken up drained out bill and pillow tube.	346

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S095 W Mata Logger Comments	Record #
12/7/2017	1:41:55	-15.11716	-173.78725	2884.5	1.9	85.3	Inflated broken lobate.	347
12/7/2017	1:42:34	-15.11708	-173.78766	2884.5	1.0	93.5	Following a fissure. Lots of hydrothermal staining going along with the small crack (fissure)	348
12/7/2017	1:43:08	-15.11713	-173.78617	2883.5	1.3	99.0	Still seeing evidence of the crack.	349
12/7/2017	1:43:55	-15.11745	-173.77954	2881.9	3.7	110.9	Young pillows here. Larger bulbous pillows.	350
12/7/2017	1:44:14	-15.11726	-173.78430	2880.6	4.1	110.7	We should be coming into the end of this lava flow pretty soon?	351
12/7/2017	1:45:27	-15.11711	-173.78626	2879.8	3.8	109.8	Note to self (sm): Maybe use a 5 meter depth difference on the difference grids from here on. We're outside of the boundary polygon by quite a way.	352
12/7/2017	1:46:10	-15.11751	-173.78404	2879.5	4.1	197.2	We're waiting for the ship so we will have a look around in the meantime.	353
12/7/2017	1:48:08	-15.11722	-173.78654	2882.1	2.4	114.8	More rugged topography now. Some jumbled sheet flows now with overlaid pillows.	354
12/7/2017	1:48:47	-15.11723	-173.78673	2882.4	2.1	136.8	More well behaved pillows in the background. Still looks young.	355
12/7/2017	1:48:54	-15.11723	-173.78673	2882.7	1.9	133.2	Spanish dancer.	356
12/7/2017	1:50:00	-15.11721	-173.78592	2882.8	1.8	117.5	It looks like this young flow may continue to the rift zone.	357
12/7/2017	1:50:47	-15.11723	-173.78673	2881.1	1.7	100.2	Taking over. checkin in ...hello pillows!	358
12/7/2017	1:51:26	-15.11718	-173.78628	2880.2	3.4	94.8	White staining on crack surfaces of breadcrust pillows.	359
12/7/2017	1:52:27	-15.11722	-173.78611	2877.7	4.4	94.5	Slight sediment cover on pillows. Water look a little milky here.	360
12/7/2017	1:59:16	-15.11717	-173.78603	2880.2	0.9	58.9	**S95-rock-16**. Sample from jumbled pillow lava; full with crystal. porphyritic; glassy and arcuate shaped; 20-25 cm.	361
12/7/2017	1:59:52	-15.11721	-173.78623	2880.2	0.9	58.8	Onwards we fly ...	362
12/7/2017	2:02:02	-15.11714	-173.78542	2879.6	0.7	63.8	ROCK 16 POSITION FROM NAVIGATOR: 15.1172125 173.7859079 Z=2880m	363
12/7/2017	2:02:28	-15.11712	-173.78509	2878.8	1.1	62.8	We're on another sheet flow now - moving into more intact pillows.	364
12/7/2017	2:02:45	-15.11711	-173.78538	2878.0	1.6	74.2	The last sample was youngish looking.	365
12/7/2017	2:03:22	-15.11726	-173.80752	2875.6	2.7	81.9	Did we go onto a contact here? We went from a really high effusion rate to these pillows? The pillows have staining on them.	366

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S095 W Mata Logger Comments	Record #
12/7/2017	2:04:08	-15.11714	-173.79624	2873.7	2.6	90.9	These pillows look really dark. We're going to take another sample to try to clarify it? These are really rough pillows.	367
12/7/2017	2:05:06	-15.11706	-173.78554	2874.4	1.7	100.2	We can see that whole side and middle have popped out of this pillow here. Looks a bit older; but we really can't tell.	368
12/7/2017	2:05:21	-15.11707	-173.78617	2874.4	1.7	99.8	We're seeing orange staining on some of these pillows.	369
12/7/2017	2:05:47	-15.11712	-173.78527	2874.3	1.8	100.0	The next one will be rock 17.	370
12/7/2017	2:07:36	-15.11714	-173.78614	2874.5	2.4	101.3	Piece of pillow lip that is more than just the exterior. The broken face we grabbed it from has visible crystals.	371
12/7/2017	2:09:52	-15.11714	-173.78558	2874.5	4.1	101.3	**S95-rock-17**. Piece of rind and small amount of interior. 25 cm long by 10 cm thick. Crystal-rich. Upper 1 cm thick glassy rind.	372
12/7/2017	2:10:30	-15.11711	-173.78594	2875.0	2.9	101.8	Not as crystal rich as the sheet we just sampled. Went in behind the port major.	373
12/7/2017	2:12:44	-15.11712	-173.78515	2871.5	6.1	101.6	Navigator fix: Z=2877m. 15.1171499 173.7862279.	374
12/7/2017	2:13:18	-15.11704	-173.78676	2869.8	3.1	102.4	Moving up slope. Still in this young flow. There are 2 young flows here so we're not sure which one we're in.	375
12/7/2017	2:14:02	-15.11705	-173.78673	2866.6	3.8	102.2	This one is probably older because we're starting to see some animals here.	376
12/7/2017	2:14:26	-15.11705	-173.78672	2865.0	4.8	102.6	The two lava flows we're looking at are probably about 10 years apart in age.	377
12/7/2017	2:14:56	-15.11706	-173.78665	2864.1	1.7	103.1	The only animals we're seeing here are these thin little stalks.	378
12/7/2017	2:16:21	-15.11705	-173.78662	2862.4	3.0	102.4	Those look like the pencil polychaetes. (A worm - tubeworm).	379
12/7/2017	2:16:51	-15.11704	-173.78661	2862.9	2.0	124.2	They look exactly like the ones we saw in the sediments the other day.	380
12/7/2017	2:18:41	-15.11704	-173.78661	2863.5	1.1	138.1	Also seeing a little white thing. Either a barnacle or a sponge. That looks like an empty barnacle shell to Walter - it might be a sponge.	381
12/7/2017	2:19:07	-15.11704	-173.78661	2863.5	1.1	137.8	Going to collect this stalked tube worm (carnivorous polychaete) that we saw on previous dives.	382
12/7/2017	2:20:10	-15.11704	-173.78661	2863.5	1.1	137.6	The pencil-tube worms (polychaetes) are sparse here but there are a couple on this pillow.	383

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S095 W Mata Logger Comments	Record #
12/7/2017	2:21:37	-15.11704	-173.78661	2863.5	1.1	137.8	**S95-bio-18.** Pencil tube worm (carnivorous polychaete) attached to top of large pillow. Great grab. Got it all. It's about 10 cm long and skinny.	384
12/7/2017	2:24:16	-15.11704	-173.78664	2861.7	2.7	130.6	Very skinny - toothpick thickness? Z=2864. Into biobox 2. 15.117066 173.786620.	385
12/7/2017	2:25:20	-15.11706	-173.78653	2856.0	2.1	109.0	Coming to the summit of this hill.	386
12/7/2017	2:26:25	-15.11716	-173.78541	2853.1	2.8	110.8	This one looks a little bit older than the other. These 2 flows could be only a few years apart.	387
12/7/2017	2:26:40	-15.11717	-173.78541	2852.5	3.6	155.5	What is that? A tunicate?	388
12/7/2017	2:27:20	-15.11713	-173.78571	2852.3	2.1	100.5	Pastier looking lavas. More upstanding than the other flow.	389
12/7/2017	2:28:28	-15.11707	-173.78586	2853.2	1.3	61.4	Could have been a sea pen with limpets on its base. Are they eggs? Is it a tunicate?	390
12/7/2017	2:30:00	-15.11715	-173.78643	2853.7	0.0	59.4	That's a bizarre looking thing. Undulates like a worm with polyps? Not sure about it? Going to suction this guy.	391
12/7/2017	2:31:37	-15.11715	-173.78642	2853.7	0.0	59.4	**S95-bio-19**. Canister 1: Unidentified tunicate? Or sea pen? Red interior with something that resembles polyps on the outside. Bluish overall color.	392
12/7/2017	2:33:11	-15.11715	-173.78582	2853.7	0.0	59.4	Could be 15 cm long. Z=2854 This thing has white eggs(?) at the base.	393
12/7/2017	2:34:25	-15.11721	-173.78533	2853.7	0.0	59.6	Going into jar 2 instead. Well connected to the rock. Got it. 15.1171764 173.786405. Z=2854 m.	394
12/7/2017	2:34:32	-15.11721	-173.78529	2853.7	0.6	59.6	Onward.	395
12/7/2017	2:36:58	-15.11705	-173.78531	2853.7	4.1	56.1	Pillow-talus contact	396
12/7/2017	2:43:49	-15.11651	-173.78467	2806.1	6.9	121.3	Moving upslope and have encountered the flow-talus contact again	397
12/7/2017	2:44:56	-15.11653	-173.78459	2804.6	10.2	108.7	Found another dangler	398
12/7/2017	2:51:38	-15.11646	-173.78550	2807.0	7.1	112.3	Another dangler. Phyric telescoping pillow lava	399
12/7/2017	2:52:10	-15.11650	-173.78462	2804.0	8.6	110.7	**S95-rock-20** location 15.1167031 173.7846586 depth 2804m	400
12/7/2017	2:54:38	-15.11651	-173.78473	2794.1	1.8	63.4	Back into the talus	401
12/7/2017	2:57:40	-15.11630	-173.78453	2779.6	2.6	77.5	Smaller talus and volcanic sediment pile - looks like a small landslide deposit among the overall larger talus pile	402
12/7/2017	2:59:36	-15.11611	-173.78487	2765.5	3.6	47.6	Not seeing much evidence for life here - only one anemone	403

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S095 W Mata Logger Comments	Record #
12/7/2017	3:01:02	-15.11599	-173.78474	2750.8	3.3	52.0	Rather rapidly transiting up the talus slope	404
12/7/2017	3:03:52	-15.11579	-173.78483	2727.3	0.0	62.5	Intact pillows with truncated faces	405
12/7/2017	3:06:19	-15.11578	-173.78431	2709.9	0.0	60.7	Truncated pillow wall is nearly vertical	406
12/7/2017	3:07:04	-15.11574	-173.78391	2705.4	0.0	62.4	Top of cliff face. Little sediment on pillows	407
12/7/2017	3:07:30	-15.11575	-173.78416	2704.7	0.0	63.2	Found another of the wormlike-animals that we sampled downslope	408
12/7/2017	3:09:28	-15.11580	-173.78381	2704.9	1.1	64.1	Taking a sample at the top of the cliff	409
12/7/2017	3:11:47	-15.11576	-173.78417	2704.9	0.0	63.5	Chunk of fresh pillow rind 3x5cm	410
12/7/2017	3:13:40	-15.11561	-173.78472	2702.7	1.3	64.6	**S95-rock-21** location 15.1157597 173.7838459 depth 2704m	411
12/7/2017	3:16:09	-15.11566	-173.78397	2696.9	1.0	90.5	Moving along what looks like a knife ridge. The rocks here are extremely fresh. Looks like drained shelly pillows - lots of collapsed shells	412
12/7/2017	3:18:09	-15.11567	-173.78398	2691.5	0.0	89.4	Traversing side of knife ridge. It's comprised entirely of stacked pillows with truncated faces.	413
12/7/2017	3:20:46	-15.11556	-173.78385	2688.8	13.3	127.4	Large pillow with an entire side "peeled off" and partially drained cavity inside.	414
12/7/2017	3:21:53	-15.11549	-173.78336	2692.4	0.0	80.2	Squat lobster.	415
12/7/2017	3:23:11	-15.11540	-173.78386	2699.5	3.2	101.3	Crossed back over the knife ridge and traversing a relatively flat area of pillows into downslope topo.	416
12/7/2017	3:23:42	-15.11537	-173.78361	2704.0	1.4	111.6	More sediment on pillows in the downslope section	417
12/7/2017	3:24:53	-15.11530	-173.78317	2709.4	3.1	85.9	Some of the pillows here are truncated. It's an unusual morphology for a relatively gently-sloping area	418
12/7/2017	3:25:41	-15.11515	-173.78280	2712.5	1.9	81.1	Uneven terrain	419
12/7/2017	3:27:06	-15.11511	-173.78246	2723.9	3.9	106.2	Slope gradient increasing. Flows mostly intact here	420
12/7/2017	3:29:51	-15.11514	-173.78248	2733.4	5.4	87.4	Talus	421
12/7/2017	3:30:40	-15.11515	-173.78260	2730.5	3.8	95.5	Talus pile displays a fairly steep slope. Traversing upslope and crossing into intact pillow lavas	422
12/7/2017	3:31:09	-15.11513	-173.78187	2726.7	6.7	95.4	Pillows transitioned to flows with truncated faces	423
12/7/2017	3:33:30	-15.11514	-173.78194	2708.4	0.0	102.2	Continuing ascent. Slope is nearing vertical	424
12/7/2017	3:34:05	-15.11515	-173.78209	2703.2	22.0	104.4	Top of pile. Picking sample site	425
12/7/2017	3:41:41	-15.11521	-173.78164	2701.9	0.0	117.8	Ingrown pillow toe inside partly drained pillow. Phyric and two 5x5 chunks. Third piece ~5x10cm	426
12/7/2017	3:42:07	-15.11522	-173.78195	2701.9	0.0	117.5	Russ	427

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S095 W Mata Logger Comments	Record #
12/7/2017	3:42:45	-15.11520	-173.78220	2698.7	0.0	119.3	**S95-rock-22** location 15.1152122 173.7620305 depth 2702m	428
12/7/2017	3:42:54	-15.11519	-173.78260	2696.8	0.0	118.8	Off bottom. End of dive.	429

S096 Mata Fa

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S096 Mata Fa Logger Comments	Record #
12/7/2017	18:50:41	-14.99216	-173.81460	2603.2	9.1	120.8	Vehicle at Seabed	26
12/7/2017	18:51:12	-14.99220	-173.81459	2603.5	5.6	134.2	Bottom in site. Z=2606-ish.	27
12/7/2017	18:52:02	-14.99225	-173.81459	2601.1	4.6	141.0	Scree slope. Fragmental lava.	28
12/7/2017	18:52:11	-14.99225	-173.81458	2600.7	4.2	141.1	In place blocky lavas ahead.	29
12/7/2017	18:52:41	-14.99226	-173.81454	2598.1	5.2	150.5	Whip coral on debris fragment.	30
12/7/2017	18:52:49	-14.99227	-173.81453	2597.7	4.0	150.7	Z=2598 m.	31
12/7/2017	18:53:32	-14.99225	-173.81443	2594.6	6.0	153.5	The nav is looking good. Halleluiah!!	32
12/7/2017	18:53:42	-14.99223	-173.81439	2594.2	6.2	153.2	We're just down slope of the ridge on the north side.	33
12/7/2017	18:53:51	-14.99222	-173.81436	2593.4	5.9	154.9	A couple of stalked corals there.	34
12/7/2017	18:53:57	-14.99221	-173.81433	2593.1	6.9	152.3	Mostly scree slope.	35
12/7/2017	18:54:37	-14.99224	-173.81426	2589.7	6.3	150.6	We want to head up slope to see if there is anything in place up there.	36
12/7/2017	18:54:54	-14.99226	-173.81421	2588.6	3.8	150.5	Seeing some blocky lavas that are in place.	37
12/7/2017	18:55:11	-14.99227	-173.81421	2586.8	5.4	150.2	Broken pillows and some lobates.	38
12/7/2017	18:55:26	-14.99228	-173.81420	2585.4	7.8	150.2	Going in for our first sample. Ken doesn't waste time.	39
12/7/2017	18:55:32	-14.99228	-173.81420	2585.1	5.3	150.5	Steep knife-edge ridge.	40
12/7/2017	18:55:38	-14.99228	-173.81420	2584.9	5.2	150.3	Massive lavas.	41
12/7/2017	18:55:49	-14.99229	-173.81420	2585.0	5.0	148.9	Sheared off rock.	42
12/7/2017	18:56:12	-14.99229	-173.81420	2585.1	4.4	148.6	Looks like broken off pillow lavas stacked up in a blocky fashion.	43
12/7/2017	18:56:35	-14.99229	-173.81418	2585.0	5.7	149.0	This looks like old lava.	44
12/7/2017	18:57:44	-14.99229	-173.81421	2585.1	5.2	148.3	We're going to start by pulling the nav off our screen. Right now it doesn't seem to be bouncing around much.	45

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S096 Mata Fa Logger Comments	Record #
12/7/2017	18:58:56	-14.99228	-173.81420	2585.1	4.8	141.6	Steep slope with piled up pillows. They look like they are not very young. Chunk of pillow here on the lower edge of this unit.	46
12/7/2017	19:00:44	-14.99227	-173.81421	2585.2	4.5	142.3	Z=2585m. Sediment cover on outer edge. Large 15 cm pillow fragment. Glass crust? Sediment and manganese coating.	47
12/7/2017	19:03:51	-14.99227	-173.81421	2584.1	5.4	142.5	**S96-rock-01**. Vesicles. Looks like there are crystals in there? Bio scuzz? Looks more like 20 cm. Wedge-shaped. 14.9922924 173.18142087. 30 m east of WP1.	48
12/7/2017	19:04:58	-14.99231	-173.81418	2581.2	0.0	142.4	Just north of the rift zone.	50
12/7/2017	19:05:01	-14.99231	-173.81418	2581.2	0.0	142.4	Oh my.	51
12/7/2017	19:05:12	-14.99232	-173.81417	2580.5	0.0	142.5	Moving to the top of the ridge now.	52
12/7/2017	19:05:16	-14.99232	-173.81416	2580.1	0.0	142.5	More in place lavas.	53
12/7/2017	19:05:50	-14.99231	-173.81414	2578.8	0.0	141.9	Large chrysogorgia stalked coral. Pink polyps.	55
12/7/2017	19:05:50	-14.99231	-173.81414	2578.8	0.0	141.9	Large chrysogorgia stalked coral. Pink polyps.	54
12/7/2017	19:06:10	-14.99231	-173.81413	2577.1	3.1	141.2	Base of larger pillows with debris on top of it.	56
12/7/2017	19:06:26	-14.99232	-173.81413	2575.8	3.9	142.5	Broken pillows and angular fragments.	57
12/7/2017	19:06:33	-14.99232	-173.81412	2575.3	0.0	142.4	Glassy rind on the pillow.	58
12/7/2017	19:06:42	-14.99232	-173.81412	2575.1	0.0	142.4	Upper rough texture on the pillows.	59
12/7/2017	19:07:06	-14.99234	-173.81412	2573.3	4.2	142.4	These rocks are relatively old. Older than anything we've seen yet at the Matas.	60
12/7/2017	19:07:17	-14.99235	-173.81410	2572.5	0.0	142.3	Several thousand years old? A thousand?	61
12/7/2017	19:07:26	-14.99236	-173.81410	2572.0	0.0	142.0	All broken up and has lost its sheen.	62
12/7/2017	19:07:38	-14.99237	-173.81410	2571.4	3.0	141.9	Massive pillows on the slope that are pretty broken up.	63
12/7/2017	19:08:44	-14.99242	-173.81406	2567.9	3.0	142.3	Large angular cracked lavas - in place - surrounded by scree debris - various sizes.	64
12/7/2017	19:08:57	-14.99243	-173.81406	2567.4	4.6	142.0	Continuing up this steep ridge.	65
12/7/2017	19:09:27	-14.99244	-173.81405	2566.4	2.0	141.9	Still moving to the SE to hit the ridge crest. Not there yet.	66
12/7/2017	19:09:45	-14.99245	-173.81405	2565.1	2.5	142.4	Broken up massive fragments - some a couple meters across.	67
12/7/2017	19:09:45	-14.99245	-173.81405	2565.1	2.5	142.4	Broken up massive fragments - some a couple meters across.	68

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S096 Mata Fa Logger Comments	Record #
12/7/2017	19:11:10	-14.99250	-173.81400	2560.0	2.4	142.6	More bulbous pillows ahead. Very broken up but mostly in place.	69
12/7/2017	19:11:37	-14.99252	-173.81399	2558.6	2.8	142.5	Glass sponge? On its side? Not positive about that. Could be a holothurian.	70
12/7/2017	19:11:49	-14.99252	-173.81398	2558.0	3.2	154.9	Seeing corals here and there on the rocks.	71
12/7/2017	19:12:15	-14.99255	-173.81398	2556.3	3.5	164.1	We may be cresting the summit of the knife-edge ridge here.	72
12/7/2017	19:12:28	-14.99256	-173.81398	2555.3	0.0	164.2	Pillow lavas heavily fractured.	73
12/7/2017	19:12:46	-14.99258	-173.81398	2554.2	3.7	164.1	We're up on the top of the ridge. We're looking to the south to the other side of the ridge.	74
12/7/2017	19:12:53	-14.99259	-173.81398	2554.0	4.4	161.3	More sediments here.	75
12/7/2017	19:13:05	-14.99260	-173.81399	2553.4	2.5	120.7	Seeing lots of in place lavas up here.	76
12/7/2017	19:13:17	-14.99261	-173.81399	2553.4	2.3	120.4	Massive lavas on the edge of the ridge.	77
12/7/2017	19:13:45	-14.99261	-173.81396	2553.1	2.1	143.4	Sandy swale up here at the summit.	78
12/7/2017	19:14:09	-14.99262	-173.81395	2553.5	1.4	169.4	This is a local high point. Seeing some rippled sands here. Going to sample that.	79
12/7/2017	19:14:47	-14.99262	-173.81396	2554.5	0.0	171.9	We don't know enough about the composition of Mata Fa to know the distinct signature here. We only have a couple rocks from this site.	80
12/7/2017	19:17:17	-14.99264	-173.81398	2554.5	0.0	171.8	**S96-rock-02**. Broken-up massive pillow. Cracked and altered on its exterior surface. Looks like it shattered in place. Z=2555m	81
12/7/2017	19:19:59	-14.99268	-173.81400	2554.5	0.5	175.3	Too much manganese coating to see what's inside. We want both glass and the pillow. 14.9926204 173.8139606.	82
12/7/2017	19:27:05	-14.99267	-173.81398	2554.5	0.6	176.3	Volcanic glass (crumbly) from exterior. A few fragments of exterior. 4 cm in length - likely in several pieces. Navigator fix: 14.99265 173.81397.	83
12/7/2017	19:33:22	-14.99264	-173.81396	2554.5	0.0	194.3	Going for more - hoping for interior of this old pillow as well. 5 cm with glassy surface and a bit of interior with it. Some occasional green crystals and glassy exterior surface. Has the "look" of a boninite.	84
12/7/2017	19:34:19	-14.99263	-173.81396	2554.5	0.0	194.4	The rocks dredged here have a little too much titanium to be officially classified as boninites. A little less prior melting?	85
12/7/2017	19:34:42	-14.99264	-173.81396	2554.5	0.0	194.5	Excellent grab into biobox 1.	86

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S096 Mata Fa Logger Comments	Record #
12/7/2017	19:35:47	-14.99271	-173.81399	2553.5	2.4	71.8	NOTE ABOUT NAVIGATION: THE NAV TODAY IS GOOD. LAST NIGHT IT WAS DECIDED THAT ONE OF THE PORT TRASDUCERS ON THE SHIP MAY BE FAILING. KEEPING THE ROV TO THE STBD SIDE OF THE SHIP IS GIVING US BETTER NAV TODAY.	87
12/7/2017	19:36:35	-14.99271	-173.81393	2554.1	0.7	2.9	Next we will take a sediment scoop. We don't have any core's on the vessel today.	88
12/7/2017	19:36:58	-14.99270	-173.81393	2554.2	0.4	1.4	Ripples in the coarser sands. Z=2584m.	89
12/7/2017	19:37:29	-14.99269	-173.81392	2554.2	0.4	1.6	This ridge appears rather old. If there is any active volcanism on Mata Fa it's not here - it's elsewhere.	90
12/7/2017	19:39:52	-14.99263	-173.81389	2554.2	0.0	1.6	Scoop bag #3 unfurled.	91
12/7/2017	19:41:23	-14.99265	-173.81390	2554.2	0.0	2.0	**S96-sed-03**. Sediment scoop with bag #3. Area of coarse black shiny seds and lighter pelagic(?) seds in rippled area (the ripples are not very high).	92
12/7/2017	19:45:11	-14.99266	-173.81393	2554.2	0.0	2.0	Black volcanic sands - small ripples - with some lighter seds at surface. Right next of previously sampled rock. Z=2554.. 14.99265 173.81397.	93
12/7/2017	19:46:17	-14.99267	-173.81392	2554.2	0.0	1.8	That scoop bag looks full. Storing bag #3.	94
12/7/2017	19:46:59	-14.99267	-173.81392	2554.2	0.0	2.0	Only have 1 dredge here - calling it boninite lite (more titanium than boninite).	95
12/7/2017	19:49:02	-14.99266	-173.81392	2554.2	0.0	2.0	The chubby scoop bag is having a hard time getting stuffed back into the space between the biobox and the next storage box.	96
12/7/2017	19:53:01	-14.99266	-173.81389	2552.7	1.6	61.5	CORRECTION ABOUT NAV. THERE IS ONE PARTICULAR ELEMENT ON THE TRANCEIVER HEAD THAT MAY BE FAILING.	97
12/7/2017	19:53:29	-14.99266	-173.81386	2551.7	1.7	61.3	Moving over rippled volcanic sand. Some in place pillow-like lavas.	98
12/7/2017	19:53:34	-14.99266	-173.81385	2551.7	1.7	61.7	Not a lot of animals here.	99
12/7/2017	19:54:36	-14.99265	-173.81377	2551.4	1.0	60.4	Continuing up the WRZ slope.	100
12/7/2017	19:54:51	-14.99264	-173.81376	2551.4	1.0	60.6	Angular debris now as the slope increases.	101
12/7/2017	19:55:08	-14.99263	-173.81374	2551.2	1.2	60.9	Large broken pillow fragments as well as smaller fragments.	102
12/7/2017	19:55:35	-14.99261	-173.81372	2551.0	1.2	60.4	Lots of these pillows have striated exteriors.	103
12/7/2017	19:56:00	-14.99259	-173.81368	2550.9	1.3	60.4	Pillow fragments covering the slope.	104
12/7/2017	19:56:37	-14.99257	-173.81364	2550.4	1.9	60.7	Pillow debris pieces are not as large as we continue up slope.	105

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S096 Mata Fa Logger Comments	Record #
12/7/2017	19:56:43	-14.99257	-173.81363	2550.3	2.0	60.5	Anemone.	106
12/7/2017	19:56:56	-14.99256	-173.81361	2550.1	2.2	60.9	Craggy ragged pile of rock.	107
12/7/2017	19:57:09	-14.99255	-173.81360	2549.9	2.3	61.1	As the slope decreases we are seeing more sands.	108
12/7/2017	19:57:34	-14.99253	-173.81357	2550.5	1.9	61.7	At the top of an elongated steep-sided WRZ summit area.	109
12/7/2017	19:58:18	-14.99250	-173.81351	2549.5	2.4	72.0	Seeing some orange in the sediments here. Some iron oxide staining here. Flocculant in the sand. That's curious. Maybe there's something to be seen at this volcano?	110
12/7/2017	20:00:49	-14.99251	-173.81329	2549.8	3.2	80.2	We are only about 130 m up the line to the NE of WP 1.	111
12/7/2017	20:01:02	-14.99251	-173.81327	2549.8	3.3	79.2	Fragmented pillows here that dip under the sediment.	112
12/7/2017	20:01:12	-14.99250	-173.81326	2550.1	3.0	79.9	Lots of angular fragments.	113
12/7/2017	20:01:28	-14.99249	-173.81324	2550.3	3.1	80.0	The pillows on the left are mostly in place. Cracked and old - but in place.	114
12/7/2017	20:01:45	-14.99249	-173.81321	2550.1	3.6	79.9	Slabby-er vehicles under the pillows. Mostly in place.	115
12/7/2017	20:01:59	-14.99248	-173.81319	2550.2	3.3	79.7	Smaller pillow fragments scattered over the slope.	116
12/7/2017	20:03:30	-14.99248	-173.81316	2552.4	1.0	67.3	Large in place pillows here. Cracked but still have glassy exterior surface.	117
12/7/2017	20:03:49	-14.99248	-173.81316	2552.5	1.0	67.1	This is a flat-ish old pillow.	118
12/7/2017	20:05:32	-14.99248	-173.81318	2552.5	0.8	65.5	**S96-rock-04**. Elongate flattened pillow. Grabbing a sheet-ish looking piece from the surface. Fragile outer surface. The rock itself is quite coherent.	119
12/7/2017	20:07:25	-14.99248	-173.81317	2552.5	0.9	66.4	Glassy with crystals. Small piece. 4-5 cm Arcuate shape. Glassy surface. Some minor crystal content.	120
12/7/2017	20:08:53	-14.99247	-173.81315	2552.5	0.9	65.9	Fairly vesicular - small bubbles. 2-fer. Nice pieces. Manganese oxide surface. Blacker piece on top from fresh exterior.	121
12/7/2017	20:09:53	-14.99247	-173.81315	2552.5	1.0	64.7	10 cm irregularly shaped with curved exterior surface. Smaller rock with fresher surface - angular. 3 rocks in this sample.	122
12/7/2017	20:11:50	-14.99249	-173.81309	2550.7	2.0	67.2	Z=2553 m. Navigator fix. 14.99247 173.813145.	123
12/7/2017	20:12:06	-14.99249	-173.81308	2551.3	1.1	67.0	Glass sponge. Beautiful.	124

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S096 Mata Fa Logger Comments	Record #
12/7/2017	20:12:58	-14.99247	-173.81302	2550.5	2.5	66.9	Rock fragments on this steep slope. Going into transit mode (I hope).	125
12/7/2017	20:13:16	-14.99246	-173.81299	2550.9	2.3	70.1	Broken up pillow fragments. A bit of sand off to the left.	126
12/7/2017	20:13:29	-14.99245	-173.81297	2551.3	2.0	73.7	Moving along the elongated ridge.	127
12/7/2017	20:13:55	-14.99244	-173.81292	2551.7	2.1	74.3	These lavas look old.	128
12/7/2017	20:14:30	-14.99243	-173.81285	2551.5	3.4	74.4	The sandy swale to the left of the screen is most likely covering intact lavas. - of course - it has to be covering something.....	129
12/7/2017	20:14:44	-14.99243	-173.81282	2551.7	3.6	74.2	Continuing up this WRZ.	130
12/7/2017	20:15:07	-14.99243	-173.81276	2553.7	2.8	74.3	Steep ridge.	131
12/7/2017	20:15:25	-14.99243	-173.81273	2555.1	2.5	74.3	We are on the main rift zone here - but it's still not all that flat.	132
12/7/2017	20:15:39	-14.99244	-173.81269	2555.6	3.0	74.0	The video looks way too blue today.	133
12/7/2017	20:15:51	-14.99244	-173.81267	2555.8	3.5	74.3	Rocky fragments with some sediment throughout.	134
12/7/2017	20:16:16	-14.99243	-173.81263	2557.2	3.2	73.6	Transition back and forth from areas dominated by sand with rocky fragments.	135
12/7/2017	20:16:31	-14.99243	-173.81260	2557.3	3.4	73.4	More sand here. Stalked animals on rocky debris.	136
12/7/2017	20:24:31	-14.99227	-173.81197	2557.6	4.0	61.1	Had a small computer malfunction - involving coffee - back at it now.	138
12/7/2017	20:25:06	-14.99226	-173.81194	2556.6	3.5	61.6	Missed 8 minutes of riveting commentary as we travel up the WRZ of Mata Fitu.	139
12/7/2017	20:27:13	-14.99225	-173.81181	2552.3	3.8	61.4	Heading up the WRZ. This is probably the longest of the North Matas - not the tallest.	140
12/7/2017	20:27:56	-14.99221	-173.81173	2549.4	3.8	79.7	Steep drop off to the north. On the rift zone. Very steep rift zone.	141
12/7/2017	20:28:15	-14.99221	-173.81170	2549.5	3.1	80.7	Drops off quickly to the north and south.	142
12/7/2017	20:28:30	-14.99222	-173.81168	2549.1	3.7	80.7	Large broken up lavas here. Sea cucumber.	143
12/7/2017	20:28:47	-14.99222	-173.81166	2549.2	2.9	79.6	Most all of the rock here is broken pillow fragments.	144
12/7/2017	20:28:51	-14.99222	-173.81165	2550.0	2.3	80.3	Urchin here.	145
12/7/2017	20:29:01	-14.99222	-173.81165	2549.9	2.3	79.7	The third on this traverse.	146
12/7/2017	20:29:20	-14.99221	-173.81162	2549.5	2.5	80.8	Still has its exterior glass on it.	147
12/7/2017	20:29:40	-14.99222	-173.81160	2549.3	2.6	80.7	Coming off a spine of in place rock.	148
12/7/2017	20:29:50	-14.99222	-173.81160	2549.6	2.5	80.6	Single in place pillow lava on the slope across the way.	149

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S096 Mata Fa Logger Comments	Record #
12/7/2017	20:30:11	-14.99219	-173.81157	2549.7	3.7	79.7	Looking at more of a talus slope ahead as the slope increases.	150
12/7/2017	20:30:28	-14.99219	-173.81153	2550.4	3.8	80.3	More broken up rocks and sediments.	151
12/7/2017	20:31:44	-14.99220	-173.81145	2552.5	2.2	80.6	Slope has small angular fragments.	152
12/7/2017	20:31:50	-14.99220	-173.81144	2552.3	2.5	80.9	Anemone on the edge.	153
12/7/2017	20:32:47	-14.99220	-173.81136	2552.2	2.9	81.1	Still moving over fragmented pillow lavas with some sediment cover; craggy rocks.	154
12/7/2017	20:34:48	-14.99222	-173.81123	2553.5	1.3	80.3	Transiting over region with much larger pillow fragments now.	155
12/7/2017	20:35:04	-14.99222	-173.81121	2553.4	1.6	85.4	Another anemone.	156
12/7/2017	20:36:15	-14.99224	-173.81113	2552.7	1.2	92.2	Stalked coral in pillow fragment.	157
12/7/2017	20:37:12	-14.99224	-173.81109	2553.7	1.0	92.3	Rocks have Fe-Mn coating meaning that they are oldish; brittle star with big brown center	158
12/7/2017	20:37:58	-14.99224	-173.81107	2553.2	1.4	92.2	We are ridge-running like in Kentucky ...	159
12/7/2017	20:38:49	-14.99225	-173.81103	2552.2	1.2	91.8	Moving up steep sided ridgeline with cracked pillows.	160
12/7/2017	20:39:22	-14.99226	-173.81101	2551.7	0.0	92.1	North side of the ridge is steeper than the southside.	161
12/7/2017	20:40:56	-14.99228	-173.81091	2553.3	1.1	92.6	We are now ~250m to the west of waypoint 2.	162
12/7/2017	20:42:17	-14.99228	-173.81083	2553.4	0.9	92.3	Deas as sponge.	163
12/7/2017	20:44:06	-14.99224	-173.81073	2552.5	3.0	92.7	Fish of some type of eel hanging out.	164
12/7/2017	20:44:26	-14.99223	-173.81071	2552.9	3.5	92.2	Two large glass sponges.	165
12/7/2017	20:45:12	-14.99226	-173.81067	2553.5	1.5	92.6	Back into terrain with much smaller pillow fragments and some sandy patches.	166
12/7/2017	20:45:42	-14.99227	-173.81066	2554.0	1.2	91.8	Red deep sea shrimp with long legs.	167
12/7/2017	20:47:23	-14.99227	-173.81043	2552.6	1.8	88.9	Moving along a sandy ridge line with fragments of pillow lava lying scattered.	168
12/7/2017	20:47:42	-14.99227	-173.81040	2552.5	1.9	89.1	Nice large anemone..	169
12/7/2017	20:48:46	-14.99228	-173.81028	2552.2	1.3	81.4	Continuing along the sandy extremely narrow ridge with small rocky fragments.	170
12/7/2017	20:49:08	-14.99227	-173.81026	2551.9	1.9	80.9	Looks like the ridge is starting to broaden out to the north now. We're at the top of the hill.	171
12/7/2017	20:49:21	-14.99225	-173.81023	2551.6	2.1	80.6	Brittle stars here and there across the sandy bottom.	172
12/7/2017	20:49:27	-14.99225	-173.81022	2551.5	2.2	80.5	Actually quite a few of them.	173

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S096 Mata Fa Logger Comments	Record #
12/7/2017	20:49:59	-14.99220	-173.81016	2551.5	1.6	80.8	Zooming in on some darker sediments now - scattered on the ridge crests.	174
12/7/2017	20:50:28	-14.99217	-173.81011	2551.4	1.3	81.8	Transitioning onto this platform of much more sand.	175
12/7/2017	20:51:05	-14.99216	-173.81004	2549.6	1.8	80.8	We had been following a knife-edge ridge that was especially steep to the north. Now we're on a broad sandy platform.	176
12/7/2017	20:52:35	-14.99213	-173.80999	2550.2	0.5	82.1	Zooming in on brittle star on the sandy seafloor here.	177
12/7/2017	20:53:20	-14.99213	-173.80998	2550.0	0.6	83.3	Probably an ophiomusium brittle star - says Walter.	178
12/7/2017	20:54:02	-14.99213	-173.80994	2548.3	1.2	81.6	Continuing up slope here. We are pondering a sediment sample. We need to head up slope.	179
12/7/2017	20:54:59	-14.99212	-173.80988	2546.8	1.0	81.7	Increasing small rock fragments here - but still mainly sandy substrate here.	180
12/7/2017	20:55:38	-14.99212	-173.80983	2545.7	1.0	81.5	More brittle stars.	181
12/7/2017	20:55:50	-14.99211	-173.80981	2545.0	1.4	81.4	Whip coral.	182
12/7/2017	20:56:15	-14.99211	-173.80979	2544.7	1.1	81.5	More stuff living on this sandy summit platform - not tons of life but more than we have seen so far.	183
12/7/2017	20:56:55	-14.99209	-173.80976	2544.0	1.5	81.6	Broken rock fragments to the right. Broad sandy swale.	184
12/7/2017	20:57:24	-14.99208	-173.80972	2543.5	1.2	81.4	We're exploring today.	185
12/7/2017	20:58:26	-14.99206	-173.80966	2542.7	1.0	81.7	These brittle stars like a sandy bottom.	186
12/7/2017	20:58:36	-14.99206	-173.80965	2542.0	1.5	80.7	Fish in the distance. Pretty big one.	187
12/7/2017	20:59:01	-14.99204	-173.80963	2542.0	1.1	81.7	Possibly a lizard fish (?) sitting on the bottom.	188
12/7/2017	20:59:36	-14.99202	-173.80959	2541.5	0.8	81.2	Pretty big fish. Weird gold eye. Again - Walter thinks it is a lizard fish.	189
12/7/2017	20:59:47	-14.99202	-173.80958	2541.2	0.9	82.0	Large rock - probably in place.	190
12/7/2017	21:04:29	-14.99198	-173.80923	2529.8	1.1	82.5	Coming into a broader sand swale . . . trying to get through here as quickly as possible but have to wait for the ship	191
12/7/2017	21:05:40	-14.99201	-173.80909	2523.7	2.1	82.1	Diverted slightly starboard to look at a rockier field where things are more interesting	192
12/7/2017	21:07:00	-14.99203	-173.80895	2518.4	1.2	82.3	Still looks like float rock	193
12/7/2017	21:09:23	-14.99202	-173.80883	2512.9	2.0	82.7	Found a coconut shell	194
12/7/2017	21:09:32	-14.99202	-173.80881	2512.5	2.0	82.1	Looking for some in-place rock to sample	195
12/7/2017	21:12:52	-14.99174	-173.80813	2491.1	4.6	67.3	Whale and dolphin impressions	196

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S096 Mata Fa Logger Comments	Record #
12/7/2017	21:15:01	-14.99131	-173.80792	2480.7	4.2	58.4	Found some in-place rock!	197
12/7/2017	21:15:19	-14.99129	-173.80791	2479.1	4.9	58.3	In place pillows with truncated faces. Sea urchin count: 1	198
12/7/2017	21:22:04	-14.99127	-173.80790	2482.1	0.9	34.6	**S96-rock-05**. Pillow lava from in-place outcrop among the infinite sediments. 10x7. Fe oxide stain on one face and Mn on another. Vesicular and phyric with slightly more xtals in glass rind	199
12/7/2017	21:22:58	-14.99127	-173.80791	2481.9	1.2	34.7	S96-rock-05 location 14.9912696 173.8079021 depth 2482m	200
12/7/2017	21:25:54	-14.99115	-173.80786	2471.1	1.4	38.1	Back into some sediments except with some in place outcrops	201
12/7/2017	21:30:08	-14.99103	-173.80764	2460.1	1.3	47.0	Seeing a few sea cucumbers here and there - light purple and translucent	202
12/7/2017	21:32:34	-14.99089	-173.80751	2452.8	1.2	46.6	Moving slightly upslope and seeing a lot of rock debris. Possibly moving into another area with in-place rock	203
12/7/2017	21:35:37	-14.99070	-173.80739	2444.0	1.3	46.9	Sand with occasional rock fragments.	204
12/7/2017	21:36:18	-14.99066	-173.80734	2441.1	1.1	46.8	Moving upslope with a few scattered rocks	205
12/7/2017	21:36:46	-14.99063	-173.80732	2439.0	1.3	46.5	Talus	206
12/7/2017	21:38:10	-14.99054	-173.80723	2433.1	1.7	54.6	Scattered. larger rocks	207
12/7/2017	21:38:40	-14.99051	-173.80720	2430.9	1.4	55.0	Looks like outcrop ahead!	208
12/7/2017	21:38:59	-14.99052	-173.80718	2429.8	2.0	52.3	Fractured. bulbous pillows.	209
12/7/2017	21:39:32	-14.99051	-173.80716	2430.1	1.2	54.5	In place flattened pillow lobes.	210
12/7/2017	21:39:59	-14.99051	-173.80716	2430.3	0.9	53.4	Surface of rocks have light sediment cover.	211
12/7/2017	21:40:13	-14.99051	-173.80716	2430.3	0.7	53.3	Sparse to no bio.	212
12/7/2017	21:43:20	-14.99051	-173.80716	2430.0	0.8	53.3	**S96-rock06**. Fractured. bulbous pillows.	213
12/7/2017	21:45:39	-14.99049	-173.80715	2425.7	4.5	69.3	Rind of fractured. broken pillow.	214
12/7/2017	21:47:39	-14.99040	-173.80698	2417.4	2.4	68.9	Sample 6 location: 14.9905336 173.8071575 Z=2430m.	215
12/7/2017	21:48:37	-14.99039	-173.80694	2412.8	3.2	76.5	Navigator fix for sample 6: 14.990609 173.8097142.	219
12/7/2017	21:49:01	-14.99038	-173.80691	2409.7	3.8	72.8	Still continuing up the slope to the NE. Halfway between WP2 and WP3.	220
12/7/2017	21:50:02	-14.99035	-173.80681	2402.7	1.6	64.8	Coming up on some more in place rocks. We're on a small ledge that doesn't show up in the bathymetry.	221

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S096 Mata Fa Logger Comments	Record #
12/7/2017	21:50:11	-14.99034	-173.80678	2401.1	1.9	64.4	The rock debris is getting larger here.	222
12/7/2017	21:50:29	-14.99031	-173.80673	2400.0	1.2	66.2	Sharp drop off to the north of the vehicle.	223
12/7/2017	21:50:35	-14.99030	-173.80672	2400.1	0.8	66.7	Flattening out now.	224
12/7/2017	21:51:25	-14.99023	-173.80658	2400.9	0.6	64.5	We're traveling over "the infinite sediments" again.	225
12/7/2017	21:52:03	-14.99018	-173.80651	2402.7	0.0	64.1	Not seeing any in place rocks. Just the occasional rock debris.	226
12/7/2017	21:52:11	-14.99018	-173.80652	2402.5	0.0	63.2	Brittle star.	227
12/7/2017	21:52:42	-14.99014	-173.80648	2402.1	0.9	67.4	Looks like white bacterial floc rolling along the sandy seds here.	228
12/7/2017	21:53:36	-14.99006	-173.80635	2400.0	0.7	67.9	We're trying to get across the sedimented plain here.	229
12/7/2017	21:53:47	-14.99005	-173.80633	2399.8	0.5	66.8	Switching over to the map view.	230
12/7/2017	21:53:58	-14.99004	-173.80632	2399.5	0.6	67.7	Coming up this slope toward WP 2.	231
12/7/2017	21:54:26	-14.99003	-173.80626	2399.4	0.6	67.8	Correction: We're heading up to waypoint 3.	232
12/7/2017	21:54:43	-14.99001	-173.80622	2398.0	1.5	68.0	Waypoint 3 will be the first summit cone that we visit.	233
12/7/2017	21:55:35	-14.98997	-173.80612	2396.6	1.4	67.3	Geologists are not as interested in the sedimented plains - they want to see the stratigraphy.	234
12/7/2017	21:55:58	-14.98994	-173.80606	2396.0	1.4	67.2	No sedimentary structure here. The occasional rock strewn on this slope.	235
12/7/2017	21:57:10	-14.98987	-173.80596	2393.9	1.6	67.3	Looks like we're coming up to a depression?	236
12/7/2017	21:58:25	-14.98976	-173.80584	2392.5	1.5	66.6	More sedimented plain over that little swale. Some larger ripples here - current induced.	237
12/7/2017	21:59:32	-14.98953	-173.80589	2388.4	1.3	11.6	Little rock fragments.	238
12/7/2017	21:59:47	-14.98949	-173.80589	2387.3	0.7	32.6	Now we're onto bigger rocks. Leaving the sedimented plain behind.	239
12/7/2017	21:59:57	-14.98948	-173.80589	2386.9	0.8	42.9	We're in proper rock fragments now.	240
12/7/2017	22:00:18	-14.98945	-173.80589	2386.3	1.1	47.8	We're close to waypoint 3. Not there yet.	241
12/7/2017	22:00:42	-14.98944	-173.80588	2385.0	2.3	58.7	Narrow ridge here. with rubble.	242
12/7/2017	22:01:05	-14.98942	-173.80584	2385.9	1.7	66.4	More rubble here on this narrow ridge.	243
12/7/2017	22:01:14	-14.98941	-173.80582	2386.3	1.5	64.2	Nice ropey looking on the top of this slope.	244
12/7/2017	22:03:12	-14.98937	-173.80575	2388.1	0.0	69.9	We're up near the top of the ridge near WP3. Transitioned from all sediment to rocky bottom.	245
12/7/2017	22:03:40	-14.98940	-173.80573	2388.3	1.4	113.4	Waiting on the ship so looking around.	246
12/7/2017	22:04:03	-14.98943	-173.80574	2388.6	2.5	96.0	Back into all sediment after driving south a little.	247

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S096 Mata Fa Logger Comments	Record #
12/7/2017	22:04:47	-14.98946	-173.80586	2384.6	4.0	257.3	This is the shallower of the two ridges east of the summit. The dive started on the deeper ridge.	248
12/7/2017	22:06:02	-14.98936	-173.80603	2385.0	3.0	302.5	Back at the ridge crest. Looking at rocky ridges that extend to the NW.	249
12/7/2017	22:06:10	-14.98933	-173.80604	2386.9	2.8	275.3	Not much in place.	250
12/7/2017	22:06:58	-14.98932	-173.80602	2389.6	2.9	168.8	Rocky angular pillow fragments. Some of these outcrops are probably in place.	251
12/7/2017	22:08:50	-14.98941	-173.80590	2386.1	1.3	172.2	So far we've only seen old broken up rocks at Mata Fa.	252
12/7/2017	22:11:42	-14.98920	-173.80567	2390.2	12.0	80.5	Exploring the ridge crest. Sedimented on one side and rock on the other.	253
12/7/2017	22:13:16	-14.98913	-173.80560	2393.5	5.5	101.3	We are about 20 m north of WP3.	254
12/7/2017	22:13:34	-14.98913	-173.80559	2393.4	6.7	121.3	Looking for a place to sample a rock.	255
12/7/2017	22:18:54	-14.98893	-173.80543	2393.6	0.0	104.5	**S96-rock-07**. 20x15cm piece with Mn coating. One fresh face	256
12/7/2017	22:22:26	-14.98908	-173.80490	2396.6	0.5	112.9	Brittle stars and a bat star	257
12/7/2017	22:24:35	-14.98908	-173.80491	2396.2	1.2	117.3	Hymanaster sea star	258
12/7/2017	22:25:52	-14.98912	-173.80474	2396.0	1.5	100.5	Moving off of circular summit into more of a ridge line	259
12/7/2017	22:27:20	-14.98909	-173.80461	2398.2	0.7	93.7	Barnacle and coral growth on some of the float debris. Spider web-like sponges also growing on side of rock	260
12/7/2017	22:28:27	-14.98909	-173.80438	2398.5	0.5	90.0	The sediment swales are populated mostly by brittle stars	261
12/7/2017	22:36:29	-14.98896	-173.80329	2386.5	2.0	142.8	Time to go a-sampling'. Past the saddle point on the approach to Waypoint 4	262
12/7/2017	22:36:49	-14.98895	-173.80325	2387.2	3.8	182.3	Large pillows on the ledge of the ridgeline	263
12/7/2017	22:47:09	-14.98919	-173.80314	2385.2	2.9	62.7	**S96-rock08**. Small 5x5cm vesicular and phyric. Mn-crust and Fe staining but VERY fresh interior. Second 5x5cm that broke in two	264
12/7/2017	22:47:36	-14.98920	-173.80310	2384.3	3.2	102.6	S96-rock-08 location 14.989062 173.803214 depth 2387m	265
12/7/2017	22:47:48	-14.98920	-173.80306	2384.5	3.2	99.5	Resuming transit along ridgeline	266
12/7/2017	22:49:43	-14.98905	-173.80271	2372.1	3.6	86.8	Portside ridgeline populated with a lot of pillows	267
12/7/2017	22:50:44	-14.98904	-173.80243	2366.6	1.4	84.9	sea star	268

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S096 Mata Fa Logger Comments	Record #
12/7/2017	22:52:41	-14.98913	-173.80202	2366.9	0.8	103.8	Traversing along portside slope of ridgeline. Rocky debris and in-place pillows. Seeing some sponges and possibly a black coral	269
12/7/2017	22:52:50	-14.98913	-173.80202	2367.1	1.1	96.8	Confirmed - black coral	270
12/7/2017	22:53:11	-14.98912	-173.80205	2368.1	1.0	87.5	waypoint 4	271
12/7/2017	22:53:57	-14.98910	-173.80202	2365.4	4.9	110.4	Branched coral. sponge. anemone. sea cucumber. stalked coral. coral skeleton with barnacles. Unusually dense little area of life	272
12/7/2017	22:55:43	-14.98941	-173.80184	2366.6	4.2	135.3	Heading change to SE toward waypoint 5. Pebbly sediment and talus along slope. High sediment load in water	273
12/7/2017	22:57:51	-14.98967	-173.80182	2386.6	5.8	266.9	Thick piles of sediment with some unusual highstanding piles of fragmental debris and some underlying pillows	274
12/7/2017	22:57:56	-14.98968	-173.80183	2387.6	5.0	288.1	Slope is getting steeper here	275
12/7/2017	22:59:56	-14.98976	-173.80164	2394.4	5.2	331.7	Talus is pretty poorly sorted on this slope	276
12/7/2017	23:00:20	-14.98978	-173.80159	2396.6	3.7	324.6	Intact jumbly pillows	277
12/7/2017	23:02:00	-14.98990	-173.80151	2400.7	0.8	132.0	Nice stack of small pillows with some potentially sample-worthy toes	278
12/7/2017	23:05:36	-14.98988	-173.80155	2392.2	9.9	124.4	**S96-rock-09**. Pillow toe 2 pieces with orange staining on glass rind. 20x10cm	279
12/7/2017	23:06:34	-14.98990	-173.80144	2391.2	7.4	124.2	S96-rock-09 location 14.9898702 173.801548 depth 2400m	280
12/7/2017	23:08:45	-14.99001	-173.80127	2372.6	14.1	123.1	Stack of beautiful small elongate pillows with little sediment	281
12/7/2017	23:10:30	-14.99014	-173.80116	2358.5	8.1	150.4	Lots of "ornamentation" - small pillow buds coming off of elongate tubes	282
12/7/2017	23:18:20	-14.99020	-173.80116	2329.1	47.6	167.1	S96-rock-10. Pillow ornament from large striated pillow. 10x20 vesicular and nearly aphyric. Peanut-shaped with biota. Orange staining on glass rind	283
12/7/2017	23:19:11	-14.99023	-173.80113	2342.4	0.0	156.3	Navigator fix: 14.990483 173.801099.	284
12/7/2017	23:19:30	-14.99030	-173.80110	2338.4	0.0	149.3	Continuing to the SE to waypoint 5.	285
12/7/2017	23:19:32	-14.99031	-173.80111	2338.3	0.0	149.5	Coral	286
12/7/2017	23:19:59	-14.99037	-173.80108	2332.9	5.5	137.6	Nice in place pillows. Look much younger than what we saw earlier on the dive.	287
12/7/2017	23:20:10	-14.99037	-173.80107	2332.1	8.0	129.6	Some small corals?	288
12/7/2017	23:20:48	-14.99041	-173.80102	2329.5	3.5	146.2	Large coral - probably a bamboo or a chrysogorgia.	289

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S096 Mata Fa Logger Comments	Record #
12/7/2017	23:21:03	-14.99041	-173.80098	2328.2	3.6	142.2	Corals here and there.	290
12/7/2017	23:23:02	-14.99048	-173.80085	2320.2	3.4	111.6	Crinoid on a coral. Coral with a brittle star. Iridogorgia (a crinoid).	291
12/7/2017	23:23:27	-14.99047	-173.80081	2322.2	3.4	84.3	We're at waypoint 5.	292
12/7/2017	23:23:44	-14.99046	-173.80074	2320.6	5.4	136.1	We are going to head to the top of this summit cone.	293
12/7/2017	23:24:08	-14.99052	-173.80069	2316.8	4.2	154.2	Large pillow toe with large pillows at its base.	294
12/7/2017	23:24:24	-14.99059	-173.80069	2315.1	4.8	198.8	Still climbing. Large pillows.	295
12/7/2017	23:24:38	-14.99063	-173.80072	2312.8	5.2	221.3	Pillow tubes - flattened lobes.	296
12/7/2017	23:24:52	-14.99067	-173.80082	2312.7	3.5	232.2	Some lava lobes.	297
12/7/2017	23:25:09	-14.99068	-173.80091	2312.4	2.2	247.6	4 sea urchins.	298
12/7/2017	23:25:21	-14.99067	-173.80096	2313.5	2.4	225.7	Flatter pillows up here at the top of this cone.	299
12/7/2017	23:25:31	-14.99066	-173.80098	2312.8	3.7	222.9	Squat lobster at the top of this cone.	300
12/7/2017	23:25:57	-14.99066	-173.80099	2312.2	3.6	271.4	Lots of "snow".	301
12/7/2017	23:26:17	-14.99064	-173.80100	2316.0	2.6	354.5	Stalked corals.	302
12/7/2017	23:26:24	-14.99062	-173.80099	2316.3	2.2	354.7	Hollow broken pillows.	303
12/7/2017	23:26:44	-14.99055	-173.80098	2317.3	4.1	35.5	Most are small in diameter and tubular.	304
12/7/2017	23:26:53	-14.99052	-173.80097	2317.4	4.6	43.2	Seeing some bulbous pillows here and there.	305
12/7/2017	23:27:46	-14.99047	-173.80087	2321.9	1.1	71.0	Coral with brittle stars.	306
12/7/2017	23:28:35	-14.99048	-173.80086	2322.5	0.0	73.8	Bamboo skeleton with 2 ophioroids (brittle stars).	307
12/7/2017	23:33:03	-14.99039	-173.80089	2320.5	9.0	97.5	**S96-bio-11**. Bamboo skeleton with 2 ophioroids (brittle stars). On young-ish pillow lava rind. Very near WP5. Z=2314m . 14.990467 173.800841.	308
12/7/2017	23:33:45	-14.99037	-173.80089	2327.1	4.8	97.4	We're finished sampling here. Now will head toward waypoint 6.	309
12/7/2017	23:33:54	-14.99036	-173.80088	2327.3	6.8	96.9	Ken and Bill are swapping out.	310
12/7/2017	23:35:03	-14.99038	-173.80078	2325.2	4.6	96.7	Some pretty corals on these in place lavas.	311
12/7/2017	23:36:36	-14.99031	-173.80070	2329.9	11.4	129.0	Darren	312
12/7/2017	23:36:57	-14.99030	-173.80071	2330.9	8.6	176.5	Discussing heading to the south and checking out this little cone due south of us. Originally it was not in the dive plan.	313
12/7/2017	23:37:37	-14.99035	-173.80074	2327.0	5.6	175.9	The next cone to the south is only about 200 m south. Looks like a good target.	314
12/7/2017	23:37:56	-14.99039	-173.80075	2324.2	5.7	176.1	Another large coral just faded from view.	315
12/7/2017	23:37:59	-14.99039	-173.80075	2323.9	5.8	176.1	Bat star.	316

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S096 Mata Fa Logger Comments	Record #
12/7/2017	23:39:00	-14.99055	-173.80077	2315.6	5.0	175.9	Heading south now. In place pillow tubes. Some bulbous pillows.	317
12/7/2017	23:39:32	-14.99067	-173.80078	2313.1	3.7	175.8	Larger flatter pillow tubes here. Some projecting out of broken bulbous pillows.	318
12/7/2017	23:39:58	-14.99079	-173.80078	2318.5	0.0	176.1	We're at the edge of this high now.	319
12/7/2017	23:40:01	-14.99080	-173.80079	2318.8	0.0	176.1	Blue water.	320
12/7/2017	23:41:19	-14.99078	-173.80077	2322.1	10.8	0.7	We're now turned around and facing north. We're looking at the south side of the cone we were just on top of.	321
12/7/2017	23:41:52	-14.99081	-173.80079	2327.0	11.1	359.0	Pillow lobes piled on top of each other on the higher part of this cone.	322
12/7/2017	23:42:05	-14.99083	-173.80080	2329.6	9.6	0.6	Broken decapitated pillows.	323
12/7/2017	23:42:12	-14.99084	-173.80081	2332.2	0.0	0.1	A big pillow peak.	324
12/7/2017	23:42:29	-14.99089	-173.80081	2334.5	7.7	0.8	Seeing a lot of talus at the bottom. Broken; angular pieces of pillows.	325
12/7/2017	23:42:55	-14.99092	-173.80082	2336.7	7.2	1.2	Radially striated pillow pieces.	326
12/7/2017	23:43:45	-14.99100	-173.80085	2339.0	3.7	2.8	Talus slope of big blocky pillow pieces. Nothing in place on this rubbly slope.	327
12/7/2017	23:44:01	-14.99101	-173.80087	2340.3	3.0	1.9	Stalk coral.	328
12/7/2017	23:45:04	-14.99102	-173.80081	2341.0	5.7	175.2	Big pieces of talus on this slope as we climb down - backwards - heading south but looking to the north.	329
12/7/2017	23:46:50	-14.99129	-173.80081	2342.7	0.0	176.6	We've turned back around and are now looking toward the south.	330
12/7/2017	23:47:00	-14.99133	-173.80081	2343.7	4.1	173.2	Still on rubble-strewn slope.	331
12/7/2017	23:48:05	-14.99147	-173.80086	2350.4	2.6	175.6	Still on a rubbly slope - less steep - sort of in the saddle between these 2 summit cones. We're heading to the southernmost of them.	332
12/7/2017	23:48:12	-14.99148	-173.80085	2351.1	2.9	175.7	More corals.	333
12/7/2017	23:48:56	-14.99162	-173.80093	2355.9	2.6	175.4	Not seeing anything in place yet.	334
12/7/2017	23:49:20	-14.99164	-173.80097	2356.8	1.8	174.9	Seeing the occasional coral. Indogorgia just passed to the left.	335
12/7/2017	23:49:55	-14.99169	-173.80099	2358.8	0.8	166.3	Seeing a lot more coral on this rubbly seafloor. These are quite large - indicating that these rocks are fairly old.	336
12/7/2017	23:50:39	-14.99167	-173.80096	2359.0	0.0	167.0	A branching bamboo - Iridogirgia behind it - and another bamboo coral behind that.....	337

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S096 Mata Fa Logger Comments	Record #
12/7/2017	23:51:28	-14.99169	-173.80097	2358.9	0.0	167.0	CORRECTION: Earlier referred to the rather wispy-looking taller coral as an Indogorgia - it's an Iridogorgia.	339
12/7/2017	23:52:07	-14.99167	-173.80098	2358.9	0.0	167.4	Zooming in on this beautiful bamboo coral. Nice healthy-looking polyps.	340
12/7/2017	23:52:36	-14.99167	-173.80096	2359.0	0.7	168.5	Off to the right are seeing smaller creatures (Maybe hydroids according to Walter).	341
12/7/2017	23:53:47	-14.99173	-173.80101	2362.9	3.1	175.3	This is the largest collection of bamboo corals that we've seen in a while. We're seeing some glass sponges as well.	342
12/7/2017	23:54:28	-14.99183	-173.80100	2367.0	4.0	174.2	Too much rubble for Ken.	343
12/7/2017	23:55:35	-14.99196	-173.80100	2373.6	2.4	175.4	We're at the base of the southernmost cone here. Transitioned from rubble to intact flattened pillows.	344
12/7/2017	23:55:46	-14.99197	-173.80099	2373.7	2.6	175.1	Going to grab a sample here.	345
12/7/2017	23:56:15	-14.99197	-173.80100	2374.3	2.4	174.9	Bill wants to grab a pillow toe.	346
12/7/2017	23:57:07	-14.99199	-173.80102	2376.5	0.6	176.8	We're at the base of the farthest south cone on the "summit".	347
12/8/2017	0:01:08	-14.99203	-173.80101	2375.8	1.3	173.6	**S96-rock-12**. N base of cone. Pillow bud (severed the head). Vesicular grayish interior. Lots of gas pockets. Melon sized. At least 20 cm x 20 cm.	348
12/8/2017	0:02:42	-14.99197	-173.80102	2374.0	2.6	176.0	Manganese staining on outer edges. Black glass. Circular. Brown clay. That's probably 40 cm by 20 cm. Beautiful pillow bud.	349
12/8/2017	0:04:01	-14.99213	-173.80100	2371.0	5.0	168.0	Z=2374 Navigator fix: 14.992016 173.800997.	350
12/8/2017	0:04:19	-14.99220	-173.80097	2370.7	4.0	168.3	Continuing up this little southern summit cone.	351
12/8/2017	0:04:36	-14.99225	-173.80095	2369.0	4.1	168.9	Seeing some dead corals. Another glass sponge.	352
12/8/2017	0:05:01	-14.99228	-173.80092	2367.3	3.6	168.8	Pillow tubes splayed down slope.	353
12/8/2017	0:05:22	-14.99230	-173.80090	2365.1	4.0	168.3	Bamboo coral (stalked coral).	354
12/8/2017	0:05:27	-14.99230	-173.80090	2364.5	5.9	168.6	Iridogorgia.	355
12/8/2017	0:05:30	-14.99231	-173.80090	2364.2	6.1	168.3	Shrimp.	356
12/8/2017	0:05:51	-14.99233	-173.80090	2361.8	4.8	168.6	Long freaky-looking taffy-like tubes.	357
12/8/2017	0:06:05	-14.99234	-173.80089	2360.1	4.4	169.4	Very long pillow tubes here.	358
12/8/2017	0:06:32	-14.99236	-173.80087	2357.1	5.4	168.5	Some are twisted up and contorted; some are ribbon-like; others are your normal pillow tubes.	359
12/8/2017	0:07:16	-14.99241	-173.80086	2352.0	4.6	168.5	The pillow tubes are starting to flatten a bit. Large intact pillow with bamboo coral.	360

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S096 Mata Fa Logger Comments	Record #
12/8/2017	0:07:30	-14.99243	-173.80086	2350.4	4.0	169.1	Chrysogorgia. and lots of bamboo corals here.	361
12/8/2017	0:07:41	-14.99244	-173.80087	2349.0	3.6	169.1	Still continuing over intact pillow lavas.	362
12/8/2017	0:07:49	-14.99248	-173.80087	2348.1	3.9	169.3	Bell-shaped sponge.	363
12/8/2017	0:08:14	-14.99251	-173.80087	2344.9	4.4	168.7	Brisingid.	364
12/8/2017	0:08:23	-14.99252	-173.80088	2343.9	4.6	169.1	Weird pillow that is standing straight up.	365
12/8/2017	0:08:32	-14.99254	-173.80087	2343.6	3.9	168.7	These are some weird pillows.	366
12/8/2017	0:09:10	-14.99257	-173.80086	2344.2	3.0	168.2	Strange looking broken pillow standing straight up. Corals and brittle stars at the top.	367
12/8/2017	0:09:54	-14.99258	-173.80085	2343.8	3.1	169.0	Giant bulbous pillow behind it.	368
12/8/2017	0:11:04	-14.99268	-173.80083	2343.3	3.2	169.1	The majority of the pillows are pillow tubes interspersed with large bulbous pillows.	369
12/8/2017	0:11:12	-14.99268	-173.80082	2343.3	3.3	169.3	Branching bamboo coral.	370
12/8/2017	0:12:40	-14.99274	-173.80069	2339.3	3.1	126.8	Still seeing pillow lavas and branching corals here and there.	371
12/8/2017	0:13:52	-14.99286	-173.80060	2331.1	2.9	127.5	Elongate pillow tubes that are starting to look more like pillow lobes ("plobates")	372
12/8/2017	0:14:54	-14.99299	-173.80057	2326.5	2.5	161.0	We're almost to the top of this pillow mound. Z=2327. Not quite as shallow as the one previously.	373
12/8/2017	0:16:30	-14.99299	-173.80060	2327.3	3.0	163.4	Steep slope here. The pillows to the right look more intact..	374
12/8/2017	0:16:52	-14.99300	-173.80061	2327.9	2.0	163.5	Long cracked pillow lobes up at the top here. Some of them are very flattened.	375
12/8/2017	0:17:40	-14.99301	-173.80061	2329.0	1.0	161.9	Facing south - sort of at the south edge of this little cone.	376
12/8/2017	0:17:45	-14.99301	-173.80061	2328.9	1.0	161.9	Vehicle Leaving Seabed.	377
12/8/2017	0:23:03	-14.99300	-173.80060	2328.9	1.0	163.1	**S96-rock-13**. Really black interior. Angular large wedge. Gray staining on exterior. Large patch of black interior exposed. Interior looks vesicular and porphoritic. Brown coating. Z=2330.	378
12/8/2017	0:24:49	-14.99299	-173.80061	2327.8	2.3	272.4	Nice fresh face on one side. 20 cm x 10 cm thick. 14.993015 173.800600.	379
12/8/2017	0:27:31	-14.99254	-173.80059	2345.9	1.2	15.9	testing - for some reason I'm stuck on ascent and recovery menu.	380
12/8/2017	0:27:49	-14.99250	-173.80058	2348.0	1.3	335.3	Went over the edge again.	381
12/8/2017	0:28:10	-14.99246	-173.80058	2349.1	0.0	229.7	We are turning around and will head up slope again.	382

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S096 Mata Fa Logger Comments	Record #
12/8/2017	0:33:09	-14.99204	-173.80025	2395.1	0.0	21.4	Not sure why the text event will not let me get off the ascent and descent menu.	383
12/8/2017	0:33:25	-14.99203	-173.80025	2395.6	0.0	26.0	Sea cucumber covered in dirt.	384
12/8/2017	0:33:58	-14.99203	-173.80026	2395.6	0.5	25.9	Dirty crud-coated holothurian.	385
12/8/2017	0:34:53	-14.99201	-173.80023	2393.8	2.6	22.2	We're continuing upon this ridge.	386
12/8/2017	0:35:15	-14.99198	-173.80020	2394.5	1.7	21.6	Coming upon another steep slope off to our north/west.	387
12/8/2017	0:35:37	-14.99197	-173.80018	2394.4	1.9	21.8	Collapsed bulbous pillow. Chrysogorgia with squat lobsters inside.	388
12/8/2017	0:36:05	-14.99195	-173.80014	2394.0	3.6	21.8	Steep slope has in-place lavas. also lots of pillow lavas.	389
12/8/2017	0:36:30	-14.99193	-173.80010	2395.5	2.9	21.5	Moving along a very steep talus slope to our west.	390
12/8/2017	0:37:05	-14.99189	-173.80005	2399.8	3.1	21.9	Passed from intact pillows to a totally broken up fragmented lava - steep slope.	391
12/8/2017	0:38:26	-14.99177	-173.79996	2402.9	3.5	22.4	Glass tall sponges on this really rubbly slope. Nothing on the surface seems in place.	392
12/8/2017	0:39:00	-14.99172	-173.79992	2404.1	3.4	7.4	Rubble rubble everywhere..... Steep slope to the west.	393
12/8/2017	0:40:12	-14.99157	-173.79987	2402.8	3.0	10.1	Traveling to the north with largest cone to our far west. Another little ridge to the west closer to the vehicle.	394
12/8/2017	0:41:18	-14.99148	-173.79980	2400.3	3.1	8.3	Angular pillow lava rubble on steep slope.	395
12/8/2017	0:41:24	-14.99147	-173.79980	2400.2	2.4	8.2	Glass sponge.	396
12/8/2017	0:42:04	-14.99139	-173.79978	2398.5	0.0	6.1	Stalked coral.	397
12/8/2017	0:45:30	-14.99115	-173.79981	2381.4	8.0	345.7	Steep slope with intact pillow lavas. On the edge of a cliff made up of stacked pillow lavas.	398
12/8/2017	0:47:34	-14.99116	-173.79982	2367.1	0.0	311.7	Heading up the east side of larger summit coin - back toward waypoint 5.	399
12/8/2017	0:47:49	-14.99116	-173.79983	2367.0	0.0	310.7	Several anemones in a pile.	400
12/8/2017	0:48:12	-14.99116	-173.79983	2366.8	0.0	311.9	Squat lobster just hanging out with them (not on them)	401
12/8/2017	0:50:29	-14.99112	-173.79982	2360.5	0.0	273.7	Moving up the slope. Beautiful decapitated pillows.	402
12/8/2017	0:50:43	-14.99113	-173.79983	2359.2	0.0	301.4	We're at the top of that very steep cliff.	403
12/8/2017	0:51:01	-14.99112	-173.79985	2358.3	0.0	318.2	Flat elongate pillows here.	404
12/8/2017	0:51:34	-14.99108	-173.79988	2357.3	3.1	329.1	Stalked crinoid. on top of this ridge. We're just SE of waypoint 5.	405
12/8/2017	0:52:09	-14.99106	-173.79990	2357.9	2.1	329.7	Bamboo corals.	406

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S096 Mata Fa Logger Comments	Record #
12/8/2017	0:54:32	-14.99086	-173.80004	2363.2	1.9	329.0	Intact pillow tubes here. Some nice bulbous pillows as well. All seem a bit small than what we've seen in the past.	407
12/8/2017	0:55:14	-14.99076	-173.80010	2363.2	2.3	329.1	Flat plates over some of these pillows.	408
12/8/2017	0:55:53	-14.99068	-173.80014	2364.4	2.0	328.8	Some sediment cover on all the pillows we've seen.	409
12/8/2017	0:56:14	-14.99064	-173.80018	2365.2	2.9	329.5	Here comes the rubble.	410
12/8/2017	0:56:56	-14.99060	-173.80021	2363.2	0.0	328.9	The slope is getting steeper here. Heading up in a NE direction toward WP 6.	411
12/8/2017	0:58:16	-14.99051	-173.80027	2357.1	5.0	333.9	Large broken pillow pieces on this steep slope. Looks like the ROV is heading toward WP 5 before heading to WP 6.	412
12/8/2017	0:59:17	-14.99042	-173.80031	2350.7	8.6	306.7	Seeing some in place lavas now - pillows perpendicular to the slope.	413
12/8/2017	0:59:50	-14.99038	-173.80034	2346.7	0.0	289.7	Blocky pillow cones are what these highs at/near the summit appear to be.	414
12/8/2017	1:01:46	-14.99023	-173.80057	2344.1	4.0	324.6	Still on a steep slope. Pillows are barely hanging on.	415
12/8/2017	1:02:20	-14.99017	-173.80056	2349.0	7.5	305.6	We're in the saddle between the ridge so we have to go to the bottom.	416
12/8/2017	1:05:10	-14.98973	-173.80028	2372.3	2.3	0.9	In place lavas on this steep slope.	417
12/8/2017	1:05:30	-14.98973	-173.80024	2372.1	2.7	52.3	Now we're down at the bottom of this saddle between WP 5 and WP 6.	418
12/8/2017	1:06:03	-14.98971	-173.80020	2372.8	1.2	50.7	Sediment here is strewn with small rock fragments. Anemone.	419
12/8/2017	1:06:19	-14.98972	-173.80018	2372.3	1.6	51.5	Small-ish rock fragments strewn over the sediments.	420
12/8/2017	1:06:37	-14.98971	-173.80016	2371.5	1.7	51.4	Tall stalked coral (bamboo type)	421
12/8/2017	1:07:39	-14.98972	-173.80007	2367.4	1.8	52.0	Older broken up rock fragments on this surface. Sedimented slope covered in more and more small rock debris.	422
12/8/2017	1:07:54	-14.98972	-173.80006	2366.0	2.4	51.2	Sea cucumber.	423
12/8/2017	1:08:05	-14.98971	-173.80005	2365.1	2.5	52.2	Heading up this gentle slope.	424
12/8/2017	1:08:26	-14.98971	-173.80003	2363.8	2.8	51.4	Little hiding shrimp. It's one of the deep sea types.	425
12/8/2017	1:08:57	-14.98971	-173.80000	2362.4	1.6	51.5	Now seeing some larger rock fragments on the slope.	426
12/8/2017	1:09:44	-14.98969	-173.79997	2360.3	1.6	51.0	Hollow in the sediment with some green-ish stuff in the hollow....	427

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S096 Mata Fa Logger Comments	Record #
12/8/2017	1:10:05	-14.98968	-173.79995	2358.9	1.8	51.6	Stalked corals.	428
12/8/2017	1:10:31	-14.98967	-173.79993	2357.0	2.1	51.5	Transitioning from small fragments of rock on seds to more intact lavas.	429
12/8/2017	1:10:38	-14.98967	-173.79993	2356.5	2.3	51.8	Large anemone.	430
12/8/2017	1:11:59	-14.98961	-173.79989	2352.7	2.4	51.1	Some in place lavas up ahead. traveling up another summit cone (that is located at WP 6)	431
12/8/2017	1:12:41	-14.98959	-173.79986	2350.9	1.7	51.2	These lavas are more in place - but still some rubble strewn all about.	432
12/8/2017	1:12:48	-14.98959	-173.79986	2350.3	1.7	51.0	Crinoid.	433
12/8/2017	1:13:08	-14.98957	-173.79985	2349.0	1.3	49.5	That last guy was either a crinoid or a brittle star.	434
12/8/2017	1:13:32	-14.98957	-173.79984	2348.5	1.7	45.2	Sandy patches with ripples and broken lavas here and there.	435
12/8/2017	1:13:53	-14.98955	-173.79983	2347.7	1.3	51.7	These lavas are very broken up but still in place in most places.	436
12/8/2017	1:15:04	-14.98948	-173.79977	2343.1	2.3	51.0	Moving up rubble strewn slope. All different sizes of rock debris.	437
12/8/2017	1:16:18	-14.98946	-173.79975	2342.9	0.9	50.7	Sediments here are mainly light colored on the surface - but also seeing some black glass shards (?) here and there.	438
12/8/2017	1:18:25	-14.98947	-173.79976	2342.9	0.8	52.1	Z=2343. Scoop #1. Not at the summit yet. On sandy slope. We're 80m to the SW of this summit cone.	439
12/8/2017	1:22:27	-14.98946	-173.79979	2343.4	0.0	54.3	**S96-rock-15**. Buff-colored seds on top. Bill says scooped seds are dark in color. Z=2344. 14.989456 173.799711.	440
12/8/2017	1:33:38	-14.98945	-173.79973	2341.6	1.3	344.3	Right next to the scoop. Glassy angular vesicular crystal rich piece of pillow lava. 10 cm long and 4 cm wide?	441
12/8/2017	1:34:45	-14.98945	-173.79973	2341.6	1.3	346.8	Sample will have same location as Sed-14. We're right next to where we took the sed bag.	442
12/8/2017	1:35:13	-14.98944	-173.79971	2341.1	0.0	317.1	Chrysogorgia with squat lobster.	443
12/8/2017	1:39:24	-14.98945	-173.79972	2341.0	0.0	310.8	**S96-bio-16.** Chrysogorgia coral with squat lobster. We only see 1 squat lobster but may be more. Nicely plucked off the holdfast rock. Same position as samples 14 and 15. Z=2342.	444
12/8/2017	1:41:34	-14.98943	-173.79972	2341.0	0.0	312.3	Quite a large coral Appears to be > 10 cm tall. And quite full. 14.989456 173.799711. Into biobox 1. Squat lobster is in the box - at least for now.	445

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S096 Mata Fa Logger Comments	Record #
12/8/2017	1:42:21	-14.98940	-173.79972	2338.6	2.5	38.8	We're close to waypoint 6 - about 75 m SW.	446
12/8/2017	1:42:57	-14.98937	-173.79966	2336.5	1.1	39.5	Back on volcanic ash (?) slope.	447
12/8/2017	1:43:07	-14.98935	-173.79965	2335.6	1.1	37.7	Seeing darker streaks in the sediment now.	448
12/8/2017	1:43:22	-14.98934	-173.79963	2334.5	1.0	38.5	Light dusting of pelagic sediment on the top.	449
12/8/2017	1:43:36	-14.98933	-173.79962	2333.2	1.6	37.7	The crests of the ripples are darker in color.	450
12/8/2017	1:44:21	-14.98929	-173.79957	2331.4	2.4	37.7	We're at the top - or near the top of this cone.	451
12/8/2017	1:44:57	-14.98925	-173.79953	2328.5	2.6	37.4	Brisingid sea star.	452
12/8/2017	1:45:08	-14.98923	-173.79951	2328.2	1.9	37.5	Sediment shoot to the left.	453
12/8/2017	1:45:19	-14.98922	-173.79951	2327.4	1.8	37.6	In place blocky lavas to our right.	454
12/8/2017	1:45:36	-14.98920	-173.79950	2325.8	2.1	37.9	Now we're climbing to the top of this cone.	455
12/8/2017	1:45:47	-14.98919	-173.79949	2325.1	1.5	39.1	Here comes a lot more sediment.	456
12/8/2017	1:46:04	-14.98917	-173.79948	2323.9	1.7	37.9	Coarse black sediment here.	457
12/8/2017	1:46:33	-14.98915	-173.79946	2322.5	1.7	37.6	There is some orange fragments in this slope.	458
12/8/2017	1:46:46	-14.98914	-173.79945	2322.2	1.6	37.7	Looking at repeated ash layers up here.	459
12/8/2017	1:47:15	-14.98914	-173.79945	2321.6	1.5	36.3	Brittle star up there.	460
12/8/2017	1:47:37	-14.98913	-173.79944	2321.7	1.4	36.6	Layers of ash on the top of the ridge here.	461
12/8/2017	1:48:18	-14.98913	-173.79944	2321.7	1.4	37.7	Zooming in on some yellow staining (?) on one of these rocks.	462
12/8/2017	1:49:02	-14.98913	-173.79943	2320.5	2.1	37.8	The ash is probably the dark layers - the lighter layers can be pelagic or altered by hydrothermal.	463
12/8/2017	1:49:32	-14.98910	-173.79939	2318.8	1.1	38.0	We're on top of that volcanic ash layer.	464
12/8/2017	1:49:59	-14.98907	-173.79936	2317.3	1.3	38.1	SW of the summit. It's a broader surface covered in sediment. Not much on this.	465
12/8/2017	1:50:40	-14.98901	-173.79935	2315.9	1.0	39.1	Heading up slope to the summit of this small summit cone.	466
12/8/2017	1:51:07	-14.98897	-173.79936	2315.8	2.6	63.7	Come rocks are exposed to the west of this sedimented slope.	467
12/8/2017	1:51:44	-14.98893	-173.79936	2317.0	2.3	61.9	Brisingid.	468
12/8/2017	1:52:13	-14.98891	-173.79930	2315.8	2.2	62.2	Rock fragments strewn about. Not sure what's in place or not - mostly covered in sediment.	469
12/8/2017	1:52:22	-14.98890	-173.79928	2315.5	2.2	62.0	Brittle stars in the sediment again.	470
12/8/2017	1:52:47	-14.98887	-173.79923	2314.7	2.0	62.0	Blocky intact lavas to the right.	471
12/8/2017	1:55:54	-14.98863	-173.79896	2315.7	1.6	123.4	Brisingid. On the edge of this summit cone. Blocky lavas to the north of the summit ridge.	472
12/8/2017	1:55:59	-14.98863	-173.79895	2315.4	2.2	124.8	Sea urchin.	473

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S096 Mata Fa Logger Comments	Record #
12/8/2017	1:56:34	-14.98860	-173.79890	2315.4	2.3	131.9	Probably in place blocky lavas here.	474
12/8/2017	1:56:41	-14.98860	-173.79889	2315.6	2.4	130.9	More brisingids.	475
12/8/2017	1:57:44	-14.98858	-173.79871	2314.1	3.0	115.2	Brisingid. 3 of them	477
12/8/2017	1:58:03	-14.98857	-173.79865	2314.7	2.2	115.5	Branching bamboo coral	478
12/8/2017	1:58:26	-14.98855	-173.79860	2316.0	2.9	116.3	Sedimented area without brittle stars	479
12/8/2017	1:59:09	-14.98850	-173.79850	2319.1	3.4	113.9	Coral skeleton with something on it. maybe a brittle star	480
12/8/2017	1:59:49	-14.98843	-173.79839	2325.1	5.2	115.8	We just passed waypoint 6.	481
12/8/2017	2:00:29	-14.98836	-173.79828	2329.4	5.7	117.4	Bill said that the youngest lavas were at the top of the summit cones that lie in a N/S orientation at the center of the volcano.	482
12/8/2017	2:00:50	-14.98834	-173.79824	2331.5	4.3	113.8	He believes the northern of the two cones was the youngest lavas we have seen on this dive - at least so far.	483
12/8/2017	2:01:18	-14.98835	-173.79819	2330.1	4.3	115.8	Rubbly slope again. Stalked bamboo with a brittle star.	484
12/8/2017	2:02:43	-14.98838	-173.79817	2330.8	1.6	114.8	Notice that the polyps are gone where the brisingid is hanging on. He might be eating them.	485
12/8/2017	2:03:54	-14.98838	-173.79818	2330.8	1.6	115.0	The brisingid is wrapping itself all around this coral. Where it is wrapped the polyps are missing.	486
12/8/2017	2:04:16	-14.98837	-173.79818	2330.8	2.1	115.6	Adam	487
12/8/2017	2:04:21	-14.98837	-173.79818	2330.8	2.1	115.8	Those are some pretty polyps on that coral.	488
12/8/2017	2:05:14	-14.98837	-173.79818	2330.8	2.1	115.7	Nice camera-work there. Beautiful brancing bamboo with brisingid.	489
12/8/2017	2:06:46	-14.98842	-173.79805	2326.9	2.9	87.5	Probably mostly brancing bamboo.	490
12/8/2017	2:07:14	-14.98842	-173.79803	2326.8	2.7	118.0	Looking at layered in place lavas. Very vesicular.	491
12/8/2017	2:07:59	-14.98840	-173.79794	2327.3	2.3	65.8	Continuing on to the east.	492
12/8/2017	2:08:34	-14.98839	-173.79786	2327.6	1.6	61.7	Back on the sandy plain. Sedimented now but see an outcrop coming up as we approach waypoint 7.	493
12/8/2017	2:08:53	-14.98838	-173.79784	2326.4	2.6	62.5	Bat star (or pin cushion star?).	494
12/8/2017	2:09:34	-14.98838	-173.79784	2327.2	1.8	56.8	Brittle stars on the seds.	495
12/8/2017	2:09:54	-14.98836	-173.79780	2327.9	1.4	56.9	That's a "pin cushion" sea star - looked pretty wrinkled up when we zoomed in.	496
12/8/2017	2:10:11	-14.98835	-173.79775	2328.3	1.7	57.4	These lavas are in place to the right.	497
12/8/2017	2:10:21	-14.98835	-173.79772	2328.0	1.8	57.7	Already breaking off to the left.	498
12/8/2017	2:10:33	-14.98834	-173.79768	2328.8	0.9	57.0	Now back in sedimented slope.	499

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S096 Mata Fa Logger Comments	Record #
12/8/2017	2:11:46	-14.98828	-173.79746	2331.4	1.2	57.7	Looking at broken up lavas on the north side of this ridge.	500
12/8/2017	2:12:59	-14.98823	-173.79724	2334.0	1.0	78.1	Weird huge pillow lava off to the north of us. The rocks at the top of the slope are obviously in place - unless they have weathered away.	501
12/8/2017	2:13:32	-14.98823	-173.79717	2335.2	0.7	78.0	We're passing waypoint 5.	502
12/8/2017	2:14:06	-14.98822	-173.79710	2336.3	1.1	71.7	Quite a depression to the north where the slope sort of drops off.	503
12/8/2017	2:15:16	-14.98821	-173.79704	2339.2	1.1	96.1	Layer of coarser fragment could be related to an eruption.	504
12/8/2017	2:15:48	-14.98821	-173.79704	2339.2	1.1	95.9	The yellow fragments look like weathered fragments.	505
12/8/2017	2:18:38	-14.98821	-173.79704	2339.2	1.0	97.1	Coarse volcanic deposit here on a little ridge. See banding of dark and light seds here. Mottled in-between ripples that are perpendicular to the slope of this ditch-like feature.	506
12/8/2017	2:20:48	-14.98821	-173.79703	2339.1	1.1	96.4	Scoop #4. Rebecca (Cary?) wants the top coarse layer for study. Lots of fine pelagic seds on top of the coarse layer.	507
12/8/2017	2:24:17	-14.98821	-173.79703	2339.1	1.1	97.7	**S96-sed-17.** Scoop into bag #2. Z=2340. This is Chris's fix (it's his birthday so he must be right) -not the navigator - 14.9882115 173.7970433.	508
12/8/2017	2:25:50	-14.98820	-173.79703	2338.9	1.2	94.9	Seeing quite a few brittle stars on the seafloor. Will suction a couple of them into jar 8.	509
12/8/2017	2:26:45	-14.98821	-173.79698	2340.0	0.0	91.7	Brittle star on sedimented sea floor.	510
12/8/2017	2:31:05	-14.98822	-173.79697	2340.0	0.0	91.2	Returned the prematurely. Brittle star is poking out the suction hose. Suctioned off sandy seafloor here.	511
12/8/2017	2:33:20	-14.98823	-173.79697	2340.0	0.0	91.2	**S96-bio-18**. Moved slightly from 3 previous sample positions. Z=2340. Fell in biobox 2 minus 1 leg. 14.9882086 173.7969751. That's Cris's position again - not the navigators pos.	512
12/8/2017	2:35:28	-14.98819	-173.79681	2342.1	0.0	68.4	Moving on toward WP 8 - to the NE about 300 m.	513
12/8/2017	2:38:51	-14.98802	-173.79642	2343.1	2.1	49.0	Field of rocks with some sedimented dunes.	514
12/8/2017	2:39:58	-14.98794	-173.79637	2345.4	2.2	40.9	Lots of rock debris with some corals and brittle stars. Not seeing a lot that is truly in place - but probably near-in place.	515
12/8/2017	2:47:12	-14.98796	-173.79628	2345.0	0.0	49.4	Saw a shrimp as we're flinging boulders around.	516

