Modeling Ice-Ocean-Ecosystem in the Bering-Chukchi-Beaufort Seas:

Using IPY (2007-2008), RUSALCA 2004 and 2009 measurements

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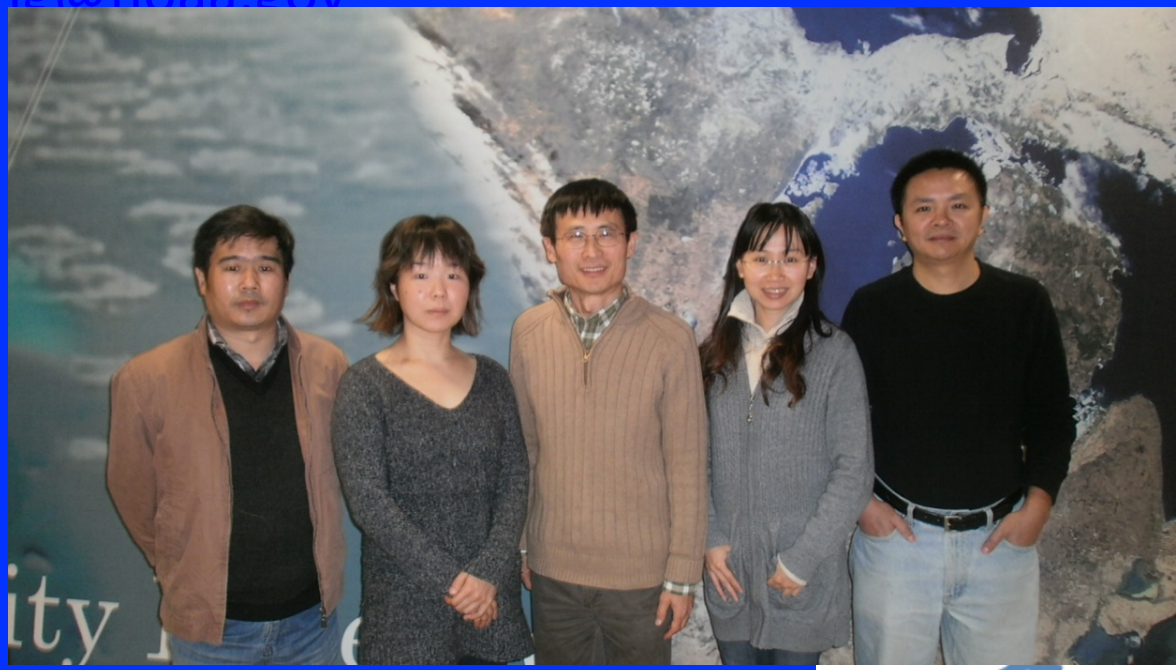
University of Michigan
Ann Arbor

Data support from
Pickart, Whitledge, Hocropt
Woodgate, ???



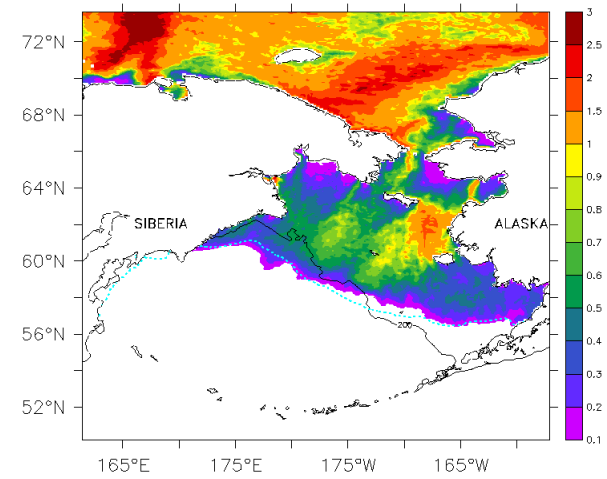
GLERL
Great Lakes Environmental Research Laboratory

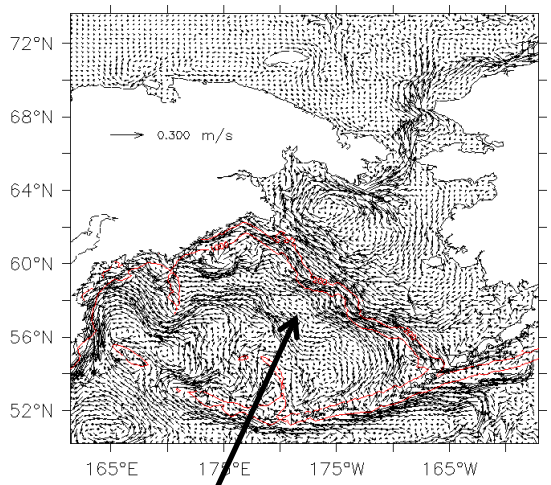
PAG Meeting, Nov. 5-6, 2012,
Suzhou, China

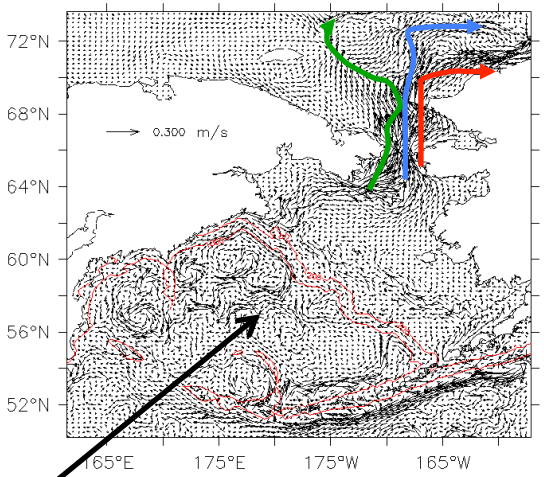
CILER
Cooperative Institute for Limnology and Ecosystems Research
University of Michigan

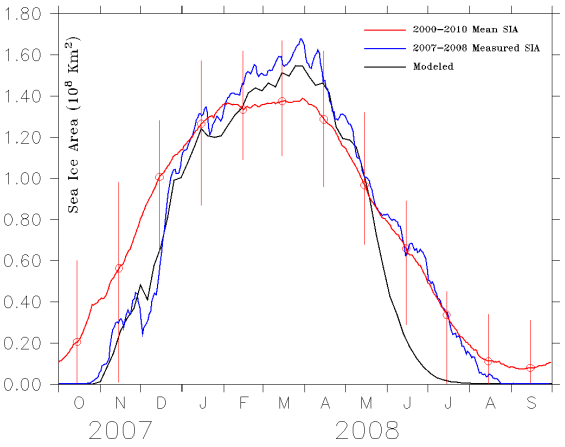
Coupled Ice-Ocean-Ecosystem Model in the Bering-Beaufort-Chukchi Seas (IPY)

Modeled ice thickness (3/08) surface current (3/08) surface current (7/08)



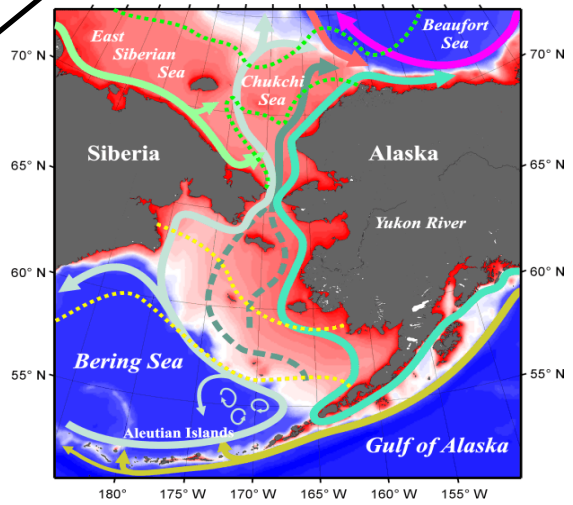


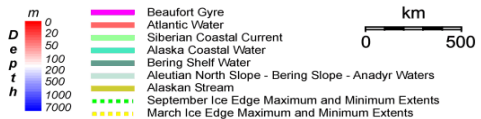




Few eddies

More eddies

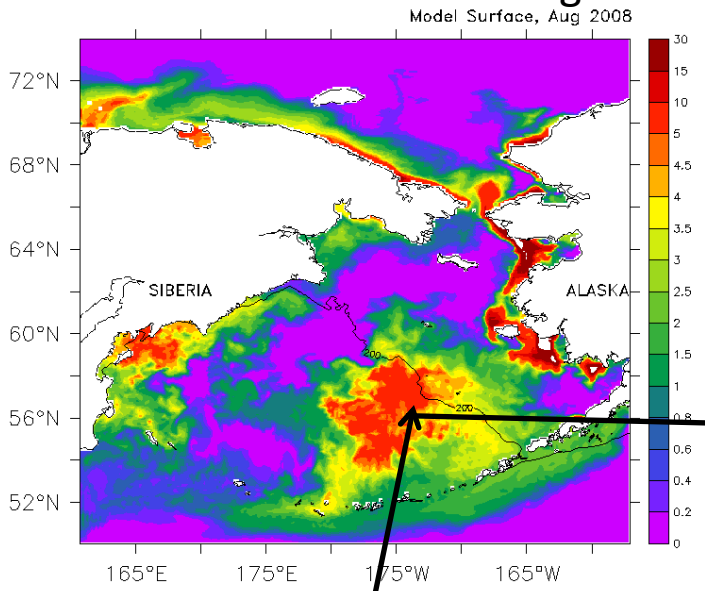




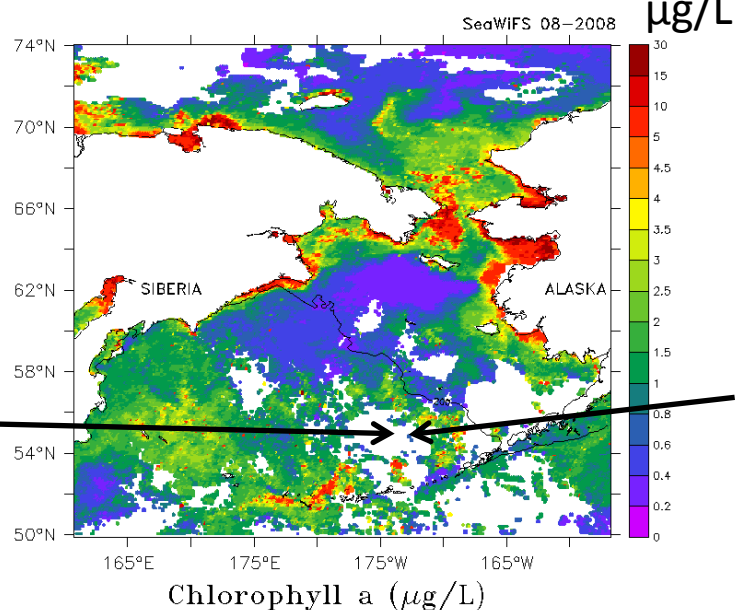
Simulated sea ice area (black line) and satellite-measured sea ice area (blue) over the entire Bering and Chukchi Seas for 2007-2008. The red line denotes the 11-year average area and the red vertical bars denote the maximum and minimum ice areas during 2000-2011.

