

FROM THE GLACIER TO THE GULF - Update 8/22/14

This document is a brief update of the status of each observation platform in the 2014 Prince William Sound/Gulf of Alaska OA study.

Note this update follows the update on 7/25/14. There was no update on 8/8/14.

21 days until the recovery cruise begins (9/12/14).

Unit 156 Slocum Glider:

Action Items:

Build and apply oxygen algorithm to glider data. The new GOA-IERP data has been acquired and is being incorporated into this process.

Design comparisons between glider data, NDBC met buoy data, AVISO SSHA, and satellite nLw products.

Scott and Nick have completed the two peripheral sample lines to the Seward Line. On the inside of the western sampling line, the glider became trapped under a very fresh surface layer. Scott was able to regain control of the glider when it cleared the freshwater mass, which is likely melt water from the glaciated Kenai Fjords. The glider is now being piloted south and then east back to the Seward Line.

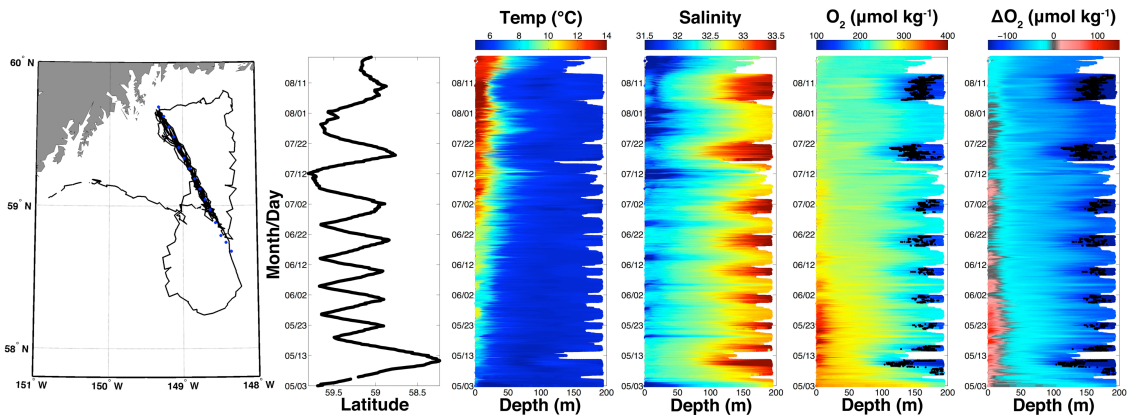


Figure 1: From left to right: map of Slocum glider track from May 3 to July 23, position of the Slocum glider in latitude versus time (mm/dd), Hovmuller plot of temperature ($^{\circ}\text{C}$), salinity, O_2 ($\mu\text{mol kg}^{-1}$) and ΔO_2 ($\mu\text{mol kg}^{-1}$). ΔO_2 is O_2 minus O_2 at saturation. Black dots in oxygen plots are the depth of the 26.2 potential density surface.

Fairweather Express II (FWX2):

Fleet Manager Josh Hillestad sent data on 7/31. On 8/22 we are getting the recent data plus Josh is riding the ship to collect the 2nd to last set of calibration samples. The last set will be taken sometime about 9/4, and Geoff is planning to travel to Seward to breakdown the system about the 3rd week of September.

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Josh called today and said there was a power failure for the CO₂ system. It looks like that happened on 8/13. He has restarted the system and send new data back tonight.

Action items:

Complete Matlab data handling routines.

Compute omega from pCO₂ and alkalinity derived from salinity using new piecewise alkalinity-salinity relation for low salinity water.