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S096 Mata Fa Logger Comments	Record #
12/8/2017	2:50:41	-14.98793	-173.79625	2343.8	1.6	51.1	S96-rock-19. Pillow fragment with ~1cm glass rind. 10x15cm and large vesicles full of sediment.	517
12/8/2017	2:53:27	-14.98790	-173.79592	2347.5	1.5	68.3	Sea star trying to eat a coral - looks like it's hanging as bait.	518
12/8/2017	2:55:25	-14.98789	-173.79585	2347.2	2.4	117.1	Sea urchin.	519
12/8/2017	2:55:51	-14.98789	-173.79577	2348.2	2.6	85.1	Brisingid.	520
12/8/2017	2:56:58	-14.98780	-173.79561	2350.2	4.5	47.6	Brisingids and a gorgia coral.	521
12/8/2017	2:58:53	-14.98758	-173.79544	2358.1	2.3	37.1	Multiple fairly tall branching corals on talus.	522
12/8/2017	3:00:46	-14.98737	-173.79518	2375.5	1.6	50.7	Increased sediment load on talus as we head downslope.	523
12/8/2017	3:01:08	-14.98734	-173.79510	2378.7	2.1	59.0	Water is very smoky here	524
12/8/2017	3:03:29	-14.98724	-173.79473	2391.9	1.2	79.6	Brittle star and a few branching corals. Seafloor is mixture of talus partly in place and fairly thick overlying sediment	525
12/8/2017	3:04:44	-14.98724	-173.79452	2402.9	2.6	79.0	Slope is sediment on top and to starboard with talus to port.	526
12/8/2017	3:04:59	-14.98723	-173.79450	2405.2	1.7	71.0	Urchin.	527
12/8/2017	3:05:47	-14.98716	-173.79443	2406.4	2.6	64.9	Large branching coral on a relatively intact pillow boulder.	528
12/8/2017	3:08:04	-14.98716	-173.79442	2407.5	1.1	30.7	Several small brittle stars are hanging out by the coral.	529
12/8/2017	3:09:28	-14.98702	-173.79433	2409.0	1.2	17.6	Lots of brittle stars in sediment. Large sponges and a huge branching coral with crinoid or brisingid on it.	530
12/8/2017	3:12:44	-14.98695	-173.79424	2409.5	1.0	97.8	Iridogorgia.	531
12/8/2017	3:19:08	-14.98694	-173.79423	2410.1	0.0	129.2	**S96-rock-20**. Rind of an intact huge pillow. 8x5cm vesicular with Mn-coat and some sediment infill in the vesicles.	532
12/8/2017	3:20:44	-14.98688	-173.79416	2409.6	3.2	52.4	S96-rock-19 location 14.9879772 173.7962883 depth 2345m.	533
12/8/2017	3:21:12	-14.98681	-173.79408	2412.9	2.9	50.7	S96-rock-20 location 14.986949 173.794241 depth 2410m.	534
12/8/2017	3:21:30	-14.98675	-173.79402	2416.1	2.9	36.1	More talus with patches of sediment and large branching corals.	535
12/8/2017	3:22:51	-14.98657	-173.79395	2426.0	3.1	28.6	Into what looks like entirely talus and some stalk coral growth. Lightly sedimented slope.	536
12/8/2017	3:25:19	-14.98613	-173.79382	2440.2	0.5	9.8	All sediment.	537

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S096 Mata Fa Logger Comments	Record #
12/8/2017	3:26:10	-14.98605	-173.79382	2442.0	0.4	8.2	Occasional boulder-size rocks covered in seds and some brittle stars.	538
12/8/2017	3:26:54	-14.98598	-173.79382	2441.8	0.7	357.0	Like Nebraska but with brittle stars.	539
12/8/2017	3:28:11	-14.98586	-173.79383	2439.7	1.7	356.0	Lots of animal trackways. No ripples and no real sed structures.	540
12/8/2017	3:28:14	-14.98586	-173.79383	2439.5	1.8	356.4	Shrimp.	541
12/8/2017	3:31:10	-14.98586	-173.79394	2437.7	1.2	215.3	Russ	542
12/8/2017	3:32:07	-14.98615	-173.79415	2436.2	3.1	192.0	Some rocks.	543
12/8/2017	3:33:07	-14.98628	-173.79425	2426.8	11.5	222.0	End of dive. Off bottom.	544

S097 Mata Fitu

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S097 Mata Fitu Logger Comments	Record #
12/8/2017	18:50:32	-14.91589	-173.77356	2758.5	3.4	352.1	Bottom in site.	23
12/8/2017	18:50:58	-14.91595	-173.77359	2759.9	1.2	352.7	Z=2760.	24
12/8/2017	18:51:40	-14.91584	-173.77346	2760.5	3.4	348.5	In place lavas - Jumbly blocky messy lavas.	25
12/8/2017	18:52:14	-14.91581	-173.77341	2759.5	3.6	351.3	Going to want to pick up a rock here.	26
12/8/2017	18:52:25	-14.91583	-173.77339	2759.2	2.7	24.3	Platy lavas in place here.	27
12/8/2017	18:52:53	-14.91586	-173.77336	2758.7	3.5	49.3	Rubble on top of this ridge.	28
12/8/2017	18:53:11	-14.91584	-173.77328	2757.4	2.9	61.0	It looks like debris - broken up fragments here down slope.	29
12/8/2017	18:53:44	-14.91597	-173.77327	2758.6	2.2	62.0	We're 20 m south of WP1.	30
12/8/2017	18:54:29	-14.91583	-173.77320	2756.2	6.3	61.2	This mound-like feature looks like a pile of rubble.	31
12/8/2017	18:55:16	-14.91594	-173.77323	2761.6	0.4	63.5	Rippled sand here. Some small tubes on the seafloor.	32
12/8/2017	18:56:04	-14.91589	-173.77321	2761.6	2.3	60.6	We're maneuvering to the WP1 position.	33
12/8/2017	18:57:05	-14.91588	-173.77315	2764.3	0.5	55.4	On a hillock with sandy seds here. Debris to the north side - south slope is sandy.	34
12/8/2017	18:57:43	-14.91590	-173.77315	2764.7	0.0	59.2	Whip coral on a small piece of rubble.	35
12/8/2017	18:58:07	-14.91588	-173.77317	2764.8	0.0	66.6	Walter thinks the little guys on the sed here are whip corals.	36
12/8/2017	18:58:43	-14.91594	-173.77322	2764.8	0.0	66.6	Burrows in the seds here.	37
12/8/2017	18:58:50	-14.91593	-173.77321	2764.8	0.0	66.7	Stalked coral. in the sand.	38
12/8/2017	18:59:07	-14.91593	-173.77318	2764.8	0.0	66.6	Going in for a sediment scoop here.	39

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S097 Mata Fitu Logger Comments	Record #
12/8/2017	19:00:13	-14.91586	-173.77313	2764.8	0.0	66.7	Sediment is mottled with some burrows. Lightish color with darker patches throughout.	40
12/8/2017	19:02:50	-14.91590	-173.77315	2764.8	0.0	67.5	Sed surface is lightish color with darker patches throughout. Scoop bag #1. Light brown seds. Volcaniclastic downslope transport.	41
12/8/2017	19:06:05	-14.91591	-173.77318	2764.8	0.0	67.5	**S97-sed-01.** 10 micron fraction. Sediment is not very dark even under the surface layer. Orangish iron oxide colored fine seds. Z=2765. Nav fix: 14.015908 173.773130.	42
12/8/2017	19:06:32	-14.91594	-173.77318	2764.8	0.0	68.0	Everyday is like Christmas? says Ken....	43
12/8/2017	19:07:11	-14.91591	-173.77319	2764.8	0.0	68.0	We're about 15 m SE of WP1.	44
12/8/2017	19:08:55	-14.91591	-173.77317	2764.8	0.0	67.9	We're moving on?? Maybe not.	45
12/8/2017	19:10:32	-14.91591	-173.77313	2765.0	0.6	43.2	The sediment scoop site shows dark brown seds under the lighter surface area. Not black like most previous scoops.	46
12/8/2017	19:10:54	-14.91592	-173.77315	2764.1	1.1	354.6	Rocky debris on the edge of this hillock.	47
12/8/2017	19:11:05	-14.91591	-173.77317	2763.7	0.9	353.6	Moving now.	48
12/8/2017	19:11:37	-14.91591	-173.77321	2762.1	1.0	346.6	Squaring up some vehicle stuff...	49
12/8/2017	19:12:03	-14.91588	-173.77325	2760.5	1.1	345.9	We're on our way now.	50
12/8/2017	19:12:58	-14.91578	-173.77329	2762.4	5.0	341.7	Going down this little slope. Moving now. We're at WP1.	51
12/8/2017	19:13:28	-14.91573	-173.77335	2763.6	4.3	342.8	Huge old chimney-looking structure in front of us.	52
12/8/2017	19:13:51	-14.91572	-173.77340	2763.4	4.4	342.1	It looks like an old chimney. The leaning tower of Pisa.	53
12/8/2017	19:14:14	-14.91576	-173.77341	2762.8	3.2	340.1	That shows up in the Sentry bathy.	54
12/8/2017	19:14:50	-14.91573	-173.77338	2763.1	4.8	340.5	Still figuring out what's going on with the controller.	55
12/8/2017	19:15:04	-14.91573	-173.77340	2763.8	3.9	338.0	We want to look at that chimney and probably sample it.	56
12/8/2017	19:16:34	-14.91567	-173.77336	2767.3	3.0	345.4	14.915716 S 173.7733645 Chris fix for this leaning old extinct chimney structure. "Leaning Tower of Pisa"	57
12/8/2017	19:17:17	-14.91566	-173.77337	2767.5	2.4	342.8	Sitting on a small rise surrounded by sandy seds.	58
12/8/2017	19:17:45	-14.91566	-173.77337	2767.9	1.9	345.6	Orangish coating. A couple of old spires. It's a couple meters high.	59
12/8/2017	19:19:29	-14.91562	-173.77340	2766.4	4.4	15.8	Some hydroids (?) on top of it. Some coral-type creature on top. Tiny Chrysogorgia here and there?	60
12/8/2017	19:19:49	-14.91563	-173.77340	2766.5	4.4	19.1	Brisingid on top of this old extinct chimney.	61

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S097 Mata Fitu Logger Comments	Record #
12/8/2017	19:21:36	-14.91563	-173.77338	2766.0	4.6	338.0	Codey	62
12/8/2017	19:23:37	-14.91559	-173.77340	2766.6	0.0	323.5	**S97-sulfide-02**. Extinct weathered chimney. ~4 m tall. Covered in sed/oxide? Z=2770 on bottom. Hydroids and brysingids on top.	63
12/8/2017	19:26:53	-14.91562	-173.77345	2769.4	2.5	53.2	The top fell off. Cross section is pretty solid. Several upflow zones. Beautiful crystals inside. Lots of white anhydrite and chalcopyrite. Possibly barite and bornite?	64
12/8/2017	19:33:42	-14.91565	-173.77347	2758.5	10.9	30.7	Top of chimney. Nice piece from near the top. Orange coating. Gray center. 12 cm piece of massive sulfide. White zones of anhydrite and barite with dispersed crystals.	65
12/8/2017	19:34:17	-14.91566	-173.77347	2755.4	14.6	332.7	Nav fix: 14.915577 173.773420. Into partition 9.	66
12/8/2017	19:34:51	-14.91570	-173.77348	2760.5	5.9	322.7	The Sentry map is right on down here. The little bumps on the map are probably all chimneys?	67
12/8/2017	19:35:42	-14.91560	-173.77355	2765.3	4.8	316.5	Moving along. There's another chimney-type structure.	68
12/8/2017	19:35:57	-14.91559	-173.77358	2763.2	5.9	320.6	More old chimney debris.	69
12/8/2017	19:36:10	-14.91557	-173.77359	2760.8	6.5	317.3	Quite an extensive extinct field.	70
12/8/2017	19:36:23	-14.91556	-173.77361	2758.7	8.1	321.7	Massive old broken pieces.	71
12/8/2017	19:36:35	-14.91554	-173.77364	2756.6	7.4	319.9	Great big old sulfide structure in the background.	72
12/8/2017	19:36:47	-14.91551	-173.77368	2756.4	4.0	316.7	Beautiful spires on this chimney.	73
12/8/2017	19:37:04	-14.91550	-173.77370	2756.5	4.8	311.7	It's active!!	74
12/8/2017	19:37:20	-14.91552	-173.77371	2756.0	5.1	337.2	Black smoke coming out of the top of both of these peaks.	75
12/8/2017	19:37:30	-14.91551	-173.77371	2756.2	4.8	342.9	Black beehive smokers.	76
12/8/2017	19:37:39	-14.91550	-173.77370	2756.1	5.2	335.4	Beautiful big old beehives.	77
12/8/2017	19:37:51	-14.91550	-173.77370	2755.5	5.7	326.5	Polynoids.	78
12/8/2017	19:38:01	-14.91549	-173.77369	2755.9	5.3	321.2	These spires are more than 6 meters tall.	79
12/8/2017	19:38:12	-14.91548	-173.77369	2756.8	5.2	315.3	2 large chimneys.	80
12/8/2017	19:38:17	-14.91547	-173.77369	2756.8	5.3	301.0	Squat lobster.	81
12/8/2017	19:38:51	-14.91542	-173.77373	2758.4	6.6	180.3	Beautiful spire and lots of active spires.	82
12/8/2017	19:39:17	-14.91546	-173.77377	2759.3	5.6	97.9	Cascading of material just from our thrusters.	83
12/8/2017	19:39:34	-14.91545	-173.77377	2758.1	6.5	96.4	Gorgeous spires.	84
12/8/2017	19:41:44	-14.91552	-173.77369	2755.8	5.6	300.0	We're going to name this Old Smokey. Z=14.015422 173.773752. Z=2763 at the base.	85

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S097 Mata Fitu Logger Comments	Record #
12/8/2017	19:42:15	-14.91550	-173.77369	2756.6	5.5	306.7	We're going to sample this Old Smokey chimney.	86
12/8/2017	19:43:38	-14.91544	-173.77369	2756.7	8.0	237.2	So - we've decided to sample it. Quite a vigorous flow coming out of the top of this 8 meters high at this point.	87
12/8/2017	19:45:16	-14.91543	-173.77371	2757.6	8.1	250.5	Old Smokey nav target: 14.915482 173.773712.	88
12/8/2017	19:45:41	-14.91543	-173.77371	2757.5	8.3	250.3	Huge polynoids; vent shrimp; bac mat; squat lobster.	89
12/8/2017	19:46:18	-14.91543	-173.77371	2757.4	10.0	247.7	Iron oxide coating. Black smoke coming out of that orifice. Really friable.	90
12/8/2017	19:47:20	-14.91541	-173.77371	2757.5	10.4	230.5	The chimney spires here are really friable. Black-gray-ish smoke.	91
12/8/2017	19:47:53	-14.91542	-173.77370	2757.8	6.3	262.5	Nautilocaris (?) shrimp. Walter doesn't think they are Opaepele.	92
12/8/2017	19:48:35	-14.91543	-173.77370	2757.9	4.2	289.1	Depth at the base of this is ~2765m.	93
12/8/2017	19:49:54	-14.91542	-173.77370	2757.7	5.2	294.6	Going in for an active sulfide grab first. Brachyuran crab in the background.	94
12/8/2017	19:50:13	-14.91542	-173.77370	2757.7	5.5	294.6	Could be opaepele after all? Really long antennae.	95
12/8/2017	19:52:29	-14.91545	-173.77371	2757.8	5.2	294.7	**S97-sulfide-03**. Pyrite shiny interior. Exterior has iron oxide coating. ~ 5 cm long. Outer crust and interior material of active sulfide sample.	96
12/8/2017	19:54:16	-14.91544	-173.77371	2757.8	5.2	294.5	Into biobox 2. 5 cm piece of central black smoker vent. 2mm - cm thick zone of chalcopyrite. Brown alteration on exterior. Old Smokey: 14.915482 173.773712. Z=2765 at base. Probably > 8m tall.	97
12/8/2017	19:55:26	-14.91546	-173.77371	2757.7	5.4	294.0	Walter says the shrimp here are opaepele after all. Polynoids. Brachyurans covered in mat.	98
12/8/2017	19:56:49	-14.91543	-173.77371	2757.7	5.5	294.9	Lots of crusty old yellow mat on this old chimney - dubbed "Old Smokey" - but it may get a Tongan interpretation.	99
12/8/2017	19:57:40	-14.91545	-173.77370	2757.7	5.5	295.3	Squidle was stopped for a while.	100
12/8/2017	19:58:38	-14.91545	-173.77370	2757.7	5.5	294.4	Our heading is 295 here.	101
12/8/2017	19:58:54	-14.91545	-173.77370	2757.7	5.5	294.5	Trying to get the temp probe out. Taking a lot of time.	102
12/8/2017	20:01:00	-14.91546	-173.77371	2757.7	5.4	294.3	We don't see the snails here at this very old sulfide structure.	103
12/8/2017	20:01:19	-14.91546	-173.77371	2757.7	5.4	294.5	We're about 30 m to the NW of the extinct chimney we sampled earlier.	104

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S097 Mata Fitu Logger Comments	Record #
12/8/2017	20:05:23	-14.91546	-173.77373	2757.8	5.4	294.2	We're re-thinking the dive plan down here now. We want to look at the little bumps on the seafloor that we see in the AUV data.	105
12/8/2017	20:07:14	-14.91544	-173.77371	2757.5	4.7	305.5	Moving around to get in position to sample the temp here.	106
12/8/2017	20:07:43	-14.91545	-173.77371	2757.7	4.2	314.8	Friable old chimney here. The spires keep breaking off at the slightest touch.	107
12/8/2017	20:12:50	-14.91546	-173.77369	2758.1	3.7	330.3	Temperature measurement max = 274 C	108
12/8/2017	20:13:06	-14.91546	-173.77369	2758.1	3.7	330.7	274.5 C	109
12/8/2017	20:23:31	-14.91543	-173.77370	2757.9	6.8	221.8	**S97-gas-04**. Gastight #16 Orange. In orifice where the temp reached 274.5C. Depth at the top is 2758 (~ 8m tall sulfide). Old and crusty.	110
12/8/2017	20:24:05	-14.91543	-173.77371	2757.7	8.1	202.2	Repositioning for the gastight. Don't have it yet. It's tough to get stable off the bottom like this.	111
12/8/2017	20:25:31	-14.91539	-173.77373	2757.5	10.6	199.2	Walter is looking at the shrimp. Opaepele? Polynoids here are huge.	112
12/8/2017	20:36:35	-14.91543	-173.77373	2757.5	14.1	200.8	Setting up for the gastight sample again... Back in the 275C orifice. Used the other manip to push down the RAM. That sample was iffy.	113
12/8/2017	20:37:51	-14.91541	-173.77372	2757.9	6.7	204.4	It doesn't look like the Ram on the gastight went down far enough. Hopefully the sample worked. The placement of the Ram on the manipulator is awkward.	114
12/8/2017	20:38:42	-14.91541	-173.77371	2756.6	9.9	232.9	Massive sulfide in the distance. Very close to Old Smokey here is another sulfide that is probably over 10 m high.	115
12/8/2017	20:40:56	-14.91539	-173.77373	2757.7	9.7	195.2	Storing the gastight.	116
12/8/2017	20:41:35	-14.91540	-173.77372	2758.8	6.7	218.2	The big chimney in the background is probably 11 - 12 meters high.	117
12/8/2017	20:41:52	-14.91540	-173.77373	2758.0	6.1	215.6	We're now coming back in for a water sample.	118
12/8/2017	20:42:44	-14.91542	-173.77370	2758.6	6.0	248.6	The gastight was in the orifice that was 274.5C. Going in to do a water sample in the same place.	119
12/8/2017	20:44:09	-14.91541	-173.77372	2758.1	6.3	257.6	This will be Major sampler #4 The sample will be S97-Fluid-5.	120
12/8/2017	20:44:44	-14.91542	-173.77370	2757.9	6.4	264.7	We plan to explore around this deeper sulfide chimney field some more. May not make it up to the upper field.	121

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S097 Mata Fitu Logger Comments	Record #
12/8/2017	20:50:59	-14.91542	-173.77371	2758.0	6.9	224.9	**S97-fluid-05**. Major fluid sampler #4. In same orifice as the gastight - Tmax=274.5C. On top of "Old Smokey". Fired at 2050:55.	122
12/8/2017	20:52:46	-14.91543	-173.77371	2754.7	10.2	224.6	Correction: had the Sample Type as Rock on previous entry - It's "Water". Old Smokey nav fix: 14.915482 173.773712.	123
12/8/2017	20:53:33	-14.91543	-173.77372	2753.3	15.0	219.3	The chimney in the background is 12 m high - but not as active. Old Smokey is much more active.	124
12/8/2017	20:55:25	-14.91537	-173.77373	2753.4	16.2	203.8	Placing the major sampler back in its cradle.	125
12/8/2017	20:57:54	-14.91548	-173.77386	2754.1	10.7	179.6	We've moved off the chimney now.	126
12/8/2017	20:58:08	-14.91546	-173.77386	2753.5	11.8	185.3	Next task is to sample the chimney biota.	127
12/8/2017	20:58:24	-14.91544	-173.77388	2753.4	17.5	170.2	Getting out the suction sampler.	128
12/8/2017	20:59:14	-14.91539	-173.77381	2758.6	10.4	134.1	There's a wide angle view of Old Smokey in the full view.	129
12/8/2017	21:00:10	-14.91541	-173.77372	2758.7	6.9	184.6	Extremely delicate chimney spires all over the place. Toward the base. Lots of delicate spires.	130
12/8/2017	21:01:15	-14.91541	-173.77371	2758.4	6.2	189.7	Lots of shrimp on the chimney. Seeing scaleworms; shrimp.	131
12/8/2017	21:06:00	-14.91541	-173.77371	2757.0	8.6	222.4	**S97-bio-06**. Shrimp on iron oxide coated area - at 2759 m. Some white wispy bac mat. Got quite a few shrimp. 1 large polynoid. At Old Smokey chimney.	132
12/8/2017	21:11:31	-14.91549	-173.77369	2758.3	3.3	317.2	Placing marker at the base. Old Smokey position: 14.915483 173.773712 Z=2765m. **Deployed Marker 299**; heading 290	133
12/8/2017	21:12:55	-14.91559	-173.77374	2752.6	6.5	300.6	Mike	134
12/8/2017	21:18:41	-14.91583	-173.77395	2755.2	1.3	164.4	Driving around field to orient and decide the next sample spot. Lots of marine snow. Moving in a southwesterly direction.	135
12/8/2017	21:21:17	-14.91603	-173.77388	2759.3	2.9	167.3	Seeing some highstanding volcanic boulders in rippled sediment.	136
12/8/2017	21:21:54	-14.91606	-173.77388	2759.2	3.6	93.7	Facing due south and about to turn. Currently facing the debris flow near the vent field.	137
12/8/2017	21:23:18	-14.91601	-173.77396	2757.6	2.7	345.8	Very poor sorting in debris field. No sign of in-place volcanic rock near vent field.	138
12/8/2017	21:23:51	-14.91596	-173.77396	2755.6	3.5	346.8	Heading now nearly due north.	139
12/8/2017	21:25:35	-14.91577	-173.77386	2757.1	3.3	346.9	Log of fallen chimney.	140

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S097 Mata Fitu Logger Comments	Record #
12/8/2017	21:26:38	-14.91572	-173.77381	2756.0	5.6	323.8	Some pillow lava but no sample because it is sullied by the hydrothermal activity.	141
12/8/2017	21:29:08	-14.91562	-173.77377	2752.5	5.4	277.1	Crinoids	142
12/8/2017	21:29:43	-14.91561	-173.77379	2752.7	3.8	267.5	Extinct chimney structure.	143
12/8/2017	21:34:07	-14.91589	-173.77406	2756.0	2.1	238.3	Fissure or crack in seafloor.	144
12/8/2017	21:35:15	-14.91600	-173.77416	2753.6	2.7	233.7	Driving southwest along gentle terraced slope.	145
12/8/2017	21:36:53	-14.91616	-173.77420	2755.1	2.2	160.5	Large pieces of debris sedimented debris. Ripple marks in sediment	146
12/8/2017	21:38:50	-14.91623	-173.77410	2754.6	7.4	191.4	A lot of the bumps in the AUV data near waypoint 2 are NOT vents. They are large blocks of debris.	147
12/8/2017	21:40:07	-14.91627	-173.77423	2756.6	1.9	231.0	Unbroken slopes appear to be heavily sedimented.	148
12/8/2017	21:41:08	-14.91633	-173.77430	2755.9	2.3	250.5	Lots of suspended marine snow	149
12/8/2017	21:43:18	-14.91653	-173.77448	2754.0	2.1	258.0	Debris at base of slope. Looks like pillow talus.	150
12/8/2017	21:43:54	-14.91653	-173.77452	2749.3	5.8	234.7	Adam	151
12/8/2017	21:46:28	-14.91666	-173.77461	2748.8	2.7	208.6	Large field of volcanic talus along gentle slope. Heading SW.	152
12/8/2017	21:49:03	-14.91674	-173.77477	2740.8	3.4	214.3	Sedimented ridges - faulted ledges?	153
12/8/2017	21:49:25	-14.91673	-173.77479	2741.1	4.2	209.4	Debris has some size sorting.	154
12/8/2017	21:50:34	-14.91674	-173.77488	2738.6	4.1	208.8	Looking for some in place rock to sample on this ridge.	155
12/8/2017	21:51:29	-14.91675	-173.77494	2736.9	2.9	204.3	Lots of rubbly rock pieces on the couth? side of the ridge.	156
12/8/2017	21:51:51	-14.91676	-173.77497	2735.5	0.0	216.7	Sandy swale to the north.	157
12/8/2017	21:52:13	-14.91673	-173.77498	2735.9	2.8	200.7	We're looking for a rock that is in place for Ken.	158
12/8/2017	21:53:02	-14.91673	-173.77496	2737.1	3.2	126.9	These are probably faulted tilted blocks with sediment over the top.	159
12/8/2017	21:53:43	-14.91672	-173.77491	2739.1	3.7	119.2	Now we're facing up slope of this rock wall.	160
12/8/2017	21:54:23	-14.91671	-173.77485	2740.1	4.2	128.6	We're facing the steep slope of this sandy swale with rocks embedded.	161
12/8/2017	21:54:40	-14.91672	-173.77483	2740.8	3.8	130.5	See some pillows. This one is probably in place.	162
12/8/2017	21:54:55	-14.91671	-173.77481	2741.7	3.8	135.7	Some of these little pillows are also in place.	163
12/8/2017	21:55:12	-14.91671	-173.77481	2742.2	3.5	169.4	Pillow with crusty lip on top.	164
12/8/2017	21:55:31	-14.91671	-173.77482	2743.4	2.3	174.5	Ken needs a rock in the worst way.	165
12/8/2017	21:57:12	-14.91672	-173.77481	2742.7	3.0	172.8	We're 60 m SE of WP14. We're in 2743 m of water.	166

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S097 Mata Fitu Logger Comments	Record #
12/8/2017	22:00:01	-14.91670	-173.77479	2741.7	4.2	172.7	We're not going to take that pillow. The ROV was having trouble holding position.	167
12/8/2017	22:00:33	-14.91668	-173.77474	2742.5	4.2	126.9	More sandy swale ahead of us. This whole face is rough for them to sample.	168
12/8/2017	22:01:31	-14.91664	-173.77462	2746.3	4.8	125.9	Lateraling to the NE along the base of this swale with sand on the top and rocks on the north face.	169
12/8/2017	22:01:46	-14.91666	-173.77461	2745.4	5.0	123.6	Wispy corals on the sand.	170
12/8/2017	22:02:20	-14.91666	-173.77460	2745.3	3.4	206.5	Pillow fragments here.	171
12/8/2017	22:02:40	-14.91666	-173.77465	2744.8	5.2	222.0	The occasional coral. The rock looks pretty old.	172
12/8/2017	22:03:24	-14.91672	-173.77471	2744.0	0.9	232.4	We are in an area where there are no "bumps" on the high-res Sentry bathy.	173
12/8/2017	22:03:42	-14.91674	-173.77474	2742.6	1.8	231.6	Coming on a pile of rocks that are pieces of pillows - boulder size.	174
12/8/2017	22:03:58	-14.91675	-173.77475	2742.3	1.7	232.8	This is faulted up. Fault scarp running through here.	175
12/8/2017	22:04:54	-14.91677	-173.77480	2741.2	1.7	232.2	The visibility is getting better.	176
12/8/2017	22:05:41	-14.91679	-173.77482	2739.9	2.1	256.7	Ken thinks that this pillow in front of us is in place. It's cracked - practically in half.	177
12/8/2017	22:09:00	-14.91679	-173.77482	2740.8	0.8	270.2	**S97-rock-07**. Weathered; old and sediment covered - outer glassy surface suspected. Black-ish interior. Beat-up outer glass. 7 cm fragment. Upper glassy surface. Alteration. Came from outer rind of partially drained out pillow	178
12/8/2017	22:10:58	-14.91679	-173.77482	2740.8	0.8	271.3	2nd piece? Nice piece with glassy rind - altered area under glass. Vesicles. Crystals are not apparent. Z=2741.	179
12/8/2017	22:13:15	-14.91683	-173.77497	2736.9	1.7	300.1	Adjacent to rock in biobox 2. Placed behind the majors. Probably boninite. Nav fix: 14.916798 173.774824.	180
12/8/2017	22:15:54	-14.91682	-173.77502	2736.0	0.8	315.3	Spotted a giant protist?	181
12/8/2017	22:16:54	-14.91683	-173.77504	2734.7	1.5	311.5	Xenophiophore	182
12/8/2017	22:17:59	-14.91683	-173.77508	2734.4	0.8	314.6	Faulting may well be listric	183
12/8/2017	22:18:59	-14.91683	-173.77509	2734.3	0.8	314.0	White microbial colonies: "Marine tumbleweeds".	184
12/8/2017	22:20:00	-14.91682	-173.77509	2734.3	0.7	312.8	Big barnacle on chunk of glassy rock.	185
12/8/2017	22:24:37	-14.91683	-173.77509	2734.1	1.2	316.1	Large barnacle on glassy rock. Rock not included.	186
12/8/2017	22:27:29	-14.91671	-173.77527	2739.2	1.9	322.4	**S97-bio-08** location 14.916822 173.775092 depth 2734m.	187

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S097 Mata Fitu Logger Comments	Record #
12/8/2017	22:28:21	-14.91662	-173.77532	2735.9	4.2	329.0	Dead chimney.	188
12/8/2017	22:30:46	-14.91648	-173.77542	2730.0	3.0	328.8	Lots of sulfide debris and what looks like some old chimney bases or pedestals. Moving slightly upslope.	189
12/8/2017	22:31:30	-14.91642	-173.77545	2726.5	3.5	350.0	Floor of extinct chimney field is sedimented but also has abundant jumbled debris and some larger pieces of toppled chimney spires.	190
12/8/2017	22:31:41	-14.91641	-173.77544	2725.6	3.4	350.0	No evidence of any hydrothermal activity in this area.	191
12/8/2017	22:32:21	-14.91635	-173.77545	2722.0	3.8	349.5	Tall and well-formed chimney with multiple spires. Checking for activity	192
12/8/2017	22:33:29	-14.91631	-173.77544	2718.8	6.8	329.3	Crinoid at the top like a Christmas tree.	193
12/8/2017	22:34:54	-14.91631	-173.77546	2718.2	6.5	12.2	This Christmas chimney is heavily encrusted with orange deposits. Grey below. Many chimlets.	194
12/8/2017	22:35:16	-14.91631	-173.77545	2718.3	6.4	12.2	Another likely-dead tall chimney behind this one. Also populated with a crinoid (or similar) near its peak.	195
12/8/2017	22:39:21	-14.91632	-173.77546	2717.9	6.5	12.2	Chimlet sample from tall extinct hydrothermal chimney. Blood-orange surface deposits. 5x20cm chimlet of chimlet.	196
12/8/2017	22:40:19	-14.91627	-173.77546	2719.9	3.3	12.3	**S97-sulfide-09** location 14.9163132 173.7754561 depth 2718m.	197
12/8/2017	22:40:51	-14.91626	-173.77544	2720.0	2.9	335.5	Sitting near a bunch of interweaving fractures that probably hosted focused water upflow.	198
12/8/2017	22:43:01	-14.91619	-173.77535	2719.5	4.1	30.4	Spotted a lighter-colored chimney near the extinct two. Looks inactive and has chimney shaped like a 4.	199
12/8/2017	22:45:28	-14.91612	-173.77534	2719.7	2.1	9.1	Large cracks in floor near these chimneys.	200
12/8/2017	22:46:40	-14.91599	-173.77529	2717.1	2.8	9.2	Crinoids seem to love the extinct chimney spires.	201
12/8/2017	22:46:53	-14.91597	-173.77528	2717.3	2.8	8.8	floor very fractured and blocky here.	202
12/8/2017	22:47:03	-14.91596	-173.77527	2717.3	2.8	9.6	Lots of toppled spires	203
12/8/2017	22:49:17	-14.91590	-173.77536	2713.8	3.0	293.2	Slope or pile of large chimney blocks. This was once a very large chimney.	204
12/8/2017	22:56:55	-14.91590	-173.77537	2712.1	3.0	307.3	Attempted a sample of the very large toppled chimney. But target piece was too crumbly. We are surveying the pile for an alternative sample.	205
12/8/2017	22:57:55	-14.91585	-173.77539	2710.2	2.3	273.8	Spotted some malachite mineralization. Brisingid.	206

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S097 Mata Fitu Logger Comments	Record #
12/8/2017	22:58:46	-14.91584	-173.77550	2711.3	3.5	273.7	Pile of dead mollusks.	207
12/8/2017	22:58:55	-14.91584	-173.77552	2710.8	3.4	272.9	Snail graveyard.	208
12/8/2017	22:59:23	-14.91585	-173.77557	2709.2	3.3	267.3	Looks like we're moving on. No sample.	209
12/8/2017	22:59:30	-14.91585	-173.77558	2708.5	4.4	267.3	Anemone.	210
12/8/2017	23:02:30	-14.91581	-173.77566	2706.7	0.0	238.7	Found another extinct chimney. Setting up for sampling.	211
12/8/2017	23:07:15	-14.91583	-173.77569	2708.1	1.5	81.7	Chimlet spire from extinct chimney	212
12/8/2017	23:07:54	-14.91584	-173.77568	2708.5	2.5	90.0	**S97-sulfide-10** location 14.91589460 173.7756580 depth 2713m.	213
12/8/2017	23:25:08	-14.91584	-173.77578	2708.0	0.0	219.4	**S97-sulfide-11**. Sampling an extinct chimney with pinecone-shaped chimlets. Got piece of pinecones 15x20cm. Black outer coat with Fe staining in inner rim. Dense.	214
12/8/2017	23:26:05	-14.91584	-173.77579	2708.1	1.3	218.6	S97-sulfide-11 location 14.91583520 173.77568830 depth 2708m.	215
12/8/2017	23:27:26	-14.91584	-173.77578	2708.2	1.8	219.4	A piece of sulfide of unknown precise origin but stuck to a major was put into box 5.	216
12/8/2017	23:29:04	-14.91585	-173.77578	2708.1	1.4	218.6	Navigation fix for sample 11: 14.915833 173.775680.	217
12/8/2017	23:31:05	-14.91596	-173.77578	2704.3	4.5	293.4	Looking at another huge extinct sulfide here. Big flanges: 14.915919 173.775752 It's 7 meters tall Z=2710m.	218
12/8/2017	23:31:55	-14.91584	-173.77589	2709.2	5.5	326.7	We're now going to resume our original dive plan. Will head up slope to WP 3.	219
12/8/2017	23:32:06	-14.91580	-173.77592	2712.1	4.3	332.9	We want to get to the hydrothermal field up slope.	220
12/8/2017	23:32:49	-14.91566	-173.77599	2713.7	0.8	336.8	Stepping down off another small fault.	221
12/8/2017	23:32:59	-14.91564	-173.77600	2714.0	1.6	336.6	Back out on sandy sediment .	222
12/8/2017	23:33:31	-14.91557	-173.77602	2713.1	1.3	336.1	Bulbous pillow(?) ahead. Sheety lavas here.	223
12/8/2017	23:34:27	-14.91550	-173.77606	2711.6	0.9	336.6	This area is a series of up and down sandy to rocky areas.	224
12/8/2017	23:34:47	-14.91547	-173.77608	2711.3	0.9	336.3	Jumbled up lavas to the east. Look like sheet flows.	225
12/8/2017	23:35:38	-14.91540	-173.77610	2707.1	1.5	328.0	Whip corals on the rocks. These rocks are old and weathered; mostly platy.	226
12/8/2017	23:35:55	-14.91537	-173.77613	2706.3	0.8	319.0	Fault scarp Drops a couple meters.	227
12/8/2017	23:36:05	-14.91536	-173.77614	2705.8	1.4	315.7	Platy rocks on the seafloor.	228

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S097 Mata Fitu Logger Comments	Record #
12/8/2017	23:36:42	-14.91533	-173.77619	2704.3	1.5	313.3	Flat plates of sheet-like lavas. Covered in manganese coating.	229
12/8/2017	23:36:57	-14.91532	-173.77620	2703.3	1.7	320.9	Those rocks are old.....	230
12/8/2017	23:37:14	-14.91531	-173.77622	2702.6	1.6	321.8	Another down block here.	231
12/8/2017	23:37:27	-14.91529	-173.77623	2701.9	1.4	322.4	Large rounded lava block.	232
12/8/2017	23:38:00	-14.91524	-173.77625	2700.0	2.2	321.8	Some of these are probably old huge pillows - very blocky texture.	233
12/8/2017	23:38:33	-14.91521	-173.77627	2698.2	1.9	322.0	These all look like cemented sedimentary layers on the slope. Listric-faulted debris.	234
12/8/2017	23:39:37	-14.91515	-173.77633	2695.5	1.8	322.1	Correction: Not a pillow in site according to Bill. He's saying they are cemented sedimentary layers.	235
12/8/2017	23:40:29	-14.91509	-173.77637	2693.5	1.5	322.1	Uplifted sedimentary block to the right.	236
12/8/2017	23:41:44	-14.91501	-173.77642	2689.6	2.4	321.8	Rubbly looking blocks of sedimentary(?) rock.	237
12/8/2017	23:42:04	-14.91499	-173.77644	2688.2	2.7	322.0	See some pillow fragments here and there.	238
12/8/2017	23:42:34	-14.91494	-173.77647	2687.4	2.1	322.4	Down block again. Falls a couple of meters.	239
12/8/2017	23:43:37	-14.91486	-173.77655	2688.1	2.2	308.9	More platy sheets on the seafloor here. Rubble and smaller material on the steeper slope to the west.	240
12/8/2017	23:44:13	-14.91483	-173.77660	2687.0	1.9	308.0	Pillow fragments on the seafloor here and there.	241
12/8/2017	23:45:12	-14.91479	-173.77668	2684.4	1.6	307.8	Jumbled up sedimentary sheets.	242
12/8/2017	23:46:29	-14.91474	-173.77677	2680.3	1.8	306.0	Not a whole lot of biota either. The occasional whip coral here and there.	243
12/8/2017	23:47:31	-14.91473	-173.77681	2677.7	3.0	305.6	See some white balls on the sandy sediment.	244
12/8/2017	23:47:55	-14.91472	-173.77685	2677.0	1.7	305.8	Pretty much a sandy sediment covered slope here.	245
12/8/2017	23:49:02	-14.91469	-173.77691	2674.6	1.1	306.1	Slabby older sedimentary layers to the left (south).	246
12/8/2017	23:52:24	-14.91461	-173.77712	2664.4	1.3	298.0	More sandy seafloor with platy sed sheets.	247
12/8/2017	23:52:59	-14.91460	-173.77716	2662.9	1.3	296.8	Flying saucer-esque creature just passed by.	248
12/8/2017	23:53:11	-14.91460	-173.77718	2662.0	1.6	297.6	More of this jumbled up sedimentary rock here.	249
12/8/2017	23:53:55	-14.91457	-173.77724	2659.1	1.4	296.6	Shrimp	250
12/8/2017	23:55:36	-14.91454	-173.77737	2654.1	1.8	289.1	Area of the seafloor that is covered in broken up lavas now. Interspersed with the platy sedimented sandstone from earlier.	251
12/8/2017	23:56:10	-14.91456	-173.77741	2652.3	3.0	288.3	These pillows look pretty much in place.	252
12/8/2017	23:56:40	-14.91455	-173.77743	2651.8	2.2	288.8	Lots of debris but also some in place lavas here.	253
12/8/2017	23:56:50	-14.91454	-173.77743	2651.6	2.2	288.9	The lower slope was mostly cemented sediment.	254

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S097 Mata Fitu Logger Comments	Record #
12/8/2017	23:57:01	-14.91455	-173.77743	2651.6	1.8	288.1	Now we're up in older volcanic rock.	255
12/9/2017	0:00:18	-14.91454	-173.77744	2651.8	2.0	287.9	**S97-rock-12**. Piece of pillow from jumbled debris. Supposedly in place. Iron oxide coating. 20 cm long pillow fragment. Outer crust and some hollow inside.	256
12/9/2017	0:03:51	-14.91453	-173.77745	2651.9	1.6	289.0	Going behind major #4. Z=2653. 30 x 20 cm. 14.914542 `73.777452.	257
12/9/2017	0:04:17	-14.91453	-173.77744	2651.7	0.0	288.8	There is no such thing as a small rock sample for these guys.	258
12/9/2017	0:04:24	-14.91453	-173.77745	2651.3	0.0	288.7	Continuing up slope.	259
12/9/2017	0:04:54	-14.91453	-173.77745	2649.5	2.6	288.4	Seeing some small corals here and there. Brittle star?	260
12/9/2017	0:05:21	-14.91452	-173.77748	2648.1	2.0	288.9	Big lava blocks here and large intact pillow here now.	261
12/9/2017	0:05:59	-14.91451	-173.77753	2645.8	1.6	289.9	Mostly intact lavas in back of us.	262
12/9/2017	0:06:06	-14.91451	-173.77754	2645.5	1.6	290.1	Debris field ahead.	263
12/9/2017	0:06:30	-14.91452	-173.77758	2644.5	1.2	289.5	Broken up pieces of lavas of various sizes.	264
12/9/2017	0:06:51	-14.91452	-173.77762	2643.6	1.1	288.7	Seeing more corals here and there. Whip coral to the right.	265
12/9/2017	0:07:54	-14.91451	-173.77769	2641.4	1.2	289.1	Slope drops off abruptly to the north. Approaching WP3.	266
12/9/2017	0:09:29	-14.91447	-173.77781	2639.6	3.8	275.0	Less than 200 m up the slope to WP4 - the location of Chim-E that was sampled in 2012 and was 331C at that time.	267
12/9/2017	0:09:50	-14.91444	-173.77787	2640.2	6.4	217.4	Rocky broken lava debris all over this slope.	268
12/9/2017	0:10:19	-14.91442	-173.77795	2642.4	6.1	211.8	Broken up pillows.	269
12/9/2017	0:11:36	-14.91431	-173.77810	2651.8	1.7	290.5	Rubble slope. More sediment on the bottom of the slope.	270
12/9/2017	0:11:43	-14.91431	-173.77811	2652.0	1.8	309.2	Lots of debris.	271
12/9/2017	0:12:11	-14.91426	-173.77815	2651.4	1.7	324.9	Driving NW. More broken up lava blocks and debris on the slope now.	272
12/9/2017	0:13:01	-14.91416	-173.77822	2650.4	1.9	320.6	Dropping down again. Lots of pillow debris. Some cracks in the seafloor.	273
12/9/2017	0:13:21	-14.91414	-173.77823	2649.7	2.3	310.5	Holothurian on the rock.	274
12/9/2017	0:14:04	-14.91412	-173.77829	2647.3	2.5	311.5	The broken layer underneath could be volcanic sand layers.	275

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S097 Mata Fitu Logger Comments	Record #
12/9/2017	0:14:24	-14.91409	-173.77831	2646.0	2.3	311.2	That used to be a magnificent pillow pile turned into a pile of rubble.	276
12/9/2017	0:15:18	-14.91403	-173.77839	2645.2	3.2	299.3	Undulating landscape. Rubble covered debris slope.	277
12/9/2017	0:15:56	-14.91403	-173.77849	2644.6	3.0	297.9	Probably some in place lavas.	278
12/9/2017	0:15:58	-14.91403	-173.77850	2644.6	2.9	298.0	Fish.	279
12/9/2017	0:16:43	-14.91401	-173.77859	2642.6	2.9	297.2	Going up a steep slope now. Rubble strewn - lots of pillows strewn about and fragmented pillows.	280
12/9/2017	0:18:06	-14.91397	-173.77873	2640.3	2.3	303.1	The map shows the Chim-E site at about 2640. We're at 2643 m now and still don't see anything.	281
12/9/2017	0:18:15	-14.91394	-173.77875	2640.2	2.6	302.4	Continuing to climb up the slope.	282
12/9/2017	0:19:10	-14.91383	-173.77876	2637.5	2.0	302.8	Rubbly slope of broken pillows. Some intact flattened lobate-looking lavas to the right.	283
12/9/2017	0:20:31	-14.91378	-173.77905	2634.3	2.0	302.6	Continuing up this somewhat steep slope.	284
12/9/2017	0:21:56	-14.91365	-173.77908	2631.0	2.0	347.2	A depth offset from the map Z=2640 on the map. and it's 2633 on the Subastian map.	285
12/9/2017	0:22:17	-14.91359	-173.77904	2630.0	2.6	347.4	Probably a dozen chimneys in this group.	286
12/9/2017	0:23:22	-14.91357	-173.77899	2627.9	3.5	348.3	Looking at a chimney in front of us that is covered in white mat. There is smoke coming out of the top of that one.	287
12/9/2017	0:23:33	-14.91357	-173.77892	2627.4	4.4	352.6	Extinct sulfide with brisingid.	288
12/9/2017	0:23:56	-14.91358	-173.77893	2626.6	5.3	14.1	More chimneys to the east here.	289
12/9/2017	0:24:25	-14.91356	-173.77892	2624.9	7.4	3.8	Huge chimney here. Massively large.	290
12/9/2017	0:25:09	-14.91354	-173.77883	2623.0	9.3	349.0	The one in front of us is active and huge.	291
12/9/2017	0:25:53	-14.91355	-173.77876	2622.2	12.0	344.0	Devils Tower. 14.9135370 173. 778768. Z=2622. Alt=13m.	292
12/9/2017	0:26:30	-14.91345	-173.77876	2623.4	8.9	324.9	Looking farther to the east.	293
12/9/2017	0:27:30	-14.91347	-173.77872	2621.8	10.8	324.4	Brachyuran crabs; snails; barnacles; shrimp; snails; Lots of life on this chimney. Anemone;	295
12/9/2017	0:27:40	-14.91337	-173.77873	2621.3	10.9	325.0	Lots of smoke coming out of this guy.	296
12/9/2017	0:29:09	-14.91343	-173.77881	2618.1	15.0	322.5	Still moving up this large chimney. Barnacle Bill. 14.9134250 173.7788214. 15 meters high. Smokers.	297
12/9/2017	0:29:20	-14.91342	-173.77879	2619.3	13.3	325.0	Barnacle Bill is pretty tall and skinny.	298
12/9/2017	0:30:56	-14.91335	-173.77877	2624.8	8.9	292.3	Now we're heading NW. Black smoker beehive on top. Black beehive. Hdg is 29614.013355 173.778777. Hdg = 9m.	299

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S097 Mata Fitu Logger Comments	Record #
12/9/2017	0:32:08	-14.91333	-173.77878	2627.2	5.3	293.4	Bumping down the iris now. Iron encrusted tower - Black Beehive - anemone and holothurians.	300
12/9/2017	0:32:30	-14.91333	-173.77878	2628.0	5.5	292.4	We're still at black beehive.	301
12/9/2017	0:33:17	-14.91329	-173.77878	2625.5	8.7	275.2	We're continuing up slope. Tons of spires.	302
12/9/2017	0:33:43	-14.91324	-173.77881	2625.6	8.2	249.5	Now we're facing SW.	303
12/9/2017	0:34:31	-14.91326	-173.77884	2629.0	4.4	235.8	The chimneys ahead are smaller and next to each other. 6 meters high. Lots of shimmering water coming out of this one.	304
12/9/2017	0:34:42	-14.91325	-173.77884	2628.7	4.8	236.9	Black smoke behind this one.	305
12/9/2017	0:35:14	-14.91324	-173.77884	2627.4	5.6	237.5	A lot of these look half extinct.	306
12/9/2017	0:35:34	-14.91322	-173.77887	2626.8	5.9	241.8	There are whelks on the extinct chimneys.	307
12/9/2017	0:35:48	-14.91323	-173.77889	2626.9	4.7	243.4	Whelks and anemones all over the seafloor here.	308
12/9/2017	0:36:48	-14.91325	-173.77892	2627.3	2.6	243.7	Anemones and whelks galore here. Dubbing this "Clam Top - Whelk Bottom".	309
12/9/2017	0:37:14	-14.91325	-173.77892	2627.5	3.3	244.5	These chimneys in this area are pretty old and cold.	310
12/9/2017	0:37:56	-14.91325	-173.77890	2626.9	4.4	243.1	Hanging holothurians(?)	311
12/9/2017	0:38:50	-14.91324	-173.77889	2624.7	6.1	236.3	Holy Holothurian or echiura (a type of worm). Probably the worm according to Walter.	312
12/9/2017	0:39:15	-14.91326	-173.77891	2624.4	7.2	271.5	Zooming in on the flow here.	313
12/9/2017	0:40:04	-14.91327	-173.77895	2626.5	4.1	1.2	Scale worms; shrimp; squat lobsters; Just one area of venting up top. Black smoker bee hives near the bottom.	314
12/9/2017	0:41:00	-14.91327	-173.77899	2626.5	4.0	4.6	Dubbed "Wormy Tower" 14.9132515 173.7789774 Z=2630 at the base.	315
12/9/2017	0:41:36	-14.91329	-173.77895	2625.7	4.8	295.9	Going to head down to Devils Tower.	316
12/9/2017	0:42:14	-14.91329	-173.77899	2624.7	4.9	221.1	Clam - Whelk to the right. "Clamtop".	317
12/9/2017	0:42:32	-14.91329	-173.77903	2625.6	6.0	203.9	Lots of beautiful smoky chimneys to the south.	318
12/9/2017	0:43:02	-14.91330	-173.77907	2626.5	5.7	199.4	Beehive right ahead of us.	319
12/9/2017	0:43:41	-14.91330	-173.77911	2626.6	4.8	179.6	Painted Towers to the left.	320
12/9/2017	0:43:58	-14.91331	-173.77908	2626.5	5.7	177.6	Looking due south. A little to our right is a white patch on the seafloor.	321
12/9/2017	0:44:30	-14.91334	-173.77904	2628.3	4.9	176.6	Beyond it is another monster tower. Bamboo Tower??	322
12/9/2017	0:45:03	-14.91339	-173.77900	2629.0	4.5	136.4	Continuing on to Devils Tower.	323

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S097 Mata Fitu Logger Comments	Record #
12/9/2017	0:45:24	-14.91342	-173.77897	2629.3	5.2	138.0	This is probably the upslope side of Devils Tower we're coming upon.	324
12/9/2017	0:45:31	-14.91344	-173.77897	2629.3	5.3	127.7	Lots of Barnacles on this north side.	325
12/9/2017	0:46:10	-14.91347	-173.77894	2629.1	4.6	123.1	Seeing squat lobsters; anemones; barnacles; that worm again; .	326
12/9/2017	0:46:23	-14.91347	-173.77895	2629.0	4.9	122.7	We're going to do a vertical transect first.	327
12/9/2017	0:47:33	-14.91347	-173.77892	2626.6	7.5	122.5	We are at Devils Tower. We're looking at the NW side.	328
12/9/2017	0:48:59	-14.91347	-173.77892	2621.8	11.5	122.6	Moving up this side of the huge chimney. Seeing lots of barnacles; anemones; white stalks are what? Anemones.	329
12/9/2017	0:49:22	-14.91348	-173.77892	2620.8	12.4	122.3	We're seeing tubes protruding here and there. Snail.	330
12/9/2017	0:50:12	-14.91348	-173.77893	2619.0	12.7	122.2	This is Devils Tower with lots of barnacles and other biota. This is the cooler side of the chimney.	331
12/9/2017	0:52:09	-14.91349	-173.77893	2614.9	18.2	80.4	The top of this side is 15 m at least. Continuing up Looking at this guy from the SW it's over 17 m high.	332
12/9/2017	0:53:06	-14.91353	-173.77890	2617.2	13.5	349.9	We're looking at the south side. We have lots of shrimp here	333
12/9/2017	0:53:19	-14.91353	-173.77889	2618.3	13.5	342.1	Shrimp; Nice diffuse flow.	334
12/9/2017	0:53:41	-14.91353	-173.77887	2619.8	11.7	342.9	Crabs; snails are covered in iron oxide coating.	335
12/9/2017	0:54:15	-14.91354	-173.77887	2622.5	9.0	342.7	Little black beehive. Sampling site there at 2621m. 110m altitude.	336
12/9/2017	0:54:36	-14.91355	-173.77887	2624.7	7.3	342.4	Peter	337
12/9/2017	0:54:51	-14.91355	-173.77887	2626.3	4.5	343.1	Crab conference.	338
12/9/2017	0:55:02	-14.91355	-173.77887	2627.3	3.7	342.9	Continuing down this south face.	339
12/9/2017	0:55:19	-14.91355	-173.77886	2628.6	2.6	343.1	Anemone land as we descend and get closer to the base.	340
12/9/2017	0:55:35	-14.91355	-173.77886	2629.1	2.4	343.0	Nice little beehive there.	341
12/9/2017	0:55:54	-14.91354	-173.77886	2628.9	2.5	342.7	Depth at the base of Devils Tower is 2631.	342
12/9/2017	0:56:24	-14.91355	-173.77887	2628.1	3.9	343.1	Didn't see prime real estate for sampling there.	343
12/9/2017	0:58:25	-14.91346	-173.77884	2621.8	9.2	231.4	Circling around the base. This is a pretty wide chimney when looking at the NE side. Probably 5 meters across at the base.	344
12/9/2017	0:58:47	-14.91347	-173.77886	2620.2	10.5	230.4	Moving up this NE side of "Devils Tower".	345

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S097 Mata Fitu Logger Comments	Record #
12/9/2017	0:59:48	-14.91346	-173.77886	2617.5	14.6	230.3	Anemones; barnacles; shrimp; snails; opaepele shrimp.	346
12/9/2017	1:00:02	-14.91346	-173.77888	2617.1	14.5	232.5	Beehive at the top over the.	347
12/9/2017	1:01:06	-14.91356	-173.77886	2624.6	6.8	231.2	We're going to travel to the W/SW and look at some other chimneys for sampling possibilities.	348
12/9/2017	1:02:41	-14.91357	-173.77889	2628.9	3.3	317.7	We are downslope of the active chimneys now at 2630 m.	349
12/9/2017	1:03:22	-14.91358	-173.77894	2629.1	2.7	318.6	There are a couple of extinct chimneys in front of us.	350
12/9/2017	1:03:43	-14.91358	-173.77898	2628.9	2.5	318.7	Brisingid on the top of extinct sulfide.	352
12/9/2017	1:04:21	-14.91357	-173.77902	2628.7	2.5	318.0	Thumbs up. Pretty little fairy-castle like chimney here. Shimmer at the bottom.	353
12/9/2017	1:04:49	-14.91356	-173.77903	2627.3	3.9	317.9	Fairy castle look to this little chimney. Beehive at the top. 4 meters high.	354
12/9/2017	1:05:22	-14.91358	-173.77907	2626.6	5.3	342.6	Another huge chimney in front of us with white bac mat at the bottom.	355
12/9/2017	1:05:54	-14.91355	-173.77910	2626.2	5.3	353.7	Another tall chimney here.	356
12/9/2017	1:06:28	-14.91354	-173.77911	2624.3	8.5	353.4	Barnacles; shrimp; scale worms.	357
12/9/2017	1:07:05	-14.91354	-173.77911	2622.1	9.8	353.6	Continuing up this big guy.	358
12/9/2017	1:07:58	-14.91353	-173.77910	2618.8	13.7	353.5	Moving up this huge chimney with various biota. Looking at the south side of this guy. Bac mat - filamentous. Lots of orange sulfide coating.	359
12/9/2017	1:08:09	-14.91353	-173.77910	2618.1	14.5	353.6	Red iron mat here as well.	360
12/9/2017	1:08:33	-14.91353	-173.77911	2616.5	16.1	353.7	Not as many animals as we move up..	361
12/9/2017	1:08:51	-14.91353	-173.77911	2615.7	16.9	353.6	Small orifices. with hot water coming out.	362
12/9/2017	1:09:55	-14.91354	-173.77913	2616.1	16.8	353.7	Black smoker 17m high. We're dubbing it Red Wood. Over 17 m high with lots of hot water pouring out.	363
12/9/2017	1:10:35	-14.91353	-173.77913	2616.2	16.4	353.3	Red Wood position 14.9135386 173.7791308 at the south side of Red Wood.	364
12/9/2017	1:11:04	-14.91352	-173.77912	2616.4	16.6	353.7	Chris wants to get that chimney top.	365
12/9/2017	1:12:19	-14.91354	-173.77910	2616.2	16.4	353.5	Nice intense flow out of the top of this huge chimney. 17+ m high. The "trunk" is red. It's a great name for it: Redwood.	366
12/9/2017	1:14:56	-14.91356	-173.77909	2616.1	16.5	353.4	All the typical sampling will happen here: Temp probe first; gas; fluids; bio; sulfides; then top it off (at the base) with a marker.	367

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S097 Mata Fitu Logger Comments	Record #
12/9/2017	1:16:01	-14.91356	-173.77909	2613.1	19.6	353.5	No big broad base on this one. Just rises right out of the ground (like a tree).	368
12/9/2017	1:16:34	-14.91353	-173.77911	2615.1	17.3	353.7	Beautiful black smoke coming out of the top of this guy.	369
12/9/2017	1:16:55	-14.91354	-173.77911	2616.0	16.6	353.6	The smokiest chimney we've seen and black smoke is coming out of it.	370
12/9/2017	1:21:19	-14.91354	-173.77912	2616.0	16.6	16.4	The top of Redwood is at 2616 meters. 2 main black smoker beehives and a couple smaller beehives.	371
12/9/2017	1:24:46	-14.91354	-173.77912	2616.0	17.2	16.6	Going up: 230; 260; 270; 273; 290; 295; cont....	372
12/9/2017	1:25:07	-14.91354	-173.77911	2616.0	16.7	16.6	Have excavated the beehive out of the way and now the temp probe is directly in the flow.	373
12/9/2017	1:27:40	-14.91354	-173.77912	2615.9	17.4	16.9	Tmax here in the lower of the two big beehives was 295C. (it's probably hotter but they can't get the probe to poke down into the orifice).	374
12/9/2017	1:32:21	-14.91352	-173.77911	2616.0	17.2	17.1	Going in for a gastight sample first. Nav fix for Redwood is: 14.913523 173.779106. The chimney is > 17 m high.	375
12/9/2017	1:34:54	-14.91352	-173.77911	2616.0	17.1	17.5	Our heading here is 16.	376
12/9/2017	1:39:54	-14.91356	-173.77910	2615.9	17.2	18.0	**S97-gas-13**. Gastight bottle #6 - yellow. In orifice where Tmax=295C. It's in there. Fired at 0139:40.	377
12/9/2017	1:40:38	-14.91356	-173.77910	2615.9	17.2	17.4	That was probably not a good sample - Tamara will take another one now.	378
12/9/2017	1:45:15	-14.91355	-173.77913	2615.9	17.1	16.9	Walter has confirmed that the wormy-like thing we saw earlier is a holothurian (sea cucumber) Chiridota hydrothermica.	379
12/9/2017	1:46:34	-14.91355	-173.77913	2615.9	17.2	16.7	Going in for another gastight in the same orifice on "Redwood".	380
12/9/2017	1:49:46	-14.91353	-173.77912	2616.0	17.2	16.9	That gastight was fired in the crate. So there was no sample on that one - just background sea water.	381
12/9/2017	1:51:28	-14.91355	-173.77913	2616.5	15.6	16.3	**S97-gas-14**. GTB-2 green. Fired in the milk crate. Not a hydrothermal sample. Will process it anyway for background sea water sample. Redwood: 14.913523 173.779106.	382
12/9/2017	1:55:33	-14.91354	-173.77912	2615.7	17.8	16.1	**S97-fluid-15**. Major #1. Going for same orifice as gastight and temp at Redwood: 14.913523 173.779106. Sampling at 2616 m near the top. Fired at 0155:30.	383

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S097 Mata Fitu Logger Comments	Record #
12/9/2017	1:58:02	-14.91357	-173.77911	2615.7	17.8	16.8	The major has been fired - and it's full now at 0157:55.	384
12/9/2017	1:59:08	-14.91354	-173.77912	2615.7	16.9	16.5	Going back in for another major water sample in the same orifice. Dave wants a duplicate sample here.	385
12/9/2017	2:10:44	-14.91352	-173.77912	2615.7	16.8	16.4	**S97-fluid-16**. Going for duplicate fluid sample in same orifice. Major sampler #3. Fired at 0209:30. Redwood.	386
12/9/2017	2:12:08	-14.91352	-173.77913	2615.7	17.9	17.0	In the less than an hour since we knocked the beehive over to sample - a new beehive; actually 2; have sprung up in its place.	387
12/9/2017	2:12:43	-14.91353	-173.77913	2615.7	16.8	16.5	The last 3 samples have been taken on the southern side of the chimney Hdg=17 degrees.	388
12/9/2017	2:12:50	-14.91354	-173.77913	2615.7	16.9	16.5	Storing the major.	389
12/9/2017	2:15:03	-14.91354	-173.77911	2615.6	16.8	16.0	Russ	390
12/9/2017	2:17:22	-14.91354	-173.77910	2615.9	16.7	355.3	Getting a highlight clip of Redwood. Beautiful black smoke pouring out of those beehive - which have grown back in less than an hour.	391
12/9/2017	2:21:44	-14.91353	-173.77910	2615.9	16.5	354.8	**S97-sulfide-17**. Top of Redwood. Orifice where we were sampling. The area where the beehive grew back in less than 1 hour. Beautiful chalcopyrite in there.	392
12/9/2017	2:25:24	-14.91353	-173.77911	2615.9	16.6	355.1	Sulfide from the top of Redwood. Small piece of active venting area. 5 cm max. Outer rind. Fell in the gastight box.	393
12/9/2017	2:27:59	-14.91352	-173.77910	2615.9	16.5	354.4	Securing the gastight sampler now.	394
12/9/2017	2:29:16	-14.91352	-173.77911	2615.9	16.5	354.5	Securing the other gastight next - and so does major 3 need securing.	395
12/9/2017	2:29:29	-14.91352	-173.77911	2615.9	16.5	354.6	Doing a bit of housekeeping here.	396
12/9/2017	2:32:37	-14.91354	-173.77912	2619.4	12.7	16.2	Moving down the chimney of this south side looking at the biota. not a lot going on. The occasional shrimp. Some barnacles on the east side.	397
12/9/2017	2:34:35	-14.91354	-173.77911	2626.7	5.4	6.7	Scale worms and barnacles.	398
12/9/2017	2:35:28	-14.91354	-173.77910	2625.9	5.9	9.8	Lots of shrimp right there for Walter.	399
12/9/2017	2:36:24	-14.91354	-173.77908	2625.9	6.0	9.9	Going for the suction sample for biology.	400

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S097 Mata Fitu Logger Comments	Record #
12/9/2017	2:41:42	-14.91352	-173.77909	2626.1	5.9	11.4	**S97-bio-18**. Still on S side of Redwood. Z=2626 here on the chimney. Jar #3 ~15 Shrimp (Opaepele); 2 red and white scale worms; Barnacle.	401
12/9/2017	2:42:32	-14.91353	-173.77910	2626.1	5.9	11.8	Zoomed on sulfide worm.	402
12/9/2017	2:43:24	-14.91353	-173.77910	2629.4	2.3	11.7	Moving down the base of Redwood.	403
12/9/2017	2:44:28	-14.91352	-173.77909	2629.8	1.7	14.4	The base of this structure is at 2630 m (at least the platform that it is sitting on.	404
12/9/2017	2:48:40	-14.91356	-173.77908	2629.1	3.2	18.0	**Deploying Marker 279 at the base of Redwood**. Marker 279. Z=2633 at the base. 19 degree heading. 14.913523 173.779106.	405
12/9/2017	2:49:45	-14.91354	-173.77911	2623.5	8.6	353.8	Exploring around a bit.	406
12/9/2017	2:52:15	-14.91344	-173.77909	2624.6	8.3	284.2	Eiffel Tower target: 14.913457 173.7791502. Z=2623 at the top. It's about 9 m high.	407
12/9/2017	2:52:47	-14.91342	-173.77910	2625.6	8.0	261.0	Eiffel Tower has lots of orifices - some big beehives with gray smoke.	408
12/9/2017	2:57:29	-14.91348	-173.77912	2626.0	5.0	335.3	**S97-bio-19**. Holothurian (Chirodota) Long skinny rather transparent creature. Got-em. Here at Eiffel Tower. From the south side of this chimney.	409
12/9/2017	2:58:21	-14.91349	-173.77911	2625.2	4.8	320.4	Added barnacles to that canister as well. We're about 5 m off the seafloor.	410
12/9/2017	2:58:52	-14.91348	-173.77909	2624.7	5.0	318.3	Walter would also like some snails. We're going to use the scoop bag.	411
12/9/2017	3:00:53	-14.91346	-173.77912	2624.2	7.2	357.6	Circling around this chimney. See some snails at the top. of the chimney.	412
12/9/2017	3:01:46	-14.91345	-173.77914	2624.0	8.1	356.8	Little tiny spire there. We're near the top of this chimney and the altitude is close to 8 m.	413
12/9/2017	3:03:07	-14.91346	-173.77913	2624.0	7.3	357.5	We're here at Eiffel Tower. Going to switch arms for this scoop sample of snails.	414
12/9/2017	3:04:36	-14.91346	-173.77914	2624.0	7.6	357.5	**S97-bio-20**. Going for bio-20 scoop of snails. We're at Eiffel Tower.	415
12/9/2017	3:21:41	-14.91338	-173.77916	2626.7	4.0	61.1	Eiffel Tower nav fix: 14.913476 173.779084. Got a few snails	416
12/9/2017	3:22:06	-14.91338	-173.77915	2629.0	1.3	61.3	We are flying around with scoop-4 still in port manip. Flying over some smokers	417
12/9/2017	3:25:31	-14.91341	-173.77911	2631.8	1.4	337.2	Moving into an area of low-lying black sulfide deposits with squat lobsters and a lot of marine snow likely that we kicked up. Snow globe	418

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S097 Mata Fitu Logger Comments	Record #
12/9/2017	3:28:03	-14.91339	-173.77909	2631.7	2.4	269.4	Found a fairly tall chimney ~10m west of Bamboo Tower. Terry suggests "K2"	419
12/9/2017	3:28:29	-14.91339	-173.77909	2631.7	2.4	269.4	S97-bio-20 stowed in GT box	420
12/9/2017	3:28:50	-14.91339	-173.77909	2631.7	2.4	269.2	Deploying temp probe	421
12/9/2017	3:37:02	-14.91337	-173.77910	2631.6	2.5	279.3	Taking a measurement. Ambient is 1.8C from ROV CTD. Tmax = 261.9C	422
12/9/2017	3:44:07	-14.91339	-173.77910	2631.5	2.5	279.0	**S97-fluid-21.** Water sample from 262C vent on K2. Location 14.913382 173.7790881 depth 2631m	423
12/9/2017	3:53:12	-14.91339	-173.77904	2612.5	20.0	330.2	**S97-sulfide-22**. Part of the K2 chimney Location: 14.913382 173.7790881 depth 2631m	424
12/9/2017	3:53:29	-14.91338	-173.77903	2605.5	25.7	335.3	Off bottom. End of Dive 97	425
12/9/2017	3:53:52	-14.91338	-173.77901	2601.9	27.1	352.1	Codey	426
12/9/2017	3:56:05	-14.91374	-173.77880	2559.3	79.7	138.0	Vehicle Leaving Seabed	427

S098 South Tafu

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S098 South Tafu Logger Comments	Record #
2017-12-09	18:43:30	-15.38165	-174.25890	2110.9	6.0	146.5	Bottom in sight.	24
2017-12-09	18:43:53	-15.38166	-174.25894	2111.6	5.3	146.3	Tafu young eruption site. Starting off the new flow.	25
2017-12-09	18:44:07	-15.38166	-174.25892	2112.7	4.2	147.7	We're starting west of the new flow.	26
2017-12-09	18:44:28	-15.38167	-174.25885	2113.3	3.7	148.3	We're in sandy terrain here. Small ripples.	27
2017-12-09	18:45:56	-15.38168	-174.25872	2116.6	0.0	146.1	Dark black grains in the trough of these ripples.	28
2017-12-09	18:46:22	-15.38169	-174.25858	2116.7	0.0	147.4	Seeing some orange sediment in patches (hydrothermal floc).	29
2017-12-09	18:46:43	-15.38164	-174.25864	2116.7	0.0	147.4	Going to go in for a sediment sample.	30
2017-12-09	18:47:50	-15.38170	-174.25874	2116.7	0.0	146.8	Going for a sediment scoop.	31
2017-12-09	18:48:17	-15.38169	-174.25874	2116.7	0.0	146.8	A little fluff tumbling around on the seafloor.	32
2017-12-09	18:50:20	-15.38167	-174.25872	2116.7	0.0	147.2	Small ripples in the sed with dark seds in the trough. Scoop bag 1.	33
2017-12-09	18:52:14	-15.38171	-174.25877	2116.7	0.0	147.3	**S98-sed-01**. Even the lighter seds are darker than normal. Dark black material. Glassy. Fresh black shiny volcanic fragments.	34
2017-12-09	18:54:07	-15.38170	-174.25869	2116.7	0.0	146.8	Half a bag. 15.381692 174.258740 Z=2117m.	35
2017-12-09	18:54:44	-15.38169	-174.25870	2116.7	0.0	146.5	A weird looking fish with a huge skull-like fish photo-bombed that sample. Swimming backward.	36

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S098 South Tafu Logger Comments	Record #
2017-12-09	18:54:57	-15.38169	-174.25870	2116.7	0.0	146.7	That scoop bag is about half full.	37
2017-12-09	18:56:29	-15.38170	-174.25872	2116.7	0.0	146.2	We have 2 majors and 1 gastight on this dive. Minimal fluid and gas sampling on this dive.	38
2017-12-09	18:57:21	-15.38164	-174.25876	2116.7	0.0	146.1	Bag stowed between the biobox and quad partition.	39
2017-12-09	18:58:15	-15.38172	-174.25866	2116.3	0.7	147.0	To date the really young rocks Ken uses polonium dating. It's a radioactive substance.	40
2017-12-09	18:59:35	-15.38183	-174.25864	2116.3	0.7	139.1	Moving along this volcaniclastic sedimented seafloor.	41
2017-12-09	18:59:43	-15.38180	-174.25860	2116.2	0.8	139.8	Not seeing any rocks at all.	42
2017-12-09	18:59:54	-15.38181	-174.25859	2116.4	0.6	139.5	There's a rock.	43
2017-12-09	19:00:45	-15.38185	-174.25853	2116.1	0.8	138.1	Weird fish here. Skinny and long - not rattails.	44
2017-12-09	19:01:05	-15.38188	-174.25850	2116.4	0.5	138.6	A couple of rocks showing up now. They are not in place.	45
2017-12-09	19:01:23	-15.38189	-174.25849	2116.6	0.0	139.3	Lots more yellow floc on the seafloor now.	46
2017-12-09	19:01:35	-15.38190	-174.25848	2116.5	0.0	138.9	We must be getting close to the new flow.	47
2017-12-09	19:01:52	-15.38191	-174.25846	2116.4	0.5	138.4	Seeing lots of yellow floc on the rippled seafloor now.	48
2017-12-09	19:02:39	-15.38196	-174.25839	2116.0	0.8	137.9	Larger boulder to the right.	49
2017-12-09	19:02:46	-15.38198	-174.25838	2116.1	0.6	138.2	The ripples are more erratic now.	50
2017-12-09	19:03:04	-15.38201	-174.25837	2116.2	0.6	138.6	All still loose rock fragments on the seafloor.	51
2017-12-09	19:03:27	-15.38203	-174.25835	2115.6	1.1	138.5	Nearly continuous orange floc on the seafloor now.	52
2017-12-09	19:03:47	-15.38205	-174.25833	2115.5	1.2	138.6	More large lava flocs in front of us.	53
2017-12-09	19:04:03	-15.38207	-174.25831	2115.5	1.1	138.1	Single shrimp crawling around on the seafloor.	54
2017-12-09	19:04:17	-15.38208	-174.25830	2115.7	0.8	138.3	Seeing more large rock fragments.	55
2017-12-09	19:04:47	-15.38211	-174.25827	2115.0	1.6	138.3	Continuously orange band of orange microbial floc on the seafloor now.	56
2017-12-09	19:05:34	-15.38215	-174.25822	2114.1	1.9	138.9	Lots more rock fragments here. The floc is turning a bit lighter in color now.	57
2017-12-09	19:05:48	-15.38216	-174.25821	2114.3	1.3	138.3	Lots of rock fragments here.	58
2017-12-09	19:07:03	-15.38220	-174.25816	2112.5	1.7	139.4	Some fish here. Don't look like a typical rattail.	59
2017-12-09	19:07:29	-15.38222	-174.25815	2112.2	1.4	139.4	We're at the edge of our depth anomaly now.	60
2017-12-09	19:07:44	-15.38223	-174.25814	2112.0	1.3	139.0	We're on an area of yellow seds and rock debris.	61
2017-12-09	19:07:52	-15.38224	-174.25814	2112.0	1.1	138.3	Seeing very large rock fragments.	62

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S098 South Tafu Logger Comments	Record #
2017-12-09	19:08:52	-15.38224	-174.25814	2112.6	0.5	139.3	We're going to collect a push core here on these sediments - before we get onto the core the new lava flow. We want to get the stratigraphy here.	63
2017-12-09	19:09:44	-15.38222	-174.25814	2112.5	0.5	139.6	Some of these depth changes in the toe of this anomaly are probably seds and rock fragments.	64
2017-12-09	19:11:33	-15.38222	-174.25812	2112.6	0.6	139.1	Going in for a push core with the core catcher.	65
2017-12-09	19:12:21	-15.38222	-174.25813	2112.5	0.6	139.0	The push core is falling apart - the silver band at the top has disconnected. The hose clamp has come off.	66
2017-12-09	19:12:41	-15.38223	-174.25813	2112.6	0.5	139.0	We're going to do a scoop bag instead.	67
2017-12-09	19:14:08	-15.38222	-174.25813	2112.6	0.5	139.3	Lots of orange floc covering the orange volcanic sand. The ripples we saw earlier are not visible here.	68
2017-12-09	19:16:24	-15.38223	-174.25812	2112.5	0.6	140.0	**S98-sed-02**. Yellow flocculent sand overlaying black volcaniclastic sands. The floc surface is substantial. Black shiny volcaniclastic seds underneath.	69
2017-12-09	19:18:30	-15.38222	-174.25812	2112.5	0.6	139.5	The yellow/orange floc is probably over a centimeter thick. Orange floc is fairly coherent. Extremely coarse volcanic sand.	70
2017-12-09	19:20:05	-15.38221	-174.25812	2112.6	0.6	139.7	Nav fix: 15.382232 S 174.25812 W Z=2113.	71
2017-12-09	19:20:27	-15.38222	-174.25813	2112.6	0.6	139.7	Huge red-colored fish.	72
2017-12-09	19:22:50	-15.38222	-174.25813	2112.6	0.5	139.7	Doing some bag housekeeping here.	73
2017-12-09	19:24:53	-15.38224	-174.25813	2112.0	1.0	139.8	Now we're looking SE 0 Seeing rocky debris on this yellow flocculent sedimented slope.	74
2017-12-09	19:25:15	-15.38225	-174.25812	2111.2	1.2	139.1	Large number of rock fragments of various sizes - including large boulder size.	75
2017-12-09	19:25:43	-15.38229	-174.25810	2110.3	1.4	138.5	We are probably within the depth anomaly area. Larger lumpier rocks that are not in place.	76
2017-12-09	19:26:10	-15.38231	-174.25808	2109.8	1.2	139.0	We're getting closer to the distal edge of the in place lava flow.	77
2017-12-09	19:26:47	-15.38235	-174.25804	2108.8	1.1	138.0	Larger pillow fragments here now. These rolled down slope.	78
2017-12-09	19:27:05	-15.38237	-174.25803	2108.3	1.2	138.3	Some yellow floc in the sediments between the rocks here.	79
2017-12-09	19:27:13	-15.38237	-174.25802	2108.0	1.3	138.6	Blocky pillow fragments.	80
2017-12-09	19:27:24	-15.38237	-174.25802	2107.5	1.6	138.7	Still a variety of sizes and shapes.	81

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S098 South Tafu Logger Comments	Record #
2017-12-09	19:27:27	-15.38238	-174.25802	2107.4	1.6	138.4	Scaleworm.	82
2017-12-09	19:27:51	-15.38239	-174.25800	2106.6	1.7	138.7	Large fish in front of us. Grenadier says Walter.	83
2017-12-09	19:28:10	-15.38241	-174.25798	2105.8	1.7	139.0	Seabed is looking a little furrier now. White staining on the rock fragments.	84
2017-12-09	19:28:27	-15.38242	-174.25796	2105.2	2.0	138.8	The yellow seds are not apparent here anymore.	85
2017-12-09	19:28:50	-15.38244	-174.25793	2104.9	1.3	138.4	We're in a little valley between 2 ridges.	86
2017-12-09	19:29:07	-15.38246	-174.25792	2104.5	1.4	139.1	The larger rocks have yellow floc on their fresh faces.	87
2017-12-09	19:29:14	-15.38246	-174.25791	2104.1	1.5	138.9	Squat lobster.	88
2017-12-09	19:29:35	-15.38248	-174.25790	2103.2	1.8	138.8	This debris looks fresh.	89
2017-12-09	19:30:51	-15.38254	-174.25785	2100.8	1.4	139.2	Some fresh black sands and some white floc here and there. Some yellow staining on the lava rubble here.	90
2017-12-09	19:31:28	-15.38257	-174.25782	2099.7	1.3	138.9	Some of these rock fragments look really fresh.	91
2017-12-09	19:31:36	-15.38257	-174.25782	2099.6	1.1	138.4	Not seeing much biology here.	92
2017-12-09	19:32:03	-15.38257	-174.25779	2098.3	2.0	142.3	Walter thinks the scale worm noted earlier was just a polychaete.	93
2017-12-09	19:32:23	-15.38256	-174.25779	2098.0	2.5	139.3	Huge pillow here that tumbled down slope. That's a couple meters across.	94
2017-12-09	19:32:42	-15.38256	-174.25778	2097.9	2.3	139.5	Nice fresh glassy surface on it. Orange floc sitting in the cracks.	95
2017-12-09	19:32:59	-15.38256	-174.25778	2097.5	2.7	141.8	Volcanic glass on top of this boulder.	96
2017-12-09	19:33:38	-15.38255	-174.25777	2097.8	2.2	141.9	There are some vesicles in this rock but no huge phenocrysts in these lavas. But we're only seeing the exterior here.	97
2017-12-09	19:33:50	-15.38256	-174.25777	2096.8	2.8	142.1	The navigation is working great today.	98
2017-12-09	19:34:00	-15.38258	-174.25776	2096.6	2.1	140.9	Poorly sorted debris slope.	99
2017-12-09	19:34:14	-15.38259	-174.25775	2096.4	1.6	140.6	Some white staining here and there.	100
2017-12-09	19:34:24	-15.38260	-174.25775	2095.8	2.0	140.7	The fragments are largely angular.	101
2017-12-09	19:34:38	-15.38262	-174.25775	2095.4	2.0	140.8	A lot more of these rocks also have the white staining.	102
2017-12-09	19:35:06	-15.38263	-174.25774	2095.0	2.0	141.4	It is a tiny swimming scallop. We saw those guys on the chimneys the other day.	103
2017-12-09	19:35:25	-15.38264	-174.25774	2095.0	2.0	141.5	Can see some olivine in that rock.	104
2017-12-09	19:35:36	-15.38264	-174.25774	2094.9	2.1	141.9	Basalt can have olivine and pycrite in it.	105

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S098 South Tafu Logger Comments	Record #
2017-12-09	19:36:37	-15.38266	-174.25772	2092.7	2.7	141.5	Rocky fragment piled up on each other - can't see the sediments here anymore.	106
2017-12-09	19:36:51	-15.38267	-174.25771	2092.1	2.5	141.2	So far haven't seen any in place lavas.	107
2017-12-09	19:37:16	-15.38269	-174.25770	2090.8	1.9	140.4	Still just seeing fragments up the slope.	108
2017-12-09	19:38:16	-15.38275	-174.25768	2087.6	1.7	141.5	Rocky angular fragments with lots of white floc.	109
2017-12-09	19:38:24	-15.38276	-174.25767	2087.3	1.8	141.5	Thicker pile of rock fragments here.	110
2017-12-09	19:39:23	-15.38277	-174.25765	2085.0	2.3	141.3	This piece of rock fragment in front of us has volcaniclastic sediments on it.	111
2017-12-09	19:39:50	-15.38278	-174.25764	2083.7	2.5	141.3	There is a substantial amount of sediments on these rocks. Looks like fresh black sand.	112
2017-12-09	19:40:05	-15.38278	-174.25763	2083.3	3.1	141.3	Ash?	113
2017-12-09	19:40:38	-15.38279	-174.25761	2082.6	2.5	141.4	Olivine-phyric rock. Not nearly as many crystals as boninite. Saw some olivine crystals up to 5 mm.	114
2017-12-09	19:40:49	-15.38279	-174.25760	2082.1	2.1	141.2	These might be very primitive basalts.	115
2017-12-09	19:41:08	-15.38280	-174.25758	2081.4	1.9	141.3	Volcanic seds on these rubble rocky fragments.	116
2017-12-09	19:41:55	-15.38282	-174.25755	2078.9	2.5	140.5	Scanning up slope and possibly seeing in place lavas here.	117
2017-12-09	19:42:04	-15.38282	-174.25755	2078.7	1.8	140.3	Blocky lavas here.	118
2017-12-09	19:42:28	-15.38284	-174.25754	2077.5	1.7	140.8	These blocks look more like folded sheet flow fragments.	119
2017-12-09	19:42:41	-15.38285	-174.25754	2077.1	1.5	141.1	Lots of volcanic sediment on these rocks.	120
2017-12-09	19:43:10	-15.38287	-174.25753	2075.9	1.5	141.0	Variety of sizes and shapes of rock just piled up here on the seabed.	121
2017-12-09	19:44:01	-15.38291	-174.25750	2073.4	1.7	140.9	No in place lavas here - still large rocky fragments.	122
2017-12-09	19:44:22	-15.38293	-174.25750	2072.1	1.7	140.7	Very unusual folded texture in some of these fragments.	123
2017-12-09	19:44:33	-15.38294	-174.25749	2071.2	2.1	140.7	More jumbled sheet flow fragments.	124
2017-12-09	19:45:41	-15.38298	-174.25746	2067.5	1.8	141.1	Rock fragments - big ones with volcanic sands on top.	125
2017-12-09	19:45:54	-15.38299	-174.25744	2066.6	2.3	141.0	Broken off pillows on the ends.	126
2017-12-09	19:46:21	-15.38301	-174.25741	2065.1	2.3	140.3	Continuing up this steepening slope.	127
2017-12-09	19:46:32	-15.38301	-174.25741	2064.3	2.9	141.5	Fresh lava rubble.	128
2017-12-09	19:47:08	-15.38303	-174.25739	2062.4	2.2	141.5	Pillow-like fragments.	129
2017-12-09	19:47:39	-15.38305	-174.25738	2061.1	0.0	141.3	Still working our way up slope. Haven't seen what are convincingly in place.	130
2017-12-09	19:48:07	-15.38305	-174.25737	2059.4	1.6	140.7	We're now at 2060 m depth.	131

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S098 South Tafu Logger Comments	Record #
2017-12-09	19:49:31	-15.38307	-174.25733	2055.5	2.1	141.0	Still in rock fragments.	132
2017-12-09	19:49:49	-15.38308	-174.25732	2054.8	1.8	141.3	Seeing some more of the yellow floc here and there.	133
2017-12-09	19:50:07	-15.38309	-174.25730	2053.6	2.1	140.9	We're now seeing some broken lavas.	134
2017-12-09	19:50:22	-15.38309	-174.25730	2053.1	2.8	142.1	Very coarse volcanic sands here.	135
2017-12-09	19:50:37	-15.38311	-174.25729	2052.2	3.0	141.2	We're going to take a sample. Ken needs a rock.	136
2017-12-09	19:51:10	-15.38313	-174.25728	2050.5	3.4	141.5	We are seeing more coherence to the pieces here. Still all fragmented here.	137
2017-12-09	19:51:40	-15.38315	-174.25729	2049.6	3.5	141.1	Ken wants to take a piece that is more coherent.	138
2017-12-09	19:51:56	-15.38316	-174.25728	2049.4	2.9	141.2	These pieces are all fragmented.	139
2017-12-09	19:52:40	-15.38316	-174.25729	2049.7	2.0	141.2	These don't look in place. Irregularly shaped pillow tube.	140
2017-12-09	19:56:18	-15.38315	-174.25729	2049.8	2.1	141.0	**S98-rock-03**. Piece of rock in area of fragmental lavas on steep slope. Thick glassy rind. Large olivine crystals. From bent pillow tube.	141
2017-12-09	19:58:57	-15.38317	-174.25729	2049.8	0.0	140.8	Nice thick glassy rind. 1 cm glass rind. Gray banded ground mass. Vesicular. Large olivine phenocrysts. 5 cm size.	142
2017-12-09	20:00:44	-15.38315	-174.25730	2049.7	2.1	140.4	Extremely fresh. Nav fix: 15.383159 174.257294 Z=2050m.	143
2017-12-09	20:02:26	-15.38316	-174.25730	2049.7	2.6	141.3	Extreme blackness on surface. Thick glass. 5 cm piece of same rock. 2nd piece. Grayish ground mass is micro-crystalline fabric.	144
2017-12-09	20:02:43	-15.38316	-174.25730	2049.7	2.0	140.8	Both those pieces went into quad 5.	145
2017-12-09	20:03:18	-15.38316	-174.25730	2049.8	0.0	141.3	Continuing up the slope.	146
2017-12-09	20:03:38	-15.38317	-174.25729	2049.2	2.6	141.8	These fragments look more pillow-esque.	147
2017-12-09	20:04:08	-15.38317	-174.25729	2047.0	4.4	141.8	Codey	148
2017-12-09	20:04:18	-15.38318	-174.25730	2045.2	5.6	139.3	Fragment covered slope. More uniform sized now. Pieces of pillow lavas mainly.	149
2017-12-09	20:05:00	-15.38323	-174.25727	2044.1	3.1	138.8	Rock fragments are jumbled up. Ken believes that these were mainly broken in place.	150
2017-12-09	20:05:47	-15.38327	-174.25723	2040.1	2.4	137.9	Some orange staining on that pillow.	151
2017-12-09	20:05:51	-15.38327	-174.25723	2040.2	2.5	138.0	Pilot change.	152
2017-12-09	20:06:26	-15.38329	-174.25721	2037.7	3.3	138.1	This depth anomaly so far has been rocky fragments.	153