Coupled Ice-Ocean-Ecosystem Model in the Bering-Beaufort-Chukchi Seas (IPY)

Modeled August 2008

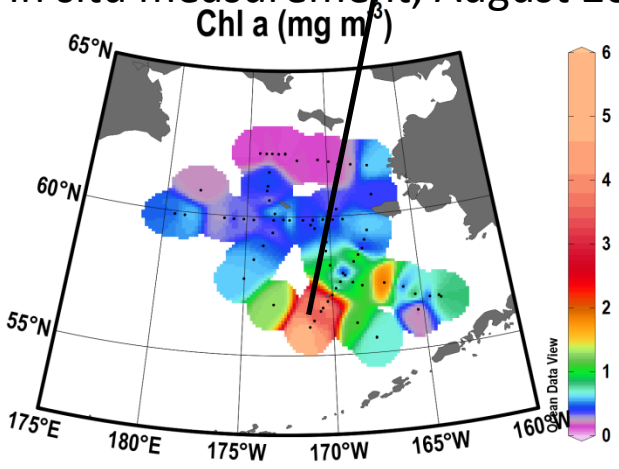


Satellite

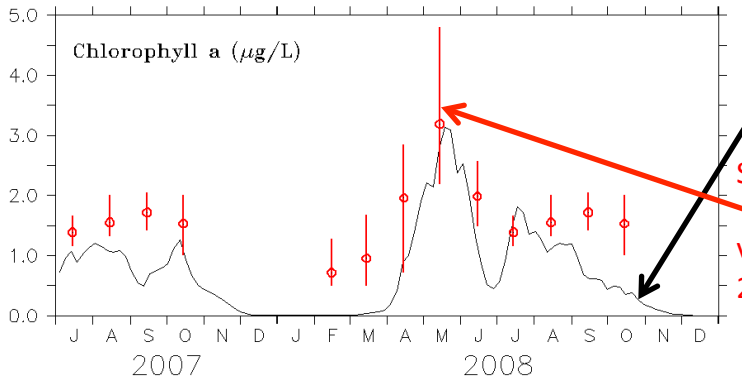


Cloud cover

In situ measurement, August 2008



Seasonal variation 2007-2008

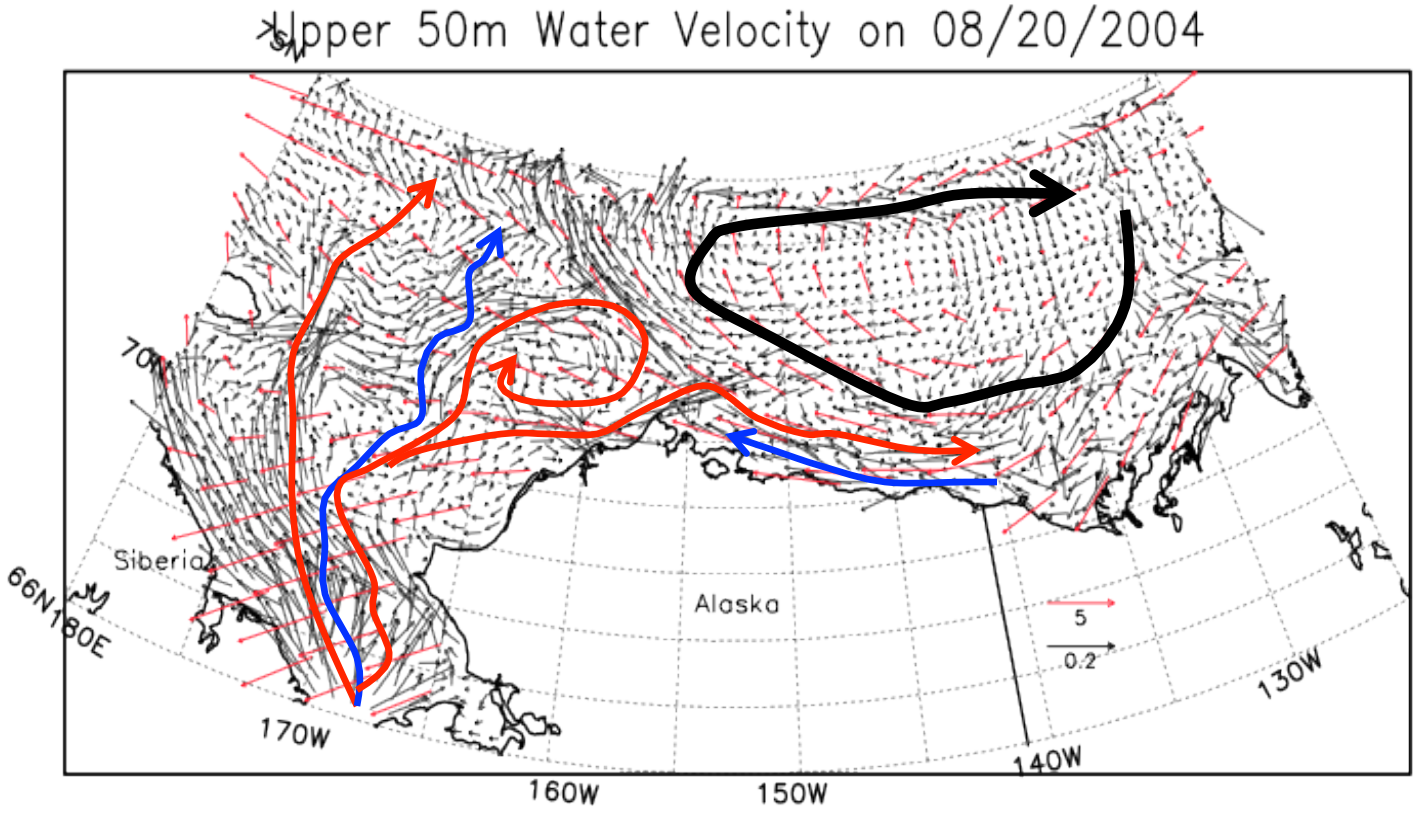


Modeled

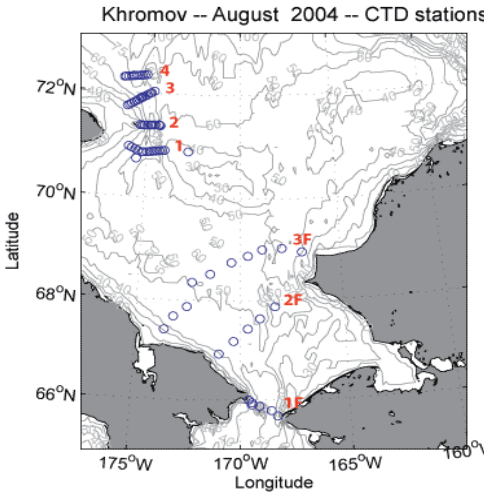
Satellite-measured with max-min values during 2000-2010

Wang et al. JGR, on revision

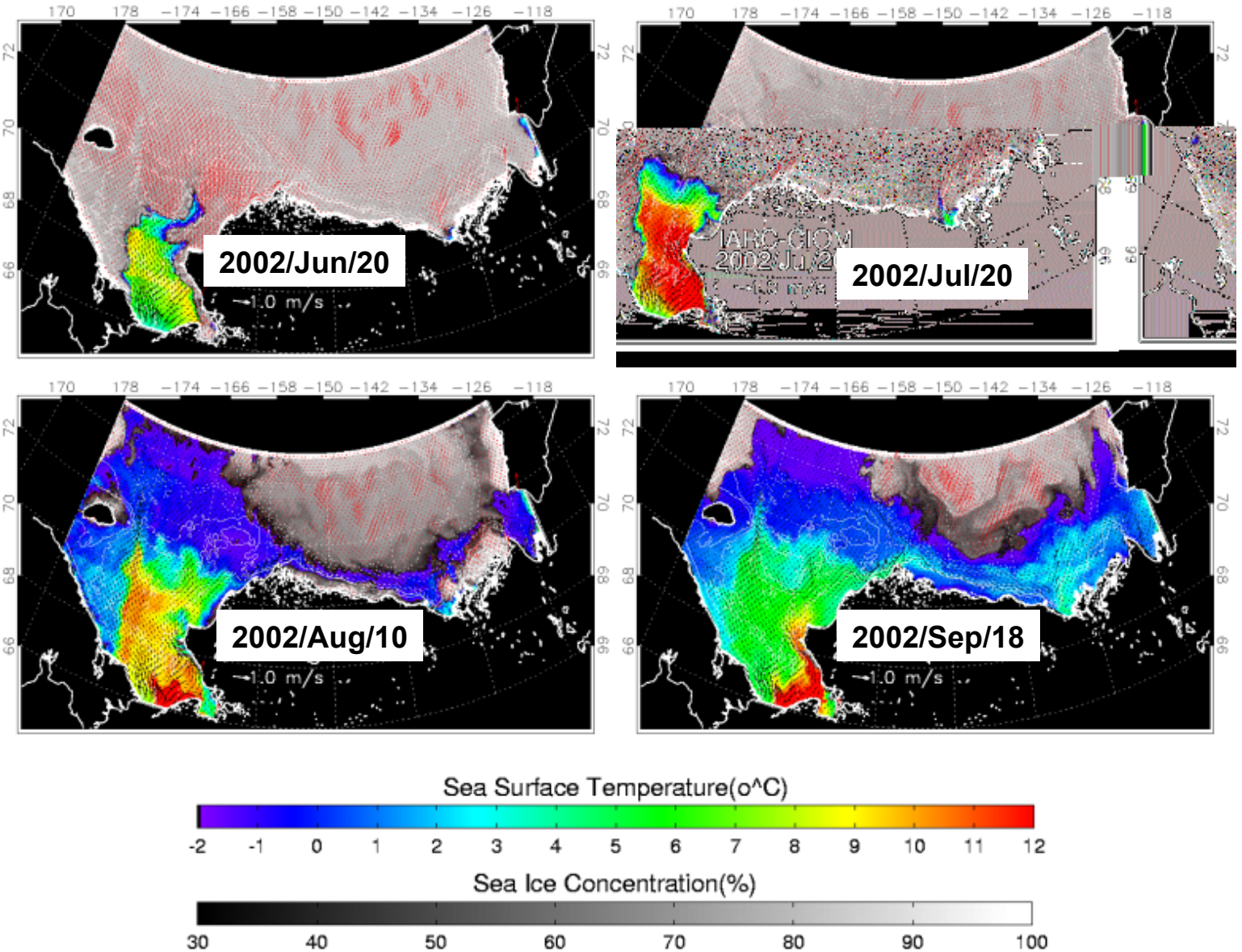
Verification of CIOM using 2004 RUSALCA Data (T) in the Bering-Beaufort-Chukchi Seas (work in progress)



