

What's New in the Bering Strait 2013



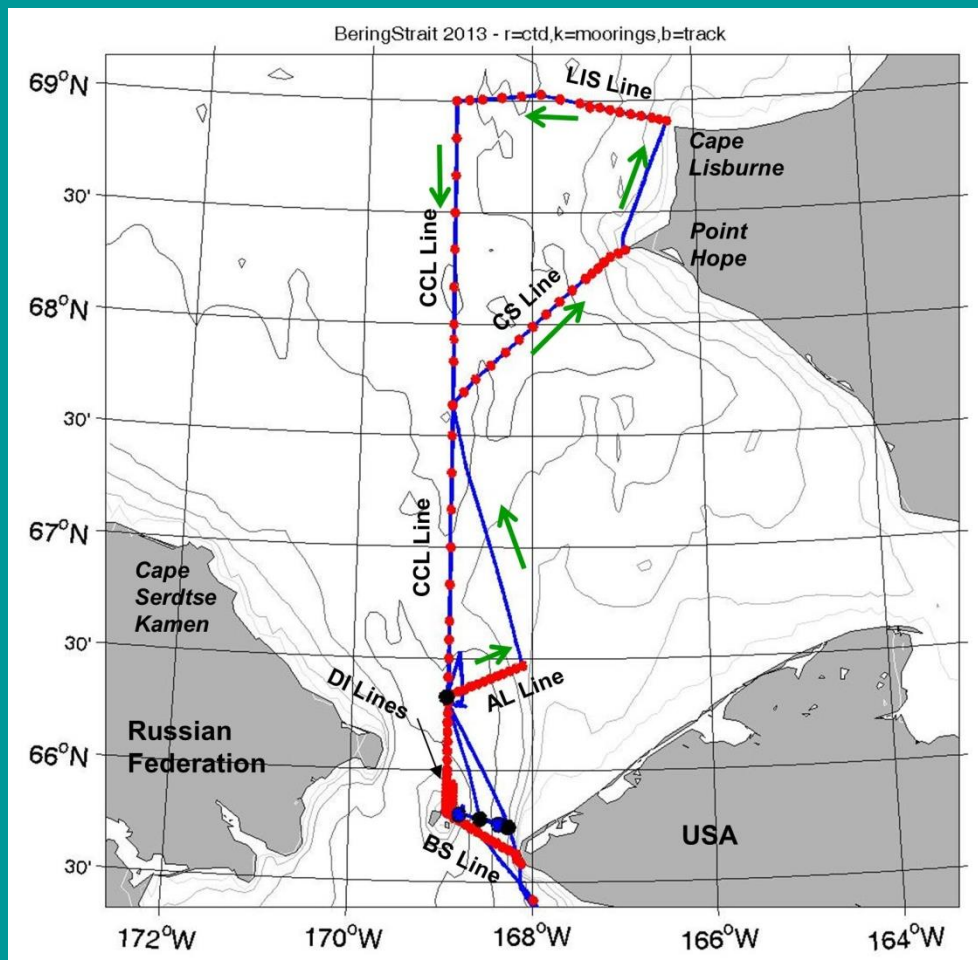
Rebecca Woodgate, Ron Lindsay (University of Washington)
Tom Weingartner, Terry Whitledge (University of Alaska, Fairbanks)

Funding from NOAA-RUSALCA and NSF-OPP (IPY and AON projects) and ONR

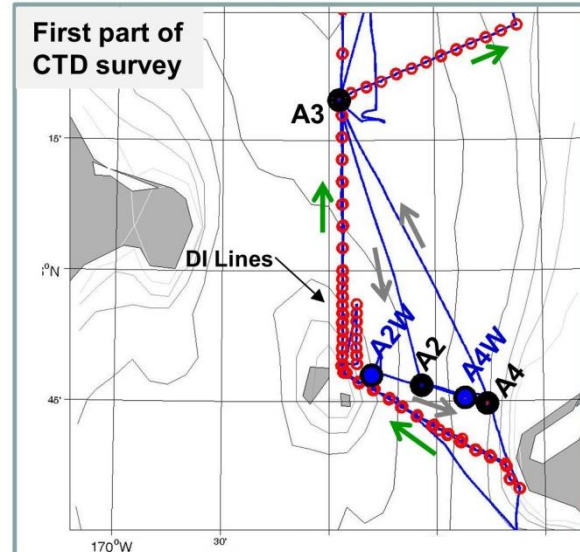
Thanks to Jim Johnson, David Leech, Seth Danielson, Kay Runciman, Wendy Ermold, Mike Schmidt and the crews of the Alpha Helix, Laurier, Sever, Lavrentiev, Khromov, and Norseman 2