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S098 South Tafu Logger Comments	Record #
2017-12-09	20:07:57	-15.38343	-174.25715	2028.1	3.5	130.3	Fairly big rampart that is on this steep slope. This slope may all be fragments.	154
2017-12-09	20:08:12	-15.38345	-174.25712	2026.7	2.9	131.4	We're seeing both pillow and ropey sheet flow fragments here.	155
2017-12-09	20:08:49	-15.38345	-174.25709	2024.4	2.3	119.4	A lot more discoloration on the outer surfaces.	156
2017-12-09	20:09:53	-15.38350	-174.25704	2018.3	3.2	124.5	Coming up a very steep slope covered in lava fragments.	157
2017-12-09	20:11:06	-15.38356	-174.25697	2013.3	2.1	123.3	These pieces have a very unusual folded texture. Folded sheet flow fragments.	158
2017-12-09	20:11:21	-15.38358	-174.25696	2012.0	2.8	124.1	Starting to look semi-continuous on this slope.	159
2017-12-09	20:11:46	-15.38361	-174.25695	2009.6	3.4	123.2	It's hard to tell with all these fragments whether they flowed down slope and broke.	160
2017-12-09	20:12:14	-15.38363	-174.25694	2008.4	2.8	123.6	Big pillow tube fragments.	161
2017-12-09	20:12:22	-15.38363	-174.25692	2007.4	3.2	123.7	More yellow mat.	162
2017-12-09	20:12:45	-15.38366	-174.25691	2005.4	3.4	123.9	Haven't seen any biota on these rock fragments.	163
2017-12-09	20:13:02	-15.38367	-174.25691	2004.2	3.2	124.6	These pillow tubes are looking more in place.	164
2017-12-09	20:13:30	-15.38367	-174.25689	2002.9	2.7	122.8	Shelly ropey fold a the base of a big pillow with white balls of material.	165
2017-12-09	20:13:49	-15.38367	-174.25688	2002.6	2.7	123.1	Ken wants one of the armored plates on the top of this pillow.	166
2017-12-09	20:14:03	-15.38367	-174.25688	2002.8	1.8	119.5	The thickest part of the flow is just up slope.	167
2017-12-09	20:14:39	-15.38367	-174.25690	2002.9	2.1	121.2	Possibly in place pillow lava. It may have moved a little bit down slope. It's a big coherent rock and upright.	168
2017-12-09	20:16:41	-15.38368	-174.25690	2002.9	1.6	122.0	**S98-rock-04**. Armored plate from large coherent pillow. White stuff in the rock cracks deposits that happened as the pillow is still cooling.	169
2017-12-09	20:17:21	-15.38371	-174.25688	2002.9	1.6	121.4	Hollow pillow inside. Yellow floc is pouring out now. Can see glass on the bottom and top of the piece.	170
2017-12-09	20:18:56	-15.38372	-174.25697	2000.3	7.5	121.3	White deposits on the cracks indicate period of extensive cooling. Fish sized. 10 cm 1.5 cm glass rind on upper surface. Thinner glass rind on lower surface. White coating on part of interior. Band of relatively thick vesicles up the center of the rind.	171
2017-12-09	20:20:21	-15.38369	-174.25692	2002.5	2.3	116.8	Seeing some crystals and yellow floc coating. Into partition 6. Chris's fix: 15.3836789 174.2568856. Z=2003m.	172

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S098 South Tafu Logger Comments	Record #
2017-12-09	20:20:40	-15.38369	-174.25692	2001.8	3.4	116.7	Beautiful pic of the pillow we just sampled.	173
2017-12-09	20:20:48	-15.38369	-174.25690	1999.9	4.0	116.9	Onward and upward.	174
2017-12-09	20:21:28	-15.38376	-174.25686	1995.8	3.0	116.3	Still rubbly here.	175
2017-12-09	20:21:45	-15.38378	-174.25685	1994.5	3.2	116.2	Largely fragmented debris.	176
2017-12-09	20:22:18	-15.38379	-174.25684	1987.7	8.8	110.6	In place pillow tubes with broken faces!! A bunch of broken pillow faces.	177
2017-12-09	20:22:36	-15.38379	-174.25684	1982.9	14.5	111.0	Shelly lavas. Steep pile of pillow tubes. Mostly they are full.	178
2017-12-09	20:22:50	-15.38379	-174.25682	1978.3	21.1	112.9	Seeing white staining and some yellow bacterial floc.	179
2017-12-09	20:23:03	-15.38378	-174.25682	1973.8	17.8	112.9	Massive pillows - broken.	180
2017-12-09	20:23:18	-15.38378	-174.25682	1968.9	29.4	112.8	Squat elongate in horizontal direction.	181
2017-12-09	20:24:17	-15.38383	-174.25679	1960.3	0.0	119.1	Lots of orange staining on this steep in place pillow ridge. Over 40 m high sheer rock face of totally intact pillows.	182
2017-12-09	20:24:42	-15.38379	-174.25679	1959.8	0.0	134.5	We're going to scan around this face a bit.	183
2017-12-09	20:24:53	-15.38378	-174.25678	1960.4	0.0	138.3	Some of those pillows are decapitated.	184
2017-12-09	20:25:08	-15.38377	-174.25676	1960.9	0.0	148.0	That's an amazing lava flow.	185
2017-12-09	20:25:32	-15.38367	-174.25682	1961.3	0.0	147.6	In place pillow mound here is over 40 m tall.	186
2017-12-09	20:25:51	-15.38362	-174.25685	1960.8	0.0	151.5	Seeing lots of yellow floc here as well.	187
2017-12-09	20:28:55	-15.38377	-174.25683	1961.3	0.0	149.0	Fresh in place pillows here. Here at WP 2. Z=1961. Going for pillow toe with yellow floc exterior.	188
2017-12-09	20:33:43	-15.38378	-174.25676	1961.8	0.0	147.0	In place elongate small pillow toe. Chris fix: 15.383771 174.256731. Z=1961.	189
2017-12-09	20:34:46	-15.38381	-174.25675	1961.9	20.3	150.7	S98-rock-05. Extruded pillow toe fragment. Olivine crystals. Looks like all glass. Iron floc stuck to exteriors.	190
2017-12-09	20:36:18	-15.38379	-174.25675	1961.9	36.6	148.7	Going for 2nd piece. Lost most of its glass. Large crystal in center. Rounded larger than first piece. Several fragments in there.	191
2017-12-09	20:37:21	-15.38383	-174.25672	1956.7	2.5	134.3	Nav fix: 15.383764 174.256732. Z=1961.	192
2017-12-09	20:38:03	-15.38391	-174.25667	1953.7	2.7	133.0	Continuing up these pillow mound. Elongate pillows and bulbous pillows here and there.	193
2017-12-09	20:38:22	-15.38393	-174.25665	1953.9	2.3	126.4	Coming on flatter squatter pillows here. Some white bac mat in the cracks.	194
2017-12-09	20:38:33	-15.38394	-174.25663	1952.8	2.9	126.3	No evidence of diffuse flow.	195

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2017-12-09	20:38:49	-15.38397	-174.25661	1952.3	2.6	125.3	Orientations of pillows are going in all directions.	196
2017-12-09	20:39:16	-15.38399	-174.25657	1951.5	2.1	123.6	Looks like there could still be some eruptive mat in the cracks between the pillows.	197
2017-12-09	20:39:33	-15.38401	-174.25654	1949.5	3.6	123.0	Coming up to the top of a tall pillow mound.	198
2017-12-09	20:39:52	-15.38404	-174.25651	1951.4	1.7	123.7	Some of these pillows are like a haystack.	199
2017-12-09	20:40:05	-15.38407	-174.25649	1952.9	2.6	124.3	We're coming back down.	200
2017-12-09	20:40:19	-15.38409	-174.25646	1954.1	2.0	123.7	Uneven shaped seabed with high-standing pillow features.	201
2017-12-09	20:40:32	-15.38407	-174.25643	1954.2	2.3	125.6	Lots of that very black glass on top of these pillows.	202
2017-12-09	20:40:55	-15.38408	-174.25637	1955.3	2.6	140.4	High-standing pillow ridge here. Inflated and broken pillows.	203
2017-12-09	20:42:39	-15.38417	-174.25628	1948.9	9.7	110.9	Shelly drained-out pillow in front of us.	204
2017-12-09	20:42:59	-15.38416	-174.25628	1947.6	11.7	110.3	Lots of yellow floc / orange staining in the cracks.	205
2017-12-09	20:43:11	-15.38415	-174.25628	1946.9	11.9	107.7	Many of these pillow tubes are broken.	206
2017-12-09	20:43:29	-15.38414	-174.25628	1945.7	13.5	118.2	We are now on the thickest part of the flow - contrary to commentary.	207
2017-12-09	20:43:58	-15.38414	-174.25628	1942.8	11.2	115.7	Elongate pillows.	208
2017-12-09	20:44:24	-15.38415	-174.25626	1940.5	0.0	116.2	We are now in the thickest part of the flow.	209
2017-12-09	20:44:32	-15.38416	-174.25626	1939.8	0.0	116.1	These are more bulbous pillows in front of us.	210
2017-12-09	20:44:42	-15.38415	-174.25625	1939.1	0.0	116.3	Sort of our of the elongate tubes.	211
2017-12-09	20:44:50	-15.38415	-174.25624	1938.5	3.1	115.8	Cresting another one of these steps.	212
2017-12-09	20:45:01	-15.38415	-174.25622	1938.0	0.0	122.6	Huge pillow lobes here.	213
2017-12-09	20:45:20	-15.38415	-174.25619	1937.2	2.5	121.7	Shelly drained-out piece of pillow here.	214
2017-12-09	20:45:30	-15.38415	-174.25617	1937.0	2.2	120.7	Something is growing here in that sediment.	215
2017-12-09	20:46:08	-15.38416	-174.25613	1934.1	3.0	98.0	Flattened elongated plobates.	216
2017-12-09	20:46:32	-15.38414	-174.25608	1933.2	1.6	97.8	Pillow / lobes are mounded up.	217
2017-12-09	20:46:48	-15.38413	-174.25605	1931.8	2.7	97.5	Smaller steps up here.	218
2017-12-09	20:47:06	-15.38414	-174.25602	1932.7	1.2	95.2	Intact pillows. Seeing bac mat in the cracks of these pillows.	219
2017-12-09	20:47:13	-15.38414	-174.25600	1932.8	1.2	94.5	High standing pillows.	220
2017-12-09	20:47:27	-15.38414	-174.25597	1933.1	2.1	95.3	Bacterial mat in the cracks in these pillows here.	221
2017-12-09	20:47:57	-15.38415	-174.25589	1934.2	2.1	103.2	Lots of volcaniclastic sands here. Some ripples in it - very thick.	222

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S098 South Tafu Logger Comments	Record #
2017-12-09	20:48:21	-15.38417	-174.25584	1933.5	2.5	103.9	Seeing more sand on these flatter pillow lobes that are transitional.	223
2017-12-09	20:48:39	-15.38416	-174.25582	1932.5	3.6	116.5	Large hollowed pillow - broken.	224
2017-12-09	20:49:00	-15.38415	-174.25581	1932.0	4.7	136.6	The white staining is not on all the cracks.	225
2017-12-09	20:49:48	-15.38423	-174.25574	1933.8	1.6	135.1	Mottled sediments on these flat-lying pillow lobes.	226
2017-12-09	20:50:05	-15.38425	-174.25573	1934.2	1.6	136.1	Large cracked pillows / lobates.	227
2017-12-09	20:50:12	-15.38426	-174.25571	1933.9	2.5	146.5	Fish off to the side.	228
2017-12-09	20:51:02	-15.38428	-174.25571	1934.2	1.7	180.4	Big pillows here. Sediment pocket between the large pillows.	229
2017-12-09	20:52:07	-15.38429	-174.25572	1934.6	0.0	180.4	Fish is possibly a zooarcid. Polychaete?	230
2017-12-09	20:52:56	-15.38428	-174.25571	1934.6	0.0	181.0	Want to see how thick the sediment is here.	231
2017-12-09	20:53:19	-15.38422	-174.25566	1934.7	1.0	178.3	We have at least a cm of volcaniclastic sediment here.	232
2017-12-09	20:55:19	-15.38411	-174.25565	1934.7	0.0	178.8	Polychaete fell into quad 8. Sacrificed itself. Another polychaete in the left distance.	233
2017-12-09	20:56:50	-15.38438	-174.25576	1934.7	1.2	179.3	**S98-sed-06.** Volcaniclastic sediment between pillow lobes. Some lighter seds on surface but mostly black.	234
2017-12-09	20:58:29	-15.38450	-174.25581	1934.7	1.0	178.8	The volcaniclastic seds here between pillows. Finer lighter colored "dust" blown in the current.	235
2017-12-09	21:00:37	-15.38430	-174.25579	1928.4	7.5	107.1	Half a scoop bag (#2) full of the sediments on this new flow. Z=1935m.	236
2017-12-09	21:01:59	-15.38434	-174.25576	1933.2	1.8	101.3	Z=1935m. Nav fix: 15.384240 174.255672. Chris fix: 15.3844141 174.2557800.	237
2017-12-09	21:03:16	-15.38436	-174.25572	1934.0	0.0	131.9	Nice elongate fat pillow tubes coming out of triangular pillow-like lobate-like lava.	238
2017-12-09	21:04:47	-15.38435	-174.25573	1934.0	0.6	131.8	**S98-rock-07**. Piece of pillow tube/lobe. Outer rind of hollow pillow with orange floc coming out interior.	239
2017-12-09	21:05:35	-15.38434	-174.25574	1930.8	4.1	129.8	Lots of young microbial staining on surface. Crystals and vesicular upper surface and more dense core. Rough texture glassy surface.	240
2017-12-09	21:07:18	-15.38440	-174.25573	1924.2	9.1	122.7	20 cm x 7 cm into quad 8. Z=1931. Nav fix: 15.384 358 174.255729.	241
2017-12-09	21:07:52	-15.38446	-174.25564	1930.3	3.2	121.1	We've seen a lot of yellow bacterial floc in these hollow pillows. Also a scale worm and some evidence of vent fauna.	242

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S098 South Tafu Logger Comments	Record #
2017-12-09	21:10:16	-15.38458	-174.25539	1930.1	3.3	125.9	Murky water and lots of evidence of fluid flow in pillow cracks	243
2017-12-09	21:10:19	-15.38459	-174.25538	1929.8	3.2	125.5	Nice pillow toes	244
2017-12-09	21:11:54	-15.38463	-174.25532	1928.2	2.7	123.4	Found a pillow with two draining episodes. Hollow and drained with pillow formation from drain. Then the second pillow drained. Drainception.	245
2017-12-09	21:13:19	-15.38464	-174.25528	1923.6	6.2	132.4	Lot of large highstanding pillow lavas	246
2017-12-09	21:14:26	-15.38466	-174.25528	1923.6	3.5	119.3	Tubular drained pillow that broke off on both sides	247
2017-12-09	21:16:01	-15.38468	-174.25518	1916.5	3.4	121.4	2/3 to waypoint 3	248
2017-12-09	21:17:25	-15.38470	-174.25510	1912.0	3.2	117.4	Hydroid growing on lava flow. These grow pretty quickly	249
2017-12-09	21:21:21	-15.38491	-174.25465	1902.6	2.0	110.8	Squalt pillow morphology. Very shelly and abundant inflation structures	250
2017-12-09	21:23:10	-15.38488	-174.25452	1903.8	2.8	116.6	No obvious evidence of diffuse flow. but the murkiness of the water suggests we can't rule it out in this area	251
2017-12-09	21:31:25	-15.38502	-174.25451	1908.3	0.8	101.1	Fragment of drainage from large pillow. Long-wavelength fold on glassy surface. 10x20cm. Thick vesicular glassy rind with vertical Fe stains	252
2017-12-09	21:34:42	-15.38502	-174.25444	1907.4	1.8	93.5	S98-rock-08 location: -15.3850196 -174.2545274 depth 1908m	253
2017-12-09	21:34:57	-15.38502	-174.25441	1906.1	2.3	93.2	waypoint 3	254
2017-12-09	21:36:15	-15.38505	-174.25407	1904.5	2.7	92.3	Seeing a few shrimp and swimming scaleworms	255
2017-12-09	21:36:48	-15.38504	-174.25401	1901.6	3.3	91.5	Transiting upslope	256
2017-12-09	21:38:06	-15.38495	-174.25392	1892.8	2.0	72.3	Slope is uneven but was briefly steep. Flattening out as we approach ridge crest	257
2017-12-09	21:40:03	-15.38489	-174.25370	1889.9	5.2	73.8	Very smoky water today. Difficult to see further than a few tens of meters	258
2017-12-09	21:40:42	-15.38491	-174.25361	1888.1	5.1	78.7	Increased proportion of pillow toes to large inflated larger source pillows. More fluid lavas than the boninites	259
2017-12-09	21:41:56	-15.38495	-174.25349	1886.7	3.7	92.6	Russ	260
2017-12-09	21:44:28	-15.38497	-174.25327	1887.3	2.4	92.2	Large lobate flows are shellier here. Approaching source?	261
2017-12-09	21:49:41	-15.38496	-174.25285	1891.9	2.5	89.0	Still seeing a lot of volcaniclastic ashy sediment ripples on top of pillows	262

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S098 South Tafu Logger Comments	Record #
2017-12-09	21:52:49	-15.38487	-174.25259	1891.6	2.0	89.5	We're traveling between WP 3 and WP 4. We should come off the new flow at WP4.	263
2017-12-09	21:53:22	-15.38486	-174.25254	1891.4	1.3	89.6	We are still on the news lava flow.	264
2017-12-09	21:53:51	-15.38485	-174.25249	1892.4	1.3	89.5	Looking like lobates here and large inflated pillow-like features.	265
2017-12-09	21:55:53	-15.38483	-174.25229	1896.1	3.0	89.7	On the backside of this flow it's not as steep - at least not yet.	266
2017-12-09	21:56:08	-15.38483	-174.25227	1896.8	3.0	90.2	Still seeing in place pillows.	267
2017-12-09	21:56:17	-15.38483	-174.25225	1897.8	3.0	89.5	Lots of murky water here.	268
2017-12-09	21:57:21	-15.38485	-174.25215	1902.3	2.2	89.5	Flat pillow tubes / lobes.	269
2017-12-09	21:57:36	-15.38483	-174.25214	1902.7	1.8	83.0	We're probably at the edge of the flow here.	270
2017-12-09	21:58:04	-15.38481	-174.25213	1902.1	2.0	106.4	Looking at hollow pillow here at the end of a flatter-lobelike pillow tube.	271
2017-12-09	21:59:37	-15.38483	-174.25215	1902.2	2.4	89.0	We are at the edge of this new lava flow. Seeing volcaniclastic sediments to the east of us. The difference map polygon appears to be right on.	272
2017-12-09	22:00:20	-15.38485	-174.25215	1904.1	0.0	41.9	Shelly drained-out pillow lavas right at the edge of the lava flow boundary.	273
2017-12-09	22:02:13	-15.38480	-174.25211	1904.2	0.0	47.8	**S98-rock-09**. Outer shell of drained-out pillow at the flow boundary. Z=1905 m. Chris fix: 15.3848443 174.2521179.	274
2017-12-09	22:04:30	-15.38484	-174.25213	1904.2	0.0	43.6	Fragile outer rind; crumbly glass exterior. Mostly glass pillow lava frag. 3cm thick 7cm long. Wedge shaped.	275
2017-12-09	22:06:30	-15.38506	-174.25234	1904.2	0.5	44.3	Into biobox 1. Very fresh black glassy rock from pillow lava at contact. Nav fix:15.384904 174.252030.	276
2017-12-09	22:07:53	-15.38483	-174.25212	0.0	0.8	43.1	Iridescent look to glass. Very young. Very vesicular and some is frothy. 2nd smaller piece. 5cm long.	277
2017-12-09	22:08:33	0.00000	0.00000	1904.2	0.0	42.8	Sample 9 went into biobox 1.	278
2017-12-09	22:10:09	-15.38499	-174.25228	1903.6	1.4	30.8	We want to follow along the contact here.	279
2017-12-09	22:10:47	-15.38494	-174.25224	1900.3	3.5	34.1	This is steepish front here. Pillows piled up. Obviously new lava.	280
2017-12-09	22:11:50	-15.38489	-174.25218	1901.4	2.2	38.6	We're going to cut the corner her and travel along the contact. Didn't go all the way out to WP 4.	281
2017-12-09	22:12:03	-15.38487	-174.25217	1902.2	2.0	38.7	Bulbous pillows and squatter pillow lobes.	282

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S098 South Tafu Logger Comments	Record #
2017-12-09	22:12:19	-15.38485	-174.25216	1902.5	2.0	38.9	Pillow tubes lying parallel to the ridge.	283
2017-12-09	22:13:05	-15.38480	-174.25213	1902.0	2.6	38.8	We're traveling to the NE along the lava flow boundary.	284
2017-12-09	22:15:53	-15.38468	-174.25198	1897.7	2.6	59.3	Highstanding pile of pillows and more drainceptions - nested drained pillows.	285
2017-12-09	22:17:19	-15.38463	-174.25191	1895.9	1.8	59.4	Volcanic sand on tops of flows is a little thicker here. Seeing an increase in the orange staining on the sedimented areas/in the sediments as well.	286
2017-12-09	22:19:04	-15.38458	-174.25186	1894.7	1.3	59.4	Squat pillow lavas with large cracks. High and low standing flows. White stains on crack faces. Looking out for diffuse flow nearby.	287
2017-12-09	22:20:28	-15.38455	-174.25182	1894.9	1.2	59.1	Huge cracked and drained pillow lava with white and orange staining on interior exposed surfaces.	288
2017-12-09	22:22:25	-15.38447	-174.25165	1893.0	2.1	59.2	Roof-collapsed drained pillows.	289
2017-12-09	22:23:42	-15.38441	-174.25159	1895.9	1.7	24.1	Bypassed waypoint 4 to follow ridgeline upsection.	290
2017-12-09	22:29:00	-15.38398	-174.25181	1878.4	3.4	347.8	Seeing some small sulfur balls - microbial colonies settled on top of flows.	291
2017-12-09	22:29:57	-15.38386	-174.25186	1876.6	3.4	348.2	More drained and disgorged pillows along this ridge.	292
2017-12-09	22:30:52	-15.38377	-174.25188	1873.5	3.6	349.3	Smoky water again. Still looking for evidence of diffuse flow.	293
2017-12-09	22:34:35	-15.38341	-174.25200	1872.1	3.9	331.3	Stacked flow with drainage into a larger collapsed pillow.	294
2017-12-09	22:40:14	-15.38331	-174.25240	1872.6	2.8	330.1	Lots of cracked seabed here.	295
2017-12-09	22:40:23	-15.38328	-174.25240	1872.5	3.2	346.0	Very large drained pillows.	296
2017-12-09	22:41:00	-15.38322	-174.25240	1871.4	3.9	352.6	Increased sediment load again.	297
2017-12-09	22:45:01	-15.38282	-174.25247	1879.3	3.2	352.7	Lobate flows are pretty large here.	298
2017-12-09	22:45:57	-15.38273	-174.25249	1879.5	2.1	352.5	Fewer ornamental toes on large pillows.	299
2017-12-09	22:50:14	-15.38238	-174.25263	1875.1	1.9	338.1	Still in area of flatter and less drained lobes. Allows for more sediment accumulation on the tops of the flows. Still not as many ornaments on lavas.	300
2017-12-09	22:51:10	-15.38236	-174.25264	1873.7	3.4	337.0	Seeing a few more swimming polychaetes and a squat lobster or two.	301
2017-12-09	22:51:28	-15.38236	-174.25264	1873.7	3.4	336.8	Fairly extensive microbial deposits on the flows.	302
2017-12-09	22:54:30	-15.38236	-174.25264	1873.7	3.5	337.5	**S98-fluid-10.** Forward Niskin successfully fired.	303
2017-12-09	22:55:22	-15.38232	-174.25267	1875.7	1.2	337.5	S98-Niskin-10 location 15.382363 173.252644 depth 1873m.	304

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S098 South Tafu Logger Comments	Record #
2017-12-09	22:58:23	-15.38214	-174.25281	1882.0	1.6	99.2	More shelly drained pillows here.	306
2017-12-09	23:01:57	-15.38185	-174.25291	1900.1	5.1	100.9	Approaching edge of lava flow and steep downslope near waypoint 5.	307
2017-12-09	23:02:37	-15.38180	-174.25294	1904.9	4.0	99.4	Lavas are again narrower and more highly ornamented with small breakouts.	308
2017-12-09	23:07:29	-15.38161	-174.25306	1920.9	5.6	98.8	Seeing more talus - localized explosions generating some fragment gravel to cobble grain size deposits.	309
2017-12-09	23:07:40	-15.38160	-174.25307	1921.6	5.6	99.5	Looking upslope and seeing lots of truncated pillows.	310
2017-12-09	23:08:14	-15.38157	-174.25310	1926.1	3.8	100.6	Talus fragments are getting a little larger downslope.	311
2017-12-09	23:08:19	-15.38157	-174.25310	1926.4	3.2	100.2	All talus.	312
2017-12-09	23:11:12	-15.38145	-174.25319	1934.9	5.9	128.3	Looks like talus pile is here because it's buttressed by a large outcrop of in-place lavas.	313
2017-12-09	23:21:36	-15.38147	-174.25321	1938.0	5.1	91.8	Logalicious 30x20cm pillow segment. Phyric and vesicular with thick grey groundmass and black core.	314
2017-12-09	23:22:13	-15.38144	-174.25323	1939.9	4.7	93.0	**S98-rock-11** Location: 15.3814768 174.2531926 depth 1937m.	315
2017-12-09	23:23:18	-15.38133	-174.25325	1941.3	10.2	97.4	Murky water still but not as bad as further upslope.	316
2017-12-09	23:25:06	-15.38109	-174.25333	1958.4	3.4	92.7	Back into well-sorted talus and a few intact pillows on top of a sediment lens as we continue downslope.	317
2017-12-09	23:25:39	-15.38107	-174.25335	1961.6	2.3	96.9	Appears to be the edge of the lava flow on the western side. No iron floc.	318
2017-12-09	23:26:57	-15.38102	-174.25330	1958.0	3.4	88.6	We're at the western edge of the traverse.	319
2017-12-09	23:29:53	-15.38112	-174.25298	1931.6	0.0	94.9	Now we're heading back to the east up another rubble debris slope. The debris must have fallen off from the new erupted lavas up slope.	320
2017-12-09	23:32:24	-15.38127	-174.25275	1905.4	0.0	102.7	These pillows are in place in front of us.	322
2017-12-09	23:33:12	-15.38132	-174.25271	1895.8	0.0	102.8	The slope is increasing dramatically here. See lots of decapitated pillow tubes hanging off this steep slope.	323
2017-12-09	23:34:35	-15.38139	-174.25261	1880.8	11.8	124.0	Heading up this steep slope. Lots of yellow - probably bacterial - floc in cracks around and within the pillows.	324

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S098 South Tafu Logger Comments	Record #
2017-12-09	23:35:28	-15.38132	-174.25251	1871.3	0.0	123.8	We're now approaching the top of this very steep slope.	325
2017-12-09	23:35:41	-15.38134	-174.25251	1870.6	0.0	122.0	These pillows are intact as the slope lessens.	326
2017-12-09	23:36:23	-15.38138	-174.25241	1869.0	2.9	123.0	More volcanic seds up here as the slope lessens.	327
2017-12-09	23:36:44	-15.38139	-174.25237	1866.7	3.2	123.6	Big bulbous pillows that are almost like lobes.	328
2017-12-09	23:37:21	-15.38141	-174.25230	1863.8	3.3	123.0	Sort of jumbly lavas in front of us.	329
2017-12-09	23:37:40	-15.38141	-174.25226	1863.0	2.8	123.4	Flat-ish large pillows - cracked and hollow inside.	330
2017-12-09	23:39:05	-15.38144	-174.25214	1861.0	3.0	124.1	The flow is more chaotic here - more lobate like. The video looks better now. Iris up.	331
2017-12-09	23:39:43	-15.38146	-174.25208	1861.5	2.4	123.3	The iris is back open.	332
2017-12-09	23:40:20	-15.38148	-174.25204	1863.3	2.1	123.3	Pillows that are hollow inside. Some with cracking.	333
2017-12-09	23:40:35	-15.38149	-174.25202	1864.1	2.3	122.9	Now we're coming upon more lobate-looking flow.	334
2017-12-09	23:41:10	-15.38151	-174.25198	1864.2	1.8	123.4	Fatter flatter pillows here - lava tubes are more like lobes.	335
2017-12-09	23:41:22	-15.38151	-174.25196	1863.9	1.7	122.7	Seeing volcaniclastic seds on top of the flow.	336
2017-12-09	23:41:44	-15.38152	-174.25193	1863.8	1.3	117.4	Broken up pillow here.	337
2017-12-09	23:42:26	-15.38153	-174.25188	1864.4	0.6	107.0	Chaotic lavas here. Large hollow with lobate/sheet flows.	338
2017-12-09	23:42:54	-15.38152	-174.25184	1863.0	2.6	107.4	Huge round pillow below.	339
2017-12-09	23:44:00	-15.38150	-174.25176	1866.0	1.2	122.9	Squat lobster to the right. A lot of mat on the pillow we just passed.	340
2017-12-09	23:44:27	-15.38151	-174.25172	1865.6	1.9	121.9	Seeing some vent fauna - squat lobster here and there and polychaetes.	341
2017-12-09	23:45:10	-15.38153	-174.25166	1866.1	2.2	122.4	Big high-standing pillows with lots of jagged fractured crust.	342
2017-12-09	23:45:25	-15.38154	-174.25163	1865.8	3.1	122.0	Larger mound of pillow lobes here.	343
2017-12-09	23:45:52	-15.38155	-174.25159	1865.7	3.1	122.0	Lots of stuff in the water so we suspect there is some hydrothermal flow here somewhere.	344
2017-12-09	23:46:17	-15.38156	-174.25155	1866.3	2.3	121.9	Most of these lavas are fractured up like they drained out a bit.	345
2017-12-09	23:48:25	-15.38166	-174.25137	1871.0	2.2	122.7	More cracked pillows here but the cracks are lessening.	346
2017-12-09	23:48:44	-15.38167	-174.25134	1871.4	1.7	122.9	There's a little bit of ash on the pillows.	347
2017-12-09	23:49:17	-15.38168	-174.25129	1871.2	2.4	119.3	The pillows in front of us are about 1 - 2 meters across.	348

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2017-12-09	23:49:50	-15.38169	-174.25124	1872.3	1.2	120.3	Now all of a sudden we are seeing some really flat pillow lobes.	349
2017-12-09	23:50:23	-15.38170	-174.25119	1872.5	1.6	119.4	Much flatter pillow lobes here.	350
2017-12-09	23:50:41	-15.38171	-174.25116	1872.3	2.6	121.4	We see the occasional large pillow.	351
2017-12-09	23:51:43	-15.38175	-174.25106	1874.7	0.4	121.8	Jumbled up flow here. Lots of cracked surfaces with staining.	352
2017-12-09	23:52:07	-15.38176	-174.25102	1873.3	2.4	121.6	There's virtually nothing growing on this lava.	353
2017-12-09	23:53:05	-15.38179	-174.25092	1873.9	1.8	117.4	Brand new seafloor here. It takes about 20 years for the first stalked animals to come in.	354
2017-12-09	23:53:48	-15.38182	-174.25086	1871.5	1.9	118.5	Another dome-like feature with a skylight.	355
2017-12-09	23:54:15	-15.38183	-174.25082	1871.2	1.3	118.6	Another collapse feature coming up to the right.	356
2017-12-09	23:54:37	-15.38184	-174.25080	1870.9	2.0	118.2	Drained out pillow there.	357
2017-12-09	23:55:08	-15.38184	-174.25075	1870.0	2.1	117.9	Large pillows here now on this steeper slope.	358
2017-12-09	23:55:33	-15.38185	-174.25070	1867.8	0.0	117.7	Long fat pillows with some shorted pillows interspersed that are moving down hill.	359
2017-12-09	23:55:42	-15.38185	-174.25068	1866.4	0.0	118.7	Shrimp.	360
2017-12-09	23:56:16	-15.38186	-174.25063	1859.5	7.3	118.1	Lots of yellow staining / mat here.	361
2017-12-09	23:56:33	-15.38187	-174.25061	1855.1	0.0	118.1	Continuing up this steep slope of pillow tubes.	362
2017-12-09	23:57:08	-15.38188	-174.25055	1850.9	0.0	129.6	Spongey disgorged pillow.	363
2017-12-09	23:57:11	-15.38189	-174.25055	1850.5	6.0	128.7	Rattail.	364
2017-12-09	23:57:59	-15.38192	-174.25045	1846.8	2.5	128.2	The slope is lessening here so the pillow tubes are flattening out and spreading out.	365
2017-12-10	00:01:30	-15.38214	-174.25002	1843.2	2.5	110.3	Hollow broken off pillow.	366
2017-12-10	00:02:16	-15.38219	-174.24990	1841.5	3.2	96.8	Moving towards highest point in summit area.	367
2017-12-10	00:03:44	-15.38200	-174.24978	1841.6	3.7	62.0	Pillows with ash on top.	368
2017-12-10	00:04:16	-15.38193	-174.24976	1843.7	3.0	137.0	We are up on a little knoll on the top of the ridge.	369
2017-12-10	00:04:41	-15.38189	-174.24974	1845.5	2.6	136.1	A big open pillow. Many pillows are hollow and have little windows.	370
2017-12-10	00:06:19	-15.38173	-174.24970	1847.6	2.2	135.7	Heading west back on the ridge and then north along the ridge.	371
2017-12-10	00:07:19	-15.38162	-174.24969	1842.1	4.1	35.5	Angular debris on slope.	372
2017-12-10	00:07:54	-15.38157	-174.24964	1836.5	4.4	34.7	Heading downslope. Lots of talus broken off from above lava flows.	373
2017-12-10	00:08:38	-15.38158	-174.24965	1826.5	15.6	34.1	Steep south slope. Climbing it up. Pillows.	374

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2017-12-10	00:09:32	-15.38147	-174.24964	1818.2	3.0	18.5	Slope gets more gently towards the top of the ridge. Still yellow staining.	375
2017-12-10	00:11:31	-15.38122	-174.24959	1810.2	2.9	18.4	Still going up the slope.	376
2017-12-10	00:14:29	-15.38098	-174.24979	1806.3	2.7	16.5	We are due taking sample.	377
2017-12-10	00:15:50	-15.38097	-174.24978	1808.1	1.1	18.9	We are preparing for taking a rock sample.	378
2017-12-10	00:17:01	-15.38097	-174.24978	1808.1	0.9	19.4	Codey	379
2017-12-10	00:20:40	-15.38096	-174.24978	1808.1	0.9	18.0	**S98-rock-12**. Collapsed pillow mound fragment. Size 5 x 8 cm. glass rim.	380
2017-12-10	00:21:43	-15.38095	-174.24978	1806.2	2.7	19.2	S98-rock-12. Pos: 15.3809629. 174. 2497782. depth 1808.	381
2017-12-10	00:22:17	-15.38088	-174.24975	1806.8	1.4	19.1	Arrived at the top of the ridge.	382
2017-12-10	00:24:00	-15.38062	-174.24964	1806.9	2.5	19.0	The top of the ridge is basically flat. Flying over it looking at pillows.	383
2017-12-10	00:24:40	-15.38064	-174.24962	1808.2	1.1	48.9	Lots of particles in the water column.	384
2017-12-10	00:26:04	-15.38053	-174.24961	1809.4	2.0	351.1	Fish in rock	385
2017-12-10	00:26:34	-15.38050	-174.24961	1811.5	0.9	337.2	It was Antimora.	386
2017-12-10	00:27:33	-15.38035	-174.24969	1810.1	3.0	359.9	Pillows on top of this ridge. Moving along the ridge.	387
2017-12-10	00:28:06	-15.38028	-174.24966	1811.7	1.9	22.9	Visibility is low. We can't see far in distance.	388
2017-12-10	00:28:21	-15.38029	-174.24966	1811.6	2.4	76.7	Sediment on the pillows.	389
2017-12-10	00:30:03	-15.38021	-174.24950	1815.1	3.5	1.6	Cracked open pillow.	390
2017-12-10	00:30:38	-15.38021	-174.24944	1813.8	4.7	95.5	We are on a constructional hill.	391
2017-12-10	00:31:09	-15.38014	-174.24936	1810.5	3.4	30.3	Yellow staining on the pillows.	392
2017-12-10	00:31:32	-15.38008	-174.24931	1809.9	2.6	28.5	Volcanic ash deposits on the pillows.	393
2017-12-10	00:35:20	-15.37974	-174.24916	1806.6	2.9	23.4	We're heading toward WP7 (about half way between WP6 and WP7).	394
2017-12-10	00:35:45	-15.37968	-174.24912	1806.3	2.6	30.7	We never see ash like this on Axial seamount. But's it's everywhere here.	395
2017-12-10	00:35:56	-15.37967	-174.24911	1806.6	2.2	30.6	Round pillows with cracks. Staining on the cracks.	396
2017-12-10	00:36:06	-15.37966	-174.24909	1806.1	2.8	46.3	Polychaetes swimming around.	397
2017-12-10	00:36:37	-15.37965	-174.24908	1806.3	2.9	57.6	Seeing some little shrimp here and there.	398
2017-12-10	00:37:18	-15.37967	-174.24900	1807.2	1.6	57.3	We're in the thick of the lava flow again.	399
2017-12-10	00:37:40	-15.37969	-174.24897	1806.6	1.9	65.4	Cracked open pillows.	400
2017-12-10	00:38:14	-15.37964	-174.24894	1805.3	2.6	26.0	We're in a thick part of the lava flow here so if the rocks are still hot we could see some venting here.	401
2017-12-10	00:38:30	-15.37960	-174.24896	1806.8	1.4	23.1	More yellow staining.	402

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2017-12-10	00:38:44	-15.37957	-174.24897	1806.6	2.0	11.7	Broken up pillows here.	403
2017-12-10	00:39:05	-15.37954	-174.24898	1807.2	1.7	21.3	A deep sea shrimp with huge antennae on the flow ahead.	404
2017-12-10	00:39:44	-15.37952	-174.24897	1807.6	0.0	37.4	Look at the huge antennae on that thing.	405
2017-12-10	00:40:06	-15.37952	-174.24897	1807.6	0.0	36.8	Little tiny hydroids on the seds here.	406
2017-12-10	00:40:34	-15.37952	-174.24897	1807.6	0.0	36.8	Might be some worms there. Possibly small amphipod swimming by.	407
2017-12-10	00:41:16	-15.37952	-174.24897	1807.6	0.0	36.8	Huge rostrum on that guy.	408
2017-12-10	00:41:48	-15.37952	-174.24898	1807.6	0.0	36.8	Big flattened pillow lobe in the background.	409
2017-12-10	00:44:26	-15.37951	-174.24904	1807.6	0.0	36.8	We're going to try a core-scoop combo here. We're going to use the core as a scoop here.	410
2017-12-10	00:44:52	-15.37950	-174.24906	1807.6	0.0	36.8	**S98-sed-13.** Right in the black volcaniclastic seds where that big shrimp is sitting.	411
2017-12-10	00:49:59	-15.37938	-174.24617	1807.6	0.0	34.2	We are ~70 m SW of WP 7. Nav jumped. Coarse black shiny volcaniclastic seds here. Some finer light seds as well.	412
2017-12-10	00:53:37	-15.37967	-174.24455	1807.6	0.0	34.2	Core 0 (no number) pouring the seds into the core tube (quiver).No navigation. Z=1811. We're 60 - 70 m SW of WP7.	413
2017-12-10	00:54:04	-15.37972	-174.24434	1807.6	0.0	34.2	The navigation is bad - to nonexistent right now.	414
2017-12-10	00:54:37	-15.37925	-174.24598	1805.6	2.0	40.4	The shrimp just sat there through the whole sample.	415
2017-12-10	00:57:06	-15.37885	-174.24617	1808.2	3.8	358.2	The navigators marker for sample 13 (Sed-13) is: 15.3794805 174.2490802. Fix taken before the nav went bad. Teri said the depth of that sample was 1807m.	416
2017-12-10	00:58:40	-15.37897	-174.24772	1806.3	4.2	326.8	Moving up a steep slope here.	417
2017-12-10	00:59:01	-15.37893	-174.24781	1808.7	3.6	320.5	The vehicle is not in the correct place on the nav screen. It's off by about 100m.	418
2017-12-10	01:00:18	-15.37882	-174.24805	1813.0	3.8	314.9	We're going to travel the line from WP 7 to WP 8 to see if the pit we saw in the difference map is real.	419
2017-12-10	01:01:54	-15.37859	-174.24803	1814.3	4.4	325.7	We've changed our heading and are now. The nav is still bad and putting the vehicle too far to the east (when if doesn't jump completely off the screen.	420
2017-12-10	01:03:01	0.00000	0.00000	1819.8	1.0	337.8	We are traveling over more of the same. Broken pillows and lobates.	421

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2017-12-10	01:03:13	0.00000	0.00000	1819.3	1.6	337.7	Big inflated and cracked pillow here.	422
2017-12-10	01:04:07	-15.37749	-174.26357	1820.4	2.0	323.8	Possibility of a USBL dropout causing the problems with the nav?	423
2017-12-10	01:05:05	-15.37798	-174.25818	1819.0	4.4	348.9	Steep sided ridge to the north. Where are we?	424
2017-12-10	01:06:11	-15.37826	-174.24673	1822.1	2.6	344.9	Steep pillow ridges to the right of the screen (NE).	425
2017-12-10	01:06:56	-15.37816	-174.24677	1826.5	1.7	354.6	There is a big drop off to the left (SW).	426
2017-12-10	01:07:52	-15.37857	-174.26379	1829.9	6.3	171.8	That's a very steep cliff we're looking at. Where did that come from.	427
2017-12-10	01:08:01	-15.37853	-174.26325	1830.0	4.9	189.5	Nearly horizontal cliff here.	428
2017-12-10	01:08:14	-15.37831	-174.25860	1831.9	2.6	202.9	Broken off pillows on this vertical slope.	429
2017-12-10	01:11:27	-15.37805	-174.24689	1829.1	4.6	21.2	There is an issue with a transducer on the ship.	430
2017-12-10	01:13:21	0.00000	0.00000	1819.7	7.0	22.1	Jimbo thinks the vehicle is where it's showing up on the screen now..	431
2017-12-10	01:14:11	-15.37830	-174.25321	1826.6	4.2	335.0	15.377987 174. 248211 Z=1829m That was probably a good fix.	432
2017-12-10	01:14:51	0.00000	0.00000	1825.8	4.8	300.6	The ROV is giving us a few hits.	433
2017-12-10	01:15:58	-15.37851	-174.25468	1832.2	12.6	50.2	We're on the edge of this steep slope. Nearly vertical.	434
2017-12-10	01:16:33	0.00000	0.00000	1841.4	4.6	38.0	Steep on the SW side.	435
2017-12-10	01:16:47	-15.37812	-174.25680	1843.5	4.7	42.7	Less smoke and cloudiness in the water now.	436
2017-12-10	01:17:00	-15.37803	-174.25120	1845.2	6.5	81.4	Lots of really broken up talus etc.	437
2017-12-10	01:17:27	-15.37719	-174.25352	1847.8	3.9	20.5	We really don't see a pit of any sort of on the sonar.	438
2017-12-10	01:18:46	-15.37775	-174.26395	1857.2	4.4	320.5	Rubble everywhere. Finer sized pieces here.	439
2017-12-10	01:19:03	-15.37792	-174.26396	1857.4	5.8	345.9	It looks murkier now.	440
2017-12-10	01:19:53	-15.37774	-174.25954	1858.9	6.7	350.9	The visibility is quite bad now.	441
2017-12-10	01:20:32	-15.37779	-174.26513	1863.0	4.7	27.5	Closer to the bottom of what showed up as a pit in the multibeam - but it was questionable.	442
2017-12-10	01:20:57	-15.37775	-174.26512	1867.7	4.0	62.1	Some intact pillows covered in talus.	443
2017-12-10	01:21:17	-15.37743	-174.25652	1868.9	5.5	91.6	Pillow sticking out of the slope. Pillow is wearing a hat.	444
2017-12-10	01:22:03	-15.37758	-174.26465	1873.0	4.3	109.5	Talus next to intact pumice on a vertical ridge.	445
2017-12-10	01:22:51	-15.37763	-174.26486	1878.2	2.2	104.8	There's a whole stack of in place pillow tubes on this steep slope.	446

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S098 South Tafu Logger Comments	Record #
2017-12-10	01:24:44	-15.37788	-174.26475	1878.6	2.5	85.5	No navigation. We know that we are facing a steep slope with a heading of 85 degrees. Our water depth here is 1879. We're hanging over the cliff edge.	447
2017-12-10	01:25:29	0.00000	0.00000	1878.6	2.5	84.9	Adam	448
2017-12-10	01:26:39	-15.37753	-174.26451	1878.6	2.4	85.1	**S98-rock-14**. Fresh pillow piece (toe?) Tube about 25cm long 10 cm diameter. Perfect glassy crust. Huge olivine crystals. Small vesicles.	449
2017-12-10	01:29:03	-15.37793	-174.26450	1878.6	2.1	85.5	Beautiful elongate piece of lava. Z=1879 m. Navigators best guess: 15.377967 174.248763.	450
2017-12-10	01:29:23	-15.37790	-174.26453	1878.6	2.1	85.5	That went into partition 9.	451
2017-12-10	01:29:52	-15.37783	-174.26447	1878.6	2.1	85.6	The navigators best guess put us half way between WP7 and WP8.	452
2017-12-10	01:30:49	-15.37769	-174.24743	1877.7	3.4	80.0	The plan is to continue farther down this slope just to see what we can see.	453
2017-12-10	01:31:52	-15.37764	-174.25838	1880.5	2.1	73.7	The steep slope that we are looking at to the NE as we back down the slope.	454
2017-12-10	01:32:24	-15.37770	-174.26245	1880.5	2.3	71.5	We're on the western flank of the steep pillow ridge.	455
2017-12-10	01:33:14	-15.37776	-174.26448	1881.0	3.6	69.3	Pillows as far as the eye can see as we look up slope and back down slope at the same time.	456
2017-12-10	01:37:46	-15.37726	-174.26540	1878.9	2.4	56.7	We're part way down the slope but can't keep going down slope without moving the ship. We're going to continue north along the 1880 contour.	457
2017-12-10	01:38:18	-15.37762	-174.26372	1877.2	2.2	41.0	We will pick up the dive plan at WP 8 vicinity.	458
2017-12-10	01:38:29	-15.37743	-174.26307	1877.1	2.3	41.2	This looks like pillows on top of talus here.	459
2017-12-10	01:39:26	0.00000	0.00000	1874.6	2.9	41.9	This area is a bit of a jumbled mess.	460
2017-12-10	01:39:36	-15.37753	-174.25566	1874.1	2.8	41.5	More intact pillows in front of us.	461
2017-12-10	01:40:03	-15.37014	-174.24900	1873.6	3.4	41.5	Coming upon some very jumbly talus field.	462
2017-12-10	01:40:13	-15.37014	-174.24900	1873.2	3.5	41.2	Talus up against a cliff face.	463
2017-12-10	01:41:26	-15.37843	-174.25833	1866.7	4.5	41.3	Now we're at 1870 and are seeing a steep volcaniclastic scree chute.	464
2017-12-10	01:42:06	-15.37923	-174.26148	1864.1	3.0	41.4	We're going to climb up to the top of this steep slope now.	465
2017-12-10	01:43:13	0.00000	0.00000	1859.9	2.7	41.8	Steep slope covered in volcaniclastic sed and rubble debris - about half and half.	466

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S098 South Tafu Logger Comments	Record #
2017-12-10	01:43:35	-15.37622	-174.24234	1858.3	3.1	43.5	The talus here is a bit smaller than what we saw farther down the slope.	467
2017-12-10	01:44:31	-15.37750	-174.25163	1854.7	6.5	47.8	We're on the top of a steep ridge now. heading to the NE.	468
2017-12-10	01:45:54	0.00000	0.00000	1855.0	1.9	88.9	Bill thinks this looks fairly old. I would not necessarily concur.	469
2017-12-10	01:48:09	-15.37713	-174.24840	1848.8	2.6	92.9	Bill thinks we are not on the new lava.	470
2017-12-10	01:48:51	-15.37714	-174.24845	1845.6	4.3	92.3	This looks like the other stuff to me.	471
2017-12-10	01:50:22	-15.37715	-174.24838	1843.0	2.7	90.3	Looks like we are back into a more talus slope. We see the ROV on the line between WP 8 and WP9.	472
2017-12-10	01:51:41	-15.37719	-174.24865	1839.7	4.1	90.2	15.772155 174.2485602 Z|=1842m. That fix looks alright. Just as a guide for future navigation processing nightmare.	473
2017-12-10	01:53:12	-15.37716	-174.24831	1839.4	2.9	89.9	Big pillow ahead. Could be in place. Yellow bac mat.	474
2017-12-10	01:54:48	-15.37722	-174.24857	1838.8	1.0	90.8	We're waiting on the ship.	475
2017-12-10	01:55:24	-15.37723	-174.24836	1838.7	0.0	90.9	Olivine crystals in the exposed broken surfaces of these broken pillows.	476
2017-12-10	01:58:52	0.00000	0.00000	1838.7	1.1	91.3	We're still waiting on the ship before we proceed up slope.	477
2017-12-10	02:00:09	-15.38009	-174.25974	1837.8	2.0	90.4	What appears purple in the video is actually the iridescent glass coating on these lavas.	478
2017-12-10	02:00:56	0.00000	0.00000	1836.1	4.2	112.4	Over to the right of the view are more in place pillows.	479
2017-12-10	02:02:10	0.00000	0.00000	1833.5	0.0	106.6	Another little ridge that is in place - pretty much surrounded by rubble/talus on this steep slope.	480
2017-12-10	02:02:59	-15.37739	-174.24679	1832.1	2.4	106.4	We're facing the SE now and seeing more in place lavas.	481
2017-12-10	02:03:44	0.00000	0.00000	1830.2	2.5	106.7	We're moving up a sort of transition zone with in place lavas to the right (S) and rubble/talus to the left (N).	482
2017-12-10	02:04:03	0.00000	0.00000	1829.5	4.1	106.6	Thin little pillow tubes flowing down slope.	483
2017-12-10	02:04:35	-15.37849	-174.26351	1829.5	2.7	99.3	Great big odd-looking expanded pillow sticking out over the slope. "Frozen in space".	484
2017-12-10	02:06:32	-15.37894	-174.26302	1822.1	3.8	97.0	Working our way up to a narrow ridge that extends SW to NE on the southern flank of Tafu.	485

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2017-12-10	02:06:47	-15.37915	-174.26288	1820.4	3.6	103.2	More broken rock now that has fallen down from above.	486
2017-12-10	02:09:23	-15.38003	-174.26265	1803.8	2.8	119.5	Oh my - more talus - broken rock.	487
2017-12-10	02:09:40	-15.38029	-174.26256	1802.3	3.0	119.7	These bigger rocks could be in place.	488
2017-12-10	02:12:17	-15.38041	-174.26401	1791.6	3.2	101.0	We are continuing ascending up this ridge another 50m or so until we get to the ridge top.	489
2017-12-10	02:12:59	-15.37757	-174.24629	1788.7	3.2	101.7	Pillows appear to be in place here - in places.	490
2017-12-10	02:13:23	-15.38054	-174.26358	1786.8	3.6	109.9	More scree slope. Volcaniclastic seds and smaller rock debris.	491
2017-12-10	02:14:30	-15.38005	-174.26252	1782.8	2.8	109.6	We have no nav - for quite some time now. We're navigating based on depth.....	492
2017-12-10	02:16:07	-15.38009	-174.26229	1775.4	11.1	91.1	Super steep slope now. Some of these pillows are decapitated on this almost vertical cliff.	493
2017-12-10	02:16:53	-15.38019	-174.26238	1768.6	14.6	95.5	That's one heck of a mound of pillows. Started at about 1775 m.	494
2017-12-10	02:17:36	-15.38009	-174.26228	1764.7	0.0	101.4	Looks like we are getting near the top of the ridge.	495
2017-12-10	02:17:49	0.00000	0.00000	1764.6	0.0	101.9	Not as steep here at 1765 meters.	496
2017-12-10	02:18:11	-15.38007	-174.26234	1764.2	0.0	102.3	The slope lessens here.	497
2017-12-10	02:18:21	-15.38007	-174.26234	1763.9	3.9	101.9	We're going to wait for the ship to catch up now.	498
2017-12-10	02:21:25	-15.37990	-174.26209	1761.0	1.8	105.1	Amazing looking lava here. Swirly and broken off at the edges.	499
2017-12-10	02:22:17	-15.38028	-174.26176	1761.0	1.6	105.2	Gorgeous swirls of broken off lavas here.	500
2017-12-10	02:22:55	0.00000	0.00000	1761.1	1.4	105.1	Going to grab a piece of pillow/lobate flow here in front of us.	501
2017-12-10	02:27:44	0.00000	0.00000	1761.3	1.3	105.1	**S98-rock-15**. Outer rind weird pillow with multiple layers. Z=1761. No nav. Angular piece of pillow rind. Pie shaped. 12 cm. Glassy exterior 1-2 mm glassy crust. Vesicular and angular. Some crystals.	502
2017-12-10	02:30:44	-15.38018	-174.26205	1756.8	3.4	90.4	Into bin 10. Navigators best guess: 15.377229 174.247788	503
2017-12-10	02:31:21	-15.38014	-174.26203	1753.9	4.6	88.4	The beautiful folded rock we were looking at in the background of our sample were giant pillows with banding and a thick crust.	504
2017-12-10	02:31:47	-15.37887	-174.25347	1753.5	2.9	88.1	We're still moving up the ridge.	505
2017-12-10	02:32:20	-15.38227	-174.26888	1750.9	3.6	88.1	Bugs animals sediment - it's all there - where's the hot water?	506

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S098 South Tafu Logger Comments	Record #
2017-12-10	02:32:33	-15.38019	-174.26021	1749.5	4.2	62.9	Continuing up this steep cliff...	507
2017-12-10	02:33:17	-15.37999	-174.26198	1748.4	2.6	47.6	Thick volcanic seds here with yellow bacterial floc.	508
2017-12-10	02:34:35	-15.37748	-174.24738	1749.3	0.9	50.0	Our depth here is now 1749. Thick small patch of sediment here. Yellow floc on top of dark volcaniclastic seds.	509
2017-12-10	02:36:29	-15.37748	-174.24731	1749.2	1.1	49.9	**S98-sed-16**. Scoop 3. We have nav. Chris fix: 15.3775187 174.2475500 Z=1749.	510
2017-12-10	02:39:27	-15.37751	-174.24749	1749.2	1.0	49.3	Black volcaniclastic seds with yellow bacterial floc on top. Nav fix: 15.377479 174.247311. Storing sed scoop bag 3 by markers.	511
2017-12-10	02:39:53	-15.37748	-174.24750	1749.2	1.0	49.3	THE NAVIGATION CAME BACK! That last fix was good.	512
2017-12-10	02:40:16	-15.37749	-174.24750	1749.2	1.0	49.3	They changed the power levels on something or another and that helped the navigation.	513
2017-12-10	02:43:24	-15.37742	-174.24737	1739.8	2.8	40.9	Lots of jumbled lava flows along this ridge.	514
2017-12-10	02:44:52	-15.37733	-174.24732	1739.6	0.0	61.8	Is there a chimney in the background?	515
2017-12-10	02:46:49	-15.37739	-174.24722	1740.3	0.9	88.9	Seeing some squat lobsters and some shrimp. Some worms too.	516
2017-12-10	02:51:34	-15.36847	-174.26136	1740.3	0.9	88.8	10x5cm lava from jumbled flow. Some Fe and S staining. Vesicular and phyric with sharp point on bottom on one side.	517
2017-12-10	02:53:34	-15.37878	-174.25940	1739.7	3.0	71.2	**S98-rock-17** Location 15.3774147 174.2471623 depth 1740m.	518
2017-12-10	02:55:44	-15.37735	-174.24784	1740.4	3.3	186.8	Circling around a strange formation that looked like a chimney from a few meters away. Up close it looks like a stack of brecciated material.	519
2017-12-10	02:56:55	-15.37739	-174.24760	1741.4	0.0	110.7	The stack has jumbled and broken pieces of pillow lava in it and is extensively coated with white secondary deposits. Not clear why it formed like this.	520
2017-12-10	02:59:47	-15.37739	-174.24751	1740.2	5.3	99.9	Breccia pipe? But why is it a highstanding feature?	521
2017-12-10	03:02:27	-15.37898	-174.26152	1739.6	0.0	85.6	Grab of odd highstanding breccia feature with altered chunks of lava. Very top piece; ~7x10cm with fairly extensive white and orange staining on surfaces.	522
2017-12-10	03:05:20	-15.37723	-174.24669	1743.0	3.5	95.7	**S98-rock-18** location 15.3774084 174.2474560 depth 1740m.	523

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S098 South Tafu Logger Comments	Record #
2017-12-10	03:05:35	-15.37725	-174.24688	1743.1	6.0	95.8	More squat lobsters and shrimp hanging out near these breccia mounds.	524
2017-12-10	03:07:47	-15.37723	-174.24702	1741.8	1.7	82.0	Pretty high sediment load in this area. Looking for evidence of diffuse flow. Lots of shrimp and worms.	525
2017-12-10	03:09:36	-15.37727	-174.24725	1741.1	3.2	75.9	Waypoint 9.	526
2017-12-10	03:17:15	-15.37727	-174.24711	1741.8	1.5	74.8	**S98-bio-19**. Slurp of two shrimp. Location: 15.3774084 174.2474560 depth 1740m.	527
2017-12-10	03:27:18	-15.37731	-174.24709	1741.8	1.5	77.2	**S98-fluid-20**. Majors to go with the shrimp. Slope is unstable so we are firing it near the talus pile and not in it. Location: 15.3774084 174.2474560 depth 1740m.	528
2017-12-10	03:27:42	-15.37729	-174.24726	1741.8	1.6	77.1	Resuming transit toward waypoint 10. Nav is jumping around.	529
2017-12-10	03:35:35	0.00000	0.00000	1730.8	8.5	50.8	Mixture of jumbly and elongate pillows.	530
2017-12-10	03:35:47	0.00000	0.00000	1729.6	8.0	42.1	Murky water.	531
2017-12-10	03:36:23	-15.37715	-174.24692	1728.6	2.7	35.5	Spatter textures???	532
2017-12-10	03:36:53	-15.37706	-174.24685	1728.7	2.1	21.3	Large drained pillows with a lot of interior sulfur staining.	533
2017-12-10	03:38:46	-15.37769	-174.25302	1726.2	2.1	38.8	Lots of volcaniclastic fragments on top of and between pillows.	534
2017-12-10	03:40:24	-15.37691	-174.24685	1722.9	4.6	31.3	Codey	535
2017-12-10	03:41:43	-15.37658	-174.24649	1718.2	4.5	39.7	Steep slope face with lots of smaller pillows and some talus. Hard to get good details in murk.	536
2017-12-10	03:42:00	-15.37898	-174.26012	1715.4	4.3	45.7	Drippy ornamented pillows.	537
2017-12-10	03:42:41	-15.37638	-174.24531	1709.4	3.6	58.7	Highly fractured and buttressed.	538
2017-12-10	03:43:22	-15.37659	-174.24652	1706.8	3.6	59.7	Nice fissure topped with a huge pile of ornaments.	539
2017-12-10	03:43:33	-15.37660	-174.24655	1706.0	2.6	56.5	Jumbled lava slightly further upsection.	540
2017-12-10	03:43:41	-15.37660	-174.24662	1705.6	2.7	51.9	Vent-type deposit.	541
2017-12-10	03:44:19	-15.37647	-174.24641	1706.3	4.7	42.9	REALLY smoky.	542
2017-12-10	03:44:53	-15.37639	-174.24622	1701.8	6.5	42.4	Sharp dropoff to the port side of the ROV.	543
2017-12-10	03:47:30	-15.37639	-174.24624	1689.8	3.6	57.3	Some truncated pillow features have complex drainback features.	544
2017-12-10	03:48:16	-15.37624	-174.24630	1688.1	2.6	49.0	Entering field of fairly coherent flat lobate flows.	545
2017-12-10	03:49:13	0.00000	0.00000	1684.9	2.5	37.2	Some large highstanding features. Ashy here.	546
2017-12-10	03:50:54	-15.37600	-174.24574	1679.4	2.2	31.9	Increasing hydrothermal staining on flow surfaces. Yellowish cast	547

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S098 South Tafu Logger Comments	Record #
2017-12-10	03:51:16	-15.37594	-174.24564	1678.2	2.9	31.5	Spotty jumbled textures among flows - more evidence of spatter?	548
2017-12-10	03:52:25	-15.37577	-174.24584	1671.8	3.9	16.2	Local highstanding feature	549
2017-12-10	03:53:32	-15.37573	-174.24588	1668.5	5.9	27.8	Murky murky murky but we are overlooking a potentially interesting highstand	550
2017-12-10	03:59:29	-15.37588	-174.24597	1673.4	4.8	8.9	**S98-rock-21**. Mostly glass frothy with orange coat. 5x15cm	551
2017-12-10	04:02:39	-15.37568	-174.24598	1662.6	5.2	58.6	Cowpie jumbled texture on edge of this slope	552
2017-12-10	04:04:20	-15.37546	-174.24529	1667.5	5.4	48.0	Can't see jack in this pit but there are a few intact pillows	553
2017-12-10	04:05:47	-15.37531	-174.24514	1660.8	3.9	43.6	Fissures in otherwise intact pillows and more spatter/jumbly flows	554
2017-12-10	04:08:36	-15.37525	-174.24506	1660.0	1.0	36.2	Flat lobate pillows are just covered in spatter	555
2017-12-10	04:13:42	0.00000	0.00000	1658.9	9.3	46.0	**S98-rock-22**. Sample of jumbly/spatter texture lava possibly from older event. 15x25cm with extensive Fe-stains. Looks like near-vent	556
2017-12-10	04:13:57	0.00000	0.00000	1658.2	15.7	46.1	Off bottom. End of Dive 98.	557
2017-12-10	04:14:58	-15.37624	-174.26046	1639.9	37.1	88.7	Vehicle Leaving Seabed	558
2017-12-10	04:14:59	-15.37624	-174.26046	1638.8	37.9	88.7	Sample 22 location: 15.37529 174.24498 depth 1661m	559

S099 North Tafu

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S099 North Tafu Logger Comments	Record #
2017-12-10	18:34:30	-15.34222	-174.22553	1949.5	6.2	290.7	Vehicle at Seabed	22
2017-12-10	18:34:43	-15.34222	-174.22553	1950.3	5.3	291.6	We're on the bottom.	23
2017-12-10	18:35:47	-15.34403	-174.22157	1952.7	2.9	291.1	Older lava here. We see a few animals here.	24
2017-12-10	18:36:12	-15.34588	-174.21015	1953.9	1.5	290.7	Volcanic sediments on these pillow lavas.	25
2017-12-10	18:37:02	-15.34579	-174.20918	1954.6	1.0	290.8	We see some biology here. Anemones and stalked coral.	26
2017-12-10	18:37:41	-15.34472	-174.21458	1954.5	0.9	270.0	Grenadier.	27
2017-12-10	18:37:54	-15.34262	-174.22638	1954.5	1.1	269.8	Older lavas here and see a few organisms	28
2017-12-10	18:38:16	-15.34348	-174.22041	1954.7	0.8	270.3	Hydroids.	29
2017-12-10	18:38:39	-15.34635	-174.20946	1954.7	0.8	270.9	No nav - again.....	30

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S099 North Tafu Logger Comments	Record #
2017-12-10	18:40:34	-15.34236	-174.21543	1954.7	0.8	270.3	**S99-rock-01**. Large pillow at landing site - piece of older looking pillow rind. Z=1955m. 6 cm long piece with glass layer. Grayish interior. Crumbly.	31
2017-12-10	18:47:28	0.00000	0.00000	1955.0	0.0	263.7	That piece crumbled up. Going for a different grab of pillow rind. Larger piece with lots of interior. Staining on 1 side. 1-2 cm glassy rind. 20 cm chunk. Gray vesicular center.	32
2017-12-10	18:48:45	0.00000	0.00000	1955.0	0.0	263.7	More oxidized outer surface. Some staining. Into quad 5. A smaller piece fell off in front of the quad.	33
2017-12-10	18:49:58	-15.30496	-174.21364	1955.0	0.0	263.7	One piece fell in front of the quad box. A piece fell into 8 so the rock is going into 8 now. Sample 1 is very crumbly.	34
2017-12-10	18:51:41	-15.34629	-174.20882	1955.0	0.0	263.7	Rock 1 broke into many pieces. It's in quad 8. Quad 5 looks empty - as it should be.	35
2017-12-10	18:52:50	0.00000	0.00000	1955.0	0.0	263.7	THE POSITION FOR ROCK 1 WILL BE WAYPOINT 1 (SINCE WE DON'T HAVE NAV): 174d 14.487' 15d 20.577 Z=1955.	36
2017-12-10	18:54:46	0.00000	0.00000	1952.7	2.3	236.2	Anemone on the lava here.	37
2017-12-10	18:54:59	0.00000	0.00000	1953.0	2.2	236.2	We're not on the young lava yet - from the looks of it.	38
2017-12-10	18:55:15	0.00000	0.00000	1953.0	2.7	236.0	Seeing some corals here as well. This is not the new lava flow.	39
2017-12-10	18:55:51	0.00000	0.00000	1954.0	2.9	235.9	A pile of pillows in front of us. - not that inflated.	40
2017-12-10	18:56:39	0.00000	0.00000	1954.3	2.3	236.0	There is a fair amount of volcanic sand on these pillows.	41
2017-12-10	18:57:45	0.00000	0.00000	1953.3	2.3	235.8	Jumbled drain out features. Folded sheet flow section in front of us now.	42
2017-12-10	18:58:50	-15.34628	-174.20890	1953.9	1.2	236.1	Flattened pillows around this odd sheety feature.	43
2017-12-10	18:59:32	-15.34298	-174.22568	1953.5	1.2	236.1	Shelly drained out pillow lava in front of us.	44
2017-12-10	19:01:28	0.00000	0.00000	1952.3	2.3	235.9	Anemone on the pillow.	45
2017-12-10	19:01:41	0.00000	0.00000	1952.5	2.2	236.4	Another stalk coral.	46
2017-12-10	19:02:58	-15.34304	-174.22595	1954.0	3.1	236.0	Some large inflated bulbous pillows appear in the distance.	47
2017-12-10	19:04:10	-15.34310	-174.22546	1953.0	6.7	324.5	Thin sediment veneer in depressions between the pillows.	48
2017-12-10	19:06:33	-15.34260	-174.22606	1965.0	4.7	164.7	Flying blind - trying to figure out where we are...	49
2017-12-10	19:08:44	0.00000	0.00000	1955.8	4.1	159.1	Pillows everywhere.....	50

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S099 North Tafu Logger Comments	Record #
2017-12-10	19:09:46	-15.34605	-174.20936	1953.9	2.3	160.2	Flattened pillow tubes - some with shelly drained tops.	51
2017-12-10	19:10:57	-15.34637	-174.21585	1952.5	2.6	169.4	Spattered deposits. Corals growing on them here and there.	52
2017-12-10	19:11:14	-15.34630	-174.21061	1952.3	2.8	169.5	Spatter at the edge of this pillow mound.	53
2017-12-10	19:11:34	-15.34611	-174.21065	1952.5	2.2	167.5	More coherent pillows now. Some with large drain out holes.	54
2017-12-10	19:11:43	-15.34588	-174.20853	1952.3	2.5	169.2	Sort of a collapse here.	55
2017-12-10	19:13:52	-15.34656	-174.20973	1952.3	2.9	182.0	Larger drain out feature. Full of fragmented rock.	56
2017-12-10	19:14:00	-15.34669	-174.20954	1952.0	2.1	181.5	Lots of shelly features.	57
2017-12-10	19:15:03	-15.34626	-174.20964	1951.1	3.2	180.0	Stalked corals here and there.	58
2017-12-10	19:16:15	-15.34671	-174.20967	1954.3	3.4	181.9	Curtain folded sheet flow. Jumbled up lavas.	59
2017-12-10	19:16:30	-15.34682	-174.20948	1953.4	4.1	181.6	Lots of fragmented sheet flow.	60
2017-12-10	19:17:10	-15.34694	-174.20928	1952.8	3.0	181.6	The sonar is showing us up at the top of some structure. We want a piece of this ropey sheet flow area.	61
2017-12-10	19:18:01	-15.34632	-174.20931	1953.6	2.5	181.0	We're probably just near waypoint 1 here given that the depth is 1954 here.	62
2017-12-10	19:20:23	-15.34672	-174.20925	1953.6	2.5	181.4	Codey	63
2017-12-10	19:20:55	-15.34685	-174.20928	1953.6	2.5	181.1	Gassy magma - piece of folded sheet. Crumbly. Lots of vesicles. BEST GUESS NAV - BASED ON DEPTH - NEAR WP1: 15.343155 174.335810 (that guess is bad).	64
2017-12-10	19:31:51	-15.34352	-174.22538	1953.4	2.8	181.2	**S99-rock-02**. Crumbly sheety lava. Piece of large fragmented near-vent spatter. Iridescent sheen. Folded. 20 cm irregular shape; mostly glass. Large vesicles. No obvious crystals.	65
2017-12-10	19:35:41	-15.34427	-174.22535	1975.7	7.6	341.9	NAV INFO: Navigator got a couple fixes while sampling but they are suspicious because it put us on the map at 1985 meters and the altimeter put us at 1954 so suspicious fix is: 15.343517 174.225429.	66
2017-12-10	19:36:15	-15.34372	-174.22531	1980.5	5.0	354.8	Beautiful fresh-looking younger lava? We could be on the new lava.	67
2017-12-10	19:36:39	-15.34515	-174.21952	1983.7	4.9	358.1	Elongate sheet flow and spatter.	68
2017-12-10	19:36:48	-15.34676	-174.21036	1984.8	4.3	358.7	Ken thinks we could be on the new lava.	69

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S099 North Tafu Logger Comments	Record #
2017-12-10	19:38:13	-15.34395	-174.22529	1990.9	0.0	347.8	There's a coral. So we are not on the new lava. It looks fresh but the coral proves different.	70
2017-12-10	19:38:18	-15.34395	-174.22529	1990.9	2.7	347.8	Bamboo coral.	71
2017-12-10	19:38:32	-15.34586	-174.21536	1990.9	2.6	347.5	Hydroid; stalked barnacle.	72
2017-12-10	19:39:04	-15.34049	-174.21751	1988.9	5.1	349.9	Walter says this is probably not new because of that stalked coral here.	73
2017-12-10	19:39:54	-15.33929	-174.21605	1989.8	5.0	352.8	Beautiful sheety looking pillow tubes falling down slope. We're facing north looking at the steeper hill in the background.	74
2017-12-10	19:40:03	-15.33836	-174.21582	1989.4	4.4	355.6	Rock fragments now.	75
2017-12-10	19:40:37	-15.34686	-174.20913	1988.2	8.7	349.4	We're waiting on the ship right now.	76
2017-12-10	19:40:56	-15.34702	-174.20934	1989.4	6.1	350.6	These pillows are in place.	77
2017-12-10	19:41:07	-15.34728	-174.20950	1990.4	4.0	6.9	Corals up hill. Anemone.	78
2017-12-10	19:41:18	-15.34743	-174.20940	1990.9	4.6	7.8	Chrysogorgia.	79
2017-12-10	19:41:29	-15.34747	-174.20935	1989.8	7.6	10.3	This is old lava.	80
2017-12-10	19:42:13	-15.34716	-174.20921	1988.5	6.6	354.0	Seeing some pretty long corals on this steep slope.	81
2017-12-10	19:42:37	-15.34702	-174.20922	1990.2	3.2	1.4	We're seeing quite a few corals here.	82
2017-12-10	19:43:03	-15.34746	-174.20932	1990.4	5.5	2.1	Might be a rattail.	83
2017-12-10	19:43:11	-15.34746	-174.20932	1991.4	4.1	2.6	Anemones.	84
2017-12-10	19:43:23	-15.34733	-174.20922	1992.4	3.2	11.5	Still moving down slope and looking at the slope to our north.	85
2017-12-10	19:43:49	-15.34729	-174.20937	1991.8	4.3	13.7	Stalked sponge. Branding bamboo coral. Anemones..	86
2017-12-10	19:44:10	-15.34750	-174.20944	1989.9	4.4	10.6	More and more biology here. Corals anemones. on these large pillows.	87
2017-12-10	19:44:20	-15.34746	-174.20938	1989.6	5.9	356.5	Dead bamboo coral.	88
2017-12-10	19:44:58	-15.34732	-174.20947	1991.2	4.4	4.2	Big beautiful anemone here.	89
2017-12-10	19:45:54	-15.34303	-174.22562	1989.4	4.9	291.5	We're finally turning around.	90
2017-12-10	19:47:26	-15.34307	-174.22572	1988.5	4.2	326.7	15.343054 174.2256248. That looks like a reasonable position. Spattery rock here.	91
2017-12-10	19:47:38	-15.34306	-174.22573	1987.4	3.7	330.9	Whip corals here.	92
2017-12-10	19:47:59	-15.34303	-174.22574	1985.0	4.5	297.3	Still facing to the NW now.	93
2017-12-10	19:48:13	-15.34302	-174.22573	1985.0	3.2	257.1	Slowly turning around.	94
2017-12-10	19:48:41	-15.34303	-174.22576	1983.5	5.0	249.7	We need to head down slope to get to the anomaly.	95

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S099 North Tafu Logger Comments	Record #
2017-12-10	19:49:08	-15.34310	-174.22582	1984.6	5.7	220.3	We're about 60m to the NW of the dive path.	96
2017-12-10	19:49:17	-15.34314	-174.22585	1986.1	4.9	215.8	Lots of pillows here in this place.	97
2017-12-10	19:49:37	-15.34322	-174.22589	1984.4	6.8	207.2	We're finally starting to point in the correct direction.	98
2017-12-10	19:49:49	-15.34327	-174.22591	1982.9	7.8	205.5	The nav is tracking now.	99
2017-12-10	19:50:10	-15.34334	-174.22591	1987.1	5.4	197.8	We're moving SSW.	100
2017-12-10	19:50:26	-15.34339	-174.22591	1988.5	4.9	191.1	Seeing more pillows here.	101
2017-12-10	19:50:36	-15.34341	-174.22590	1989.3	5.4	190.6	Not seeing any biota.	102
2017-12-10	19:50:59	-15.34347	-174.22588	1992.5	4.5	189.6	Z=~1995 m.	103
2017-12-10	19:52:58	-15.34372	-174.22582	1994.8	6.4	217.6	We're looking at a large mound of pillows.	104
2017-12-10	19:53:36	-15.34377	-174.22581	1999.5	3.7	199.8	The rocks here have more sediment on them.	105
2017-12-10	19:54:13	-15.34380	-174.22582	2001.6	1.1	225.5	Maybe some sampling will help us determine the story.	106
2017-12-10	19:54:44	-15.34380	-174.22582	2001.7	1.1	248.0	We're going to sample this now.	107
2017-12-10	19:55:14	-15.34379	-174.22583	2001.7	0.0	247.1	Seeing a little snail.	108
2017-12-10	19:55:33	-15.34379	-174.22583	2001.7	0.0	247.1	This rock doesn't look that much younger than the last one we were on.	109
2017-12-10	19:59:31	-15.34469	-174.22614	1998.9	4.4	244.0	**S99-rock-03**. Z=2002 m. Staining frothy 1cm glass on upper surface. No big crystals 15 cm. triangular wedge-shaped piece. Pillow surface and center.	110
2017-12-10	20:01:07	-15.34467	-174.22586	1993.3	11.7	225.0	Going into partition 6. White specks on rock surface. Nav fix (probably good)): 15.3447846 174.2254434. Z=2002 m.	111
2017-12-10	20:01:59	-15.34463	-174.22590	1996.3	7.5	251.3	We actually were on the edge of the flow at the 2000 m contour. That last nav fix for sample 3 was probably good.	112
2017-12-10	20:02:14	-15.34462	-174.22594	1995.8	4.6	252.4	We're looking at pillow lavas here. Flowing down this slope.	113
2017-12-10	20:02:32	-15.34462	-174.22600	1995.3	3.3	250.9	According to the flow outline we should be getting into it now.	114
2017-12-10	20:02:54	-15.34462	-174.22602	1991.2	5.7	254.6	Pillow tubes flowing down this steep slope.	115
2017-12-10	20:03:22	-15.34462	-174.22606	1989.5	5.3	252.7	Some larger pillows interspersed among these smaller narrow tubes.	116
2017-12-10	20:03:42	-15.34461	-174.22612	1986.2	4.4	244.1	Broken up exterior crust on inflated pillows.	117
2017-12-10	20:03:53	-15.34463	-174.22615	1986.1	3.2	217.4	The slope is flattening out here.	118
2017-12-10	20:04:06	-15.34467	-174.22616	1985.6	3.5	217.1	Obvious change in the character of the seabed.	119

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S099 North Tafu Logger Comments	Record #
2017-12-10	20:04:18	-15.34469	-174.22616	1982.7	4.9	216.4	The navigation seems to be working right now.	120
2017-12-10	20:04:32	-15.34471	-174.22618	1980.0	8.2	240.1	Most of this lava is in place. Not seeing any rock fragments here.	121
2017-12-10	20:05:34	-15.34476	-174.22631	1974.9	3.1	234.8	Not a lot of ash on these pillows.	122
2017-12-10	20:06:01	-15.34476	-174.22630	1974.9	2.6	246.6	Cracked pillows with white deposits in the cracks. These pillows look fresher.	123
2017-12-10	20:06:24	-15.34478	-174.22634	1973.1	2.5	246.4	We are near waypoint 2. The nav is agreeing with the map quite well now.	124
2017-12-10	20:06:41	-15.34477	-174.22636	1973.4	1.7	269.6	We're seeing some jumbled up spattery deposits here.	125
2017-12-10	20:06:51	-15.34476	-174.22635	1973.4	1.6	272.9	Broken up pillow - not spatter.	126
2017-12-10	20:06:59	-15.34476	-174.22635	1973.6	1.4	272.9	Going to sample here.	127
2017-12-10	20:07:34	-15.34477	-174.22636	1974.1	1.1	271.9	Broken up sheety-exterior pillow.	128
2017-12-10	20:08:26	-15.34476	-174.22638	1974.5	0.9	272.0	Going to grab one of these loose swirly patterned exterior.	129
2017-12-10	20:11:22	-15.34476	-174.22639	1973.8	1.6	272.3	**S99-rock-04**. Swirly patterned sheety exterior of a pillow. Z=1975. Slab of more intact upper surface of pillow.	130
2017-12-10	20:13:29	-15.34482	-174.22635	1972.5	4.6	233.3	Some gray spongey interior. 20 cm. Glass rind. Chris fix: 15.344757 174.226383. Z=1975m.	131
2017-12-10	20:14:12	-15.34485	-174.22641	1971.3	4.8	246.9	Continuing up the small pillow mound. This is a rough uneven seabed.	132
2017-12-10	20:14:39	-15.34485	-174.22648	1970.7	5.3	273.7	Nav fix for sample 4: 15.34477 174.226368.	133
2017-12-10	20:15:03	-15.34483	-174.22655	1965.9	4.3	275.9	Climbing up this steep-sided pillow mound.	134
2017-12-10	20:15:25	-15.34483	-174.22662	1966.6	3.6	270.8	We're moving to the ???	135
2017-12-10	20:15:45	-15.34482	-174.22666	1968.7	4.0	271.0	We're working our way around this mound.	136
2017-12-10	20:16:57	-15.34479	-174.22682	1968.1	1.8	279.0	We're probably to the east of waypoint 2. We're seeing 1966 meters depth.	137
2017-12-10	20:17:22	-15.34477	-174.22685	1967.7	3.0	305.1	We're still climbing up another pillow ridge.	138
2017-12-10	20:17:49	-15.34475	-174.22685	1968.4	1.8	303.8	We're probably somewhere near waypoint 2 now. Can't believe the vehicle navigation right now. It's not making sense.	139
2017-12-10	20:18:08	-15.34474	-174.22686	1969.4	1.2	293.1	2 squat lobsters up in this place.	140
2017-12-10	20:21:30	-15.34474	-174.22685	1968.2	2.0	294.0	Pillow crust from the base of a pillow. Lots of yellow alteration on gray-ish center with vesicles. Pie shaped with hole in top.	141

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S099 North Tafu Logger Comments	Record #
2017-12-10	20:22:52	-15.34482	-174.22664	1970.2	1.9	213.8	**S99-rock-05.** Uneven shaped. 15-20 cm long. Some iron staining. Frothy interior. Into partition 7. No idea where we are. Z=1964.	142
2017-12-10	20:24:18	-15.34500	-174.22660	1974.6	3.3	189.1	We're probably in the vicinity of WP2. Nav fix puts us over deeper area on the map: 15.344746 174.226868. That position is questionable.	143
2017-12-10	20:24:50	-15.34506	-174.22657	1979.9	4.0	192.0	Top of this pillow structure? We've sampled the top of two of those pillow mounds.	144
2017-12-10	20:25:35	-15.34520	-174.22662	1980.8	2.2	196.1	The navigation seems OK right now. Just 15 m south of WP2.	145
2017-12-10	20:25:54	-15.34524	-174.22663	1982.3	3.0	200.0	Hollow collapsed expanded pillow.	146
2017-12-10	20:26:27	-15.34529	-174.22644	1980.9	6.6	203.9	Large pillows - mainly cracked tops at the base of this slope.	147
2017-12-10	20:27:04	-15.34539	-174.22656	1977.4	5.8	214.2	We're now looking at a steep slope with pillow tubes. Some elongate tubes.	148
2017-12-10	20:27:17	-15.34537	-174.22679	1974.6	0.0	218.6	The pillows are flattening out a big.	149
2017-12-10	20:27:31	-15.34541	-174.22677	1974.0	4.3	218.5	Cracked white stained pillow coming up.	150
2017-12-10	20:27:44	-15.34550	-174.22664	1973.4	3.6	218.1	Pillows upon pillows of all sizes and shapes.	151
2017-12-10	20:28:53	-15.34570	-174.22660	1970.1	2.6	206.1	Stacked up pillows parallel to the slope as we approach the summit of this pillow mound.	152
2017-12-10	20:29:25	-15.34576	-174.22678	1970.0	3.0	211.0	Pillows have disgorged centers.	153
2017-12-10	20:29:41	-15.34581	-174.22673	1969.9	2.9	206.3	Yellow bacterial(?) staining.	154
2017-12-10	20:30:02	-15.34579	-174.22693	1971.4	1.7	209.6	Fractured broken pillows and others totally in place.	155
2017-12-10	20:30:37	-15.34585	-174.22668	1969.4	2.8	184.7	Some large flat-ish pillows that border on lobates.	156
2017-12-10	20:30:55	-15.34586	-174.22682	1968.6	3.3	183.4	Shelly and hollow pillow tubes here.	157
2017-12-10	20:31:09	-15.34591	-174.22668	1967.5	3.3	182.6	These pillows are very large and flat.	158
2017-12-10	20:31:24	-15.34596	-174.22662	1969.0	2.4	182.1	Seeing lots of floc in the water. Venting in the vicinity?	159
2017-12-10	20:32:09	-15.34604	-174.22674	1966.6	4.1	222.3	We're on a flat slope - now we're climbing more.	160
2017-12-10	20:32:20	-15.34609	-174.22672	1965.6	2.9	221.7	Seeing flocky material here.	161
2017-12-10	20:32:29	-15.34609	-174.22672	1964.6	2.8	221.9	More staining on these lavas.	162
2017-12-10	20:32:46	-15.34610	-174.22685	1963.0	3.6	204.5	More pillows - of course.	163
2017-12-10	20:33:07	-15.34621	-174.22650	1963.4	3.8	213.5	Some cracked drained-out pillows here.	164
2017-12-10	20:33:21	-15.34622	-174.22661	1964.7	2.8	219.2	Seeing quite a lot of yellow mat.	165

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S099 North Tafu Logger Comments	Record #
2017-12-10	20:33:55	-15.34614	-174.22698	1964.6	2.9	219.2	Lot of large cracked pillows - many without their tops.	166
2017-12-10	20:34:28	-15.34624	-174.22683	1965.0	1.3	237.6	Looking more like pillow lobes than pillows.	167
2017-12-10	20:34:45	-15.34631	-174.22668	1964.0	3.2	237.1	Most of these pillows are probably hollow.	168
2017-12-10	20:35:35	-15.34628	-174.22693	1966.4	0.8	212.7	We're probably approaching WP3. We're at 1965 and the waypoint is at 1966.	169
2017-12-10	20:37:08	-15.34625	-174.22692	1966.1	0.0	185.4	We're going to grab another lava sample here.	170
2017-12-10	20:39:57	-15.34625	-174.22694	1966.2	0.0	179.0	Z=1967. Pillow rind. White staining in the cracks of this large lobate-looking pillow.	171
2017-12-10	20:45:12	-15.34635	-174.22672	1965.4	1.5	184.5	**S99-rock-06**. Chris fix: 15.346311 174.226760. Slab is pie shaped. Slabby top of pillow. 25+ cm length. Glassy rind. vesicular 2-toned grayish and lighter banded interior.	172
2017-12-10	20:46:36	-15.34657	-174.22683	1973.8	3.6	194.2	Navigator fix for sample 6: 15.346266 174.226827.	173
2017-12-10	20:47:01	-15.34665	-174.22689	1974.7	5.1	198.3	We're moving on to the south now.	174
2017-12-10	20:47:15	-15.34668	-174.22681	1974.5	5.9	222.5	More steep slope coming up.	175
2017-12-10	20:47:30	-15.34672	-174.22686	1971.1	8.5	244.5	Steep slope. Intact pillows on this steep slope.	176
2017-12-10	20:47:56	-15.34672	-174.22676	1966.6	9.5	252.8	Nearly vertical face as we come up this mound. Mostly intact.	177
2017-12-10	20:48:31	-15.34665	-174.22713	1961.1	5.3	235.6	Some more bulbous pillows with small pillow tubes extruding out their bases.	178
2017-12-10	20:48:48	-15.34673	-174.22699	1960.7	5.4	225.3	Not seeing a lot of volcanic sand on these pillows.	179
2017-12-10	20:49:24	-15.34694	-174.22689	1960.4	3.6	225.7	The slope is flattening a bit. We're on the "step".	180
2017-12-10	20:49:35	-15.34695	-174.22705	1962.0	4.0	225.4	Now we're climbing again.	181
2017-12-10	20:49:54	-15.34692	-174.22716	1958.5	6.0	212.0	Looking at ruble strewn steep slope.	182
2017-12-10	20:50:30	-15.34692	-174.22710	1957.1	6.2	218.3	Now looking at in place lavas on steep slope - lavasicles. Just hanging there in space.	183
2017-12-10	20:50:52	-15.34696	-174.22698	1953.7	11.0	217.7	These only form on the very steepest faces - > 80 degree slope.	184
2017-12-10	20:51:48	-15.34711	-174.22696	1945.7	5.3	211.8	Pillows are flattening out now as we approach the summit.	185
2017-12-10	20:52:26	-15.34716	-174.22712	1944.2	5.1	214.3	Longer; elongated pillows more like lobates - plobates.	186
2017-12-10	20:52:53	-15.34718	-174.22717	1944.3	3.1	225.5	Relatively squat lobed pillows.	187
2017-12-10	20:53:12	-15.34725	-174.22710	1943.6	5.7	204.8	We're now at 1944 meters.	188
2017-12-10	20:53:24	-15.34731	-174.22721	1944.9	4.1	204.4	The nav is somewhat decent right now.	189