RUSALCA
Aug 2004

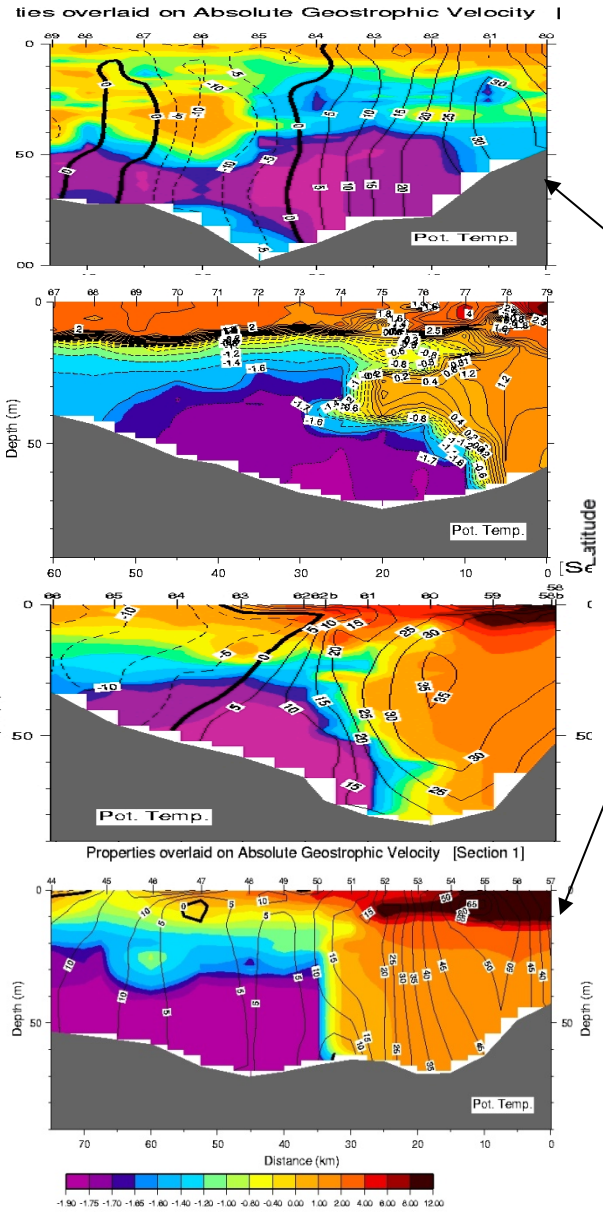


CIOM-simulated ice-ocean system

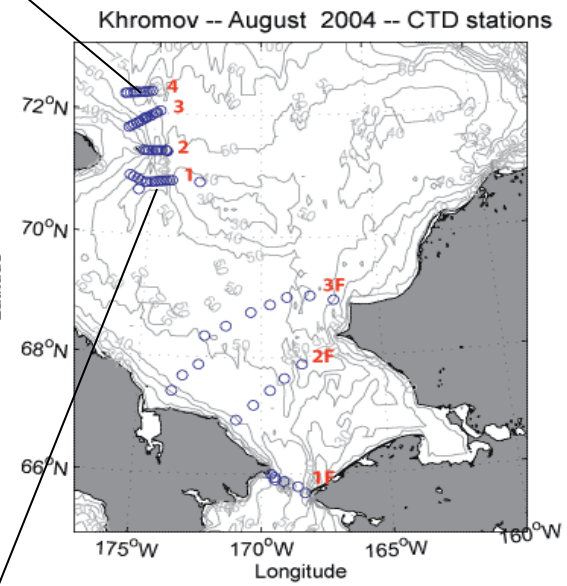


Verification of CIOM using 2004 RUSALCA Data (T&V) in the Bering-Beaufort-Chukchi Seas

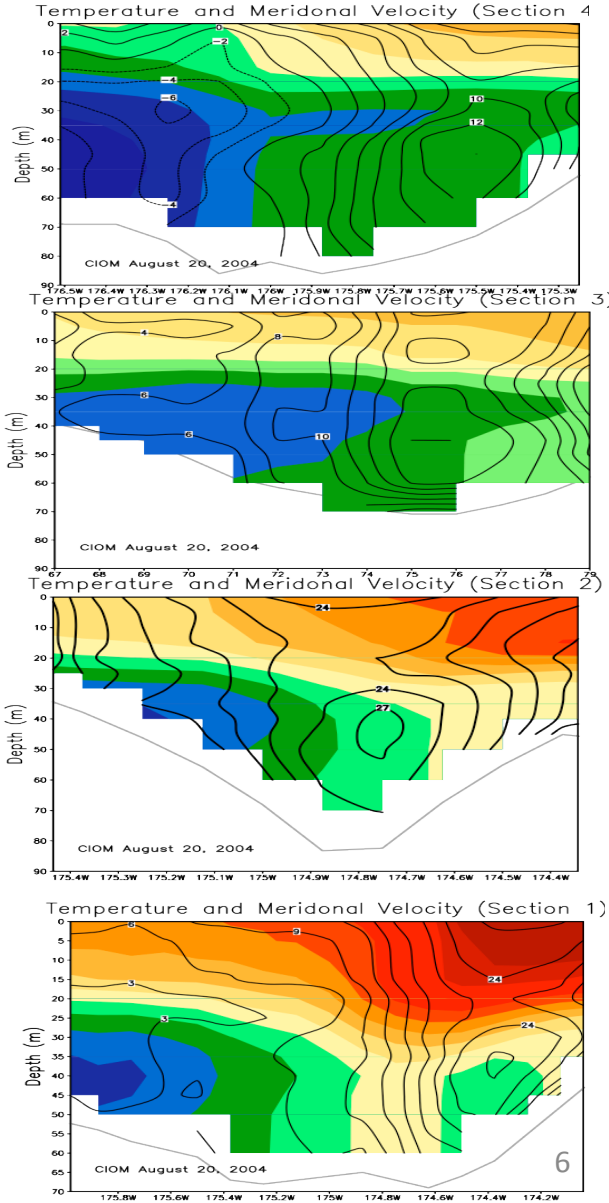
Observed (Pickart)



Aug 2004



CIOM-simulated (GLERL)

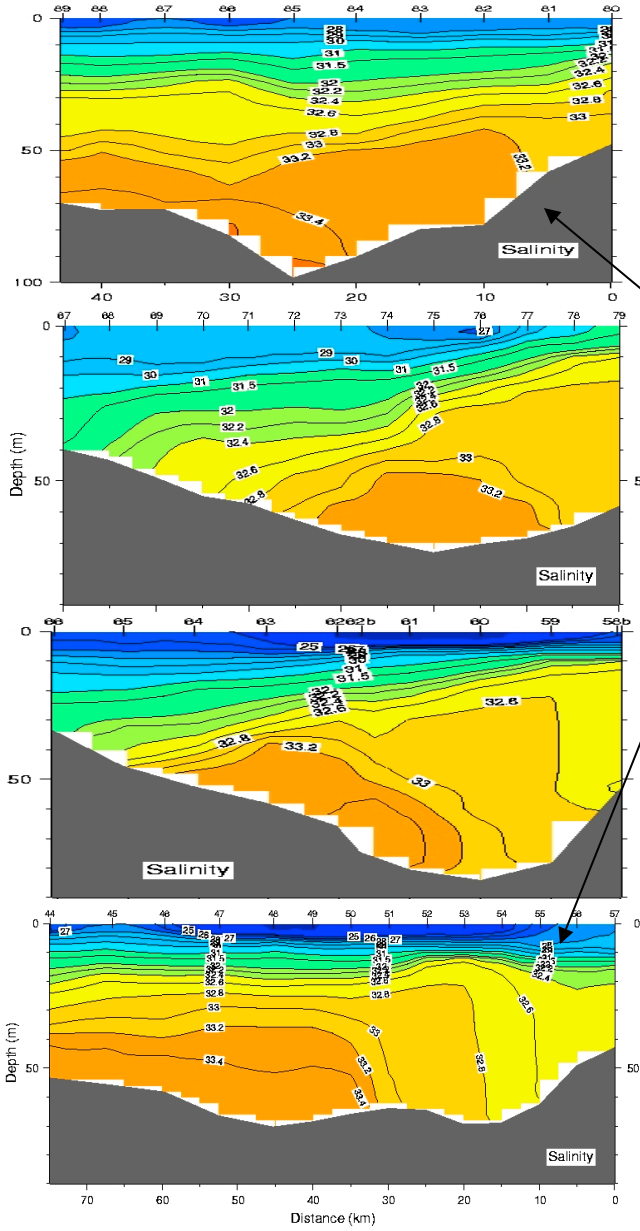


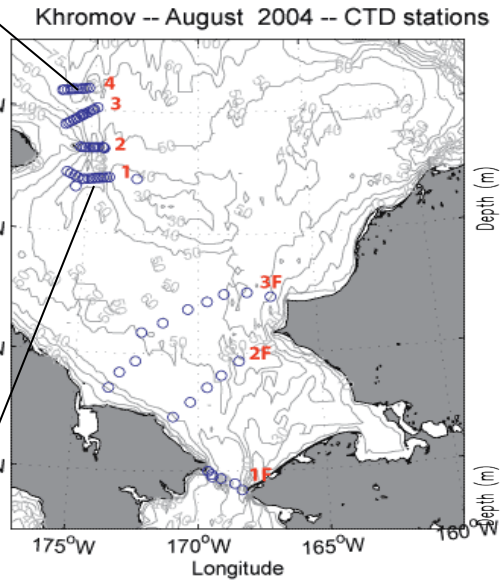
Verification of CIOM using 2004 RUSALCA Data (S) in the Bering-Beaufort-Chukchi Seas