Bering Strait 2013 - Norseman 2

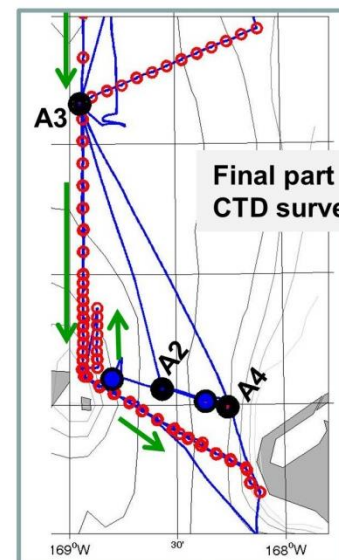
3rd-10th
July 2013
Nome to Nome



First part of CTD survey



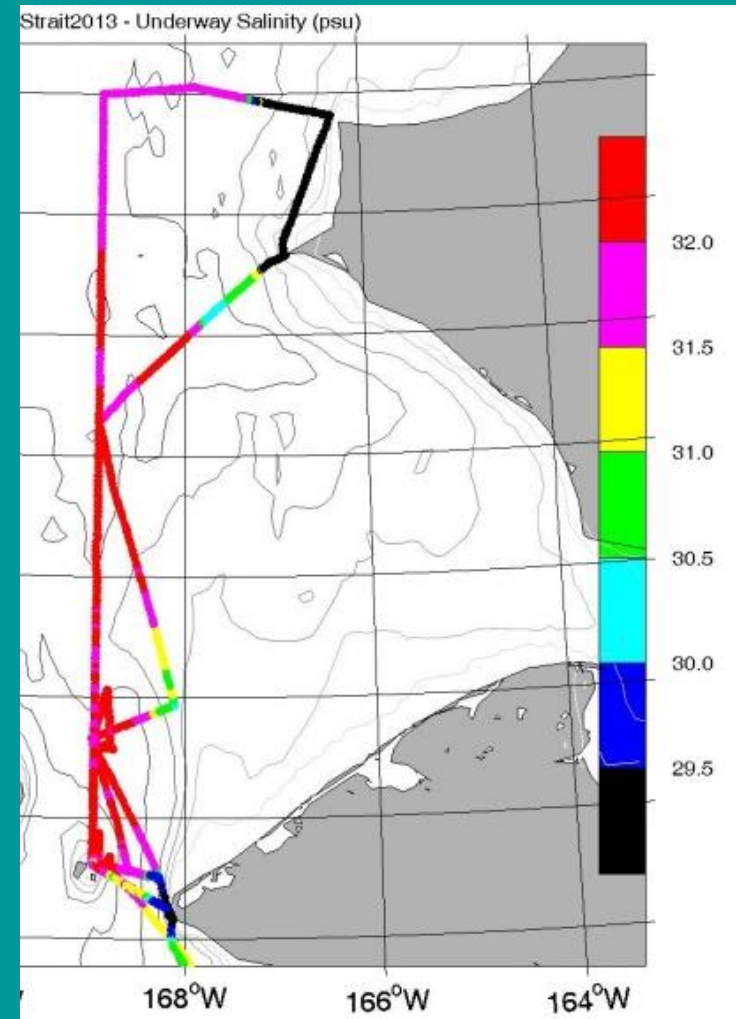
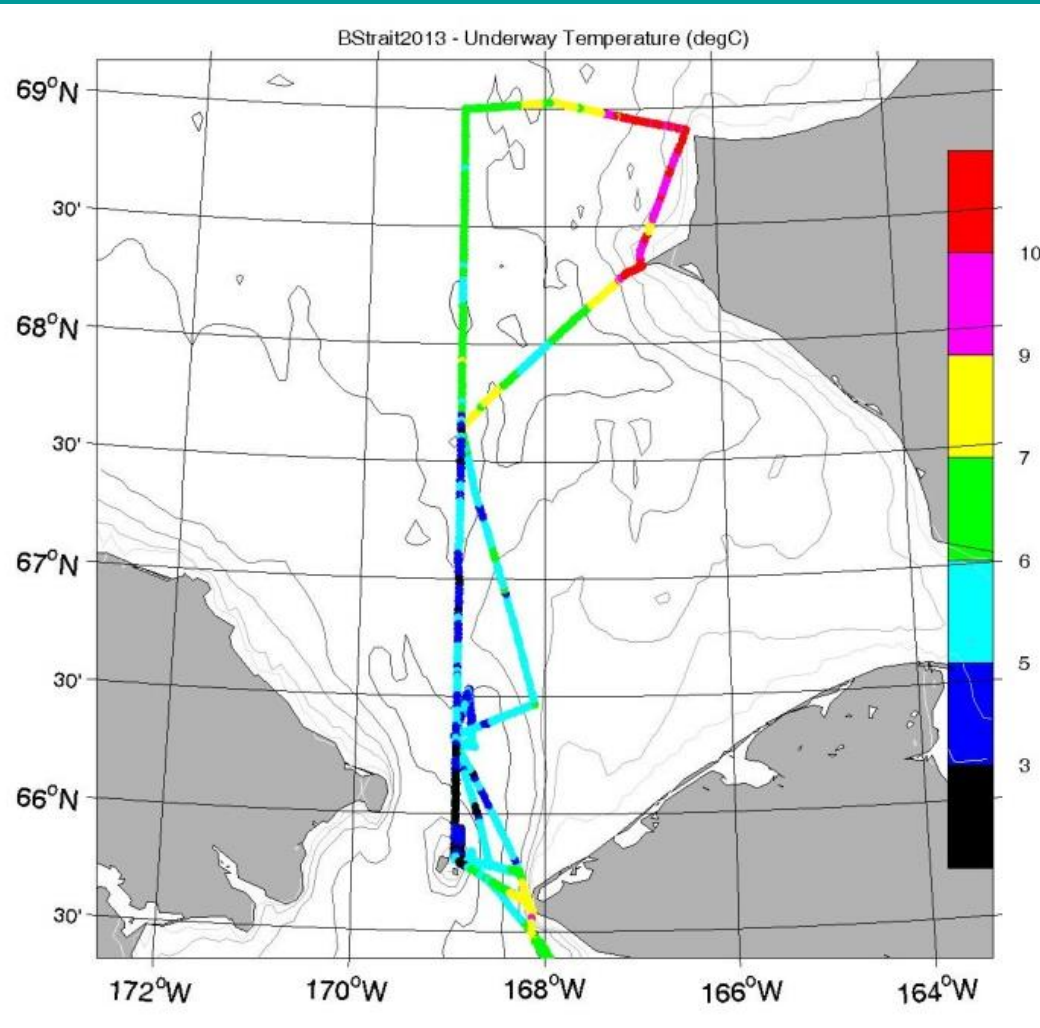
Final part of CTD survey