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S099 North Tafu Logger Comments	Record #
2017-12-10	20:53:37	-15.34736	-174.22715	1945.5	3.3	205.0	The water is more and more cloudy now.	190
2017-12-10	20:54:24	-15.34740	-174.22731	1948.7	2.3	207.7	More lobate-style pillows again.	191
2017-12-10	20:54:33	-15.34740	-174.22743	1948.7	3.1	210.9	We're approaching the summit.	192
2017-12-10	20:54:48	-15.34738	-174.22736	1949.1	3.0	235.2	Long pillow lobes parallel to the slope.	193
2017-12-10	20:55:08	-15.34752	-174.22725	1946.8	3.9	261.6	Spattery fragments on this really steep slope.	194
2017-12-10	20:55:17	-15.34758	-174.22721	1944.9	5.2	256.7	Fragmented all to heck.	195
2017-12-10	20:55:35	-15.34757	-174.22727	1941.7	3.6	253.0	This is really different looking stuff.	196
2017-12-10	20:55:50	-15.34756	-174.22723	1940.8	3.6	252.1	Seeing a tube of something here.	197
2017-12-10	20:56:03	-15.34755	-174.22723	1938.8	5.3	249.6	The rock really took on a different character.	198
2017-12-10	20:56:21	-15.34750	-174.22742	1937.7	4.4	248.1	We're on a tortured looking seabed.	199
2017-12-10	20:56:32	-15.34751	-174.22732	1936.6	5.8	254.5	More angular fragments.	200
2017-12-10	20:56:40	-15.34748	-174.22751	1935.4	4.7	254.4	We're at 1937 meters.	201
2017-12-10	20:56:51	-15.34750	-174.22748	1933.9	5.0	254.5	Some whitish coating on these rocks.	202
2017-12-10	20:56:59	-15.34751	-174.22743	1932.9	5.5	254.7	We're coming to the summit here.	203
2017-12-10	20:57:12	-15.34755	-174.22717	1932.1	3.6	232.0	Very fragmented here.	204
2017-12-10	20:57:26	-15.34746	-174.22751	1932.2	3.8	195.7	Lots of white deposits.	205
2017-12-10	20:57:38	-15.34745	-174.22756	1932.4	2.1	204.8	That could be whitish microbial mat.	206
2017-12-10	20:57:49	-15.34746	-174.22758	1932.3	2.4	205.3	Lots of squat lobster4s here.	207
2017-12-10	20:58:39	-15.34756	-174.22723	1932.1	1.2	186.8	Adam	208
2017-12-10	20:58:40	-15.34756	-174.22723	1932.1	1.2	186.8	We're seeing white microbial mat. Polycheate of some type.	209
2017-12-10	21:00:16	-15.34760	-174.22730	1932.2	1.3	186.2	**S99-rock-07**. Orange flocculant material on this rumbly-looking rock. 15 cm angularly broken pillow fragment. Glass crust. Slightly vesicular.	211
2017-12-10	21:03:39	-15.34752	-174.22745	1930.6	2.9	182.6	Z=1933m. Area of vent biota. Nav fix: 15.347723 174.227370. On the boundary of the anomaly. Chris fix: 15.3475313 174.227348.	212
2017-12-10	21:04:11	-15.34757	-174.22758	1930.6	2.9	160.5	That piece came from an area of scoria - slope. Not really a pillow.	213
2017-12-10	21:04:40	-15.34759	-174.22747	1928.7	3.1	138.7	In an area where we are seeing hydrothermal animals. Don't see any flow. Area of near-vent spatter deposits.	214
2017-12-10	21:06:18	-15.34765	-174.22751	1932.6	3.5	202.5	Past apparent vent field is a highstanding pillow ridge with a wall of talus	215

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2017-12-10	21:07:41	-15.34782	-174.22710	1926.6	5.7	202.3	Pillows upslope are intact with some broken/truncated faces. Steep slope	216
2017-12-10	21:07:59	-15.34777	-174.22733	1924.9	6.3	202.4	Biota has dropped off substantially here but still seeing some squat lobsters	217
2017-12-10	21:09:43	-15.34776	-174.22756	1915.7	0.0	203.2	Some buttresses on this wall. Lavas are very fresh and all in place	218
2017-12-10	21:12:40	-15.34777	-174.22773	1912.1	1.3	226.1	At top of cliff. flows are flattened/lobate and often inflated/capped with a rather loose top crust. Glass surfaces look extremely friable. Highly filamented and drawn out	219
2017-12-10	21:15:26	-15.34793	-174.22715	1912.1	1.4	224.9	Sample of top crust from a lobate pillow. 5x5cm vesicular. Half glass half groundmass and frothy. Aphyric or close to it	220
2017-12-10	21:17:49	-15.34791	-174.22751	1912.5	1.4	242.2	S98-rock-08 taking second piece also in Biobox 2. Looks like maybe rare small hydroids on outer surface. Location: 15.3480407 174.2273816 depth 1912m	221
2017-12-10	21:25:16	-15.34955	-174.21131	1908.1	9.9	208.1	Second piece of S99-rock-08 is about the same size as the first. Also into biobox 2. Same description. Grabbing third piece. similar to first two	222
2017-12-10	21:25:57	-15.34883	-174.22035	1904.0	8.1	209.7	Moving upslope again along a steep cliff structure. Large pillows with truncated faces. Anemones and hydroids	223
2017-12-10	21:26:34	0.00000	0.00000	1901.0	0.0	202.1	Pyroclastic deposits on top of the flows	224
2017-12-10	21:28:54	-15.34840	-174.22781	1895.4	3.9	201.6	Large pillows and flattened lobate flows	225
2017-12-10	21:30:28	-15.34941	-174.21733	1896.2	2.4	168.9	Scoping out places to take a sediment sample - top of one of the flattened flows would be ideal	226
2017-12-10	21:37:58	-15.34879	-174.22848	1892.7	0.9	140.9	Scoop of sediment deposited on top of lobate pillows	227
2017-12-10	21:39:28	0.00000	0.00000	1892.8	0.7	139.9	**S99-sed-09** Location 15.3488458 174.2278238 depth 1892m	228
2017-12-10	21:42:38	-15.34900	-174.22775	1887.6	2.6	181.1	We are probably in the 2006-2008 lava flow. We're up at 1888 m.	229
2017-12-10	21:44:27	-15.34983	-174.22074	1885.7	4.8	203.7	Fluid-looking pillow tubes. then some broken up pillows.	230
2017-12-10	21:48:04	-15.34926	-174.22782	1874.0	5.0	203.8	Pillows a bit broken up as we go upslope. Depth is 1874 m.	231

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2017-12-10	21:49:29	-15.34979	-174.22117	1865.3	13.1	209.7	Steep slope of talus off to the left. Still intact pillows on ridge crest. Very narrow ridge.	232
2017-12-10	21:51:31	-15.34932	-174.22830	1856.0	3.5	207.9	Getting close to WP4 which is at 1846 m. Ridge should get flatter up there.	233
2017-12-10	21:54:27	-15.34949	-174.22810	1849.3	1.3	199.7	Pillows are pretty broad here. We must be near WP4. Going to sample a rock.	234
2017-12-10	21:56:40	-15.34946	-174.22815	1849.4	1.2	199.3	Trying to get a piece of crust from a hollowed out pillow.	235
2017-12-10	22:01:47	-15.34949	-174.22814	1849.4	1.3	195.4	**S99-rock-10**. Crust from a hollowed out pillow. 3-4 cm on a side almost 10 cm on long axis. Lot of glass. First piece was small and fragile. Nav fix -15.349475 -174.228162. Two more pieces gotten on a second grab. All went into biobox bin 3. Broke up a lot going into bin.	236
2017-12-10	22:04:48	-15.35052	-174.21342	1847.1	2.3	197.9	Moving on over large bulbous pillows.	237
2017-12-10	22:06:17	-15.34964	-174.22784	1845.5	1.4	199.1	Traversing over large pillow tubes towards large fragmented pillows.	238
2017-12-10	22:08:26	-15.34976	-174.22814	1843.6	2.5	198.7	Pillows are highly fragmented here - lots of large angular fragments; looks like a fissure cutting through the shelly lava.	239
2017-12-10	22:10:19	-15.34994	-174.22812	1839.6	3.6	199.6	Steep slope on the left.	240
2017-12-10	22:11:09	-15.34996	-174.22826	1839.6	2.9	200.5	JRod	241
2017-12-10	22:11:44	-15.34998	-174.22808	1838.1	3.1	228.4	Large pillow. partly broken up. cover the ridge line we are moving up now; pillows have some staining.	242
2017-12-10	22:12:42	-15.35011	-174.22809	1839.4	12.6	293.1	Moving over the cliff on the left side of the ridge now.	243
2017-12-10	22:14:21	-15.35021	-174.22827	1839.0	17.6	245.0	Lots of broken pillow tubes at the cliff; some drained.	244
2017-12-10	22:18:44	-15.35078	-174.22844	1838.2	17.7	245.8	Very shelly lava here. Broad pillow lobes.	245
2017-12-10	22:20:21	-15.35092	-174.22850	1839.4	12.2	284.2	Nice cliff with nasty dropoff as we move up ridge.	246
2017-12-10	22:21:29	-15.35098	-174.22856	1840.3	9.4	334.8	Cliff face has a lot of truncated and collapsed/drained lava flows as well as occasional intact draping flows.	247
2017-12-10	22:21:33	-15.35098	-174.22856	1839.7	5.5	331.6	Crinoid.	248
2017-12-10	22:23:27	-15.35105	-174.22860	1833.4	4.1	303.7	Some of the larger inflated pillows here preserve a very complex drainage history. Multiple stages visible.	249

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2017-12-10	22:25:41	-15.35104	-174.22850	1832.8	4.2	299.5	Spun glass inside pillow. Beautiful delicate stretching texture from expansion while interior of pillow was still gooey.	250
2017-12-10	22:25:53	-15.35106	-174.22877	1832.9	4.5	292.7	Going to try to slurp some of the spun glass.	251
2017-12-10	22:29:47	-15.35103	-174.22874	1830.2	6.0	270.1	Filaments of spun glass from interior of inflated and drained pillow.	252
2017-12-10	22:31:49	-15.35112	-174.22868	1827.5	5.3	244.9	**S99-rock-11** Location 15.3510900 174.2287517 depth 1831m.	253
2017-12-10	22:33:35	-15.35123	-174.22873	1823.2	10.1	236.4	Lower effusion rate lavas along this steep slope. Fewer broken faces and more toes.	254
2017-12-10	22:34:19	-15.35132	-174.22874	1822.5	17.8	294.5	Back into higher effusion rate lavas - less competence here and more drainage.	255
2017-12-10	22:36:15	-15.35155	-174.22904	1820.7	5.9	257.9	Mixture of pillow lavas and pillow tubes forming a vertical cliff.	256
2017-12-10	22:38:21	-15.35165	-174.22918	1812.5	3.0	269.3	Looking for a piece of tube to sample.	257
2017-12-10	22:47:25	-15.35162	-174.22931	1810.3	3.5	254.9	Stalk coral.	258
2017-12-10	22:53:54	-15.35162	-174.22940	1808.7	1.0	203.6	Sample of pillow tube detachment end. Lava Britney Spear. Surface hydroids and lots of vesicular glass around groundmass core. Roughly 35x10cm before breaking. Three pieces.	259
2017-12-10	22:54:58	-15.35171	-174.22940	1804.8	1.9	201.3	**S99-rock-12** Location 15.3516241 174.2293993 depth 1808m.	260
2017-12-10	22:56:17	-15.35189	-174.22941	1801.7	2.3	200.7	Exploded pillow.	261
2017-12-10	22:57:19	-15.35207	-174.22936	1800.7	1.8	196.2	Seeing occasional spatters that are probably coming from exploding pillows.	262
2017-12-10	22:58:26	-15.35215	-174.22938	1801.5	1.0	162.8	Stalked coral. Just a lil guy.	263
2017-12-10	23:00:13	-15.35218	-174.22937	1800.5	2.0	164.8	Bamboo coral - about ten years old or less.	264
2017-12-10	23:01:58	-15.35226	-174.22929	1805.2	0.7	188.3	Tiny little branching coral on lava shell.	265
2017-12-10	23:04:20	-15.35244	-174.22936	1805.0	4.0	203.4	Lava lobes are huge here.	266
2017-12-10	23:06:04	-15.35263	-174.22937	1806.3	0.0	212.6	We are chasing a fish. Despite repeated inquiries. it is still not an assfish.	267
2017-12-10	23:07:06	-15.35269	-174.22945	1803.5	0.0	273.6	Vertical cliff with a lot of dripped-off flows. Lavas are mantling the cliff edge so this was a pre-existing structure.	268
2017-12-10	23:08:09	-15.35279	-174.22940	1801.4	21.1	290.2	Some spatter topping the cliff edge lava flows.	269
2017-12-10	23:08:20	-15.35282	-174.22946	1800.6	19.7	278.2	Exploded pillow textures here and there.	270

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2017-12-10	23:10:48	-15.35305	-174.22950	1798.0	0.0	322.8	We're on the ridge at 1800m. The nav is tracking well.	271
2017-12-10	23:11:21	-15.35300	-174.22949	1799.2	0.0	288.1	We're on the older lava flow now that erupted sometime between 2006 and 2009.	272
2017-12-10	23:11:45	-15.35300	-174.22950	1800.4	4.3	284.5	Moving up this narrow ridge to eventually end up at the summit to Tafu.	273
2017-12-10	23:12:38	-15.35300	-174.22950	1800.2	0.0	278.9	Beautiful huge pillow where the rind has fallen off and can see all the multiple layers inside. Lots of vesicles. Gray interior. Yellow staining.	274
2017-12-10	23:13:42	-15.35297	-174.22953	1799.0	1.5	196.0	Some large lobate-like pillows here.	275
2017-12-10	23:14:02	-15.35298	-174.22956	1799.0	1.6	136.8	We must be waiting for the ship.	276
2017-12-10	23:14:34	-15.35306	-174.22953	1799.6	0.0	204.8	This ridge is quite narrow - drops off rapidly to the east (the left side of the screen).	277
2017-12-10	23:15:06	-15.35313	-174.22958	1801.3	1.3	221.6	Broken up pillows with collapsed tops and sides.	278
2017-12-10	23:15:28	-15.35319	-174.22960	1801.5	1.4	211.0	More like thick fat lobates here.	279
2017-12-10	23:16:12	-15.35330	-174.22965	1801.6	1.7	232.1	The water seems a bit cloudier.	280
2017-12-10	23:16:25	-15.35335	-174.22967	1801.8	1.7	223.5	Not much biota here.	281
2017-12-10	23:16:41	-15.35340	-174.22970	1801.2	1.0	225.4	Minimal hydroids and the occasional bamboo coral.	282
2017-12-10	23:16:56	-15.35343	-174.22971	1801.3	1.4	240.4	Big broad lobe that drained out and collapsed.	283
2017-12-10	23:17:29	-15.35353	-174.22976	1799.4	4.5	241.0	The nav is right on at the moment - don't want to jinx it.....	284
2017-12-10	23:18:07	-15.35359	-174.22982	1800.3	3.2	346.9	A little fissure? At least a large crack between these big pillow lobes.	285
2017-12-10	23:18:56	-15.35367	-174.22982	1801.7	0.0	346.9	That's a fissure-like feature.	286
2017-12-10	23:19:22	-15.35366	-174.22986	1801.0	2.6	237.6	Panning around this place.	287
2017-12-10	23:20:25	-15.35391	-174.23007	1798.5	4.0	217.7	Seeing some ash on these pillows.	288
2017-12-10	23:20:40	-15.35396	-174.23000	1798.4	5.1	251.4	Broken up and collapsed pillows here.	289
2017-12-10	23:21:06	-15.35402	-174.23006	1799.0	0.0	212.6	Some yellow staining.	290
2017-12-10	23:21:26	-15.35410	-174.23007	1799.4	3.7	216.8	Crazy-looking lobate sheets on top of big pillows.	291
2017-12-10	23:21:38	-15.35412	-174.23008	1799.9	3.4	218.4	Back on smaller pillow tubes now.	292
2017-12-10	23:23:01	-15.35407	-174.23020	1798.3	0.9	272.3	Some more fluid-looking lavas in front of us - drained out from large pillows.	293
2017-12-10	23:23:14	-15.35406	-174.23020	1797.8	1.4	264.9	Disgorged pillow tube.	294
2017-12-10	23:23:39	-15.35405	-174.23022	1797.4	0.0	249.6	Gas bubbles in this disgorged pillow.	295

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2017-12-10	23:23:51	-15.35405	-174.23022	1797.4	1.4	247.2	Some little creature on the top of that tube.	296
2017-12-10	23:24:29	-15.35404	-174.23024	1793.8	3.9	272.9	Long arched pillow lobes / tubes.	297
2017-12-10	23:24:44	-15.35404	-174.23026	1791.9	4.1	271.9	Almost every pillow you look inside are half gas bubbles.	298
2017-12-10	23:24:54	-15.35402	-174.23028	1790.8	1.8	277.8	Not seeing a lot growing on these lavas.	299
2017-12-10	23:25:53	-15.35404	-174.23037	1789.9	0.0	218.0	Edge of a ridge here with jumbled up scoria.	300
2017-12-10	23:26:06	-15.35406	-174.23038	1789.1	0.0	232.1	Spatter - probably near an emission site.	301
2017-12-10	23:26:30	-15.35414	-174.23043	1790.4	3.4	229.0	Now we're coming upon more organized large pillows on the top of smaller pillow tubes.	302
2017-12-10	23:27:36	-15.35428	-174.23059	1786.3	6.9	229.1	Moving up this steep slope and seeing lots of broken pillows that fell down the slope.	303
2017-12-10	23:28:37	-15.35437	-174.23065	1781.3	9.9	244.7	Moving up this steep slope with in place pillows - large bulbous and smaller pillow tubes.	304
2017-12-10	23:28:56	-15.35440	-174.23066	1780.1	5.2	249.6	Quite a plethora of all types of pillows.	305
2017-12-10	23:29:14	-15.35442	-174.23066	1779.1	8.8	258.7	Disgorged pillow with lots of its innards sticking out.	306
2017-12-10	23:29:42	-15.35446	-174.23066	1780.7	6.8	268.4	These lobes are cracked up and drained out.	307
2017-12-10	23:30:14	-15.35449	-174.23069	1779.3	0.0	264.9	A couple of squat lobsters around here.	308
2017-12-10	23:30:45	-15.35454	-174.23071	1779.2	5.1	265.2	Long lobes.	309
2017-12-10	23:32:03	-15.35471	-174.23072	1779.1	1.4	263.4	Up on another step here. We're at 1778 m. Continuing to climb up this ridge.	310
2017-12-10	23:32:24	-15.35473	-174.23074	1778.2	2.0	257.5	Long fat pillow lobes on this ridge.	311
2017-12-10	23:34:03	-15.35490	-174.23081	1773.4	9.9	210.6	More of the same as we continue up slope.	312
2017-12-10	23:34:09	-15.35490	-174.23080	1772.4	11.4	210.4	We are getting nav.	313
2017-12-10	23:34:31	-15.35490	-174.23079	1769.5	13.7	212.5	Some broken pillow lobes and tubes as we climb up this stack of pillows.	314
2017-12-10	23:35:04	-15.35493	-174.23078	1768.5	19.2	232.8	Quite a steep slope on both sides. The axis of the ridge is only a few meters wide.	315
2017-12-10	23:35:19	-15.35494	-174.23079	1767.5	0.0	249.3	The pillows are diving down either side.	316
2017-12-10	23:35:53	-15.35497	-174.23084	1764.5	2.1	242.9	Fish and a shrimp.	317
2017-12-10	23:36:13	-15.35501	-174.23088	1763.9	2.9	221.5	We're thinking about taking a sample.	318
2017-12-10	23:36:30	-15.35503	-174.23090	1762.7	3.8	215.8	These lavas are in place.	319
2017-12-10	23:37:21	-15.35504	-174.23091	1762.2	3.1	215.7	Going to grab what looks like a small pillow "toe". It's probably bigger than it looks.	320

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S099 North Tafu Logger Comments	Record #
2017-12-10	23:39:52	-15.35504	-174.23091	1763.4	2.6	213.9	**S99-rock-13**. Going for the tip of a pillow "toe". Big drainout pillow to the right and left. Z1=764 m. Perfect pillow toe. Some staining on the interior.	321
2017-12-10	23:41:44	-15.35504	-174.23091	1763.4	2.2	214.5	Vesicles Green olivine crystals. Nice glass rind on all surfaces but broken one. 15x15 circular bud.	322
2017-12-10	23:42:38	-15.35504	-174.23091	1763.3	2.2	214.9	Nav fix for sample 13:15.355046 174.230899.	323
2017-12-10	23:42:53	-15.35504	-174.23091	1763.5	2.0	214.2	That was a beautiful sample - just right.	324
2017-12-10	23:43:12	-15.35506	-174.23089	1762.7	2.2	203.3	Heading on now.	325
2017-12-10	23:43:33	-15.35511	-174.23087	1762.6	2.9	273.0	Some broken big pillows.	326
2017-12-10	23:44:07	-15.35518	-174.23090	1761.2	5.8	250.9	Pillow tubes that cascade down slope.	327
2017-12-10	23:49:11	-15.35579	-174.23110	1747.7	2.5	267.6	Continuing up the slope; we're at 1748 m now.	328
2017-12-10	23:49:44	-15.35580	-174.23112	1747.3	2.8	270.8	Looks like a chrysogorgia coral.	329
2017-12-10	23:51:00	-15.35580	-174.23113	1747.5	1.3	274.5	Zooming in on this coral - it's not a chrysogorgia Walter says. The polyps are too big. It's a soft coral of some time and octocoral.	330
2017-12-10	23:51:21	-15.35582	-174.23115	1746.5	0.0	260.7	We've seen a few of those on this slope.	331
2017-12-10	23:52:44	-15.35597	-174.23136	1743.1	0.0	287.6	More cascading pillows on the slope. What else would we expect?	332
2017-12-10	23:54:01	-15.35602	-174.23159	1734.1	1.8	265.2	Broken pillows ere. As the slope increases the pillows are more broken.	333
2017-12-10	23:54:51	-15.35606	-174.23161	1730.5	5.6	252.4	Wall of larger broken off pillows Smaller tubes are not as broken.	334
2017-12-10	23:55:14	-15.35605	-174.23160	1730.2	4.7	252.4	Zoom on outer spongy crust. Seem to be hydroids in the spongy interior hanging out on the rind.	335
2017-12-10	23:56:15	-15.35618	-174.23161	1726.1	15.8	244.8	Fish.	336
2017-12-10	23:57:09	-15.35640	-174.23167	1721.9	9.5	233.0	Steep pillow wall ahead of us. Broken off pillows.	337
2017-12-10	23:57:37	-15.35645	-174.23169	1719.0	7.4	229.1	The white staining on the pillows is a mineral precipitate or the water/rock interaction.	338
2017-12-10	23:59:16	-15.35654	-174.23180	1706.4	11.6	230.2	Continuing up slope. More broken pillow tubes in place on the steep cliff face.	339
2017-12-10	23:59:39	-15.35657	-174.23180	1704.0	10.7	255.2	Seeing more yellow staining. Hydrothermal?	340
2017-12-11	00:01:06	-15.35659	-174.23183	1701.7	0.0	241.4	We're going to grab another rock here on this somewhat flatter area. Large flattish lobates and bulbous pillows here.	341
2017-12-11	00:01:56	-15.35660	-174.23184	1702.5	0.0	242.1	Setting up to sample.	342

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2017-12-11	00:04:35	-15.35667	-174.23163	1702.4	0.0	244.5	Top rind from large disgorged pillow. Looks like it has lost its rind because it's so inflated.	343
2017-12-11	00:09:05	-15.35674	-174.23182	1700.4	1.6	284.0	SAMPLE CORRECTION: Going for something else. Did not take the previous rock 15 sample. That one was too crumbly...	344
2017-12-11	00:09:43	-15.35674	-174.23182	1701.1	1.0	283.7	Possible zoarcid siting.	345
2017-12-11	00:10:45	-15.35675	-174.23182	1701.2	0.0	283.7	SAMPLE 14 HAS NOT BEEN COLLECTED YET (DISREGARD PREVIOUS SAMPLE LIST ENTRY)	346
2017-12-11	00:14:31	-15.35669	-174.23176	1701.2	0.0	284.1	**S99-rock-14.** Rind of pillow tube. Olivine crystals visible. Vesicular; Glass exterior. Glat. 30 cm long 15 cm wide.	347
2017-12-11	00:16:02	-15.35669	-174.23176	1701.1	1.0	283.3	Went into biobox. Z=1701m. Nav fix:15.356748 174.231827.	348
2017-12-11	00:16:37	-15.35669	-174.23176	1701.1	0.0	284.0	Darren	349
2017-12-11	00:17:39	-15.35670	-174.23177	1701.2	0.6	283.7	We're nearing the top of the 2006 - 2009 lava flow.	350
2017-12-11	00:17:59	-15.35670	-174.23177	1701.2	0.6	283.7	A little squat lobster jumped out of the cavity in the pillow that we just sampled.	351
2017-12-11	00:19:39	-15.35673	-174.23180	1696.9	5.0	231.9	We're moving on now..	352
2017-12-11	00:19:50	-15.35675	-174.23181	1696.3	3.8	234.1	More pillow lavas - of course.	353
2017-12-11	00:20:55	-15.35681	-174.23189	1691.8	1.6	233.2	Pillow lobes piled on top of each other - some perpendicular to each other.	354
2017-12-11	00:21:08	-15.35682	-174.23190	1690.9	1.8	233.1	Big egg-shaped pillow ahead.	355
2017-12-11	00:21:53	-15.35686	-174.23195	1687.2	3.0	232.4	Coming to the top of this platform here. Nav is steady.	356
2017-12-11	00:22:31	-15.35691	-174.23200	1685.7	2.8	233.7	We should be getting out of the 2006 - 2009 depth anomaly sometime soon.	357
2017-12-11	00:22:51	-15.35694	-174.23205	1684.3	3.5	233.4	Broken up pillows - some with a little bit of ash.	358
2017-12-11	00:23:02	-15.35696	-174.23206	1683.1	3.8	233.3	In place long pillows here.	359
2017-12-11	00:23:23	-15.35697	-174.23208	1681.0	3.9	233.4	Seeing a bit of orange floc-like material here and there.	360
2017-12-11	00:24:19	-15.35699	-174.23210	1677.1	5.7	262.1	This ridge is not very wide at this time.	361
2017-12-11	00:25:21	-15.35705	-174.23214	1674.8	3.9	287.7	Spongy0textured interior of broken pillows.	362
2017-12-11	00:26:33	-15.35710	-174.23221	1672.4	2.3	269.0	Coming to the top of this slope here. Looking to the west along this knife edge.	363
2017-12-11	00:28:13	-15.35718	-174.23228	1670.9	6.9	33.0	Steep jumbly lavas up here. A fractured surface with some staining coming up.	364
2017-12-11	00:28:47	-15.35713	-174.23231	1672.9	6.1	69.0	Massive lavas overhanging this steep slope.	365

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2017-12-11	00:29:02	-15.35712	-174.23231	1674.0	0.0	95.7	Shrimp.	366
2017-12-11	00:29:32	-15.35713	-174.23232	1675.7	0.0	86.3	Lots of alteration on the lavas here.	367
2017-12-11	00:29:56	-15.35713	-174.23232	1676.5	0.0	57.7	Looks like bac mat to the lower right.	368
2017-12-11	00:30:09	-15.35713	-174.23230	1674.0	0.0	56.7	We're going to continue up this steep ridge.	369
2017-12-11	00:30:25	-15.35714	-174.23226	1670.4	9.7	34.0	We're at the top.	370
2017-12-11	00:31:00	-15.35716	-174.23221	1670.6	4.8	227.0	All these little white things are squat lobsters?	371
2017-12-11	00:31:26	-15.35721	-174.23224	1671.4	3.8	218.8	Knife-edge ridge here.	372
2017-12-11	00:31:31	-15.35722	-174.23225	1671.2	3.1	219.4	Jumbled up flow.	373
2017-12-11	00:31:41	-15.35723	-174.23226	1671.3	2.6	218.6	Pillow hanging out in space.	374
2017-12-11	00:32:25	-15.35724	-174.23229	1671.8	4.8	195.2	Squat lobster in that pillow.	375
2017-12-11	00:32:50	-15.35727	-174.23230	1671.1	0.0	206.5	Continuing on along this ridge.	376
2017-12-11	00:33:06	-15.35730	-174.23230	1672.4	1.0	212.8	This stretch is scrambled up lava crust.	377
2017-12-11	00:33:11	-15.35731	-174.23230	1672.3	1.6	212.6	Zoarcid.	378
2017-12-11	00:33:46	-15.35737	-174.23233	1672.7	2.1	211.8	Jumbled up flow here.	379
2017-12-11	00:34:06	-15.35739	-174.23234	1672.3	3.1	211.5	Going to try a scoop bag here.	380
2017-12-11	00:36:14	-15.35739	-174.23234	1674.2	0.0	211.7	Going in for a scoop of these seds on a flatter surface now.	381
2017-12-11	00:42:54	-15.35744	-174.23245	1674.2	0.0	212.4	**S99-sed-15**. Sediment sample in this dark coarse volcaniclastic seds. Black shiny - some very large grains. Z=1675. Nav fix: 15.357470 174.232244	382
2017-12-11	00:44:56	-15.35742	-174.23249	1674.2	0.0	211.6	The gastight was tripped sometime before rock 15. Obviously that was a mistake.	383
2017-12-11	00:46:20	-15.35749	-174.23246	1672.5	1.8	211.5	We're going to go take a peek at a white patch that we see on the west side of the slope.	384
2017-12-11	00:48:27	-15.35754	-174.23252	1676.1	2.2	211.7	Looking around for any chance of hydrothermal venting. There's a crab there. A small tiny bit of mat here. A couple of squat lobsters here.	385
2017-12-11	00:48:43	-15.35754	-174.23252	1676.4	2.0	213.0	Barnacle on the rock.	386
2017-12-11	00:49:00	-15.35754	-174.23252	1676.4	2.0	214.5	Squat lobster.	387
2017-12-11	00:49:17	-15.35754	-174.23252	1676.4	2.1	215.7	That's bacterial mat. The yellow could be sulfur.	388
2017-12-11	00:49:43	-15.35754	-174.23252	1676.4	2.0	216.1	That's a scaleworm.	389
2017-12-11	00:50:06	-15.35749	-174.23261	1676.3	2.0	216.7	Whelk.	390
2017-12-11	00:51:28	-15.35748	-174.23271	1676.3	2.1	217.1	Diffuse venting area of edge of cliff: 15.3574955 174.2326377. Z=1676.	391
2017-12-11	00:51:55	-15.35748	-174.23275	1676.3	2.1	216.6	Ctenophore - comb jelly.	392

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2017-12-11	00:52:25	-15.35747	-174.23279	1676.3	2.1	216.3	Dying vent on a cliff.	393
2017-12-11	00:52:50	-15.35747	-174.23284	1676.3	2.1	216.2	Shrimp look like Alvinocaris? Hydroids.	394
2017-12-11	00:53:10	-15.35754	-174.23230	1676.3	0.0	214.3	Whelks.	395
2017-12-11	00:54:20	-15.35755	-174.23207	1675.7	4.2	165.7	A couple shrimp here as well.	396
2017-12-11	00:54:38	-15.35756	-174.23201	1675.9	4.2	164.4	Squat lobsters.	397
2017-12-11	00:56:22	-15.35755	-174.23159	1676.0	0.0	163.5	This site is on a nearly vertical cliff. - Just a small patch of mat here and there.	398
2017-12-11	00:58:17	-15.35747	-174.23105	1676.1	3.2	162.3	15.3574955 174.2326377. Z=1676. "Cliff Could Have Been a Contender" site. That's probably a little patch of sulfur with some white filamentous mat on edge.	399
2017-12-11	00:59:56	-15.35732	-174.23052	1676.0	3.6	163.4	Nav fix for Cliff Could Have Been a Contender (Cliff Contender) site: 15.357548 174.232277 Z=1671.	400
2017-12-11	01:03:13	-15.35775	-174.23241	1676.1	0.0	162.2	S99-fluid-16. Major #3. Sample fluids above small patch of sulfur and filamentous (long hairy) mat. A few animals sparsely scattered about. Nav fix: 15.357548 174.232277 Z=1671. Fired at 0102:50	401
2017-12-11	01:04:35	-15.35775	-174.23239	1676.0	0.0	161.5	Zooming in. Not a chunk of sulfur says Dave. Either way it's sulfur and white mat. Little scale worm to the right. Squat lobster defending its turf up front.	402
2017-12-11	01:05:19	-15.35774	-174.23240	1676.1	0.0	162.0	Sample 16 info: Major finished at 0104:50.	403
2017-12-11	01:06:28	-15.35774	-174.23239	1676.0	8.0	161.5	Stowing the major sampler now.	404
2017-12-11	01:12:13	-15.35746	-174.23217	1675.8	3.3	179.2	Shrimp there. Alvinocaris-looking (it has eyes).	405
2017-12-11	01:12:54	-15.35747	-174.23217	1675.8	3.3	179.2	Going to suction shrimp; scaleworm; squat lobster; etc.....	406
2017-12-11	01:22:23	-15.35851	-174.23415	1675.8	3.4	177.5	Cliff Contender site. Suction 3 shrimp; 1 squat lobster; 1 small whelk; 1 scale worm; and Sulfur mat.	407
2017-12-11	01:24:33	-15.35856	-174.23426	1675.1	0.0	165.2	Sample **S99-Bio-17**. "Cliff Could Have Been A Contender" site. Nav fix: 15.357548 174.232277 Z=1671.	408
2017-12-11	01:24:50	-15.35856	-174.23422	1673.1	3.3	167.3	The Cliff contender site is on a lava cliff of pillow piles.	409
2017-12-11	01:25:26	-15.35864	-174.23424	1670.9	1.4	177.8	We're now moving along this narrow ridge of jumbled up lavas. Not a lot of pillows on the top of this ridge.	410
2017-12-11	01:26:55	-15.35884	-174.23426	1681.4	2.2	197.3	The vehicle is generally going up this steep slope.	411

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2017-12-11	01:27:04	-15.35885	-174.23427	1681.7	1.4	198.2	That might have been the very end of that flow.	412
2017-12-11	01:27:14	-15.35887	-174.23428	1682.4	0.8	198.2	Do these lavas look older?	413
2017-12-11	01:28:20	-15.35895	-174.23439	1682.4	0.9	220.0	We're near the depth change boundary - when we dropped down.	414
2017-12-11	01:28:37	-15.35642	-174.23103	1683.3	1.0	223.4	Bill suspects this may be a different flow.	415
2017-12-11	01:28:50	-15.35825	-174.23290	1682.9	1.4	220.8	Still not seeing any biota.	416
2017-12-11	01:29:02	-15.35652	-174.22998	1682.0	1.9	219.5	Doesn't look particularly old here.	417
2017-12-11	01:29:44	-15.35182	-174.22530	1678.8	3.0	220.2	We're looking at more jumbled up flow here. More near-vent type lavas.	418
2017-12-11	01:29:58	0.00000	0.00000	1678.2	2.7	219.0	Collection of mangled glass.	419
2017-12-11	01:30:11	-15.35130	-174.22065	1678.6	0.0	250.8	Scoria pile.	420
2017-12-11	01:30:35	0.00000	0.00000	1678.7	3.1	273.5	Contorted scrambled up lavas here.	421
2017-12-11	01:31:00	-15.35298	-174.22548	1678.1	1.8	258.6	What a jumbled up mess of lava on the top of this ridge.	422
2017-12-11	01:31:36	-15.35600	-174.22912	1680.2	1.8	239.3	Lavas are still mixed up jumbled.	423
2017-12-11	01:32:08	-15.35186	-174.22323	1681.5	1.8	213.1	Some larger pillows now.	424
2017-12-11	01:32:26	-15.35291	-174.22493	1680.3	1.8	212.0	Fluid-looking glassy lobes. More spatter.	425
2017-12-11	01:33:02	-15.35122	-174.22221	1680.9	1.5	212.4	At the top of that ridge.	426
2017-12-11	01:33:16	-15.35135	-174.22205	1682.6	1.7	212.3	Some thick ash in this pocket.	427
2017-12-11	01:33:46	-15.35688	-174.23064	1684.1	0.3	211.4	Fluid lavas here - sheet-like pillow lobes.	428
2017-12-11	01:34:38	-15.36495	-174.24119	1684.2	0.0	213.2	We're going in for some crumbly lava on this step - steep slope just to the north of us.	429
2017-12-11	01:39:34	-15.36109	-174.23626	1684.1	0.0	213.1	**S99-rock-18**. Z=1684 m. Ropey sheet flow crust. Crumbly. Shiny surface. Skinny piece. 20 cm x 5 cm. Long skinny glassy shiny; aphyric. From step-steep slope over 150m NE of waypoint 6.	430
2017-12-11	01:42:13	-15.35334	-174.22859	1685.9	2.2	214.3	Nav fix: guesstimated: 15.358883 174.233083. Put pointer on ridge position at 1683 m.	431
2017-12-11	01:42:41	-15.35380	-174.22625	1685.3	3.8	215.1	Continuing to move up this steep ridge.	432
2017-12-11	01:43:11	-15.35950	-174.23336	1682.9	2.2	215.7	Large pillow tube up here where it flattens out.	433
2017-12-11	01:43:20	-15.35815	-174.23258	1682.8	1.9	214.9	Lots of in place pillows here.	434
2017-12-11	01:43:29	-15.35636	-174.23390	1683.3	1.7	214.2	Small coral on that pillow.	435
2017-12-11	01:44:14	-15.35901	-174.23328	1682.9	2.1	214.5	See a little stalked coral now. And there's another one.	436
2017-12-11	01:44:48	-15.35923	-174.23351	1681.7	2.1	214.7	These pillows still look pretty glassy and dark.	437

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2017-12-11	01:45:25	-15.34977	-174.22260	1679.0	2.3	214.9	The nav is sporadic.	438
2017-12-11	01:46:09	-15.36000	-174.23508	1676.2	1.4	214.9	Big pillows with striations.	439
2017-12-11	01:46:20	-15.35842	-174.23561	1675.8	2.1	215.0	Some are hollowed out and broken.	440
2017-12-11	01:46:38	-15.36254	-174.23760	1673.9	2.3	215.3	Another little stalked coral.	441
2017-12-11	01:46:56	-15.35936	-174.23360	1671.6	3.6	214.6	Lava toothpaste pouring out of a larger pillow.	442
2017-12-11	01:47:28	-15.35936	-174.23355	1668.7	6.2	213.8	What is that? Polychaete of some type. Very pretty.	443
2017-12-11	01:47:55	-15.35915	-174.23326	1667.1	4.1	214.1	Changing the iris to auto.	444
2017-12-11	01:48:49	-15.35964	-174.23373	1662.1	3.2	214.2	Nav right now is. Z=1667. 15.3592313 174.2334268.	445
2017-12-11	01:49:08	-15.35951	-174.23355	1660.9	1.4	214.7	Had to get that nav fix while we got em.	446
2017-12-11	01:49:30	-15.35954	-174.23358	1659.3	1.5	215.0	Trying to adjust the color and lighting on the video a bit.	447
2017-12-11	01:49:48	-15.35946	-174.23343	1658.3	1.9	214.3	More stalked corals now.	448
2017-12-11	01:50:05	-15.35975	-174.23370	1657.9	1.6	215.1	Lots of sediment in between pillow.	449
2017-12-11	01:50:27	-15.35946	-174.23331	1657.0	1.2	214.9	Stretched large lava loves.	450
2017-12-11	01:50:49	-15.35973	-174.23367	1656.1	1.4	214.6	Flattened pillows and big pillow lobes flowing out large pillow.	451
2017-12-11	01:51:55	-15.35986	-174.23373	1652.1	1.4	214.9	Brisingid.	452
2017-12-11	01:52:30	-15.36001	-174.23382	1650.2	1.1	214.4	Jelly fish.	453
2017-12-11	01:52:53	-15.36001	-174.23380	1649.8	1.3	214.4	Huge collapse here.	454
2017-12-11	01:53:04	-15.35999	-174.23378	1649.6	1.4	213.8	Just a collapse in a big pillow.	455
2017-12-11	01:53:35	-15.35907	-174.23272	1649.7	1.3	214.4	Zooming in on innards of broken pillows.	456
2017-12-11	01:54:37	-15.36022	-174.23406	1649.1	1.6	212.2	Seeing more corals here. Looks like we are on the older flow older than 2008.	457
2017-12-11	01:55:22	-15.34268	-174.24912	1648.1	1.9	214.4	Seeing lots of corals. We're on older lavas now. Z=1648	458
2017-12-11	01:55:40	-15.35230	-174.24582	1648.3	1.4	214.4	Brisingid. Little chrysogorgia. Walter says this is old.	459
2017-12-11	01:56:30	-15.35998	-174.23371	1643.9	2.9	216.0	Seeing crinoid. chrysogorgid coral. talked crinoid. Branching bamboo corals and stalked bamboo corals.	460
2017-12-11	01:56:44	-15.35988	-174.23354	1642.9	2.6	215.0	Dead glass vase sponge.	461
2017-12-11	01:56:56	-15.35983	-174.23352	1643.0	1.9	214.8	Big stalked crinoid.	462

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S099 North Tafu Logger Comments	Record #
2017-12-11	01:57:49	-15.36029	-174.23402	1638.5	3.1	214.7	CONTACT LOCATION: 15.359581 174.233532 (That's an approximation based on depth).	463
2017-12-11	01:58:13	-15.36002	-174.23367	1637.4	2.3	215.3	Lots of corals on this older lava. Large brisingid.	464
2017-12-11	01:59:09	-15.36032	-174.23407	1636.5	0.0	214.4	The current is going from west to east at this depth of 1637 m.	465
2017-12-11	01:59:28	-15.36030	-174.23408	1639.0	1.5	214.9	We're thinking of taking a rock sample here.	466
2017-12-11	02:00:10	-15.36023	-174.23385	1639.8	2.1	214.6	There are corals all over here. Sea star; glass sponges; Stalked crinoid; Chrysogorgia; squat lobsters.	467
2017-12-11	02:00:18	-15.36026	-174.23393	1639.5	2.3	214.7	There is biota everywhere here.	468
2017-12-11	02:01:16	-15.36036	-174.23406	1640.7	2.0	123.9	Beautiful fluid sheety pillow tubes here.	469
2017-12-11	02:01:32	-15.36037	-174.23413	1640.9	2.1	114.8	We're going to take a rock sample here and also grab a coral.	470
2017-12-11	02:03:10	-15.36030	-174.23385	1642.0	0.7	74.0	Lots of corals here. Zoom on chrysogorgia with squat lobster.	471
2017-12-11	02:07:08	-15.36036	-174.23415	1641.9	1.3	101.7	**S99-bio-19**. Chrysogorgia with a squat lobster on old lava. Broke the top off of it. Have the squat lobster too. Chris fix: 15.360397 174.2340815 Z=1642m	472
2017-12-11	02:11:29	-15.36033	-174.23407	1640.1	2.8	113.5	That rock is too crumbly to sample. We'll find a more stable piece.	473
2017-12-11	02:12:01	-15.35797	-174.22961	1635.9	4.7	113.4	The flow here is textured long sheet-like lobes.	474
2017-12-11	02:12:41	-15.35397	-174.22293	1633.5	6.6	181.7	We're getting up into more jumbled lavas.	475
2017-12-11	02:14:19	-15.36017	-174.23324	1632.7	2.1	209.7	Navigators fix for Bio-19 sample is: 15.360394 174.234089. I believe Chris's fix more because we were getting positions at that time.	476
2017-12-11	02:15:01	-15.36021	-174.23334	1632.3	2.7	209.6	Thinking of sampling some of this jumbled sheet-like flow here.	477
2017-12-11	02:16:51	-15.36026	-174.23349	1628.7	2.1	209.7	This ridge is really steep and narrow. Moving out of the jumbled up lavas into more of the same - pillows with ropy crust.	478
2017-12-11	02:17:05	-15.36037	-174.23344	1627.3	2.9	209.7	Anemone on top of this jumbled up ropy lavas.	479
2017-12-11	02:17:34	-15.36044	-174.23351	1626.2	1.6	210.5	Sponge -bell sponge (Susan's name).	480
2017-12-11	02:17:44	-15.36047	-174.23357	1625.4	2.6	209.7	Steep drop off on either side.	481
2017-12-11	02:18:56	-15.36039	-174.23346	1624.5	1.5	211.2	Chrysogorgia to the right. Lots of corals to the left. Oxidized old pillow that has all but collapsed. Going to sample it if we can.	482

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S099 North Tafu Logger Comments	Record #
2017-12-11	02:19:38	-15.36038	-174.23347	1624.5	0.0	210.0	Shrimp swam by. Brisingid in the pillow we are thinking of sampling.	483
2017-12-11	02:25:15	-15.36047	-174.23365	1620.5	2.9	215.4	**S99-rock-20**. Rind of old pillow that is hollowed out. Fragile - oxidized. 15 cm crumbly narrow rind. Glassy? Older flow - don't know what year. Z=1625 Chris fix: 15.3604403 174.2336205	484
2017-12-11	02:26:10	-15.36057	-174.23363	1614.4	1.9	215.4	Beautiful stalked crinoids; Chrysogorgia; Bamboo (?) corals. On this jumbled up seafloor here - talus	485
2017-12-11	02:26:20	-15.36061	-174.23368	1613.0	2.0	215.5	Long bamboo coral	486
2017-12-11	02:26:49	-15.36073	-174.23392	1608.8	2.8	215.5	This is a coral garden here. Brisingids. A LOT of corals here.	487
2017-12-11	02:27:36	-15.36065	-174.23374	1607.1	3.9	214.5	Navigator fix for rock-20 15.360479 174.233559.	488
2017-12-11	02:27:56	-15.36090	-174.23396	1607.2	2.2	213.9	We're dropping down a little bit - but climbing again now.	489
2017-12-11	02:28:38	-15.36077	-174.23372	1604.3	1.3	213.5	A dozen corals in one view. 2 chrysogorgias Lots of bamboo - stalked and branched.	490
2017-12-11	02:29:26	-15.36109	-174.23421	1601.4	2.3	215.3	Stalked crinoids; Brisingid; crinoid; chrisogorgia with 2 squat lobsters.	491
2017-12-11	02:29:41	-15.36102	-174.23406	1600.4	2.6	214.8	Jumbled up fragments of sheet-like flow.	492
2017-12-11	02:29:44	-15.36103	-174.23407	1600.3	2.3	215.3	Anemone.	493
2017-12-11	02:30:00	-15.36124	-174.23471	1599.6	2.1	215.0	Nothing but jumbled flow up here.	494
2017-12-11	02:30:21	-15.36149	-174.23485	1599.6	1.6	215.2	Still seeing tons of biota. Glass sponge ahead in this coral field.	495
2017-12-11	02:30:44	-15.36148	-174.23471	1599.3	1.8	215.0	All of a sudden we are into an area of big pillow lavas.	496
2017-12-11	02:31:11	-15.36149	-174.23459	1597.8	3.4	214.6	Codey	497
2017-12-11	02:31:21	-15.36153	-174.23470	1597.9	3.3	215.4	Still lots of sponges and corals; crinoids here. So; the pillows are old too.	499
2017-12-11	02:32:41	-15.36137	-174.23437	1594.7	2.2	215.4	Bell sponge with brittle star. Crinoids and lots of corals. We're traveling over pillows now. All in place.	500
2017-12-11	02:33:04	-15.36137	-174.23432	1594.0	2.8	215.7	Squat lobster and lots of crinoids; etc. Long lava tubes that resemble lobates.	501
2017-12-11	02:33:41	-15.36153	-174.23447	1592.7	2.1	218.1	Big bulbous pillows here in a sea of biota.	502
2017-12-11	02:34:18	-15.36156	-174.23455	1590.7	2.5	217.9	Glass sponge with brittle star hugging it.	503
2017-12-11	02:34:35	-15.36158	-174.23452	1589.0	2.7	221.9	Crinoids. Brisingids?	504
2017-12-11	02:34:51	-15.36160	-174.23454	1588.0	2.2	221.8	Huge pillows ahead with lovely biota everywhere.	505

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S099 North Tafu Logger Comments	Record #
2017-12-11	02:35:08	-15.36160	-174.23453	1586.5	2.5	223.2	Thick pillow lobes cascading down the slope.	506
2017-12-11	02:35:33	-15.36163	-174.23461	1583.8	3.7	237.8	Coming to a ledge (actually just not quite as steep here.	507
2017-12-11	02:36:05	-15.36167	-174.23468	1581.4	3.2	247.0	Still in pillows here but coming to a transition of more jumbled flow. Zoom on branching bamboo.	508
2017-12-11	02:36:44	-15.36162	-174.23469	1576.3	3.5	261.5	Now we're out of the pillows and back into jumbled lava. More of the biota garden full of corals and crinoids and the occasional anemone.	509
2017-12-11	02:37:10	-15.36158	-174.23469	1576.7	1.7	252.6	Chrysogorgia and squat lobsters here. Crinoid on the right.	510
2017-12-11	02:37:30	-15.36151	-174.23456	1576.6	1.6	250.4	Great zoom on chrysogorgia and squat lobsters.	511
2017-12-11	02:38:18	-15.36172	-174.23487	1570.8	2.1	250.2	More jumbled flow here..	512
2017-12-11	02:38:49	-15.36196	-174.23538	1569.9	1.8	229.1	Now we're at another area where pillows are lapping up onto the jumbled flow.	513
2017-12-11	02:39:34	-15.36188	-174.23553	1563.3	4.0	235.1	Pillows to the west. Jumbled fragments on the steep slope. Topped with long pillow lobes above.	514
2017-12-11	02:41:31	-15.36215	-174.23565	1555.7	3.0	221.1	We keep going back and forth between pillows and jumbled lavas.	515
2017-12-11	02:41:46	-15.36223	-174.23565	1553.3	3.8	211.2	Pillows over the jumbled flow here.	516
2017-12-11	02:42:52	-15.36229	-174.23558	1547.8	4.0	206.9	We're at 1550 m here. The ROV depth agrees well with the map right now.	517
2017-12-11	02:43:15	-15.36243	-174.23571	1543.0	4.3	203.8	Steep fragmented slope.	518
2017-12-11	02:43:56	-15.36226	-174.23524	1538.3	2.3	212.2	Really steep again.	519
2017-12-11	02:44:08	-15.36226	-174.23521	1538.0	2.6	213.0	Ctenophore.	520
2017-12-11	02:44:33	-15.36235	-174.23540	1535.6	2.7	210.6	Back into jumbled up flow here.	521
2017-12-11	02:44:45	-15.36238	-174.23542	1534.9	2.7	214.2	Over the edge.	522
2017-12-11	02:44:59	-15.36245	-174.23544	1536.0	2.9	216.7	We want to continue up on the ridge.	523
2017-12-11	02:45:56	-15.36242	-174.23574	1533.5	3.4	196.3	The water is somewhat milky again.	524
2017-12-11	02:46:30	-15.36259	-174.23570	1530.2	1.7	201.0	Fragmented jumbled lavas transitioning back into pillows.	525
2017-12-11	02:46:36	-15.36262	-174.23575	1530.3	2.4	199.5	Lots of corals.	526
2017-12-11	02:47:11	-15.36262	-174.23565	1531.1	1.4	215.0	Red crinoid.	527
2017-12-11	02:48:22	-15.36278	-174.23576	1525.1	2.4	225.1	Back onto fragmented lavas. Smaller fragments. We're approaching the high point on this ridge. Lots of corals and crinoids at this ridge top.	528

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2017-12-11	02:49:26	-15.36286	-174.23579	1522.3	4.0	214.6	Continuing our climb. See a few pillows. Now we're onto talus slope.	529
2017-12-11	02:50:17	-15.36292	-174.23595	1511.1	4.1	208.8	Lave tubes - fat and shiny to the left. Talus chute to the right.	530
2017-12-11	02:50:45	-15.36294	-174.23584	1508.3	4.0	208.9	At a local high here we're into more jumbled lavas.	531
2017-12-11	02:51:46	-15.36298	-174.23596	1509.7	2.0	208.5	Large massive chunk of jumbled up lava here.	532
2017-12-11	02:54:16	-15.36319	-174.23603	1507.0	4.8	209.3	Back in the pillows again. The pillows are on top of the jumbled flow.	533
2017-12-11	02:54:32	-15.36317	-174.23599	1505.7	4.4	208.0	Lots of stalked corals on this bunch of pillows.	534
2017-12-11	02:55:11	-15.36327	-174.23605	1499.5	5.0	216.7	Long pillow lobes running down slope.	535
2017-12-11	02:58:32	-15.36343	-174.23631	1497.1	1.9	235.5	Ridge is alternating lobes and jumbles.	536
2017-12-11	02:58:44	-15.36344	-174.23627	1497.9	1.9	223.1	Lots of corals and some skeletons.	537
2017-12-11	03:05:27	-15.36366	-174.23652	1490.5	3.5	268.8	Chunk of frothy glass from young-looking lava flow. Covered in hydroids. 15x15cm platy like Wisconsin.	538
2017-12-11	03:08:03	-15.36370	-174.23674	1489.3	2.7	244.6	**S99-rock-21** Location: 15.3636708 174.2365880 depth 1490m.	539
2017-12-11	03:11:39	-15.36377	-174.23672	1482.5	2.6	233.6	This flow is younger for sure. Some hydroid and coral growth as well as some small squat lobsters.	540
2017-12-11	03:12:15	-15.36375	-174.23669	1477.2	4.1	230.5	Lots of elongate flows and bluish reflections off of some glass surfaces. Driving up knife ridge. Not a lot of ash to speak of.	541
2017-12-11	03:14:09	-15.36399	-174.23700	1465.4	2.4	211.8	Moving up the ridge. Lots of intact pillows and small local highs.	542
2017-12-11	03:14:52	-15.36405	-174.23699	1460.5	3.3	210.3	Rubbly knife ridge.	543
2017-12-11	03:15:57	-15.36427	-174.23722	1455.2	3.1	218.8	Spatter.	544
2017-12-11	03:17:44	-15.36444	-174.23733	1452.5	4.5	203.5	Back into a slightly flatter area with flattened lobate flows and lots of debris - some jumbly and taffy-like.	545
2017-12-11	03:18:02	-15.36447	-174.23732	1449.0	4.8	221.4	Definitely vent nearby. Back into jumbly	546
2017-12-11	03:18:12	-15.36448	-174.23730	1450.1	2.2	250.8	Lots of hydrothermal deposits.	547
2017-12-11	03:18:59	-15.36455	-174.23733	1449.8	1.7	245.2	Encountered what looks like another breccia pipe?	548
2017-12-11	03:19:40	-15.36454	-174.23745	1445.7	2.5	217.6	A few pillows but mostly jumbled here.	549
2017-12-11	03:20:01	-15.36459	-174.23740	1444.9	2.9	215.8	Hydrothermal stains are patchy but fairly extensive here.	550
2017-12-11	03:21:18	-15.36476	-174.23755	1440.5	4.5	234.4	Pillows and talus looking downslope off knife ridge. Still seeing some jumbly lavas. Terrain changes very quickly here.	551

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2017-12-11	03:24:47	-15.36519	-174.23783	1440.3	3.6	176.7	Stacks of jumbled lava and pillows. Some of it is in or near place and some definitely talus	552
2017-12-11	03:24:52	-15.36519	-174.23782	1439.9	3.1	176.4	Shrimp.	553
2017-12-11	03:25:26	-15.36530	-174.23790	1435.6	3.2	210.7	Pillows on top of jumbly lava.	554
2017-12-11	03:26:13	-15.36528	-174.23790	1433.2	3.2	208.1	Moving across VERY orange-stained lava with a dead branching coral on it. Looks like 70s-era orange.	555
2017-12-11	03:26:24	-15.36532	-174.23797	1431.3	3.6	208.8	Probably an older lava.	556
2017-12-11	03:27:31	-15.36545	-174.23792	1426.0	2.7	228.8	Local small highstand of jumbly lavas that contacted large pillow flows.	557
2017-12-11	03:27:47	-15.36543	-174.23789	1424.0	2.5	224.4	Pillows here are striated and very orange.	558
2017-12-11	03:27:52	-15.36544	-174.23791	1423.5	1.9	222.4	Striated.	559
2017-12-11	03:28:58	-15.36553	-174.23797	1423.3	1.1	233.1	Shimmering water and a snail.	560
2017-12-11	03:29:09	-15.36554	-174.23802	1423.5	0.8	232.7	Lots of microbial nurdles.	561
2017-12-11	03:32:07	-15.36548	-174.23799	1423.2	1.6	231.9	Deploying temperature probe.	562
2017-12-11	03:34:54	-15.36548	-174.23793	1423.2	1.9	231.8	Water temp at diffuse flow Tmax is 5C.	563
2017-12-11	03:35:17	-15.36549	-174.23797	1423.2	1.6	231.8	Ambient T is 2.6C.	564
2017-12-11	03:40:27	-15.36541	-174.23782	1423.2	1.7	231.2	Fluid sample at very microbial outcrop with diffuse flow and Tmax=5C.	565
2017-12-11	03:42:32	-15.36551	-174.23801	1423.2	1.6	231.3	**S99-fluid-22** Location: 15.3653533 174.2380319 depth 1423m.	566
2017-12-11	03:44:10	-15.36544	-174.23791	1418.8	2.4	233.7	Russ	567
2017-12-11	03:45:05	-15.36552	-174.23798	1419.2	3.0	233.2	More shimmering water along ridge here. Out of majors but will pop the niskins.	568
2017-12-11	03:46:41	-15.36509	-174.23771	1419.2	2.3	237.4	**S99-fluid-23.** Niskin sample over this hydrothermal active jumbly lava. Altitude 3m over flows.	569
2017-12-11	03:47:18	-15.37451	-174.24378	1419.3	2.4	238.8	**S99-fluid-24**. Niskin in same place as first niskin.	570
2017-12-11	03:50:46	-15.37462	-174.23699	1431.0	4.1	247.2	Niskin pop location 15.3737113 174.2373172 (bad guess) depth 1418m with 3m hover.	571
2017-12-11	03:51:26	-15.37680	-174.23642	1434.0	3.3	247.0	Very murky water again and into an area with fairly extensive diffuse flow indicated by whole field of view shimmering.	572
2017-12-11	03:53:44	-15.37719	-174.23647	1434.0	2.4	245.4	More shimmer - might be warmer here.	573
2017-12-11	03:54:35	-15.37718	-174.23647	1435.0	2.4	245.2	Jumbly lava with extensive microbial/hydrothermal coating.	574
2017-12-11	03:55:18	-15.36605	-174.23857	1434.1	3.5	209.4	Waypoint 7.	575

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S099 North Tafu Logger Comments	Record #
2017-12-11	03:56:21	-15.36542	-174.23864	1434.9	0.8	194.0	Lots of small chimney-like features. Unsure if all bacterial or if there's sulfide underneath.	576
2017-12-11	03:58:58	-15.37719	-174.23670	1430.7	1.3	180.8	Very fluffy.	577
2017-12-11	03:59:36	-15.37729	-174.23656	1427.6	2.4	179.7	Racing to the summit.	578
2017-12-11	03:59:48	-15.37734	-174.23658	1425.8	3.4	178.7	Dead hydroid skeletons.	579
2017-12-11	04:01:37	-15.36478	-174.23856	1409.6	3.6	168.2	Still moving through alternating patches of jumbly and pillow lava coated with hydrothermal material. Summiting a local high and nav came back with ROV location near summit.	580
2017-12-11	04:02:09	-15.36589	-174.23846	1411.4	0.6	201.0	Now says we're near waypoint 7 so totally unreliable.	581
2017-12-11	04:02:15	-15.36589	-174.23846	1411.5	0.0	199.1	Shrimp.	582
2017-12-11	04:03:09	-15.36602	-174.23854	1415.7	6.1	198.4	Flying over murky jumbled lava. Still evidence of hydrothermal activity but not as intense.	583
2017-12-11	04:03:25	-15.36603	-174.23857	1412.2	8.3	199.7	Some ashy sediments on pillows comprising slope.	584
2017-12-11	04:03:40	0.00000	0.00000	1408.3	10.9	204.3	Narrow tubes and some drained pillows. Largely intact.	585
2017-12-11	04:04:55	-15.36600	-174.23881	1391.0	8.1	211.7	Very shelly lavas on slope. Elongate tubes with jumbled deposits at their tops.	586
2017-12-11	04:05:29	-15.36624	-174.23888	1387.0	3.4	212.4	Some pyroclastic deposits.	587
2017-12-11	04:05:58	-15.36611	-174.23894	1385.7	2.3	212.4	More orange staining but patchy. Found a toadfish and some shimmer.	588
2017-12-11	04:06:45	-15.36633	-174.23895	1383.9	1.6	203.0	More fluffy white microbial buildups. Looks like we're moving into an extensive hydrothermal field again near the summit.	589
2017-12-11	04:07:42	-15.36634	-174.23901	1377.3	5.7	202.9	Back into sloped pillow lavas above hydrothermal field. Some jumbly lava.	590
2017-12-11	04:08:59	-15.36661	-174.23901	1376.9	4.3	179.4	Crossing another local high.	591
2017-12-11	04:10:14	-15.36682	-174.23899	1376.8	3.7	154.9	Pillow lava with a lot of hydrothermal mats and what might be volcaniclastic sediment. Corals that might be dead.	592
2017-12-11	04:10:20	-15.36684	-174.23896	1376.9	3.0	152.9	Yep. Volcaniclastic sediment.	593
2017-12-11	04:10:39	-15.36690	-174.23891	1378.4	0.9	153.7	Pillows are stained orange.	594
2017-12-11	04:10:55	-15.36695	-174.23889	1378.3	1.0	160.2	Anemone.	595

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S099 North Tafu Logger Comments	Record #
2017-12-11	04:16:08	-15.36678	-174.23896	1378.7	0.9	162.4	**S99-sed-25**. Scoop #2: volcaniclastic sediments - Black shiny seds. A bit more coherent upper crust lighter(?). Z=1379. Chris fix:15.36689237 174.2389108.	596
2017-12-11	04:19:08	-15.36704	-174.23882	1378.4	0.9	128.9	**S99-rock-26**. Piece of pillow covered in yellow bacterial floc outer coating. The rock is fresh and black inside. Dome-shaped black and vesicular rock. 10cm.	597
2017-12-11	04:21:27	-15.36688	-174.23888	1378.4	0.9	131.2	Going for another piece. Looks fresh inside. 20 cm with iron cm. Grey frothy bubbly stuff near margins. Black inside.	598
2017-12-11	04:23:18	-15.36735	-174.23880	1365.9	4.7	164.6	Navigators fix for samples 25 and 26: 15.347885 174.227001 Z=1374m.	599
2017-12-11	04:24:01	-15.36720	-174.23887	1358.9	9.6	170.4	Black volcanic sand and iron-oxide deposits (microbial mat?) on these rocks.	600
2017-12-11	04:24:28	-15.36727	-174.23889	1361.1	2.5	182.7	It looks like we are at the summit here about 50m south of WP 8.	601
2017-12-11	04:24:50	-15.36741	-174.23890	1361.5	3.6	184.4	It's a rocky crag up here at the summit.	602
2017-12-11	04:24:57	-15.36745	-174.23888	1361.6	4.9	196.2	Taking off and leaving the bottom.	603
2017-12-11	04:27:35	-15.36827	-174.23865	1344.9	26.5	169.0	We're out of here.	604
2017-12-11	04:28:40	-15.36833	-174.23866	1343.1	34.1	193.4	Vehicle Leaving Seabed	605
2017-12-11	04:43:01	-15.36862	-174.23739	1034.5	0.0	209.5	**S99-gas-27**. This sample was tripped during stowage of Rock-12. Use that location information. This sample was accidental. It will be processed. Gastight 17 white.	606

S100 Mata Ua

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S100 Mata Ua Logger Comments	Record #
2017-12-11	18:50:26	-15.01213	-173.77941	2407.9	3.9	169.1	Vehicle on the bottom.	25
2017-12-11	18:50:55	-15.01210	-173.77893	2409.0	3.7	168.5	Sandy bottom here with some scatter rock fragments.	26
2017-12-11	18:52:06	-15.01204	-173.77926	2409.7	3.8	168.4	The sands here are lighter colored with some darker patches.	27
2017-12-11	18:52:20	-15.01199	-173.77926	2409.2	3.4	169.0	We're not going to sample here. Will head upslope a bit.	28
2017-12-11	18:52:34	-15.01211	-173.77932	2408.0	3.8	168.5	Looks like the vehicle is tracking today.	29

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S100 Mata Ua Logger Comments	Record #
2017-12-11	18:52:48	-15.01215	-173.77959	2407.3	3.0	168.0	Rock fragments on sandy bottom	30
2017-12-11	18:53:21	-15.01213	-173.77967	2405.0	3.7	168.7	We're going to climb the slope and see what we see.	31
2017-12-11	18:53:27	-15.01214	-173.77971	2404.7	3.5	169.0	More rock fragments here.	32
2017-12-11	18:53:51	-15.01222	-173.77905	2402.8	3.4	169.3	Lots of rocky debris on sedimented slope.	33
2017-12-11	18:54:04	-15.01222	-173.77917	2402.4	2.6	168.8	Angular fragments. Brittle star.	34
2017-12-11	18:56:25	-15.01241	-173.77945	2392.6	4.0	168.3	The nav is putting the ROV farther east by about 100 miles than it should be. Not trusting the nav right now.	35
2017-12-11	18:56:45	0.00000	0.00000	2391.5	3.1	168.5	More smaller angular fragments here - still seeing the sandy slope.	36
2017-12-11	18:56:59	-15.01248	-173.77922	2390.8	2.8	168.6	Larger pieces of rock debris as we start to climb the slope.	37
2017-12-11	18:57:30	-15.01252	-173.77905	2388.9	2.2	168.1	Coming up to an in place massive pillow lava.	38
2017-12-11	18:58:10	-15.01253	-173.77923	2387.0	3.3	168.5	It's probably 1 - 2 meters across. Flattened and sedimented. Surrounded by more rocky debris.	39
2017-12-11	18:59:06	0.00000	0.00000	2387.0	2.1	167.6	This is a coherent rocky outcrop. Seeing several lobes of pillow lava here - rather flattened and sedimented.	40
2017-12-11	19:04:22	0.00000	0.00000	2387.4	2.3	167.3	**S100-rock-01.** Stirred up yellow seds. Exterior piece with interior included. Very Vesicular and crystal rich. Altered rind. Black interior. 25 cm x 20 cm. Brown/black staining on exterior	42
2017-12-11	19:07:11	-15.01196	-173.79852	2385.7	2.8	166.9	Black glassy rind. Z=2387m. Navigators guess: to be determined.....	43
2017-12-11	19:07:43	-15.01256	-173.77959	2383.8	3.2	167.2	Continuing up slope now. More in-place lavas interspersed with coarser materials.	44
2017-12-11	19:07:48	-15.01260	-173.77811	2383.2	3.2	167.1	Volcanic spatter.	45
2017-12-11	19:08:46	0.00000	0.00000	2379.5	3.4	161.9	Traversing over poorly sorted fragments of rocks; sedimented.	46
2017-12-11	19:09:55	-15.01266	-173.77916	2374.8	0.0	175.8	Old pillow lavas overlaid with scree and sediments.	47
2017-12-11	19:10:34	-15.01271	-173.77931	2373.0	2.4	175.7	NAVIGATORS FIX FOR SAMPLE 1:15.012884 173.780081. Z=2387m.	48
2017-12-11	19:11:50	-15.01233	-173.79492	2368.5	4.2	175.8	More craggy outcrops here. Talus and in place pillows.	49
2017-12-11	19:11:59	-15.01418	-173.79497	2367.8	5.2	176.3	These lavas look old.	50
2017-12-11	19:12:13	-15.01315	-173.79765	2367.0	4.2	175.9	Rocky debris and in place lavas.	51

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S100 Mata Ua Logger Comments	Record #
2017-12-11	19:14:55	0.00000	0.00000	2357.1	0.0	175.8	Getting "bad" on system status.	52
2017-12-11	19:15:08	0.00000	0.00000	2356.8	0.0	175.7	Looking for another rock to sample.	53
2017-12-11	19:15:39	-15.01156	-173.79834	2355.8	7.8	175.8	These rocks are in place. Look like old pillows.	54
2017-12-11	19:16:00	-15.01219	-173.79413	2355.9	0.0	175.8	Big fish in the background.	55
2017-12-11	19:16:11	-15.01256	-173.78776	2355.9	5.1	176.3	Not a lot of life on these rocks.	56
2017-12-11	19:19:30	0.00000	0.00000	2355.8	0.0	173.8	Intact piece of old pillow (consolidated pillows here - more massive). Glassy rind (thin iron oxide sed coating).	57
2017-12-11	19:25:23	-15.00739	-173.79652	2354.2	0.0	177.2	**S100-rock-02**. Re-positioning. Massive pillow. Edge piece. Very vesicular. Large pillow rind. Vesicles are elongate and over 1cm. Crystal-rich. 7 cm long 5 cm wide.	58
2017-12-11	19:27:47	-15.01181	-173.78806	2351.6	0.0	175.6	Into partition 6. Nice interior of pillow. Light brown/orange sediment. Very large crystals of green pyroxene.	59
2017-12-11	19:29:52	-15.01269	-173.79857	2342.8	2.9	175.1	Navigator fix very uncertain: 15.0130130 173.7800763. 173Z=2354m. (Several centuries time frame for this rock).	60
2017-12-11	19:30:12	-15.01241	-173.79841	2341.6	2.2	175.2	Seeing more in place massive broken up pillows.	61
2017-12-11	19:30:21	-15.01254	-173.79833	2341.3	1.8	175.5	Whip coral.	62
2017-12-11	19:32:02	-15.01278	-173.79781	2340.8	1.7	141.9	Ken wants another rock. He wants that toe-like rock that's wedge-shaped. We're just upslope 15 m from previous sample.	63
2017-12-11	19:36:54	-15.01211	-173.79858	2340.8	1.7	142.7	**S100-rock-03**. Pillow toe(?) off cracked tube. Preserved interior. Orange staining on exterior.. Crystal rich with fresh interior. 30 cm long. Angular vesicular.	64
2017-12-11	19:38:31	-15.01252	-173.79820	2337.7	2.1	142.8	Z=2341m. Into partition 7. Navigators best guess (no nav): 15.0131041 173.7800765.	65
2017-12-11	19:39:08	-15.01241	-173.79803	2336.6	1.6	142.4	Continuing up the slope. More sedimented here and more fragmental debris.	66
2017-12-11	19:39:41	-15.01229	-173.79768	2334.5	2.4	142.9	More in place pillow lavas that look worse for the wear. Massive blocky.	67
2017-12-11	19:39:52	-15.01230	-173.79766	2333.9	2.5	142.8	More sedimented fragmental slope here.	68
2017-12-11	19:40:35	-15.01274	-173.79885	2333.0	1.2	143.2	Small pillow tubes in place. Mostly fragments.	69
2017-12-11	19:40:42	-15.01274	-173.79910	2332.8	1.4	143.5	Yellow urchin.	70
2017-12-11	19:41:25	-15.01217	-173.79855	2331.6	1.2	142.7	Coming over a hill here. Drops off a couple meters.	71

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S100 Mata Ua Logger Comments	Record #
2017-12-11	19:41:41	-15.01259	-173.79861	2331.7	1.8	142.8	Combination of debris and a bit of in place lavas.	72
2017-12-11	19:41:54	-15.01292	-173.79851	2331.5	1.9	152.8	Crinoid.	73
2017-12-11	19:42:43	-15.01291	-173.79810	2329.9	3.5	152.5	Yellowish/orangeish patch on pillow.	74
2017-12-11	19:43:57	-15.01265	-173.79848	2327.6	4.6	133.6	More in place old lavas. Some massive pillow blocks. Big shelly pillow lava.	75
2017-12-11	19:48:06	-15.01207	-173.79848	2327.9	4.5	134.8	**S100-rock-04**. Piece of shelly pillow. Z=2328m. Glassy exterior. Smaller vesicles. Orange sed staining. 4cm across angular. Little glass rind. Crystals not visible.	76
2017-12-11	19:55:00	-15.01267	-173.79853	2327.9	4.5	134.4	2nd piece. Somewhat fresh interior. Preserved glassy exterior. Large wedge-shaped fragment of pillow. MnO coating on interior.	77
2017-12-11	19:56:27	-15.01244	-173.79840	2327.9	3.6	134.0	30 cm in long 25 cm across. Upper surface of glass. Nav guesstimate: 15.0133684 173.7799255.	78
2017-12-11	19:57:04	-15.01282	-173.79849	2325.3	5.6	134.2	We're moving on. The navigation is non-existent this morning.	79
2017-12-11	19:57:17	-15.01305	-173.79842	2324.3	6.4	134.1	Seeing a little squat lobster in the cracks?	80
2017-12-11	19:57:22	-15.01304	-173.79828	2323.9	6.5	134.0	Codey	81
2017-12-11	19:57:42	-15.01306	-173.79838	2322.3	7.2	134.3	More sedimented slope now. In place pillows ending now.	82
2017-12-11	19:58:12	-15.01275	-173.79796	2321.5	1.8	135.7	Seds are coarse in places. Some volcanic seds over more buff-colored seds.	83
2017-12-11	19:58:33	-15.01251	-173.79839	2320.2	2.4	135.6	Some more rocks poking out of the seds here and there. Mainly in place.	84
2017-12-11	19:59:27	-15.01300	-173.79817	2316.5	2.0	143.2	On a heavily sedimented slope. No ripples to speak of.	85
2017-12-11	19:59:39	-15.01302	-173.79837	2315.7	1.8	139.8	Some pock-marks.	86
2017-12-11	19:59:54	-15.01313	-173.79834	2313.7	2.1	139.7	Moving up this gentle slope.	87
2017-12-11	20:00:12	-15.01287	-173.79830	2311.5	2.0	139.8	Some rocky fragments here.	88
2017-12-11	20:00:24	-15.01287	-173.79830	2309.6	2.3	139.5	Pilot change.	89
2017-12-11	20:00:58	0.00000	0.00000	2304.7	3.0	139.5	2.0 C is ambient here.	90
2017-12-11	20:01:14	-15.01322	-173.79798	2301.9	3.3	142.6	Mostly fragmental here on sedimented slope.	91
2017-12-11	20:01:41	-15.01313	-173.79825	2297.2	4.8	143.0	Lots of fragments - mostly cantaloupe size - angular.	92
2017-12-11	20:03:35	-15.01343	-173.79793	2283.6	3.4	144.1	More rocky fragments here. Can't see the sedimented bottom now.	93
2017-12-11	20:03:49	-15.01362	-173.79790	2281.0	3.6	144.2	Larger rock fragments now - boulder size.	94

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S100 Mata Ua Logger Comments	Record #
2017-12-11	20:04:04	0.00000	0.00000	2279.1	3.1	140.1	More sandy bottom to the east.	95
2017-12-11	20:05:23	-15.01386	-173.79795	2271.0	2.3	145.2	Possibly in place lavas - not easy to tell - sandy slope with large boulders strewn about.	96
2017-12-11	20:05:57	-15.01381	-173.79653	2268.6	2.6	134.9	East of us (left side) seeing more broken pillows that are in place. Pillow tubes.	97
2017-12-11	20:06:13	-15.01354	-173.79742	2268.5	2.2	148.4	Cracked broken off pillow faces here.	98
2017-12-11	20:06:31	0.00000	0.00000	2268.6	2.1	148.9	Long cracked pillow lobates as well.	99
2017-12-11	20:06:45	0.00000	0.00000	2268.4	1.8	148.3	Some stalked organisms on these rocks.	100
2017-12-11	20:06:53	-15.01391	-173.78844	2268.4	1.3	151.8	Hydroids as well.	101
2017-12-11	20:07:24	-15.01379	-173.79019	2268.4	0.0	142.2	Zoning in on a sample site.	102
2017-12-11	20:07:54	-15.01340	-173.79756	2268.3	2.1	146.0	Focusing on pillow lobe.	103
2017-12-11	20:12:01	-15.01353	-173.79790	2267.0	3.3	141.4	**S100-rock-05**. Slabby pillow top (elongate pillow tube piece). All the exterior glass intact. 30 cm long. Smaller vesicles. (Didn't get good image of rock to look for crystals).	104
2017-12-11	20:13:57	-15.01353	-173.79759	2252.9	9.4	145.4	Z=2268m. Navigators best guess (no nav): 15.0136037 173.7798252.	105
2017-12-11	20:14:19	0.00000	0.00000	2250.4	6.6	146.9	Continuing up slope. We're cresting this slope soon.	106
2017-12-11	20:14:33	0.00000	0.00000	2249.4	5.4	147.2	Still in place pillow lavas here.	107
2017-12-11	20:14:52	-15.01383	-173.79743	2249.0	5.3	154.9	Lots of sheety-ish debris in the area.	108
2017-12-11	20:15:12	0.00000	0.00000	2249.9	5.9	151.6	Some of the lavas are broken up debris of sheet flow instead of pillow.	109
2017-12-11	20:15:56	-15.01375	-173.79789	2250.1	0.0	152.2	Going for another sample 18 m upslope of the last sample.	110
2017-12-11	20:20:33	-15.02526	-173.78845	2252.3	7.2	144.3	**S100-rock-06**. Piece of elongate pillow. Nice glassy rind. Less vesicular - small bubbles. Some crystals - less than others. 20 cm x 15 cm. Narrow wedge shape.	111
2017-12-11	20:22:19	-15.01429	-173.79777	2246.8	2.3	150.6	Continuing up the slope. Those last 2 samples were 12 meters apart in elevation.	112
2017-12-11	20:22:34	-15.01429	-173.79777	2248.4	0.7	150.7	More sedimented slope here.	113
2017-12-11	20:22:50	-15.01471	-173.79314	2248.9	0.7	146.8	Some frothy pillow tubes here.	114
2017-12-11	20:22:53	-15.01448	-173.78942	2249.0	0.9	143.3	Urchin.	115
2017-12-11	20:23:31	-15.01445	-173.77844	2249.0	1.9	130.7	S0100-Rock-6 cont. NAVIGATOR BEST GUESS: 15.0140592 173.7795558.	116

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S100 Mata Ua Logger Comments	Record #
2017-12-11	20:24:04	-15.01409	-173.78550	2249.7	2.2	133.3	We're going to continue to waypoint 2 to see what this upper slope looks like.	117
2017-12-11	20:24:43	0.00000	0.00000	2250.7	3.8	134.0	Sedimented slope below us. Lava debris ish here.	118
2017-12-11	20:25:57	-15.01417	-173.77537	2254.9	0.0	126.5	CORRECTION TO SAMPLE 6 LOCATION NAVIGATOR FIX: 15.0143006 173.7799069.	119
2017-12-11	20:26:25	-15.01416	-173.77545	2254.9	0.0	126.5	Going to take a scoop here on this heavily sedimented plain.	120
2017-12-11	20:29:27	-15.01429	-173.77841	2254.9	0.0	126.2	**S100-sed-07**. Light-sandy brown- sediments here. Scoop bag#2. Light brown/ orangish seds - coarser upper surface and buff colored underneath.	121
2017-12-11	20:30:50	-15.01429	-173.77845	2254.9	0.0	126.3	Z=2255 m. No navigator fix right now.....	122
2017-12-11	20:33:46	-15.01438	-173.77852	2246.7	2.3	230.3	Navigator best guess:15.014828 173.778801. Chris fix: 15.0142893 173.7783925. Trust the nav fix more this time.	123
2017-12-11	20:34:08	-15.01441	-173.77870	2245.3	2.8	231.1	We're on a steep slope. 4th urchin.	124
2017-12-11	20:35:09	-15.01447	-173.77881	2244.3	1.9	244.1	Steep near-vertical slope here. Intact pillow lavas and other debris.	125
2017-12-11	20:35:43	-15.01448	-173.77874	2243.2	1.7	242.9	Lots of thick seds here. Some larger "scree" type seds.	126
2017-12-11	20:35:46	-15.01448	-173.77874	2243.1	1.7	243.3	Broken pillows.	127
2017-12-11	20:36:25	-15.01452	-173.77895	2240.9	1.6	236.5	Heavily sedimented slope with pockets of flattened pillow tubes here and there.	128
2017-12-11	20:36:35	-15.01453	-173.77896	2240.5	1.4	237.8	Big crack.	129
2017-12-11	20:36:52	-15.01456	-173.77889	2239.5	1.4	238.2	Large broken pillow with some inplace pillows and tubes in the background.	130
2017-12-11	20:36:56	0.00000	0.00000	2239.3	1.4	237.9	Stalked coral.	131
2017-12-11	20:39:02	-15.01443	-173.78731	2238.3	2.0	233.9	Lots of sand - pockmarked.	132
2017-12-11	20:39:13	-15.01442	-173.78656	2238.9	1.8	234.6	We're not exactly sure where we are.	133
2017-12-11	20:40:45	0.00000	0.00000	2240.0	1.0	214.4	NAV: Based on the depth we estimate that we are just a little south and west of waypoint 3 now.	134
2017-12-11	20:41:32	-15.01412	-173.79835	2241.4	2.0	205.1	We're still heading to the SW.	135
2017-12-11	20:42:45	-15.01586	-173.77647	2248.3	3.5	330.0	Pillow rubble lying scattered on top of seafloor sediments.	136
2017-12-11	20:43:52	-15.01479	-173.79432	2251.2	2.0	338.6	Heading NW now.	137
2017-12-11	20:44:09	-15.01503	-173.78320	2252.0	1.5	342.9	We're heading back downslope.	138
2017-12-11	20:44:53	-15.01545	-173.77035	2250.2	1.1	1.7	The ROV is on the screen. It's bounding all over the place by 600 m west to east.	139

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S100 Mata Ua Logger Comments	Record #
2017-12-11	20:45:15	-15.01774	-173.77468	2247.7	2.4	14.2	Working our way down the mostly sedimented slope.	140
2017-12-11	20:45:30	-15.01488	-173.79888	2246.0	4.0	346.8	Prop wash - no visibility.	141
2017-12-11	20:46:40	-15.01405	-173.79695	2248.8	3.1	270.1	Sand.....	142
2017-12-11	20:47:47	-15.01457	-173.79682	2244.4	5.6	313.7	Rocky debris to the north on a small slope then more sediment on top of that.	143
2017-12-11	20:48:06	-15.01669	-173.78694	2243.6	3.9	318.3	Area of seds and rocky debris - small fragments.	144
2017-12-11	20:48:12	-15.01573	-173.79474	2243.6	3.4	320.5	Sea cucumber.	145
2017-12-11	20:48:24	-15.01449	-173.79784	2242.7	3.1	311.1	Brisingid.	146
2017-12-11	20:48:43	-15.01454	-173.79809	2240.0	4.0	312.7	In place lavas here.	147
2017-12-11	20:48:49	-15.01435	-173.79801	2239.5	3.8	312.7	2 urchins on one rock.	148
2017-12-11	20:49:10	-15.01417	-173.79810	2238.0	1.6	315.0	Some possible bacterial mat(?)	149
2017-12-11	20:49:58	-15.01404	-173.79818	2241.7	2.2	280.6	We're basically lost. We have no nav and we only have ship multibeam so - we're lost.	150
2017-12-11	20:50:21	-15.01397	-173.79849	2243.9	4.1	277.2	We've popped out over the slope now. Vertical slope.	151
2017-12-11	20:53:30	-15.01447	-173.79334	2264.2	4.9	144.7	We're still not getting any nav.	152
2017-12-11	20:55:32	-15.01853	-173.77733	2279.6	5.2	158.9	We are moving down a steep scree slope with poorly sorted pillow debris.	153
2017-12-11	20:56:28	-15.01423	-173.76312	2284.1	3.9	174.2	Some white flock covers seafloor here.	154
2017-12-11	20:58:27	-15.01394	-173.79859	2296.7	4.8	197.4	Red shrimp.	155
2017-12-11	21:00:37	-15.01498	-173.76434	2311.6	3.3	184.9	Talus slope. We're below the in-place rock.	156
2017-12-11	21:01:57	-15.01576	-173.77984	2314.9	5.5	194.1	Stalked organisms and some white floc.	157
2017-12-11	21:02:24	-15.01497	-173.76429	2314.8	11.1	209.5	Just crossed a fissure.	158
2017-12-11	21:02:51	-15.01257	-173.76337	2317.9	6.5	190.9	Suddenly back into in-place rock just before crossing this fissure.	159
2017-12-11	21:03:26	-15.01547	-173.76472	2320.1	0.0	196.3	Another fissure parallel to the first one.	160
2017-12-11	21:05:51	-15.01482	-173.76469	2332.7	0.0	178.8	Descending a near-vertical wall of broken pillows ~10m high before hitting debris slope.	161
2017-12-11	21:07:21	-15.01456	-173.76411	2338.4	0.0	146.5	Anemone on debris slope and then into another steep face with lots of in-place rock.	162
2017-12-11	21:08:42	-15.01472	-173.77638	2341.8	4.8	215.9	Shrimp and "slivered" rocks. Probably looking at a faulted area.	163
2017-12-11	21:08:48	-15.01305	-173.79920	2342.1	4.5	218.0	Fish.	164
2017-12-11	21:09:41	-15.01351	-173.79957	2348.4	5.7	174.8	Steep talus slope	165
2017-12-11	21:12:38	-15.01479	-173.79551	2362.1	6.5	212.6	Scree slope.	166

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S100 Mata Ua Logger Comments	Record #
2017-12-11	21:13:54	-15.01333	-173.79998	2373.2	4.0	220.4	Fragments and sediments.	167
2017-12-11	21:15:01	-15.01280	-173.80068	2378.9	2.3	252.0	Talus slope with channelized sediments and in-place pillows on the other side. Very sharp boundary.	168
2017-12-11	21:18:27	-15.01311	-173.80053	2380.2	1.2	310.7	Checking out a siliceous sponge ("looks like a bong") and small patch of what may be hydroids and a coral skeleton. Small squat lobster.	169
2017-12-11	21:18:40	-15.01303	-173.80043	2380.2	1.2	310.7	Going to grab a sample of the pillow with this overgrowth	170
2017-12-11	21:24:24	-15.01386	-173.80115	2380.2	1.4	307.9	**S100-rock-08**. Piece of pillow with fresh glass rind and some orange surface staining. No hydroids made it. 5x7cm.	171
2017-12-11	21:26:52	-15.01285	-173.80047	2383.1	2.8	282.2	S100-rock-08 Location 15.0132009 173.7812628 depth 2380m.	172
2017-12-11	21:27:01	-15.01258	-173.80054	2383.8	2.9	294.6	Smoky water down here.	173
2017-12-11	21:27:53	-15.01299	-173.78581	2387.4	1.6	241.3	Into a large sediment lens with occasional float debris	174
2017-12-11	21:28:35	0.00000	0.00000	2386.4	2.1	200.8	Following distal edge of talus slope-sediment contact	175
2017-12-11	21:29:36	-15.01801	-173.79048	2380.7	3.2	201.2	Brittle star and sea urchin.	176
2017-12-11	21:30:49	-15.01363	-173.78398	2371.6	3.4	201.0	Another large siliceous sponge.	177
2017-12-11	21:31:11	-15.01365	-173.78378	2369.1	3.4	200.9	Fairly large coral.	178
2017-12-11	21:31:23	-15.01375	-173.78353	2367.5	3.3	200.8	Shrimp.	179
2017-12-11	21:32:51	-15.01372	-173.78386	2368.0	3.7	215.7	Some fish and anemones too.	180
2017-12-11	21:33:13	-15.01052	-173.78743	2369.0	4.2	221.9	What looks like an eel and more siliceous sponges.	181
2017-12-11	21:34:35	-15.01584	-173.78956	2368.1	4.6	194.5	Coral(?) that looks like a small white palm tree and a brittle star.	182
2017-12-11	21:34:51	0.00000	0.00000	2368.0	3.3	209.1	Rippled sediment along slope at base of talus.	183
2017-12-11	21:37:46	0.00000	0.00000	2369.9	2.0	246.5	Traversing across talus slope. Some sponges and corals.	184
2017-12-11	21:38:19	-15.01399	-173.78408	2371.9	0.6	254.5	Nav is in and out but mostly out.	185
2017-12-11	21:42:23	0.00000	0.00000	2364.9	2.7	242.6	Sea anemone on talus.	186
2017-12-11	21:42:51	-15.01431	-173.78448	2364.8	1.9	242.5	Eel and small white crab in talus.	187
2017-12-11	21:43:24	0.00000	0.00000	2363.8	1.7	242.9	Corals on talus. Depth is 2363 m.	188
2017-12-11	21:44:03	-15.01433	-173.78511	2362.7	1.3	242.5	Darren	189
2017-12-11	21:45:55	-15.01398	-173.78727	2358.2	1.0	243.1	Sandy bottom. not as much talus as previously.	190