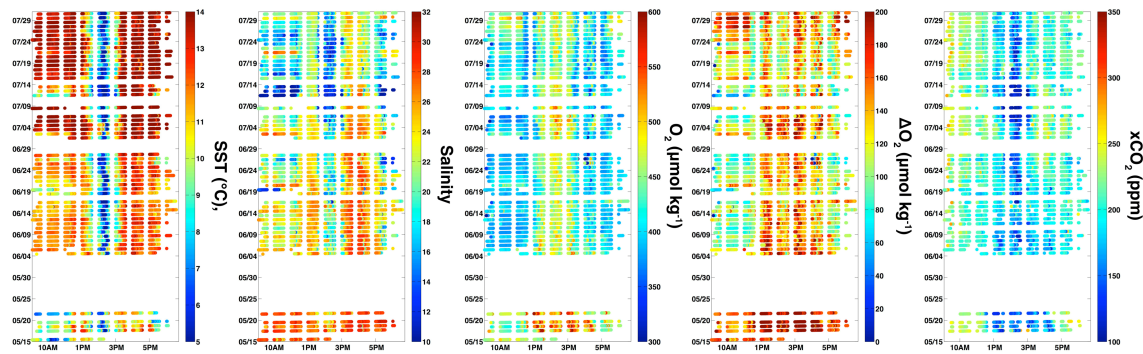


Figure 4: Hovmuller plots of SST (°C), salinity, O₂ (μmol kg⁻¹), ΔO₂ (μmol kg⁻¹) and xCO₂ (ppm). ΔO₂ is O₂ minus O₂ at saturation, with large positive values present in the face of swift gas exchange being indicative of high rates of primary production.

Wave Gliders:

Naked Island Wave Glider:

Initial attempt to pilot around Knight Island was unsuccessful due to strong current near the south side of the island. Eshamey Bay recovered the glider and carried the platform back to their lodge. A few days later the glider was redeployed near Naked Island. A second Knight Island attempt was unsuccessful, however this time the glider was piloted out of Prince William Sound. **This track revealed glacial melt water, with instances of oversaturation of Omega-Arag (values down to 0.8), exiting PWS onto the adjacent shelf.**

Action items:

Convert ISFET voltages to pH

Test O₂ algorithm against WG pCO₂

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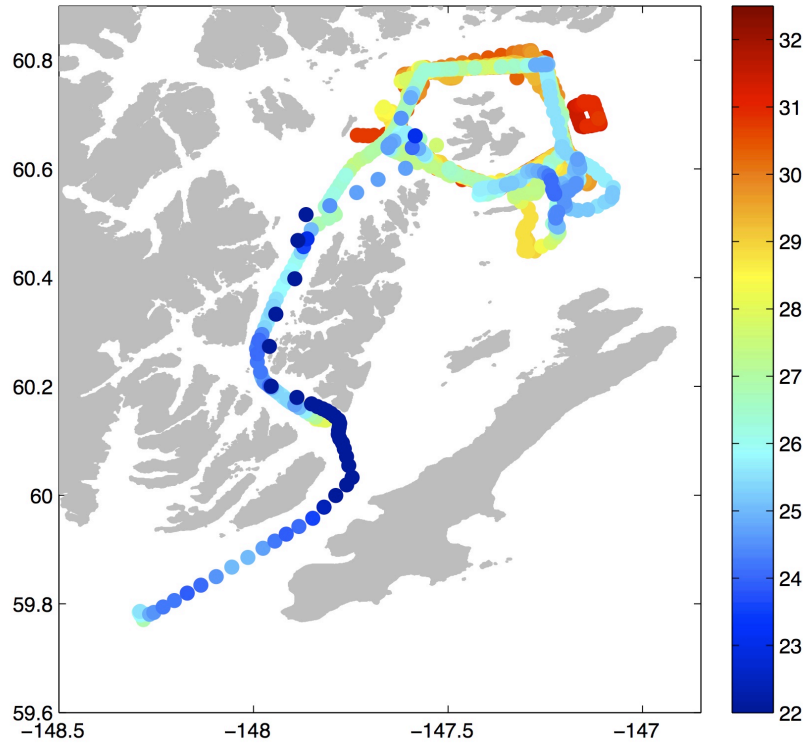


Figure 5: PMEL #1 Wave Glider track around Naked Island and out of Prince William Sound with color as salinity. Data are sorted so lower salinity observations overlay higher salinities.