Black dots = moorings (A2, A3, A4 recovered and redeployed; A2W, A4W just recovered)

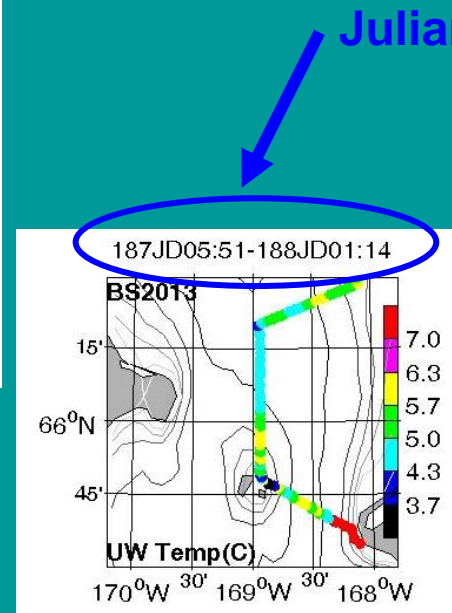
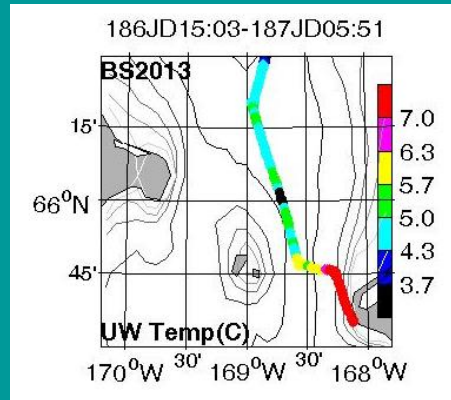
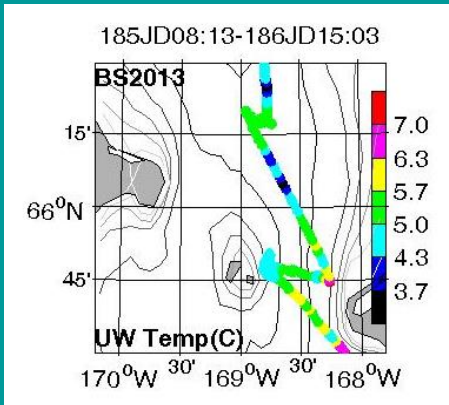
Blue = ship track Red dots = CTDs