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S100 Mata Ua Logger Comments	Record #
2017-12-11	21:47:51	-15.02565	-173.76886	2352.8	1.9	242.5	Squat lobsters on talus and corals.	191
2017-12-11	21:48:51	-15.02378	-173.78116	2351.2	1.1	242.9	Another pair of squat lobsters. Also corals on talus. Depth is 2351 m.	192
2017-12-11	21:50:14	-15.01493	-173.78526	2347.6	3.1	242.4	Squat lobster.	193
2017-12-11	21:51:16	-15.02399	-173.78710	2348.2	2.9	242.8	Chute with more talus. less sediment.	194
2017-12-11	22:03:57	-15.02223	-173.78600	2369.9	0.8	242.9	Still moving over pillow fragments with sedimented patches in between; some minor iron staining appears every now and then plus a few squat lobsters.	195
2017-12-11	22:04:54	-15.00933	-173.80394	2369.2	1.8	242.2	Coral.	196
2017-12-11	22:06:13	-15.01511	-173.78770	2370.5	0.0	242.5	Water becomes slightly more smoky and some of the pillows appear slightly fuzzy - microbial mat?	197
2017-12-11	22:06:58	-15.01403	-173.79043	2371.9	1.3	242.6	Mini inactive chimney. probably ~50 cm high.	198
2017-12-11	22:07:23	-15.01521	-173.78752	2373.2	0.4	249.5	Brittlestar grows on the backside.	199
2017-12-11	22:08:21	-15.01284	-173.79420	2373.4	0.0	249.5	Anemone.	200
2017-12-11	22:10:26	-15.01667	-173.78795	2374.0	2.2	243.0	Sediment has greenish tint; small fish.	201
2017-12-11	22:11:50	0.00000	0.00000	2370.5	3.7	242.0	Moving 10 m up-slope.	202
2017-12-11	22:14:00	-15.01069	-173.79367	2361.7	2.9	242.0	Sediments become more stained; some discoloration (white and orange) on both rocks and sediments.	203
2017-12-11	22:16:15	-15.03731	-173.78482	2362.5	4.2	206.7	Spotted some chimney debris.	204
2017-12-11	22:17:11	-15.01320	-173.78826	2363.2	6.3	201.3	Seeing a lot of dead coral stalks.	205
2017-12-11	22:17:40	-15.01426	-173.78724	2363.9	4.3	194.2	Lots of fish and some brisingids.	206
2017-12-11	22:18:52	-15.01601	-173.78781	2364.3	3.4	156.1	Anemones are same color as hydrothermally stained sediments.	207
2017-12-11	22:19:25	-15.02421	-173.78887	2363.7	2.8	157.0	More ex-chimney material.	208
2017-12-11	22:19:39	0.00000	0.00000	2363.1	3.4	156.5	Mollusk shell.	209
2017-12-11	22:21:36	-15.02908	-173.80110	2353.9	2.7	134.9	Lots of life here. Stalked corals; anemones; fish; brisingids; large squat lobsters.	210
2017-12-11	22:22:16	-15.00927	-173.80426	2349.8	6.3	134.9	Spotted a chimney. Lots of them actually - no signs of activity yet.	211
2017-12-11	22:23:44	-15.01610	-173.78776	2348.2	3.4	134.4	A fairly large chimney graveyard. Still well-populated but not vent shrimp or living mollusks. Vent locus shifted away from this area not too long ago.	212

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S100 Mata Ua Logger Comments	Record #
2017-12-11	22:27:37	-15.01945	-173.77468	2346.7	7.2	134.9	**S100-sulfide-09**. Piece of chimney spire. Aiming for the top - hovering grab. 5x10cm orange with white filaments. From top of ~7m tall chimney.	213
2017-12-11	22:30:58	0.00000	0.00000	2342.7	6.5	111.1	S100-sulfide-09 Location: 15.0163547 173.7867155 depth 2348m "The Amphitheatre".	214
2017-12-11	22:31:13	0.00000	0.00000	2342.3	6.8	95.1	Some chimneys are COVERED in large barnacles.	215
2017-12-11	22:31:26	-15.01599	-173.78702	2342.1	6.6	95.3	Just found a smoker - this area is not totally dead at all.	216
2017-12-11	22:32:38	-15.02126	-173.78733	2342.0	8.0	195.4	Big stack of mollusks.	217
2017-12-11	22:34:22	-15.01332	-173.79414	2342.1	7.2	194.3	Deploying 100 flag.	218
2017-12-11	22:47:18	-15.01632	-173.78712	2340.4	9.9	151.3	Surveying Amphitheatre to see what the best sample site is.	219
2017-12-11	22:48:28	-15.01659	-173.78696	2334.2	7.6	151.3	Chimneys in this field are very tall.	220
2017-12-11	22:49:43	-15.01376	-173.79532	2333.0	11.7	159.1	Some of the tallest chimneys are active - small chimlets on sides but no true black smoke that we've spotted yet. Lots of barnacles.	221
2017-12-11	22:53:21	-15.02511	-173.78682	2327.0	7.9	257.3	Found a tall/skinny smoker but it will be almost impossible to sample. Fragile and looks as if it had recently broken and is rebuilding again.	222
2017-12-11	23:02:03	-15.02272	-173.78680	2329.4	11.7	78.2	Still surveying for a place where we can sample	223
2017-12-11	23:08:42	-15.01671	-173.78711	2336.5	6.3	126.2	We're in an area of very tall chimneys with black smokers. Seabed here is ~2342 m. Lots of big smokers and some fallen chimneys.	224
2017-12-11	23:09:43	-15.01660	-173.78760	2335.9	7.3	125.9	Tons of biota. Huge chimneys. We're somewhere to the NE of Temple of Smoke in ~2340 m of water.	225
2017-12-11	23:10:21	0.00000	0.00000	2334.7	5.2	122.8	Barnacles; Flat-topped chimney with flack smoke pouring out. Snails; barnacles; anemones; shrimp; crabs.	226
2017-12-11	23:11:12	0.00000	0.00000	2334.6	4.2	121.4	This chimney top is laying on the bottom. It was knocked off earlier.	227
2017-12-11	23:13:51	-15.01663	-173.78698	2334.7	4.4	116.5	We're going to come in and do a suction here for biota.	228
2017-12-11	23:15:13	-15.01640	-173.78827	2334.7	3.5	117.6	This field is probably to the NE of Temple of Smoke. We did not pass over this area on S89.	229
2017-12-11	23:16:00	-15.01650	-173.78763	2334.7	4.3	117.4	Depth at the sampling site is 2335 m. Altitude is ~4m.	230

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S100 Mata Ua Logger Comments	Record #
2017-12-11	23:22:29	-15.01819	-173.77736	2334.7	6.5	116.9	**S100-bio-10**. Right next to black smoker orifice: Suction chamber 5. 4 Shrimp (look like Opaepele) - some are really tiny; Snails (Ifremeria);	231
2017-12-11	23:23:23	-15.02395	-173.79584	2334.7	6.5	117.1	Tons of biota on this tall flat-topped chimney. Mussels; barnacles; anemones; snails; shrimp; squat lobsters.	232
2017-12-11	23:24:44	-15.01833	-173.78796	2334.7	6.5	116.7	S100-bio-11. Mussel from the top of the flat chimney. Into biobox 2. Covered in little limpets probably.	233
2017-12-11	23:27:06	0.00000	0.00000	2334.8	4.2	116.6	We're going to stow the suction sampler now.	234
2017-12-11	23:28:55	-15.01705	-173.78557	2334.8	6.4	117.5	Sample 10 addition: Also sampled polynoids.	235
2017-12-11	23:30:21	-15.02199	-173.78688	2334.7	5.7	117.3	WE'RE DUBBING THIS SITE: LAU-FLATTOP. Z=2339 at the base. Altitude is over 5 meters. We're sampling at 2335 m - about 5 m above the seafloor.	236
2017-12-11	23:33:02	0.00000	0.00000	2334.8	4.2	117.1	We're probably about 50m due east of temple of slope.	237
2017-12-11	23:35:28	-15.01996	-173.78999	2334.9	3.4	116.9	Taking the temp in the orifice at Lau-Flattop. It's going up to 327C.	238
2017-12-11	23:37:26	-15.01658	-173.78732	2334.8	5.1	117.3	NAV-INFO-ETC Lau-Flattop: 327C. 15.0166822 173.786930 Z=2339 at base and 2335 at sampling site orifice.	239
2017-12-11	23:38:03	-15.01650	-173.78765	2334.8	3.7	117.3	SAMPLE INFO FOR ALL LAU-FLATTOP SAMPLES: 15.0166822 173.786930 Z=2339 at base and 2335 at sampling site orifice. 327 C.	240
2017-12-11	23:40:13	-15.00688	-173.79671	2334.8	5.1	117.9	Bio here: Polynoids (have scales); anemones; stalked barnacles; Ifremeria; Opaepele and Alvinocaris; squat lobsters; brachyuran crabs; mussel.	241
2017-12-11	23:40:27	-15.01675	-173.78658	2334.8	3.7	117.8	There are also lots of zoarcids around.	242
2017-12-11	23:47:07	-15.01904	-173.78210	2334.8	4.3	118.8	**S100-gas-12**. Gastight #16 orange. 327C black smoker gaping orifice. Looks like it's good and deep in the flow. Fired 2346:55.	243
2017-12-11	23:48:30	-15.01653	-173.78704	2334.8	4.2	117.8	Stowing the gastight sampler. That was a nice sample.	244
2017-12-11	23:53:33	-15.01679	-173.78707	2334.8	4.3	118.4	The vent fish here are probably cusk eels. They don't quite look like zoarcids. The vent fish we have seen so far at Mata Ua and called zoarcids are probably cusk eels.	245

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S100 Mata Ua Logger Comments	Record #
2017-12-12	00:01:16	-15.01639	-173.78798	2334.9	4.2	118.6	**S100-fluid-13**. Major sampler #3 in same huge orifice at Lau-Flattop. Fired at ? It's filling now. 0001:05 finished.	246
2017-12-12	00:01:29	-15.01675	-173.78688	2334.9	4.2	118.6	Stowing the major in its holster.	247
2017-12-12	00:02:31	-15.01618	-173.78871	2334.8	4.3	118.4	Next task will be a sulfide for Chris.	248
2017-12-12	00:02:38	-15.01648	-173.78808	2334.8	4.3	118.6	We're finished with the water sampling now.	249
2017-12-12	00:03:46	-15.01893	-173.78102	2334.8	4.3	119.3	All tucked in.	250
2017-12-12	00:04:30	-15.02149	-173.78327	2334.8	4.4	118.3	Walter wants a grab of barnacles. Christian would like to try to get a piece of the sulfide at the sampling site.	251
2017-12-12	00:06:43	-15.01672	-173.78734	2334.9	4.3	118.2	That sulfide attempt did not work.	252
2017-12-12	00:06:56	-15.01676	-173.78678	2334.9	4.3	118.2	Crab zoom; shrimp; barnacles.	253
2017-12-12	00:07:21	-15.01662	-173.78732	2334.9	4.3	118.1	Walter would like the stalked barnacles on the left.	254
2017-12-12	00:09:19	-15.01381	-173.80011	2334.9	3.4	118.7	**S100-bio-14**. Grab of stalked barnacles. Got some sulfide as well - not the sampling site; but to the left of it. Hdg=119	255
2017-12-12	00:09:50	-15.01611	-173.78894	2334.9	3.5	119.3	Peter	256
2017-12-12	00:10:33	-15.01645	-173.78834	2334.9	6.0	111.1	**S100-sulfide-15**. Grab of sulfide when sampling stalked barnacles on chimney to the left of sampling orifice. Must be warm because lots of vent animals were living on it.	257
2017-12-12	00:11:47	-15.01663	-173.78720	2335.0	4.3	118.0	Going to go in and try to get a piece of sulfide from the black smoker flow sampling area.	258
2017-12-12	00:14:52	-15.01658	-173.78781	2335.0	4.4	119.3	**S100-sulfide-16**. Sulfide piece from very near the black smoker orifice. Beautiful piece. Outer piece of large sulfide probably chalcopyrite and anhydrite minerals. 15 - 20 cm across.	259
2017-12-12	00:15:22	-15.01653	-173.78805	2335.0	4.3	118.4	Probably in 2 or more pieces now. Into biobox 4.	260
2017-12-12	00:16:44	-15.01663	-173.78810	2335.0	4.4	118.9	23:17 arrived. So - samples 10 - 16 all have the same position information. Lau-Flattop. Mkr-297.	261
2017-12-12	00:19:52	-15.01344	-173.79886	2338.2	4.9	130.5	**DEPLOY MKR-297** AT THE BASE OF LAU-FLATTOP. 15.0166822 173.786930 Z (seafloor) = 2337. That's not really the base yet - it's propped next to the piece that fell off the top (at least 3 m long).	262
2017-12-12	00:20:07	-15.01661	-173.78665	2337.8	5.4	131.6	Beautiful. Heading is 131.	263

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S100 Mata Ua Logger Comments	Record #
2017-12-12	00:20:48	-15.01455	-173.79339	2336.3	6.5	131.0	At least 8 tall sulfides here and a grouping of smaller sulfides covered in barnacles.	264
2017-12-12	00:21:39	-15.01606	-173.78848	2335.7	9.4	131.2	Facing N/NW now and see a lot more in the background. Over a dozen older sulfides covered in stalked barnacles.	265
2017-12-12	00:22:07	0.00000	0.00000	2335.3	10.7	131.4	Most of the venting at Ua was deeper than this.	266
2017-12-12	00:22:29	0.00000	0.00000	2335.9	8.7	131.7	We're at 2345 m on the seafloor.	267
2017-12-12	00:23:21	-15.01733	-173.78504	2335.6	9.4	131.4	As we move to the west we continue to see tall active sulfides and more diffuse older chimneys covered in barnacles.	268
2017-12-12	00:23:54	-15.02664	-173.78589	2337.2	7.3	124.6	Black Smoking beehive just below us now. In good view.	269
2017-12-12	00:24:57	-15.01851	-173.78073	2339.3	5.4	104.3	Hdg here 8s 117 degrees. We've probably moved about 20 m to the northeast.	270
2017-12-12	00:25:34	-15.02754	-173.78946	2339.6	5.5	106.0	Huge diffuse old sulfides with stalked barnacle coverings.	271
2017-12-12	00:26:22	-15.01648	-173.78718	2341.0	7.5	105.3	Beautiful bac mat smaller chimney below us now.	272
2017-12-12	00:26:39	-15.01452	-173.79244	2340.6	6.4	106.5	Moving downslope.	273
2017-12-12	00:26:46	-15.01441	-173.79328	2340.7	7.7	105.0	Thinning out here.	274
2017-12-12	00:27:23	-15.01630	-173.78787	2342.8	5.3	71.8	Z=2350m on the bottom. See lots of chimneys in the distance. Some right in front of us as well. Lots of active chimneys here.	275
2017-12-12	00:28:11	-15.02970	-173.78771	2346.7	4.4	72.5	Small black smoker with beehive.	276
2017-12-12	00:28:24	-15.02544	-173.78953	2346.9	4.5	77.9	We're facing the hilltop and moving to the NE.	277
2017-12-12	00:28:33	-15.02544	-173.78953	2347.0	5.1	79.5	There's a lot of shimmering water here.	278
2017-12-12	00:28:38	-15.02318	-173.79092	2347.2	5.2	78.7	Black smoker beehive here.	279
2017-12-12	00:29:32	-15.01621	-173.78784	2349.5	2.8	79.2	Looking down to the base of this big sulfide structure with more diffuse barnacle covered chimneys and little black smoker beehives at the top.	280
2017-12-12	00:30:36	-15.01611	-173.78804	2348.1	4.9	93.6	That's such a little skinny guy.	281
2017-12-12	00:31:27	-15.01640	-173.78723	2348.8	6.7	148.7	Looking at this smallish skinny chimney to the NE of where we sampled earlier.	282
2017-12-12	00:31:43	0.00000	0.00000	2349.2	4.6	164.0	Squat lobster photobomb.	283
2017-12-12	00:33:16	-15.02134	-173.77443	2348.4	7.4	231.6	That looks like a hard sampling site.	284
2017-12-12	00:33:34	-15.01783	-173.78350	2348.8	7.4	234.6	Beautiful flat-topped structure with white bac mat all over it.	285

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S100 Mata Ua Logger Comments	Record #
2017-12-12	00:34:23	-15.01258	-173.79685	2349.2	7.7	188.7	Searching around for a good sampling site.	286
2017-12-12	00:35:46	-15.01619	-173.78759	2350.6	3.7	191.6	Still searching around for a place to sample that will appeal to everyone.	287
2017-12-12	00:37:00	-15.01622	-173.78812	2349.7	4.2	192.5	We're back where we first started - looking at the same chimney. We're going to see if we can park here.	288
2017-12-12	00:37:36	-15.01645	-173.78739	2348.7	6.2	152.9	We can't park here. Going to continue up the slope and look around.	289
2017-12-12	00:38:16	-15.01963	-173.77731	2349.7	4.5	141.7	Really tall sulfides here- 7 or more in this direction.	290
2017-12-12	00:39:01	-15.01599	-173.78992	2351.2	3.3	142.1	Fairly large fish on the seafloor. Cusk eels on the bottom here.	291
2017-12-12	00:39:34	-15.01612	-173.78661	2351.4	3.0	142.0	Going to look around and try to find a place that will be easy to set up and sample.	292
2017-12-12	00:39:59	-15.01566	-173.78896	2351.7	3.6	141.7	We're going to travel downslope a bit more and look around.	293
2017-12-12	00:40:15	-15.01375	-173.79430	2352.1	3.3	142.3	Couldn't set up there.	294
2017-12-12	00:40:47	-15.02544	-173.78987	2352.1	3.8	141.9	We're going to move downslope a bit and continue heading to the NW and see if we can find the perfect sampling site.	295
2017-12-12	00:41:06	0.00000	0.00000	2352.5	3.9	127.6	Cusk eel.	296
2017-12-12	00:41:56	-15.00719	-173.80209	2353.6	2.7	134.0	Not much going on here. We're at 2355 m and out of the venting.	297
2017-12-12	00:43:00	-15.01679	-173.78551	2350.7	2.7	200.9	Lots of fallen chimneys here. We're now going to head up slope a bit.	298
2017-12-12	00:44:13	-15.01586	-173.78763	2345.9	6.8	202.1	There's pretty substantial venting over there.	299
2017-12-12	00:44:21	-15.01602	-173.78709	2345.6	6.8	199.5	Quite a large beehive here.	300
2017-12-12	00:44:36	-15.01642	-173.78686	2345.3	5.1	201.6	Lots of biota on the chimney as well.	301
2017-12-12	00:44:47	-15.01642	-173.78686	2345.4	5.2	200.3	Cusk eel.	302
2017-12-12	00:45:16	-15.01651	-173.78730	2344.4	5.7	202.9	Beautiful. 8 meter chimney here.	303
2017-12-12	00:45:53	0.00000	0.00000	2345.1	6.7	179.3	Some beehives on this one but no black smoke. Squat lobster in the barnacles.	304
2017-12-12	00:46:15	-15.01139	-173.78695	2344.4	7.7	172.4	Covered one here with Ifremeria snails.	305
2017-12-12	00:48:46	-15.02260	-173.79392	2340.3	9.0	171.8	We're going to drive straight ahead and start at the base of these things.	306
2017-12-12	00:49:25	-15.01648	-173.78768	2341.1	7.6	174.9	These don't look that active although there is lots of biota - especially barnacles on these guys.	307
2017-12-12	00:49:43	-15.01643	-173.78667	2340.7	6.5	178.0	Not much happening at the top of that one.	308

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S100 Mata Ua Logger Comments	Record #
2017-12-12	00:50:00	-15.03151	-173.78648	2340.3	6.5	178.5	Flanges at the base of some of these sulfides.	309
2017-12-12	00:50:23	-15.02790	-173.78729	2340.5	0.0	178.7	Several mussels scattered around on that one.	310
2017-12-12	00:51:38	0.00000	0.00000	2336.8	8.3	188.6	Lots of these look a bit cooler. Lots of stalked barnacles; shrimp; snails; crabs; polynoids; squat lobsters. The whole suite of animals.	311
2017-12-12	00:52:36	-15.01649	-173.78721	2335.5	11.6	118.6	This one has some good black smoke pouring out of it.	312
2017-12-12	00:53:20	-15.01891	-173.78093	2338.1	5.7	99.0	So does the one to the next of it. We're looking to the east Hdg 100 degrees.	313
2017-12-12	00:54:20	-15.01637	-173.78805	2339.4	4.5	99.5	We're back at the asparagus. This one had a nice beehive on top last time we saw it.	314
2017-12-12	00:55:04	-15.01656	-173.78754	2339.1	4.7	98.3	Black smoke coming out of that tall skinny chimney.	315
2017-12-12	00:55:20	-15.01652	-173.78758	2338.8	4.8	97.8	We also have black smoke coming out lower down on the other side.	316
2017-12-12	00:56:20	-15.01735	-173.78596	2338.1	5.8	97.6	They can't get in on the other side because of the ship.....	317
2017-12-12	00:57:23	-15.02291	-173.79584	2336.9	6.3	98.0	We thought there might have been some smoke coming from across the way.	318
2017-12-12	00:58:16	-15.01635	-173.77850	2337.8	8.7	119.8	Moving on to the SE looking at more sampling possibilities.	319
2017-12-12	00:59:11	-15.01629	-173.78667	2337.9	0.0	124.8	Lots of smaller black smoker vents.	320
2017-12-12	00:59:19	-15.01655	-173.78688	2338.6	0.0	122.6	Have some room to move in the front.	321
2017-12-12	00:59:35	-15.01567	-173.78965	2339.1	2.6	122.6	It's actually near the seafloor.	322
2017-12-12	01:00:14	-15.01567	-173.78965	2339.2	2.5	121.9	Some biology around here. Little tiny black smoker less than 1 meter high.	323
2017-12-12	01:00:30	-15.01647	-173.78859	2339.5	2.6	122.4	Going to take the temperature here first and decide if we want to sample here.	324
2017-12-12	01:00:52	-15.01641	-173.78797	2339.7	2.5	121.4	One little chimney out of hundreds here.	325
2017-12-12	01:01:06	0.00000	0.00000	2339.7	2.4	124.0	Going to take the temp here first.	326
2017-12-12	01:02:03	-15.01651	-173.78719	2339.8	2.8	120.8	Polynoids; snails; barnacles; squat lobsters; brachyuran crabs. Saw a few shrimp.	327
2017-12-12	01:02:10	0.00000	0.00000	2339.8	2.7	118.3	This is a little guy.	328
2017-12-12	01:03:30	-15.01639	-173.78814	2340.1	2.4	117.2	Ambient is 2.5 C here. Going to take the temperature and see if its got a fever.	329
2017-12-12	01:04:58	-15.03709	-173.78532	2340.1	2.4	117.3	There you go. Off went part of the top.	330

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2017-12-12	01:05:55	-15.01574	-173.78786	2340.1	2.4	117.4	The fluids coming out of this guy look less black than at Lau-Flattop.	331
2017-12-12	01:07:30	-15.01639	-173.78768	2340.1	2.4	116.6	The clear fluid orifice only read 3.9C but it wasn't even in the flow.	332
2017-12-12	01:09:24	-15.01667	-173.78789	2340.1	2.3	117.7	The dark fluid orifice temp got up to: 160C or so.	333
2017-12-12	01:09:51	-15.01522	-173.79101	2340.1	2.3	117.4	We're going to have to reposition a bit to get at the black smoker area.	334
2017-12-12	01:12:07	-15.02070	-173.78965	2340.0	2.4	106.9	Maneuvering around here. We need to get rid of the piece in front of us.	335
2017-12-12	01:13:06	-15.01616	-173.78650	2339.9	2.8	105.6	Going to grab the top of that little sulfide and get a sample for Chris - at least that's the plan.	336
2017-12-12	01:14:00	-15.01638	-173.78779	2340.0	1.7	107.5	Going in for the grab	337
2017-12-12	01:16:00	-15.01627	-173.78778	2340.0	0.0	107.9	**S100-sulfide-17**. Grabbed sulfide chimney spirt. It's white coating - pointed on top. 5 cm high - only half the piece is there. Into biobox 1.	338
2017-12-12	01:18:04	-15.01648	-173.78821	2340.0	1.7	107.5	2nd grab. The top piece of sulfide in the center. Lost most of it. Nice flow zones. Chalcopyrite. Circular piece 2 cm.	339
2017-12-12	01:19:36	-15.02250	-173.79089	2340.0	1.7	107.4	Voodoo Child little sulfide. 15.0167948 173.786947. Z=2340. We're at the seafloor here.	340
2017-12-12	01:19:50	-15.01852	-173.79001	2340.1	2.3	107.8	What are we trying to do now.	341
2017-12-12	01:20:08	-15.01404	-173.79031	2340.0	2.4	107.9	That's looking pretty good after the excavation.	342
2017-12-12	01:24:38	-15.01605	-173.78643	2340.1	2.3	107.8	Nice little piece of sulfide with sparkly chalcopyrite interior. The larger piece got away. Crumbled when put it in the biobox 1.	343
2017-12-12	01:27:15	-15.01243	-173.77449	2340.0	2.7	107.7	Voodoo Child temperature reading - 322 C was the highest reading.	344
2017-12-12	01:30:23	-15.01621	-173.78763	2340.0	1.6	107.7	Next task if a gastight at Voodoo Child.	345
2017-12-12	01:33:05	-15.01633	-173.78804	2340.1	0.0	107.4	This will be the yellow gastight #6.	346
2017-12-12	01:36:59	-15.02216	-173.78701	2340.1	2.4	107.9	Trying to grab the handle of the gastight sampler and get it just right (which it has to be).	347
2017-12-12	01:42:10	-15.01655	-173.78732	2340.0	1.6	107.7	**S100-gas-18**. Yellow gastight #6. Using both arms to right the sampler in the claw. Large black smoker flow here at Voodoo Child. 15.016795 173.78695 Z=2340.	348
2017-12-12	01:50:48	-15.01520	-173.78281	2340.0	2.5	100.9	Setting up over black smoke (322 C). This is going to be a 2-arm production. 1 arm won't work. Fired at 0150:20. Looks like it was successful.	349

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2017-12-12	01:51:40	-15.01612	-173.78812	2340.1	1.8	100.7	Going in for the major next - after we stow the gastight.	350
2017-12-12	01:54:12	0.00000	0.00000	2340.0	2.5	99.9	Crab down below is eating something. Brachyuran.	351
2017-12-12	01:54:27	-15.01657	-173.78667	2340.0	2.5	99.9	Fumbling a bit while trying to stow the gastight.	352
2017-12-12	01:55:50	-15.01658	-173.78680	2340.0	2.7	99.1	Polynoids; shrimp brachyurans; stalked barnacles. Ifremerias.	353
2017-12-12	01:56:00	-15.01659	-173.78675	2340.0	2.4	99.7	Codey	354
2017-12-12	01:56:58	-15.01572	-173.79452	2340.0	2.3	99.0	The gastight does not want to cooperate.	355
2017-12-12	01:58:42	0.00000	0.00000	2340.0	2.7	100.3	Gastight is stored a t last.	356
2017-12-12	01:58:59	-15.01989	-173.78030	2340.0	2.5	99.9	Squat lobster hanging out on the front porch.	357
2017-12-12	01:59:12	-15.01778	-173.78361	2340.0	1.9	100.1	Going in for a major fluid sample.	358
2017-12-12	02:02:15	-15.01649	-173.78691	2340.0	1.9	100.5	**S100-fluid-19**. Major sampler #2/ Fluid sample in same orifice as gas sample (and sulfide too) Voodoo Child little sulfide chimney. Z=322C.	359
2017-12-12	02:04:32	-15.01571	-173.78945	2340.0	1.9	100.1	Fired at 0203:32. Filling up quickly. Finished at 0204:25.	360
2017-12-12	02:05:42	-15.01648	-173.78698	2340.0	2.5	100.3	Next we will sample for biology on / in the vicinity of Voodoo Child.	361
2017-12-12	02:06:10	-15.01640	-173.78729	2340.0	2.8	100.5	Stowing the major.	362
2017-12-12	02:07:20	-15.01622	-173.78726	2340.0	2.4	100.1	Next we will take a suction sample of this little tiny vent site.	363
2017-12-12	02:08:28	-15.01653	-173.78687	2340.0	2.3	99.0	Limpets; Tiny shrimp for a tiny chimney.	364
2017-12-12	02:12:18	-15.01896	-173.77944	2340.0	2.4	99.8	**S100-bio-20**. Suction into canister #6. 3 Opaepele shrimp (including ones covered in black sulfide); Polynoid.	365
2017-12-12	02:16:28	-15.01497	-173.79157	2340.0	1.8	100.1	Going for the barnacles: They're in there. 4 shrimp; 3 polynoids; clump of barnacles (they may be stuck in the tube).	366
2017-12-12	02:20:32	-15.01653	-173.78652	2340.1	1.1	75.1	**DEPLOYING MARKER 229** at Voodoo Child.. Z=2340 15.0167948 173.786947 Temp = 322 C. Heading 82 degrees.	367
2017-12-12	02:22:24	-15.01639	-173.78686	2337.1	3.5	98.8	We're going to work our way out away from Voodoo Child. Another small black smoker directly behind it.	368
2017-12-12	02:23:46	-15.01644	-173.78664	2331.0	9.2	110.2	We're going to go east and slightly upslope.	369
2017-12-12	02:24:15	-15.01640	-173.78646	2331.6	7.5	122.4	The barnacles here are quite special.	370
2017-12-12	02:24:35	-15.01653	-173.78690	2329.7	7.4	146.9	That's a beautiful little chimney.	371

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S100 Mata Ua Logger Comments	Record #
2017-12-12	02:24:53	-15.01648	-173.78644	2326.6	9.2	143.4	We're looking to the east for more venting..	372
2017-12-12	02:25:13	-15.01639	-173.78652	2320.7	12.5	115.9	These here are well over 10 meters tall.	373
2017-12-12	02:25:38	-15.01651	-173.78692	2317.1	10.8	88.2	This big boy is 14 meters tall.	374
2017-12-12	02:26:13	-15.01650	-173.78637	2317.2	10.0	86.5	Two big black smoker beehives with another in the back.	375
2017-12-12	02:27:54	-15.01648	-173.78644	2318.1	7.6	341.4	Z=2330 m at the seafloor. That guy is flaming.	376
2017-12-12	02:28:20	-15.01638	-173.78623	2317.9	7.4	340.1	There are bunches of shrimp and snails; crabs; etc.	377
2017-12-12	02:30:27	-15.01638	-173.78654	2318.0	7.4	343.2	Going to try to get a piece of this for Chris. Lost the beehive.	378
2017-12-12	02:31:46	-15.01650	-173.78540	2318.0	7.3	342.5	This one is going to be called "Big Smoke".	379
2017-12-12	02:31:58	-15.01674	-173.78614	2318.0	0.0	342.3	Try to pick it up again. It fell over.	380
2017-12-12	02:36:41	-15.01659	-173.78697	2318.0	7.4	342.1	This sulfide is gray interior. Huge sample with huge polynoids. The piece is > 30 cm long.	381
2017-12-12	02:39:09	-15.01650	-173.78653	2318.0	0.0	342.5	**S100-sulfide-21**. Large chunk of sulfide taken from top of Big Smoke 35 cm. Massive chalcopyrite? From Big Smoke.	382
2017-12-12	02:40:44	-15.01647	-173.78662	2318.0	7.2	342.7	NAV INFO-ETC FOR BIG SMOKE: 15.0167531 S `73.7859689 Z=2330 at seafloor. > 14 m tall. Tmax=324 C.	383
2017-12-12	02:42:35	-15.01661	-173.78694	2318.0	0.0	342.2	The gastight sample will be GT#2 green.	384
2017-12-12	02:45:14	-15.01654	-173.78682	2318.0	7.6	342.4	Biota: Alvinoconcha; polynoids; Opaepele; Paralvinela sulfide worm.	385
2017-12-12	02:45:22	-15.01661	-173.78674	2318.0	0.0	342.6	Going in for the gastight sample.	386
2017-12-12	02:46:29	-15.01648	-173.78618	2318.0	6.7	343.1	**S100-gas-22**. GT#2 green fired at 0245:43. Looks like a good sample. Directly in the venting orifice at the top of Big Smoke.	387
2017-12-12	02:48:04	-15.01743	-173.78911	2318.0	7.2	342.7	The sulfides in the background are all sparkly on the venting edges.	388
2017-12-12	02:49:37	-15.01661	-173.78649	2318.0	7.0	342.7	Didn't get the other sulfide piece.	389
2017-12-12	02:50:02	-15.01666	-173.78646	2318.0	6.5	342.4	Securing the gastight now.	390
2017-12-12	02:50:57	-15.01664	-173.78620	2318.0	7.3	342.7	Dave wants to take both of his remaining major samplers in this venting site at the top of Big Smoke.	391
2017-12-12	02:52:20	-15.01638	-173.78643	2318.0	7.3	342.9	Grabbing the major sampler.	392

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S100 Mata Ua Logger Comments	Record #
2017-12-12	02:55:10	-15.01844	-173.78000	2318.0	7.3	342.4	**S100-fluid-23**. Major sampler #1. Fluid sample in the same black smoker hole as gastight; and Chris's sulfide sample.. 0254:29	393
2017-12-12	02:56:05	-15.01658	-173.78624	2318.0	7.0	342.4	Opaepele shrimp. The mystery is solved by Walter.	394
2017-12-12	02:57:34	-15.01641	-173.78655	2318.0	7.2	343.3	Tucking the major back in.	395
2017-12-12	02:58:00	-15.01645	-173.78678	2318.0	7.2	343.1	Grabbing the other major sampler for the final fluid sample of this dive.	396
2017-12-12	03:08:30	-15.01647	-173.78633	2318.0	7.2	342.9	Majors sampling attempt with Majors-4 failed. Did not respond when fired with the ram. Mount was crooked (despite good seat in manip) and water could not be collected.	397
2017-12-12	03:16:17	-15.01649	-173.78628	2317.9	7.2	342.6	**S100-bio-24**. Shrimp (5). Probably mixed in with other bio sample to be figured out later	398
2017-12-12	03:23:15	-15.01686	-173.78542	2317.9	7.1	342.5	**S100-bio-25**. Scale worms and some sulfur worms from same location/vent as sample 24. Got two snails - Alvinoconcha.	399
2017-12-12	03:23:55	-15.01645	-173.78580	2317.9	6.9	342.1	Going to try to get another piece of the sulfide from the top of this Big Smoke chimney.	400
2017-12-12	03:24:40	-15.01635	-173.78636	2318.0	7.1	342.3	This will be another sample.	401
2017-12-12	03:26:23	-15.01534	-173.77757	2318.0	7.2	341.9	**S100-sulfide-26**. Large shiny piece of sulfide 10 - 15 cm part of second chimney vent. Massive chunk of pyrite. Went into the forward stbd part of gastight container.	402
2017-12-12	03:28:23	-15.01648	-173.78579	2317.9	7.2	342.4	Storing the large piece of sulfide that we collected earlier. S100-Sulfide-21. Huge piece of active smoker vent site. Chalcopyrite circular area. Mat - some smaller beehive structures.	403
2017-12-12	03:28:48	-15.01638	-173.78618	2317.9	7.2	342.3	Going to take a couple Niskins over the top a few meters. and farther up.	404
2017-12-12	03:32:41	-15.01634	-173.78652	2315.4	14.1	89.6	**S100-fluid-27**. Aft Niskin in the smoke. We're at 2318 right now. Fired at 2315.6 m .	405
2017-12-12	03:33:36	-15.01641	-173.78551	2309.9	19.0	75.5	**S100-fluid-28**. Forward Niskin fired at 2309 m. In the plume over Big Smoke.	406
2017-12-12	03:33:59	-15.01617	-173.78659	2313.5	17.6	84.3	That's it for sampling here. We will put a marker out next at the base of Big Smoke.	407
2017-12-12	03:34:45	-15.01635	-173.78631	2321.1	7.9	93.8	We're on the west side of Big Smoke chimney facing east moving down to the bottom.	408

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S100 Mata Ua Logger Comments	Record #
2017-12-12	03:35:27	-15.01645	-173.78623	2323.8	4.1	88.0	Seeing a few mussels on the side. Other chimneys close bee's=2327 or so at the bottom.	409
2017-12-12	03:37:11	-15.01642	-173.78573	2321.8	7.4	139.8	Looking for a place to deploy the marker. We've moved up the chimney now to Z=2321.6 m. Not sure how this is going to work.	410
2017-12-12	03:39:24	-15.01822	-173.77979	2320.7	8.9	174.5	**Deploy Marker 206** at Big Smoke. Perching it between a couple large spires up here. Heading is 155 degrees.	411
2017-12-12	03:40:09	-15.01608	-173.78704	2318.5	6.5	48.5	That looks beautiful. Z=2320 m at marker deployment site. 2 - 3 meters down from the sampling site.	412
2017-12-12	03:40:24	-15.01584	-173.78795	2318.6	6.6	344.3	Circling Big Smoke now.	413
2017-12-12	03:40:57	-15.01370	-173.79540	2318.5	5.7	303.1	Probably about 7 - 10 spigots on the top. One really large black bee hive.	414
2017-12-12	03:41:14	-15.01641	-173.78539	2318.7	5.8	14.4	On the way out we will run up slope to see what's there.	415
2017-12-12	03:41:40	-15.01716	-173.78344	2318.6	0.0	102.3	We're going to head SE. These chimneys here are really big.	416
2017-12-12	03:42:05	0.00000	0.00000	2317.4	5.4	120.8	Lots of life on these big guys. Most are over 10 meters.	417
2017-12-12	03:42:12	-15.01647	-173.78566	2318.0	5.3	121.9	We're near the top of the vent field.	418
2017-12-12	03:42:17	-15.01646	-173.78581	2318.3	4.0	122.7	No chimneys here.	419
2017-12-12	03:42:34	-15.01655	-173.78592	2317.5	4.3	121.7	Looking at squat lobsters etc. on the seafloor.	420
2017-12-12	03:42:53	-15.01659	-173.78577	2315.9	5.3	122.7	Z=2322m here. No more chimneys.	421
2017-12-12	03:44:00	-15.01634	-173.78604	2312.4	9.2	358.1	Turning around to have a last look at the chimneys. We are looking to the north -slope Z=2322 m here at the edge of the field.	422
2017-12-12	03:44:26	-15.01632	-173.78597	2312.2	11.8	88.8	This one in front of us at the edge of the field is over 10 m tall.	423
2017-12-12	03:45:16	-15.01635	-173.78617	2312.1	11.5	56.6	The north is down slope. Looks like the edge of the venting sulfides is at about 2322 m. They end further up slope.	424
2017-12-12	03:45:29	-15.01633	-173.78601	2312.6	9.1	32.9	Beautiful dive at Mata Ua.	425
2017-12-12	03:46:13	-15.01646	-173.78567	2317.2	5.0	337.6	Major smoke coming out of that guy at 2316 m in the water (not on the bottom).	426
2017-12-12	03:46:32	-15.01650	-173.78520	2317.4	4.8	326.2	We're about 5 m off the bottom.	427
2017-12-12	03:46:59	-15.01641	-173.78559	2315.6	6.7	333.7	Z at the seafloor is about 2322 or so.	428

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S100 Mata Ua Logger Comments	Record #
2017-12-12	03:47:39	-15.01637	-173.78567	2315.2	7.8	322.5	Farewell to the Mata Ua smokers - at least for this trip.	429
2017-12-12	03:48:48	-15.01637	-173.78579	2316.9	6.4	225.2	There have got to be over 200 large sulfides in this complex; including what we saw on dive S89.	430
2017-12-12	03:50:48	-15.01646	-173.78563	2320.7	1.3	305.5	We're going to put a marker out here at this chimney for next time. Black Smoker Farewell. **Deploy Marker 227** deployed.	431
2017-12-12	03:52:23	-15.01670	-173.78615	2315.6	6.7	355.1	Black Smoker Farewell. Marker 227 Z=2322. Placed on the seafloor beneath a large black smoker. Susan's quick nav pick (probably not accurate).	432
2017-12-12	03:52:29	-15.01659	-173.78606	2314.8	7.4	36.2	ROV Off Seabed.	

S101 Mata Ono

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S101 Mata Ono Logger Comments	Record #
12/12/2017	22:09:59	-14.94632	-173.80056	2671.1	5.6	2.6	On the seafloor.	21
12/12/2017	22:11:11	-14.95157	-173.79672	2672.7	2.7	32.7	On the bottom. Sediments and blocky rubble.	22
12/12/2017	22:13:06	-14.94612	-173.79989	2667.7	4.4	70.6	These pillows are in place now.	25
12/12/2017	22:13:23	-14.94634	-173.79978	2667.2	3.0	74.8	Pillow tubes.	26
12/12/2017	22:13:42	-14.94627	-173.79979	2667.1	2.6	56.8	Looking at a drained out pillow here. Going to sample here.	27
12/12/2017	22:14:29	-14.94608	-173.80012	2668.5	0.8	54.8	Not seeing much biota - or any.	28
12/12/2017	22:20:13	-14.94620	-173.80036	2668.8	0.8	50.0	**S101-rock-01.** Drained out pillow - piece up upper crust. Black glass under upper sed layer. Lots of big crystals. 3 cm slightly vesicular. Glassy rind.	29
12/12/2017	22:20:59	-14.94622	-173.80035	2668.8	0.8	50.1	Two pieces Into quad 5.	30
12/12/2017	22:22:52	-14.94544	-173.80057	2668.8	0.8	51.0	The second piece of pillow rind. Very crystal rich. 10 cm x 6 cm across. 1 cm glass rind. Orange/brown staining on underside. Not too vesicular.	31
12/12/2017	22:23:57	-14.94661	-173.79954	2668.8	0.8	50.9	Sample 1: 3 pieces of rock - the first small grab was 2 pieces; the 2nd grab was the larger one.	32
12/12/2017	22:24:44	-14.94603	-173.80005	2666.7	2.7	74.1	S101-rock-01 Location 14.946258 173.8001381 depth 2669.	33
12/12/2017	22:25:07	-14.94646	-173.79979	2662.9	4.0	92.6	Elongated pillow tubes running downslope with a few bulbous larger piles.	34

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S101 Mata Ono Logger Comments	Record #
12/12/2017	22:26:58	-14.94658	-173.79942	2647.8	5.2	90.9	Squat pillow tubes. Gentler slope.	35
12/12/2017	22:28:02	-14.94637	-173.79990	2643.8	6.3	90.3	Drained pillows.	36
12/12/2017	22:29:01	-14.94637	-173.79945	2643.3	5.2	43.5	Also seeing some expansion textures and detached upper crusts.	37
12/12/2017	22:30:03	-14.94676	-173.79893	2645.6	2.3	28.1	Sea star and a cucumber or two.	38
12/12/2017	22:30:35	-14.94648	-173.79904	2646.0	2.0	28.3	Lobate lavas are fairly hollow and becoming larger.	39
12/12/2017	22:31:36	-14.94428	-173.80423	2643.3	5.3	27.2	Transitioning into narrower lobates on top of the squat pillows as we start moving upslope again.	40
12/12/2017	22:36:17	-14.94573	-173.79946	2639.4	1.4	27.3	**S101-rock-02**. Ornamental toe of pillow just above small slope break where pillow morphology changed. Orange FeO stains on exterior with very fresh interior. Spongy and phyric. 10x15cm toe.	41
12/12/2017	22:38:34	-14.94554	-173.79936	2629.7	4.0	28.9	Seeing more bulbous pillows that have undergone a lot of inflation.	42
12/12/2017	22:38:52	-14.94572	-173.79916	2627.6	5.1	29.4	Seeing more sediment on top of pillows here.	43
12/12/2017	22:40:55	-14.94564	-173.79902	2629.5	1.3	28.9	Found a fish. Is it a bony-eared assfish?	44
12/12/2017	22:42:07	-14.93941	-173.80339	2629.0	1.1	61.1	S101-rock-02 Location 14.9458298 173.7990710 depth 2637m.	45
12/12/2017	22:50:18	-14.94616	-173.79795	2629.1	1.0	59.4	**S101-sed-03**. Scoop of volcaniclastic sediment off the top of a pillow. Coarse black seds with some tan fines. Location 14.945588 173.799012 depth 2629m.	46
12/12/2017	22:51:52	-14.94587	-173.79860	2625.4	1.6	44.4	Tall coral growing on flows. Indication that it's a slightly older unit - first evidence we've seen.	47
12/12/2017	22:55:14	-14.94589	-173.79852	2626.0	0.7	39.4	Has a squat lobster on it plus benthic ctenophores. Very tall coral.	48
12/12/2017	22:57:24	-14.94561	-173.79882	2626.0	0.0	37.8	**S101-rock-04**. Grab of drained pillow crust from the same flow that has the tall coral attached to it.	49
12/12/2017	23:01:22	-14.94572	-173.79864	2624.7	1.7	43.0	Rock is very frothy and phyric. Fe surface staining. 5x10x10cm with large light pyx.	50
12/12/2017	23:03:45	-14.94564	-173.79831	2623.7	3.2	37.1	Talus pile on top of lava flows. Angular and poorly sorted in cantaloupe to watermelon size fraction.	51
12/12/2017	23:04:37	-14.94530	-173.79837	2621.4	3.5	28.7	Sea cucumber and a brisingid.	52
12/12/2017	23:05:04	-14.93947	-173.80783	2618.8	4.5	28.6	Seeing some in place flows poking out of talus here and there.	53

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S101 Mata Ono Logger Comments	Record #
12/12/2017	23:06:19	-14.92330	-173.79476	2613.2	2.6	28.8	Continuing up gentle slope. Talus is giving way to glassy pillow tubes with variable levels of draining and inflation.	54
12/12/2017	23:06:48	-14.94540	-173.79784	2611.2	2.8	28.8	Flows are a little thicker and more striated than the flows we saw earlier.	55
12/12/2017	23:07:58	-14.94500	-173.79898	2607.2	4.0	29.1	Seeing some recently broken pillow tubes and small pockets of fragmental pillow bits in lowstands between flows.	56
12/12/2017	23:08:16	-14.94499	-173.79875	2606.1	4.5	29.0	Interiors are still frothy here.	57
12/12/2017	23:09:33	0.00000	0.00000	2601.6	7.1	30.3	Flows are on fairly flat slope. Combination of fairly circular as well as flattened lobate cross sections.	58
12/12/2017	23:09:44	-14.94521	-173.79789	2601.4	0.0	30.0	Holothurians.	59
12/12/2017	23:10:12	-14.94293	-173.79467	2601.4	0.0	30.2	Correction: probably a "spoon worm".	60
12/12/2017	23:14:43	-14.94501	-173.79875	2601.6	0.0	31.0	**S101-rock-05**. Vesicular phyric rock with some Fe and Mn surface staining. Frothy and irregular vesicle shape. Olivine and cpx including in rind.	61
12/12/2017	23:16:32	-14.94502	-173.79787	2598.7	0.0	24.7	S101-rock-05 Location 14.944879 173.798626 depth 2601m.	62
12/12/2017	23:16:44	-14.94502	-173.79787	2598.7	0.0	24.7	Small fissure.	63
12/12/2017	23:17:57	-14.94502	-173.79787	2598.7	0.0	24.7	Fissure is more continuous than first thought. Running parallel to planned dive track. Widening in distance.	64
12/12/2017	23:18:57	-14.94502	-173.79787	2598.7	0.0	24.7	Getting mostly "bad" indicators on system status. No nav. no control of science camera. no sonar are obvious issues.	65
12/12/2017	23:21:17	-14.94502	-173.79787	2598.7	0.0	24.7	Rebooting ROV status computer.	66
12/12/2017	23:25:12	-14.94661	-173.79623	2624.0	0.0	359.3	Still trying to get the system back up and running. Camera control is back so we're evaluating the fissure.	67
12/12/2017	23:25:40	-14.94661	-173.79621	2624.0	0.0	359.3	A sea star and fairly tall coral (maybe skeleton) are visible in background.	68
12/12/2017	23:27:00	-14.94505	-173.79841	2594.1	1.1	357.9	Zoomed on coral - may be alive. Statii all green to go and we are resuming transit.	69
12/12/2017	23:30:28	-14.94462	-173.79856	2589.7	1.8	359.2	King Neptune in the spatter. Lots of drained pillows and moving into area of large flattened pillows. Lost the fissure.	70

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S101 Mata Ono Logger Comments	Record #
12/12/2017	23:32:29	-14.94435	-173.79807	2589.2	1.8	358.9	Some of these flat pillows are drained but not yet collapsed. We can see into some of them along larger cracks in the floor. Relatively flat along this expanse and some sediment buildup.	71
12/12/2017	23:32:44	-14.94436	-173.79775	2588.6	2.6	358.7	Anemone.	72
12/12/2017	23:33:40	-14.94436	-173.79929	2589.5	1.4	359.1	2589m and moving into slightly less-squat pillows.	73
12/12/2017	23:34:44	-14.94419	-173.79868	2588.8	1.1	1.0	Looks like more sediment here than downhill even with more relief on the pillows.	74
12/12/2017	23:41:00	-14.94402	-173.79948	2587.6	0.0	358.8	Sample of a bulbous striated pillow with hollow interior. Super bubbly with drips on the bottom. Fe stains all over and some sediment on top. 35x20cm.	75
12/12/2017	23:42:07	-14.94399	-173.79814	2586.7	1.2	0.2	**S101-rock-06** Location 14.943898 173.798373 depth 2588m.	76
12/12/2017	23:42:25	-14.94414	-173.79753	2585.4	2.2	359.5	Moving into slope break with sediment and talus.	77
12/12/2017	23:43:14	-14.94383	-173.79785	2582.2	2.2	359.0	Slope debris are very poorly sorted.	78
12/12/2017	23:44:26	-14.94390	-173.79785	2577.3	2.5	359.3	Rocky debris still patchy on slope but increasing in percentage area covered.	79
12/12/2017	23:46:08	-14.94378	-173.79881	2570.2	2.2	359.2	Sparse biota here but seeing an occasional sea cucumber.	80
12/12/2017	23:47:55	-14.94354	-173.79824	2562.8	2.3	2.0	Still on sedimented slope with patchy talus.	81
12/12/2017	23:49:26	-14.94334	-173.79791	2560.5	0.9	1.0	Brittle star and some of the spiderwebs (sponges?). Starting to see more orange floc on the seabed.	82
12/12/2017	23:50:24	-14.94333	-173.79886	2556.4	2.1	357.5	Talus getting larger.	83
12/12/2017	23:51:06	-14.94331	-173.79858	2554.1	1.5	358.0	Anemone.	84
12/12/2017	23:51:31	-14.94297	-173.79880	2552.8	1.6	358.0	Sediment also becoming coarser and has more orange patches. Signs of hydrothermal activity.	85
12/12/2017	23:51:41	-14.94310	-173.79879	2552.3	1.9	357.6	Water is getting smoky.	86
12/13/2017	0:02:16	-14.94336	-173.79899	2550.9	0.8	359.2	Temporarily lost log access. Squiddle is not accessible at present.	87
12/13/2017	0:09:55	-14.94295	-173.79869	2539.1	2.3	359.9	**S101-sed-07**. Scoop of sediment from talus slope. Location: 14.943123 173.798675 depth 2550m.	88
12/13/2017	0:10:54	-14.94372	-173.79500	2534.7	1.9	2.9	Having computer problems so logging from personal laptops while rebooting computers and locating problem.	89
12/13/2017	0:11:48	-14.94290	-173.79863	2531.5	2.1	359.8	Moving into thicker rubble pile and fewer sediments. Seeing a few fish. Still murky water.	90

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S101 Mata Ono Logger Comments	Record #
12/13/2017	0:12:35	-14.94288	-173.79759	2528.3	1.7	359.7	Back into more of a sediment lens. Poor sorting of rocky debris and sediment pile looks like it has fairly large grain size; at least a few mm.	91
12/13/2017	0:13:55	-14.94265	-173.79753	2522.5	1.8	356.5	Reboot of MT machine appears to have fixed the problem. Back on ship's computer.	92
12/13/2017	0:14:10	-14.94291	-173.79803	2521.9	1.3	356.7	Squiddle is also back up and running.	93
12/13/2017	0:14:55	-14.94285	-173.79799	2518.7	1.7	357.1	Anemone.	94
12/13/2017	0:16:18	-14.94272	-173.79826	2513.4	1.8	356.4	Just watched a fish panic-swim headfirst into the seabed.	95
12/13/2017	0:16:46	-14.94290	-173.79904	2511.5	2.1	356.9	Some stalky growth on talus - maybe hydroids.	96
12/13/2017	0:18:51	-14.94251	-173.79850	2503.2	2.3	31.0	Note that we are missing at least one several-minute gap in the Squidle grabs from the ROV reboot. There MAY be a second gap of similar length shortly after from the computer issues.	97
12/13/2017	0:19:20	-14.94240	-173.79789	2501.2	2.3	30.8	Shrimp.	98
12/13/2017	0:21:59	-14.94218	-173.79847	2493.6	1.4	27.8	Still moving upslope. Mixture of coarse sediment and talus.	99
12/13/2017	0:22:24	-14.94214	-173.79807	2492.3	1.6	25.2	Shrimp.	100
12/13/2017	0:23:43	-14.94220	-173.79790	2490.7	2.3	32.4	Waiting for the ship to catch up.	101
12/13/2017	0:24:18	-14.94209	-173.79843	2490.3	2.1	43.1	Anemone.	102
12/13/2017	0:30:46	-14.94207	-173.79800	2488.8	2.2	8.3	Moving on.	103
12/13/2017	0:31:44	-14.94193	-173.79864	2486.4	2.6	33.8	All talus. Slope is steepening a little.	104
12/13/2017	0:33:05	-14.94170	-173.79804	2487.0	1.2	33.3	Very poorly sorted debris and sediment again as we look along-contour of the slope we're moving up/parallel to.	105
12/13/2017	0:40:03	-14.94145	-173.79746	2488.5	2.0	33.6	Still tons of talus.	106
12/13/2017	0:40:12	-14.94155	-173.79729	2488.1	2.0	34.2	Some fish but not much else.	107
12/13/2017	0:44:36	-14.94124	-173.79795	2486.3	5.2	40.1	Jrod	108
12/13/2017	0:45:28	-14.94123	-173.79675	2484.2	2.1	326.5	Back into sediment-heavy lens and moving directly uphill now rather than partly along-contour.	109
12/13/2017	0:46:27	-14.94101	-173.79803	2481.6	1.5	316.7	Sea cucumber.	110
12/13/2017	0:46:42	-14.94115	-173.79712	2480.8	2.4	318.3	Increase in orange floc on seabed.	111
12/13/2017	0:47:51	-14.94112	-173.79698	2478.4	4.7	56.5	Back into dominantly talus. Some cucumbers.	112
12/13/2017	0:48:02	-14.94099	-173.79808	2479.2	6.3	59.5	Water increasingly cloudy.	113
12/13/2017	0:51:38	-14.94112	-173.79709	2501.3	5.3	60.3	Transiting over talus.	114

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S101 Mata Ono Logger Comments	Record #
12/13/2017	0:52:16	-14.94117	-173.79703	2506.2	4.8	59.1	Talus talus talus.....	115
12/13/2017	0:52:57	-14.94105	-173.79699	2506.9	7.6	48.2	Now we're over more sandy seds.	116
12/13/2017	0:53:10	0.00000	0.00000	2504.5	10.1	48.4	Here comes more talus - smaller blocks.	117
12/13/2017	0:53:19	-14.94088	-173.79624	2504.4	8.9	47.1	Nothing much for biota.	118
12/13/2017	0:54:29	-14.94097	-173.79712	2501.7	3.9	28.3	Looking for the source of vent signature we saw on the CTD tow in 2010.	119
12/13/2017	0:58:00	-14.94059	-173.79673	2492.5	3.0	39.0	We're on a sedimented slope with volcanic debris.	120
12/13/2017	0:58:17	-14.94053	-173.79669	2491.5	4.0	38.2	The water is milky - but maybe I'm imagining things.	121
12/13/2017	0:59:05	-14.94035	-173.79655	2493.0	3.6	40.9	The nav is not working very well again.	122
12/13/2017	0:59:51	-14.94054	-173.79611	2491.7	5.4	40.3	Angular rocky debris.	123
12/13/2017	1:00:14	-14.94031	-173.79606	2494.3	3.4	40.4	Back into more of a sediment lens. Poor sorting of rocky debris and sediment pile looks like it has fairly large grain size; at least a few mm.	124
12/13/2017	1:01:39	-14.94042	-173.79657	2495.0	3.2	50.3	The nav has been iffy - again today; but at least the ROV is on the screen - but jumping all around ~50 m spread.	125
12/13/2017	1:03:07	-14.94031	-173.79629	2498.8	3.1	50.8	Shrimp - the one with the extra long tentacles.	126
12/13/2017	1:05:01	-14.94015	-173.79569	2500.9	5.6	45.2	Mottle sandy seafloor (brown and blackish). Scattered rock fragments.	128
12/13/2017	1:05:10	-14.94017	-173.79524	2500.4	6.0	22.0	More cloudy water?	129
12/13/2017	1:06:09	-14.93993	-173.79597	2500.8	4.4	52.0	Skipping (veering around) WP4 and heading to WP5.	130
12/13/2017	1:07:55	-14.94002	-173.79573	2514.8	4.5	84.6	We're on the SE side of Mata Ono - we're going to head to WP5 directly.	131
12/13/2017	1:09:12	-14.94007	-173.79520	2525.7	3.6	114.4	We're down in a little hole here at the base of the hill to the SW of WP5.	132
12/13/2017	1:09:30	-14.94030	-173.79521	2525.7	3.7	115.5	Pillow lavas that are in place. Going to look for a piece to sample.	133
12/13/2017	1:10:00	-14.94005	-173.79504	2527.3	1.9	119.2	Nice to see intact pillows after all the talus.	134
12/13/2017	1:10:17	-14.94010	-173.79493	2527.7	1.8	118.4	Anemone; Saw a holothurian a minute ago.	135
12/13/2017	1:10:36	-14.94007	-173.79549	2526.9	2.6	140.0	Looking for the perfect pillow to sample.	136
12/13/2017	1:10:58	-14.94007	-173.79555	2525.1	2.6	136.7	Intact pillow tubes flowing down this little hill.	137
12/13/2017	1:11:02	-14.94007	-173.79555	2525.1	2.3	138.1	Another anemone.	138
12/13/2017	1:11:27	-14.94008	-173.79569	2524.5	2.2	122.3	Something on that elongate pillow.	139
12/13/2017	1:11:49	-14.94018	-173.79555	2524.8	1.9	121.9	Going to sample a pillow crust.	140

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S101 Mata Ono Logger Comments	Record #
12/13/2017	1:12:22	-14.94012	-173.79619	2523.5	2.9	113.7	Holothurian	141
12/13/2017	1:12:44	-14.94022	-173.79540	2524.3	1.8	107.6	Looking at grabbing the little knob on top of this pillow.	142
12/13/2017	1:13:14	-14.94012	-173.79537	2524.7	1.0	102.4	Western edge of a satellite cone here on the SE side of Mata Ono.	143
12/13/2017	1:19:50	-14.93856	-173.80501	2524.8	1.2	102.5	**S101-rock-08**. Pillow piece. Top of small pillow. Probably came off of piece directly above it. 1st piece is circular with small vesicles. Some crystals. Very little glass. 3-5 cm - roundish. Gray interior. Bad nav	144
12/13/2017	1:24:02	-14.94012	-173.79472	2524.1	2.3	99.9	Nav fix (bad!): 16.9393980 173.7948286 Z=2525m. Nice pillow piece. Large white crystals angular. Green pyroxene(?) crystals. Large vesicles. 15 cm. Thick glassy rind. The white crystals are probably orthopyroxene.	145
12/13/2017	1:25:02	-14.94019	-173.79572	2517.3	3.6	125.6	Continuing up this slope of pillow tubes cascading down the slope. Some flatter lobes as we move up slope.	146
12/13/2017	1:25:35	-14.94019	-173.79469	2515.7	1.6	115.4	Now on a gentler slope. A fair amount of ash here.	147
12/13/2017	1:25:49	-14.94024	-173.79478	2515.2	2.0	113.8	Fissure at the bottom of this little high place.	148
12/13/2017	1:26:48	-14.94035	-173.79531	2516.0	2.2	35.4	Wow - that's a crack in the pillows.	149
12/13/2017	1:27:09	-14.94026	-173.79573	2515.9	2.6	36.1	Jumbled up broken pillows at the edge of this big crack.	150
12/13/2017	1:27:11	-14.94026	-173.79573	2516.0	2.6	37.5	Anemone.	151
12/13/2017	1:27:42	-14.94034	-173.79510	2516.0	2.5	38.0	Anemones here and there.	152
12/13/2017	1:27:47	-14.94022	-173.79520	2516.2	2.0	25.5	Fish and holothurian.	153
12/13/2017	1:28:29	-14.94016	-173.79527	2515.4	4.5	61.9	This is a fissure or a crack - they're the same.	154
12/13/2017	1:28:51	-14.94031	-173.79590	2513.1	4.2	88.2	We're sorting out the position relative to the ship.	155
12/13/2017	1:29:11	-14.94018	-173.79559	2513.1	1.9	99.5	Moving upslope. More thick sediments here.	156
12/13/2017	1:29:42	-14.94029	-173.79463	2509.2	4.0	123.4	More thicker sediments here.	157
12/13/2017	1:29:49	-14.94030	-173.79494	2508.9	4.6	134.6	Coming up on a ridge line.	158
12/13/2017	1:29:58	-14.94017	-173.79503	2509.1	4.5	152.2	Maybe right up on top?	159
12/13/2017	1:30:18	-14.94026	-173.79443	2509.4	2.7	136.5	Brachyuran crab.	160
12/13/2017	1:30:34	-14.94016	-173.79473	2508.9	3.3	137.3	A little hydrothermal staining?	161
12/13/2017	1:30:40	-14.94039	-173.79474	2509.0	3.3	137.3	Rock or chimney?	162
12/13/2017	1:30:51	-14.94043	-173.79470	2509.5	3.8	134.7	Yellow staining?	163

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S101 Mata Ono Logger Comments	Record #
12/13/2017	1:31:21	-14.94046	-173.79459	2511.9	1.4	142.6	Grab of sediment coming up. Polychaete?	164
12/13/2017	1:31:38	-14.94056	-173.79486	2512.6	0.7	145.5	Yellow hydrothermal staining on the seds.	165
12/13/2017	1:32:15	-14.94050	-173.79490	2512.9	0.5	144.9	Going to take a sed sample.	166
12/13/2017	1:36:36	-14.94051	-173.79526	2512.8	0.5	144.6	**S101-sed-09**. Scoop bag #2. Sed has orangish coating (hydrothermal). Mottled brown/blackish at surface. Black sparkly seds - volcaniclastic.	167
12/13/2017	1:42:06	-14.94049	-173.79395	2512.9	5.5	55.6	Navigator fix: Z=2513 m. 15.016742 173.787618. (Bad pos).	168
12/13/2017	1:42:27	-14.94052	-173.79396	2512.3	4.3	45.4	Seeing squat lobsters here.	169
12/13/2017	1:42:36	-14.94048	-173.79391	2511.9	4.0	44.9	Anemone.	170
12/13/2017	1:42:41	-14.94054	-173.79393	2511.5	4.0	43.8	Still on pillows.	171
12/13/2017	1:42:46	-14.94059	-173.79415	2511.3	3.3	43.4	Anemones here and there.	172
12/13/2017	1:43:50	-14.94037	-173.79401	2508.5	5.4	41.9	Continuing up this slope covered in pillows and some holothurians.	173
12/13/2017	1:44:32	-14.94072	-173.79505	2507.2	2.9	350.9	We're thinking that navigators fix is way off.	174
12/13/2017	1:44:44	-14.93942	-173.79478	2507.2	2.4	351.3	More squat lobsters here on the orangish seds.	175
12/13/2017	1:45:47	-14.93984	-173.79345	2501.6	4.6	80.0	We're at a contact on a talus slope. Large pillow fragments.	176
12/13/2017	1:46:58	-14.94008	-173.79410	2494.4	5.5	54.6	Anemones of pillows on this steep slope.	177
12/13/2017	1:47:02	-14.94008	-173.79410	2494.0	5.7	44.8	Yellow seds.	178
12/13/2017	1:47:10	-14.94013	-173.79397	2493.3	8.9	42.8	Squat lobster.	179
12/13/2017	1:47:20	-14.94013	-173.79397	2492.3	8.1	43.2	Lots of anemones everywhere.	180
12/13/2017	1:47:41	-14.93998	-173.79329	2489.3	6.2	42.7	Squat lobsters ahead.	181
12/13/2017	1:47:56	-14.93998	-173.79329	2487.1	0.0	43.7	This is an anemone strewn slope.	182
12/13/2017	1:48:02	0.00000	0.00000	2486.3	8.2	47.7	Fish looks like a rattail.	183
12/13/2017	1:48:23	-14.93988	-173.79353	2487.5	0.0	48.2	We're at 2486 making our way up this satellite cone.	184
12/13/2017	1:48:53	-14.93974	-173.79492	2485.1	2.7	45.6	Stalked coral skeleton?	185
12/13/2017	1:48:58	-14.93982	-173.79407	2484.5	3.3	45.6	Possible whip coral.	186
12/13/2017	1:49:08	-14.93982	-173.79407	2483.6	3.3	45.3	Brisingid. Tons of anemones.	187
12/13/2017	1:49:21	-14.93968	-173.79383	2481.9	4.7	45.9	A few brisingids to the right.	188
12/13/2017	1:49:41	-14.93977	-173.79385	2479.8	6.0	45.3	More squat lobsters scattered about.	189
12/13/2017	1:50:04	-14.93983	-173.79327	2476.6	4.7	45.1	Barnacles?	190
12/13/2017	1:50:17	-14.93973	-173.79411	2474.5	4.9	46.1	Brisingids.	191
12/13/2017	1:50:28	-14.93985	-173.79379	2472.7	5.1	45.5	Barnacles.	192

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S101 Mata Ono Logger Comments	Record #
12/13/2017	1:51:00	-14.93964	-173.79414	2469.1	4.5	46.4	Stalked sponges? Brisingid.	193
12/13/2017	1:51:54	-14.93973	-173.79332	2465.9	2.5	39.9	Several fish on the seafloor.	194
12/13/2017	1:52:03	-14.93966	-173.79343	2465.6	1.8	39.6	Rattail and Cusk eel. Squat lobster.	195
12/13/2017	1:52:35	0.00000	0.00000	2464.7	1.3	42.8	Broken up large pillow lobes. with sheet-like crusts.	196
12/13/2017	1:52:52	-14.93951	-173.79361	2464.0	1.5	36.0	Beautiful up here.	197
12/13/2017	1:53:07	-14.93949	-173.79355	2463.8	1.6	32.9	More sediments at the top. Deeper here.	198
12/13/2017	1:53:52	-14.93942	-173.79365	2464.7	0.8	32.4	Going to take a sample here on the edge of the summit - satellite cone to the SE of the summit.	199
12/13/2017	1:54:12	-14.93979	-173.79436	2464.7	0.8	32.5	Cusk eel swam out from under that rock.	200
12/13/2017	1:58:11	-14.93953	-173.79347	2464.7	0.8	31.8	**S101-rock-10**. At the edge of satellite cone summit. Long in place pillow lava - outer crust. Z=2464 m Nav fix: 14.9393538 173.7946546.	201
12/13/2017	1:59:54	-14.91992	-173.78576	2464.6	0.8	31.1	Nice glass surface. White crystals. Small vesicles. Cow-shaped. 10 cm long 6 cm across. Into biobox 2. Glass rind on 2+ sides.	202
12/13/2017	2:01:21	-14.93958	-173.79307	2463.7	2.0	31.3	Codey	203
12/13/2017	2:01:23	-14.93958	-173.79307	2463.2	2.2	31.5	CORRECTION FOR SAMPLE-9 (Sed-9): 14.9393662 173.7947334.	204
12/13/2017	2:02:40	-14.93932	-173.79388	2459.4	20.0	37.6	The ROV team is trying to decide where we are relative to the ship. No nav you know.....	205
12/13/2017	2:03:23	-14.92198	-173.77921	2463.6	3.4	58.2	We're back on the bottom a little west of the summit of the SE satellite cone.	206
12/13/2017	2:03:50	-14.93198	-173.78673	2465.7	2.6	53.8	More orange staining on the seds? Not positive about that. Could just be the lighting.	207
12/13/2017	2:04:10	-14.94055	-173.79366	2461.7	4.5	51.9	We're actually not to the tippy top of that satellite cone yet.	208
12/13/2017	2:04:37	0.00000	0.00000	2460.7	4.2	85.0	We're still climbing. The summit we just saw was just another "step" as we head up this cone.	209
12/13/2017	2:05:47	-14.94001	-173.79034	2454.4	4.0	56.9	Now we're at another high point - lots of biota. Anemones brisingids cusk eels; etc.	210
12/13/2017	2:06:07	-14.93950	-173.79418	2456.0	3.5	24.4	Cusk eels on the bottom.	211
12/13/2017	2:07:04	-14.93925	-173.79418	2451.7	5.3	336.5	Still climbing up a talus slope. We're approaching WP 6. Z=2451. Bill's not going to the top.	212
12/13/2017	2:07:16	-14.93921	-173.79315	2454.1	5.0	331.8	He doesn't want to go over more talus??	213
12/13/2017	2:07:49	-14.93913	-173.79298	2459.0	3.2	327.5	We're now going to head down slope - Big drop off here. Z=2458 m.	214

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S101 Mata Ono Logger Comments	Record #
12/13/2017	2:08:19	-14.93895	-173.79345	2462.0	2.1	72.6	Heading to the NW toward WP7.	215
12/13/2017	2:08:26	-14.93889	-173.79354	2462.0	0.0	110.7	Bottom again.	216
12/13/2017	2:08:54	-14.93916	-173.79370	2465.5	6.7	181.8	Anemones; a couple of kinds.	217
12/13/2017	2:09:28	-14.93892	-173.79345	2470.9	4.5	168.9	Cusk eel	218
12/13/2017	2:10:11	0.00000	0.00000	2475.5	6.2	123.1	White things could be sponges? Walter is not sure.	219
12/13/2017	2:10:29	0.00000	0.00000	2478.1	9.0	118.1	Traveling downslope now - backing down the slope.	220
12/13/2017	2:10:33	0.00000	0.00000	2478.7	7.6	114.4	Talus.	221
12/13/2017	2:10:53	-14.93914	-173.79427	2483.3	5.2	114.1	Blocks of pillows - angular - some smaller pieces as well.	222
12/13/2017	2:12:33	-14.93883	-173.79396	2494.8	6.2	127.2	Piles of pillow talus. Some intact to the left of the screen.	223
12/13/2017	2:13:47	-14.93875	-173.79353	2499.8	3.5	25.5	Slope is still fairly steep.	224
12/13/2017	2:14:04	-14.93876	-173.79340	2501.7	3.4	352.3	We're on the NW side of that satellite cone - moving down slope.	225
12/13/2017	2:15:03	-14.93743	-173.79250	2513.0	1.0	329.1	Heading toward WP7. We're not seeing much of the bottom as we travel downslope.	226
12/13/2017	2:15:17	-14.91512	-173.79641	2514.6	3.0	322.4	We're now approaching the saddle.	227
12/13/2017	2:15:21	-14.91512	-173.79641	2515.5	4.3	319.7	Looks older here.	228
12/13/2017	2:16:17	0.00000	0.00000	2515.3	6.0	324.9	Jumbled up lavas - angular long tocks.	229
12/13/2017	2:16:38	-14.93864	-173.79392	2508.7	9.8	335.6	We're now heading up slope again.	230
12/13/2017	2:17:07	-14.93855	-173.79394	2502.5	8.6	334.1	Heading up this steep slope now.	231
12/13/2017	2:17:40	-14.93853	-173.79396	2493.2	20.7	336.0	Pillow lavas that are in place and mostly decapitated. This is the source of all the talus we saw down slope.	232
12/13/2017	2:18:12	-14.93848	-173.79400	2484.4	0.0	331.2	The nav actually looks reasonable at the moment.	233
12/13/2017	2:18:42	-14.93844	-173.79404	2484.3	2.6	342.2	We will collect a rock sample here. Maybe one of those pillow toes.	234
12/13/2017	2:23:03	-14.93843	-173.79404	2485.7	0.9	352.8	**S101-rock-11**. Pillow bud-like piece. - got half of it. Some white staining below the glass. Vesicles and some white crystal. Manganese coating. Grayish interior. 35 cm long	235
12/13/2017	2:25:10	-14.93831	-173.79437	2475.2	4.4	296.7	Filled up partition 9. We're close to WP 7(9!!) (just north of it). Z=2485 m Nav fix: 14.9384109 173.7940416.	236
12/13/2017	2:26:15	-14.93825	-173.79465	2471.5	3.1	300.0	Continuing up slope now heading NW toward WP8 (10 !!) (the farthest NE part of the summit).	237

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S101 Mata Ono Logger Comments	Record #
12/13/2017	2:26:27	-14.93824	-173.79471	2472.1	2.5	298.4	Squat lobster on a pillow.	238
12/13/2017	2:26:33	-14.93824	-173.79473	2470.9	2.9	298.0	Thicker sediments here.	239
12/13/2017	2:27:02	-14.93822	-173.79480	2467.7	2.4	296.3	Large pillow lobes and tubes covered in heavy sediment.	240
12/13/2017	2:27:35	-14.93823	-173.79486	2464.6	3.7	302.1	Really long fish *eel) ahead.	241
12/13/2017	2:28:02	-14.93817	-173.79493	2463.0	2.7	302.2	Collapse structure that we just passed.	242
12/13/2017	2:28:25	-14.93814	-173.79500	2465.3	0.5	301.9	Crest of the hill at 2465m.	243
12/13/2017	2:29:09	-14.93810	-173.79508	2465.6	2.1	300.4	Large pillow / lobate structures here - top collapsed.	244
12/13/2017	2:29:50	-14.93807	-173.79520	2467.7	1.0	291.6	We're at the edge of a high point here.	245
12/13/2017	2:30:22	-14.93804	-173.79527	2469.6	2.4	283.8	Blue water.	246
12/13/2017	2:31:11	-14.93811	-173.79538	2472.4	1.6	262.5	In place pillows here.	247
12/13/2017	2:31:58	-14.93811	-173.79541	2473.1	2.6	273.4	We're going to head to the W/SW next. Right now we're in the vicinity of WP8 right now. The nav is actually working.	248
12/13/2017	2:32:27	-14.93817	-173.79556	2472.1	7.3	254.6	We're facing west. Talus slope.	249
12/13/2017	2:32:49	-14.93820	-173.79562	2468.4	5.2	247.6	Lots of broken up pillow lavas.	250
12/13/2017	2:33:02	-14.93822	-173.79565	2465.9	6.3	248.1	Some in place pillow tubes.	251
12/13/2017	2:33:17	-14.93824	-173.79569	2462.9	5.2	251.4	Scree here.	252
12/13/2017	2:34:27	-14.93831	-173.79583	2453.2	4.0	248.9	More in place lavas ahead of us as we approach this high spot.	253
12/13/2017	2:34:54	-14.93832	-173.79583	2453.7	2.2	262.0	Jumbled up ropey sheet flows broken up.	254
12/13/2017	2:35:05	-14.93832	-173.79583	2454.2	1.8	267.7	Drained out pillow in front of us.	255
12/13/2017	2:40:25	-14.93831	-173.79585	2454.8	2.5	241.7	**S101-rock-12.** Half way between WP8 and WP9 (10 & 11?!?!). Rind of large pillow with cracked collapsed top. Z=2455 m. Wedge of crust.	256
12/13/2017	2:43:10	-14.93843	-173.79593	2446.8	3.9	239.2	25 cm long - 7 cm wide. 5 cm high. Black glassy crust. Very vesicular Some white crystals. 14.9382468 173.7965702.	257
12/13/2017	2:43:34	-14.93847	-173.79599	2443.4	3.3	235.7	The water is clearing up now.	258
12/13/2017	2:43:52	-14.93850	-173.79605	2442.6	2.5	238.0	In place pillow tubes with scattered jumbled sheet flow here and there.	259
12/13/2017	2:44:15	-14.93848	-173.79613	2440.5	4.2	235.9	Large plat pillow / lobes (plobates).	260
12/13/2017	2:44:40	-14.93853	-173.79619	2436.8	5.2	236.2	Quite a lot of sedimentation on these lavas.	261
12/13/2017	2:45:48	-14.93872	-173.79636	2430.9	4.4	220.8	The ROV seems to be tracking now??	262
12/13/2017	2:46:01	-14.93873	-173.79636	2429.9	0.0	220.4	Rattail?	263

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S101 Mata Ono Logger Comments	Record #
12/13/2017	2:46:43	-14.93885	-173.79647	2422.0	4.6	222.9	Talus slope - again - Broken up angular fragments.	264
12/13/2017	2:47:55	-14.93897	-173.79667	2407.1	5.1	223.9	Fragments of pillows on this talus slope.	265
12/13/2017	2:48:20	-14.93904	-173.79671	2402.4	6.6	221.6	Steep slope here. I sort of believe the nav.	266
12/13/2017	2:49:56	-14.93927	-173.79693	2379.0	7.4	221.0	Continuing up this talus talus-y slope.	267
12/13/2017	2:52:29	-14.93962	-173.79723	2371.1	3.5	234.6	We're probably near WP 11 - based on the nav.	268
12/13/2017	2:53:15	-14.93972	-173.79736	2370.3	5.1	258.3	NAVIGATION INFO: THE USBL FIXES ARE PUTTING US MORE IN LINE WITH THE DEPTHS - BUT THEY ARE MORE SCATTERED ABOUT ESPECIALLY AT THIS DEPTH.	269
12/13/2017	2:54:30	-14.93977	-173.79754	2367.6	4.0	249.1	NAV INFO CONT: THE DVL NAV (SMOOTHER LINE) IS PUTTING US ABOUT 40 M TO THE SOUTH OF THE USBL.SCATTERED FIXES. INFO FOR FUTURE NAV PROCESSING.	270
12/13/2017	2:56:20	-14.93986	-173.79785	2374.4	2.2	238.3	We're probably at waypoint 11 - or close to it based on the nav.	271
12/13/2017	2:56:49	-14.93993	-173.79791	2374.5	2.2	231.4	Bumbled up lavas interspersed with fragmental rock.	272
12/13/2017	2:57:03	-14.93998	-173.79796	2371.7	3.5	232.4	The jumbled stuff is probably just broken up pillows.	273
12/13/2017	2:57:20	-14.94003	-173.79800	2368.3	4.3	232.8	Piece of sheety looking pillow tube there.	274
12/13/2017	2:58:04	-14.94008	-173.79807	2364.2	4.8	228.3	We're going up the summit ridge to the east of the summit.	275
12/13/2017	2:58:27	-14.94009	-173.79809	2365.2	3.3	232.4	Little rattail on the rock?	276
12/13/2017	2:59:08	-14.94014	-173.79812	2362.0	3.8	237.2	Broken up larger pillows here.	277
12/13/2017	2:59:26	-14.94014	-173.79814	2361.6	3.1	239.3	Going to try to grab a piece of the broken up pillow below.	278
12/13/2017	2:59:43	-14.94014	-173.79816	2362.4	2.1	247.6	Seeing a few squat lobsters around. Anemone over there.	279
12/13/2017	2:59:55	-14.94014	-173.79816	2362.8	1.2	246.0	Broken up large pillow below us?	280
12/13/2017	3:00:30	-14.94015	-173.79818	2362.8	1.4	245.4	Partly drained out pillow in front of us.	281
12/13/2017	3:06:20	-14.94015	-173.79818	2362.7	1.7	245.4	**S101-rock-13**. Drained out; worn out; seen its better days; piece of pillow crust! Gaseous big vesicles. Mostly outer edge or some interior as well. Don't see any glass. 2 pieces: 10x5cm and 8x5cm pieces.	282
12/13/2017	3:11:52	-14.94015	-173.79818	2362.8	1.6	245.5	Z=2363 m. 14.9400886 173.7989411.	283

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S101 Mata Ono Logger Comments	Record #
12/13/2017	3:13:49	-14.94020	-173.79833	2357.9	2.2	249.6	**S101-rock-14**. Grab from more tube-like lava behind the previous pillow sample. 5x5 cm piece. glassy pillow rind. ~0.5 m behind rock-13. Z=2363 m. 14.9400886 173.7989411	284
12/13/2017	3:14:05	-14.94023	-173.79838	2357.9	1.7	230.9	We're moving on now.	285
12/13/2017	3:14:15	-14.94025	-173.79837	2358.1	1.5	259.6	Continuing up slope to the summit here at Mata Ono.	286
12/13/2017	3:14:24	-14.94026	-173.79838	2357.7	2.2	263.5	Rattail or cusk eel?	287
12/13/2017	3:14:52	-14.94032	-173.79843	2355.3	1.9	231.5	Rubble slope - turning into talus with scattered pillows.	288
12/13/2017	3:15:22	-14.94040	-173.79849	2354.4	2.1	232.4	Squat lobster herd here. Actually about 10 or more.	289
12/13/2017	3:15:34	-14.94045	-173.79850	2355.4	0.0	238.3	Seeing more biology.	290
12/13/2017	3:15:48	-14.94046	-173.79853	2355.5	1.7	253.4	Seeing hydrothermal sediment here. Orange seds.	291
12/13/2017	3:16:17	-14.94050	-173.79861	2356.8	1.6	253.3	Lots of anemones. Cusk eels.	292
12/13/2017	3:16:22	-14.94051	-173.79863	2356.8	1.4	253.0	Lots of anemones.	293
12/13/2017	3:16:35	-14.94053	-173.79867	2356.1	2.7	250.9	Whip sponges or corals.	294
12/13/2017	3:16:57	-14.94057	-173.79875	2355.8	2.8	253.4	Anemones and squat lobsters around.	295
12/13/2017	3:17:06	-14.94057	-173.79878	2355.7	2.4	254.3	Barnacles up here.	296
12/13/2017	3:17:22	-14.94056	-173.79879	2357.0	1.1	275.2	Anemone-covered seafloor.	297
12/13/2017	3:17:30	-14.94056	-173.79880	2357.8	0.0	284.3	Z=2357 m.	298
12/13/2017	3:17:40	-14.94054	-173.79881	2358.1	2.5	256.0	Diffuse venting.	299
12/13/2017	3:18:02	-14.94054	-173.79883	2359.5	0.0	219.5	Anemones covering the seafloor.	300
12/13/2017	3:18:15	-14.94054	-173.79883	2359.9	0.7	222.7	Lots of brachyuran crabs.	301
12/13/2017	3:19:28	-14.94054	-173.79882	2360.0	0.7	221.6	Z=2360 m. Anemones everywhere.	302
12/13/2017	3:20:11	-14.94055	-173.79883	2360.0	0.8	222.1	Polychaetes; brachyurans; squat lobsters; cusk eels.	303
12/13/2017	3:21:17	-14.94055	-173.79883	2360.0	0.8	221.9	Going to drop a marker here.	304
12/13/2017	3:23:31	-14.94055	-173.79883	2359.9	0.7	221.0	Deploying a seafloor marker here at **Anemone Frenzy. Marker 231** deployed in the midst of these anemones.	305
12/13/2017	3:24:18	-14.94057	-173.79888	2358.2	2.1	263.3	MARKER 231 POSITION: 14.99494273 173.7994674 Z=2356.	306
12/13/2017	3:24:35	-14.94058	-173.79895	2358.0	3.8	264.1	Diffuse flow all over.	307
12/13/2017	3:24:45	-14.94059	-173.79899	2358.0	3.7	264.5	Lots of fish - tons of fish.	308
12/13/2017	3:24:59	-14.94060	-173.79906	2357.7	2.9	261.4	We're heading to the west now along the summit.	309

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S101 Mata Ono Logger Comments	Record #
12/13/2017	3:25:13	-14.94061	-173.79911	2358.2	2.2	267.3	Lots of diffuse flow ahead.	310
12/13/2017	3:25:31	-14.94063	-173.79919	2355.8	6.0	262.5	Huge chimney at the summit.	311
12/13/2017	3:25:46	-14.94064	-173.79921	2353.5	8.0	267.8	One giant chimney at the top here.	312
12/13/2017	3:26:27	-14.94060	-173.79925	2350.3	10.5	214.1	How tall is it.12 + meters tall. Really wide at the base and several large spires at the top.	313
12/13/2017	3:27:08	-14.94065	-173.79923	2350.8	11.5	290.9	Brachyurans; both snails; polynoids.	314
12/13/2017	3:27:16	-14.94065	-173.79925	2351.1	11.9	312.6	We're right at the very summit of the volcano.	315
12/13/2017	3:27:28	-14.94067	-173.79926	2351.5	11.3	0.1	This is crazy looking.	316
12/13/2017	3:27:52	-14.94068	-173.79924	2355.0	7.2	323.9	Lots of smaller spires off the side. Some gray smoke.	317
12/13/2017	3:27:58	-14.94068	-173.79923	2355.0	8.7	320.4	Fairy castle.	318
12/13/2017	3:28:14	-14.94068	-173.79922	2356.3	7.0	312.5	Squat lobsters.	319
12/13/2017	3:29:32	-14.94067	-173.79928	2352.7	11.2	8.2	This thing is really thick at the base. Lots of spires. Sulfide worms; polynoids; Ifremeria snail. Beautiful black smoker beehives as well.	320
12/13/2017	3:29:51	-14.94066	-173.79927	2351.2	11.4	358.9	Tons of brachyurans.	321
12/13/2017	3:29:57	-14.94066	-173.79927	2350.7	11.3	358.3	Haven't seen any shrimp yet.	322
12/13/2017	3:30:08	-14.94066	-173.79927	2350.5	12.2	359.4	Alvinoconcha snails.	323
12/13/2017	3:30:11	-14.94066	-173.79928	2350.4	15.0	358.9	Limpets.	324
12/13/2017	3:30:39	-14.94067	-173.79926	2349.3	15.8	352.9	Little black beehives at the top.	325
12/13/2017	3:31:01	-14.94070	-173.79926	2355.3	8.0	323.8	We think there is one other chimney on the sonar.	326
12/13/2017	3:31:13	-14.94070	-173.79928	2356.9	6.9	321.4	There's another in the background.	327
12/13/2017	3:31:25	-14.94070	-173.79931	2360.0	4.2	301.8	Lots of white mat over there.	328
12/13/2017	3:31:46	-14.94071	-173.79937	2362.9	3.4	294.8	We're going down the NW slope now.	329
12/13/2017	3:32:15	-14.94073	-173.79943	2365.4	2.2	312.1	Short squat fat sulfide with totally white top and biota.	330
12/13/2017	3:32:45	-14.94068	-173.79949	2366.8	3.4	328.5	Lots of broken sulfide in the area.	331
12/13/2017	3:32:55	-14.94065	-173.79950	2364.8	5.2	336.9	Tons of fish. Cuck eels.	332
12/13/2017	3:33:15	-14.94062	-173.79952	2361.1	7.5	334.7	Climbing up another big sulfide. Black smoker.	333
12/13/2017	3:33:26	-14.94060	-173.79951	2359.4	9.0	328.6	Beehives everywhere.	334
12/13/2017	3:33:35	-14.94059	-173.79951	2358.7	9.4	316.1	That's the biggest beehive I've ever seen.	335
12/13/2017	3:34:24	-14.94055	-173.79954	2358.7	10.6	179.8	Monstrous beehives here at the top of this 12 meter chimney. Lots of white coating and then topped with beautiful black beehives.	336