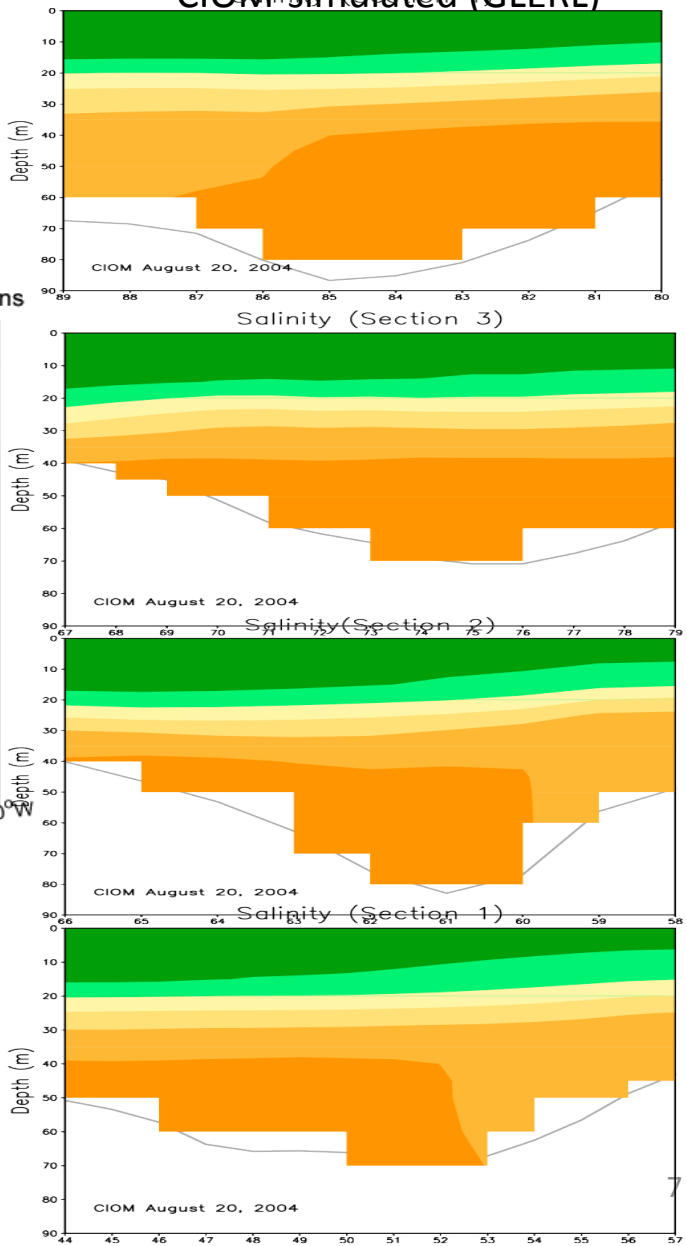
Observed (Pickart)

CIOM-simulated (GLERL)

