

Augmenting RUSALCA observations: simulated hydrography from high- resolution ocean models

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Acknowledgements:

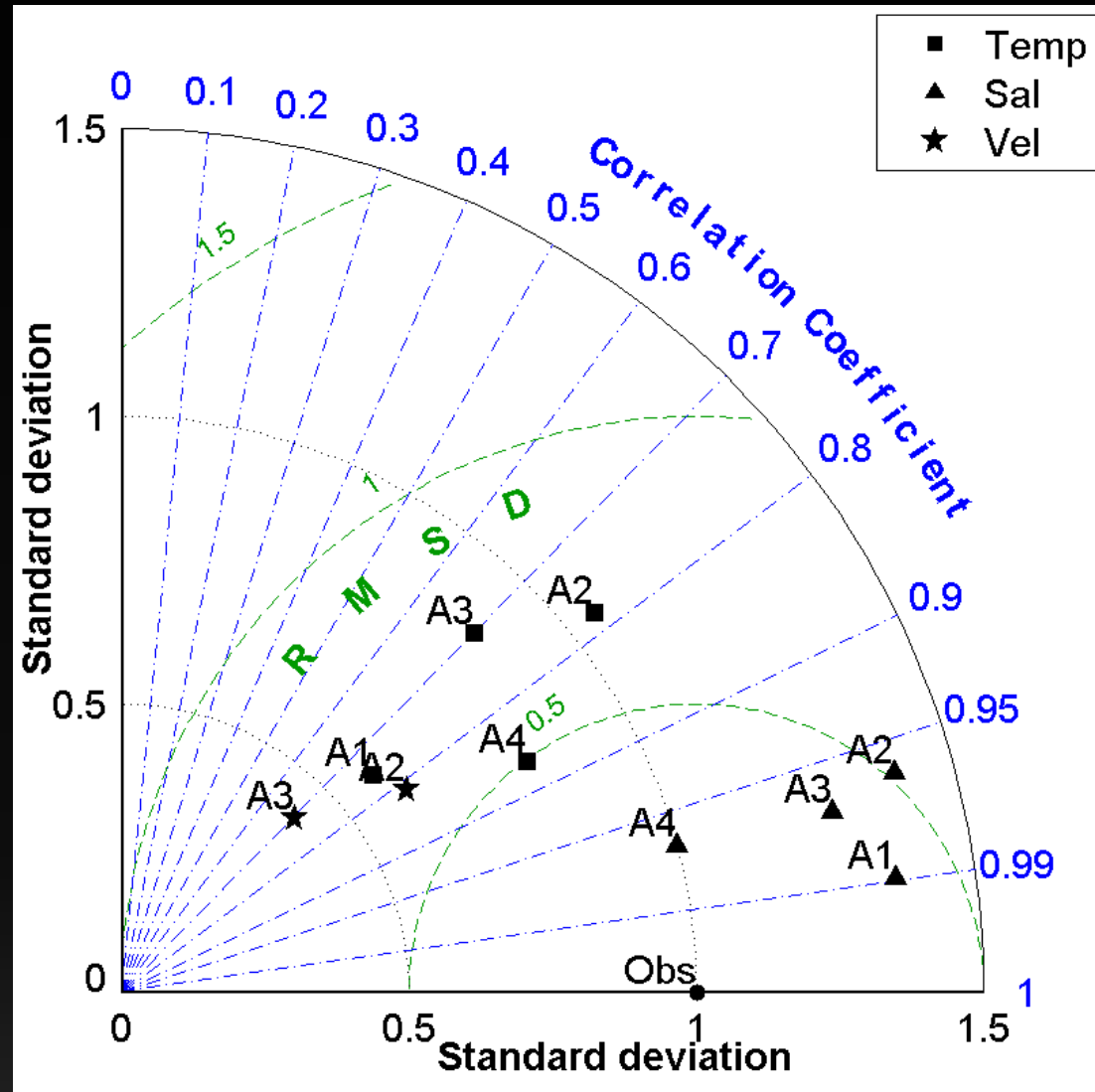
Tom Weingartner, Rebecca Woodgate

Bob Pickart, Maria Pisareva

Peter Winsor

Model skill analysis

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