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S101 Mata Ono Logger Comments	Record #
12/13/2017	3:34:55	-14.94054	-173.79951	2358.9	11.8	200.9	That whole thing is blasting out black smoke. The beehive at the top is 40 cm across.	337
12/13/2017	3:35:19	-14.94057	-173.79948	2360.7	7.6	291.7	Good for sampling here.	338
12/13/2017	3:35:33	-14.94060	-173.79948	2360.1	8.0	293.8	Z=2360 at the base here.	339
12/13/2017	3:37:00	-14.94072	-173.79960	2365.1	3.4	221.6	Driving SW looking at the next sonar target - downslope of the chimney we just were at.	340
12/13/2017	3:37:22	-14.94078	-173.79965	2367.1	3.0	294.5	Fish forever here.	341
12/13/2017	3:37:52	-14.94074	-173.79967	2365.0	4.1	28.9	Here at 2367 m to the SW of the summit - last chimney we're pretty much out of it.	342
12/13/2017	3:39:04	-14.94067	-173.79961	2365.0	2.8	20.7	Looking north now down the north flank. Mostly blocky. Don't see much here.	345
12/13/2017	3:39:37	-14.94063	-173.79953	2363.2	5.0	359.0	Z=2364 at the base of this huge chimney with the big black HUGE beehive at the top.	346
12/13/2017	3:42:48	-14.94060	-173.79952	2362.4	4.7	324.6	Navigation target for Giant Beehive (40 cm across): 14.9405783 173.7995584. The base is at 2364 m. It's over 12 m high. Monstrous beehive structure at the top.	347
12/13/2017	3:44:10	-14.94061	-173.79952	2362.5	4.7	323.7	Giant Beehive chimney: We will sample this. Near the base of the chimney (altitude is 5 m).	348
12/13/2017	3:44:15	-14.94061	-173.79953	2362.5	4.6	323.7	Walter saw shrimp.	349
12/13/2017	3:44:46	-14.94061	-173.79953	2362.5	4.9	323.7	Going to try to sample the spire for Chris.	350
12/13/2017	3:45:27	-14.94061	-173.79952	2362.0	5.8	320.8	This little beehive place has a thin chalcopyrite opening.	351
12/13/2017	3:46:00	-14.94061	-173.79960	2362.6	4.3	317.7	Going to go in and sample fluids.	352
12/13/2017	3:46:52	-14.94059	-173.79962	2362.4	5.0	318.5	Going to go in for another grab of this little spire before moving on to sample fluids; etc.	353
12/13/2017	3:47:22	-14.94060	-173.79962	2362.5	5.5	317.9	Didn't get a piece of this chimney.	354
12/13/2017	3:47:43	-14.94060	-173.79962	2362.5	5.6	318.0	Going to take the temperature in this little spire hole.	355
12/13/2017	3:51:17	-14.94055	-173.79965	2362.2	5.1	315.7	Adam	357
12/13/2017	3:54:00	-14.94055	-173.79965	2362.1	5.9	316.1	Tmax = 299C	358
12/13/2017	3:54:06	-14.94055	-173.79965	2362.1	0.0	315.9	0.41	359
12/13/2017	4:01:10	-14.94063	-173.79986	2362.1	6.2	316.4	Sample from 299C smoker vent.	360
12/13/2017	4:05:54	-14.94065	-173.79987	2361.4	6.7	318.4	**S101-gas-15** Location: 14.9405783 173.7995584 depth 2360m.	361
12/13/2017	4:17:01	-14.94068	-173.79982	2362.8	4.6	356.4	**S101-fluid-16**. Water sample from 299C vent. Location: 14.9405783 173.7995584 depth 2360m.	362

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S101 Mata Ono Logger Comments	Record #
12/13/2017	4:17:15	-14.94068	-173.79982	2362.8	4.8	358.1	Lasers off.	363
12/13/2017	4:20:54	-14.94068	-173.79982	2362.8	4.9	358.9	**S101-sulfide-17**. Sample of sulfide from the 299C vent. Location: 14.9405783 173.7995584 depth 2360m.	364
12/13/2017	4:31:03	-14.94067	-173.79980	2360.0	8.9	10.8	**S101-bio-18**. Snail in front basket. Crab and snails. Location: 14.9405783 173.7995584 depth 2360m.	365
12/13/2017	4:39:00	-14.94065	-173.79978	2361.8	7.1	354.0	**S101-sulfide-19**. Scoop of sulfide fragments from 299C vent. Location: 14.9405783 173.7995584 depth 2360m.	366
12/13/2017	4:42:19	-14.94060	-173.79981	2354.9	13.7	345.5	**S101-fluid-20**. Niskin of smoky water at ~12m altitude.	367
12/13/2017	4:42:52	-14.94051	-173.79982	2352.8	19.5	342.8	**S101-fluid-21**. Fore Niskin fired at 2355m depth.	368
12/13/2017	4:43:04	-14.94045	-173.79982	2353.1	19.9	342.3	Ascending. End of Dive 101.	369
12/13/2017	4:45:09	-14.94027	-173.79983	2326.6	0.0	342.1	The first niskin was fired at 2356 m the second was fired at 2355 m.	370

S102 Mata Ono

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S102 Mata Ono Logger Comments	Record #
2017-12-13	19:01:17	-14.94468	-173.80826	2677.3	5.2	120.0	We're on the bottom at Mata Ono.	19
2017-12-13	19:02:01	-14.94279	-173.81459	2676.0	5.7	119.4	We're on the bottom at 2676 m.	20
2017-12-13	19:02:34	-14.95426	-173.80709	2679.2	2.5	120.2	We're seeing some in place lavas here.	21
2017-12-13	19:03:25	-14.94448	-173.80835	2680.7	1.1	120.3	Ken wants a pillow piece. Pillow tubes here ready for the plucking.	22
2017-12-13	19:05:48	-14.94404	-173.80931	2680.8	1.2	115.7	The marker is sticking up in front of the biobox. Needs some housekeeping.	23
2017-12-13	19:07:22	-14.94418	-173.80749	2680.8	1.2	115.4	Trying to get marker 288 back into the proper spot - lay down already.	24
2017-12-13	19:08:19	-14.96252	-173.81465	2680.8	1.2	116.0	Tucked it under the lid of the biobox - huh?	25
2017-12-13	19:09:04	0.00000	0.00000	2680.8	1.2	116.1	The navigation is bad..... again. Jumping all over the place.	26
2017-12-13	19:12:32	-14.94401	-173.80920	2680.8	1.2	116.8	**S102-rock-01**. Piece of pillow tube - nub at the end. Sedimented. Glass on a couple sides. Manganese/iron staining. Vesicular. Don't see white minerals. Fresh interior. 30x15cm.	27

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S102 Mata Ono Logger Comments	Record #
2017-12-13	19:14:35	-14.94391	-173.80974	2680.8	1.1	123.0	A piece went into the major box. Partition 9. Z=2681m Nav fix: 14.9441766 173.8092139. Nav thinks we're 50 - 70 m west of WP1	28
2017-12-13	19:15:11	-14.94418	-173.80945	2679.9	2.2	120.1	Moving on up slope now.	29
2017-12-13	19:15:33	0.00000	0.00000	2679.1	2.5	120.1	Some in place pillow tubes. Lots of fragments.	30
2017-12-13	19:16:04	-14.94411	-173.80899	2677.1	3.3	86.6	Chrysogorgia? Sea cucumber.	31
2017-12-13	19:16:56	-14.94442	-173.80867	2674.6	3.3	86.9	Stalked coral a big one several meters high. Chrysogorgia next to it.	32
2017-12-13	19:17:51	-14.94286	-173.81530	2671.2	4.2	66.4	Seafloor is now covered in fragmented pieces of pillow lavas. Slope of large pillow fragments.	33
2017-12-13	19:19:46	-14.94367	-173.80964	2668.9	4.7	57.9	Heading to the NE. Possibly approaching WP 1 on top of this little mound. Z=2668 ish.	34
2017-12-13	19:19:51	-14.94367	-173.80964	2668.9	4.4	58.1	Cloudy water here.	35
2017-12-13	19:20:49	-14.94325	-173.80965	2673.6	2.8	57.5	We're following a ridge line. We should be descending off this slope according to the map. But - we have no nav so who the heck knows?	36
2017-12-13	19:21:53	-14.94407	-173.80764	2683.3	0.0	57.1	We're probably coming off the east side of this mound.	37
2017-12-13	19:22:42	0.00000	0.00000	2684.8	3.5	37.5	Seeing some pieces of in place pillows here and there.	38
2017-12-13	19:22:54	-14.94271	-173.81025	2684.7	5.2	34.9	Most of the slope is fragments - some quite large.	39
2017-12-13	19:24:06	-14.94326	-173.80848	2686.5	1.2	34.6	Possible black coral - palm tree look.	40
2017-12-13	19:24:31	-14.94305	-173.80908	2687.0	1.6	34.0	We're on a flattish place - more seds here. Some black seds covering the lighter seds.	41
2017-12-13	19:24:45	-14.94301	-173.80921	2687.7	1.4	33.9	4- or more stalked corals ahead.	42
2017-12-13	19:25:27	-14.94358	-173.80820	2689.1	0.3	33.0	Bizarre ripple pattern here. Sort of wavy. Some nice black glass in the seds.	43
2017-12-13	19:27:30	-14.94296	-173.80864	2689.2	0.0	32.5	Going to take a sediment sample next. Going in for the scoop sample.	44
2017-12-13	19:27:59	-14.94328	-173.80812	2689.2	0.0	32.5	**S102-sed-02**. Going in for scoop bag number 2.	45
2017-12-13	19:34:47	-14.93752	-173.81579	2689.2	0.0	32.2	Scoop of volcaniclastic seds/sand from flat-ish seafloor. Very coarse black sand. Clumpy-ish gray seds as well. Z=2689m 14.9435140 173.8078919.	46
2017-12-13	19:35:52	-14.94321	-173.80855	2690.8	1.2	33.8	The nav is still jumping around 50 + meters or more.	47
2017-12-13	19:36:05	-14.94360	-173.80799	2691.5	0.6	38.5	Sponge? with corals in it?	48
2017-12-13	19:36:16	-14.94368	-173.80759	2691.5	0.6	30.9	Whip coral.	49

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S102 Mata Ono Logger Comments	Record #
2017-12-13	19:36:25	-14.94377	-173.80716	2691.5	0.6	33.7	Beautiful clump of stalked coral.	50
2017-12-13	19:37:24	-14.94342	-173.80763	2693.8	2.5	35.0	Lots of floc (?) sed (?) in the water column.	51
2017-12-13	19:38:05	-14.95474	-173.81234	2698.0	2.5	51.2	Moving over sedimented seafloor now.	52
2017-12-13	19:38:16	-14.95351	-173.81169	2699.2	2.0	51.3	Slight ripples.	53
2017-12-13	19:38:42	-14.95275	-173.81163	2701.3	1.5	50.9	Some burrows in the sediment.	54
2017-12-13	19:39:25	-14.94315	-173.80801	2703.9	1.0	50.8	Large pillow - lobate lavas next.	55
2017-12-13	19:39:41	-14.94308	-173.80822	2703.7	1.2	65.8	We want to sample this "unit" of pillows.	56
2017-12-13	19:40:02	-14.94305	-173.80826	2703.8	1.2	80.6	Long pillow lobes here.	57
2017-12-13	19:40:54	-14.94304	-173.80823	2704.3	0.7	92.6	Large pillow lobes here. Going to sample one of them. Brownish sedimentary coating on the exterior of all these lavas.	58
2017-12-13	19:41:22	0.00000	0.00000	2704.3	0.7	92.7	Nearing the top of this local high. Going in for a sample.	59
2017-12-13	19:47:57	-14.94314	-173.80792	2704.4	0.8	119.3	**S102-rock-03**. Outer crust of pillow tube. Fragile/crumbly. Some vesicles. Small olivine crystals (?). Glass on lower corner? 10x10 cm piece.	60
2017-12-13	19:52:42	-14.94314	-173.81045	2705.0	1.3	153.7	1st piece is wedge-shaped and may be mostly interior. Z=2704m. 2nd piece: More exterior glass on this one. Ridges. 10ish cm fragment.	61
2017-12-13	19:54:28	-14.94302	-173.80855	2704.2	2.1	145.8	All into partition 5. Z=2705 m. 14.9433584 173.8076339.	62
2017-12-13	19:54:48	-14.94299	-173.80862	2704.0	1.8	146.2	Brisingid.	63
2017-12-13	19:54:52	-14.94318	-173.80823	2703.8	1.6	145.9	Stalked coral.	64
2017-12-13	19:56:06	-14.94302	-173.80847	2703.3	1.3	168.3	Large branching bamboo coral. Sponge; brittle star; Chrysogorgia; Sponges.	65
2017-12-13	19:56:10	-14.94298	-173.80857	2703.2	1.4	168.3	Lots of biota here.	66
2017-12-13	19:56:34	0.00000	0.00000	2703.1	1.5	167.7	2 different kinds of sponges; whip coral; anemone.	67
2017-12-13	19:57:07	-14.94303	-173.80775	2703.5	1.4	168.2	Brisingid or crinoid.	68
2017-12-13	19:57:22	-14.94332	-173.80806	2703.6	1.1	168.3	Lots of big brittle stars (pink).	69
2017-12-13	19:57:32	-14.94304	-173.80848	2703.7	1.0	168.3	Whole family of brittle stars on a tock.	70
2017-12-13	19:57:52	-14.94315	-173.80800	2703.7	1.0	166.6	Sea cucumber.	71
2017-12-13	19:58:20	-14.94333	-173.80791	2703.7	0.9	166.6	More brittle stars on a dead stalked coral.	72
2017-12-13	19:58:45	-14.94342	-173.80831	2703.7	1.0	167.1	Lots of hydroids too.	73
2017-12-13	19:58:57	-14.94342	-173.80831	2703.4	1.0	167.8	Moving on now.	74
2017-12-13	19:59:19	-14.94316	-173.80789	2702.6	1.7	146.3	In place pillows here.	75

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S102 Mata Ono Logger Comments	Record #
2017-12-13	19:59:27	-14.94336	-173.80694	2702.4	1.8	126.6	Brittle star on dead sponge.	76
2017-12-13	19:59:32	-14.94336	-173.80694	2702.4	1.7	121.6	More brisingids.	77
2017-12-13	20:00:09	-14.94336	-173.80774	2702.1	1.7	83.5	Brisingid(?).	78
2017-12-13	20:00:43	-14.94306	-173.80778	2701.4	2.6	83.6	Nav is on and off. Right now it's on the screen and in a somewhat reasonable area.	79
2017-12-13	20:00:50	-14.94306	-173.80778	2701.2	2.6	83.5	Moving up slope now.	80
2017-12-13	20:01:25	-14.94312	-173.80800	2699.8	2.7	84.4	A small pillow mound? Moving up slope. Pillow tubes and some larger pillow lobes.	81
2017-12-13	20:01:46	-14.94315	-173.80791	2698.5	3.2	84.2	Sponges on the pillows.	82
2017-12-13	20:02:22	-14.94307	-173.80789	2696.4	0.0	84.2	Beautiful large cracked pillows with lots of biota.	83
2017-12-13	20:02:36	-14.94304	-173.80795	2695.6	3.4	84.1	Whip coral.	84
2017-12-13	20:02:55	-14.94536	-173.78156	2694.9	2.3	84.2	Glass sponge and brittle star - hanging out together.	85
2017-12-13	20:03:22	-14.94247	-173.80870	2694.3	2.4	84.0	More sponges than corals.	86
2017-12-13	20:03:44	-14.94315	-173.80772	2693.4	2.7	84.0	Chrysogorgia(?)	87
2017-12-13	20:04:12	-14.94339	-173.80768	2692.3	2.8	84.5	Huge pile of pillow here. Disgorged interior of huge pillow.	88
2017-12-13	20:04:40	-14.94301	-173.80797	2691.7	3.1	84.0	Triad of sponges on this pillow - brittle stars on top. The "bell" sponges.	89
2017-12-13	20:05:06	-14.94292	-173.80773	2691.2	2.5	97.3	Iridigorgia coral.	90
2017-12-13	20:05:31	-14.94300	-173.80798	2691.0	2.9	97.1	Sponges zoom. huge sponges here with lots of brittle stars.	91
2017-12-13	20:05:53	-14.94310	-173.80829	2690.9	2.5	97.6	Broken bamboo coral.	92
2017-12-13	20:06:15	-14.94325	-173.80751	2691.1	2.3	96.8	Going to sample another pillow lava.	93
2017-12-13	20:06:42	-14.94289	-173.80775	2691.5	1.9	78.4	Very bulbous pillows here.	94
2017-12-13	20:07:24	-14.94261	-173.80842	2691.5	3.5	166.8	Coral (bamboo?).	95
2017-12-13	20:07:59	-14.94483	-173.79409	2691.7	3.0	140.8	Quite the pillow mound here. - piled up here with lots of biota. Corals and crinoids.	96
2017-12-13	20:08:17	-14.94340	-173.80360	2691.5	2.8	140.6	Large whip coral ahead on big bulbous pillow.	97
2017-12-13	20:08:25	-14.94336	-173.80403	2691.3	2.7	140.4	Gentle slope here.	98
2017-12-13	20:08:59	-14.94435	-173.80163	2690.8	2.4	141.1	Super tall stalked bamboo coral.	99
2017-12-13	20:09:30	-14.94256	-173.80890	2690.5	1.7	85.1	See a bunch of broken pillow faces. Narrow crack (fissure) here.	100
2017-12-13	20:09:53	-14.94285	-173.80746	2689.9	2.9	68.7	Large branching bamboo coral in the back.	101
2017-12-13	20:10:06	-14.94282	-173.80846	2689.7	2.4	69.6	Fissure direction 075 or 080 degrees.	102

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S102 Mata Ono Logger Comments	Record #
2017-12-13	20:11:03	0.00000	0.00000	2690.2	2.7	69.5	Boney eared ass fishes.	103
2017-12-13	20:11:14	-14.94284	-173.80756	2690.1	1.8	69.4	Fissure heading along the axis of the ridge.	104
2017-12-13	20:11:38	-14.94280	-173.80791	2689.3	1.9	69.4	Heading here is 69 degrees - we're looking down the fissure.	105
2017-12-13	20:11:56	-14.94268	-173.80781	2688.6	1.9	69.5	Fissure is several meters deep - narrow 30 cm across.	106
2017-12-13	20:12:10	-14.94253	-173.80788	2688.3	1.8	69.4	Fissure is getting harder to follow.	107
2017-12-13	20:12:25	-14.94241	-173.80779	2687.7	2.0	69.7	We'll take a sample next to this fissure.	108
2017-12-13	20:13:12	-14.94751	-173.80225	2687.0	3.3	160.6	We're going to turn around and sample some of the pillows along the fissure. The seafloor changes ahead of us.	109
2017-12-13	20:14:06	-14.94217	-173.80867	2688.5	1.2	158.3	We're going to sample a pillow here. Large flattened pillow here. Intact. Whip coral on top of it.	110
2017-12-13	20:20:07	-14.94285	-173.80763	2688.9	0.7	158.5	**S102-rock-04**. Intact pillow (not disgorged or collapsed) with a little barnacle and whip coral on top. Going for outer plate. Z=2689m. 14.9432518 173.8070277	111
2017-12-13	20:22:31	0.00000	0.00000	2688.9	0.8	158.2	Bubbly. 1 face glass - thick rind 1cm . Olivine and pyroxene crystals. 6cm longest dimension. Into quad 6.	112
2017-12-13	20:29:39	-14.94291	-173.80708	2688.8	1.2	201.5	Codey	113
2017-12-13	20:30:23	-14.94344	-173.80669	2688.8	1.3	202.6	This pillow is right at the edge of the fissure. 2nd grab: Pyroxene megacryst - Some glass 5cm across. Vesicular.	114
2017-12-13	20:31:01	-14.95009	-173.79899	2686.0	3.8	167.6	Got that sample on the edge of the fissure.	115
2017-12-13	20:32:09	-14.94280	-173.80754	2684.1	5.6	74.6	Just beyond this sampling site we are now going to head up slope - lots of broken pillow fragments at the base and elongated pillow tubes.	116
2017-12-13	20:33:05	-14.94252	-173.80807	2686.0	2.2	67.0	Not seeing much growing on the pillow tubes on this slope.	117
2017-12-13	20:33:39	-14.94264	-173.80734	2686.6	1.7	84.7	We have barely moved the vehicle. We are on a different lava unit now.	118
2017-12-13	20:34:22	-14.94188	-173.80820	2686.5	1.9	85.5	These lavas look younger. Little hydroids here and there.	119
2017-12-13	20:34:27	-14.94188	-173.80820	2686.5	1.8	85.5	Going in for a pillow toe.	120
2017-12-13	20:37:28	0.00000	0.00000	2683.6	4.4	71.1	Pillow toe from pillow tube. Huge. Broken face view - not seeing big white crystals. Rounded and elongate 25+ cm Glass all around; vesicular;	121

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S102 Mata Ono Logger Comments	Record #
2017-12-13	20:42:45	-14.94267	-173.80747	2675.6	5.3	63.7	**S102-rock-05**. Large pillow toe. Z=2684. 14.9430056 173.8069625.	122
2017-12-13	20:43:03	-14.94267	-173.80777	2673.8	6.3	63.8	Continuing up this debris slope with lots of pillow fragments.	123
2017-12-13	20:43:12	-14.94783	-173.80215	2673.3	5.5	63.9	Some pillow tubes in place here now.	124
2017-12-13	20:43:51	0.00000	0.00000	2669.6	3.1	64.6	Another very large bamboo stalked coral.	125
2017-12-13	20:44:14	-14.94250	-173.80689	2666.1	5.6	98.1	More pillow rubble on this slope. Fragmental talus slope.	126
2017-12-13	20:45:09	-14.94268	-173.80672	2658.3	3.6	45.2	Moving up this slope with pillow fragments - large and small.	127
2017-12-13	20:46:31	-14.94181	-173.80757	2643.9	5.5	31.9	In place pillow tubes - slightly tortured.....	128
2017-12-13	20:46:41	-14.94237	-173.80746	2642.8	4.9	34.4	This rock has seen better days.	129
2017-12-13	20:47:23	-14.94266	-173.80647	2635.5	4.9	42.3	To the left there are some more cracked but in place pillow lavas.	130
2017-12-13	20:47:54	-14.94255	-173.80716	2631.2	6.4	36.0	Smaller pillow tubes that are cracked on their faces.	131
2017-12-13	20:48:11	-14.94262	-173.80704	2628.8	2.0	40.3	Seeing in place lavas here on this plateau.	132
2017-12-13	20:48:33	0.00000	0.00000	2626.5	2.5	42.5	More lobate-looking pillows here. Some large whip corals.	133
2017-12-13	20:49:13	-14.94232	-173.80680	2624.6	3.9	44.6	Quite a drop in front of us - but we are mainly traveling up slope.	134
2017-12-13	20:49:38	-14.94697	-173.81599	2624.9	4.4	64.4	Fissure in front of us is 065degrees orientation.	135
2017-12-13	20:49:55	0.00000	0.00000	2622.5	5.4	63.7	Fissures and dike feature.	136
2017-12-13	20:50:26	-14.94230	-173.80586	2620.1	4.4	63.8	Same orientation; roughly; as the fissure we saw earlier. This one is deeper and wider than the fissure we saw earlier.	137
2017-12-13	20:50:48	0.00000	0.00000	2619.6	3.9	64.2	Just came off a pillow slope to this fissure feature.	138
2017-12-13	20:51:53	-14.94232	-173.80648	2621.3	5.7	49.6	Pillow surface on each side of this 3-5 meter across fissure.	139
2017-12-13	20:52:16	0.00000	0.00000	2618.9	6.8	53.5	Seems to be terminating now and running into a talus slope to the east.	140
2017-12-13	20:52:42	-14.94258	-173.80480	2618.2	7.8	53.7	In place lavas to the west.	141
2017-12-13	20:53:11	-14.94405	-173.80372	2621.6	4.0	59.2	Another slope of elongated tubes. Also some bulbous pillows.	142
2017-12-13	20:53:19	-14.94380	-173.80437	2620.2	5.3	60.2	Not seeing any biology now.	143
2017-12-13	20:53:27	-14.94268	-173.80561	2619.2	5.6	57.7	These must be much older.	144

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S102 Mata Ono Logger Comments	Record #
2017-12-13	20:53:47	-14.94640	-173.80115	2618.7	3.7	58.5	Pillow tubes on the right overlying debris on the left hand side of the screen.	145
2017-12-13	20:53:51	-14.94414	-173.80393	2618.5	3.2	60.4	Milky water here.	146
2017-12-13	20:54:26	-14.94191	-173.80616	2615.0	2.2	63.4	More debris here and broken up rock now.	147
2017-12-13	20:54:35	-14.94180	-173.80613	2614.7	2.7	62.5	Gentle down slope here.	148
2017-12-13	20:55:39	-14.94195	-173.80551	2607.6	3.6	48.0	We're going to have to head up this talus pile. Moving N/NE at 30 degree heading.	149
2017-12-13	20:56:27	-14.94162	-173.80653	2604.4	4.5	48.1	Really milky water here.	150
2017-12-13	20:57:52	-14.94174	-173.80596	2601.2	6.7	35.3	We're coming up slope slowly. The ROV position on the nav screen is way off (probably 100 + m).	151
2017-12-13	20:58:04	-14.94117	-173.80664	2600.2	9.4	22.9	Talus slope - smaller debris now.	152
2017-12-13	20:58:55	-14.94117	-173.80604	2596.7	5.5	21.3	Now seeing a steep slope of intact pillows with loose debris on top of it. At very steep - almost vertical wall o the east of us.	153
2017-12-13	20:59:17	-14.94172	-173.80527	2594.9	0.0	29.6	We're on a spur here.	154
2017-12-13	20:59:57	-14.94118	-173.80611	2590.7	2.4	30.8	Debris scattered slope here - Fragments of pillows of various sized.	155
2017-12-13	21:01:15	-14.94128	-173.80570	2584.4	0.0	54.4	Talus slope. On probably heavily tectonized spur.	156
2017-12-13	21:01:52	-14.94080	-173.80637	2582.9	4.2	65.2	Some intact pillows on right side of screen.	157
2017-12-13	21:02:58	-14.94132	-173.80562	2578.0	3.3	65.6	More in place pillows here - but not much.	158
2017-12-13	21:11:13	-14.94084	-173.80587	2567.7	15.3	57.8	Chunk of pillow lava from an intact flow somewhere on the approach to waypoint 2. Shaped like a slice of Chicago deep dish. 25x15cm; Fe and Mn coats; vesicular.	159
2017-12-13	21:12:03	-14.94136	-173.80485	2563.6	10.9	56.4	**S102-rock-06**. Location 14.9412878 173.8051033 depth 2561m.	160
2017-12-13	21:12:48	-14.94096	-173.80566	2560.0	3.9	51.9	Ascending up talus slope.	161
2017-12-13	21:12:54	-14.94096	-173.80566	2559.4	3.4	52.2	Smoky water.	162
2017-12-13	21:14:28	-14.94290	-173.80309	2554.2	1.9	57.5	Knife ridge. Lots of debris that can't have moved far.	163
2017-12-13	21:18:55	-14.94135	-173.80439	2565.8	9.3	131.1	Near waypoint 2. Whalesongs.	164
2017-12-13	21:21:13	-14.94132	-173.80419	2577.8	0.4	69.0	Came across relatively flat spot with a lot of sediment covering some volcanic spatter. Near-vent and in the area of what is interpreted as a small cone on the map.	165

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S102 Mata Ono Logger Comments	Record #
2017-12-13	21:26:25	-14.94147	-173.80382	2577.8	0.4	69.1	Sed scoop in area of sediments blanketing some spatter deposits. Fines are very sticky on the canvas; probably finer overall grain size distribution.	166
2017-12-13	21:27:01	-14.94123	-173.80496	2576.8	1.3	100.3	**S102-sed-07** Location 14.9413306 173.8041732 depth 2578m.	167
2017-12-13	21:29:04	0.00000	0.00000	2586.3	7.1	307.6	Into the blue for a reposition. Settling over a field of younger-looking intact pillows - inflated and elongated.	168
2017-12-13	21:29:16	-14.94220	-173.80331	2586.8	6.1	308.8	Seeing a few fish and crabs.	169
2017-12-13	21:30:52	0.00000	0.00000	2581.8	4.7	304.5	Seds between pillows have an orange tint. 2582m.	170
2017-12-13	21:31:04	-14.94101	-173.80594	2579.2	0.0	305.4	Pretty high sediment load in the water.	171
2017-12-13	21:31:21	-14.94126	-173.80523	2576.7	4.4	304.5	Pillows more cracked at local high.	172
2017-12-13	21:32:19	-14.94134	-173.80423	2576.1	1.2	183.1	Brisingid.	173
2017-12-13	21:33:41	-14.94180	-173.80428	2586.4	3.1	125.4	Multiple brisingids.	174
2017-12-13	21:34:24	-14.94110	-173.80591	2584.4	3.6	136.4	Jumbly spatter.	175
2017-12-13	21:34:55	-14.94127	-173.80539	2585.9	1.3	129.1	Squat lobster.	176
2017-12-13	21:40:14	-14.94179	-173.80448	2583.5	3.5	130.3	Piece of jumbly lava; 3x7cm crusty bit with glass rind.	177
2017-12-13	21:40:49	-14.94170	-173.80487	2581.0	7.2	129.3	**S102-rock-08** Location 14.9421146 173.8041795 depth 2586m.	178
2017-12-13	21:41:21	-14.94643	-173.80051	2580.4	10.0	129.1	Very clouded water.	179
2017-12-13	21:43:50	-14.94225	-173.80370	2597.8	4.5	105.0	Back into talus pile.	180
2017-12-13	21:44:14	-14.94233	-173.80362	2593.4	7.9	103.4	Seeing little more orange staining in the sediments.	181
2017-12-13	21:45:13	0.00000	0.00000	2585.9	0.0	103.4	Intact pile of pillows with brisingids.	182
2017-12-13	21:48:38	-14.94178	-173.80443	2560.2	5.6	88.1	Nice slope of intact. fairly fresh-appearing pillows. Some anemones/fish/brittle stars but not a lot else.	183
2017-12-13	21:50:32	-14.94213	-173.80386	2542.6	4.4	92.9	Slope is steep.	184
2017-12-13	21:52:30	-14.94154	-173.80404	2520.9	3.9	41.6	Slope flattened a bit and we are now looking at larger/flatter lobate pillows.	185
2017-12-13	21:53:28	-14.94197	-173.80343	2520.8	1.5	16.6	Shrimp at this rock sample site.	186
2017-12-13	21:53:47	-14.94168	-173.80389	2520.9	1.8	13.3	Little patchy orange stains on rock.	187
2017-12-13	21:54:25	-14.92974	-173.81839	2520.9	2.1	13.9	Russ	188
2017-12-13	22:00:29	-14.94167	-173.80394	2521.0	1.3	9.2	**S102-rock-09**. Grab of top crust from an inflated pillow on a local high in the vicinity of waypoint 3. Glassy face. Pie shaped. Vesicular. Not too many crystals. Olivines and pyroxenes. 15 cm long.	189

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S102 Mata Ono Logger Comments	Record #
2017-12-13	22:01:15	-14.94171	-173.80388	2519.3	2.2	10.8	Z=2521m 14.9417288 173.8032880.	190
2017-12-13	22:01:40	-14.94157	-173.80406	2519.6	2.5	65.1	Moving up a pillow-tube slope.	191
2017-12-13	22:02:01	-14.94165	-173.80390	2519.7	3.5	88.9	The last sample was ~40 m NW of WP3.	192
2017-12-13	22:02:15	-14.94172	-173.80369	2518.9	3.4	96.6	Large bulbous lavas here.	193
2017-12-13	22:03:56	-14.94191	-173.80371	2527.8	3.4	96.8	Based on depth we're probably just north from WP 4. That would put the ship pretty far away.	194
2017-12-13	22:04:38	-14.94177	-173.80319	2526.9	5.3	97.5	A cusp eel up ahead. So - the vents are probably not far away.	195
2017-12-13	22:04:51	-14.94132	-173.80419	2527.8	5.7	96.9	Lots of stuff in the water column here.	196
2017-12-13	22:05:33	-14.94217	-173.80286	2532.0	2.1	102.9	We're hovering here.	197
2017-12-13	22:07:25	-14.94178	-173.80361	2539.6	5.2	104.5	Christian thinks that rock 9 went into box 8.	198
2017-12-13	22:07:59	-14.94212	-173.80297	2538.3	3.0	103.7	Both rocks 8 and 9 went into partition 8.	199
2017-12-13	22:08:06	-14.94212	-173.80297	2538.2	3.0	104.9	Cusk eel.	200
2017-12-13	22:08:24	-14.94221	-173.80285	2536.6	3.8	104.8	Fragmented talus slope.	201
2017-12-13	22:08:56	-14.94185	-173.80340	2534.6	3.3	103.5	Traversing this slope with rocky pillow debris - talus.	202
2017-12-13	22:11:26	-14.94201	-173.80314	2533.1	2.4	105.9	CHECK THE DEPTH FOR ROCK-9 2521 SEEMS TOO SHALLOW.	203
2017-12-13	22:13:11	-14.94211	-173.80290	2534.4	1.4	106.1	DOUBLE-CHECKED THE DEPTH FOR SAMPLE 9 - IT WAS CORRECT.	204
2017-12-13	22:13:34	0.00000	0.00000	2534.8	1.1	105.2	Slope with rocky debris and sandy patches.	205
2017-12-13	22:14:00	-14.94235	-173.80275	2534.1	1.5	106.3	Lots of "stuff" in the water column so visibility is not so great.	206
2017-12-13	22:14:56	-14.94210	-173.80255	2532.4	3.9	106.1	Rubble-strewn slope - various sizes.	207
2017-12-13	22:16:48	-14.94215	-173.80219	2531.2	6.1	105.6	We're waiting for the ship so just hanging out here over rubble-strewn talus slope.	208
2017-12-13	22:17:37	0.00000	0.00000	2535.4	2.4	106.2	This slope is no only devoid of intact lavas - it's also devoid of biota.	209
2017-12-13	22:17:49	0.00000	0.00000	2536.3	2.0	106.3	The ship is having difficulty.	210
2017-12-13	22:17:52	-14.94245	-173.80229	2536.4	2.3	106.3	Anemone.	211
2017-12-13	22:18:03	-14.94243	-173.80163	2536.3	2.8	106.0	Just when I said no life - an anemone.	212
2017-12-13	22:18:53	-14.94270	-173.80165	2535.3	3.3	86.3	We're now debating what to do because we are having problems with this heading and the ship.	213
2017-12-13	22:19:24	-14.94660	-173.80360	2534.3	2.5	65.0	Sounds like we are going to eliminate waypoints 5 and 6 and just head up slope to waypoint 7.	214
2017-12-13	22:19:34	-14.94311	-173.80259	2533.2	2.7	42.7	We're now heading up slope again.	215

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S102 Mata Ono Logger Comments	Record #
2017-12-13	22:20:09	-14.94061	-173.80166	2527.6	6.0	44.4	More pillow debris on this slope.	216
2017-12-13	22:20:18	-14.94120	-173.80198	2526.5	6.4	37.0	Seeing a patch of sand ahead now.	217
2017-12-13	22:20:27	-14.94150	-173.80204	2526.1	3.5	37.8	Rocky fragments and sandy areas.	218
2017-12-13	22:20:31	-14.94161	-173.80207	2525.5	3.2	38.8	Holothurian.	219
2017-12-13	22:20:50	-14.94225	-173.80186	2523.3	1.8	23.0	Cusk eel ahead.	220
2017-12-13	22:21:05	-14.95482	-173.80643	2522.2	1.8	20.7	Extensive coarse sand here.	221
2017-12-13	22:21:37	-14.94251	-173.80171	2518.5	3.2	24.2	Debris slope to the west of us.	222
2017-12-13	22:21:59	-14.94240	-173.80189	2516.5	3.1	23.1	Bits of broken pillow fragments strewn across this slope.	223
2017-12-13	22:23:34	-14.94208	-173.80180	2507.0	2.9	22.9	Alternating patches of just talus and talus/sediment mixtures.	224
2017-12-13	22:23:54	-14.94184	-173.80214	2504.6	2.7	23.6	Gently sloping; not completely flat here.	225
2017-12-13	22:24:39	-14.94186	-173.80118	2499.3	1.9	23.3	Moving into larger boulders and much poorer sorting.	226
2017-12-13	22:26:05	-14.94184	-173.80159	2488.1	2.9	9.3	Increasingly large boulders and better sorting as we move uphill. Some fish.	227
2017-12-13	22:27:33	-14.94158	-173.80171	2477.6	2.9	358.4	Hydroid and either a worm or small sea cucumber.	228
2017-12-13	22:29:25	-14.94486	-173.80331	2465.5	0.0	353.2	Larger talus boulders giving way to slightly smaller cobble-boulder size.	229
2017-12-13	22:30:35	-14.94126	-173.80191	2467.3	3.6	284.3	Turning to stop moving uphill and instead follow the contour toward vicinity of waypoints 5 and 6.	230
2017-12-13	22:32:09	-14.94135	-173.80235	2468.0	4.3	324.5	Fish.	231
2017-12-13	22:32:57	-14.94132	-173.80216	2465.7	7.8	298.5	Found some in-place rock. Maybe not so fresh but unclear currently. Surveying for sample.	232
2017-12-13	22:34:36	-14.94142	-173.80219	2463.8	0.0	322.0	Flows have a fair amount of sediment.	233
2017-12-13	22:40:31	-14.94141	-173.80214	2464.6	0.0	299.3	5x7cm chunk of outer pillow lava crust. Pretty vesicular and some Fe and Mn coating.	234
2017-12-13	22:41:54	0.00000	0.00000	2464.6	0.0	299.0	Peter	235
2017-12-13	22:44:11	-14.94130	-173.80245	2462.7	0.0	319.2	**S102-rock-10** Location: 14.9412066 173.8020836 depth 2465m.	236
2017-12-13	22:44:33	-14.94143	-173.80207	2463.1	0.0	336.3	Lots of flattened lobate flows and a small amount of jumbly lava.	237
2017-12-13	22:44:51	-14.94150	-173.80214	2463.8	0.0	336.0	Crossing a cliff face with a lot of truncated pillow faces.	238
2017-12-13	22:45:25	-14.94091	-173.80332	2464.8	12.0	344.3	Fish and brisingids.	239
2017-12-13	22:47:47	-14.94116	-173.80268	2464.3	0.0	0.3	Not a lot of life or sediment on this flow stack.	240

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S102 Mata Ono Logger Comments	Record #
2017-12-13	22:51:49	-14.94131	-173.80239	2465.5	3.1	359.8	Murky water still. Suddenly seeing some lava flows with anemones and more stalked growth - older? Also some fish and a swarm of brisingids.	241
2017-12-13	22:52:59	-14.94118	-173.80255	2465.4	3.2	4.7	Large inflated flows - not too flattened and a few jumbly deposits in patches.	242
2017-12-13	22:53:10	-14.94099	-173.80281	2465.3	3.6	4.7	Crossing what may be a 1m wide fissure.	243
2017-12-13	22:53:38	-14.94113	-173.80249	2466.3	4.0	6.4	Maintaining 2465m contour.	244
2017-12-13	22:54:10	-14.94099	-173.80279	2467.1	5.7	52.0	Slope steepening and seeing narrower pillows and a fair amount of sediment blanketing.	245
2017-12-13	22:55:07	-14.94090	-173.80270	2468.0	3.7	64.8	Sediments thickening slightly.	246
2017-12-13	22:56:08	-14.94039	-173.80299	2467.7	4.6	66.1	Increase in ornamentation on pillows.	247
2017-12-13	22:56:37	-14.94051	-173.80271	2467.5	5.2	66.5	Seeing some talus patches among in place flows. Looks like we're transitioning back into a talus lens.	248
2017-12-13	22:56:52	-14.94050	-173.80288	2466.9	5.8	66.7	Fish.	249
2017-12-13	22:57:40	-14.94010	-173.80325	2464.9	8.2	66.6	Small patch of in place pillow tubes.	250
2017-12-13	23:00:27	-14.93988	-173.80309	2461.4	0.0	80.4	Crossing a lens of smaller pillow fragments with some large pillow boulders.	251
2017-12-13	23:00:41	0.00000	0.00000	2461.0	4.2	80.6	In-place pillows again.	252
2017-12-13	23:04:49	-14.93921	-173.80313	2466.0	4.4	80.8	Dominantly talus again. Some of it looks very vesicular and possibly jumbly.	253
2017-12-13	23:05:27	-14.93989	-173.80199	2465.6	6.2	80.7	Small patches of in-place flows still cropping out of talus periodically.	254
2017-12-13	23:10:57	-14.93957	-173.80159	2463.7	6.8	108.3	Still looking at talus . . . waiting for the ship to catch up.	255
2017-12-13	23:12:52	-14.93934	-173.80181	2465.4	3.9	108.1	Moving again.	256
2017-12-13	23:14:23	-14.93965	-173.80163	2465.8	5.7	89.0	Found a nice stack pf pillows.	257
2017-12-13	23:14:44	-14.93948	-173.80183	2466.4	5.7	89.0	Shrimp	258
2017-12-13	23:16:04	-14.93935	-173.80162	2466.2	4.4	88.8	Back into talus	259
2017-12-13	23:18:24	-14.93922	-173.80148	2465.0	4.7	88.2	Slope may be getting a little steeper here. Otherwise no major changes.	260
2017-12-13	23:19:18	-14.93914	-173.80146	2463.3	6.3	89.4	Squat lobster.	261
2017-12-13	23:21:01	-14.93859	-173.80108	2463.8	4.5	88.8	Little sediment lens.	262
2017-12-13	23:21:34	-14.93922	-173.80110	2462.8	5.5	88.0	Shrimp.	263
2017-12-13	23:22:55	-14.93917	-173.80108	2464.0	4.0	88.5	A few sedimented in-place pillows.	264
2017-12-13	23:23:39	-14.93913	-173.80123	2463.0	3.9	91.8	Steep slope - more sediment	265

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S102 Mata Ono Logger Comments	Record #
2017-12-13	23:24:55	-14.94461	-173.80435	2462.2	4.5	103.9	Some in-place lavas underneath sediment. Still a lot of talus; smaller grain size now on average and very poorly sorted.	266
2017-12-13	23:26:41	-14.93898	-173.80081	2460.6	7.4	124.4	Talus grain size increasing again. Slope gentled slightly.	267
2017-12-13	23:28:59	-14.93896	-173.80079	2459.1	6.2	179.2	Brittle star. Not a lot of life here.	268
2017-12-13	23:31:21	-14.93631	-173.80429	2458.9	7.5	164.6	Where's the venting? No signs of it here.	269
2017-12-13	23:32:33	-14.93903	-173.80024	2462.7	10.5	162.9	Talus covered slope - pillow fragments - pretty small here.	270
2017-12-13	23:34:07	-14.93865	-173.80045	2467.4	4.4	151.4	Traversing along the north side of Mata Ono now.	271
2017-12-13	23:34:30	-14.93866	-173.80070	2466.4	5.5	150.7	We're searching for the vents - in the meantime we're looking at talus slope.	272
2017-12-13	23:34:52	-14.93874	-173.80024	2466.0	6.2	151.9	In place pillow lavas here on the left. Looks old and broken up.	273
2017-12-13	23:34:56	-14.93874	-173.80024	2466.0	6.4	151.9	Steep slope here.	274
2017-12-13	23:35:30	-14.93877	-173.80020	2465.1	7.9	150.6	We're probably at waypoint 18 right now.	275
2017-12-13	23:35:39	-14.93861	-173.80041	2465.4	8.2	150.6	We plan to go upslope from here.	276
2017-12-13	23:37:16	-14.93856	-173.80065	2467.1	6.2	150.1	Not much biota here. - not anything to speak of.....	277
2017-12-13	23:38:51	-14.93897	-173.79994	2462.2	6.2	149.3	We are at 2465 m now and starting up slope over intact pillows that are heavily sedimented.	278
2017-12-13	23:41:12	-14.93902	-173.80002	2449.7	7.1	149.2	We're approaching the depth - 2450 - where the plume was seen in the CTD data.	279
2017-12-13	23:41:57	-14.93865	-173.80027	2447.5	3.1	149.1	Seeing some darker grains to the sediments that drape these lavas - but not much.	280
2017-12-13	23:42:17	-14.93886	-173.80015	2446.3	3.7	149.9	Coming on more fragmented pieces of pillows up above us.	281
2017-12-13	23:43:18	-14.93876	-173.80051	2441.8	4.2	149.2	Small fragmental rock on the steep slope now - most overlain with seds that appear to get thicker as we move up.	282
2017-12-13	23:43:38	-14.93896	-173.80040	2440.0	4.8	149.8	More in place elongate pillow tubes on the slope now. Lots of them are broken.	283
2017-12-13	23:44:51	-14.93908	-173.80029	2433.0	4.5	141.5	Some more sheet-like lavas to the left. More lobate - flat pillow tubes in front of us.	284
2017-12-13	23:45:05	-14.93899	-173.80044	2431.9	4.3	141.1	Ken wants a rock here.	285
2017-12-13	23:45:43	-14.93904	-173.80013	2431.8	2.9	143.4	We're at about 2435 m now.	286

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S102 Mata Ono Logger Comments	Record #
2017-12-13	23:50:09	-14.93914	-173.79990	2432.4	2.1	145.3	**S102-rock-11**. Piece of intact (at least sort of) pillowlobe. This is a big rock - not huge. Vesicular. Manganese on 1 side. Wedge shaped piece of a pillow. Good glass on a layer at least.	287
2017-12-13	23:52:17	-14.93892	-173.80030	2427.7	0.0	129.1	Z=2433m. 15x10 cm. 14.9392458 173.79900867.	288
2017-12-13	23:52:52	-14.93902	-173.80034	2428.0	4.9	128.9	Still traversing. Talus shoot to the right. Some highly sedimented pillow tubes under us.	289
2017-12-13	23:53:26	-14.93907	-173.80037	2428.2	4.2	137.1	We're on the north side of the volcano.	290
2017-12-13	23:54:34	-14.94107	-173.79791	2429.1	6.4	182.0	We're going to traverse to the west at this depth. Still searching for vents and looking at lavas.	291
2017-12-13	23:55:40	-14.93930	-173.80023	2432.1	7.2	184.2	Intact decapitated - broken pillows.	292
2017-12-13	23:56:28	-14.93886	-173.80063	2432.4	9.3	184.3	The nav continues to suck.	293
2017-12-13	23:56:52	0.00000	0.00000	2432.5	8.3	184.4	Quite a few cusk eels.	294
2017-12-13	23:57:44	-14.93942	-173.80029	2429.6	7.6	184.7	Boulder size pillow fragments on the gentler slope here. Lots of smaller pillow fragments as well.	295
2017-12-14	00:00:26	-14.93936	-173.80076	2429.7	5.5	193.5	Sedimented steep area of the slope. Scree.	296
2017-12-14	00:02:19	-14.93917	-173.80110	2430.0	4.0	186.3	Rubble strewn steep slope.	297
2017-12-14	00:03:56	-14.93937	-173.80049	2429.1	4.0	186.4	One lonely squat lobster to the lower right.	298
2017-12-14	00:06:20	-14.93946	-173.80157	2428.3	12.5	194.1	These steep slopes don't seem to be vent country.	299
2017-12-14	00:06:52	-14.93957	-173.80118	2428.4	14.5	194.6	Brisingid?	300
2017-12-14	00:07:00	-14.93952	-173.80144	2428.6	0.0	193.7	Cusk eel.	301
2017-12-14	00:07:22	-14.93926	-173.80161	2429.8	0.0	194.0	Steep sedimented slope interspersed with talus strewn pillows.	302
2017-12-14	00:08:00	-14.93964	-173.80146	2429.8	13.3	166.2	Intact pillow tubes and some bulbous pillows.	303
2017-12-14	00:08:27	-14.93953	-173.80167	2429.7	8.1	166.6	Now coming upon more talus covered slope.	304
2017-12-14	00:08:58	0.00000	0.00000	2429.7	5.6	161.8	Alternating areas of intact broken up pillow lavas and rubble strewn talus slopes.	305
2017-12-14	00:09:24	-14.93937	-173.80185	2429.5	5.6	161.8	Several cusk eels.	306
2017-12-14	00:10:29	-14.93969	-173.80178	2428.9	4.5	175.0	Large pillow tubes above us.	307
2017-12-14	00:11:09	-14.93979	-173.80144	2428.6	0.0	168.0	More of the same.	308
2017-12-14	00:12:50	-14.94024	-173.80106	2424.1	0.0	148.8	We're probably just to the north of WP20 about 10 m. The depth agrees ~2430 m. We're at the NW point of the summit.	309
2017-12-14	00:13:51	-14.93970	-173.80146	2420.4	2.8	149.0	Climbing the ridge here - Looking to the SW as we climb up this spur.	310

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S102 Mata Ono Logger Comments	Record #
2017-12-14	00:15:08	-14.93959	-173.80155	2414.7	5.0	129.6	Seeing some semi-intact pillows. Mostly all broken up.	311
2017-12-14	00:15:20	-14.93959	-173.80155	2414.0	4.1	130.2	Not seeing any biota.	312
2017-12-14	00:15:27	0.00000	0.00000	2413.6	3.8	130.1	Except the cusk eels.	313
2017-12-14	00:15:43	-14.94059	-173.80004	2412.5	3.7	130.0	Anemone - just to prove me wrong.	314
2017-12-14	00:16:46	-14.93985	-173.80165	2407.9	4.0	130.3	All talus - broken rocks piled at the angle of repose.	315
2017-12-14	00:16:53	-14.93986	-173.80124	2407.9	3.8	130.0	Cusk eel.	316
2017-12-14	00:19:40	-14.94003	-173.80105	2399.9	4.7	126.2	We're at 2400 meters. We're 40 m beneath the summit.	317
2017-12-14	00:20:24	-14.93969	-173.80147	2398.9	0.0	128.2	Hydroids on some of these talus pieces.	318
2017-12-14	00:20:55	-14.93980	-173.80143	2398.4	4.9	127.5	Holothurian.	319
2017-12-14	00:21:09	-14.93986	-173.80122	2398.3	4.8	127.3	We're heading back to the east now at 2500 m depth.	320
2017-12-14	00:21:18	-14.93986	-173.80122	2398.2	4.9	128.4	Hydrothermal staining.	321
2017-12-14	00:21:52	-14.93979	-173.80130	2397.6	2.7	127.3	Seeing some hydrothermal chimlets in front of us.	322
2017-12-14	00:21:56	-14.93979	-173.80130	2397.5	2.2	131.8	Cusk eels.	323
2017-12-14	00:22:27	-14.93997	-173.80141	2396.4	3.0	149.4	Maybe a sulfide block that fell down from the slope.	324
2017-12-14	00:22:33	-14.94014	-173.80096	2396.2	3.0	148.6	Not chimlets after all.	325
2017-12-14	00:23:09	-14.93995	-173.80129	2395.5	6.8	138.8	We're seeing more of the eels here.	326
2017-12-14	00:24:03	0.00000	0.00000	2397.8	5.2	130.1	We're looking at t pillow lava ridge here.	327
2017-12-14	00:25:23	-14.93963	-173.80135	2398.0	4.6	126.2	We're now seeing larger pillow lobes on this less steep part of the slope.	328
2017-12-14	00:26:19	-14.93984	-173.80097	2396.3	0.0	127.9	Rubble strewn slope here again.	329
2017-12-14	00:26:23	-14.93984	-173.80097	2396.3	5.1	133.5	Several cusk eels.	330
2017-12-14	00:27:26	-14.93989	-173.80067	2395.3	4.5	150.5	Maybe urchins up the slope.	331
2017-12-14	00:27:52	0.00000	0.00000	2394.6	5.0	150.2	1 urchin and 1 anemone - 3 cusk eels.	332
2017-12-14	00:28:12	-14.93957	-173.80131	2397.2	4.3	150.4	Squat lobsters.	333
2017-12-14	00:29:01	-14.94003	-173.80004	2397.3	5.8	151.2	We're seeing a few squat lobsters. Anemone.	334
2017-12-14	00:30:34	-14.93965	-173.80084	2398.4	4.7	151.6	We're moving to the east now.	335
2017-12-14	00:31:34	-14.93978	-173.80070	2398.3	3.1	152.0	Another anemone.	336
2017-12-14	00:31:47	-14.93990	-173.79999	2397.9	4.2	150.8	Intact broken lavas here.	337
2017-12-14	00:33:52	-14.93969	-173.80046	2397.3	7.8	150.9	Large massive pillows intact on this slope. Edges are broken mostly.	338
2017-12-14	00:34:36	-14.93980	-173.80036	2397.3	7.3	150.9	Anemone.	339

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S102 Mata Ono Logger Comments	Record #
2017-12-14	00:35:11	-14.93993	-173.79964	2397.2	7.2	151.5	We're at 2400 - 60m below the summit.	340
2017-12-14	00:37:07	-14.93989	-173.80034	2392.2	8.1	150.1	We're at the eastern edge of this 2400 m transit.	341
2017-12-14	00:37:30	-14.93931	-173.80053	2392.1	10.1	151.0	We're going o come up to 2380 m and then transit to the west.	342
2017-12-14	00:38:02	-14.93973	-173.80009	2388.9	13.1	149.3	Steep slope here on this side.	343
2017-12-14	00:38:19	-14.93985	-173.80029	2382.7	20.0	153.7	We're rising up 20 m.	344
2017-12-14	00:38:56	-14.93966	-173.80044	2381.7	17.8	153.3	Seeing more evidence of hydrothermal staining here.	345
2017-12-14	00:40:06	-14.93986	-173.79979	2381.5	6.9	224.8	We're moving to the west now at 2380 m.	346
2017-12-14	00:40:18	0.00000	0.00000	2381.1	8.1	221.2	I'm not on board with this strategy.	347
2017-12-14	00:40:39	-14.93992	-173.79987	2380.9	17.3	202.2	It's too steep for hydrothermal venting here.....	348
2017-12-14	00:41:35	-14.93964	-173.80096	2380.3	16.3	194.5	More intact elongate pillows parallel to the slope.	349
2017-12-14	00:42:57	-14.94001	-173.80038	2380.5	20.4	187.2	Brisingid and anemones here on the rocks.	350
2017-12-14	00:43:12	-14.93997	-173.80067	2379.9	20.3	187.2	Still on this fairly steep slope.	351
2017-12-14	00:43:28	-14.93969	-173.80106	2379.3	13.0	187.3	Brisingids - several of them.	352
2017-12-14	00:43:39	-14.93975	-173.80075	2378.9	13.1	187.1	Anemones and squat lobsters.	353
2017-12-14	00:44:31	-14.94006	-173.80066	2378.1	12.0	149.0	We're at 2380 m now - or so.	354
2017-12-14	00:44:49	-14.94025	-173.80042	2377.6	8.3	148.7	We're seeing an anemone covered slope.	355
2017-12-14	00:45:07	-14.94277	-173.78395	2377.4	6.6	148.7	Lots of little anemones on this rock. Squat lobsters.	356
2017-12-14	00:45:31	-14.94011	-173.80064	2376.2	6.8	149.1	The smaller guys that look like barnacles are a different species of anemones.	357
2017-12-14	00:46:49	-14.94024	-173.80035	2371.1	7.1	133.0	Putting a nav marker in here where the hydrothermal venting starts - at least the animals. Started at about 2380 m.	358
2017-12-14	00:47:27	-14.94044	-173.80042	2369.4	5.6	133.4	Now at 2370 the biota has thinned out. Still some but not as thick here.	359
2017-12-14	00:48:59	-14.94021	-173.80029	2362.3	4.8	133.2	NAV TARGET FOR START OF VENTING AT 2380-ISH: Sea Creatures - 14.940321 173.800170.	360
2017-12-14	00:49:15	-14.94010	-173.80078	2361.1	5.1	133.8	Walter is seeing 4 - 5 species of anemones here. Brisingids.	361
2017-12-14	00:49:26	-14.93993	-173.80107	2360.1	5.2	133.3	Here at 2360 the biota has picked up again.	362
2017-12-14	00:49:30	-14.93993	-173.80107	2359.8	5.4	133.5	Cusk eels.	363
2017-12-14	00:50:00	-14.94043	-173.80036	2357.5	5.8	131.0	Anemone meadow there.	364
2017-12-14	00:50:14	-14.93999	-173.80091	2357.0	4.8	96.8	We're up on top now.	365

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S102 Mata Ono Logger Comments	Record #
2017-12-14	00:50:33	-14.94023	-173.80060	2356.2	5.2	108.3	Z=2358 m here.	366
2017-12-14	00:50:59	-14.94026	-173.80045	2354.8	6.4	150.4	We're now turning around to see what we see.	367
2017-12-14	00:51:05	-14.94035	-173.80019	2354.7	5.3	149.5	There's a lot of smoke here.	368
2017-12-14	00:51:30	-14.94016	-173.80066	2355.1	4.2	149.2	There's a crack behind this rock with lots of diffuse flow coming out.	369
2017-12-14	00:52:11	-14.94028	-173.80047	2354.4	4.4	149.5	Ifremeria snails. Brachyuran. Lots of excellent parking here.	370
2017-12-14	00:52:49	-14.94042	-173.80041	2355.0	3.5	149.2	Huge area of diffuse flow here. Some concentrated area.	371
2017-12-14	00:53:39	-14.94040	-173.80063	2357.3	1.0	149.5	Really zonal animals. At this site there are snails - at the diffuse area yesterday there were none. This area here is hotter than where the marker was set yesterday.	372
2017-12-14	00:54:58	-14.94039	-173.80029	2357.5	0.8	149.7	A pile of Irfremeria snails surrounded by crabs; anemones; etc.	373
2017-12-14	00:56:12	-14.94034	-173.80019	2357.4	0.7	149.4	Going to take a temperature in diffuse flow near the snails.	374
2017-12-14	01:02:43	0.00000	0.00000	2357.5	0.7	149.2	Temperature measurement Tmax: 12.3 deg C. Alvinocaris or Nautilocaris shrimp in background.	375
2017-12-14	01:03:58	-14.94612	-173.80333	2357.5	0.0	147.3	Anemone; snails; barnacles.	376
2017-12-14	01:07:03	-14.93943	-173.80048	2357.5	0.8	149.8	We're going to call this Snanemone Garden (Snails and Anemones) diffuse site. 12.3C Lots of biota and milky water here. We're on the west side of where we sampled yesterday.	377
2017-12-14	01:12:43	-14.93997	-173.80057	2357.5	0.9	148.0	**S102-fluid-12.** Major #3 in crack area of 12.3C water. Fired at 0109:12. Done 0110:25. Snanemone Garden: Z=2358 m 14.940412 173.799667.	378
2017-12-14	01:13:32	-14.94039	-173.80035	2357.5	0.0	148.7	Storing the major.	379
2017-12-14	01:13:58	-14.95543	-173.81434	2357.5	0.8	148.9	Fighting crabs - behind the majors..	380
2017-12-14	01:14:42	-14.94220	-173.80171	2357.5	0.7	148.3	Biology scoop.	381
2017-12-14	01:17:41	-14.94000	-173.80025	2357.6	0.9	147.6	**S102-bio-13**. Scoop bag #4 for biology: 4+ Ifremeria snails (big guys); Anemones (beautiful pink - on periphery of shimmer); cont.	382
2017-12-14	01:21:08	-14.94029	-173.80003	2357.7	0.8	148.0	Didn't get any anemones in the scoop bag. Got several snails in the scoop bag. Placed behind major box.	383

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S102 Mata Ono Logger Comments	Record #
2017-12-14	01:24:11	-14.93956	-173.79993	2357.7	0.8	148.1	**S102-bio-14**. Suction jar #8. Pretty large pink anemones that were attached to a rock. Got 3 or 4 of them.	384
2017-12-14	01:25:49	-14.93970	-173.79925	2357.8	0.8	148.2	That's it for this spot. The anemones have "freckles" at their gases. Regular barnacles to the right of the anemones - not stalked.	385
2017-12-14	01:27:48	0.00000	0.00000	2357.7	1.0	148.5	DEPLOYING a seafloor marker here. **Marker-228 at "Snanemone Garden**" Z=2358 m. 12.3 C. 173.799667 14.940412 m.	386
2017-12-14	01:28:38	-14.93990	-173.79928	2357.8	0.0	146.9	Hdg is 148 degrees. Marker placed on the rock where we suctioned the anemones.	387
2017-12-14	01:28:52	-14.94011	-173.79941	2357.8	0.8	147.8	The crabs continue to fight.	388
2017-12-14	01:32:02	-14.94027	-173.79948	2356.0	7.4	182.3	The chimney is about 25m to the east of where we just sampled.	389
2017-12-14	01:34:50	-14.94040	-173.79933	2348.1	18.2	115.8	We're looking at the south side of the chimney now. Z=2362 at the bottom. The top is at 2349 m. It's about 15 m high. And it's named "Rock Star".	390
2017-12-14	01:36:25	-14.94086	-173.79870	2349.6	11.2	233.2	2348 m at top. Up to 18 m tall. If there is a good sampling spot farther down we will - otherwise we'll go to the Giant Beehive.	391
2017-12-14	01:37:16	-14.94330	-173.79488	2350.5	10.2	200.2	Rock Star - has lots of little spires here and there - a beehive here and there. This is the one at the summit peak.	392
2017-12-14	01:37:39	-14.93994	-173.80012	2356.6	4.4	163.3	Brachyurans; ifremeria and maybe alvinoconcha on Rock Star.	393
2017-12-14	01:39:28	-14.94077	-173.79900	2353.6	7.9	241.5	Correction: We're still looking at Rock Star. Nice flow here.	394
2017-12-14	01:40:06	-14.94052	-173.79936	2353.8	7.4	230.4	Ifremeria snails; brachyurans/ etc.	395
2017-12-14	01:40:18	-14.94076	-173.79926	2353.6	7.2	231.1	Polynoids on it too.	396
2017-12-14	01:42:50	-14.94069	-173.79883	2353.7	6.4	239.1	Going to sample this active site here about 7 meters above the seafloor. Chris wants a sulfide here at "Rock Star" chimney.	397
2017-12-14	01:47:39	-14.94057	-173.79961	2353.7	6.7	239.6	Tried for pretty pointy sulfide next to the larger beehive. Now it's really pouring out black smoke - small spigot. We didn't get that sample. Will try later.	398
2017-12-14	01:50:48	-14.94052	-173.79979	2353.7	7.2	240.9	Codey	399

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S102 Mata Ono Logger Comments	Record #
2017-12-14	01:53:31	-14.94078	-173.79907	2353.7	6.8	240.1	Temp measurement here at "Rock Star" in area where small beehive was: Tmax=238C. Location 173.799375 14.940536	400
2017-12-14	01:53:40	-14.94054	-173.79949	2353.7	6.5	240.6	238 C it is.	401
2017-12-14	01:54:15	-14.94061	-173.79959	2353.7	7.2	240.5	Bac mat covered brachyuran crab in the front of our sampling spot. He doesn't look happy about our presence.	402
2017-12-14	01:55:07	-14.94085	-173.79862	2353.7	6.6	239.8	Going for a gastight sample first.	403
2017-12-14	01:57:20	-14.93743	-173.80032	2353.6	7.5	239.9	The gastight sample will be gastight #6 - yellow. Will take in the 238C flow gray-smoker orifice.	404
2017-12-14	02:01:35	-14.94041	-173.79995	2353.7	7.9	240.4	**S102-gas-15**. Gastight #6 - yellow. Fired at 0201:12. Saw the poof when they depressed the ram - so hoping it was a good sample.	405
2017-12-14	02:04:45	-14.94054	-173.79920	2353.6	7.9	239.0	The position for the sample here at Rock Star is: 173.799375 W 14.940536 S. Z=~2361 at the seafloor. Samples taken at ~7 m up the chimney at 2354 m. Tmax=238C.	406
2017-12-14	02:04:54	-14.94061	-173.79890	2353.6	7.4	239.7	Stowing the gastight.	407
2017-12-14	02:06:56	-14.93742	-173.80898	2353.6	6.7	240.1	That was interesting..... The gastight made it into the milk crate - after a lot of fumbling.....	408
2017-12-14	02:10:31	-14.94046	-173.80024	2353.6	7.3	240.1	Got it in the basket. Hopefully it will stay there.	409
2017-12-14	02:10:58	-14.94041	-173.79918	2353.6	6.6	239.7	Next task will be a major sampler here.	410
2017-12-14	02:18:41	0.00000	0.00000	2353.7	7.8	240.0	**S102-fluid-16**. Major sampler #2. Same orifice position; etc. as gastight. Fired at 0217:17. Finished at 0218:30. Rock Star.	411
2017-12-14	02:19:02	-14.94032	-173.79927	2353.7	6.9	239.8	Stowing the major now.	412
2017-12-14	02:20:42	-14.94035	-173.79940	2353.7	6.5	239.7	Stowing the major.	413
2017-12-14	02:21:20	-14.94031	-173.79951	2353.7	7.8	239.8	The rest of the tasks here are chimney grab and bio suctioning.	414
2017-12-14	02:22:00	-14.94050	-173.79943	2353.7	7.5	239.5	Going to try to grab the sulfide now.	415
2017-12-14	02:24:45	-14.94058	-173.79940	2353.7	7.6	259.6	**S102-sulfide-17**. Sulfide spire from active beehive. Flow hole in the center. Chalcopyrite? Narrow chimney spire. Taken right next to gas and fluid sampling site. The next spigot over. Placed in biobox 2.	416
2017-12-14	02:25:23	-14.94038	-173.79965	2353.8	6.8	281.5	Re-positioning slightly - just around the chimney to slurp some shrimp and snails.	417

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2017-12-14	02:25:57	-14.94070	-173.79882	2354.2	6.2	281.3	Going to slurp the chimney side here.	418
2017-12-14	02:26:28	0.00000	0.00000	2355.1	5.2	278.9	Lots of brachyuran.	419
2017-12-14	02:27:04	-14.94054	-173.79946	2355.2	5.4	253.7	Now we're facing the SW on same chimney.	420
2017-12-14	02:34:48	-14.94089	-173.79900	2351.2	9.6	260.9	**S102-bio-18**. Suction into chamber 1: Huge Ifremeria snails (They are larger than the brachyuran crabs) brachyuran crabs; 1 snail - could be the hairy variety (going in biobox 2)	421
2017-12-14	02:35:32	-14.94056	-173.79908	2352.5	8.3	263.0	3 + snails; 1 crab; 1 polynoid in the jar - 1 snail in the biobox as well.	422
2017-12-14	02:35:54	-14.94052	-173.79897	2352.7	8.2	260.4	Heavy action coming up at Giant Beehive next.	423
2017-12-14	02:36:49	-14.94075	-173.79921	2362.9	2.3	232.5	Samples 15 - 18 were taken at Rock Star summit sulfide. All have same position.	424
2017-12-14	02:37:12	-14.94055	-173.79959	2363.6	4.1	249.6	Weird flat-topped white chimney below.	425
2017-12-14	02:39:17	-14.94056	-173.79931	2359.0	10.0	253.6	Base of this chimney is 2365 at Giant Beehive. Moving up to the top here. They want to sample the giant beehive at the top. Z=2359 m. Our altitude is 10m.	426
2017-12-14	02:41:02	-14.94101	-173.79890	2359.1	9.2	340.3	About 10 individual spigots of black smoke - plus 1 honking large 40 cm across Giant Beehive in the center.	427
2017-12-14	02:41:42	-14.94041	-173.79976	2359.0	11.0	345.8	This is one of the biggest black smokers that we have ever seen. We're talking about the width of the black smoker orifice here.	428
2017-12-14	02:43:56	-14.94046	-173.79968	2358.2	10.6	297.7	Setting up to sample right at the top of this huge large orifice black smoker we're calling "Giant Beehive".	429
2017-12-14	02:44:12	-14.94055	-173.79980	2357.6	10.9	280.3	First we will take its temperature. I think its got a fever.	430
2017-12-14	02:45:59	-14.93596	-173.79355	2359.5	9.2	303.9	The temperature probe is caught under the gastight that we used. We're going to sample first - then take the temp here.	431
2017-12-14	02:46:22	-14.94084	-173.79973	2359.0	9.4	293.7	We're going to try a major here first and see how it works.	432
2017-12-14	02:52:41	-14.94053	-173.79965	2358.5	9.5	297.7	Handing off the major - one hand to the other.	433
2017-12-14	02:53:33	-14.93741	-173.80556	2359.1	9.5	319.2	Major #3 (evil #3) which has been misbehaving - but Dave gave it a talking to last night.	434

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S102 Mata Ono Logger Comments	Record #
2017-12-14	02:57:16	-14.94044	-173.79937	2357.5	11.8	334.8	**S102-fluid-19**. Major #3. Sampling while hovering over Bodacious Booming Beehive (B3). Fired. We think it's probably over 300C.	435
2017-12-14	02:59:06	-14.94075	-173.79926	2360.3	9.3	291.9	Stowing the major sampler now.	436
2017-12-14	03:03:55	-14.94053	-173.79941	2360.8	7.1	292.5	The samples here at Bodacious Booming Beehive (B3) location for dive S102: 14.940581 S 173.799559 W. Very similar to the position from dive 101.	437
2017-12-14	03:08:54	-14.94053	-173.79995	2358.6	10.3	298.6	**S102-gas-20**. Sample of smoker gases from top of B3.	438
2017-12-14	03:19:05	-14.94268	-173.79469	2360.8	7.2	327.1	Found Shrimp Township at the base of the upper beehive structures. Still think they look more like conifers.	439
2017-12-14	03:25:12	-14.94055	-173.79935	2360.2	9.0	339.0	**S102-bio-21**. Slurped a few shrimp from Shrimp Township. Approximately 6 shrimp collected.	440
2017-12-14	03:25:54	-14.94053	-173.79930	2362.1	6.1	313.8	Correction: S102-bio-21 should have closer to 10 shrimp.	441
2017-12-14	03:32:36	-14.94065	-173.79893	2360.9	5.6	315.6	**S102-sulfide-22**. Fragment of a rather large chimney sample that we then went Hulk on.	442
2017-12-14	03:44:43	-14.92778	-173.79925	2362.2	6.6	322.9	**S102-fluid-23.** Water sample from smoker vent about halfway up the chimney structure. 2362.7m.	443
2017-12-14	03:55:19	-14.94209	-173.81277	2362.3	6.2	325.4	**S102-fluid-24**. Sample from the same hydrothermal vent as S102-fluid-23.	444
2017-12-14	04:05:17	-14.94078	-173.79901	2366.1	1.4	345.6	**S102-sulfide-25**. Most of the rest of the whole chimlet we pulled off earlier. Same as S102-sulfide-22.	445
2017-12-14	04:05:50	-14.94070	-173.79903	2362.3	4.1	334.1	Vehicle Leaving Seabed.	446
2017-12-14	04:06:02	-14.94071	-173.79926	2363.5	2.3	322.8	Off bottom. End of dive.	447

S103 W Mata

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S103 W Mata Logger Comments	Record #
2017-12-14	18:22:43	-15.08843	-173.73757	1595.7	1.6	302.7	We are on the bottom at 1820.	20
2017-12-14	18:23:18	-15.08827	-173.73725	1594.9	2.5	284.3	We're going to take a sed sample right off the bat.	21
2017-12-14	18:23:57	-15.08829	-173.73728	1593.8	3.6	284.9	We have nav.	22
2017-12-14	18:24:21	-15.08832	-173.73738	1594.1	3.0	284.8	Z=1504 here.	23

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S103 W Mata Logger Comments	Record #
2017-12-14	18:25:11	-15.08823	-173.73720	1596.1	0.9	285.1	Coarse sediments here.	24
2017-12-14	18:26:10	-15.08839	-173.73754	1596.2	0.0	283.3	This eruption happened sometime between 2016 and 2017.	25
2017-12-14	18:26:36	-15.08824	-173.73726	1596.3	0.7	283.9	Microbial bio film orangish coating on the rocks.	26
2017-12-14	18:31:10	-15.08831	-173.73735	1596.3	0.0	283.4	**S103-rock-01**. New pillow lava crust. We're right at WP1. Fresh shiny glass. Large phenocrysts. Very vesicular. Z=1596. 2 5x5cm pieces. Into biobox 1. Z=1596. 15.088296 173.737241.	27
2017-12-14	18:31:33	-15.08823	-173.73719	1596.3	0.8	283.7	Going to take a sed sample next.	28
2017-12-14	18:32:30	-15.08834	-173.73741	1596.2	1.2	282.5	Going for a push core next with a core catcher.	29
2017-12-14	18:35:37	-15.08825	-173.73741	1596.2	1.3	283.6	**S103-sed-02**. Push core 3. Coarse grained volcaniclastic sed. Nothing pelagic. Black shiny coarse. Tube is ~1/3 full. Z=1596. 15.088296 173.737241.	30
2017-12-14	18:36:14	-15.08837	-173.73768	1596.3	0.7	283.4	Shiny black glass apparent on the top of the core.	31
2017-12-14	18:36:19	-15.08837	-173.73768	1596.3	0.0	283.5	Carrying on.	32
2017-12-14	18:36:35	-15.08831	-173.73738	1596.3	0.0	283.6	Series of zig-zags across this new lava flow.	33
2017-12-14	18:36:50	-15.08839	-173.73749	1595.9	1.5	284.6	We're off.	34
2017-12-14	18:38:02	-15.08820	-173.73731	1594.5	2.3	284.9	Beautiful new shiny pillows here covered in volcaniclastic seds.	35
2017-12-14	18:38:23	-15.08834	-173.73741	1593.9	2.2	284.6	Saw a scale worm earlier.	36
2017-12-14	18:39:42	-15.08827	-173.73751	1591.4	1.2	284.6	Lava spire sticking out of top of one of these mounds.	37
2017-12-14	18:40:28	-15.08814	-173.73723	1590.7	1.6	284.3	Small pits filled with volcaniclastic seds (the circles we saw in the Sentry photo survey).	38
2017-12-14	18:41:29	-15.08821	-173.73744	1589.4	2.0	284.8	Thick volcaniclastic seds covering everything here. Rolling sand dune look to it.	39
2017-12-14	18:42:12	-15.08824	-173.73752	1588.0	2.1	284.1	Lots of yellow and white hydrothermal microbial mat.	40
2017-12-14	18:42:55	-15.08838	-173.73788	1588.4	2.2	283.4	There is diffuse flow going on but don't see it - just apparent because of all the mat.	41
2017-12-14	18:43:19	-15.08829	-173.73785	1587.3	2.9	283.4	Larger pit with orange flocculant balls.	42
2017-12-14	18:43:43	-15.08820	-173.73767	1587.7	1.9	284.3	We're heading to the NW up to the contact at the rift zone.	43
2017-12-14	18:43:57	-15.08818	-173.73777	1586.9	2.6	283.5	Crack in the seafloor there.	44
2017-12-14	18:44:24	-15.08818	-173.73776	1587.3	2.0	284.4	Extensive mat - with some black areas where the mat is pushed away.	45

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2017-12-14	18:45:00	-15.08814	-173.73778	1587.4	2.4	294.6	This must be pillow lavas beneath this thick mat.	46
2017-12-14	18:45:50	-15.08820	-173.73795	1587.8	1.9	294.1	We want to stick the temp probe into the thick seds here with lots of yellow hydrothermal seds.	47
2017-12-14	18:46:29	-15.08801	-173.73755	1589.5	0.0	293.3	We've seen a few hydrothermal animals - scaleworm and a shrimp.	48
2017-12-14	18:46:48	-15.08807	-173.73762	1589.5	0.0	293.3	Fluffy orange mat with black volcanic glass underneath.	49
2017-12-14	18:47:18	-15.08803	-173.73772	1589.5	0.0	293.3	White scaleworm on the mat.	50
2017-12-14	18:48:24	-15.08818	-173.73789	1589.5	0.0	292.9	The mat is completely covering the pillows here.	51
2017-12-14	18:48:49	-15.08813	-173.73801	1589.5	0.0	292.7	White balance test.	52
2017-12-14	18:50:14	-15.08808	-173.73782	1589.5	0.0	292.8	Fluffy orange-yellow mat here.	53
2017-12-14	18:52:41	-15.08816	-173.73802	1589.5	0.0	292.9	15.088127 173.7337943 Z=1589. Ambient is 2.5 and the temp probe went up to 4.69 C.	54
2017-12-14	18:52:49	-15.08811	-173.73801	1589.5	0.0	292.9	Another white scaleworm.	55
2017-12-14	18:53:00	-15.08807	-173.73781	1589.5	0.0	293.0	Temp went up to 4.98 C.	56
2017-12-14	18:53:49	-15.08816	-173.73794	1589.5	0.0	293.0	Next we want to suction up a scaleworm or two on the orange microbial mat.	57
2017-12-14	18:56:08	-15.08821	-173.73773	1589.4	0.0	292.9	Bacterial balls - floc pieces floating by.	58
2017-12-14	18:59:33	-15.08800	-173.73763	1589.4	0.0	292.4	**S103-bio-03**. Suction of 2 small white scale worm; orange floc (some white floc too) ; black fresh volcaniclastic sand. The mat is really coherent. 15.088127 173.737943 Z=1589. T=4.69 C.	59
2017-12-14	19:00:10	-15.08822	-173.73799	1589.4	0.0	292.4	Don't see any crystals in that black ash.	60
2017-12-14	19:00:24	-15.08816	-173.73779	1589.4	0.0	292.4	Sample 3 went into jar 6.	61
2017-12-14	19:01:55	-15.08818	-173.73782	1589.3	0.0	292.4	Moving on along this pillow platform on the new flow.	62
2017-12-14	19:03:51	-15.08806	-173.73786	1587.5	1.5	294.0	Little circular pits in the sand.- floc in the middle.	63
2017-12-14	19:04:10	-15.08806	-173.73800	1587.3	1.5	292.8	Larger pit depressions ahead. Most are perfectly circular.	64
2017-12-14	19:04:58	-15.08793	-173.73792	1586.5	2.3	293.2	Looks like lavas in the background.	65
2017-12-14	19:05:30	-15.08803	-173.73816	1586.8	1.7	293.3	Exposed rock here at the edge of the flow. We're at the flow boundary.	66
2017-12-14	19:05:43	-15.08797	-173.73809	1585.8	2.8	293.0	Lots of stuff in the water column.	67
2017-12-14	19:05:53	-15.08795	-173.73807	1585.0	3.5	291.9	Older rock? ahead.	68
2017-12-14	19:06:07	-15.08799	-173.73819	1585.1	3.3	294.0	Microbial staining on this outcrop.	69
2017-12-14	19:06:16	-15.08800	-173.73820	1585.5	2.9	293.5	Rattail.	70

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S103 W Mata Logger Comments	Record #
2017-12-14	19:06:51	-15.08792	-173.73832	1584.5	3.6	295.2	Vesicular lava here - the edge of the older lava that was here before this eruption. Mostly covered with sand from younger eruption.	71
2017-12-14	19:07:35	-15.08793	-173.73817	1586.9	1.1	295.3	The sand on top is much more buff colored. Not seeing the extensive sheet of black sand on top of it.	72
2017-12-14	19:08:13	-15.08784	-173.73808	1585.1	2.0	253.6	Youngish looking rock fragments - very black - butting up against this older lava to the left (north).	73
2017-12-14	19:08:34	-15.08791	-173.73832	1584.5	2.1	246.8	Fresh black coarse rocks and fragments to the south.	74
2017-12-14	19:09:21	-15.08792	-173.73824	1583.8	2.1	245.6	Spattery stuff on the lower area could be part of the older lava flow.	75
2017-12-14	19:10:06	-15.08794	-173.73824	1585.3	1.4	259.1	This older lava looks like flow interior - not any glass visible.	76
2017-12-14	19:10:49	-15.08783	-173.73819	1584.9	2.2	255.3	Looking at the interior of an older flow along the rift zone. Nothing to sample.	77
2017-12-14	19:11:03	-15.08779	-173.73798	1585.5	1.9	234.9	The nav looks pretty good.	78
2017-12-14	19:12:08	-15.08795	-173.73793	1585.7	2.4	242.7	Rock fragments on the (pile of rubble) - some of the fragments look young and others don't.	79
2017-12-14	19:12:38	-15.08791	-173.73808	1584.9	2.3	255.9	Looking at the older rock here.	80
2017-12-14	19:13:06	-15.08792	-173.73808	1584.5	2.0	265.8	This older rock has a ribbon of microbial staining on it.	81
2017-12-14	19:13:57	-15.08789	-173.73809	1581.3	3.1	269.6	Moving along the contact. Broken off pillow ahead of us.	82
2017-12-14	19:14:12	-15.08791	-173.73809	1580.4	3.0	269.4	Black sand is from young deposit.	83
2017-12-14	19:15:19	-15.08824	-173.73880	1577.8	2.6	280.5	Zooming in on this older rock? Could be the older rock with volcanic sand on it.	84
2017-12-14	19:15:29	-15.08802	-173.73841	1578.2	0.0	280.6	Generally the nav is good.	85
2017-12-14	19:16:48	-15.08789	-173.73809	1577.3	1.7	240.1	This deposit is lava flow but also multiple layers with froth. This is the older lava that we're looking at.	86
2017-12-14	19:18:03	-15.08801	-173.73841	1577.1	2.1	234.2	Setting up to sample this older eruption deposit.	87
2017-12-14	19:19:51	-15.08794	-173.73830	1577.1	2.2	233.4	**S103-rock-04.** Frothy deposit - areas of glass - jumbled pattern. Grabbing pillow piece. Unstable. Black and glassy where the piece fell. Near-vent deposit from prior eruption. Older rock.	88

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S103 W Mata Logger Comments	Record #
2017-12-14	19:23:51	-15.08799	-173.73832	1577.1	1.8	237.4	Grabbing it now. Piece has some orange coating. Nice black glass surface on 2 sides. Crystals some small 10 cm long. Not very vesicular. Z=1577. 15.087994 173.738276. Into partition 5.	89
2017-12-14	19:24:54	-15.08791	-173.73814	1578.5	5.7	252.3	Looking at this older rock face. The eruption deposit butts right up against it - black coarse volcanic sands.	90
2017-12-14	19:25:29	-15.08800	-173.73834	1580.9	4.4	240.8	Backing down slope and stirring up the floc.	91
2017-12-14	19:27:10	-15.08797	-173.73800	1586.6	1.9	146.1	Back onto sediment terrain with extensive microbial mat and circular depressions.	92
2017-12-14	19:27:53	-15.08804	-173.73799	1586.6	2.0	143.5	Back on the flats.	93
2017-12-14	19:28:04	-15.08800	-173.73798	1586.7	1.8	146.6	We're close to waypoint 2.	94
2017-12-14	19:28:33	-15.08811	-173.73808	1587.2	1.9	151.3	It's so awesome to be diving on the AUV data.	95
2017-12-14	19:29:33	-15.08811	-173.73795	1587.2	1.9	150.5	Trying to get the porch to retract. Pushing it.	96
2017-12-14	19:29:47	-15.08806	-173.73777	1587.2	1.9	150.4	Done.	97
2017-12-14	19:30:04	-15.08814	-173.73802	1587.0	1.8	150.3	Scaleworm.	98
2017-12-14	19:30:23	-15.08813	-173.73793	1587.1	2.0	151.2	Undulations in the surface - sand overlying pillow lavas underneath.	99
2017-12-14	19:30:49	-15.08826	-173.73799	1587.3	2.1	167.0	The covering of sand underlies the character of the lava beneath.	100
2017-12-14	19:31:17	-15.08821	-173.73772	1587.1	2.5	167.4	There really isn't anything to sample here.	101
2017-12-14	19:31:38	-15.08828	-173.73765	1588.9	1.2	167.1	We don't know how long this eruption lasted.	102
2017-12-14	19:31:59	-15.08838	-173.73793	1589.0	1.5	167.4	Large circular pits to the right.	103
2017-12-14	19:32:06	-15.08836	-173.73786	1588.5	2.0	167.3	There may be a bit of rock here.	104
2017-12-14	19:32:18	-15.08850	-173.73818	1587.2	3.2	171.1	Beautiful pillow lavas here that are pouring down a slope.	105
2017-12-14	19:32:52	-15.08840	-173.73801	1586.0	4.4	202.4	Steep pillow lava rampart here. Young black pillow lavas associated with the new eruption.	106
2017-12-14	19:33:10	-15.08839	-173.73810	1583.4	6.3	205.8	Ken wants to look at the extent of this.	107
2017-12-14	19:33:24	-15.08839	-173.73806	1581.0	7.1	205.9	This is quite a tall pillow mound.	108
2017-12-14	19:33:33	-15.08842	-173.73805	1579.9	7.7	206.2	Some of the pillows are broken.	109
2017-12-14	19:33:45	-15.08847	-173.73798	1578.6	8.8	215.3	Higher standing bulbous pillow.	110
2017-12-14	19:34:19	-15.08845	-173.73802	1577.9	3.7	237.9	More high standing lavas here.	111
2017-12-14	19:34:26	-15.08851	-173.73819	1577.5	0.0	237.8	Spattery rock here.	112
2017-12-14	19:34:42	-15.08845	-173.73808	1577.4	0.0	252.1	Drained pillow tube in front of us.	113

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S103 W Mata Logger Comments	Record #
2017-12-14	19:34:56	-15.08847	-173.73812	1577.2	0.0	251.2	Stunning drained out pillow ahead of us.	114
2017-12-14	19:35:10	-15.08837	-173.73800	1577.0	0.0	240.3	Platy slabs here.	115
2017-12-14	19:35:32	-15.08837	-173.73800	1576.6	5.0	234.1	Thin shell of frozen lava here and pouring out the bottom.	116
2017-12-14	19:35:48	-15.08843	-173.73808	1576.6	9.2	234.4	More chaotic spattery look to the pillows here.	117
2017-12-14	19:37:15	-15.08842	-173.73808	1578.2	4.4	234.4	Spectacular. Frozen in time. Sheet-like lava behind it.	118
2017-12-14	19:37:24	-15.08842	-173.73807	1578.2	7.1	234.3	Super drained out pillow.	119
2017-12-14	19:37:32	-15.08841	-173.73798	1578.2	4.4	234.2	Polychaetes swimming around.	120
2017-12-14	19:37:49	-15.08843	-173.73806	1578.2	4.4	234.3	Bigger than what we saw on the microbial mat.	121
2017-12-14	19:40:36	-15.08852	-173.73835	1578.2	4.4	234.3	**S103-rock-05**. Piece of young frothy pillow "tongue" exgorged lava. Crystal-rich boninite. Fragile sheet that broke off the disgorged end.	122
2017-12-14	19:42:20	-15.08838	-173.73803	1578.2	4.5	234.4	1st piece. Glassy. Abundant crystals. 3 cm. Young fresh fragile frothy glass - sampled out of pillow tongue. Z=1579m. Into biobox 2.	123
2017-12-14	19:43:41	-15.08842	-173.73813	1578.1	0.0	234.2	Near vent glass. 1st piece is coherent. 14.0884054 173.7380671.2nd piece:	124
2017-12-14	19:47:37	-15.08828	-173.73784	1578.1	0.0	234.5	2nd piece: Ropey piece of lava just beneath piece 1. Glassy fresh phenocryst rich. Similar size more rounded.	125
2017-12-14	19:49:12	-15.08838	-173.73816	1576.7	0.0	234.0	Excellent sample that was all glass. From drained out pillow upon drained out pillow upon drained out pillow.	126
2017-12-14	19:49:50	-15.08835	-173.73809	1575.1	10.6	234.2	Coming up on the rise here. Vent spatter deposit with more coherent pillow lobes in the distance.	127
2017-12-14	19:50:35	-15.08837	-173.73808	1575.1	0.0	234.7	We're going to continue forward on this high platform.	128
2017-12-14	19:51:07	-15.08839	-173.73809	1573.8	1.8	234.8	This is a step in the pillow front. Up on the next platform a meter or so up - now covered in volcaniclastic seds again.	129
2017-12-14	19:51:44	-15.08846	-173.73831	1572.8	1.4	234.4	This entire eruption deposit on the "steps" is covered in thick volcaniclastic seds.	130
2017-12-14	19:52:26	-15.08842	-173.73824	1572.3	1.0	234.3	We're going to get a scoop bag of this volcaniclastic sed next.	131
2017-12-14	19:53:06	-15.08840	-173.73811	1572.1	0.7	234.1	Seeing some rocky fragments here.	132
2017-12-14	19:53:28	-15.08836	-173.73816	1572.3	0.4	231.7	Also see the small pits in the sands.	133