Bering Strait 2013 - Norseman 2 - Underway data

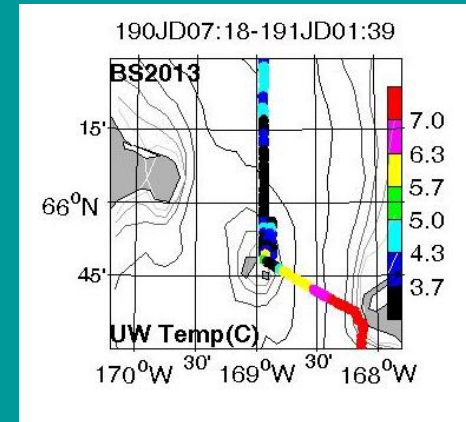


**Very fresh waters off Cape Lisburne (68-69N), \equiv 2m freshwater
(O18 isotopes suggest 1.3m river water, 0.6m ice melt)**

Bering Strait 2013 - Norseman 2 - Underway SST

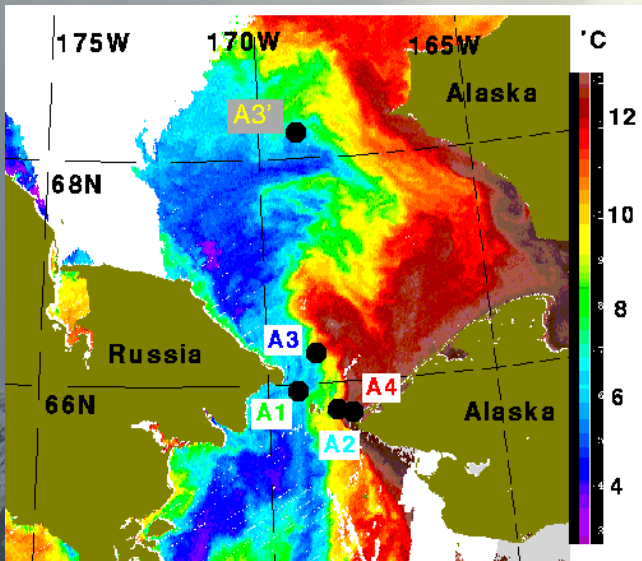


Julian day, GMT time



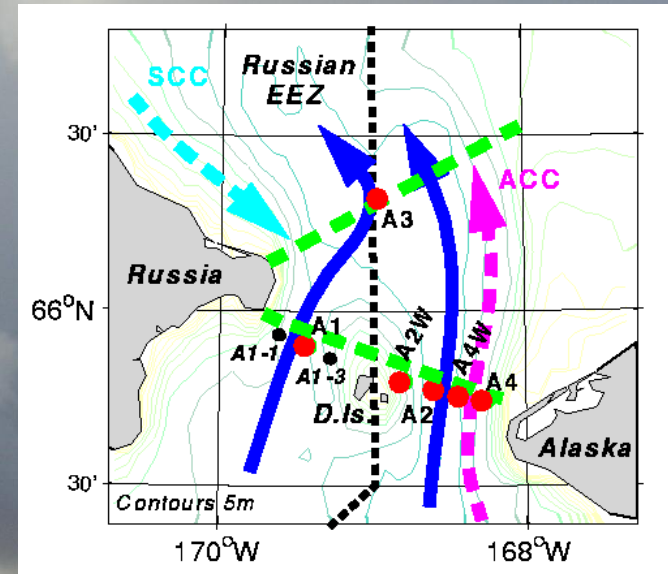
Large changes in SST (and SSS, not shown)
over just 4 days

Overview of Bering Strait measurements



1990 - present

== US mid-channel moorings
+ the “climate site” A3
== mostly near bottom
== 2001 started measuring the
ACC with A4.