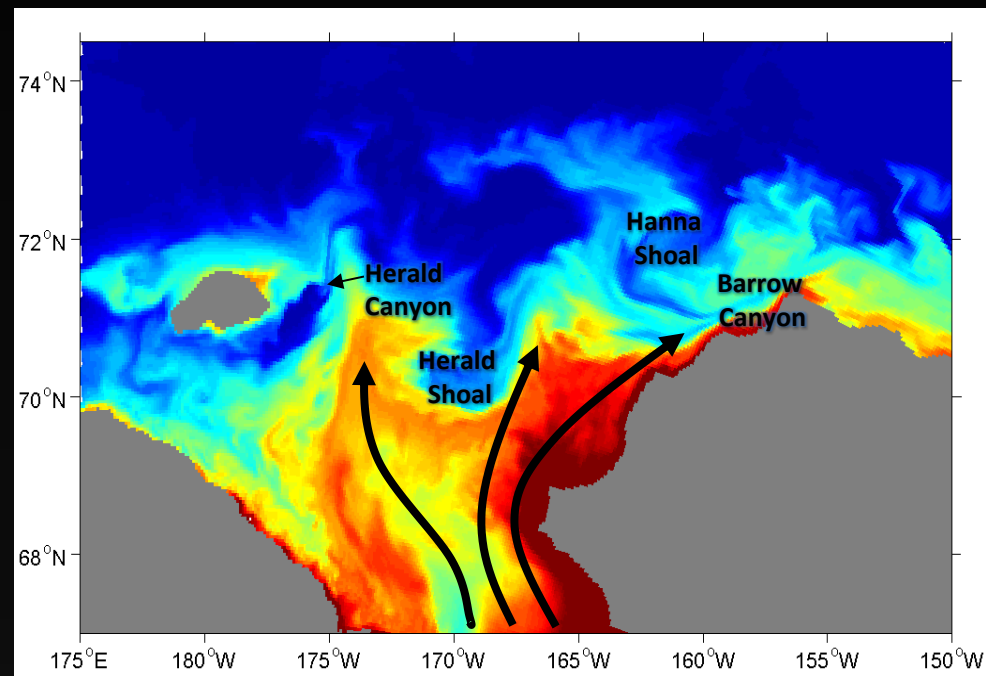
Augmenting observations in Bering Strait

	Velocity (cm s ⁻¹)	CSA (×10 ⁶ m ²)	Volume Transport (Sv)	Heat Transport (10 ²⁰ J yr ⁻¹)	Freshwater Transport (km ³ yr ⁻¹)
Published	21 ± 8	4.25	0.89 ± 0.3	2.3 ± 1.0	1700 ± 250
Modeled (A3) (monthly)	21 ± 11	3.99	0.83 ± 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)