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S103 W Mata Logger Comments	Record #
2017-12-14	19:54:28	-15.08839	-173.73816	1570.4	0.9	234.5	Moving up to the top of this mound. Rippled volcanic sand up here.	134
2017-12-14	19:54:55	-15.08843	-173.73821	1569.8	0.6	233.8	We're at the crest of this sand dune.	135
2017-12-14	19:55:14	-15.08840	-173.73815	1570.2	0.0	234.3	Here the depressions are full of yellow mat.	136
2017-12-14	19:55:23	-15.08845	-173.73824	1570.2	0.0	234.3	Some have none - on the other hand.	137
2017-12-14	19:56:32	-15.08845	-173.73834	1570.2	0.0	234.2	Grabbing scoop bag 4.	138
2017-12-14	19:58:03	-15.08845	-173.73838	1570.2	0.0	234.0	Scoop bag 4 - in thick fresh volcaniclastic seds. Produced during new eruption (2016-2017). Black shiny glass.	139
2017-12-14	20:00:07	-15.08843	-173.73833	1570.2	0.0	234.0	**S103-sed-06**. Extremely coarse volcanic sed. Black and shiny. Z=1570. 15.0884115 173.7382234.	140
2017-12-14	20:00:42	-15.08845	-173.73842	1569.7	0.0	235.7	Looking at sed bag scoop area.	141
2017-12-14	20:01:09	-15.08854	-173.73843	1569.4	0.7	234.8	Coming up upon another step up - at least on the AUV data. Don't see it yet on the seafloor.	142
2017-12-14	20:01:34	-15.08845	-173.73831	1567.7	2.8	234.3	Seeing bits of rock poking through here and there.	143
2017-12-14	20:02:17	-15.08852	-173.73843	1568.1	1.8	245.2	Patches of sed in the pits - but the seafloor is not thickly covered with it now.	144
2017-12-14	20:02:48	-15.08854	-173.73842	1566.7	2.2	247.6	Some of these pits are more elongate than the ones we saw earlier.	145
2017-12-14	20:02:56	-15.08849	-173.73839	1566.4	1.7	247.5	Some rock fragments here and there.	146
2017-12-14	20:03:30	-15.08864	-173.73854	1564.9	1.4	247.8	Larger pit to the right (north).	147
2017-12-14	20:03:44	-15.08859	-173.73842	1564.3	1.5	248.6	Going up a little slope here.	148
2017-12-14	20:03:59	-15.08861	-173.73867	1563.6	1.3	253.3	Can see some of the pillow lavas under the sandy surface.	149
2017-12-14	20:04:07	-15.08864	-173.73873	1563.2	1.6	253.2	Piece of pillow lava.	150
2017-12-14	20:05:13	-15.08857	-173.73850	1560.2	1.5	253.1	Here's a small area with pillows poking through. Large pillows in front of us - but lots of sand here as well.	151
2017-12-14	20:05:31	-15.08862	-173.73860	1559.5	1.6	252.9	The pillows are large - almost lobate like here.	152
2017-12-14	20:05:48	-15.08859	-173.73856	1558.3	2.1	250.5	Another disgorged pillow lobe.	153
2017-12-14	20:06:01	-15.08868	-173.73874	1557.4	2.7	250.6	We're near the northern extent of the flow.	154
2017-12-14	20:06:09	-15.08862	-173.73870	1557.0	3.1	250.6	Pretty coherent pillows here.	155
2017-12-14	20:06:33	-15.08855	-173.73855	1556.8	3.2	250.7	Another one of those small polychaetes swimming by.	156

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S103 W Mata Logger Comments	Record #
2017-12-14	20:07:10	-15.08860	-173.73863	1556.4	3.4	251.5	Beautiful pillows here - more intact than the ones we saw previously. Bulbous pillows with elongated tubes in the background.	157
2017-12-14	20:10:34	-15.08861	-173.73862	1557.5	2.0	259.4	**S103-rock-07.** Bulbous pillow with disgorged end. and twisty-looking toe on top. Z=1558 m. Grabbing piece near the toe.	158
2017-12-14	20:13:01	-15.08856	-173.73857	1557.5	2.2	259.5	Fresh crystal-rich glassy. Large crystals. Vesicles. Thick glassy rind (cm's). Grayer material. Circular-ish shape. 20 cm long	159
2017-12-14	20:14:58	-15.08868	-173.73876	1557.4	2.2	259.1	Placed in partition 8. 15.088600 173.738616. Z=1558m.	160
2017-12-14	20:15:28	-15.08860	-173.73860	1557.4	1.9	259.4	Finished up with that sample.	161
2017-12-14	20:16:36	-15.08863	-173.73867	1556.6	3.0	247.9	We're going to head to WP 5 next.	162
2017-12-14	20:17:31	-15.08867	-173.73874	1553.0	3.1	220.3	Moving over long flattish pillow tubes/lobes.	163
2017-12-14	20:17:39	-15.08865	-173.73872	1552.3	4.1	220.6	Bulbous pillows on the top.	164
2017-12-14	20:18:00	-15.08866	-173.73872	1550.5	2.0	220.4	Pillows are now half covered in volcanic seds.	165
2017-12-14	20:18:20	-15.08867	-173.73873	1548.6	3.1	211.3	As the seafloor flattens out the sediment cover increases.	166
2017-12-14	20:18:30	-15.08868	-173.73875	1548.1	2.7	211.5	5 polychaetes swimming in the water.	167
2017-12-14	20:19:12	-15.08872	-173.73877	1544.7	2.6	211.9	Sandy flat plain now.	168
2017-12-14	20:19:22	-15.08874	-173.73878	1544.2	2.1	211.4	Seeing some rock fragments here and there.	169
2017-12-14	20:20:06	-15.08881	-173.73879	1542.0	1.6	209.6	Heading southward over volcaniclastic sands - with some pillow fragments visible.	170
2017-12-14	20:20:44	-15.08888	-173.73880	1540.6	1.5	209.8	Seeing orange and white mats here.	171
2017-12-14	20:21:02	-15.08891	-173.73881	1540.0	1.4	209.3	More white mat here.	172
2017-12-14	20:21:18	-15.08894	-173.73881	1539.2	1.8	209.5	The orange mat is still here but also seeing white mat.	173
2017-12-14	20:21:28	-15.08896	-173.73881	1538.8	1.8	209.5	Rock fragments on the seafloor.	174
2017-12-14	20:22:05	-15.08901	-173.73881	1537.5	1.8	209.5	Spattery rock fragments at the foot of more coherent pillow lavas ahead.	175
2017-12-14	20:22:33	-15.08904	-173.73881	1535.9	2.0	208.8	Shelly lavas again.	176
2017-12-14	20:23:01	-15.08906	-173.73882	1534.9	2.3	209.4	Large number of coarse debris fragments here.	177
2017-12-14	20:23:19	-15.08907	-173.73882	1533.6	2.9	209.1	Lots of polychaetes in the water.	178
2017-12-14	20:23:45	-15.08909	-173.73881	1532.1	2.5	209.1	Seafloor covered with small spattery fragments - and larger pillow fragments.	179

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S103 W Mata Logger Comments	Record #
2017-12-14	20:24:26	-15.08910	-173.73881	1530.7	2.9	208.8	Ken wants a bag of these coarse fragments on the seafloor here.	180
2017-12-14	20:27:06	-15.08913	-173.73882	1530.6	1.0	208.9	Codey	181
2017-12-14	20:30:47	-15.08912	-173.73882	1530.5	0.9	208.6	**S103-sed-08**. Scoop bag 3. Coarse spattery-like seds / small rock fragments / some yellow floc. More coherent rock as well.	182
2017-12-14	20:33:54	-15.08912	-173.73879	1530.6	1.2	208.5	Z=1531. From gentle slope. Coarse. Fresh-glassy. Near vent deposit including spatter? 15.0891313 173.7388080.	183
2017-12-14	20:34:19	-15.08911	-173.73878	1530.6	1.2	208.5	We've come up 66 m since the start of the dive. We are climbing up...	184
2017-12-14	20:34:36	-15.08911	-173.73878	1529.4	3.2	208.0	Got some rock sample in that sed bag as well.	185
2017-12-14	20:35:11	-15.08916	-173.73880	1524.6	4.1	205.9	Coming up another small rampart. Some lavas poking out of these coarse volcanic sands.	186
2017-12-14	20:35:34	-15.08921	-173.73883	1521.9	3.5	206.7	This is all rock fragments with pillow tubes sticking out. Near-vent structure?	187
2017-12-14	20:35:47	-15.08923	-173.73884	1519.7	3.9	206.4	Seeing white and orange mat here.	188
2017-12-14	20:36:15	-15.08928	-173.73887	1516.9	4.2	210.2	This is a vent structure. Weird black fish.	189
2017-12-14	20:36:25	-15.08929	-173.73888	1516.7	3.5	210.4	High upstanding conical feature.	190
2017-12-14	20:36:34	-15.08928	-173.73887	1516.8	3.2	210.4	This looks like volcanic spatter at its summit.	191
2017-12-14	20:36:40	-15.08928	-173.73887	1516.7	3.2	213.7	Lots of polychaetes here.	192
2017-12-14	20:37:42	-15.08927	-173.73886	1516.6	3.4	239.6	Walter? What is that fat black fish large fins on the side that it uses to propel itself.	193
2017-12-14	20:38:20	-15.08927	-173.73890	1514.4	5.3	198.6	This is a huge mound of eruptive mat here. Looks like the eruptive mounds we saw at Hades vent site.	194
2017-12-14	20:38:25	-15.08927	-173.73891	1514.3	4.7	193.4	White mat on the top.	195
2017-12-14	20:38:38	-15.08927	-173.73892	1514.2	3.6	174.0	We want to do a pirouette around this first.	196
2017-12-14	20:39:03	-15.08930	-173.73895	1514.0	0.0	105.3	Chaotic lavas poking out here and there.	197
2017-12-14	20:39:18	-15.08932	-173.73894	1514.1	2.1	75.2	Nice accumulation of white mat on the pinnacle.	198
2017-12-14	20:39:35	-15.08934	-173.73893	1514.7	3.6	38.7	Coarse sand here right up to the top of this spatter rampart.	199
2017-12-14	20:40:29	-15.08921	-173.73894	1517.8	4.7	140.9	Brownish rock all around this. Orange thick mat - white mat here as well.	200
2017-12-14	20:40:42	-15.08920	-173.73892	1518.6	5.2	172.5	That's some thick yellow mat.	201

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S103 W Mata Logger Comments	Record #
2017-12-14	20:41:15	-15.08922	-173.73892	1519.7	3.4	202.4	Going to measure the temperature here. Area of sand; rock; rocky fragments coated with white and orange microbial mat.	202
2017-12-14	20:41:44	-15.08923	-173.73892	1520.1	2.6	211.5	Don't know when this happened. Z=1522 at the base.	203
2017-12-14	20:42:05	-15.08923	-173.73891	1520.0	2.7	214.0	Polychaetes everywhere.	204
2017-12-14	20:42:20	-15.08923	-173.73891	1520.0	2.8	214.2	Polychaete plethora.	205
2017-12-14	20:43:46	-15.08924	-173.73891	1520.0	2.8	214.6	Eruptive spatter mound location: 15.0892610 173.7389210.	206
2017-12-14	20:43:55	-15.08924	-173.73892	1520.1	2.7	214.4	Shrimp just passed Chris by.	207
2017-12-14	20:46:06	-15.08922	-173.73891	1520.0	2.3	215.2	Taking a temp measurement here. T=4.39 C in white mat. Seeing a plethora of scale worms.	208
2017-12-14	20:46:46	-15.08923	-173.73892	1520.0	2.2	214.8	Seeing "bag creatures" - polysaccharide.	209
2017-12-14	20:47:38	-15.08922	-173.73892	1520.0	2.7	211.6	Temp = 4.69C.	210
2017-12-14	20:47:42	-15.08923	-173.73892	1520.0	2.2	213.3	2nd shrimp.	211
2017-12-14	20:48:09	-15.08923	-173.73893	1520.0	2.9	214.1	Poking the temp probe in a crack now. Alvinocaris and opaepele shrimp.	212
2017-12-14	20:50:17	-15.08924	-173.73891	1520.0	2.8	213.5	Temp in the crack 4.98 C. Blobby sacks of material on rock above crack where temp is being taken.	213
2017-12-14	20:52:10	-15.08923	-173.73890	1520.0	2.2	214.6	Trying 1 more temp measurement in white mat. T=4.69 C.	214
2017-12-14	20:53:07	-15.08923	-173.73889	1520.0	2.8	214.4	Zooming in on shrimp. Opaepele shrimp. Scale worms.	215
2017-12-14	20:59:38	-15.08923	-173.73887	1519.9	2.8	214.3	**S103-bio-09**. Suction chamber 4: 3 Opaepele shrimp; 10+ polynoids. Spatter Mound: 15.089261 173.738921 Z=1520.	216
2017-12-14	21:00:01	-15.08923	-173.73886	1520.0	2.8	214.1	From this Spatter Mound that is about 3 m tall.	217
2017-12-14	21:01:24	-15.08924	-173.73886	1519.9	2.7	214.3	This mound is probably an eruptive vent site during the last eruption - similar to Hades. But not hot of course.	218
2017-12-14	21:01:33	-15.08924	-173.73886	1520.0	2.7	214.3	We're going to take a Niskin.	219
2017-12-14	21:02:28	-15.08924	-173.73887	1517.2	4.8	224.8	**S103-fluid-10**. Aft Niskin taken from the side of this Spatter Mound. Some location as sample 9.	220
2017-12-14	21:02:59	-15.08924	-173.73889	1513.2	12.1	235.8	This mound is 10 meters high - more or less.	221
2017-12-14	21:04:06	-15.08926	-173.73901	1518.9	1.6	226.0	Entering an area that looks like miniature ski slopes with a tortured face.	222

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S103 W Mata Logger Comments	Record #
2017-12-14	21:05:01	-15.08936	-173.73904	1515.1	2.3	226.0	Orange stains in the depressions.	223
2017-12-14	21:07:28	-15.08934	-173.73928	1513.3	2.0	279.1	Very smoky water here. Orange microbial mats becoming more abundant and sulfur mats less so.	224
2017-12-14	21:08:01	-15.08934	-173.73928	1509.9	5.4	209.7	Looks like less orange mats in distance.	225
2017-12-14	21:09:43	-15.08958	-173.73922	1516.6	3.0	215.5	Sediments are becoming darker and coarser with fewer microbial mats. More current ripples and a lot of small potholes/collapse pits.	226
2017-12-14	21:10:56	-15.08941	-173.73949	1512.8	1.8	282.0	Sedimented pillows.	227
2017-12-14	21:13:30	-15.08927	-173.73978	1516.5	1.3	267.6	Moving to end of sand lens to confirm contact.	228
2017-12-14	21:15:27	-15.08922	-173.73990	1517.3	0.8	310.3	And we have a talus slope quickly grading into intact shelly pillow tube. Relative age of this pillow is unclear.	229
2017-12-14	21:16:22	-15.08923	-173.73990	1517.3	0.7	309.2	JRod	230
2017-12-14	21:17:21	-15.08922	-173.73990	1517.3	0.7	309.0	Codey	231
2017-12-14	21:19:55	-15.08919	-173.73973	1512.1	5.2	284.6	Crust of fairly large drained pillow tube we found at the sediment/slope contact at waypoint 6. 15x25cm irregular chunk with Some Mn/Fe/S alteration patches.	232
2017-12-14	21:20:47	-15.08921	-173.73981	1516.3	2.5	224.7	**S103-rock-11** Location 15.0892060 173.7399760 depth 1515m.	233
2017-12-14	21:21:55	-15.08931	-173.73983	1516.1	1.9	180.7	Moved back down to sediment lens on terrace and moving on a heading toward waypoint 7.	234
2017-12-14	21:23:41	-15.08946	-173.73976	1513.7	1.2	175.8	Microbes here are a combination of the nurdles in depressions/lee slopes and more fixed mats grown in place on sediment surface.	235
2017-12-14	21:24:14	-15.08948	-173.73977	1513.9	1.4	178.5	Found some large lobate/flattened drained pillow lavas. Some shelly flows that suggest we may be near-vent.	236
2017-12-14	21:25:14	-15.08958	-173.73979	1513.2	2.9	178.7	Bulbous spherical striated pillows. Less sediment accumulation and fewer lobate flows.	237
2017-12-14	21:25:28	-15.08963	-173.73979	1512.4	3.5	180.1	Still lots of microbial scuzz.	238
2017-12-14	21:25:57	-15.08968	-173.73979	1516.4	1.2	178.7	Seeing narrower pillow tubes suddenly. Looking for some slightly narrower ones so we can grab a toe.	239
2017-12-14	21:35:35	-15.08988	-173.73990	1518.8	1.0	125.2	S103-rock-12. 10x10cm pie slice of face-melting vesicular and very phyric with thick glass rind. Minimal secondary coating; looks extremely fresh.	241
2017-12-14	21:37:03	-15.08983	-173.73987	1511.9	9.0	172.8	S103-rock-12 Location 15.0198835 173.7399095 depth 1518m.	242

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S103 W Mata Logger Comments	Record #
2017-12-14	21:37:28	-15.08982	-173.73987	1508.7	11.4	184.4	Off bottom to reposition.	243
2017-12-14	21:39:07	-15.08987	-173.74002	1511.3	4.5	269.9	Moving along the face-melter pillows and seeing a small increase in sediment. Actually. a fairly large increase.	244
2017-12-14	21:39:25	-15.08989	-173.74004	1510.0	3.1	274.1	Just passed waypoint 7. We are moving upslope.	245
2017-12-14	21:41:11	-15.08986	-173.74019	1501.8	2.4	278.7	Lots more sediment on pillows as we continue upslope.	246
2017-12-14	21:41:22	-15.08985	-173.74020	1500.2	3.6	282.9	Still some microbial nurdles.	247
2017-12-14	21:45:05	-15.08981	-173.74064	1481.3	3.4	273.5	Pillow size increasing a little. Steep slope; not seeing many truncated pillows.	248
2017-12-14	21:45:30	-15.08981	-173.74070	1477.9	4.0	276.0	Slope becoming nearly vertical.	249
2017-12-14	21:46:04	-15.08981	-173.74077	1475.8	1.4	275.9	Slope flattened and we have some spatter stop a few flows. Lots of sediment.	250
2017-12-14	21:46:18	-15.08979	-173.74080	1474.9	2.4	276.0	Lots of orange staining; more than downsection.	251
2017-12-14	21:49:31	-15.08980	-173.74086	1474.2	1.0	288.6	Adam	252
2017-12-14	21:52:39	-15.08980	-173.74088	1474.2	1.0	288.7	**S103-rock-13**. Piece of jumbly spatter just short of waypoint 8. Phyric and very glassy. Vesicular and fragile. Location 15.0897957 173.7408626 depth 1474m. 15x25cm.	253
2017-12-14	21:52:59	-15.08980	-173.74089	1474.2	1.0	290.2	Moving on.	254
2017-12-14	21:53:57	-15.08979	-173.74093	1471.2	2.6	265.3	Could be at the contact? Not sure.... Still a lot of the mat here so we are probably still in the new lava.	255
2017-12-14	21:54:12	-15.08980	-173.74095	1470.9	1.7	264.0	Still have the sinkhole pits.	256
2017-12-14	21:54:18	-15.08980	-173.74096	1470.7	1.8	263.6	More undulating slope here.	257
2017-12-14	21:54:31	-15.08980	-173.74098	1471.1	1.3	263.9	More spattery outcrops here.	258
2017-12-14	21:55:01	-15.08981	-173.74100	1471.2	1.5	263.8	Stalked animal on that spatter pile. There are sponges on this outcrop of spatter. So - we are on an older lava flow now.	259
2017-12-14	21:55:43	-15.08982	-173.74104	1469.6	2.1	263.1	Despite the fact that there is a lot of mat and ash - this is definitely older. Seeing more coral ahead. Z=1470 almost at WP8.	260
2017-12-14	21:56:26	-15.08982	-173.74105	1469.9	1.7	270.5	Seeing more stalked biota now.	261
2017-12-14	21:56:52	-15.08978	-173.74106	1469.2	2.4	301.6	Not sure if the last sample was on old or new lava - will have to look for stalked animals in the video.	262

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S103 W Mata Logger Comments	Record #
2017-12-14	21:57:37	-15.08973	-173.74112	1467.0	1.9	310.3	We just passed WP8. We're now going to head across a platform (step) from the south to the north side of the east rift zone.	263
2017-12-14	21:57:48	-15.08972	-173.74113	1466.1	1.8	310.4	Coral and barnacles on that rock.	264
2017-12-14	21:57:57	-15.08972	-173.74114	1465.5	1.7	306.6	Still seeing orange mat here.	265
2017-12-14	21:58:04	-15.08971	-173.74115	1464.6	2.6	304.9	Broken up pile of pillows.	266
2017-12-14	21:58:30	-15.08971	-173.74116	1462.5	4.4	300.7	Seeing stalked corals and sponges on this lava outcrop. This is older.	267
2017-12-14	21:59:06	-15.08970	-173.74117	1459.0	7.2	293.3	Moving up the steep slope between steps - should be the last step before the rift zone axis.	268
2017-12-14	22:00:09	-15.08971	-173.74123	1454.5	3.7	298.0	Cnidaria - lots of soft corals. Lots of lollipop sponges.	269
2017-12-14	22:00:26	-15.08972	-173.74127	1453.4	2.2	296.2	Really jumbled up lavas here. Lots of ash.	270
2017-12-14	22:00:50	-15.08969	-173.74128	1451.8	2.4	304.3	Lots of biota on these lavas. Lollipop sponges everywhere.	271
2017-12-14	22:01:00	-15.08968	-173.74129	1451.1	0.0	304.0	Polynoid.	272
2017-12-14	22:01:19	-15.08967	-173.74132	1450.2	1.8	309.4	We are moving over the sandy bottom.	273
2017-12-14	22:02:13	-15.08962	-173.74137	1449.6	2.1	309.9	Bamboo coral - Anthomastus are the cnidaria red ball corals we have been seeing.	274
2017-12-14	22:02:28	-15.08960	-173.74137	1450.5	3.5	294.5	Broken up pillows here and there.	275
2017-12-14	22:02:50	-15.08956	-173.74138	1451.5	4.1	290.2	Seeing lots of the soft corals.	276
2017-12-14	22:03:26	-15.08951	-173.74142	1451.9	3.2	291.2	Sponges everywhere. Brisingids; hydroids.	277
2017-12-14	22:03:40	-15.08949	-173.74144	1452.0	3.5	289.5	Moving over large pillows - lobe-like.	278
2017-12-14	22:04:05	-15.08945	-173.74147	1453.1	2.2	279.7	Large pillow lava lobes flowing down the slope.	279
2017-12-14	22:04:21	-15.08944	-173.74149	1453.9	1.4	271.9	Older - but not too much older says Ken - pillow lavas.	280
2017-12-14	22:04:45	-15.08942	-173.74152	1455.1	2.1	277.5	Extensive amount of volcanic sands here - on everything up here.	281
2017-12-14	22:05:01	-15.08940	-173.74154	1456.0	1.9	277.2	Seeing some organisms. Soft and stalked corals.	282
2017-12-14	22:05:35	-15.08938	-173.74157	1455.6	2.5	272.2	We're pretty much in the middle of the rift zone now. Z=1455.	283
2017-12-14	22:05:49	-15.08936	-173.74159	1456.2	1.9	269.8	Anthomastus on large pillows.	284
2017-12-14	22:06:16	-15.08934	-173.74160	1456.1	2.3	281.2	We're facing the east here as we traverse along this step on the rift zone.	285
2017-12-14	22:06:27	-15.08933	-173.74159	1456.5	2.2	288.2	Slabby lava here.	286
2017-12-14	22:06:43	-15.08932	-173.74158	1456.8	2.1	311.9	Brisingids.	287

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S103 W Mata Logger Comments	Record #
2017-12-14	22:06:59	-15.08929	-173.74158	1456.0	3.2	311.5	Ken is thinking of taking a sample.	288
2017-12-14	22:07:16	-15.08925	-173.74158	1456.5	3.6	279.2	There is a lot of volcanic sand here.	289
2017-12-14	22:07:24	-15.08924	-173.74159	1457.0	2.7	277.2	Z=1456 m now.	290
2017-12-14	22:07:50	-15.08922	-173.74162	1457.2	1.7	257.2	Moving around the upper north edge of the east rift zone.	291
2017-12-14	22:08:19	-15.08921	-173.74165	1456.6	2.4	265.3	Lollipop sponges and corals on the rocks here.	292
2017-12-14	22:08:55	-15.08919	-173.74171	1457.0	3.1	246.4	Large pillows here. Older and a bit weathered.	293
2017-12-14	22:09:07	-15.08918	-173.74172	1456.8	0.0	243.7	Bamboo coral on the large pillow lobe in the background.	294
2017-12-14	22:09:39	-15.08919	-173.74173	1457.6	0.0	234.3	We're looking up the rift zone - to the west.	295
2017-12-14	22:10:01	-15.08919	-173.74172	1457.5	1.6	233.7	Crinoids on the rocks here with 2 sets of stalks.	296
2017-12-14	22:12:03	-15.08918	-173.74172	1457.5	2.1	234.0	Going to scoop this sediment at the top of the rift zone next. We want to skim it across the top. - Ken wants to try to tell if the new flow sands were spit up into the water this high.	297
2017-12-14	22:13:49	-15.08919	-173.74172	1457.5	1.9	234.0	**S103-sed-14**. Scoop bag 1. Surficial sediments here near the axis of the east rift zone (just to the north of it). Want to determine what eruption the seds on the surface come from.	298
2017-12-14	22:16:23	-15.08918	-173.74170	1457.5	1.9	234.0	Lighter brown surficial seds with black patches. Z=1458m. Blacker seds under the lighter surface. 15.089246 173.741753. Sampling just the upper surface.	299
2017-12-14	22:22:33	-15.08905	-173.74183	1470.6	3.2	306.6	Traveling back along-slope. Close to waypoint 9.	300
2017-12-14	22:23:58	-15.08890	-173.74186	1477.2	1.8	309.9	Nodular branching corals.	301
2017-12-14	22:24:05	-15.08889	-173.74187	1477.3	2.1	309.3	Anemones and brisingids.	302
2017-12-14	22:25:31	-15.08878	-173.74192	1478.7	0.0	261.6	Lavas look pretty frothy.	303
2017-12-14	22:27:28	-15.08886	-173.74212	1480.5	5.2	252.1	Slope we're following has gotten steeper; nearly vertical and has a lot of broken pillows.	304
2017-12-14	22:29:58	-15.08876	-173.74214	1495.8	9.0	163.5	Descending along a pretty much vertical slope. This is probably part of the crack/fault showing up in the AUV data.	305
2017-12-14	22:32:46	-15.08876	-173.74213	1495.8	7.2	137.8	Waiting for the ship to catch up. Making some lateral moves to keep the scenery interesting while waiting.	306
2017-12-14	22:35:56	-15.08868	-173.74214	1504.1	4.8	134.7	Looking at slope with sediment and some draping fragmental-looking deposits.	307

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S103 W Mata Logger Comments	Record #
2017-12-14	22:36:16	-15.08869	-173.74214	1505.9	3.3	135.5	Fairly thick sediment.	308
2017-12-14	22:36:41	-15.08866	-173.74216	1506.8	4.2	155.8	Sediment and talus contact.	309
2017-12-14	22:39:00	-15.08844	-173.74220	1519.5	4.8	162.2	Talus sorting getting very poor. Almost all size fractions represented.	310
2017-12-14	22:40:52	-15.08845	-173.74238	1525.7	3.2	297.5	Heading downslope; still seeing a lot of talus fragments and what appears to be pretty thick sediment blanket.	311
2017-12-14	22:41:00	-15.08844	-173.74239	1527.9	1.7	324.8	High sediment load in the water column.	312
2017-12-14	22:42:56	-15.08820	-173.74249	1543.8	3.6	334.6	Back downslope and traveling across a flatter area littered with debris.	313
2017-12-14	22:44:30	-15.08802	-173.74251	1557.4	2.5	331.1	Bit of an overhang and sudden dropoff. Short shelf of broken pillows and sediments. Lava contact or possibly a faulted area?	314
2017-12-14	22:45:56	-15.08791	-173.74264	1563.4	3.2	283.0	Almost to waypoint 10 and crossing a talus slope again. Approaching a stack of in-place flows with truncated/broken faces.	315
2017-12-14	22:46:28	-15.08786	-173.74267	1565.2	6.2	258.2	Brittle star and brisingid.	316
2017-12-14	22:49:19	-15.08777	-173.74285	1563.6	5.4	267.8	All talus. relatively well-sorted.	317
2017-12-14	22:49:35	-15.08778	-173.74287	1561.3	5.6	259.9	Moving upslope. About 10m past waypoint 10.	318
2017-12-14	22:50:36	-15.08781	-173.74297	1551.7	6.9	261.1	All talus. all the time.	319
2017-12-14	22:51:06	-15.08781	-173.74301	1552.4	2.6	264.9	Ken Rubin IS Oceanography!	320
2017-12-14	22:51:35	-15.08779	-173.74305	1552.4	3.1	265.0	Some seds now.	321
2017-12-14	22:52:23	-15.08775	-173.74311	1552.9	2.5	266.3	A steep slope covered with angular rock fragments. seds. and larger pillow debris.	322
2017-12-14	22:52:42	-15.08775	-173.74313	1552.5	2.6	266.1	Freshly cracked pillows.	323
2017-12-14	22:52:57	-15.08774	-173.74314	1552.2	1.9	266.1	Volcanic sands.	324
2017-12-14	22:54:06	-15.08769	-173.74320	1551.8	2.6	260.6	Halfway between waypoints 10 and 11.	325
2017-12-14	22:54:25	-15.08768	-173.74322	1551.6	2.5	245.6	Very large angular pillow fragments.	326
2017-12-14	22:54:58	-15.08768	-173.74327	1551.6	2.1	228.6	Angular pillow lava rubble on steep slope.	327
2017-12-14	22:55:12	-15.08768	-173.74330	1551.7	2.2	226.3	Coarse sands mixed in.	328
2017-12-14	22:56:49	-15.08769	-173.74343	1552.3	0.0	190.5	Starting to see some more in-place flows.	329
2017-12-14	22:58:38	-15.08771	-173.74351	1551.3	7.6	190.6	Combination of intact and broken pillows in in-place flows. Lots of sediment and talus still.	330
2017-12-14	23:00:26	-15.08773	-173.74359	1549.8	6.0	194.0	Made the turn at waypoint 11 and will start moving uphill.	331
2017-12-14	23:01:35	-15.08780	-173.74364	1548.0	2.7	190.7	Seeing some orange microbial stuff.	332

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S103 W Mata Logger Comments	Record #
2017-12-14	23:02:00	-15.08780	-173.74362	1547.4	2.8	188.3	Shrimp photobomb	333
2017-12-14	23:03:19	-15.08785	-173.74362	1543.9	2.3	188.6	Moving up the talus pile on this slope. Riveting.	334
2017-12-14	23:05:42	-15.08791	-173.74365	1538.6	2.4	188.7	Back into a mixture of talus/seds and in-place lava flows with a fair amount of orange and white staining.	335
2017-12-14	23:09:38	-15.08793	-173.74364	1527.8	7.5	188.6	Lots of fractured pillows.	336
2017-12-14	23:18:05	-15.08803	-173.74371	1523.9	11.2	158.7	Shopping around for a rock sample.	337
2017-12-14	23:31:41	-15.08807	-173.74375	1503.6	0.0	207.9	We're just sort of bobbing around here right now. We're looking for a place to sample a rock.	338
2017-12-14	23:32:48	-15.08808	-173.74373	1499.9	23.6	208.5	We're on a steep front face of a scarp here. Looking at a wall of pillows - many of them decapitated.	339
2017-12-14	23:33:18	-15.08804	-173.74366	1501.5	0.0	208.5	Peter	340
2017-12-14	23:34:52	-15.08812	-173.74369	1502.6	0.0	208.2	Still looking for that easy to sample shelly pillow.	341
2017-12-14	23:35:39	-15.08807	-173.74359	1502.1	0.0	163.9	Huge vesicles in the partially drained out pillow in front of us.	342
2017-12-14	23:36:12	-15.08811	-173.74365	1502.7	3.9	152.3	Beautiful banding (alteration) on these pillows.	343
2017-12-14	23:36:52	-15.08807	-173.74364	1502.9	3.1	150.3	This is a precarious sampling site.	344
2017-12-14	23:39:40	-15.08809	-173.74369	1502.9	3.2	149.8	**S103-rock15**. Pillow lava piece from steep slope - pillow pile. Nice glass surface. 30x15x10 cm. Some staining and large vesicles. Lots of crystals.	345
2017-12-14	23:41:41	-15.08810	-173.74362	1498.1	15.3	185.7	Spongey pillow interior. Z=1503m. 15.0881409 173.7436866 . 40 m SW of WP 11.	346
2017-12-14	23:42:29	-15.08814	-173.74375	1492.3	0.0	185.7	Moving up this pillow slope.	347
2017-12-14	23:43:26	-15.08826	-173.74369	1487.6	4.9	205.3	We're at the top of the cliff face and the slope is smoothing out a bit. N Not as much broken off pillows here.	348
2017-12-14	23:43:45	-15.08822	-173.74369	1486.0	4.7	204.6	Whoops. The slope increased again and so have the decapitated pillows.	349
2017-12-14	23:44:21	-15.08832	-173.74381	1482.4	5.8	204.5	Some yellow/orange staining on these pillows now.	350
2017-12-14	23:44:35	-15.08830	-173.74383	1481.0	6.3	210.9	Trap door in pillow.	351
2017-12-14	23:45:06	-15.08826	-173.74377	1477.9	10.3	211.4	Pillow tubes streaming down this slope now. Very orderly compared to what we saw earlier.	352
2017-12-14	23:45:31	-15.08833	-173.74383	1476.5	0.0	226.9	Some larger pillow tubes here.	353
2017-12-14	23:45:54	-15.08841	-173.74393	1474.7	3.9	228.8	We're at 1375 m now.	354
2017-12-14	23:46:06	-15.08835	-173.74384	1473.9	4.3	228.6	Correction - we're at 1475 m now.	355

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S103 W Mata Logger Comments	Record #
2017-12-14	23:47:33	-15.08847	-173.74388	1471.7	4.5	257.9	More pillow tubes - these are fatter - scattered pillows here and there.	356
2017-12-14	23:48:11	-15.08851	-173.74383	1472.0	5.2	258.4	We're not seeing any corals or sponges on this lava. It's still too young - erupted sometime between 2012 and 2016.	357
2017-12-14	23:48:30	-15.08851	-173.74376	1472.1	4.2	258.0	These pillows are much more spherical in the middle here.	358
2017-12-14	23:48:53	-15.08861	-173.74402	1471.0	4.9	236.1	Disgorged pillows.	359
2017-12-14	23:49:06	-15.08864	-173.74393	1470.3	4.5	211.3	Nice glassy crust on these pillows.	360
2017-12-14	23:49:15	-15.08861	-173.74389	1470.1	0.0	210.6	Seeing some pillow tubes now.	361
2017-12-14	23:49:33	-15.08855	-173.74382	1469.8	5.5	210.7	We're coming up to a steeper slope now.	362
2017-12-14	23:49:59	-15.08868	-173.74386	1469.4	0.0	210.2	Lots of pillow fragments just to the east of the pillow ridge.	363
2017-12-14	23:50:25	-15.08876	-173.74382	1467.6	5.8	209.7	Pillow talus - broken up pillows of all sizes.	364
2017-12-14	23:51:41	-15.08880	-173.74394	1462.4	6.0	217.5	Broken pieces of pillow that have fallen from upslope - littering the steep seafloor here.	365
2017-12-14	23:53:18	-15.08883	-173.74386	1457.7	7.8	235.8	We're coming another cliff face of the flow front of these pillow lavas. Decapitated pillows - almost all of them here.	366
2017-12-14	23:54:10	-15.08892	-173.74395	1455.1	9.7	243.6	Hollow decapitated pillow - with spongy center.	367
2017-12-14	23:55:04	-15.08882	-173.74381	1453.2	5.5	243.1	We're approaching the top of this cliff and approaching the step terrace here.	368
2017-12-14	23:55:29	-15.08887	-173.74385	1451.4	0.0	243.1	Disgorged pillow.	369
2017-12-14	23:56:32	-15.08888	-173.74397	1449.9	2.2	243.6	Ready to sample now - at the step (terrace) level of this section of the slope.	370
2017-12-15	00:00:52	-15.08891	-173.74399	1450.2	1.5	244.9	**S103-rock-16**. Drained out pillow. Rind with thick glass rind on 3 sides ~1 cm. . Spongy grayish center. Crystals and vesicles. 15 cm on long axis 10 on short axis.	371
2017-12-15	00:01:51	-15.08892	-173.74401	1447.9	2.5	243.1	Went into the marker box. Z=1450 m. Just passed WP12. 15.0889092 173.7439437.	372
2017-12-15	00:02:14	-15.08890	-173.74389	1447.1	2.5	242.9	Small crinoid on this lava flow that is only a few years old.	373
2017-12-15	00:03:03	-15.08901	-173.74409	1445.0	2.6	243.1	We're now heading to the W/SW. Flatter terrain here.	374
2017-12-15	00:03:51	-15.08898	-173.74408	1443.3	3.7	242.9	Large pillow lobes in front of us.	375
2017-12-15	00:04:01	-15.08896	-173.74400	1442.7	3.4	243.1	Crinoid again.	376

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S103 W Mata Logger Comments	Record #
2017-12-15	00:04:25	-15.08905	-173.74423	1442.2	2.1	243.2	Large lobes.	377
2017-12-15	00:04:45	-15.08904	-173.74415	1440.7	2.8	243.3	Pillow tubes (lobes) moving down slope.	378
2017-12-15	00:05:06	-15.08909	-173.74433	1439.4	2.7	242.6	Still seeing orange staining in the cracks of some of these pillows.	379
2017-12-15	00:05:54	-15.08917	-173.74437	1437.6	2.3	242.8	Sediment on the lavas is lighter in color - Bill says there's more and more ash as we go up slope.	380
2017-12-15	00:07:03	-15.08919	-173.74449	1436.2	2.3	243.3	The ship is having to change its direction after we changed ours.....	381
2017-12-15	00:09:29	-15.08923	-173.74458	1435.1	0.0	243.8	Here's the big rift that we were just noticing on the bathymetry. It looks like we may have come across it.	382
2017-12-15	00:10:52	-15.08925	-173.74474	1435.2	3.8	243.5	Either it's a fissure or some area of drain out.	384
2017-12-15	00:11:05	-15.08915	-173.74451	1435.2	3.4	243.8	We're seeing some bathtub rings.	385
2017-12-15	00:11:48	-15.08926	-173.74460	1434.2	4.0	246.0	This extends for a while on top of this pillow ridge.	386
2017-12-15	00:12:24	-15.08927	-173.74475	1434.8	2.2	246.2	Now the lavas look pretty jumbled up here.	387
2017-12-15	00:12:42	-15.08929	-173.74483	1435.4	1.8	245.8	Bill thinks he may see some shimmer around here.	388
2017-12-15	00:13:18	-15.08926	-173.74479	1435.0	2.8	246.3	Lots of yellow seds on the big lava lobe here.	389
2017-12-15	00:13:44	-15.08922	-173.74480	1435.3	2.9	245.8	More of that big crack here. It seems to have jumped over a bit.	390
2017-12-15	00:14:09	-15.08928	-173.74484	1434.9	3.1	246.8	Lots of sediments here. More cracking here.	391
2017-12-15	00:14:21	-15.08930	-173.74476	1436.0	2.4	246.9	Big broken up pillow.	392
2017-12-15	00:15:24	-15.08923	-173.74495	1438.4	1.8	246.3	We're now to the north of the fissure feature. These pillows lobes are sort of broken up.	393
2017-12-15	00:16:09	-15.08926	-173.74501	1438.3	1.9	245.7	Looks like we are approaching the top of one of these cliff faces. We're at WP 12.	394
2017-12-15	00:16:37	-15.08928	-173.74505	1437.7	3.2	185.2	We are turning to the south now. Looks much flatter on the map.	395
2017-12-15	00:17:06	-15.08930	-173.74505	1436.0	4.4	185.2	Big pillows - that one looks like a double.	396
2017-12-15	00:17:23	-15.08932	-173.74505	1434.5	4.8	185.7	Continuing up the steep slope here.	397
2017-12-15	00:18:05	-15.08935	-173.74504	1430.5	7.3	185.2	Long pillow tubes flowing down this steep slope - which barely shows up in the bathymetry.	398
2017-12-15	00:18:35	-15.08939	-173.74502	1427.4	8.3	185.6	Spongy-looking interior in broken pillow.	399
2017-12-15	00:18:44	-15.08937	-173.74501	1426.9	7.2	185.6	Continuing up slope.	400
2017-12-15	00:19:02	-15.08938	-173.74502	1425.8	10.7	185.5	The end of that pillow tube looks quite ropey/	401
2017-12-15	00:19:09	-15.08938	-173.74501	1425.4	0.0	185.4	Little baby rattail.	402

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S103 W Mata Logger Comments	Record #
2017-12-15	00:20:36	-15.08947	-173.74505	1419.3	4.1	178.5	Lots of sediments on these lavas - as the slope gentles out.	403
2017-12-15	00:21:11	-15.08950	-173.74507	1416.9	5.1	178.2	Disgorged pillow. Crinoid.	404
2017-12-15	00:22:35	-15.08961	-173.74509	1416.1	2.5	178.0	Now we're on a gentle slope with more sedimentation. Some yellow bacterial mat here and there.	405
2017-12-15	00:23:33	-15.08969	-173.74511	1415.3	3.3	177.9	Large pillow lobes (plobates) up here - interspersed with spherical pillows.	406
2017-12-15	00:23:51	-15.08971	-173.74512	1415.3	3.4	177.5	Some white and yellow staining in the cracks of these pillows.	407
2017-12-15	00:24:26	-15.08974	-173.74514	1416.2	2.8	177.6	Mineral staining in the cracks of these pillows.	408
2017-12-15	00:24:43	-15.08974	-173.74515	1416.2	3.0	177.2	Large inflated pillow - pillow lobe ahead.	409
2017-12-15	00:25:50	-15.08979	-173.74518	1416.7	3.7	178.0	Huge pillow that cracked and oozed out a pillow tube beneath it.	410
2017-12-15	00:27:52	-15.08986	-173.74516	1419.4	0.5	174.9	Going to try to grab a pillow rind. Take me take me I'm just hanging out.	411
2017-12-15	00:28:08	-15.08986	-173.74516	1419.4	0.5	174.9	Tiny little shrimp.	412
2017-12-15	00:30:24	-15.08986	-173.74515	1419.4	0.5	174.3	**S103-rock-17**. Piece of rind and come interior - pie wedge. Yellow staining. Lots of crystals. gray interior. Glassy dark part 1 cm thick. 15x20 cm. Some large vesicles.	413
2017-12-15	00:32:05	-15.08985	-173.74515	1419.3	0.8	177.1	Going into biobox 4. Z=1420 m. 15.0898648 173.7451580. From large broken pillow.	414
2017-12-15	00:32:32	-15.08988	-173.74515	1416.2	4.2	177.4	The slope is getting steeper now.	415
2017-12-15	00:33:48	-15.08995	-173.74514	1414.4	6.1	173.2	We're seeing broken up decapitated pillow tubes on this steep slope.	416
2017-12-15	00:35:17	-15.09003	-173.74516	1409.4	1.9	164.5	Debris strewn here and there on this volcaniclastic sand slope.	417
2017-12-15	00:36:20	-15.09011	-173.74516	1404.8	3.0	163.5	Broken up lavas - talus slope. Broken pillow pieces. Various sized.	418
2017-12-15	00:37:32	-15.09023	-173.74519	1400.3	3.4	163.4	The summit or W Mata is < 1200 m. We're downslope to the NE of the summit in 1200 m water depth.	419
2017-12-15	00:38:38	-15.09030	-173.74524	1396.4	3.8	163.2	Sulfur? No probably microbial mats.	420
2017-12-15	00:39:12	-15.09033	-173.74526	1394.1	3.8	163.9	Moving up a steep slope again. Talus.	421
2017-12-15	00:39:26	-15.09034	-173.74527	1393.1	3.8	163.5	Sort of jumbly.	422
2017-12-15	00:40:16	-15.09036	-173.74527	1389.3	5.7	163.4	Seeing nice black lava lobe to our right (west).	423

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S103 W Mata Logger Comments	Record #
2017-12-15	00:40:43	-15.09037	-173.74526	1387.0	8.6	180.5	Broken off pillows see here in cross section.	424
2017-12-15	00:42:08	-15.09043	-173.74531	1379.5	0.0	180.4	Going up slope long pillow tubes and some broken up pillows; Quite a lot of decapitated pillows.	425
2017-12-15	00:43:50	-15.09045	-173.74530	1368.5	27.8	180.1	Decapitated pillows are going away now.	426
2017-12-15	00:44:27	-15.09046	-173.74528	1364.6	30.0	180.3	The slope is gentling here a bit. Pillow tubes flowing down slope. Spherical pillows interspersed here and there.	427
2017-12-15	00:44:40	-15.09048	-173.74527	1363.6	0.0	181.0	Disgorged lava tubes.	428
2017-12-15	00:45:59	-15.09058	-173.74525	1357.6	4.6	180.8	Seds are thicker here - seeing the orangish mat here and there.	429
2017-12-15	00:46:21	-15.09060	-173.74524	1355.6	0.0	181.1	More thick ash here.	430
2017-12-15	00:47:32	-15.09072	-173.74524	1350.4	3.2	139.8	Pillow pieces sticking straight up.	431
2017-12-15	00:48:07	-15.09077	-173.74526	1349.1	2.8	187.7	Now we're in an area of pillow lobes and large pillows.	432
2017-12-15	00:48:20	-15.09078	-173.74527	1349.2	2.4	188.1	It has flattened out here.	433
2017-12-15	00:49:01	-15.09080	-173.74528	1351.0	1.6	187.7	Big fat pillow lobes with lots of sed cover.	434
2017-12-15	00:49:44	-15.09081	-173.74529	1350.6	1.8	187.6	Swimming polychaete.	435
2017-12-15	00:50:19	-15.09084	-173.74531	1349.5	2.1	187.7	Those are some monstrous pillows. Huge tubes that are more like pillow lobes.	436
2017-12-15	00:52:44	-15.09094	-173.74534	1348.9	1.2	162.0	These features really match up with the AUV Sentry map.	437
2017-12-15	00:53:20	-15.09094	-173.74534	1349.2	0.9	163.5	Going in for a sample of this broken pillow in front of us. Zooming in on the hydroids.	438
2017-12-15	00:55:46	-15.09094	-173.74534	1349.4	0.8	164.9	**S103-rock-18**. Going for the corner of the pillow rind. Pie shaped. Thick class. Vesicles - 1cm thick crust. Gray center. 10 cm on narrower and 15 on longer side.	439
2017-12-15	00:56:46	-15.09094	-173.74534	1349.3	1.1	164.0	Going into biobox 3. Z=1350. 15.0909443 173.7453364.	440
2017-12-15	00:57:55	-15.09095	-173.74535	1348.5	1.9	161.6	Shrimp in front of us. With a parasite.	441
2017-12-15	00:58:30	-15.09098	-173.74535	1348.7	1.6	161.7	Undulating large puffy pillow lobes here.	442
2017-12-15	00:59:07	-15.09098	-173.74534	1349.1	0.9	161.3	Scoop bag of these thick seds on top of a pillow lobe.	443
2017-12-15	01:00:01	-15.09099	-173.74535	1349.1	1.0	161.3	Opaepele shrimp. Pteropod shells.	444
2017-12-15	01:00:54	-15.09100	-173.74535	1349.1	1.0	161.4	We're still on the north side of the volcano on the youngish lava flow (2012-2016).	445

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S103 W Mata Logger Comments	Record #
2017-12-15	01:03:43	-15.09101	-173.74536	1349.2	0.9	161.5	**S103-sed-19**. Scoop bag 2. In area of lobate lavas with thick seds on the top. Sed color is lighter on top with black fresh volcaniclastic black seds underneath.	446
2017-12-15	01:07:22	-15.09101	-173.74537	1349.2	1.0	161.4	The lighter seds on top also include hydrothermal mat on the top. Z=1350. 15.0910086 173.7453586. Storing it in the marker box.	447
2017-12-15	01:09:28	-15.09103	-173.74534	1348.2	1.2	162.0	We're taking off again. We're at the site of an eruption that happened between 2012 and 2016. Large pillow lavas.	448
2017-12-15	01:10:17	-15.09104	-173.74534	1348.4	0.7	161.7	Brachyuran crab and 2 deep sea shrimp at the same time!	449
2017-12-15	01:10:39	-15.09105	-173.74533	1348.6	0.7	161.6	Synchronized swimming going on here.	450
2017-12-15	01:12:26	-15.09113	-173.74531	1348.0	1.6	161.9	Moving up this slope of giant pillow lavas covered in ash - not totally covered but mostly.	451
2017-12-15	01:13:38	-15.09122	-173.74532	1346.8	3.1	161.3	Going up a pillow slope now. Pillow tubes are big.	452
2017-12-15	01:14:25	-15.09126	-173.74532	1344.4	2.9	160.8	This must be a kipuka. This surface is older.	453
2017-12-15	01:15:21	-15.09131	-173.74529	1342.3	2.8	161.7	We haven't seen any sponges on the flow before this.	454
2017-12-15	01:15:42	-15.09134	-173.74529	1341.2	1.8	161.0	We are still seeing some sponges here and there.	455
2017-12-15	01:15:47	-15.09135	-173.74529	1340.9	2.0	162.0	Little drain out here.	456
2017-12-15	01:15:54	-15.09136	-173.74529	1340.6	2.0	162.0	Polynoid.	457
2017-12-15	01:17:02	-15.09138	-173.74522	1338.9	4.0	161.4	Spatter with stalactites.	460
2017-12-15	01:17:34	-15.09138	-173.74521	1337.6	3.5	161.4	Soft corals - Red anthomastus.	461
2017-12-15	01:18:32	-15.09144	-173.74525	1336.8	1.7	170.8	All these pillows have sponges on them.	462
2017-12-15	01:19:18	-15.09149	-173.74527	1334.7	1.9	171.2	So - that high point just at the southern edge of this lave flow outline is old.	463
2017-12-15	01:19:37	-15.09150	-173.74527	1334.0	1.9	170.9	Amazing sediment there with a recent slide...	464
2017-12-15	01:19:59	-15.09152	-173.74526	1332.9	2.5	170.8	Orangish microbial mat on top of these sediments.	465
2017-12-15	01:20:13	-15.09153	-173.74527	1332.0	2.3	171.2	Sponges on this slope.	466
2017-12-15	01:20:17	-15.09153	-173.74527	1331.7	2.6	171.4	Polynoid.	467
2017-12-15	01:20:28	-15.09155	-173.74528	1330.8	2.9	170.9	Thick sediments here.	468
2017-12-15	01:21:03	-15.09158	-173.74529	1328.1	3.0	170.6	Blown out pillow.	469
2017-12-15	01:21:29	-15.09162	-173.74530	1326.9	1.4	171.2	We're out of the 2012-2016 flow.	470
2017-12-15	01:21:50	-15.09164	-173.74531	1326.2	1.0	171.4	This area has lots of ash covering the pillows in the low flat areas.	471

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S103 W Mata Logger Comments	Record #
2017-12-15	01:22:30	-15.09168	-173.74531	1324.1	2.8	175.5	Polynoids here.	472
2017-12-15	01:22:56	-15.09171	-173.74531	1321.9	3.3	175.7	I think we're into young flow again. Don't see the sponges; etc.	473
2017-12-15	01:23:33	-15.09172	-173.74533	1320.9	3.0	175.5	This is the new flow and that raised area was a kipuka of older lava popping above the 2012-2016 lava.	474
2017-12-15	01:23:47	-15.09173	-173.74532	1321.0	1.8	175.8	Going in for a grab of this pillow from the new flow.	475
2017-12-15	01:24:02	-15.09174	-173.74533	1320.8	1.4	175.7	Scale worm coming in for a landing on our sample site.	476
2017-12-15	01:24:10	-15.09174	-173.74533	1320.8	1.4	175.7	White worm.	477
2017-12-15	01:24:38	-15.09175	-173.74533	1320.9	1.1	175.3	Sitting here at the base of a disgorged pillow. Going to grab a sample.	478
2017-12-15	01:28:00	-15.09175	-173.74533	1320.9	0.0	174.8	**S103-rock-20**. Delicate surface texture on this 2012-2016 lava. 20 long 5 to 10 cm wide. Large vesicles. Glassy rind. No visible crystals.	479
2017-12-15	01:29:48	-15.09181	-173.74532	1317.4	1.4	176.1	Z=1321. 15.0917580 173.7453297 into partition 10.	480
2017-12-15	01:30:23	-15.09185	-173.74530	1316.2	1.7	175.4	Ctenophores.	481
2017-12-15	01:31:00	-15.09190	-173.74528	1315.1	1.8	175.8	Polychaete; crab (paralomith?)	482
2017-12-15	01:31:19	-15.09193	-173.74527	1314.9	1.9	175.8	The ambient is up to 3.1C.	483
2017-12-15	01:31:42	-15.09195	-173.74525	1314.3	2.8	176.0	Seeing sponges on the lava in the front..	484
2017-12-15	01:31:52	-15.09197	-173.74524	1313.7	3.1	180.7	Lots of yellow globby mat here.	485
2017-12-15	01:32:16	-15.09202	-173.74521	1313.7	2.8	180.1	That was a small outcrop of old lava.	486
2017-12-15	01:32:31	-15.09202	-173.74521	1314.0	2.4	179.2	Now we're back on the new lava.	487
2017-12-15	01:32:50	-15.09202	-173.74520	1313.7	2.6	180.2	Back in the new lava.	488
2017-12-15	01:33:00	-15.09202	-173.74520	1313.0	3.1	179.0	Sponges on these lavas now.	489
2017-12-15	01:33:18	-15.09202	-173.74520	1312.0	3.9	151.5	Probably older.	490
2017-12-15	01:33:49	-15.09202	-173.74520	1309.8	5.9	144.8	Lots of yellow staining on the broken pillows here.	491
2017-12-15	01:34:16	-15.09203	-173.74522	1306.8	8.4	150.4	Definitely older rock here now. More sponges here and there.	492
2017-12-15	01:34:42	-15.09204	-173.74523	1302.9	11.5	150.7	Anemones.	493
2017-12-15	01:34:54	-15.09204	-173.74523	1301.1	13.8	151.3	Moving up a fairly steep slope.	494
2017-12-15	01:35:19	-15.09207	-173.74526	1298.9	10.6	152.4	We're approaching the top of this ridge now. Lots of lollipop sponges on these lavas.	495
2017-12-15	01:36:57	-15.09207	-173.74521	1296.9	13.8	121.7	We're like 20 or 30 m south of where the nav is plotting us.	496

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S103 W Mata Logger Comments	Record #
2017-12-15	01:37:24	-15.09202	-173.74513	1300.8	10.9	143.6	We're driving to the east to determine whether the features we see on the AUV map are kipukas.	497
2017-12-15	01:38:32	-15.09209	-173.74504	1304.7	2.3	173.5	This looks like the edge of the older lava here. We're on new lava now. There's those little pits here.	498
2017-12-15	01:39:22	-15.09211	-173.74504	1305.7	0.8	173.8	We're seeing increased microbial mat here as well. Lots of black in the ripples here. Thick volcaniclastic seds.	499
2017-12-15	01:40:59	-15.09211	-173.74505	1305.6	0.9	174.2	**S103-sed-21.** New lava flow area (2012-2016) with thick seds that is light and black rippled with some yellow bacterial mat as well.	500
2017-12-15	01:43:08	-15.09211	-173.74505	1305.8	0.7	173.1	We're at WP 16 (the nav is showing us 30-40m to the NE) Navigator fix: Z=1306 15.0921244 173.7450505.	501
2017-12-15	01:44:04	-15.09210	-173.74504	1305.8	0.7	173.1	We're at WP 16 (the nav is showing us 30-40m to the NE) Bill says we are at WP14 - which would agree with the Sentry map and depths. Into core 4.	502
2017-12-15	01:44:37	-15.09210	-173.74504	1304.2	2.6	188.0	We're on the axis of the rift zone now. Will cross over to the south side now.	503
2017-12-15	01:45:28	-15.09211	-173.74506	1301.5	5.7	229.9	We will go up and over these older lava kipukas that are visible in the AUV data.	504
2017-12-15	01:46:55	-15.09211	-173.74513	1298.9	3.6	241.6	We've turned around and there is the kipuka again.	505
2017-12-15	01:47:06	-15.09213	-173.74515	1298.4	3.3	241.6	A couple meter wide fissure there in this older lava here.	506
2017-12-15	01:47:22	-15.09214	-173.74516	1298.6	2.6	241.9	It's apparent in the AUV data.	507
2017-12-15	01:48:09	-15.09216	-173.74521	1297.8	2.3	241.8	We will have to look into whether or not the map was moved incorrectly as well. Not sure if the ROV is in the wrong place now - or if it was the shift in the Sentry data.	508
2017-12-15	01:48:22	-15.09217	-173.74523	1297.2	2.4	241.9	Still continuing through the fissure.	509
2017-12-15	01:48:29	-15.09218	-173.74524	1296.9	2.3	241.8	Sort of a spatterish texture.	510
2017-12-15	01:48:40	-15.09219	-173.74525	1296.4	2.2	241.7	Big pillow with sponges all over it.	511
2017-12-15	01:48:51	-15.09220	-173.74526	1295.9	2.3	241.5	Pile of broken pillows in here.	512
2017-12-15	01:49:52	-15.09225	-173.74537	1290.8	7.6	189.0	The west shift in the AUV data may not be necessary - CHECK THIS IN THE OFFICE SM.	513
2017-12-15	01:50:23	-15.09232	-173.74539	1298.1	6.8	146.3	Moving along and dropping over this steep ridge.	514
2017-12-15	01:50:34	-15.09233	-173.74539	1301.2	3.9	147.0	Is this our new lava at the base of this slope.	515
2017-12-15	01:50:47	-15.09234	-173.74539	1301.6	3.6	159.4	Lots of hydrothermal staining down here.	516

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S103 W Mata Logger Comments	Record #
2017-12-15	01:51:30	-15.09239	-173.74540	1300.8	4.2	227.5	The pillows down here are younger. These young lavas come to the edge of the kipuka.	517
2017-12-15	01:51:52	-15.09241	-173.74542	1300.2	3.7	256.3	This yellow mat is in lots of the cracks in these pillows.	518
2017-12-15	01:52:02	-15.09242	-173.74543	1299.9	4.0	257.2	More white bacterial mat here now.	519
2017-12-15	01:53:29	-15.09246	-173.74563	1298.0	2.4	266.0	We're facing west but driving to the south.	520
2017-12-15	01:53:44	-15.09247	-173.74567	1297.0	2.1	267.2	Big round bulbous pillows here.	521
2017-12-15	01:53:56	-15.09247	-173.74569	1296.4	1.9	268.7	Almost lobate-looking again.	522
2017-12-15	01:54:31	-15.09247	-173.74576	1294.1	2.3	268.4	Polychaete.	523
2017-12-15	01:54:49	-15.09248	-173.74579	1293.4	1.6	268.4	Broken up pillows.	524
2017-12-15	01:55:22	-15.09250	-173.74581	1292.9	2.2	269.3	More than 6 shrimp hanging out up here.	525
2017-12-15	01:56:02	-15.09251	-173.74588	1293.1	1.9	268.5	Lots of mat here - alternate light and black colored.	526
2017-12-15	01:56:03	-15.09252	-173.74588	1293.1	1.9	268.6	Fish.	527
2017-12-15	01:56:40	-15.09252	-173.74594	1294.4	1.7	269.1	Rattail.	528
2017-12-15	01:56:53	-15.09252	-173.74597	1295.2	1.9	268.9	Heavy ash covering the pillows to our right.	529
2017-12-15	01:57:02	-15.09252	-173.74599	1295.8	2.0	269.3	More shrimp.	530
2017-12-15	01:57:35	-15.09252	-173.74604	1296.4	2.0	269.2	Shrimpy features.	531
2017-12-15	01:58:07	-15.09251	-173.74610	1295.7	3.0	251.3	Rattail or cusk eel?	532
2017-12-15	01:58:20	-15.09249	-173.74613	1294.0	5.0	236.6	Thick orange hydrothermal sediments.	533
2017-12-15	01:59:04	-15.09250	-173.74622	1290.6	5.1	192.5	We're now going to turn to the SE. We've been traveling west for the last few minutes.	534
2017-12-15	02:00:03	-15.09253	-173.74621	1289.8	4.4	250.1	Seeing shimmer coming up from the base of the rock. Also seeing shrimp.	535
2017-12-15	02:00:45	-15.09253	-173.74619	1287.7	7.2	250.0	Codey	536
2017-12-15	02:02:07	-15.09255	-173.74623	1288.8	3.4	251.6	We'll put in a Shimmer target. 1288 m Quite a lot of flow coming out of this crack between the rocks.	537
2017-12-15	02:04:14	-15.09256	-173.74627	1285.0	2.1	233.3	NAV TARGET: SHIMMER 15.0925316 173.7461874. Z=1287 m. A little bit of shimmering water; some shrimp; polynoids; brachyuran crab;	538
2017-12-15	02:04:36	-15.09258	-173.74625	1283.5	6.2	202.4	Blobbier mat - orange bacterial balls.	539
2017-12-15	02:05:53	-15.09268	-173.74610	1288.2	2.1	149.7	So we're still in the new flow.	540
2017-12-15	02:06:04	-15.09269	-173.74607	1289.2	1.7	149.7	We're just out of the thickest seds.	541
2017-12-15	02:06:36	-15.09274	-173.74601	1290.3	2.9	146.9	Drained-out sediment flow.	542
2017-12-15	02:06:49	-15.09276	-173.74599	1290.3	1.7	147.7	Seeing lots of shrimp in the water column.	543

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S103 W Mata Logger Comments	Record #
2017-12-15	02:07:19	-15.09279	-173.74594	1290.5	2.1	147.5	Beautiful pillow tubes moving down slope here - fat pillows.	544
2017-12-15	02:07:49	-15.09284	-173.74588	1289.8	1.9	131.4	Inflated pillow / lobate (plobates).	545
2017-12-15	02:08:29	-15.09285	-173.74588	1289.8	1.6	125.5	Shrimp and squat lobsters on the newish flow here.	546
2017-12-15	02:08:49	-15.09284	-173.74588	1289.9	1.5	129.7	Squat lobsters and shrimp stirred up.	547
2017-12-15	02:14:00	-15.09286	-173.74586	1289.3	0.8	138.5	**S103-rock-22**. Good piece of bubbly vesicular rock Crystals in the rind and smaller crystals in the interior. Large void spaces. Z=1290. 15.0928442 173.7458779 35+ cm long 25 cm wide. Slipped on top of the scoop bags.	548
2017-12-15	02:14:32	-15.09291	-173.74584	1290.5	0.0	137.5	Squat lobsters. Beautiful thick seds again. Looks like a winter wonderland.	549
2017-12-15	02:15:07	-15.09297	-173.74581	1291.6	1.2	140.8	Eel.	550
2017-12-15	02:15:48	-15.09305	-173.74577	1290.5	2.6	145.2	Huge pillows in the lower relief area.	551
2017-12-15	02:16:12	-15.09308	-173.74575	1291.0	2.5	145.2	Squat lobster are our friend.	552
2017-12-15	02:16:44	-15.09313	-173.74572	1288.5	2.8	145.3	We're headed to WP 18 - crossing between 17 and 18.	553
2017-12-15	02:17:28	-15.09313	-173.74572	1287.8	3.0	148.5	Alvinocaris; opaepele; zoarcid; squat lobsters; large scaleworms. The whole shebang.	554
2017-12-15	02:17:52	-15.09313	-173.74572	1287.6	2.8	162.9	not seeing any shimmer yet.	555
2017-12-15	02:18:21	-15.09315	-173.74573	1288.7	1.9	166.3	This is where the alvinocaris live. Lots of them.	556
2017-12-15	02:18:55	-15.09315	-173.74573	1288.8	1.7	162.0	Going to try to suction these 2 types of shrimp here.	557
2017-12-15	02:30:11	-15.09313	-173.74568	1289.1	1.6	171.3	**S103-bio-23**. Suction jar 5. Alvinocaris ?(probably not); Opaepele; white scaleworm; pink scaleworm. Z=1289m 15.0931569 173.7457246.	558
2017-12-15	02:32:03	-15.09314	-173.74569	1288.1	2.4	174.8	We sampled on the new lava flow here. Lots of sediment - white and yellow. Looking for the diffuse flow here. Don't see any shimmer.	559
2017-12-15	02:33:16	-15.09322	-173.74569	1286.0	0.9	174.6	We're in the landslide scar now. The new lava fell down this slope.	560
2017-12-15	02:33:57	-15.09324	-173.74569	1284.4	2.0	174.0	As we move to the south we should run into the landslide scar.	561
2017-12-15	02:34:23	-15.09325	-173.74570	1283.8	2.5	174.4	Lots of cusk eels here. - orange floc - scaleworms - Alvinocaris.	562
2017-12-15	02:34:43	-15.09327	-173.74570	1282.7	2.6	176.0	Don't see visible shimmer but must be some flow because there are lots of vent samples.	563

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S103 W Mata Logger Comments	Record #
2017-12-15	02:34:59	-15.09328	-173.74570	1281.3	0.0	176.7	We're near the edge of the landslide scar here.	564
2017-12-15	02:36:12	-15.09331	-173.74566	1275.7	3.8	180.3	Odd-looking jumbled up complex drainage there.	565
2017-12-15	02:37:12	-15.09332	-173.74570	1275.6	0.0	184.6	Deep sea shrimp and the Alvinocaris here. - as well as the Opaepele.	566
2017-12-15	02:37:21	-15.09332	-173.74570	1275.5	2.7	184.6	Very photogenic shrimp.	567
2017-12-15	02:38:14	-15.09338	-173.74573	1272.9	3.7	183.6	This looks like a horito-ey thing. Drained and folded.	568
2017-12-15	02:38:46	-15.09340	-173.74573	1270.7	4.5	172.5	That shrimp we just zoomed in on was probably not an alvinocaris after all.	569
2017-12-15	02:39:20	-15.09343	-173.74567	1269.4	3.6	190.6	It's super drained out here.	570
2017-12-15	02:40:12	-15.09346	-173.74567	1267.8	1.6	193.2	We're just moving up the lip of this collapsed cone that was formed sometime between 2012 - 2016.	571
2017-12-15	02:41:05	-15.09347	-173.74565	1266.5	3.2	183.7	We're looking out at the landslide scar from the new cone that collapsed.	572
2017-12-15	02:42:25	-15.09348	-173.74565	1268.3	4.0	12.2	Bill wants to see the edge of this cone landslided down to the SE. This cone built up 90 meters (and collapsed on the east side).	573
2017-12-15	02:42:31	-15.09348	-173.74565	1268.3	6.4	13.2	Shrimp mania here.	574
2017-12-15	02:43:00	-15.09350	-173.74565	1268.6	4.3	9.7	Shrimp hanging out on the edge of the cliff.	575
2017-12-15	02:44:33	-15.09345	-173.74572	1262.6	3.3	254.5	We're at the edge of this cone driving along the edge.	576
2017-12-15	02:44:42	-15.09346	-173.74574	1262.3	1.9	255.7	We're heading to the west now.	577
2017-12-15	02:44:59	-15.09346	-173.74576	1262.3	2.4	249.8	The animals like the edge of the cliff I guess.	578
2017-12-15	02:45:31	-15.09345	-173.74582	1262.5	2.0	263.1	The shrimp are not as prolific here.	579
2017-12-15	02:46:06	-15.09344	-173.74590	1265.0	3.7	185.0	Harder to see on this sedimented slope. Looking at the edge of this cone - on the north side of the cone	580
2017-12-15	02:46:24	-15.09346	-173.74591	1265.8	3.5	173.6	Seeing pillows lava tubes flowing down the slope.	581
2017-12-15	02:47:04	-15.09348	-173.74594	1265.9	2.8	164.2	Lots of shrimp on the seafloor here.	582
2017-12-15	02:48:33	-15.09347	-173.74604	1268.2	0.0	165.8	Looking at a slope that is covered in volcaniclastic sands with occasional pillow tubes and pillows are exposed.	583
2017-12-15	02:50:32	-15.09343	-173.74623	1272.4	7.9	266.0	Off bottom to maneuver and in very smoky water.	584
2017-12-15	02:50:45	-15.09340	-173.74630	1274.5	8.3	266.7	Still lots of sedimented bulbous pillows.	585
2017-12-15	02:51:18	-15.09337	-173.74639	1274.1	5.2	295.2	Narrow pillows on slopes and jumbly lava blanket.	586
2017-12-15	02:52:34	-15.09328	-173.74647	1274.8	8.5	134.5	We are at waypoint 19 "Coneholio".	587
2017-12-15	02:53:14	-15.09327	-173.74644	1275.7	5.9	173.6	Coneholio is comprised of some narrow pillow tubes and a lot of spatter.	588

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S103 W Mata Logger Comments	Record #
2017-12-15	02:58:07	-15.09332	-173.74634	1274.7	4.4	161.6	Highest chunk of jumbly spatter from the top of Coneholio (waypoint 19). 5x10cm glassy and phyric. Azimuthal vesicles.	589
2017-12-15	02:59:26	-15.09336	-173.74632	1276.3	5.4	254.9	**S103-rock-24** Location waypoint 19 15.0932943 173.7464016 depth 1276m.	590
2017-12-15	03:00:34	-15.09352	-173.74632	1275.0	5.4	169.8	Pillow toes - lava here is highly ornamented and sedimented.	591
2017-12-15	03:01:57	-15.09367	-173.74622	1267.3	1.4	136.3	We are somewhere near waypoint 20 but the nav is off.	592
2017-12-15	03:02:42	-15.09371	-173.74622	1268.0	0.9	86.2	Shimmer in the water at cliff's edge and a veritable landslide of shrimp.	593
2017-12-15	03:03:08	-15.09372	-173.74622	1267.8	1.5	71.3	Lots of pink polychaetes.	594
2017-12-15	03:03:37	-15.09372	-173.74621	1267.9	1.4	46.5	Found the shimmer source - fairly large vent at base of pillow.	595
2017-12-15	03:04:42	-15.09373	-173.74622	1267.9	1.4	48.7	Sulfur balls.	596
2017-12-15	03:06:54	-15.09371	-173.74622	1266.8	2.4	70.0	Shrimp everywhere.	597
2017-12-15	03:07:33	-15.09369	-173.74619	1265.6	1.2	161.4	Pillows are extensively stained orange	598
2017-12-15	03:12:21	-15.09375	-173.74623	1267.5	1.0	356.0	Surveyed hydrothermal vents to decide where to run T probe and take samples.	599
2017-12-15	03:13:35	-15.09373	-173.74620	1267.7	1.2	33.8	Deploying temperature probe.	600
2017-12-15	03:18:01	-15.09374	-173.74623	1267.7	1.2	33.2	Probe Tmax = 6C Ambient 3.5C at 15.093796 173.7462064 depth 1267.7m. Note that ambient here is 0.4C warmer than we've seen for the last hour or two.	601
2017-12-15	03:23:04	-15.09374	-173.74622	1267.7	1.2	36.6	**S103-fluid-25**. Water sample from 6C vent. Location: 15.093796 173.7462064 depth 1267.7m.	602
2017-12-15	03:34:00	-15.09374	-173.74622	1267.7	1.1	32.9	**S103-bio-26**. Sample of Alvinocaris shrimp (1); Opele (5); and scale worm (1) from 6C vent. Location 15.093796 173.7462064 depth 1267.7m.	603
2017-12-15	03:36:28	-15.09380	-173.74619	1263.1	4.8	355.1	We are moving again. Traversing sedimented pillow and jumbly lavas hosting a pretty large shrimp population.	604
2017-12-15	03:39:14	-15.09427	-173.74625	1267.1	2.1	189.6	Patchy but extensive microbial mats on surfaces of sediments and exposed pillow surfaces. Mostly white but some orange localized patches as well.	605
2017-12-15	03:40:27	-15.09456	-173.74625	1271.3	2.0	186.0	Skipping waypoint 21 and heading straight to waypoint 22; looking out for marker previously left.	606

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S103 W Mata Logger Comments	Record #
2017-12-15	03:42:22	-15.09460	-173.74642	1276.2	3.4	281.5	Pillows along slope still looking like part of the most recent eruption. Less hydrothermal stains.	607
2017-12-15	03:42:29	-15.09459	-173.74645	1277.3	2.5	284.7	Waypoint 22.	608
2017-12-15	03:42:52	-15.09455	-173.74657	1281.4	3.0	294.0	Life pretty sparse here; water murky.	609
2017-12-15	03:43:26	-15.09448	-173.74667	1282.9	3.4	295.3	Found a talus pile contact.	610
2017-12-15	03:45:33	-15.09466	-173.74641	1277.0	5.7	96.6	Lots of fresh elongate pillow tubes and some sediment. Syneruptive.	611
2017-12-15	03:46:56	-15.09462	-173.74608	1269.8	2.7	79.4	Area of lobate squat pillows and fairly high sediment load. Lots of particles in the water column.	612
2017-12-15	03:48:35	-15.09473	-173.74614	1278.3	2.8	213.6	Still looking for Shrimp Canyon.	613
2017-12-15	04:00:19	-15.09444	-173.74644	1274.9	1.3	327.1	So much for seafloor markers.	614
2017-12-15	04:00:28	-15.09443	-173.74646	1274.8	1.3	324.1	Can't find it.	615
2017-12-15	04:01:18	-15.09434	-173.74654	1273.2	3.0	322.9	We're ending the dive here and now. We can't find the marker or our previous sampling here.	616
2017-12-15	04:03:20	-15.09414	-173.74633	1278.0	2.6	144.5	We're still surveying the landscape- don't really see anything special to speak of.	617
2017-12-15	04:04:45	-15.09471	-173.74642	1293.5	3.5	184.6	Farewell West Mata. We'll see you again.	618
2017-12-15	04:04:56	-15.09473	-173.74642	1286.6	2.6	182.0	A bientot!	619
2017-12-15	04:05:25	-15.09490	-173.74643	1288.9	8.0	175.5	Whoops - premature farewell.	620
2017-12-15	04:05:33	-15.09492	-173.74640	1286.8	9.8	170.2	That's a nice pile of lava here.	621
2017-12-15	04:06:11	-15.09504	-173.74636	1290.1	4.8	211.1	That's it for West Mata this time.	622
2017-12-15	04:06:52	-15.09502	-173.74644	1276.3	16.4	285.7	Moving up this lovely slope - at the southern edge of the collapse area.	623
2017-12-15	04:10:27	-15.09438	-173.74644	1260.6	14.6	306.2	We're finished here for 2017. Next time we return - red hot lava on the seafloor would be nice. Please?	624
2017-12-15	04:15:05	-15.09410	-173.74638	1174.8	31.8	293.8	Vehicle Leaving Seabed	625

S104 Mata Taha

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S104 Mata Taha Logger Comments	Record #
2017-12-15	18:56:35	-15.03465	-173.77903	2358.3	4.8	267.3	We're on the bottom. Corals on the seafloor. Brittle stars and branched corals.	21
2017-12-15	18:58:24	-15.03455	-173.77919	2355.5	2.7	269.4	We're on the bottom at Mata Taha.	22
2017-12-15	18:58:55	-15.03458	-173.77898	2355.4	2.5	269.5	Fish there looks like tiny rattail..... probably not.	23

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S104 Mata Taha Logger Comments	Record #
2017-12-15	18:59:41	-15.03452	-173.77885	2354.0	2.4	269.6	Walter says it was "probably" a fish.	24
2017-12-15	19:00:07	-15.03473	-173.77890	2352.8	3.0	269.7	Sedimented seafloor with the occasional rock exposed here and there. Sponges.	25
2017-12-15	19:00:20	-15.03450	-173.77884	2353.3	2.6	270.2	Big anemone.	26
2017-12-15	19:00:27	-15.03450	-173.77884	2352.9	3.4	268.1	Rocky debris on sandy slope.	27
2017-12-15	19:01:08	-15.03439	-173.77866	2352.9	5.1	240.5	These rocks look like high effusion rate lavas - pieces of jumbled sheet.	28
2017-12-15	19:03:20	-15.03927	-173.78578	2352.4	1.9	233.5	Working our way up slope.	29
2017-12-15	19:03:27	-15.03928	-173.78437	2352.3	2.1	233.8	Larger rocks here.	30
2017-12-15	19:03:47	-15.03556	-173.78110	2351.6	2.3	234.1	Anemone and boulder.	31
2017-12-15	19:04:01	-15.03430	-173.77902	2351.6	2.0	234.1	Large hunks of rock.	32
2017-12-15	19:05:23	-15.03489	-173.77947	2350.2	2.2	218.7	The rocks are getting bigger and more continuous. Brittle stars on the seafloor. Bamboo corals.	33
2017-12-15	19:05:52	-15.03451	-173.77908	2350.0	1.6	218.9	We're getting into more intact-looking lavas but hard to tell because of the sediment cover.	34
2017-12-15	19:06:03	-15.03450	-173.77844	2350.5	1.2	218.9	Older lavas for sure because of all the animals.	35
2017-12-15	19:06:26	-15.03472	-173.77907	2351.2	0.6	219.2	Shelly drained out pillows poking up through the sand.	36
2017-12-15	19:06:50	-15.03469	-173.77894	2351.4	0.5	219.8	We're on a mound on the northeast side of the volcano.	37
2017-12-15	19:07:29	-15.03473	-173.77894	2351.5	0.4	220.2	Going to take a sample of this flattish pillow tube. Shelly pillow lavas here ~ half way up this little mound.	38
2017-12-15	19:07:59	-15.03470	-173.77910	2351.5	0.4	220.2	Some dark grains in the sand here mixed in with the lighter sands.	39
2017-12-15	19:12:59	-15.03450	-173.77914	2351.4	0.0	221.0	**S104-rock-01.** Edge piece of flattish shelly pillow. Z=2352. Orangish staining on exterior. Black interior - fine vesicles. Bubbly hole - glass on top. White crystals. 12 cm. Blocky.	40
2017-12-15	19:15:02	-15.03591	-173.78018	2351.4	0.0	221.1	Bubbly rock - although interior only has small vesicles. Small white crystals visible. Into quad 5.	41
2017-12-15	19:20:49	-15.03429	-173.77927	2351.6	0.4	230.0	2nd grab: Glass on the bottom - small vesicles 15x10cm at widest part. Thick frothy glass layer. 3rd bonus nugget. Nav fix: 15.034868 173.779430.	42
2017-12-15	19:21:31	-15.03430	-173.77922	2351.7	0.4	230.0	Going for a push core - if that doesn't work we'll do a scoop. Same location.	43

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S104 Mata Taha Logger Comments	Record #
2017-12-15	19:24:46	-15.03428	-173.77939	2351.7	0.4	231.1	We're on top of the satellite cone at 2352m - based on the depth. That's about 50 m SW of waypoint 1 (our starting position)	44
2017-12-15	19:25:40	-15.03506	-173.77776	2351.7	0.4	231.5	Have the dip stick out and looking at how deep the sediments are. The seds are not thick here. The deepest are only about 15 cm thick.	45
2017-12-15	19:25:49	-15.03471	-173.77954	2351.7	0.4	231.5	We'll do a scoop bag here instead.	46
2017-12-15	19:27:31	-15.03500	-173.77973	2351.7	0.4	231.4	Going in for a scoop bag next. Not enough sed for the push core.	47
2017-12-15	19:32:38	-15.03407	-173.77917	2351.7	0.0	227.1	**S104-sed-02.** Light colored sand on the surface. Scoop bag #2. The sand is ~ 2-15 cm thick here. White circular granules (bio?) mixed with brown grains. Very fine.	48
2017-12-15	19:35:34	-15.03459	-173.77948	2351.9	0.0	225.8	The volcaniclastics here are not dark black - quite a bit lighter in color (brown/gray ish). Z=2352. Same location as sample 1.	49
2017-12-15	19:36:16	-15.03450	-173.77959	2351.9	0.0	225.8	We're about 1 meter away from our previous sample.	50
2017-12-15	19:38:07	-15.03444	-173.77938	2354.7	1.9	238.3	Navigator fix for sample 2 (even though it was right next to sample 1): 15.0349054 173.7794550. Z=2355.	51
2017-12-15	19:38:32	-15.03431	-173.77900	2357.1	2.2	238.9	Heading downslope now. Lots of branching corals here.	52
2017-12-15	19:38:46	-15.03457	-173.77940	2358.8	2.2	238.6	Ripples in the sediment here.	53
2017-12-15	19:38:55	-15.03461	-173.77934	2359.5	2.9	237.6	Heading down a gentle slope.	54
2017-12-15	19:39:54	-15.03459	-173.77919	2367.6	1.8	238.9	Glass sponges; stalked corals; stalked bamboo corals.	55
2017-12-15	19:40:29	-15.03442	-173.77896	2371.7	2.3	238.3	Jumbled sheet flow looking features with pillows.	56
2017-12-15	19:41:06	-15.03494	-173.77925	2374.0	4.3	237.7	Bell sponge. Rippled sand with rocks poking out here and there.	57
2017-12-15	19:41:45	-15.03494	-173.77946	2380.2	1.9	237.9	Ropey lavas - sort of sheety.	58
2017-12-15	19:42:21	-15.03492	-173.77912	2383.9	2.4	235.9	Sort of jumbled up sheet flow with occasional pillow tubes.	59
2017-12-15	19:42:48	-15.04344	-173.78110	2386.5	2.7	240.0	Lots of sand here again. Probably at the base of that satellite cone.	60
2017-12-15	19:43:36	-15.03545	-173.77935	2386.7	2.6	334.5	The ROV is not in the right place - again....	61
2017-12-15	19:43:52	-15.03539	-173.77938	2387.8	1.4	338.0	Flatter pillow lobe now - with large bulbous pillow here.	62

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S104 Mata Taha Logger Comments	Record #
2017-12-15	19:44:02	-15.03519	-173.77933	2387.6	1.7	338.6	Single stalked coral.	63
2017-12-15	19:44:37	-15.03541	-173.77958	2387.7	1.7	336.2	Went back up to the base of the satellite cone. Ken wants another rock before we hit the sandy plain beneath the cone.	64
2017-12-15	19:46:23	-15.03561	-173.77952	2387.5	1.9	340.7	Bowling ball pillow with sponge. Chrysogorgia with a squat lobster??	65
2017-12-15	19:46:43	-15.03582	-173.77957	2388.2	1.5	338.1	Flat pillow tubes.	66
2017-12-15	19:46:51	-15.03572	-173.77958	2388.3	1.3	341.6	Stalked coral or crinoid.	67
2017-12-15	19:47:34	-15.03527	-173.77941	2388.8	0.7	3.4	The spatter is not in place. The lobate is safer because its in place. Must have been high effusion rate flow.	68
2017-12-15	19:52:34	-15.03549	-173.77956	2388.6	0.0	4.9	Jumbled sheet next to flat pillow lobe. Taken from ropey jumbly spattery lump of lava. Z=2389. 15.0354404 173.7796930.	69
2017-12-15	19:54:01	-15.03549	-173.77969	2388.7	0.8	3.4	**S104-rock-03**. That was an in place sheet. Jumbled morphology. Cm-scale wavelength folds. Some glass. 10-15cm. Frothy magma. Into partition 6.	70
2017-12-15	19:56:30	-15.03518	-173.77961	2387.9	2.2	247.9	Now continuing to the SW and are on sedimented plain.	71
2017-12-15	19:57:17	-15.03532	-173.77947	2389.6	1.2	219.7	Seeing some more lavas boking out now.	72
2017-12-15	19:57:40	-15.03527	-173.77940	2389.0	2.4	219.1	The sediments are thicker here and almost covering the lavas here.	73
2017-12-15	19:58:13	-15.03494	-173.77917	2390.2	2.8	219.2	We're off of the cone - lots of sediments and some pillows - some frothy looking lavas here as well.	74
2017-12-15	19:58:38	-15.03495	-173.77926	2390.3	3.1	218.6	Shrimp - lots of brittle stars.	75
2017-12-15	19:59:23	-15.03494	-173.77920	2387.8	5.1	239.2	Nav sucks again. We're debating where we are.	76
2017-12-15	19:59:49	-15.03540	-173.77953	2387.0	6.0	264.9	Lobate to sheety lavas on this gentle slope to the north.	77
2017-12-15	20:00:17	-15.03580	-173.77990	2386.2	5.9	265.4	Not as much biota on these lavas. Small coral there.	78
2017-12-15	20:01:23	-15.03605	-173.78015	2384.3	3.1	276.5	We're probably beyond WP 2 - to the west of it maybe 50 m or less..... Guessing here.	79
2017-12-15	20:01:26	-15.03605	-173.78015	2384.4	3.3	275.8	Urchin.	80
2017-12-15	20:01:39	-15.03551	-173.77987	2384.5	2.4	276.0	Urchin number 1.	81
2017-12-15	20:01:51	-15.03539	-173.77992	2384.5	2.7	276.7	Vesicular rock here. Broken up here and there.	82