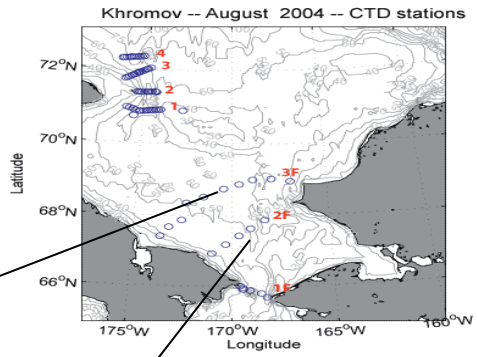
Aug 2004

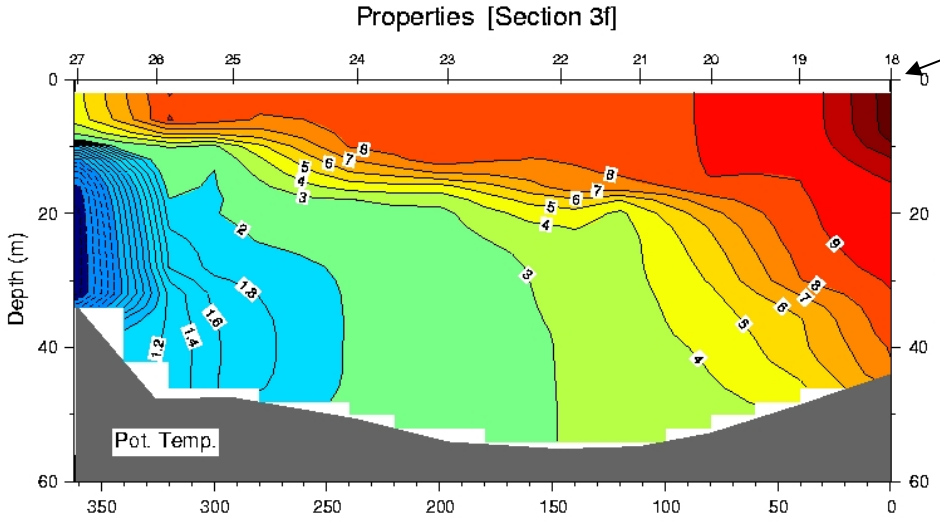


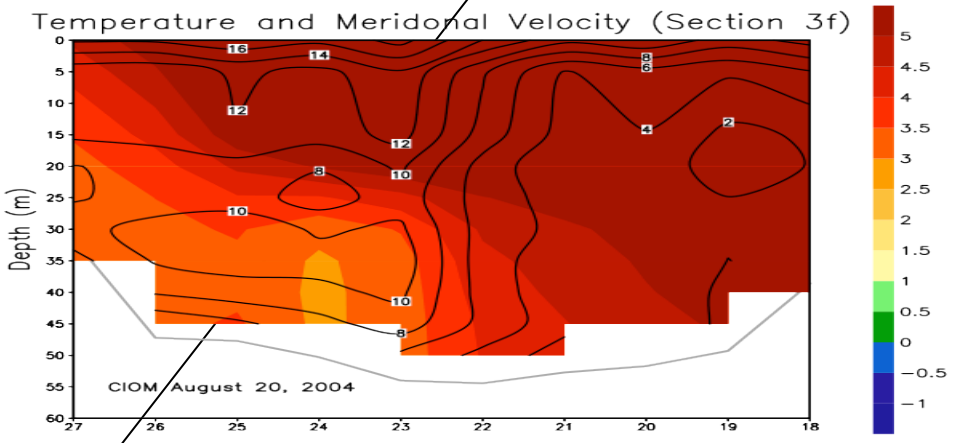


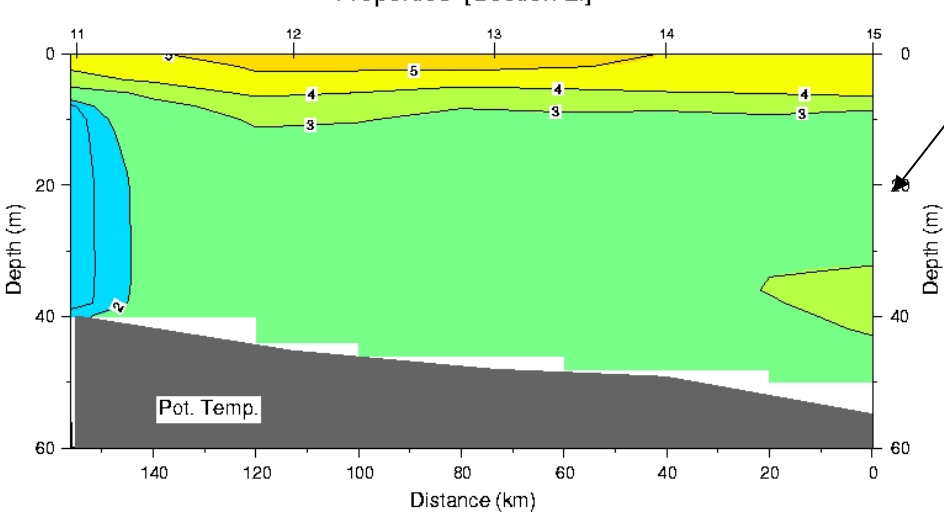


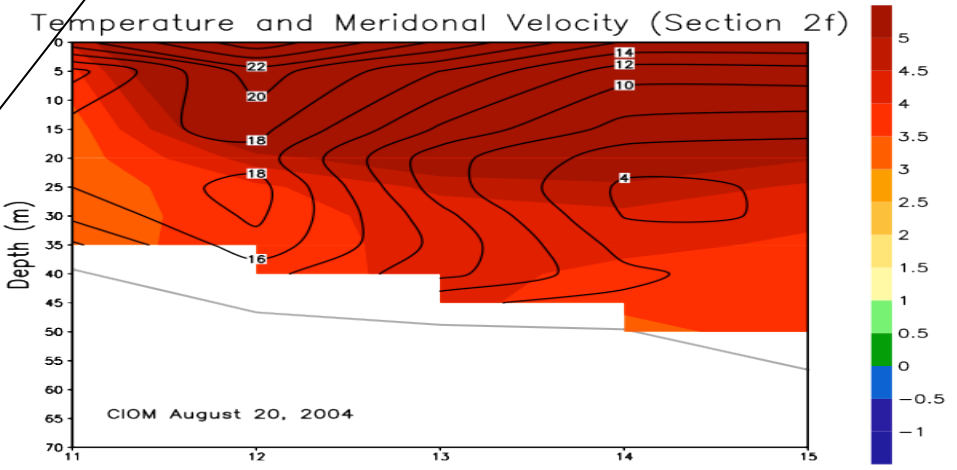
Southern Chukchi Sea



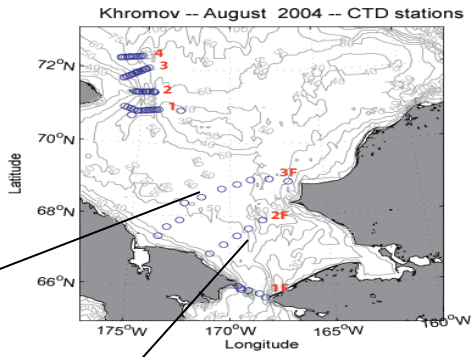


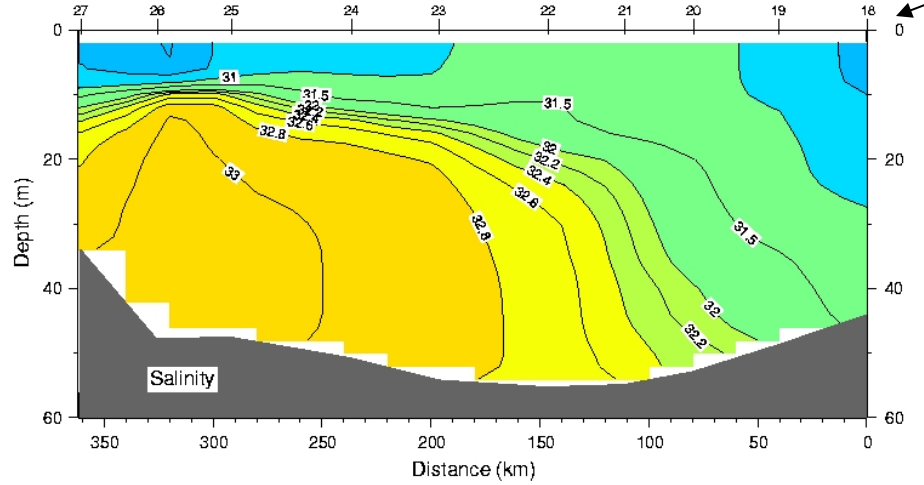


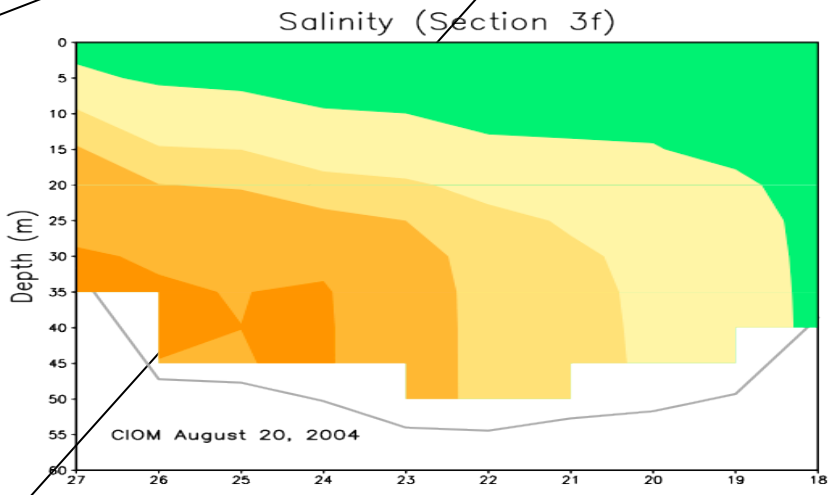


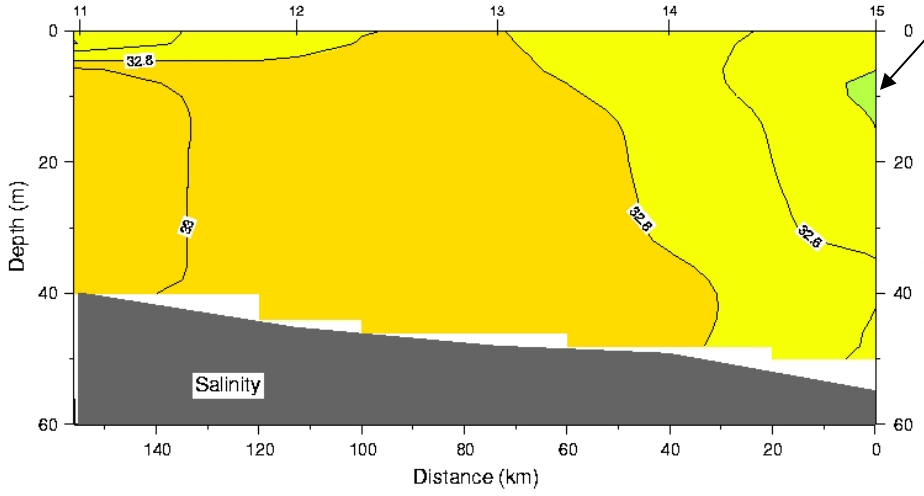


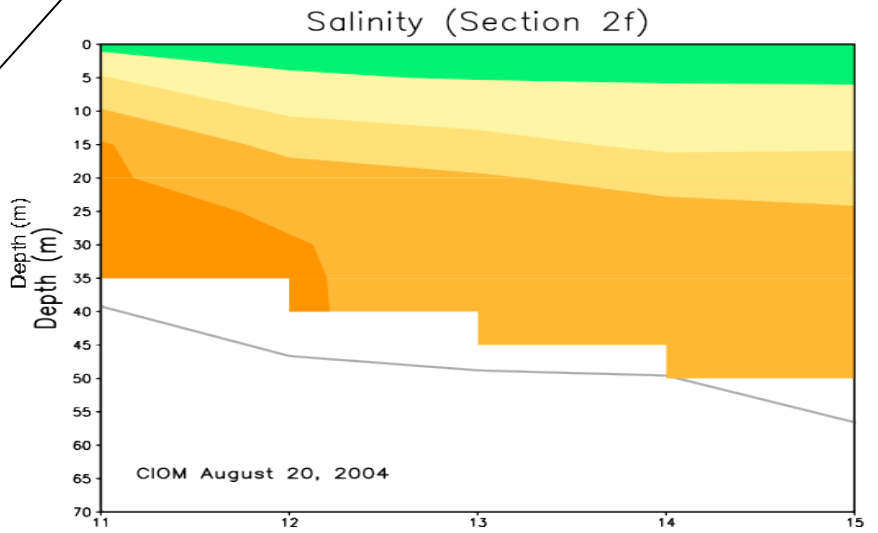
Southern Chukchi Sea: S







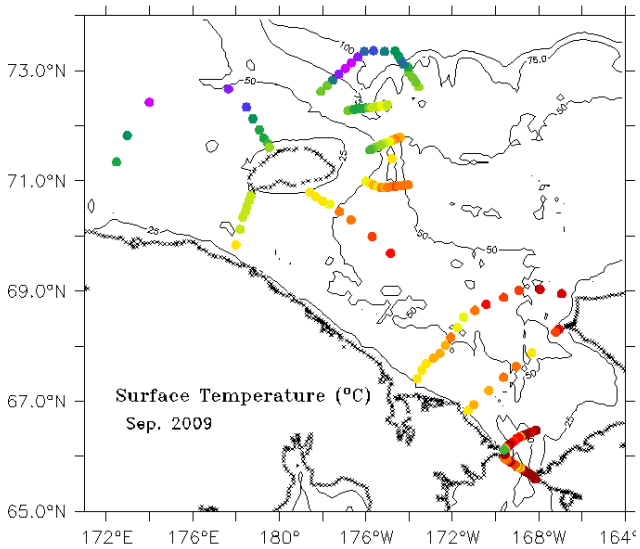




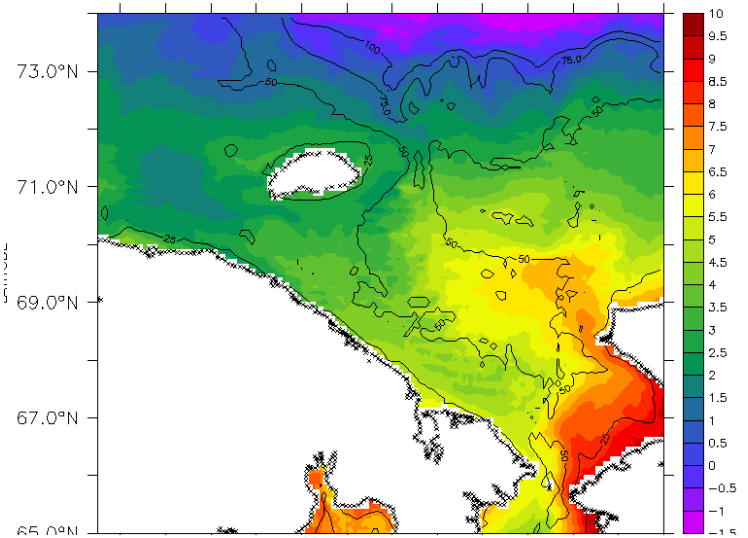
Verification of CIOM using 2009 RUSALCA Data in the Bering-Beaufort-Chukchi Seas (work in progress)

