### Augmenting RUSALCA observations: simulated hydrography from highresolution ocean models

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# Model skill analysis

- 18 km resolution global model
- Data from Bering Strait moorings
- Point to point comparisons for T/S/vel



### Augmenting observations in Bering Strait

	Velocity (cm s <sup>-1</sup> )	CSA (×10 <sup>6</sup> m²)	Volume Transport (Sv)	Heat Transport (10 <sup>20</sup> J yr <sup>-1</sup> )	Freshwater Transport (km <sup>3</sup> yr <sup>-1</sup> )
Published	21 ± 8	4.25	$0.89 \pm 0.3$	2.3 ± 1.0	1700 ± 250
Modeled (A3) (monthly)	21 ± 11	3.99	$0.83 \pm 0.4$	n/a	n/a
Modeled (BS) (monthly)	28 ± 12	3.99	1.11 ± 0.5	4.2 ± 4.9	2689 ± 960
Increase	7 (33%)	n/a	0.22 (24.7%)	1.9 (82.6%)	989 (58.2%)

- Use model to "fill in gaps"
  - Periods when mooring not deployed
  - No T/S measurements at <18m (i.e. missing signal from stratification)</li>

#### Hydrography in Herald Canyon

- Higher resolution run (~4km)
  - Regional configuration
  - Forced by open
    boundary conditions
    from global run
  - Output as average of 3 day periods



# Hydrography in Herald Canyon

- Lines run in HC every RUSALCA process cruise
- 2004, 2009, 2012
- Occupied by Swedish cruise in 2008
- Pickart et al. (2010) show salinity, potential temperature and velocity for 2004 occupation



## Salinity



### Potential temperature



#### Along canyon velocity



### ...and more!

- Model reproduces structure of HC well
- Can supply estimates of hydrography (vertical and horizontal layers) and sea ice where no observations exist
- Suggest controls and causes of observed hydrography, biochemistry, species distribution, etc...

### Synthesis plans

- Collaboration with Bob Pickart (WHOI) and Maria Pisareva (Shirsov)
  - Compare CTD profiles to model for other years.
  - Suggest potential drivers of HC water mass distribution and transport (Wrangell Polynya?)
- Provide estimates of hydrography for other projects.