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S104 Mata Taha Logger Comments	Record #
2017-12-15	20:02:15	-15.03595	-173.78031	2384.5	3.1	276.2	Larger lobates and jumbled sheet flow. Not as many proper pillows.	83
2017-12-15	20:02:37	-15.03527	-173.77983	2384.6	3.1	277.5	Small whip coral?	84
2017-12-15	20:03:38	-15.01889	-173.77953	2386.5	3.7	278.4	We could be right at WP 2 now - judging on the outcrop to our right here.	85
2017-12-15	20:04:42	-15.04309	-173.78191	2385.8	5.2	263.3	These lavas are flatter lobes - some pillows - some tubes.	86
2017-12-15	20:05:12	-15.03832	-173.78079	2389.0	1.9	253.5	Sand in front of us now as far as we can see. The slope flattens out here in the vicinity of WP 2.	87
2017-12-15	20:06:35	-15.03618	-173.78049	2388.6	1.8	253.5	Burrows in the sand here.	88
2017-12-15	20:06:57	-15.03544	-173.78007	2388.6	1.4	253.3	Lots of little white shelly pieces on the seafloor.	89
2017-12-15	20:07:43	-15.03640	-173.78066	2388.8	0.6	253.6	Brittle stars out here and sand forever. Not a lot of ripples either.	90
2017-12-15	20:08:01	-15.03313	-173.80313	2388.6	0.6	253.3	Echinoderm.	91
2017-12-15	20:13:16	-15.03614	-173.78058	2383.5	0.8	252.5	More sand - sea stars (brittle stars? - but they look pretty big).	92
2017-12-15	20:13:41	-15.03531	-173.78033	2382.8	0.8	252.2	Seeing a bit more rippling in the sand now.	93
2017-12-15	20:14:07	-15.03537	-173.78022	2382.2	0.8	252.6	Gentle slope.	94
2017-12-15	20:14:45	-15.02909	-173.77431	2381.3	0.8	252.2	There's a rock up ahead..	95
2017-12-15	20:15:00	0.00000	0.00000	2381.0	0.8	252.2	Heading toward WP3.	96
2017-12-15	20:15:28	-15.03623	-173.78071	2380.3	0.8	252.5	Brisingid?	97
2017-12-15	20:15:44	0.00000	0.00000	2380.0	0.7	252.9	This rock could be in place - but it's covered in sand.	98
2017-12-15	20:15:54	-15.03622	-173.78099	2379.9	0.7	253.2	Brittle star?	99
2017-12-15	20:16:14	0.00000	0.00000	2379.6	0.7	253.1	To the stbd side we're seeing a rockier outcrop.	100
2017-12-15	20:17:28	-15.03641	-173.78124	2377.9	4.4	261.3	Jumbled up lavas here - sheet-like.	101
2017-12-15	20:18:34	-15.03533	-173.78059	2379.2	3.1	183.3	Lava morphologies - aha (rough jagged flow). Palm tree coral?	102
2017-12-15	20:18:44	-15.03532	-173.78053	2378.9	3.6	182.7	Branching corals here and there.	103
2017-12-15	20:18:54	-15.03527	-173.78036	2378.5	4.2	183.9	Just a small outcrop here.	104
2017-12-15	20:20:03	-15.03542	-173.78067	2380.2	2.9	183.3	Ken is thinking of taking a sample of this flow.	105
2017-12-15	20:20:41	-15.03635	-173.78131	2381.7	1.4	219.8	Stalked crinoid.	106
2017-12-15	20:21:39	-15.03558	-173.78076	2381.7	1.4	205.1	This lava is platy and slightly jumbled. Subtle platy bedding to this rock.	107

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S104 Mata Taha Logger Comments	Record #
2017-12-15	20:26:37	-15.03576	-173.78089	2381.6	1.7	192.8	Fluid-looking texture - Sheety lava. Grab of jumbled piece from top. Z=2382. Crumbly. Frothy; small vesicles; some glass.~ 4 cmx1cm piece.	108
2017-12-15	20:34:06	-15.03571	-173.78086	2381.6	1.7	192.6	**S104-rock-04**. 15.0361934 173.7812228. 2nd grab: Fll flow interior White crystals some vesicles. Very altered. Irregular shape. 10cm in longest dimension.	109
2017-12-15	20:34:44	-15.03658	-173.78104	2381.7	1.4	192.4	Rock sampled at the base of the northern slope - on the way to WP3.	110
2017-12-15	20:35:28	0.00000	0.00000	2381.7	1.4	193.6	Spattery-jumbly-sheety weird in place rock here.	111
2017-12-15	20:35:42	-15.03029	-173.77529	2381.7	1.4	194.8	Darren	112
2017-12-15	20:35:55	-15.03203	-173.77721	2380.7	2.5	193.9	We're ready to go. Heading W/SW.	113
2017-12-15	20:36:11	-15.03358	-173.77896	2378.8	3.4	194.6	Shrimp.	114
2017-12-15	20:36:34	-15.03587	-173.78091	2377.4	1.9	184.6	The lava morphology here is jumbly. Fair amount of sand here as well.	115
2017-12-15	20:37:08	-15.03593	-173.78078	2374.7	3.2	184.6	Brisingid on jumbly lava.	116
2017-12-15	20:37:23	-15.03673	-173.78112	2372.7	2.8	185.1	Spattery jumbled morphology.	117
2017-12-15	20:37:38	-15.03626	-173.78116	2371.2	2.0	179.5	Coming on area with more sand here.	118
2017-12-15	20:38:14	-15.03579	-173.78087	2369.7	2.1	237.2	Sandy seafloor here butting up to jumbly sheety flow.	119
2017-12-15	20:38:52	-15.03546	-173.78064	2368.3	2.2	236.5	Bubbly-looking sponge(?)	120
2017-12-15	20:39:08	0.00000	0.00000	2367.2	2.2	234.1	Brisingid.	121
2017-12-15	20:39:23	-15.03603	-173.78113	2366.9	1.0	236.1	Coming upon some more traditional looking pillow lavas now.	122
2017-12-15	20:40:28	-15.03595	-173.78116	2365.9	1.0	235.1	We're crabbing up this sandy slope.	123
2017-12-15	20:41:23	-15.03584	-173.78110	2366.2	1.7	264.2	No proper navigation. We're at the depth of WP3 but don't know for sure.	124
2017-12-15	20:41:33	-15.03584	-173.78110	2365.6	2.4	264.0	Pillow lavas off to port now.	125
2017-12-15	20:41:49	-15.03562	-173.78085	2366.2	4.3	262.5	Ridge of sedimented lavas in front of us.	126
2017-12-15	20:48:50	-15.02762	-173.78536	2352.5	4.9	264.0	Moving up slope; lava poking out have a more slab-like appearance.	127
2017-12-15	20:49:32	-15.03589	-173.78231	2352.1	1.9	263.8	Brittle star hanging out...	128
2017-12-15	20:50:22	-15.03684	-173.78302	2350.7	2.7	265.0	Shrimp swimming by...	129
2017-12-15	20:51:19	-15.03607	-173.78241	2351.3	1.6	266.8	Smooth fine grained sediment all over the place. only few rock fragments here and there.	130

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S104 Mata Taha Logger Comments	Record #
2017-12-15	20:53:09	-15.03587	-173.78246	2348.8	1.7	267.7	Moving on ... not much happening on the seafloor - rocks and sediment. a lot of sediment...and some brittlestars and maybe crinoids?	131
2017-12-15	20:53:44	-15.03574	-173.78223	2348.2	2.0	267.3	Whoa. some pillows!	132
2017-12-15	20:55:00	-15.03652	-173.78308	2348.4	1.1	266.8	Two large and proper pillows. cracked with some sediment on top.	133
2017-12-15	20:56:27	-15.03614	-173.78297	2345.5	3.2	154.5	We're probably going to sample this pillow - surrounded by thick sandy sediments on this gentle slope.	134
2017-12-15	20:57:05	-15.03625	-173.78274	2347.9	0.4	127.1	Copious sand on this volcano. The sands of time - this volcano looks truly old; at least down here.	135
2017-12-15	21:10:07	-15.03587	-173.78290	2345.4	1.8	264.3	**S104-rock-05**. Pillow (elongated). Z=2348m. Upper surface with come nice interior. Very vesicular with few crystals (aphyric?) . 10x7 cm. Orange staining on exterior. Location: 15.0365087 173.7829996 depth 2348m	136
2017-12-15	21:10:17	-15.03602	-173.78290	2345.5	1.2	264.6	Sibilant sediment	137
2017-12-15	21:12:10	-15.03600	-173.78310	2340.3	2.8	266.5	Whip coral - very tall	138
2017-12-15	21:13:52	-15.03584	-173.78288	2338.2	3.5	264.2	Branch coral "look at the nodes on that coral"	139
2017-12-15	21:14:04	-15.03592	-173.78302	2337.1	4.4	264.1	Sponge in the far distance	140
2017-12-15	21:14:50	-15.03603	-173.78317	2335.0	2.3	263.6	Seeing more rock here. Still lots of sediment. Some brittle stars and corals. Dead sponge too	141
2017-12-15	21:20:12	-15.03595	-173.78326	2331.2	3.1	264.5	Weird crustaceans emulating polyps on a coral. Also had a crinoid on it	142
2017-12-15	21:21:22	-15.03545	-173.78290	2322.4	5.8	265.1	Into mostly rocks. Sedimented and overgrown with some fairly tall corals and sponges. Older lava	143
2017-12-15	21:21:56	-15.03644	-173.78380	2319.5	4.0	264.0	Iridogorgia coral and sea urchin	144
2017-12-15	21:22:10	-15.03644	-173.78380	2318.3	4.1	264.3	All talus	145
2017-12-15	21:22:15	0.00000	0.00000	2317.9	3.9	264.7	Chrysogorgia.	146
2017-12-15	21:23:14	-15.03535	-173.78304	2315.0	3.2	264.5	Urchin count: 3	147
2017-12-15	21:24:02	-15.03606	-173.78364	2309.1	3.0	264.4	Stalked corals including Iridogorgia. Moving into more sediment and some in-place pillows	148
2017-12-15	21:40:10	-15.03649	-173.78394	2309.3	1.1	264.2	**S104-rock-06**. Slab of pillow crust. Heavily sedimented and drippy underside. Vesicular so that'll stay in it. 15x20cm Location 15.0364462 173.7838021 depth 2309m	149
2017-12-15	21:43:49	-15.03629	-173.78398	2308.8	1.1	265.5	**S104-bio-07**. Crangon shrimp	150

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S104 Mata Taha Logger Comments	Record #
2017-12-15	21:44:54	-15.03587	-173.78367	2305.8	4.0	264.2	Continuing uphill to WP 4 which is at the top of a cone north of the summit.	151
2017-12-15	21:46:20	-15.03562	-173.78343	2298.7	4.2	270.4	Might be getting to near the top of the cone north of the summit at WP 4 based on the depth	152
2017-12-15	21:47:39	-15.03619	-173.78409	2287.6	4.4	269.7	This is probably the top of the cone at a depth of 2290 m.	153
2017-12-15	21:48:01	-15.03582	-173.78385	2287.9	3.9	269.4	Russ	154
2017-12-15	21:49:31	-15.03595	-173.78413	2286.3	2.8	269.4	Pillows with some jumbled or breccia surrounded by sediment. Going downslope now.	155
2017-12-15	21:52:04	-15.03620	-173.78432	2293.9	1.9	222.9	Still heading down-slope over scattered pillows poking through sediments.	156
2017-12-15	21:53:22	-15.03621	-173.78418	2295.4	2.8	219.1	Three whip corals.	157
2017-12-15	21:54:27	-15.03628	-173.78412	2296.5	1.3	219.3	We see some circular depressions. similar to what we saw on West Mata...	158
2017-12-15	21:56:05	-15.03661	-173.78437	2290.6	1.0	219.7	Moving above heavily sedimented ridge-like structure. no ripples but wait!...some brittlestars	159
2017-12-15	21:57:45	-15.03554	-173.78594	2285.4	1.2	221.9	Shrimp	160
2017-12-15	21:58:11	-15.03737	-173.78357	2284.7	0.7	221.8	Brittle star.	161
2017-12-15	21:58:18	-15.03734	-173.78491	2284.3	0.9	221.7	Flat sandy seafloor here.	162
2017-12-15	21:58:26	-15.03738	-173.78471	2283.9	0.9	221.9	The visibility if quite good right ow.	163
2017-12-15	21:58:53	-15.03744	-173.78477	2283.2	1.0	221.1	Small depression to stbd as we continue to the SW toward WP5.	164
2017-12-15	22:00:30	-15.03781	-173.78481	2281.0	1.1	221.7	Sea urchin on the seafloor. Purple-pink one.	165
2017-12-15	22:01:57	-15.03726	-173.78498	2277.8	1.2	221.1	Sand; sand; sand - with the occasional brittle star.	166
2017-12-15	22:03:45	-15.03318	-173.79346	2271.6	2.2	222.3	Flying over soft sediment ... quite a bit of it ...	167
2017-12-15	22:04:38	-15.03726	-173.78508	2268.0	2.1	222.2	I guess the brittlestars like it - there are a few lying around.	168
2017-12-15	22:06:15	-15.03697	-173.78466	2261.5	3.6	261.6	Some frothy pillow lava poke through the sediment here.	169
2017-12-15	22:07:36	-15.03736	-173.78513	2265.0	2.0	355.5	We are going to sample here.	170
2017-12-15	22:11:12	-15.03765	-173.78526	2262.0	4.0	293.0	**S104-rock-08**. Jumbly frothy looking lava flow poking out of the sediment; crystal poor. vesicular. some glass ~half circular 10 cm.	171
2017-12-15	22:13:23	-15.03784	-173.78532	2264.3	2.6	350.1	Location: z = 2260; 15.0378676; 173.7852540.	172
2017-12-15	22:14:37	0.00000	0.00000	2263.5	3.2	9.8	Going in for a sediment sample here.	173

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S104 Mata Taha Logger Comments	Record #
2017-12-15	22:22:20	-15.03669	-173.78488	2261.4	2.8	7.6	**S104-sed-09**. Coarse volcanic gravel sample. Z=2264. Scoop bag #1 Location: 15.0377795 173.7853838.	174
2017-12-15	22:24:35	-15.03708	-173.78526	2262.8	1.8	253.8	Rippled sediments overlying some jumbly and pillow lavas. Some coral growth as well.	175
2017-12-15	22:26:42	-15.03708	-173.78538	2261.4	4.9	257.4	Slope with some in-place rock and rubble. Still covered in fine sediment.	176
2017-12-15	22:28:11	-15.03728	-173.78599	2260.6	3.1	254.7	Some pillows; lots of rubbly fragments and sediment. Tall coral stalks here and there.	177
2017-12-15	22:31:37	-15.03694	-173.78588	2258.5	2.0	285.7	Really broken up folded sheet flow.	178
2017-12-15	22:37:31	-15.03734	-173.78625	2260.2	0.0	297.4	**S104-rock-10.** Chunk of folded lava pillow. Very bubbly and full of fine sediment. 10x15cm.	179
2017-12-15	22:39:18	-15.03738	-173.78625	2257.2	2.8	258.7	Moving on - seeing some corals and sponges.	180
2017-12-15	22:39:21	-15.03738	-173.78625	2256.7	3.5	258.2	Sea star.	181
2017-12-15	22:39:49	-15.03736	-173.78658	2255.9	3.3	258.2	Slope we're moving up is a mixture of talus/pillow/sediment.	182
2017-12-15	22:40:32	-15.03695	-173.78618	2256.4	1.7	254.0	Jumbled sheet flow; mostly collapsed. Ropy surface.	183
2017-12-15	22:44:03	-15.03734	-173.78678	2254.6	3.5	245.6	Some sort of white mat patch on sediment - not sulfur but not sure what it is.	184
2017-12-15	22:44:49	-15.03811	-173.78719	2254.0	2.3	223.6	Occasional big pillow with rocky debris along edge of ridge we're climbing. Found a palm tree coral. Rippled sediments here.	185
2017-12-15	22:46:31	-15.03730	-173.78702	2249.0	1.9	225.5	A few more pillows along the ridge.	186
2017-12-15	22:46:53	-15.03762	-173.78722	2248.0	1.4	234.7	Seeing a few barnacles and sponges.	187
2017-12-15	22:51:07	-15.03725	-173.78760	2239.4	1.9	251.7	Still moving uphill. Very similar setting although new talus on both side of this little sediment ridge/scarp we've been following.	188
2017-12-15	22:51:27	-15.04098	-173.79067	2239.3	1.4	250.4	Seeing some corals and brisingids/crinoids.	189
2017-12-15	22:53:35	0.00000	0.00000	2238.5	1.2	246.4	ROV is driving to the west on the N flank but slope appears to go downslope to the left at least here.	190
2017-12-15	22:54:17	-15.03751	-173.78763	2238.0	1.4	245.7	Older broken up pillows along slope edges.	191
2017-12-15	22:56:48	-15.03807	-173.78815	2236.2	1.0	245.5	Following a ridge now.	192
2017-12-15	22:57:40	-15.03730	-173.78790	2235.3	1.4	246.2	Must be getting close to WP6 based on the depth.	193
2017-12-15	22:59:25	-15.03807	-173.78831	2234.4	1.2	245.9	It's a fairly narrow ridge composed of broken lavas and sediment cover.	194
2017-12-15	23:00:07	-15.03777	-173.78832	2234.3	0.8	246.2	Very large anemone.	195

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S104 Mata Taha Logger Comments	Record #
2017-12-15	23:01:23	-15.03725	-173.78793	2234.0	1.1	244.3	Main body of anemone is about 10 cm high.	196
2017-12-15	23:02:05	-15.03741	-173.78800	2233.2	1.4	244.2	Broken talus.	197
2017-12-15	23:02:18	-15.03760	-173.78814	2232.9	1.5	244.1	Mike	198
2017-12-15	23:03:44	-15.03770	-173.78827	2229.9	1.4	243.7	Approaching the top of this slope.	199
2017-12-15	23:04:02	-15.03750	-173.78820	2229.2	1.8	243.9	Lava debris is getting larger.	200
2017-12-15	23:07:37	-15.03763	-173.78854	2225.6	1.4	243.9	Lava debris is getting larger.	201
2017-12-15	23:07:50	-15.03753	-173.78848	2225.3	1.4	243.9	More broken lavas.	202
2017-12-15	23:08:38	-15.03772	-173.78854	2225.2	0.9	244.3	Still moving along the broken lava ridge at 2225 m.	203
2017-12-15	23:09:56	-15.03784	-173.78879	2224.0	1.4	239.1	Waiting for the ship. so investigating another outcrop.	204
2017-12-15	23:11:33	-15.03755	-173.78854	2223.8	1.4	210.7	More broken lavas.	205
2017-12-15	23:11:46	-15.03755	-173.78854	2223.9	1.3	210.7	Large brittle star.	206
2017-12-15	23:14:18	-15.03782	-173.78864	2223.4	1.7	169.6	Turning back to sample large pillow.	207
2017-12-15	23:17:00	-15.03717	-173.78826	2224.9	0.5	203.5	Sampling with port Manip	208
2017-12-15	23:24:08	-15.03811	-173.78889	2222.0	4.1	240.6	**S104-rock-11**. Pillow rind from weathered and sedimented pillow. 15 x 10 cm.	209
2017-12-15	23:28:54	-15.03783	-173.78846	2235.6	2.6	286.4	Old as* pillow looks; z = 2224m. 15.0388696. 173.7895640	210
2017-12-15	23:29:12	0.00000	0.00000	2235.4	2.9	269.4	Whoaaa - pile of rubble!	211
2017-12-15	23:30:37	-15.03822	-173.78870	2237.4	0.8	216.7	We're just coming off of the summit of satellite cone (WP6 area). Heading to the S/SW.	212
2017-12-15	23:30:52	-15.03823	-173.78871	2237.4	1.1	216.5	Little shrimp; urchin; Whip corals in the distance.	213
2017-12-15	23:31:14	-15.03868	-173.78883	2237.1	1.3	217.2	Coming up on older in place lavas now.	214
2017-12-15	23:31:41	-15.03885	-173.78902	2237.1	1.4	217.7	Big pillow right in front of us would be a good sample.	215
2017-12-15	23:32:21	-15.03843	-173.78884	2237.3	1.2	216.4	In place lavas here. Some flat lava lobes here and some pillows. Whip bamboo coral?	216
2017-12-15	23:34:55	-15.03828	-173.78867	2238.3	0.0	215.7	**S104-rock-12.** From large pillow with collapsed top. Highly oxidized - lots of secondary sediment filling the vesicles. Z=2238m.	217
2017-12-15	23:38:27	-15.03850	-173.78894	2238.3	0.0	213.3	Lots of glass. 15x20cm. Manganese/iron coating. Angular. Into gastight box. 15.039232 173.789487.	218
2017-12-15	23:38:51	-15.03863	-173.78912	2237.4	1.1	216.2	Bamboo coral in the background.	219
2017-12-15	23:39:29	-15.03908	-173.78917	2236.5	2.0	213.1	Anemone.	220

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S104 Mata Taha Logger Comments	Record #
2017-12-15	23:39:48	-15.03876	-173.78903	2235.9	2.6	213.4	Probably one of the better rock outcrops we've seen today.	221
2017-12-15	23:40:18	-15.03842	-173.78875	2233.8	3.1	213.4	As we progress up the slope we're seeing lots of rock fragments with whip corals.	222
2017-12-15	23:40:47	-15.03881	-173.78893	2232.0	2.9	213.3	Corals and brisingids.	223
2017-12-15	23:41:14	-15.03905	-173.78925	2231.0	2.6	214.0	Pillow tubes amidst jumbled up lava. Highly sedimented to port.	224
2017-12-15	23:41:56	-15.03868	-173.78904	2231.6	1.8	214.7	Quite a cliff here. Spatter or collapsed lavas - sedimented seafloor below that..	225
2017-12-15	23:42:27	-15.03874	-173.78915	2233.7	3.5	213.9	ROV nav still is bad; bad; bad.	226
2017-12-15	23:42:48	-15.03858	-173.78891	2234.1	5.1	277.9	Murky water here.	227
2017-12-15	23:43:17	-15.03902	-173.78924	2234.2	4.2	294.7	Now moving up this slope with jumbled up lavas beneath us.	228
2017-12-15	23:43:52	-15.03903	-173.78922	2234.0	4.6	294.8	Stalked corals and brisingid.	229
2017-12-15	23:44:38	-15.03878	-173.78916	2234.5	4.3	244.1	We're deviating from the dive track and following the contour to get oriented.	230
2017-12-15	23:45:29	-15.03900	-173.78934	2237.6	4.1	243.3	We're lost.	231
2017-12-15	23:47:10	-15.03863	-173.78288	2247.2	4.7	288.1	Heavily sedimented slope here.	232
2017-12-15	23:48:16	-15.03911	-173.78938	2249.9	6.7	290.2	The navigators believe the nav right now. According to that we have not progressed far down the satellite cone (WP6). We're to the south of it.	233
2017-12-15	23:49:04	-15.03927	-173.78963	2253.9	5.6	289.0	Pretty steep slope. We will lateral down it until we get to 2260 or so.	234
2017-12-15	23:49:47	-15.03937	-173.78969	2256.3	6.7	293.3	Jumbled up folded up texture to the lavas here. All looks pretty darn old.	235
2017-12-15	23:49:59	-15.03915	-173.78961	2256.9	6.3	292.8	More sedimentation as we go downslope.	236
2017-12-15	23:50:26	-15.03979	-173.78998	2256.9	6.3	293.6	Taller piece of lava with Bamboo coral and chrysogorgia.	237
2017-12-15	23:52:14	-15.03948	-173.78964	2259.4	4.6	300.3	Old chimney? Some glass sponges and bunches of corals crinoids.	238
2017-12-15	23:52:55	-15.03922	-173.78962	2260.3	3.6	299.7	Sulfide chimney - obviously dead.	239
2017-12-15	23:53:04	-15.03922	-173.78962	2260.1	4.0	299.2	Interesting spot for this guy.	240
2017-12-15	23:53:13	-15.03940	-173.78978	2259.6	4.3	301.4	Beautiful corals on this chimney.	241
2017-12-15	23:53:45	-15.03929	-173.78959	2258.4	5.8	300.7	Iridigorgia coral.	242
2017-12-15	23:56:23	-15.03930	-173.78971	2262.0	0.7	241.9	How tall is that? 3 meters tops - some are saying 6 meters tall.	243

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S104 Mata Taha Logger Comments	Record #
2017-12-15	23:57:40	-15.03974	-173.79013	2260.6	1.8	188.8	Leaning chimney - covered in corals and sponges.	244
2017-12-15	23:59:22	-15.03947	-173.79007	2260.5	2.2	188.7	Chrysogorgia (with a squat lobster) and bamboo corals.	245
2017-12-16	00:00:54	-15.03928	-173.78987	2261.1	1.3	217.8	Going for another piece of this chimney instead. Don't want to impact the corals on it.	246
2017-12-16	00:01:06	-15.03906	-173.78987	2261.1	1.4	217.5	Glass sponge to the right.	247
2017-12-16	00:01:24	-15.03930	-173.78968	2261.1	1.3	216.8	Some lollipop sponges.	248
2017-12-16	00:01:47	-15.03932	-173.78958	2261.1	1.4	217.0	Interesting coral with squat lobster to the right - not a chrysogorgia.	249
2017-12-16	00:06:02	-15.03971	-173.79008	2261.1	1.4	217.4	**S104-sulfide-13**. Sulfide spire top from old chimney. Orange stained interior. Brown exterior. Pointy top. Broke into at least 2 pieces. Into biobox 3. 15.038254 173.798012	250
2017-12-16	00:13:13	-15.03914	-173.78965	2260.3	3.6	280.6	**S104-bio-14**. Biota from same old extinct chimney just sampled. 15.038254 173.798012. Chrysogorgia (pink) with squat lobster. Into biobox 2.	251
2017-12-16	00:14:50	-15.03917	-173.78961	2260.3	3.6	280.8	This extinct chimney is 6 meters tall - the consensus of the ROV pilot. This is an odd tilted crooked chimney - all by itself. At least for now.	252
2017-12-16	00:15:28	-15.03964	-173.78997	2260.4	3.6	280.9	Chris wants to dub that the "Leaning Chimney of Taha".	253
2017-12-16	00:16:07	-15.03956	-173.78996	2259.3	4.5	282.5	Good job sampling this sulfide structure and not hurting the biota attached to it.	254
2017-12-16	00:17:21	-15.03907	-173.78955	2261.0	3.0	215.3	Sedimented slope with rock fragments.	255
2017-12-16	00:18:00	-15.03950	-173.78985	2260.4	3.1	204.1	Back to the land of sediments and fragmental rock.	256
2017-12-16	00:18:09	-15.03958	-173.78967	2260.4	2.9	204.3	Corals.	257
2017-12-16	00:19:38	-15.03947	-173.78973	2260.5	3.9	198.2	Moving into an area with rock fragments.	258
2017-12-16	00:20:53	-15.03784	-173.79400	2260.5	4.5	198.6	Slope with sediments and rock fragments.	259
2017-12-16	00:22:34	-15.04019	-173.79057	2254.5	10.9	142.1	A whole field of old extinct chimneys in a line.	260
2017-12-16	00:23:06	-15.03962	-173.79013	2254.9	11.1	141.3	Chrysogorgia and bamboo corals. This one is 11 m high. Slightly tilted.	261
2017-12-16	00:24:04	-15.03997	-173.79018	2254.2	5.2	237.9	Two dead chimneys here: Dubbing this place death valley.	262
2017-12-16	00:25:38	-15.03996	-173.79044	2255.3	2.9	253.2	Chrysogorgia and other corals - similar biota to what we saw on the last extinct chimney.	263

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2017-12-16	00:28:56	-15.04021	-173.79055	2254.8	3.5	255.3	**S104-sulfide-15**. Spire from extinct chimney at "Death Valley". Z=2258m . leaning sulfide with horizontal banding.	264
2017-12-16	00:33:44	-15.03987	-173.79037	2252.1	3.7	217.4	Chimney spire - weathered and covered in sediment. Intact? 15.038254 173.798012. Probably a 9 m high chimney.	265
2017-12-16	00:34:29	-15.04050	-173.79063	2252.2	1.8	205.6	We're going to take a quick look upslope to see if we see any more of these chimneys.	266
2017-12-16	00:34:54	-15.04026	-173.79061	2251.3	2.9	164.6	Glass sponge.	267
2017-12-16	00:35:26	-15.04012	-173.79035	2250.4	2.6	162.2	Another drop off here. - a few minutes.	268
2017-12-16	00:36:37	-15.03992	-173.79032	2253.1	1.9	256.8	We want to turn around so that we can see the chimneys.... guess not...	269
2017-12-16	00:37:46	-15.04045	-173.79088	2252.3	8.4	27.9	Facing north 360 and looking at the chimneys. They are on the edge of this "cliff" downdrop.	270
2017-12-16	00:38:30	-15.04040	-173.79096	2251.1	13.6	61.0	Looking NE parallel to the slope - hanging out over a cliff to the north. The highest chimney was 11 meters.	271
2017-12-16	00:39:54	-15.03986	-173.79033	2256.5	3.5	191.7	Those are those weird chrysogorgia-like corals. They have their own squat lobster too.	272
2017-12-16	00:40:20	-15.03994	-173.79024	2254.6	2.6	192.4	We're going to continue on toward WP 7.	273
2017-12-16	00:41:54	-15.04014	-173.79037	2252.2	3.0	146.3	Another small drop off.	274
2017-12-16	00:42:34	-15.04040	-173.79049	2250.3	5.4	168.5	Looks like we're on in place lavas. Long whip coral. Big one.	275
2017-12-16	00:43:13	-15.04008	-173.79027	2247.3	7.4	153.6	This looks like what we've been used to seeing. Intact pillow tubes - cracked pillows. Iridogorgia coral.	276
2017-12-16	00:43:54	-15.04007	-173.79017	2247.9	3.8	153.8	On the north flank of this constructional mound on the western summit crest.	277
2017-12-16	00:45:18	-15.04035	-173.79041	2247.8	4.3	148.0	Pretty weathered pillow in front of us. We're going to sample it. Intact on a slight slope now. Z=2248 m.	278
2017-12-16	00:49:21	-15.04060	-173.79045	2247.9	3.1	148.0	Piece of fractured crunchy sedimented pillow crust. Z=2248m 15.040964 173.790736.	279
2017-12-16	00:55:35	-15.04036	-173.79043	2243.7	3.0	155.6	SAMPLE 16 DID NOT GET COLLECTED IN THAT SPOT. WE'RE GOING TO RELOCATE. DIDN'T LIKE THAT ROCK FOR SAMPLING. NIX ON THAT LAST SAMPLE 16. THERE WILL BE ANOTHER.	280

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S104 Mata Taha Logger Comments	Record #
2017-12-16	00:57:44	-15.04039	-173.79050	2243.4	1.8	117.4	We moved just a little bit upslope - about 5 meters. Looking at another pillow lava now. Hydroids on its surface. Big pillow - Huge pillow.	281
2017-12-16	01:02:50	-15.04031	-173.79025	2241.6	3.8	159.9	We're going to keep shopping - That second attempt didn't work either.	282
2017-12-16	01:03:53	-15.04078	-173.79063	2238.7	3.8	146.8	Continuing up these slope of in-place fat pillow lobes and large cracked and broken pillows.	283
2017-12-16	01:04:55	-15.04035	-173.79014	2240.1	2.3	140.8	Checking out this big cracked up pillow in front of us.	284
2017-12-16	01:07:22	-15.04055	-173.79042	2240.3	2.1	143.1	DISREGARD THE PREVIOUS SAMPLE 16 LOGGED IN THE SAMPLE LIST. DIDN'T GET IT. THIS IS OUR 3RD ATTEMPT AT A SAMPLE.	285
2017-12-16	01:09:23	-15.04044	-173.79022	2239.8	2.8	147.0	**S104-rock-16**. Got that one. Outer cruse of old cracked pillow. Outer crust of pillow manganese staining. hydroid on top. vesicles. 6x4 cm angular. 15.041176 173.790786. Z=2240m.	286
2017-12-16	01:10:01	-15.04067	-173.79061	2238.5	4.3	145.4	Finally got rock sample 16. We will continue up slope again.	287
2017-12-16	01:10:57	-15.04048	-173.79019	2235.4	3.2	146.0	Branching coral in field of pillows and some jumbled lavas.	288
2017-12-16	01:11:29	-15.04075	-173.79042	2234.5	3.5	189.4	Large cracked pillows on big lobes. Some tubes laying down the slope as well.	289
2017-12-16	01:12:54	-15.04083	-173.79038	2232.3	4.0	188.7	Out of the pillows now and looking at broken up rocks that have fallen downslope - talus slope.	290
2017-12-16	01:13:29	-15.04085	-173.79041	2229.4	3.0	192.3	Stalked corals.	291
2017-12-16	01:13:49	-15.04068	-173.78992	2227.5	2.5	192.4	Holothurian.	292
2017-12-16	01:14:10	-15.04067	-173.79016	2223.8	4.3	192.7	Taller stalked bamboo corals as we move up this talus slope.	293
2017-12-16	01:15:26	-15.04109	-173.79070	2215.6	3.0	204.9	Stalked crinoid.	294
2017-12-16	01:16:04	-15.04106	-173.79096	2213.2	3.7	204.9	Roooooooccccckkksss and an anemone with dots :)	295
2017-12-16	01:17:21	-15.04101	-173.79026	2207.0	3.4	204.1	Beautiful coral .	296
2017-12-16	01:18:35	-15.04129	-173.79077	2198.6	5.1	204.8	We are flying up slope above pillow debris. lots and lots of fragments.	297
2017-12-16	01:20:40	-15.04122	-173.79061	2196.9	3.3	205.1	JRod	298
2017-12-16	01:21:05	-15.04132	-173.79087	2196.8	3.3	204.6	Brisingid. Based on the depth we should be close to the summit of the western cone (WP007).	299
2017-12-16	01:24:36	-15.04177	-173.79124	2192.7	2.0	205.7	Sweet little sea star.	300

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S104 Mata Taha Logger Comments	Record #
2017-12-16	01:25:54	-15.04181	-173.79136	2194.5	2.8	202.9	We're probably at the top of the western mound - close to waypoint 7.Glass sponge and brisingid.	301
2017-12-16	01:26:14	-15.04185	-173.79176	2194.9	2.5	204.1	We're going to grab a piece of this lava - that looks in place since we're at the summit.	302
2017-12-16	01:26:53	-15.04220	-173.79194	2195.1	1.9	205.0	Some pillow lobes and broken up pieces here and there.	303
2017-12-16	01:28:31	-15.04174	-173.79144	2196.8	0.0	204.6	This pillow is staring back at us. At the summit of this mound. Doesn't look particularly in place. Weird sediment pattern on this pillow.	304
2017-12-16	01:28:55	-15.04175	-173.79159	2196.8	0.0	204.6	Holes in the sediment in a geometric pattern but no one knows how they form.	305
2017-12-16	01:32:34	-15.04153	-173.79091	2196.8	0.0	202.2	Darren	306
2017-12-16	01:33:40	-15.04201	-173.79108	2196.8	0.0	202.2	**S104-rock-17**. Pillow with weird sediment pattern on top (holes in a geometric pattern). Z=2197. Piece of crust. 7x2 cm. Z=2197. Flat-ish All manganese coated. Thin brittle crust piece.	307
2017-12-16	01:35:10	-15.04166	-173.79119	2196.0	1.1	204.8	Z=2197 m 15.042003 173.791493.	308
2017-12-16	01:35:31	-15.04163	-173.79054	2196.1	2.2	205.7	Beautiful glass sponge and brisingids; sea stars and sea urchin.	309
2017-12-16	01:36:38	-15.04183	-173.79089	2195.0	4.3	205.0	Low down of the geometric pattern on the rock: paleodictyon - It's a pattern they see in the sediment there's a fossil that looks like it: Called a "trace fossil" - could be a protist that is making it.	310
2017-12-16	01:37:13	-15.04200	-173.79112	2195.9	3.5	204.4	We're approaching the summit. We're at waypoint 7 now.	311
2017-12-16	01:37:57	-15.04198	-173.79106	2196.2	2.9	175.2	We will head to waypoint 8 next.	312
2017-12-16	01:39:04	-15.04187	-173.79120	2196.9	1.8	43.8	We will be heading down slope. Whip bamboo corals.	313
2017-12-16	01:39:39	-15.04184	-173.79071	2196.8	1.5	43.2	Scattered rock debris here and large sediment patterns. Z=2197.	314
2017-12-16	01:39:45	-15.04184	-173.79071	2196.6	1.5	43.9	Large brisingids.	315
2017-12-16	01:39:52	-15.04173	-173.79040	2196.7	1.1	44.2	Large whip coral.	316
2017-12-16	01:40:24	-15.04188	-173.79135	2197.1	1.1	51.7	Broken up seafloor here. Lots of tock fragments. Brancing coral to the right.	317
2017-12-16	01:40:45	-15.04205	-173.79179	2197.7	1.1	51.7	Lots of sediment on the rocks here - just like all that we have seen so far.	318
2017-12-16	01:41:18	-15.04180	-173.79110	2198.0	2.1	29.7	Massive lava in front of us - looks in place - jumbled up looking - a real mess of a lava chunk.	319

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S104 Mata Taha Logger Comments	Record #
2017-12-16	01:42:31	-15.04182	-173.79070	2201.7	2.3	22.6	Looking at platy sheet-like lavas on this slope with some pillow tubes.	320
2017-12-16	01:42:48	-15.04180	-173.79065	2204.1	2.5	22.4	Lots of jumbled up broken lavas on this steep-ish slope.	321
2017-12-16	01:43:37	-15.04175	-173.79077	2209.6	2.3	23.4	We're sort of lateraling down this slope facing NNE as we head from WP 7 to WP8.	322
2017-12-16	01:44:38	-15.04181	-173.79021	2212.7	0.0	22.0	On a fairly gentle slope (as far as these slopes go). Lots of sand covering the lavas.	323
2017-12-16	01:45:09	-15.04177	-173.78995	2212.4	3.3	22.5	Only see the occasional rocks now - no outcrops. Stalked coral ahead.	324
2017-12-16	01:46:06	-15.04186	-173.79094	2213.9	4.7	23.3	Now we're seeing rocky debris in the background.	325
2017-12-16	01:47:08	-15.04170	-173.79000	2218.4	4.5	21.1	Spherical and tubular pillows on the slope here and lots of rocky debris.	326
2017-12-16	01:47:25	-15.04154	-173.78987	2219.8	4.9	23.3	We're getting low down on this structural slope.	327
2017-12-16	01:47:34	-15.04152	-173.79008	2221.0	4.2	24.1	Seeing intact pillow tubes here.	328
2017-12-16	01:47:45	-15.04150	-173.78996	2221.4	4.2	24.4	Continuing downslope.	329
2017-12-16	01:48:13	-15.04153	-173.78993	2222.7	3.5	25.5	The lavas down lower on the slope are more intact than what we saw up top - although there was a lot of sediment up there.	330
2017-12-16	01:49:11	-15.04168	-173.79048	2224.5	3.4	24.4	Another steep slope after a sort of step that we were on.	331
2017-12-16	01:50:14	-15.04139	-173.79014	2231.0	1.8	23.5	Looks like quite a lot of rubble down below.	332
2017-12-16	01:51:22	-15.04146	-173.78997	2233.5	1.5	23.5	Continuing down this slope. Quite debris strewn here. Corals growing on lots of this debris.	333
2017-12-16	01:53:09	-15.04133	-173.79023	2238.0	3.7	23.4	Most of the lavas we're looking at now are probably inplace - just heavily sedimented.	334
2017-12-16	01:54:52	-15.04121	-173.78944	2241.2	0.7	22.2	Huge bell sponge. That's a big one. has a few sea stars living inside it. Nice zoom on that bell sponge.	335
2017-12-16	01:55:57	-15.04125	-173.78981	2241.0	0.8	19.9	Beautiful colors on this sponge - purple white and reddish. There are a bunch of tiny sea stars living on this big bell-shaped sponge.	336
2017-12-16	01:57:23	-15.04134	-173.78988	2238.2	4.3	24.2	Mycid and tiny little brittle stars on this glass sponge. That was 25 cm across at least.	337
2017-12-16	01:57:53	-15.04133	-173.78978	2241.6	2.2	68.8	Another down drop here - a few meters step.	338
2017-12-16	01:58:12	-15.04115	-173.78956	2244.5	3.4	87.4	Back on the seafloor with broken up rock fragments.	339

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S104 Mata Taha Logger Comments	Record #
2017-12-16	01:58:48	-15.04137	-173.78983	2247.9	5.5	86.4	The water is really looking murky now.	340
2017-12-16	02:00:08	-15.04126	-173.78975	2258.7	2.1	87.9	There's another chimney-like structure here. Long stalk coral growing out of it. It's also tilting.	341
2017-12-16	02:00:23	-15.04123	-173.78979	2259.7	1.4	87.9	Sponge	342
2017-12-16	02:01:13	-15.04089	-173.78877	2260.6	1.8	87.7	Continuing on. Seeing what look like iridigorgia corals.	343
2017-12-16	02:01:49	-15.04120	-173.78990	2260.4	1.3	87.5	Bathypathes black coral.	344
2017-12-16	02:02:05	-15.04103	-173.78905	2259.4	2.3	86.4	Holothurian.	345
2017-12-16	02:02:37	-15.04101	-173.78876	2259.9	1.1	83.6	Brittle star on the move to get away from the fluff we stirred up.	346
2017-12-16	02:03:10	-15.04087	-173.78877	2259.4	2.4	88.4	Next we will head up to the summit.	347
2017-12-16	02:04:02	-15.04113	-173.78961	2259.0	2.2	87.7	Another iridigorgia.	348
2017-12-16	02:04:19	-15.04083	-173.78904	2256.8	2.7	88.3	Now we're in the sedimented plain.	349
2017-12-16	02:04:36	-15.04085	-173.78909	2254.8	3.4	104.8	To stbd we are seeing large pillow lavas - in place.	350
2017-12-16	02:05:27	-15.04108	-173.78899	2251.7	5.3	126.9	Huge pillows now - to stbd seeing more rocky debris.	351
2017-12-16	02:06:48	-15.04090	-173.78576	2247.2	1.3	252.4	We're at the top of a little crest on the seafloor here. Bill is going to go for a piece on large pillow with collapsed top.	352
2017-12-16	02:07:20	-15.04109	-173.78981	2247.1	0.9	333.4	Where are we?	353
2017-12-16	02:07:44	-15.04134	-173.78951	2245.8	2.1	332.1	Going to go in for a sample of this pillow lava lobe.	354
2017-12-16	02:08:15	-15.04130	-173.78950	2245.5	2.8	357.0	We stirred some stuff up.	355
2017-12-16	02:11:52	-15.04093	-173.78890	2248.0	1.6	117.0	Want to sample this in-place lava here. Seeing bulbous pillows "chunky-looking -as well as rubble strewn about.	356
2017-12-16	02:15:04	-15.04107	-173.78905	2247.6	0.0	115.8	**S104-rock-18**. Weathered large bulbous pillow with lots of cracking. Glass surface? Some vesicles; banding 15-29 cm long. From slabby crust. Grainy. Behind the major box	357
2017-12-16	02:16:21	-15.04094	-173.78904	2247.8	9.0	99.4	From the west base of the summit cone. Z=2247 15.041026 173.789131.	358
2017-12-16	02:16:49	-15.04095	-173.78903	2249.2	8.5	103.1	The first ROV dive ever at this volcano.	359
2017-12-16	02:17:49	-15.04076	-173.78843	2250.2	2.8	99.9	Rock fragments at the base of this slope.	360
2017-12-16	02:18:36	-15.04066	-173.78871	2247.4	3.3	100.2	Rock fragments at the slope base with stalked corals.	361

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S104 Mata Taha Logger Comments	Record #
2017-12-16	02:20:17	-15.04053	-173.78834	2243.8	3.1	100.1	We are now back into sediment country with few rocks here and there.	362
2017-12-16	02:20:39	-15.04058	-173.78866	2241.6	2.9	99.9	Large whip coral.	363
2017-12-16	02:21:42	-15.04051	-173.78814	2237.3	3.5	99.5	More rocks now somewhat covered in fine fluffy sediment (near WP 8).	364
2017-12-16	02:23:44	-15.04071	-173.78834	2232.2	2.4	99.4	Larger in situ lavas as we come up towards the summit of Taha.	365
2017-12-16	02:24:47	-15.04049	-173.78813	2231.1	2.1	100.0	Slabs of lavas with brown alteration surfaces covered in fluffy sediment.	366
2017-12-16	02:25:40	-15.04056	-173.78859	2230.0	0.0	104.8	Really; really old sediment slabs.	367
2017-12-16	02:25:57	-15.04048	-173.78813	2229.9	1.1	104.4	We're on a little high mound.	368
2017-12-16	02:27:07	-15.04073	-173.78856	2231.3	2.4	110.4	We're actually somewhat where the ROV appears on the screen - for the moment - whoops - it just made a 50m jump.	369
2017-12-16	02:27:33	-15.04066	-173.78783	2232.7	3.3	105.8	We're back in the sediments.	370
2017-12-16	02:27:42	-15.04069	-173.78784	2232.2	4.1	105.8	Big hole to stbd.	371
2017-12-16	02:28:40	-15.04082	-173.78814	2231.2	3.5	56.9	Patterns of burrowing in the sediment.	372
2017-12-16	02:30:12	-15.04072	-173.78793	2232.1	1.8	81.7	We're near waypoint 8 now. Maybe a bit to the east of it.	373
2017-12-16	02:31:05	-15.04055	-173.78768	2231.9	0.8	81.7	Heavily sedimented slope with more pits here and there.	374
2017-12-16	02:31:17	-15.04055	-173.78754	2232.0	0.4	81.5	We're in "pit" country now.	375
2017-12-16	02:31:54	-15.04078	-173.78756	2229.8	3.0	81.7	Looks like there are pillow lobes underneath this thick sediment and these pits.	376
2017-12-16	02:32:24	-15.04064	-173.78753	2228.3	3.2	80.8	Now we're looking at some lavas here with no sediment.	377
2017-12-16	02:33:01	-15.04024	-173.78405	2226.9	2.5	81.1	And now most of the pillow lobes are covered again.	378
2017-12-16	02:33:46	-15.04061	-173.78776	2224.1	3.6	81.3	Crinoid.	379
2017-12-16	02:34:04	-15.04068	-173.78797	2222.0	4.3	82.0	Now we're climbing up this slope - making our way toward the summit.	380
2017-12-16	02:34:18	-15.04062	-173.78743	2221.0	4.1	81.4	In place pillow tubes and lobes.	381
2017-12-16	02:34:46	-15.04051	-173.78719	2218.8	3.5	81.2	Still lots of sediment when the slope decreases - like now.	382
2017-12-16	02:37:08	-15.04036	-173.78655	2214.5	1.6	81.0	More pits to port - brittle stars - and sedimented seafloor forever stretching on in front of us....	383
2017-12-16	02:38:02	-15.04059	-173.78713	2212.0	2.1	81.8	Big long fat pillow here .	384

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S104 Mata Taha Logger Comments	Record #
2017-12-16	02:38:20	-15.04038	-173.78684	2210.5	2.5	80.9	Seeing more exposed lavas here.	385
2017-12-16	02:39:58	-15.04033	-173.78677	2200.5	4.0	81.2	Large pillow with pillow tubes extruding out the bottom.	386
2017-12-16	02:40:52	-15.04044	-173.78652	2200.1	1.3	81.0	Probably passed a couple of black corals.	387
2017-12-16	02:41:08	-15.04038	-173.78673	2199.5	1.4	81.4	Sediment moving on and on.	388
2017-12-16	02:41:19	-15.04041	-173.78663	2198.9	1.4	80.9	Lollipop corals to the right.	389
2017-12-16	02:41:59	-15.04030	-173.78652	2197.5	1.9	82.3	The nav is somewhat believable right now.	390
2017-12-16	02:42:16	-15.04030	-173.78652	2196.9	2.3	81.2	Large whip bamboo coral ahead.	391
2017-12-16	02:43:14	-15.04035	-173.78659	2198.4	0.0	78.3	We're moving in for a rock sample.	392
2017-12-16	02:43:37	-15.04035	-173.78652	2198.4	0.0	78.4	Sitting down next to a big bulbous pillow lava.	393
2017-12-16	02:53:39	-15.04029	-173.78604	2197.6	0.9	23.1	**S104-rock-19**. Piece of bulbous cracked crumbly sedimented pillow - knob and plate. Z=2198 m. highly oxidized exposed surface. Large vesicles. Glassy crust. 25x20 cm..	394
2017-12-16	02:55:04	-15.04053	-173.78600	2196.2	2.2	196.3	Sample location: 15.040306 173.786507.	395
2017-12-16	02:55:36	-15.04048	-173.78644	2195.6	3.5	193.4	The plan is to head to the summit. We're going to head to waypoint 10 - it's closer and higher.	396
2017-12-16	02:56:43	-15.04045	-173.78603	2194.0	2.0	134.6	We're going to head to the SE to the highest cone.	397
2017-12-16	02:57:05	-15.04044	-173.78591	2194.4	1.1	132.6	We're back over the lunar landscape again. Heavily sedimented seafloor.	398
2017-12-16	02:57:19	-15.04059	-173.78616	2194.9	0.7	133.4	Shrimp - brittle stars.	399
2017-12-16	02:58:21	-15.04108	-173.78712	2197.6	2.7	134.1	This volcano has very little volcanic ash in the sediments. Mainly appears to be pelagic - unlike all of the volcanoes we've visited on this expedition.	400
2017-12-16	02:59:03	-15.04077	-173.78568	2196.0	3.3	118.9	Going down a little ravine. Busted up pillow pile.	401
2017-12-16	03:02:06	-15.04116	-173.78556	2183.0	4.0	141.5	Some in-place pillows among the talus.	402
2017-12-16	03:04:32	-15.04152	-173.78540	2169.1	4.1	155.8	Talus slope and some stalks and sponges.	403
2017-12-16	03:05:02	-15.04158	-173.78536	2166.5	2.1	149.2	Urchin count: 6.	404
2017-12-16	03:05:11	-15.04157	-173.78529	2166.4	1.8	141.4	Anemone.	405
2017-12-16	03:10:38	-15.04166	-173.78525	2160.2	2.5	214.6	Not much sediment here. Lots of broken rock. Urchin count: 7.	406
2017-12-16	03:16:41	-15.04170	-173.78536	2161.4	1.0	210.9	**S104-rock-20**. 15x15 chunk of pillow rind. Prebroken. Mn-crust with large elongate vesicles on top. Drippy bottom. A couple of hydroids.	407
2017-12-16	03:17:26	-15.04169	-173.78584	2160.9	1.6	214.6	Rocks are exceptionally bubbly here.	408

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S104 Mata Taha Logger Comments	Record #
2017-12-16	03:19:23	-15.04183	-173.78599	2161.0	2.4	230.3	S104-rock-20 Location 15.041357 173.7855785 depth 2160m.	409
2017-12-16	03:19:30	-15.04186	-173.78611	2160.9	2.3	230.5	Found the Monolith.	410
2017-12-16	03:20:24	-15.04194	-173.78626	2159.9	3.2	230.2	Monolith has brisingids at its top.	411
2017-12-16	03:20:39	-15.04209	-173.78652	2159.1	3.8	230.0	Brittle stars at mid-Monolith.	412
2017-12-16	03:21:06	-15.04188	-173.78610	2161.0	1.3	231.1	Found a Mound. Similarly populated.	413
2017-12-16	03:22:08	-15.04225	-173.78642	2161.7	2.6	239.9	Both of these small highstanding features have a jumbly to rubbly texture.	414
2017-12-16	03:23:09	-15.04164	-173.78550	2160.8	2.0	35.6	Some in-place pillow lavas.	415
2017-12-16	03:23:22	-15.04164	-173.78566	2160.2	2.1	36.2	Urchin count: 8.	416
2017-12-16	03:25:00	-15.04177	-173.78535	2162.0	3.9	287.8	Urchin count: 10.	417
2017-12-16	03:32:27	-15.04179	-173.78600	2167.0	2.2	203.4	**S104-rock-21**. Part of the crust of a half-drained pillow tube near waypoint 11. ~7x15cm; breaking into two.	418
2017-12-16	03:39:31	-15.04151	-173.78563	2171.1	1.2	207.3	Russ	419
2017-12-16	03:49:45	-15.04176	-173.78589	2152.8	12.4	201.4	ROV Off Seabed	422

S105 Northern Dacite Flow

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S105 Northern Dacite Flow Logger Comments	Record #
2017-12-16	18:03:44	-14.88667	-173.94546	2833.9	5.8	114.9	On the bottom - Dive S105 at the Northern Dacite Flow.	20
2017-12-16	18:04:09	-14.87703	-173.94087	2836.3	3.9	127.3	Pile of talus.	21
2017-12-16	18:04:38	0.00000	0.00000	2837.7	2.7	133.1	Sedimented seafloor at the edge of this talus pile.	22
2017-12-16	18:05:06	-14.88666	-173.94603	2839.2	1.0	138.6	Sandy bottom here.	23
2017-12-16	18:05:29	-14.88772	-173.94609	2835.9	4.0	148.9	Brittle star.	24
2017-12-16	18:05:44	-14.88739	-173.94587	2835.3	4.8	136.5	Some burrows	25
2017-12-16	18:06:44	0.00000	0.00000	2834.2	5.3	133.6	We're going to head to the south over a high-standing mound in the middle of a depression.	26
2017-12-16	18:07:59	-14.88673	-173.94547	2821.0	3.8	133.3	Angular talus.	27
2017-12-16	18:08:13	-14.88662	-173.94543	2819.0	4.0	137.8	Stalked coral.	28
2017-12-16	18:08:24	-14.88719	-173.94558	2817.9	3.2	138.2	Angular rock - no pillow lava pieces.	29
2017-12-16	18:09:29	-14.88773	-173.94573	2808.8	3.1	154.3	Combination of coarse large and small angular fragments.	30

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S105 Northern Dacite Flow Logger Comments	Record #
2017-12-16	18:09:36	-14.88773	-173.94573	2808.6	2.6	157.4	In place rock here.	31
2017-12-16	18:10:09	0.00000	0.00000	2808.1	1.9	159.7	Very different look than what we've seen.	32
2017-12-16	18:10:48	-14.90234	-173.95128	2807.8	2.4	157.9	Fine rubbly layer on top of layered lavas.	33
2017-12-16	18:11:32	-14.88040	-173.93712	2808.0	2.1	159.7	There's a thick slab and another layer of broken-up lava (look like small flat pillows)..	34
2017-12-16	18:15:42	-14.88656	-173.94532	2807.9	2.1	159.2	Thick dense dacite flow on the bottom (layered) and small glassy outer crust - flatish surface. Z=2808. [aside: Dacite is 60% silica]	35
2017-12-16	18:21:48	-14.89299	-173.94407	2790.7	4.3	130.2	**S105-rock-01**. Glassy exterior with oxidized coating on interior. Stretched texture on the glass. Interior has a gray look. 7cm long. From a lava flow that's 1.5 m thick. No vesicles or crystals that can be seen.	36
2017-12-16	18:22:18	-14.88785	-173.94431	2792.1	3.6	132.6	Talus everywhere - Not much in place. Small ridges covered in pillows.	37
2017-12-16	18:22:25	-14.88658	-173.94492	2792.3	3.0	133.7	Coherent lava just up the slope.	38
2017-12-16	18:23:09	-14.88954	-173.94560	2788.2	2.8	131.5	NAV FIX FOR SAMPLE 1: 14.887193 173.946451.	39
2017-12-16	18:24:07	-14.88798	-173.94478	2784.8	1.3	131.7	Corals; Crinoids; Chrysogorgids; Probably a brancing bamboo; Whipped corals; all on a field of blocky talus.	40
2017-12-16	18:24:22	-14.88756	-173.94476	2784.0	1.4	131.8	Brittle star on a branching coral of some type.	41
2017-12-16	18:24:56	-14.88736	-173.94475	2784.3	3.6	138.9	Steep rock face that steps down. All this could be landslide debris.	42
2017-12-16	18:25:41	-14.88803	-173.94475	2784.4	1.5	145.5	Large lava block talus - actually all sizes of debris here.	43
2017-12-16	18:25:50	-14.88803	-173.94475	2784.5	1.4	151.9	Could be coherent lavas ahead.	44
2017-12-16	18:26:16	-14.88801	-173.94467	2786.4	1.0	123.6	Can't tell if that's in place.	45
2017-12-16	18:26:29	-14.88727	-173.94446	2786.2	0.0	101.3	Thicker more coherent pieces of lava here.	46
2017-12-16	18:26:45	-14.88756	-173.94451	2784.7	2.3	76.3	Larger blocks in a line - they are broken.	47
2017-12-16	18:27:12	0.00000	0.00000	2783.4	2.6	52.3	Lots of rubble - and some bigger blocks that are somewhat coherent.	48
2017-12-16	18:27:30	-14.88808	-173.94476	2784.3	1.7	114.4	We're near the top of the slope.	49
2017-12-16	18:27:50	-14.88752	-173.94462	2784.4	2.0	130.8	We're backing off a bit in search of coherent lavas.	50
2017-12-16	18:28:17	-14.87341	-173.95704	2782.2	3.4	147.2	Probably just fragments here and not in place.	51
2017-12-16	18:28:25	-14.88232	-173.94976	2781.1	5.0	132.4	We're going to continue on.	52
2017-12-16	18:28:32	-14.88454	-173.94941	2782.3	3.9	130.8	Lots of stuff in the water.	53
2017-12-16	18:28:51	-14.88112	-173.93875	2785.8	3.2	135.2	Just a bunch of loose blocks here.	54

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S105 Northern Dacite Flow Logger Comments	Record #
2017-12-16	18:29:00	-14.87681	-173.93576	2785.9	4.3	133.5	Could be a coherent ridge here.	55
2017-12-16	18:29:24	-14.87698	-173.93450	2790.8	2.3	141.2	Possibly in place here and just above here.	56
2017-12-16	18:29:56	-14.88737	-173.94397	2791.7	2.6	143.9	These rocks here are clearly in place - verging on pillow-like forms.	57
2017-12-16	18:30:10	-14.88744	-173.94402	2792.9	1.4	152.7	Very coarse exterior texture.	58
2017-12-16	18:30:41	-14.88482	-173.93966	2794.0	0.9	158.5	It does have that "buffalo hair" texture on the outer crust of this pillow-type rock.	59
2017-12-16	18:30:57	-14.88758	-173.94456	2794.0	1.0	158.5	Sponge on this pillow.	60
2017-12-16	18:37:18	-14.88752	-173.94425	2794.0	0.8	159.0	**S105-rock-02**. Pillow-like structure with buffalo-hair outer striated rind - very glassy underneath (shiny); obsidian-like. Long angular piece of black glass with a small bit of gray interior. 25cm long - pointy end. 14.8879879 173.9444424.	61
2017-12-16	18:37:36	-14.88847	-173.94432	2791.3	3.7	160.5	Looking around at the top of this little ridge - 30 - 40 m high.	62
2017-12-16	18:38:17	-14.88660	-173.94428	2791.8	1.8	161.6	Pillow lavas somewhat bulbous producing a lot of debris - broken. Corals growing on them.	63
2017-12-16	18:38:59	-14.89547	-173.94345	2791.1	1.7	161.5	Large dimeter pillows a meter or more. Also some thick slabs of rock here. Lots of in place broken lavas here.	64
2017-12-16	18:41:04	-14.88760	-173.94413	2788.2	2.3	162.3	We're at waypoint 2. Bob wants the lasers on.	65
2017-12-16	18:41:34	-14.87519	-173.95552	2788.6	1.9	162.4	Lots of large pillows here along this ridge.	66
2017-12-16	18:42:11	-14.89168	-173.96259	2787.4	2.3	161.5	In place blocky and pillow lava types. Tons of rocky debris all around.	67
2017-12-16	18:42:47	-14.88484	-173.94245	2787.0	2.0	161.6	Chrysogorgia-like corals on these pillow pieces.	68
2017-12-16	18:42:52	-14.88542	-173.94258	2786.8	2.0	161.5	Bulbous pillow.	69
2017-12-16	18:43:56	-14.88797	-173.95090	2784.5	2.5	161.5	Elongated pillows here with fragments surrounding them - these pillows tend to break apart.	70
2017-12-16	18:44:05	-14.88832	-173.94283	2784.2	2.3	161.4	Large stalk coral.	71
2017-12-16	18:44:49	-14.88905	-173.94414	2783.5	3.7	161.2	We're on the top of a mound at 2784 m. About 1 km x 1.5 km mound.	72
2017-12-16	18:45:49	-14.88780	-173.94350	2784.4	1.4	161.4	Very large bulbous pillows surrounded by rubble.	73
2017-12-16	18:46:32	-14.90526	-173.95282	2784.5	1.2	161.1	A lot more corals growing in this area of pillows.	74
2017-12-16	18:47:02	-14.88806	-173.94354	2785.0	1.5	161.4	Butterfly net sponge.	75
2017-12-16	18:47:34	-14.88860	-173.94374	2786.3	2.4	161.8	The slope in front of us has more elongate lavas - almost lobate here and there.	76

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2017-12-16	18:47:54	0.00000	0.00000	2787.3	3.2	161.6	Platy-looking rocks interspersed.	77
2017-12-16	18:49:01	-14.88792	-173.94360	2788.8	2.5	161.5	Going in for a sample.	78
2017-12-16	18:49:09	-14.88792	-173.94360	2789.2	2.3	161.4	Lots of corals here.	79
2017-12-16	18:49:22	-14.88885	-173.94358	2789.1	2.3	161.9	Some of these pillows are a little bit squat.	80
2017-12-16	18:49:30	-14.88907	-173.94369	2788.6	2.6	162.2	Sponges.	81
2017-12-16	18:50:18	-14.89534	-173.94253	2790.1	3.8	101.4	Going to look for a pillow that we can sample.	82
2017-12-16	18:50:37	-14.88898	-173.94389	2790.8	3.6	82.9	Peter	83
2017-12-16	18:51:34	-14.88797	-173.94359	2792.4	2.6	48.5	Upper part of a platy pillow.	84
2017-12-16	18:52:01	-14.88763	-173.94363	2793.2	1.4	48.7	This pillow is a bit more elongate and squat.	85
2017-12-16	18:57:44	-14.88843	-173.94353	2793.4	1.0	49.3	**S105-rock-03**. Piece from pillow with exposed fresh glassy interior and some banding. Different texture glass on interior than exterior for these lavas. Nice 10cm piece of outer layer with buffalo hair.	86
2017-12-16	19:01:42	-14.88860	-173.94358	2793.1	1.5	47.0	**S105-rock-04**. Same pillow - Ken wants a different number. Z=2793m. 14.8891448 173.9437913. Piece from interior. Some orange staining on 1 side. Massive with conchoidal-like fracture.	87
2017-12-16	19:02:39	-14.88902	-173.94350	2790.4	3.5	91.0	NAV INFO: Z=2793m. 14.8891448 173.9437913. for samples 3 and 4 which came from the same rock but for some reason were given different sample numbers.	88
2017-12-16	19:03:05	-14.88866	-173.94367	2792.4	2.9	90.0	The navigation is bouncing around but not too bad today.	89
2017-12-16	19:03:49	-14.88862	-173.94326	2794.0	5.5	109.1	Pillows along this gentle slope. A bit more coherent. Lots of rubble pieces large and small	90
2017-12-16	19:04:01	0.00000	0.00000	2795.6	3.7	107.9	This pillow looks slightly drained out.	91
2017-12-16	19:04:41	-14.88856	-173.94340	2800.7	2.7	120.5	Some sediment on the pillows here.	92
2017-12-16	19:05:08	-14.88917	-173.94325	2801.9	3.1	105.9	There is a pocket of sediment here with some black grains (mostly sandy colored).	93
2017-12-16	19:05:21	-14.88917	-173.94325	2802.9	3.0	64.4	We're going to scoop up some of that sediment.	94
2017-12-16	19:05:54	-14.88837	-173.94329	2805.2	0.7	65.5	Small sediment pocket in this depression between pillows with rough exterior texture.	95
2017-12-16	19:06:13	-14.88749	-173.95581	2805.3	0.0	65.5	Seeing a little stratigraphy in the seds - a bit of a crust look to it.	96

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2017-12-16	19:11:00	-14.88850	-173.94324	2805.3	0.7	65.6	**S105-sed-05**. Bag #4: Scoop of orangish surface with a bit of crusty layering. Got some of the coherent grayish crust topped with orangish crust.	97
2017-12-16	19:15:53	-14.87999	-173.93862	2805.3	0.0	65.0	Z=2805. 14.8892748 173.9431381. Pasty orange coating on the bag. Orange crusty layer; mustard yellowish green layer; Thicker layer of darker material; also some gray coarse volcanic sand.	98
2017-12-16	19:17:06	-14.89185	-173.94444	2805.3	0.0	65.5	That crust continues and the thickness of the layers is not constant.	99
2017-12-16	19:17:47	-14.89144	-173.94442	2805.3	0.0	65.3	Zoom on pillow rind in front of us.	100
2017-12-16	19:18:35	-14.88875	-173.94352	2805.3	0.0	65.2	Some critters. Coral and holothurians. Brown sponge?	101
2017-12-16	19:18:49	-14.88396	-173.94434	2805.3	0.8	65.6	Weird fossil pattern in the sediment.	102
2017-12-16	19:19:45	-14.88895	-173.94339	2802.8	3.2	156.8	Huge bulbous pillow with lots of glass broken off. Couple meters of pillow.	103
2017-12-16	19:19:54	-14.88891	-173.94344	2803.2	2.8	163.4	Hard to sample these pillows.	104
2017-12-16	19:21:38	-14.88791	-173.94276	2804.0	2.5	159.2	Pillows are really broken up and some fracture along plains (conchoidal). Others are fractured more chaotically.	105
2017-12-16	19:21:47	-14.88720	-173.94206	2804.1	2.0	159.1	Massive interior of this pillow.	106
2017-12-16	19:22:30	-14.88902	-173.94343	2804.1	2.2	161.6	Lots of pillow fragments here - talus.	107
2017-12-16	19:22:52	0.00000	0.00000	2803.7	1.7	162.6	This rock likes to break apart - except when we're sampling it.	108
2017-12-16	19:24:06	-14.88735	-173.94248	2799.7	2.2	143.3	We're on our way to waypoint 3.	109
2017-12-16	19:24:16	-14.88999	-173.94398	2799.0	2.9	142.3	More blocky interior flow ahead of us.	110
2017-12-16	19:25:11	-14.88919	-173.94402	2797.4	2.7	142.5	Broken up pillow on top - more blocky on the bottom. We want to go into the interior of this to see the texture.	111
2017-12-16	19:29:54	-14.88818	-173.94304	2795.0	0.0	142.4	**S105-rock-06**. Piece from the blocky pillow interior. Massive interior. Elongate angular piece. 25cm long. Pillow interior. Z=2797. 14.8896350 173.9433376.	112
2017-12-16	19:31:09	-14.88919	-173.94345	2789.9	3.5	155.7	We're moving up a talus covered slope with in place broken up pillows here and there.	113
2017-12-16	19:31:16	-14.89000	-173.94356	2790.2	3.9	146.8	On top of a ridge.	114
2017-12-16	19:32:08	-14.88906	-173.94295	2798.4	4.1	98.5	Undulating talus ridges.	115
2017-12-16	19:32:31	-14.88981	-173.94343	2801.5	4.2	95.6	Some in place rock units with rocky fragments on top.	116

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2017-12-16	19:33:12	-14.90077	-173.94911	2807.4	4.8	96.5	Coming down slope to the south and looking to the ease.	117
2017-12-16	19:33:44	-14.89628	-173.94687	2811.1	3.6	103.4	At the base of this mound now. Sedimented area are the base of this slope.	118
2017-12-16	19:34:25	-14.89016	-173.94337	2811.5	3.3	107.6	We're going to try a push core down here on this sedimented plain.	119
2017-12-16	19:35:49	0.00000	0.00000	2814.6	0.0	106.5	We're close to waypoint 3 now.	120
2017-12-16	19:36:54	-14.87871	-173.93253	2814.6	0.0	106.5	Going for the dip stick to see how thick the seds are.	121
2017-12-16	19:38:07	-14.87164	-173.93476	2814.6	0.0	108.5	Burrows in the sediment - sea cucumber in the distance.	122
2017-12-16	19:38:16	-14.87164	-173.93476	2814.6	0.0	108.5	20 cm thick here.	123
2017-12-16	19:39:17	-14.89037	-173.94329	2814.5	0.0	107.0	40 cm+ sed thickness.	124
2017-12-16	19:41:24	0.00000	0.00000	2814.5	0.0	107.0	Going to use a core without a catcher.	125
2017-12-16	19:50:28	-14.88948	-173.94276	2814.5	0.0	102.4	**S105-sed-07**. Core #2. Buff-colored sed surface. Harder layers in there. Darker sediments in the bottom are coarser (volcaniclastic ash?) and buff colored seds (pelagic) on top. Z=2815. 14.8903206 173.9433119.	126
2017-12-16	19:51:48	-14.88960	-173.94297	2814.5	0.0	102.4	Stowing the dip stick before we take off.	127
2017-12-16	19:52:07	-14.89026	-173.94329	2814.5	0.0	102.4	The dip stick just fell to the ground.	128
2017-12-16	19:52:53	-14.88978	-173.94313	2814.5	0.0	102.4	Sitting here on extensive patch of sediment here.	129
2017-12-16	19:53:02	-14.88995	-173.94323	2814.5	0.0	102.4	Doing a bit of housekeeping.	130
2017-12-16	19:55:15	-14.88325	-173.93680	2812.7	2.1	107.8	And we're off.	131
2017-12-16	19:55:34	-14.88910	-173.94280	2812.2	2.2	181.6	The sedimented are is in the local low at 2812 meters.	132
2017-12-16	19:56:56	-14.88737	-173.94300	2812.9	2.0	206.4	Something sticking out of the seds. Snail?	133
2017-12-16	19:57:11	-14.88737	-173.94300	2813.6	1.4	205.5	Fish - rattail?	134
2017-12-16	19:57:59	-14.89013	-173.94335	2815.0	0.0	204.2	Now we're seeing some coarse darker pebbly-looking sediment here - certainly a part of the dacite. There is rock beyond us.	135
2017-12-16	20:01:00	-14.89902	-173.94208	2814.9	0.0	204.4	**S105-sed-08**. Going for coarse pebbles on top of the buff layer (at the distal edge of fragmented slope) Z=2815.	136
2017-12-16	20:03:01	-14.89081	-173.94346	2814.8	0.0	205.1	Scoop #3: Grabbing thick layer of coarse pebbles that overlay buff-colored seds. Pebble layer is ~10 cm thick and various sizes.	137

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2017-12-16	20:06:24	-14.89059	-173.94347	2814.9	0.0	204.8	The buff-colored layer is sticky is somewhat coherent. 14.8913405 173.9436663.	138
2017-12-16	20:07:13	-14.89010	-173.94317	2814.9	0.0	204.8	Coarse pebbles Roundish. The buff colored sediment also has particles in it.	139
2017-12-16	20:08:42	-14.89474	-173.94309	2814.6	0.0	205.0	Glass sponge - looks like a patch of grass.	140
2017-12-16	20:09:33	-14.88946	-173.94298	2812.9	1.8	205.3	Approaching sediment-talus contact and seeing some stalked corals and sponges. Crysogorgia. Older rocks given overgrowth.	141
2017-12-16	20:09:58	-14.89054	-173.94358	2812.9	1.4	205.6	Sea cucumber.	142
2017-12-16	20:10:14	-14.89078	-173.94367	2812.0	1.8	206.1	Slope is increasing in steepness.	143
2017-12-16	20:11:23	-14.89022	-173.94342	2809.8	2.0	204.9	Sponges on larger talus boulder. Hydroid growth too. Brisingid.	144
2017-12-16	20:11:42	-14.89093	-173.94348	2809.3	1.9	205.3	Talus sorting becoming poorer - more large boulders.	145
2017-12-16	20:13:40	-14.88990	-173.94312	2802.6	1.7	209.3	Another sea cucumber and a few other stalked organisms among the talus.	146
2017-12-16	20:13:48	-14.88985	-173.94305	2802.1	1.6	209.2	Tall corals as slope gentles.	147
2017-12-16	20:14:36	-14.90264	-173.94375	2799.3	1.6	209.2	Found a little in-place lava.	148
2017-12-16	20:15:29	-14.89031	-173.94338	2796.6	1.8	209.2	Some debris has patchy orange staining.	149
2017-12-16	20:17:11	-14.89076	-173.94341	2789.0	1.6	209.1	Water becoming a bit more sediment-rich/smoky.	150
2017-12-16	20:18:43	-14.88791	-173.94213	2786.0	3.6	142.8	Moving across top of talus and slightly downhill; contacts rippled sediment.	151
2017-12-16	20:20:00	0.00000	0.00000	2789.6	2.1	169.6	Sand is coarse with ripples and patches featuring fewer ripples/rippled in different directions.	152
2017-12-16	20:22:16	-14.88955	-173.94687	2791.7	0.0	170.5	Deploying depth probe - checking this area out for a pushcore sample.	153
2017-12-16	20:23:55	-14.88634	-173.94322	2791.7	0.0	168.2	Sediment <10cm thick - no pushcore. We're going to scoop.	154
2017-12-16	20:35:13	-14.89193	-173.94313	2791.7	0.0	175.8	**S105-sed-09**. Scoop of sediment lens next to talus contact. Shallow lens with coarse fragments and some pumice clasts. Trying to get a good representation of the size fractions present. Location: 14.8919000 173.9437271 depth 2792m.	155
2017-12-16	20:38:56	-14.89041	-173.94235	2790.0	1.1	203.0	Approaching edge of sediment lens and into more talus.	156
2017-12-16	20:42:24	-14.89154	-173.94319	2784.1	2.7	202.2	Some stalked corals and stalked crinoid.	157
2017-12-16	20:43:31	-14.89026	-173.94104	2781.4	2.3	203.5	Talus sleep steepened here. Moving upslope.	158

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2017-12-16	20:44:20	-14.89176	-173.94346	2777.1	4.2	253.7	Urchin count: 1.	159
2017-12-16	20:45:50	-14.87389	-173.96082	2771.5	2.9	221.7	There are patches of relatively coherent in-place rock. It's very fractured though.	160
2017-12-16	20:48:31	-14.89156	-173.94330	2766.6	1.7	219.8	Met the slope break to flat high at 2767m. Lots of in-place but broken rock here.	161
2017-12-16	20:49:03	-14.89118	-173.94329	2764.9	3.9	211.0	Lots of debris here - also lots of large highstanding pillow lavas.	162
2017-12-16	20:49:20	-14.89142	-173.94299	2765.2	4.1	164.3	High sediment load in the water column.	163
2017-12-16	20:50:39	-14.88622	-173.93584	2770.9	4.4	133.2	Seeing sediment up here.	164
2017-12-16	20:51:42	-14.89718	-173.95141	2776.6	2.8	100.6	Small rocky slope contacting another sediment lens up here.	165
2017-12-16	20:55:22	-14.89684	-173.95747	2777.9	4.2	209.1	Lots of rocky talus as we continue upslope.	166
2017-12-16	20:57:11	-14.88471	-173.93890	2771.2	3.3	209.0	Some stalked coals and crinoids. Brisingids here and there.	167
2017-12-16	20:57:26	-14.88706	-173.94029	2769.5	3.4	208.9	Some patchy Fe stains on fracture surfaces again.	168
2017-12-16	20:58:34	-14.89383	-173.94523	2768.0	2.8	208.8	Waiting for the ship to catch up.	169
2017-12-16	21:03:00	-14.89292	-173.94462	2749.9	2.9	209.0	Starting to move again. Some rocks have interesting textures on a side that looks like mudcracks - possibly drip pattern from underside of a crust?	170
2017-12-16	21:03:08	0.00000	0.00000	2749.2	2.7	209.2	Hydroids.	171
2017-12-16	21:04:32	-14.89270	-173.94461	2742.1	2.5	209.8	Chrysogorgia.	172
2017-12-16	21:04:43	-14.89257	-173.94457	2740.7	2.8	209.5	Chrysogorgia and some squat lobsters.	173
2017-12-16	21:04:52	-14.89244	-173.94455	2740.0	2.6	209.6	Sponge with a brittle star.	174
2017-12-16	21:05:30	0.00000	0.00000	2736.7	2.2	208.9	Moving into relatively flat area with bigger blocks. Huge brisingid.	175
2017-12-16	21:07:07	-14.89118	-173.94933	2730.2	1.7	210.5	Possible landslide structures where smaller debris appears to be channelized.	176
2017-12-16	21:08:19	-14.90387	-173.95136	2725.9	0.0	209.0	Corals/sponges/brisingids in view.	177
2017-12-16	21:08:46	-14.88900	-173.95753	2723.8	2.5	209.2	Spotted a wall of what appears to be in-place rock in the background.	178
2017-12-16	21:10:26	-14.89307	-173.94496	2718.4	4.1	208.8	Dikes.	179
2017-12-16	21:11:06	-14.89988	-173.94788	2713.9	5.5	209.0	Lots of dikes.	180
2017-12-16	21:11:47	-14.90171	-173.94865	2711.2	0.0	222.5	Looking for a place to samples.	181

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S105 Northern Dacite Flow Logger Comments	Record #
2017-12-16	21:25:57	-14.88272	-173.96410	2707.5	0.0	183.9	**S015-rock-10**. Chunk of dike rock from wall of rock near waypoint 4. Columnar joints and some curved fracture planes. Faceted. 25x20cm. Mn coat and evidence of prior Fe stains. Location: 14.8932083 173.9452427 depth 2707.5m.	182
2017-12-16	21:29:00	-14.89225	-173.94519	2697.7	0.0	221.0	Got to be a fault scarp since these are intrusive features. Some Fe staining in patches here and there. Complex textural fabrics and joint patterns in the dikes.	183
2017-12-16	21:29:52	-14.89069	-173.93676	2695.4	0.0	221.8	As we continue to ascend we have hit the apparent contact between the dikes and pillows.	184
2017-12-16	21:30:38	-14.87711	-173.96404	2692.5	0.0	237.8	Pillows about 1.5m thick.	185
2017-12-16	21:30:56	-14.87261	-173.95950	2691.7	2.4	238.1	2692m.	186
2017-12-16	21:31:28	-14.88450	-173.95243	2690.1	3.8	237.7	Pillows are in place but heavily fractured. Fracture planes are highly curved unlike the dikes beneath.	187
2017-12-16	21:31:35	0.00000	0.00000	2690.0	4.5	237.9	Urchin count: 2.	188
2017-12-16	21:31:58	-14.89677	-173.95312	2688.7	4.9	238.1	Cm-scale ropy/folded surface structures visible on some of the more intact pillows.	189
2017-12-16	21:32:31	-14.89320	-173.94366	34.7	1501.9	0.0	Buffalo head hair is the textural term we using for the ropy surface textures.	190
2017-12-16	21:44:38	-14.88763	-173.95348	2687.6	4.5	223.5	Russ	191
2017-12-16	21:49:21	-14.89310	-173.94548	2687.1	1.8	337.7	**S105-rock-11**. Chunk of glassy pillow overlying the dike complex. 10x10cm. Piece has "buffalo head hair" texture where glass rind is intact. Location 14.8961433 173.9452471 depth 2688m.	192
2017-12-16	21:50:53	-14.89283	-173.94542	2685.6	6.3	222.7	On we go ...up the steep slope of in situ lava and pillow fragments.	193
2017-12-16	21:51:24	-14.89288	-173.94543	2685.6	4.5	208.4	Much more in place pillow lavas here.	194
2017-12-16	21:53:17	-14.88917	-173.94550	2684.5	4.0	205.0	Several corals and crinoid ion large pillow.	195
2017-12-16	21:53:33	0.00000	0.00000	2683.5	0.0	207.2	Large branching coral.	196
2017-12-16	21:54:16	-14.89369	-173.94544	2679.3	2.8	206.8	High effusion rate rough and jagged in place lava here ...	197
2017-12-16	21:54:32	-14.89369	-173.94544	2680.4	0.9	206.9	Getting ready to sample ...	198
2017-12-16	21:58:25	-14.89295	-173.94546	2680.7	0.0	207.8	Swirly-looking outer crust on this pillow-jumbly looking lava. Going for the elongate glassy interior piece to the side.	199

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S105 Northern Dacite Flow Logger Comments	Record #
2017-12-16	22:01:45	-14.89258	-173.94528	2682.3	1.2	207.1	**S105-rock-12**. Massive flow interior of jumbly sheet-like flow. Black shiny whole coherent fold. 20x15 cm. Into biobox 3. Z=2680. 14.8961066 173.9448542.	200
2017-12-16	22:03:24	-14.87795	-173.95141	2685.3	1.8	147.1	We've come up out of the drain-out valley. We've climbed out of that depression and are now up on the rim to the SE of WP4.	201
2017-12-16	22:03:49	-14.88790	-173.93957	2689.1	0.9	147.5	We're going to start driving toward WP 5 now.	202
2017-12-16	22:04:04	-14.88790	-173.93957	2689.6	2.0	147.7	Nav is bad - again.....	203
2017-12-16	22:04:52	-14.89555	-173.94433	2690.1	1.8	147.6	Huge pillow lobes up here. Jumbled up lavas among these large pillow lobes.	204
2017-12-16	22:06:36	-14.88436	-173.94414	2691.5	2.7	147.4	The pillow lobes are flattening out here. Broken up jumbly look to them.	205
2017-12-16	22:08:20	-14.89061	-173.95372	2695.0	1.2	147.5	Some flows are partially drained.	206
2017-12-16	22:11:26	-14.89450	-173.94294	2697.9	3.6	146.8	Shrimp.	207
2017-12-16	22:12:13	-14.89341	-173.94495	2695.6	5.1	146.9	Rather ferocious-looking black urchin in foreground.	208
2017-12-16	22:13:17	-14.89473	-173.94475	2698.1	2.7	146.6	Mostly flattened lobate flow here but we do see a few bulbous pillows. Not very large; diameter is similar to the lobates.	209
2017-12-16	22:20:06	-14.89527	-173.94421	2685.4	4.6	185.9	Less sediment here - pillows are a little rounder.	210
2017-12-16	22:22:28	-14.89542	-173.94441	2687.9	2.2	216.0	Large branched coral signaling still pretty old lavas. Comparable to other large corals we've seen previously. In good agreement with the hypothesis that these lavas were emplaced over a rather short time period.	211
2017-12-16	22:31:27	-14.89550	-173.94454	2680.9	2.7	154.7	Pillows getting larger/more elongate/less flattened.	212
2017-12-16	22:31:38	-14.89661	-173.94428	2680.6	2.4	154.9	Lenses of locally spalled talus between flows.	213
2017-12-16	22:33:03	-14.89500	-173.94435	2677.7	2.5	144.5	Some flattened pillows with fairly large fractures.	214
2017-12-16	22:33:14	0.00000	0.00000	2676.0	4.6	145.7	Gorgia corals.	215
2017-12-16	22:43:10	-14.89517	-173.94422	2677.7	0.6	79.8	**S105-rock-13.** Pillow crust from flat region along approach to waypoint 5. Fresh glassy with some Fe stains and radial banding. Pillows here are slightly squat with buffalo head hair glass texture. Location 14.8963248 173.9444023 depth 2678m.	216
2017-12-16	22:44:39	0.00000	0.00000	2677.0	1.6	126.0	More sediment on lobes as we resume transit.	217
2017-12-16	22:48:17	-14.89592	-173.94377	2683.7	3.9	130.1	Moving off the flat a bit and overlooking a slope with a mix of in-place pillows and lots of poorly-sorted debris.	218

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S105 Northern Dacite Flow Logger Comments	Record #
2017-12-16	22:48:28	-14.89657	-173.94399	2685.7	5.2	131.1	Water is smokier here than it has been in a while.	219
2017-12-16	22:49:28	-14.89940	-173.94282	2693.0	3.7	134.1	Talus has a lot of the spherical bulbous pillows.	220
2017-12-16	22:53:59	-14.89709	-173.94374	2713.9	5.3	107.7	Very large talus. Most is near-in place.	221
2017-12-16	22:55:59	-14.89817	-173.94347	2710.9	3.9	125.9	Lava flow is very rubbly. Coming up to textural contact where pillows increase and rubble decreases. Moving off flat and back onto slope.	222
2017-12-16	22:56:58	-14.89773	-173.94353	2713.4	3.0	129.6	Large bulbous pillows surrounded by lots of debris.	223
2017-12-16	22:57:14	-14.89780	-173.94352	2714.2	2.8	129.9	Slope gets a little steeper here.	224
2017-12-16	22:59:43	0.00000	0.00000	2699.1	6.5	117.5	More talus and less pillows. Pillows also getting smaller.	225
2017-12-16	23:01:21	-14.89765	-173.94281	2691.8	4.6	110.2	Back on top of a flat high - somewhere in the vicinity of waypoint 5. Rubble instantly gives way to sedimented lobate squat pillows.	226
2017-12-16	23:03:13	0.00000	0.00000	2682.8	6.9	108.6	Fracture pattern in rocks is highly arcuate. Yields a lot of small rounded pieces as well as the more typical radial/irregular angular fragments.	227
2017-12-16	23:12:46	-14.89918	-173.94213	2678.8	4.2	138.9	**S105-bio-14**. Chrysogorgia (tentative ID; looks odd; "Puff Daddy") sample with a squat lobster in the center. Location 14.8983133 173.9422745 depth 2682m.	228
2017-12-16	23:13:03	-14.89881	-173.94237	2677.5	5.3	138.8	Resuming transit.	229
2017-12-16	23:17:09	-14.90562	-173.96462	2675.7	1.4	124.5	Lobes showing arcuate fracture patterns under the buffalo head hair glass.	230
2017-12-16	23:17:43	-14.90540	-173.96223	2674.4	3.2	123.9	Large pillows here. More bulbous and often strongly inflated.	231
2017-12-16	23:18:46	-14.89849	-173.94172	2675.6	3.1	122.8	Elongate flows off of some of the large bulbous heads.	232
2017-12-16	23:19:44	-14.91454	-173.94404	2673.4	5.5	126.6	Very high sediment load in the water column here.	233
2017-12-16	23:21:05	-14.89886	-173.94161	2673.3	4.2	122.4	Sediment load on pillows in increasing.	234
2017-12-16	23:30:03	0.00000	0.00000	2676.3	1.0	135.5	**S105-rock-15**. Chunk of pillow crust with perfect buffalo head hair glass rind. Location 14.8993756 173.9415846 depth 2676m.	235
2017-12-16	23:37:04	-14.90383	-173.95862	2675.6	2.1	145.8	**S105-sed-16.** Scoop of very fine sediment sitting atop pillows.	236
2017-12-16	23:37:09	-14.90383	-173.95862	2675.0	3.1	146.3	Moving again.	237
2017-12-16	23:38:28	-14.92187	-173.93673	2671.8	4.5	147.5	Flows here are yuuuuge.	238

Date	Time	Latitude	Longitude	Depth	Altitude	Heading	S105 Northern Dacite Flow Logger Comments	Record #
2017-12-16	23:41:39	-14.90006	-173.94098	2672.6	3.0	148.1	Large lava flows are interspersed with well-sedimented folded and jumbled debris.	239
2017-12-16	23:45:43	-14.90106	-173.94050	2683.1	1.7	93.3	Final survey of the area between waypoints 5 and 6. Beautiful large striated pillows surrounded by spalled off debris.	240
2017-12-16	23:46:44	0.00000	0.00000	2687.6	4.1	130.4	Moving down a small slope and finding lots of large pillow boulders and debris. Some of this is in place. Silty water.	241
2017-12-16	23:49:10	-14.89970	-173.94041	2690.8	2.9	34.2	Moving along slope edge. Lots of broken and smaller pillows.	242
2017-12-16	23:49:25	-14.89998	-173.94015	2690.3	4.7	340.8	Arcuate fracture patterns. These are very brittle rocks.	243
2017-12-16	23:53:15	-14.89974	-173.93659	2699.9	4.0	118.7	Still a lot of fragmental debris and some fine-grained sediments here. Lots of intact pillows under seds too.	244
2017-12-16	23:59:10	-14.89964	-173.93942	2705.7	0.6	64.2	**S105-rock-17**. Chunk of rock with thicker ropy texture on flat top - somewhere west of waypoint 6. Location 14.9006223 173.9393462 depth 2706m.	245
2017-12-17	00:08:16	-14.89685	-173.93749	2702.5	3.5	7.0	**S105-rock-18.** Christmas gift from the ROV pilots. "Dirtbag" 10x15cm with orange sediment coating on bottom. 14.9006223 173.9393462 depth 2706m.	246
2017-12-17	00:09:04	-14.89947	-173.93967	2706.4	3.7	195.0	Off bottom. End of Dive 105. End of expedition!	247