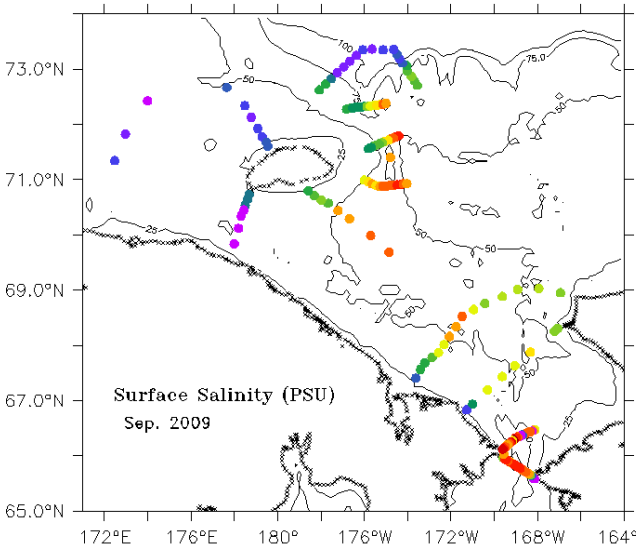
Measured Sep 2009

Modeled

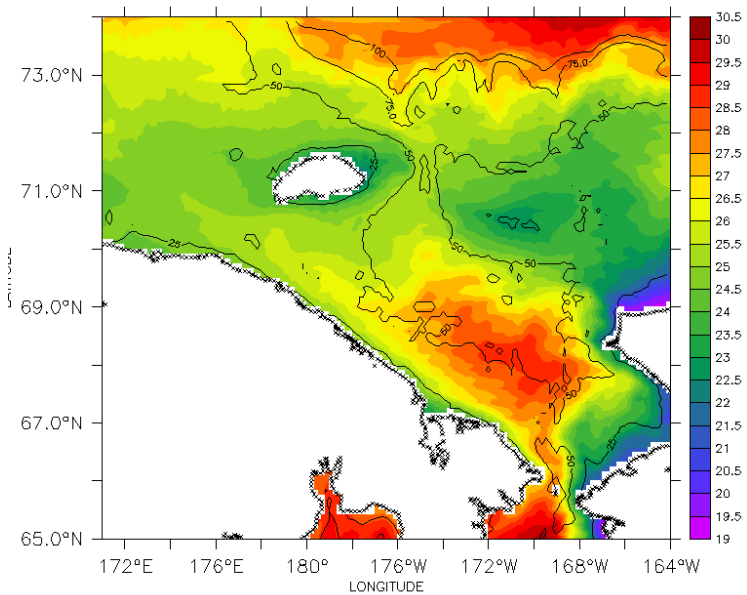


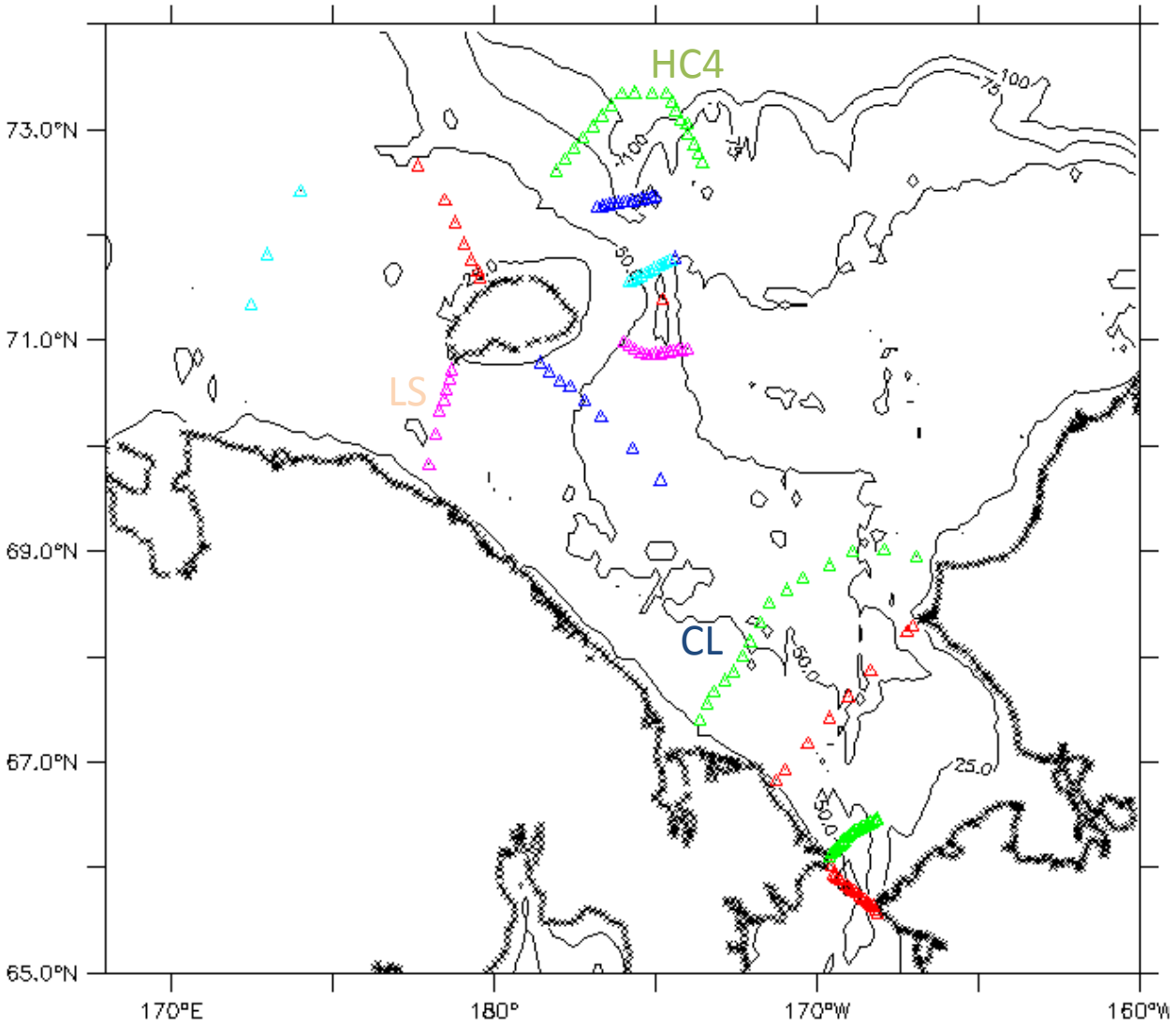
SST



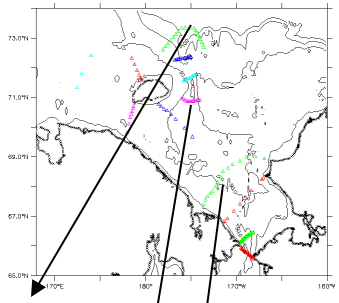


SSS



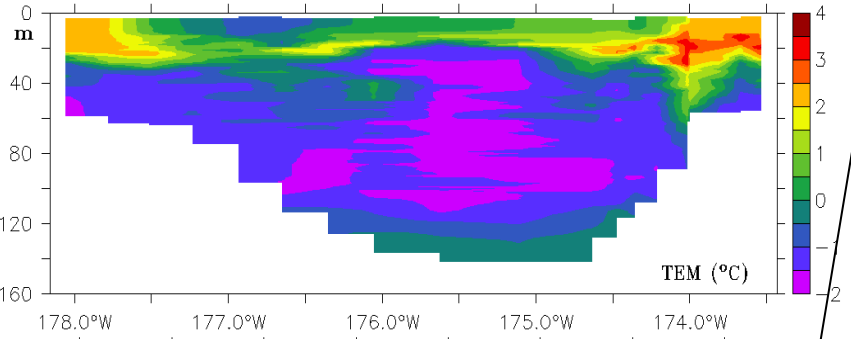


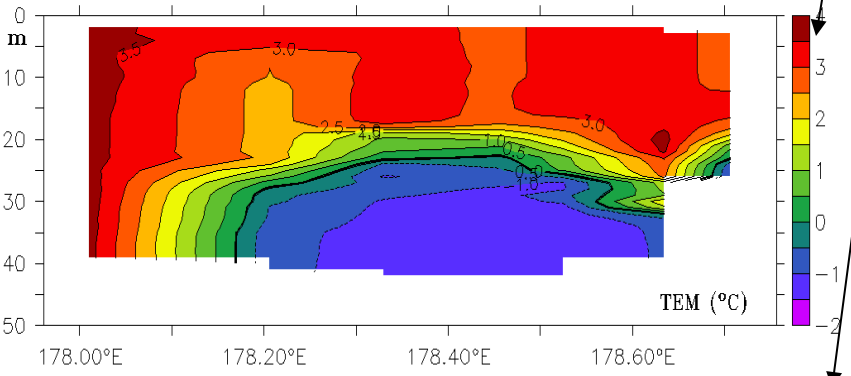
Cruise stations, Sep 3-29, 2009

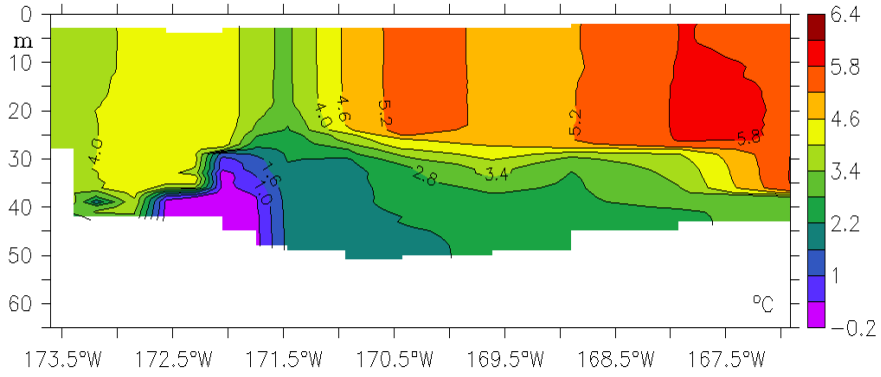


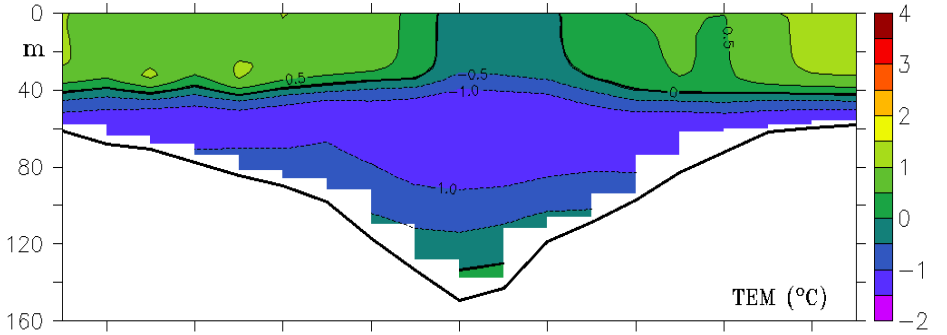
Observed temperature

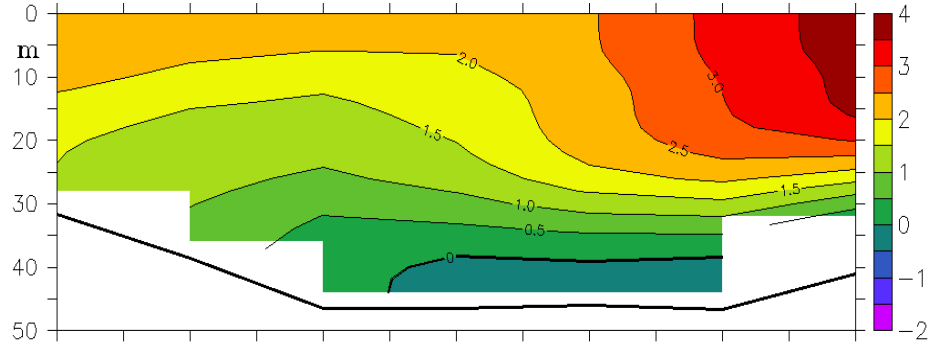
Simulated temperature

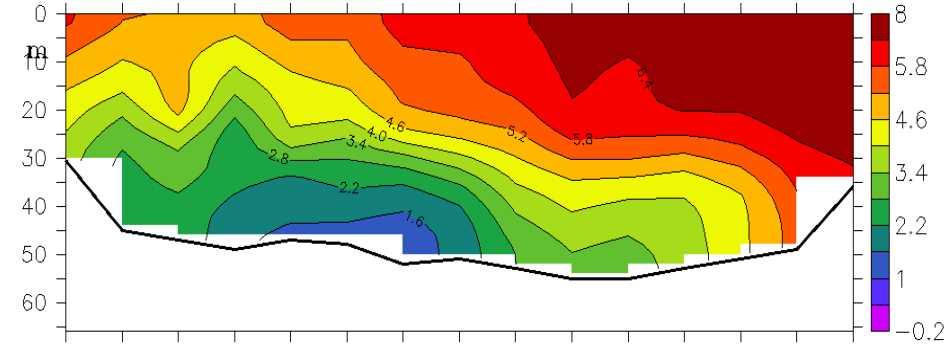


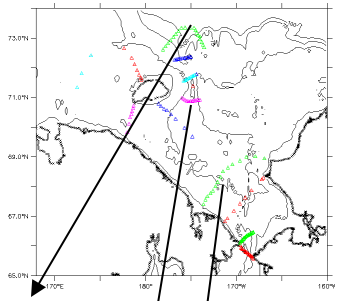






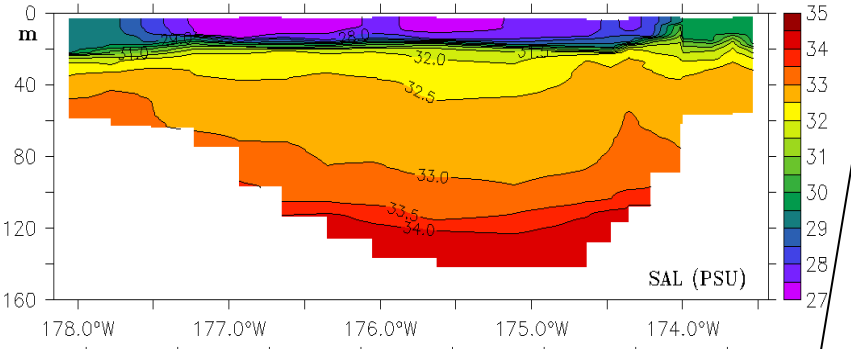


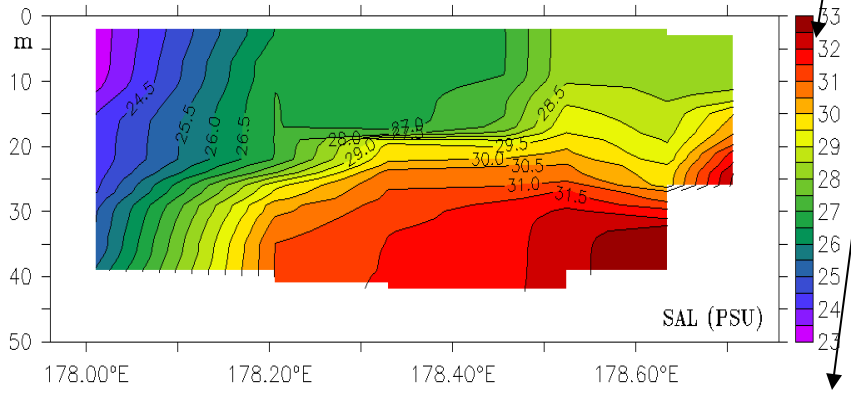


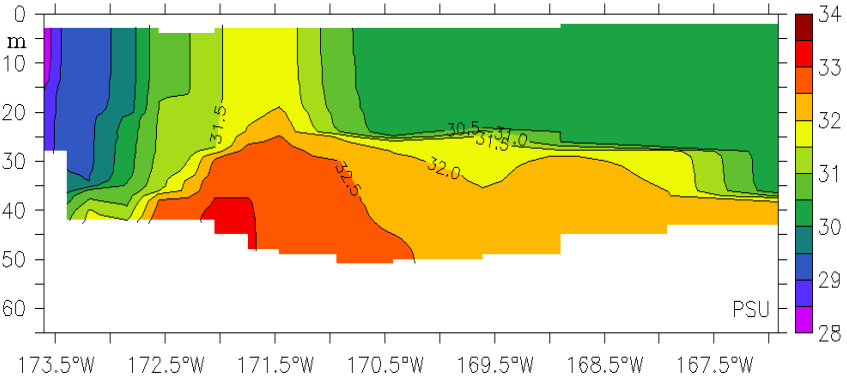


