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Modeling the Circulation in Casco Bay (2011 Casco Bay Circulation Modeling Workshop Presentation)

Huijie Xue
University of Maine

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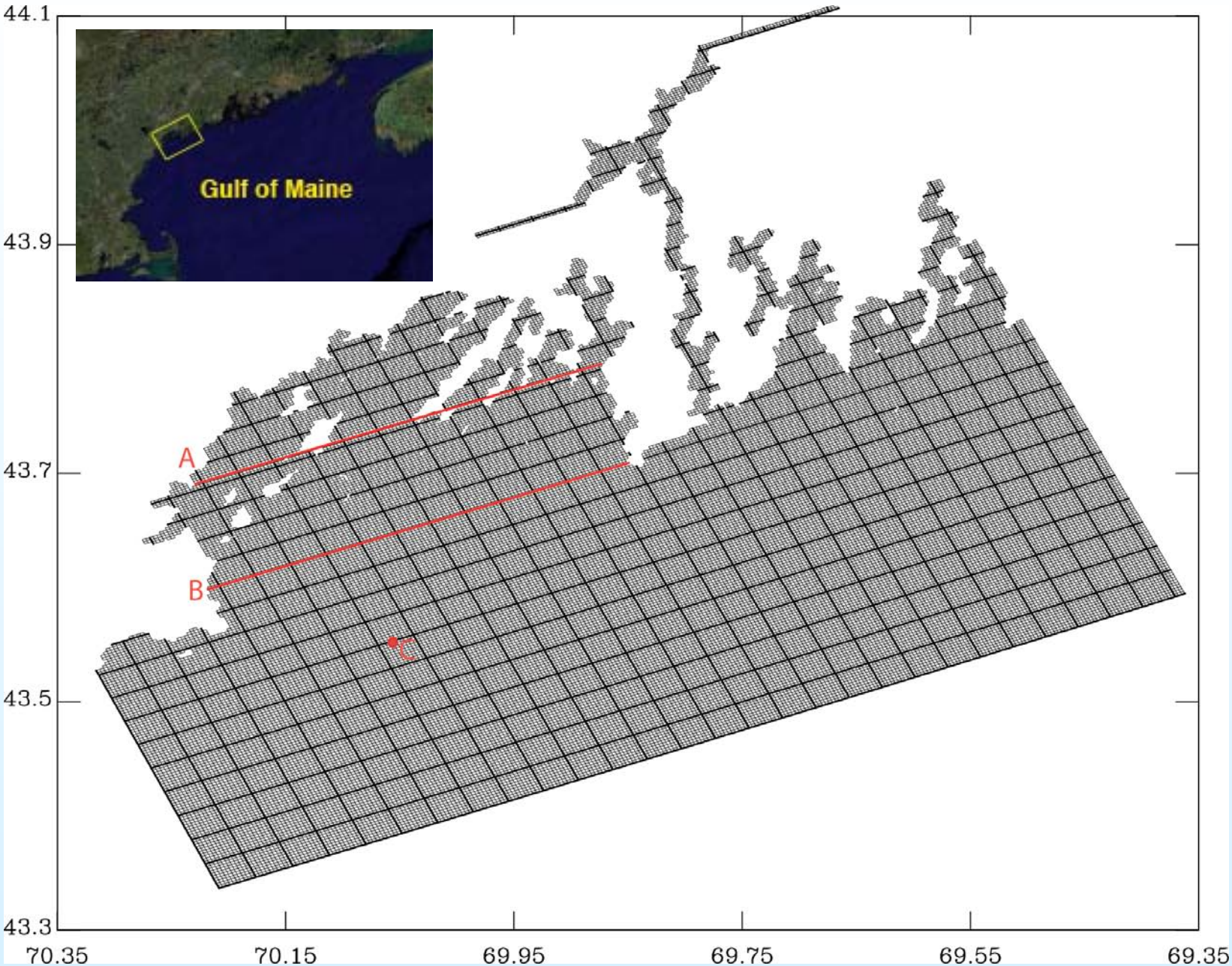
Modeling the Circulation in Casco Bay

