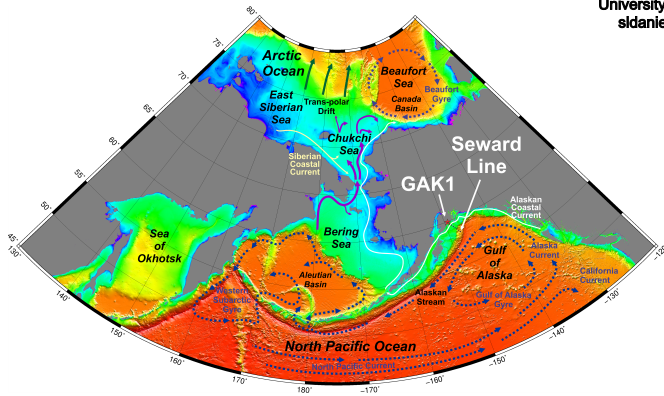
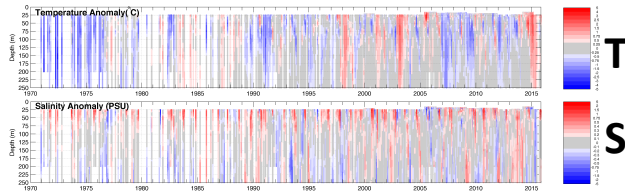


# 1970 to 2015 Thermal and Haline Anomalies on the Northern Gulf of Alaska Continental shelf

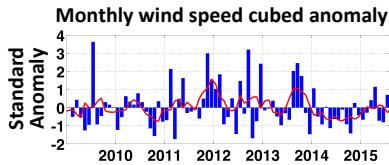
Seth Danielson, Tom Weingartner & Russ Hopcroft  
University of Alaska Fairbanks  
sldanielson@alaska.edu



1970-2015 GAK1 Monthly Anomaly T&S Timeseries



Long-term coastal time series at station GAK1 exhibits 44-year warming of 0.4 °C near-bottom, warming of 0.8 °C near the surface, freshening of -0.5 at the surface, and salinization of +0.1 near the seafloor.

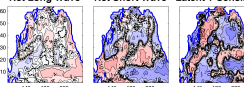


Weak wind mixing over the GOA shelf: In relation to the 1979-2015 climatology, 17 of 24 months in 2013 and 2014 had less wind mixing than normal, and four of the remaining had anomalously high levels of wind mixing. Time series from NCEP2 grid point at 58°N/150°. Red = 5-month running average.

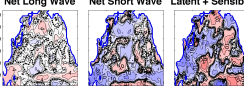
North Pacific Annual Heat Flux Anomaly (W m<sup>-2</sup>)



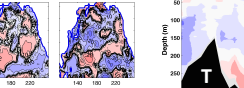
2010 Heat Flux Anomalies



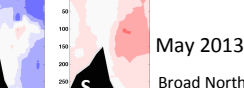
2011 Heat Flux Anomalies



2012 Heat Flux Anomalies



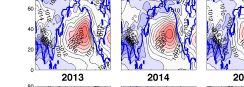
2013 Heat Flux Anomalies



2014 Heat Flux Anomalies



2015 Heat Flux Anomalies

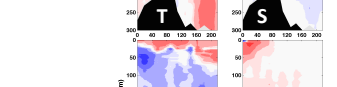


Seward Line May & September T & S Anomaly (°C and PSU)

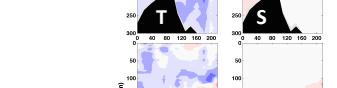


Temperature Salinity

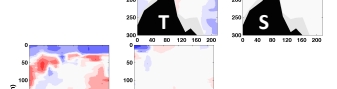
May 2010



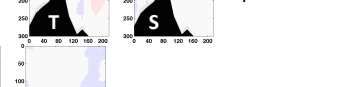
Sept. 2010



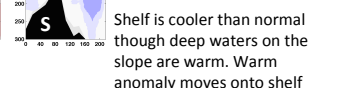
May 2011



Sept. 2011



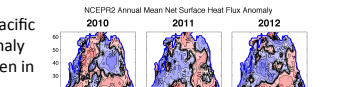
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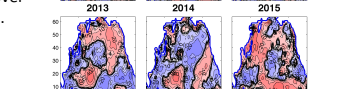
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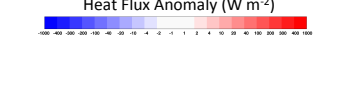
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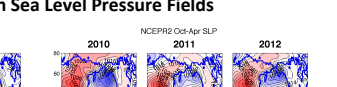
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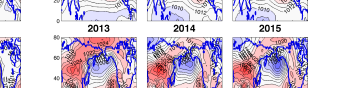
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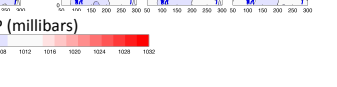
Sept. 2014



May 2015

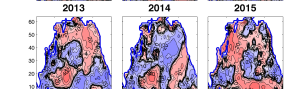
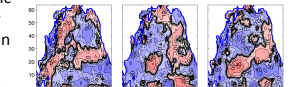


Sept. 2015

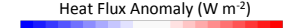


Annual mean heat flux anomalies

NCEP2 Annual Mean Net Surface Heat Flux Anomaly

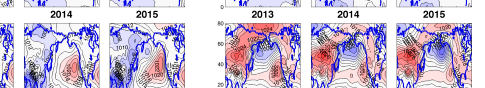
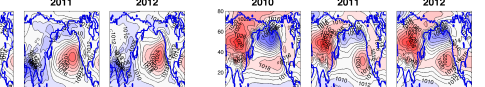


Heat Flux Anomaly (W m<sup>-2</sup>)

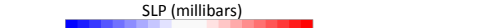


Seasonal mean Sea Level Pressure Fields

NCEP2 May-Sep SLP



SLP (millibars)



A presidential visit to GAK1!

What next?

**Acknowledgements:**

This work was supported by the Alaska Ocean Observing System, the North Pacific Research Board, and the Exxon Valdez Oil Spill Trustee Council. Heat fluxes, sea level pressures and winds taken from the National Center for Environmental Prediction Reanalysis 2 product at <http://www.esrl.noaa.gov/psd/data/gridded/data.ncep.reanalysis2.html>