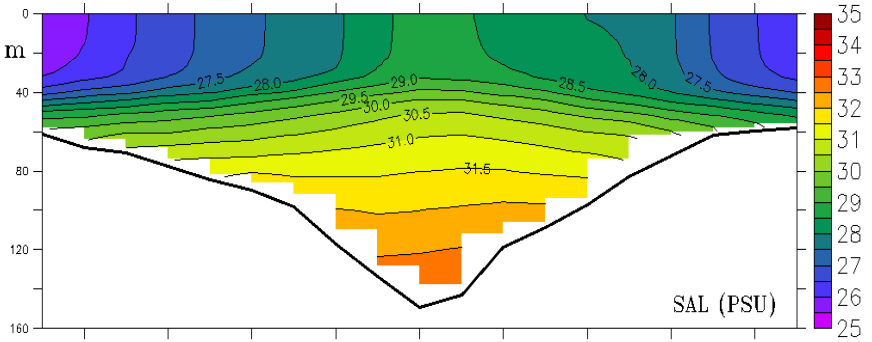
Observed salinity

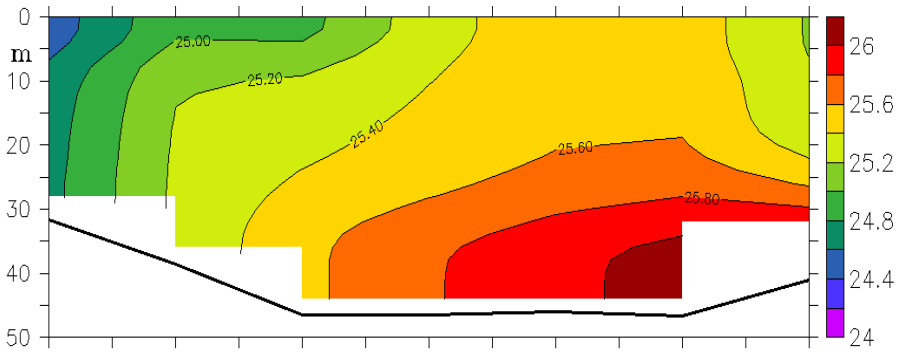
Simulated salinity

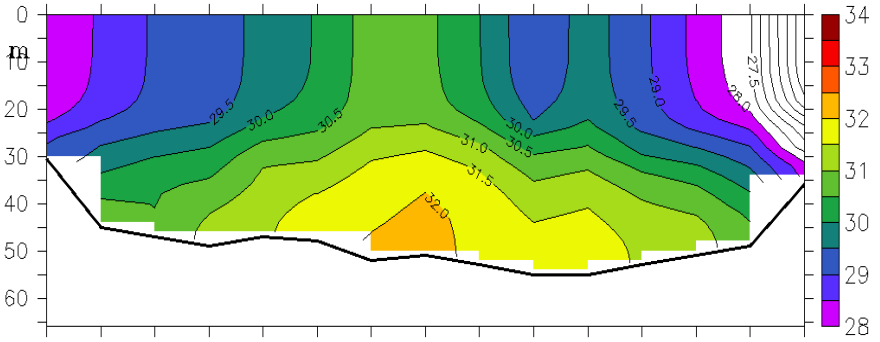




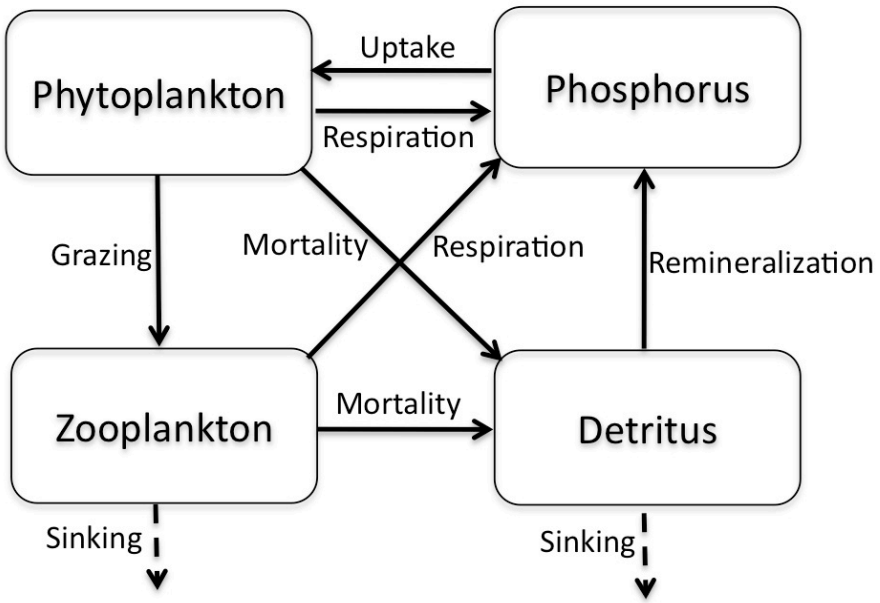


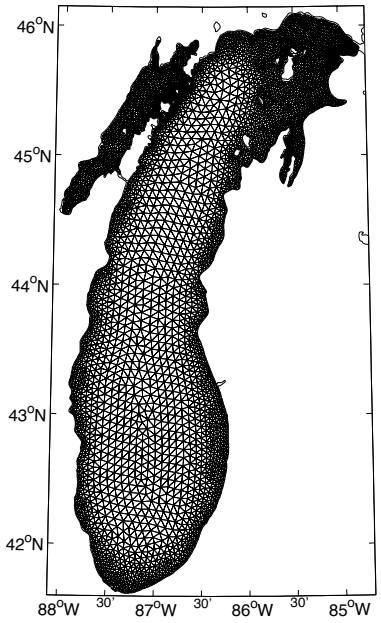




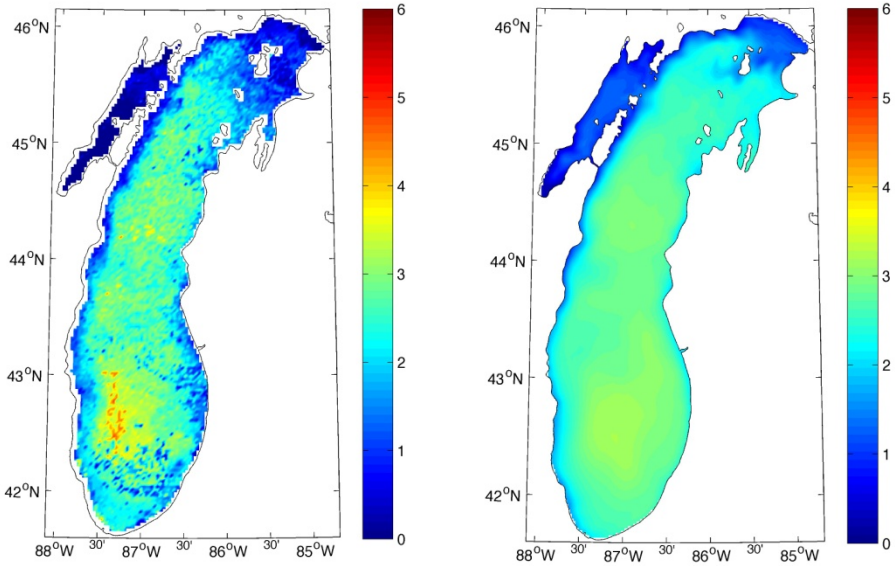


Lower-trophic NPZD model in Lake Michigan using FVCOM

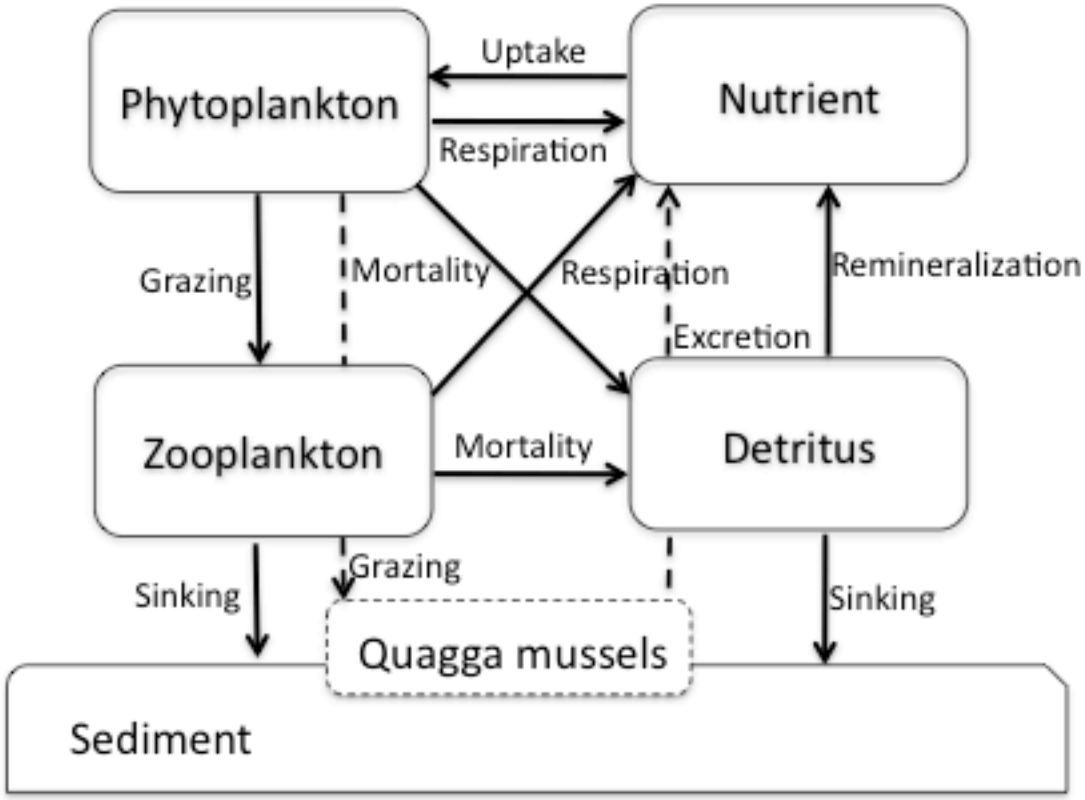




The diagram for NPZD model (upper left), FVCOM-ecosystem model grid (upper right), the SeaWIFS-measured (lower left) and FVCOM-simulated (lower right) surface chl-a in March 15, 2008 . (Luo, Wang, Schwab et al. 2012, JGR)



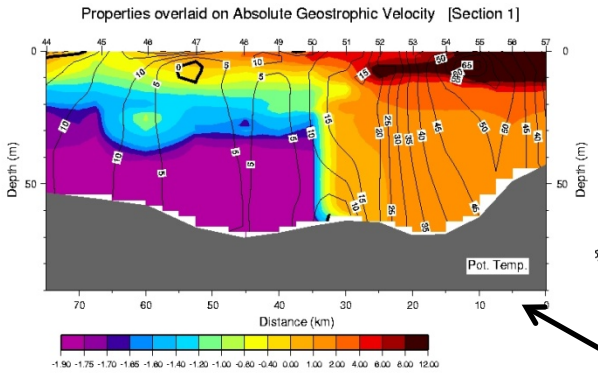
Proposed NPZD model with Quagga mussels in Lake Michigan using FVCOM