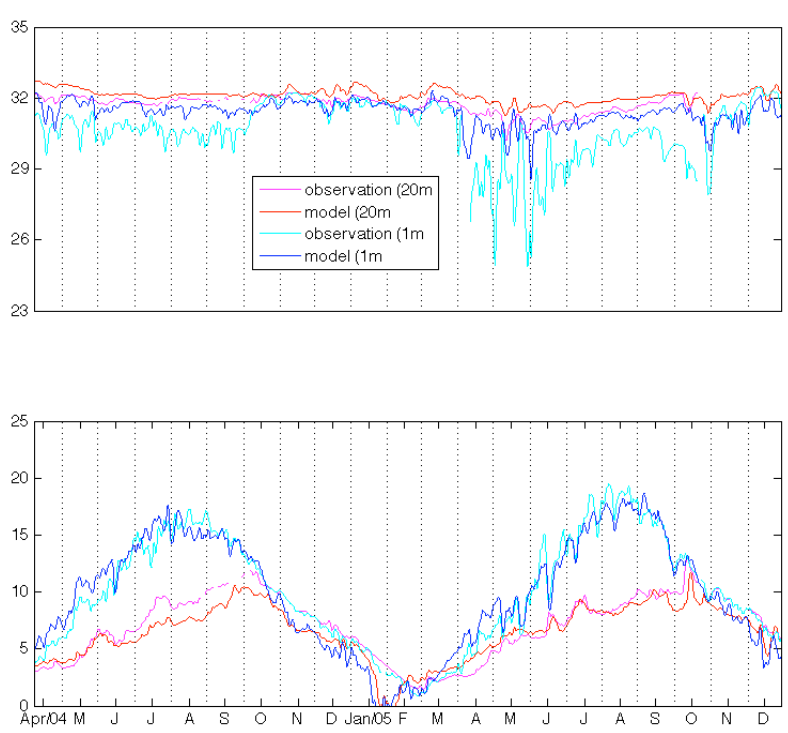
Huijie XUE
School of Marine Sciences
University of Maine

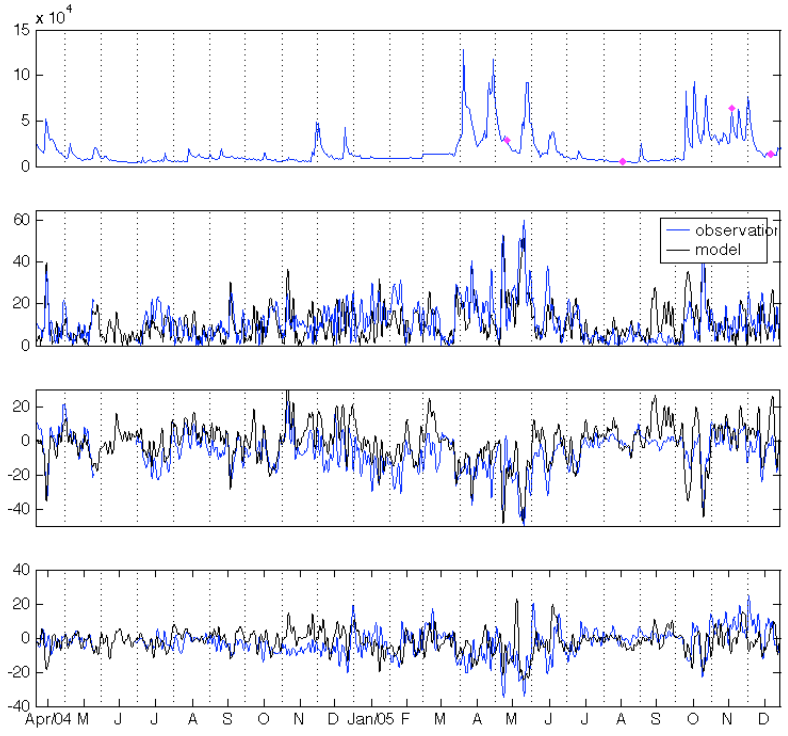
Casco Bay Circulation Modeling Workshop, May 19, 2011