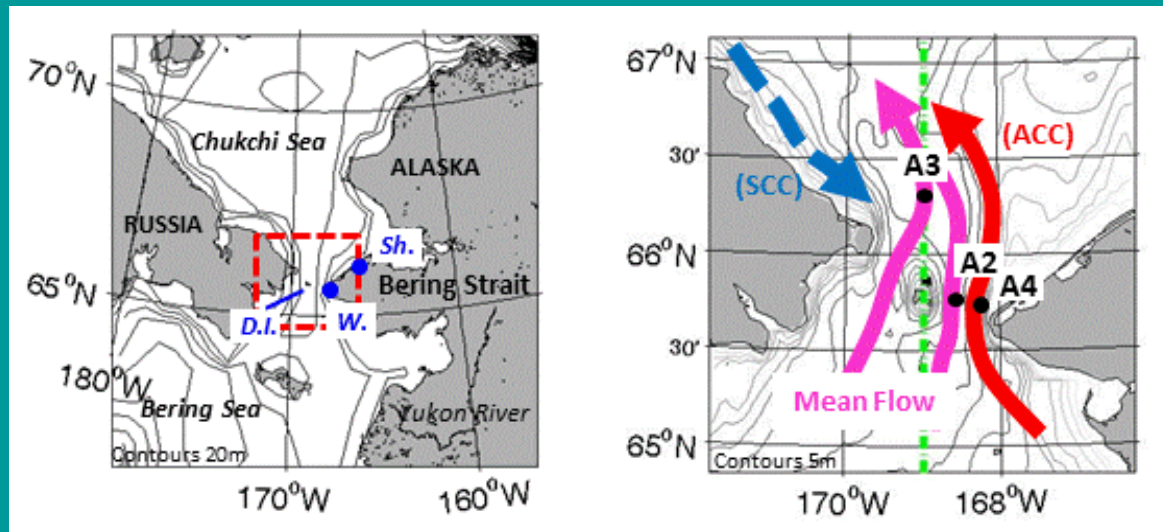
Early 1990s, 2004-2006

== 1 (or 2) moorings also
in Russian waters.

2007-2012

== up to 8 moorings
“high-resolution” array
High-Res work finished in
summer 2013

Bering Strait Moorings 2013 - 2018 *(Woodgate, Nguyen, Heimbach)*



Data from the high resolution array shows we can quantify the **physical** fluxes through the strait, using only 3 moorings sites, all in US waters

== 3 moorings in US waters (serviced annual

- volume, freshwater and heat
- upper and lower layer T and S
- ice thickness and motion (with ADCPs)

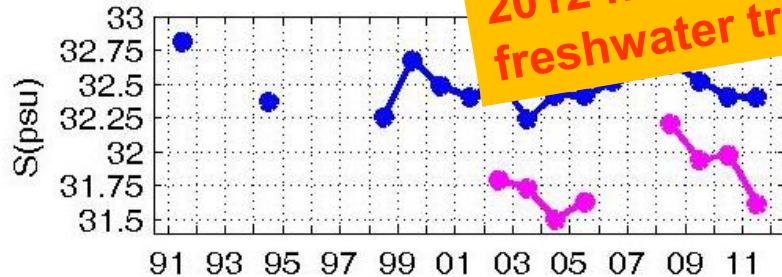
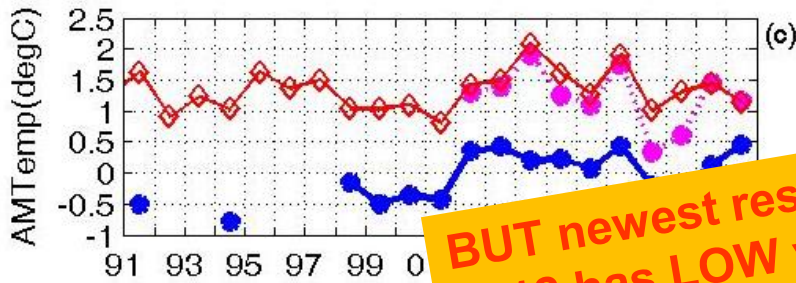
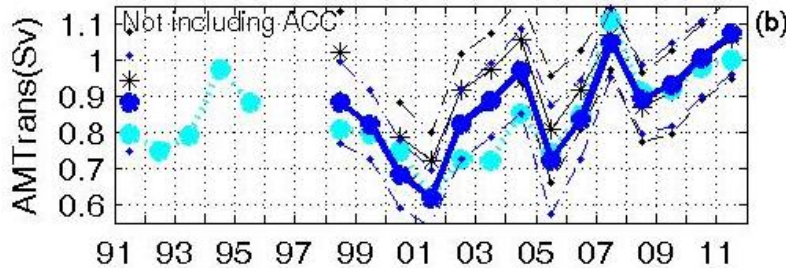
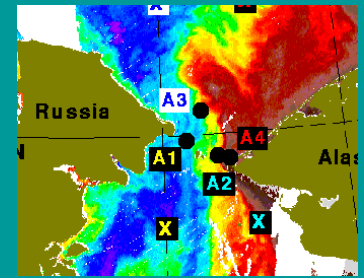
== 2-way information exchange with local comn
(including what we can learn from what they know),
Kawerak, Inc, and Julie Raymond-Yakoubian