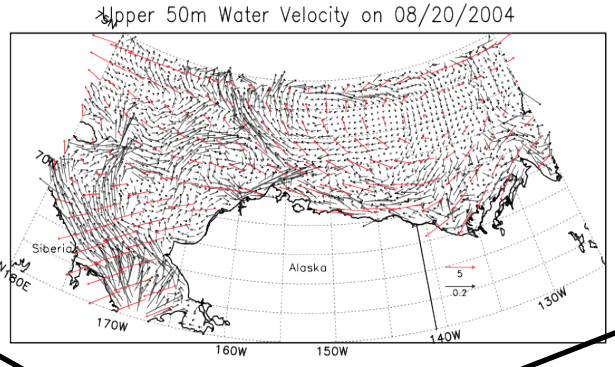
Under forcing of climate trend, extreme weather, storms, and river nutrient loads due to land use to investigate the interactions between the invasive stressor and climate stressor and the impacts on Great Lakes ecosystem

Verification of CIOM using 2004 RUSALCA Data (T) in the Bering-Beaufort-Chukchi Seas (GLERL)

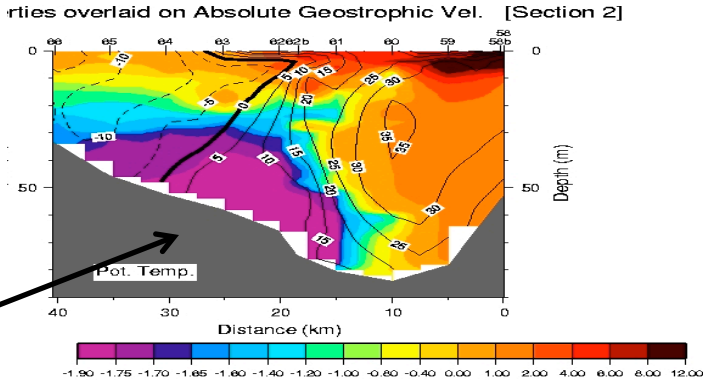
Transect 1



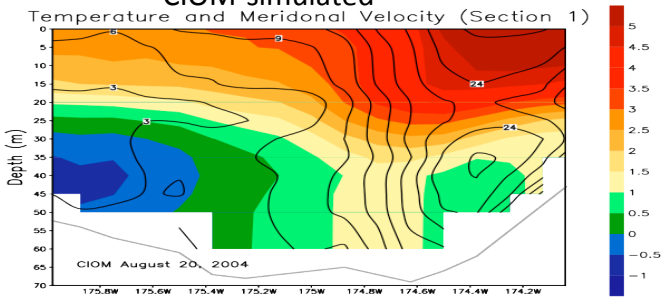
Aug 2004

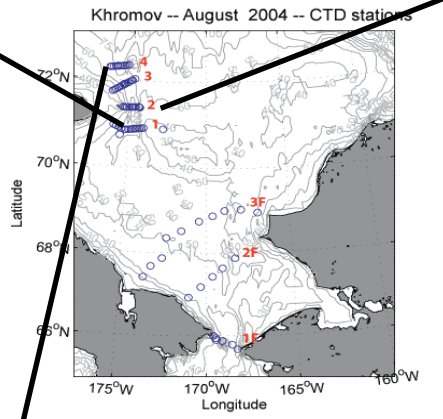


Transect 2



CIOM-simulated





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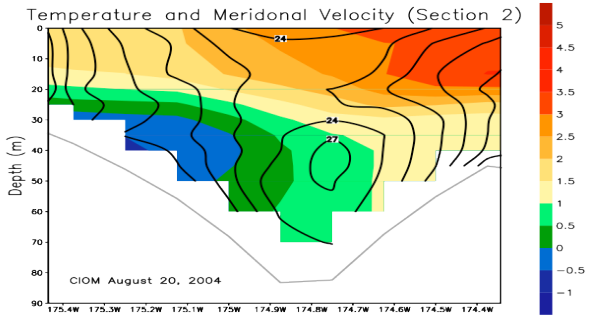
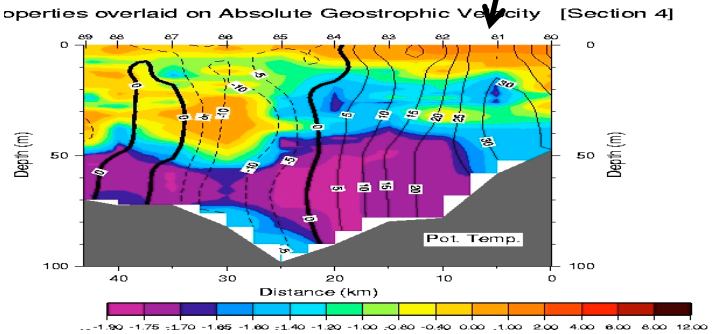


Transect 4



CIOM-simulated