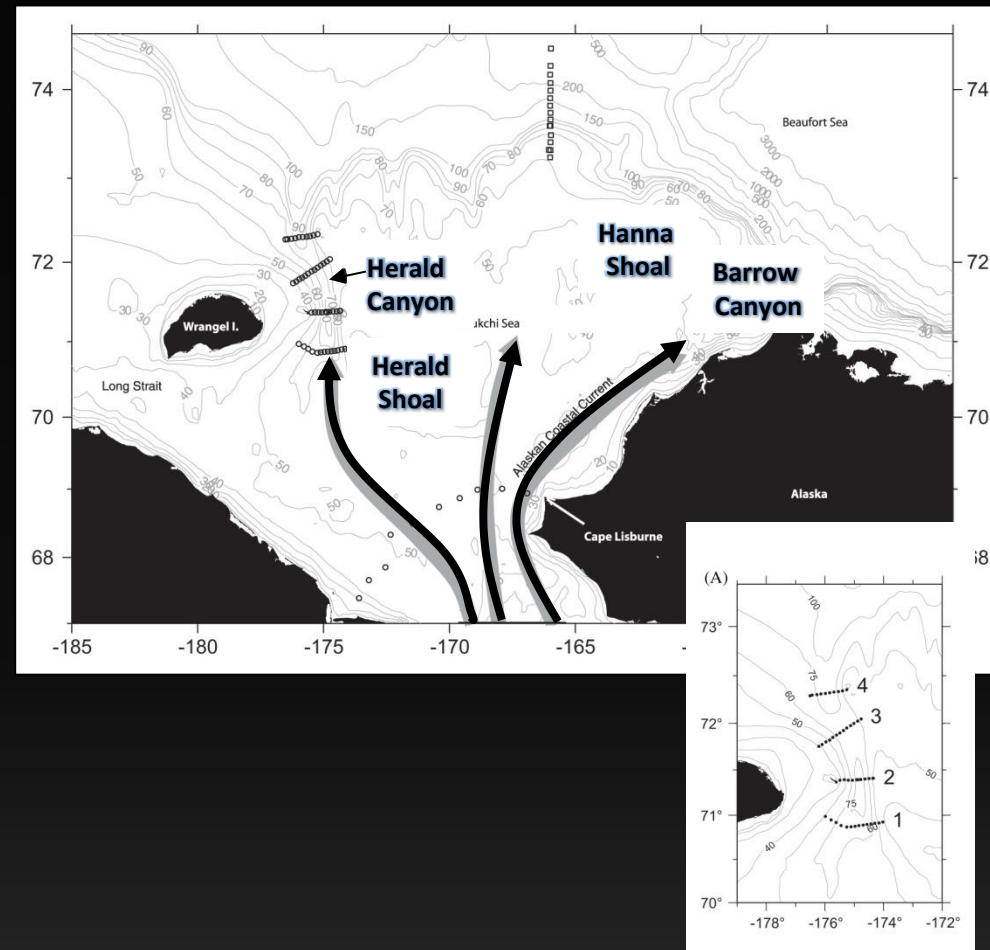
Hydrography in Herald Canyon

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

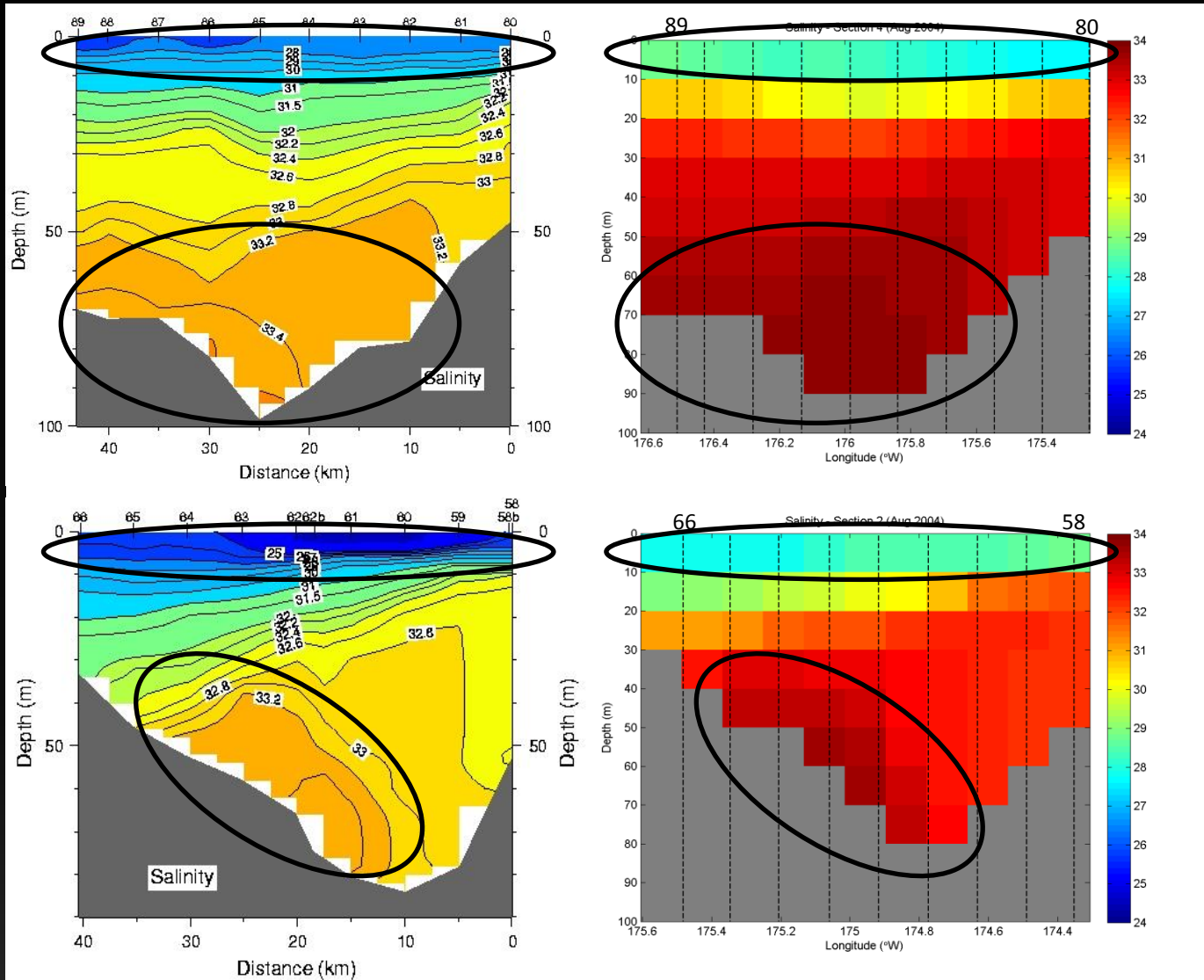


Hydrography in Herald Canyon

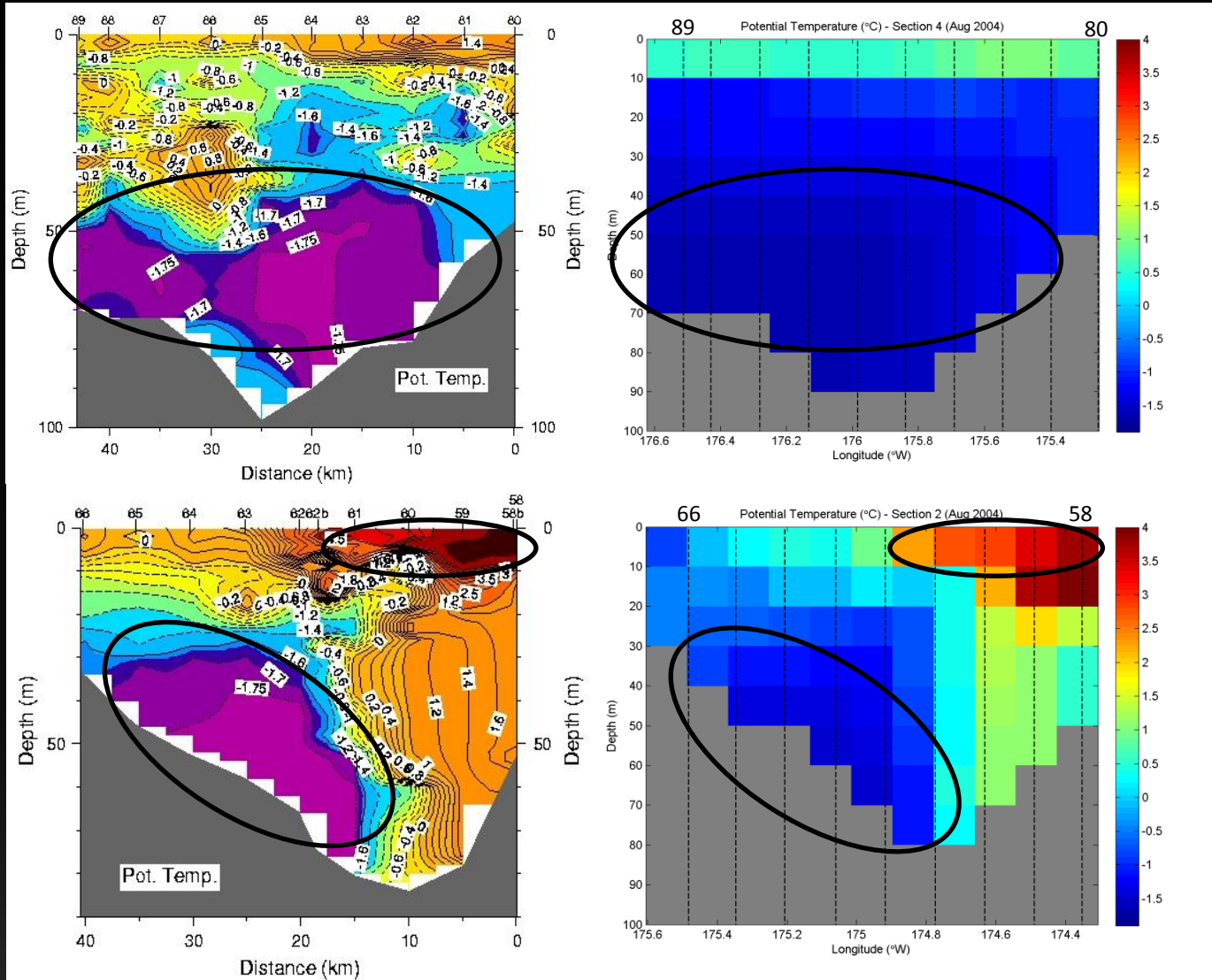
- Lines run in HC every RUSALCA process cruise
- 2004, 2009, 2012
- Occupied by Swedish cruise in 2008
- Pickart et al. (2010) show salinity, potential temperature and velocity for 2004 occupation