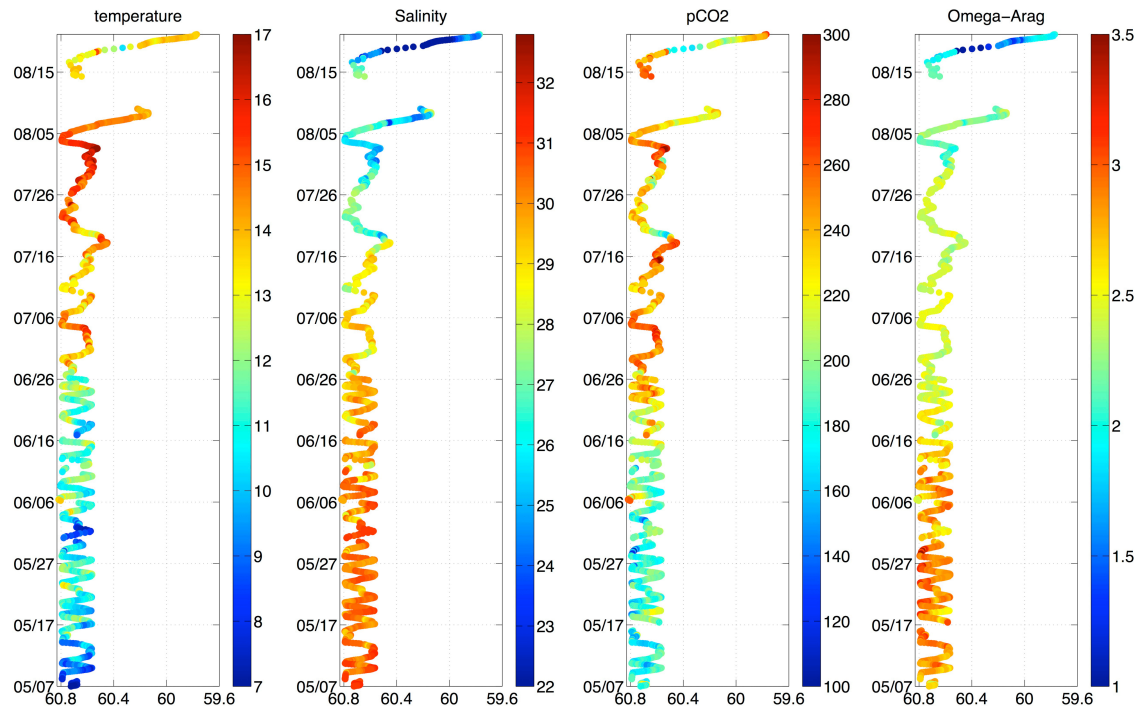


Figure 6: Latitude-time Hovmuller plots of temperature, salinity, pCO₂ and Omega-Arag (calculated from pCO₂ and salinity derived alkalinity).

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Montague Wave Glider:

This waveglider was pushed far east to near the mouth of Resurrection Bay. During this storm event power concerns resulted in very limited science sampling. Control of the glider was regained, and the platform was piloted south and then east back towards the sample area outside of Montague Strait.

Action items:

Convert ISFET voltages to pH

Test O2 algorithm against WG pCO2

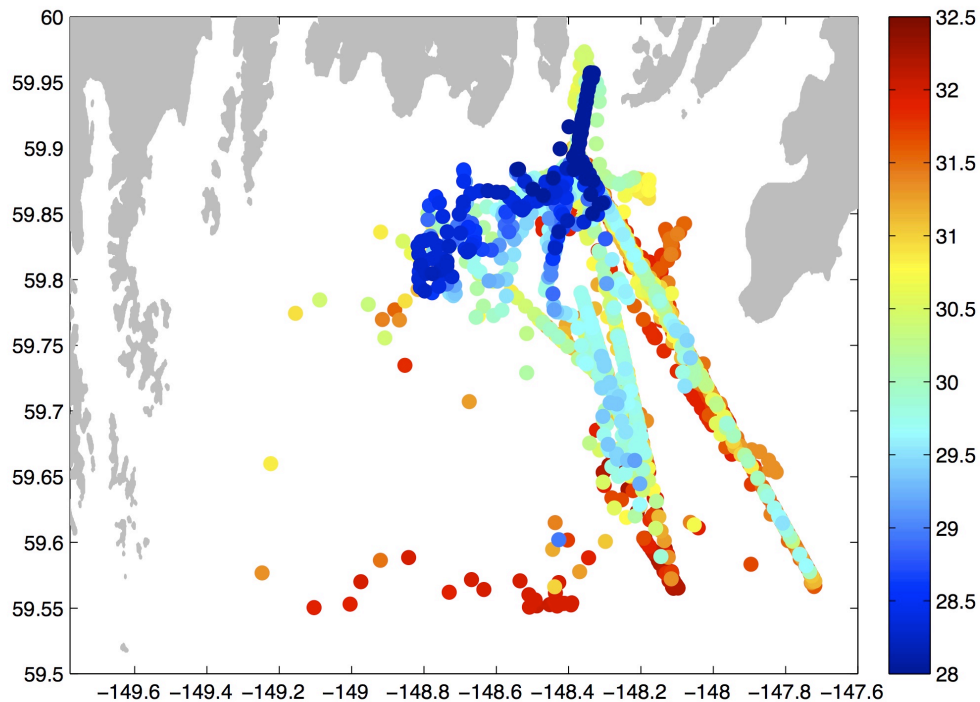


Figure 7: PMEL #2 Wave Glider track outside of Montague Strait with color as salinity. Data are sorted so lower salinity observations overlay higher salinities.

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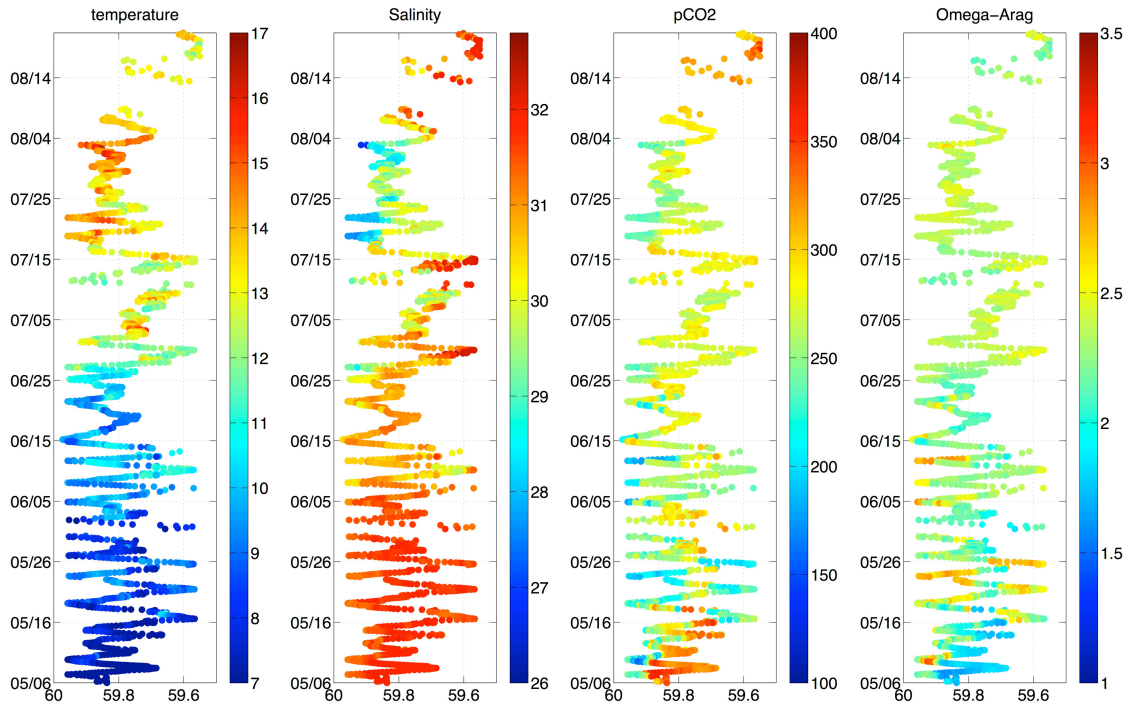


Figure 8: Latitude-time Hovmuller plots of temperature, salinity, pCO2 and Omega-Arag (calculated from pCO2 and salinity derived alkalinity).