**== Collaborative with the ECCO2-4km model (Nguyen and Heimbach),
to provide a “hybrid” data product, and fill gaps in past time-series**

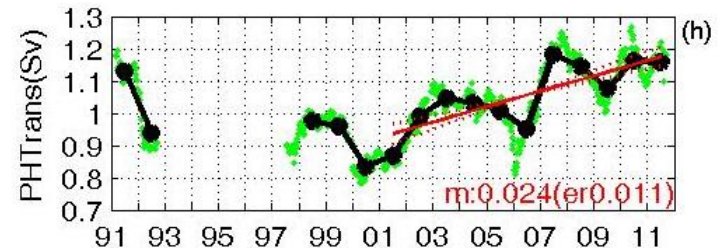
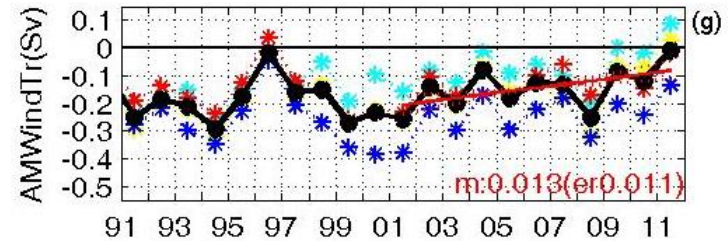
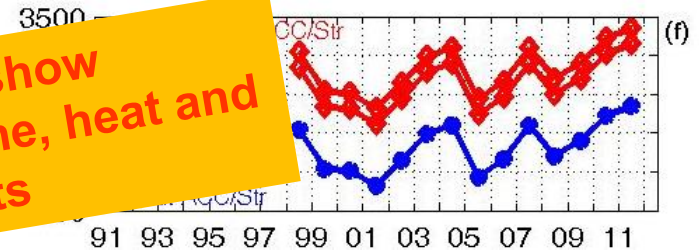
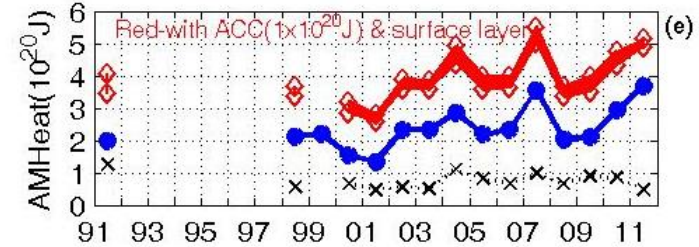
**== Model-data analysis of forcings of the flow (including the
infamous Pacific-Arctic Pressure Head) to improve the measurement system**

Funded by ONR 2013-2014
Funded by NSF-AON 2014-2018
- Mooring work to be done from
the Norseman 2 (Nome to Nome,
US waters) in early July each year
- Ask me if you want to add
instruments to the moorings

Bering Strait Annual Mean Fluxes



**BUT newest results show
2012 has LOW volume, heat and
freshwater transports**



Colours give mooring location
 blue is A3, "climate site"
 magenta is A4, "ACC"
 red is satellite sea surface temperature

Woodgate et al., GRL 2012

Bering Strait Work in Progress (main topics)

1. On the velocity and TS structure in the Bering Strait - a synthesis of mooring and CTD results

Woodgate et al

- including driving dynamics, and calibration for the long term array

2. Sea-ice Flux through the Bering Strait *Travers and Woodgate*

- building on Cynthia Travers' Master's thesis, to quantify fluxes, interannual change, and other interesting lessons

3. Heat balances for the Chukchi Sea *Woodgate, Light and others*

- building on our prior ocean heat flux work

4. The Eddying zone north of the Diomed Islands in the Bering Strait *Woodgate et al*

- mooring, satellite, CTD and ship's ADCP results of the bio productive eddying zone N of the islands, anyone care to help with the bio-production part of this?

Also happy to collaborate on other projects woodgate@apl.washington.edu