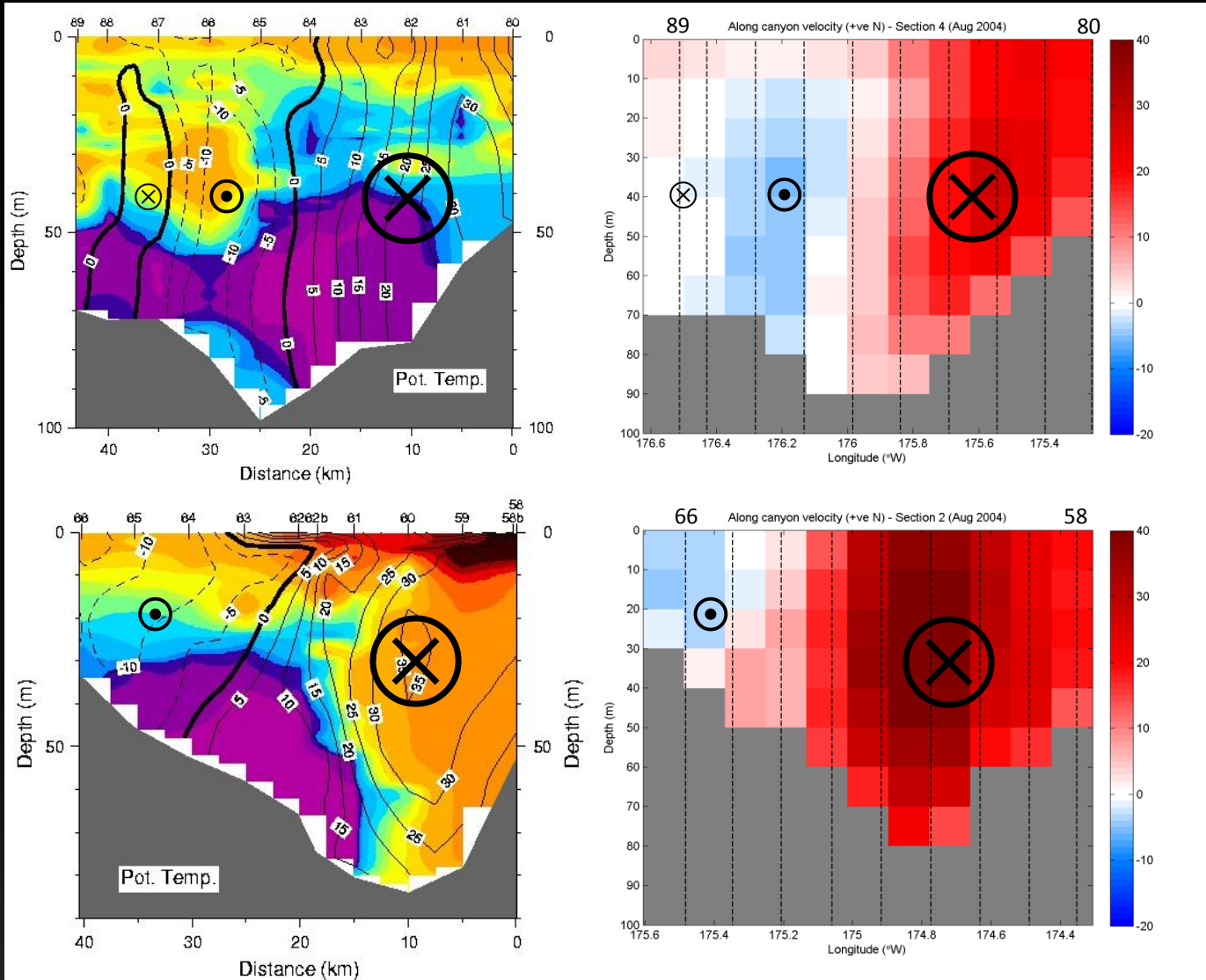
Salinity



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.