MOSAC/Maine DEP/SeaGrant, NOAA, NASA

Comparison with in situ Observations at GoMOOS buoy C

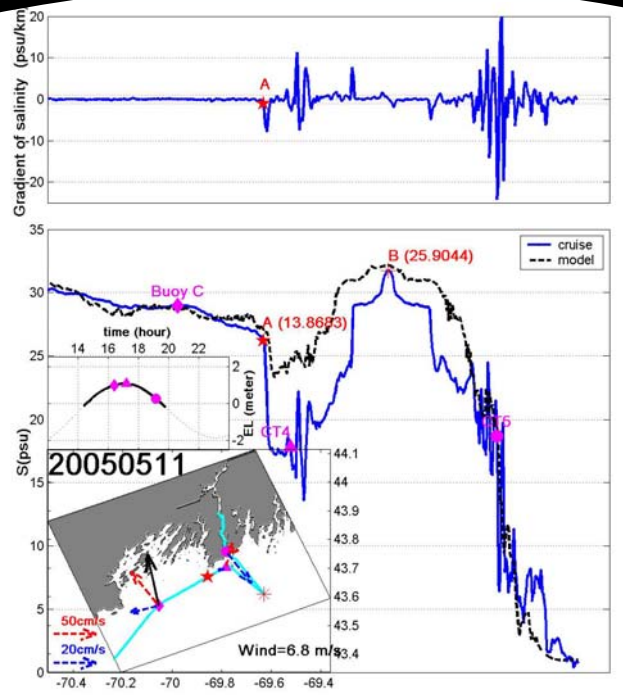


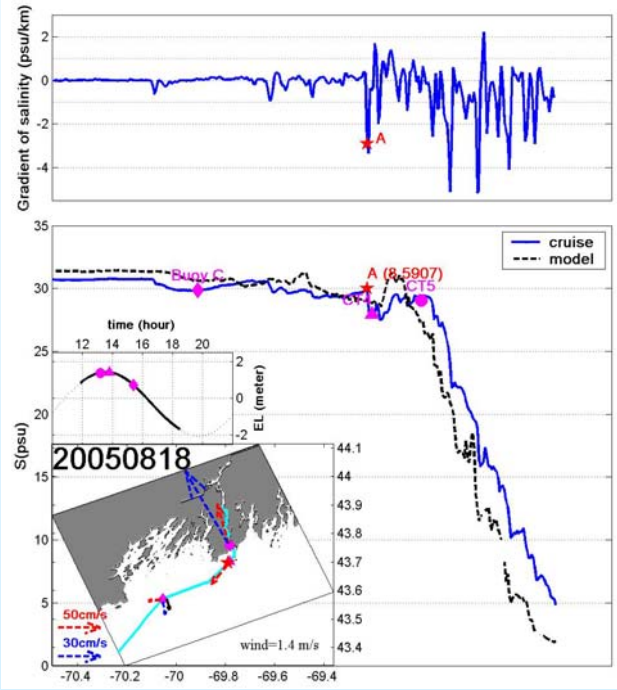


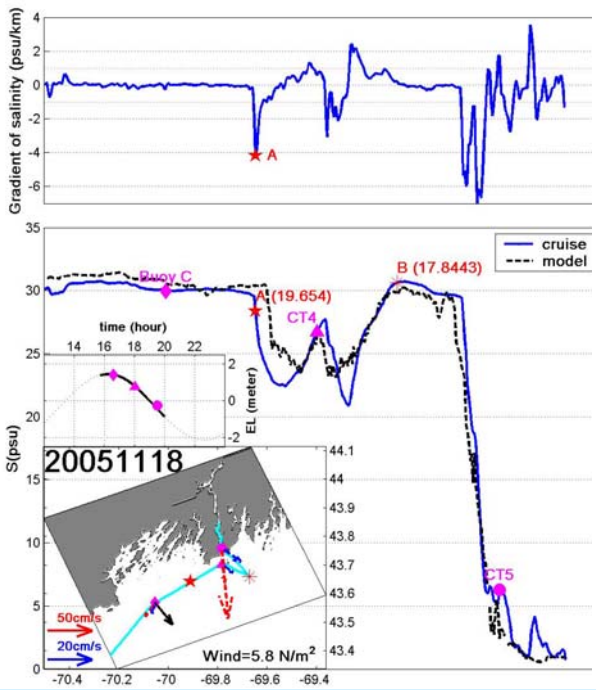
Xue & Du, OceDyn, 2010

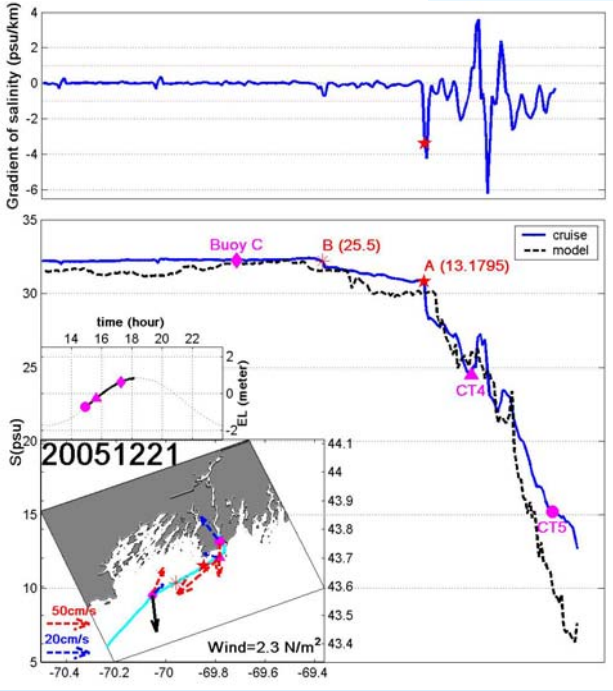
Comparison with UNH cruise Data

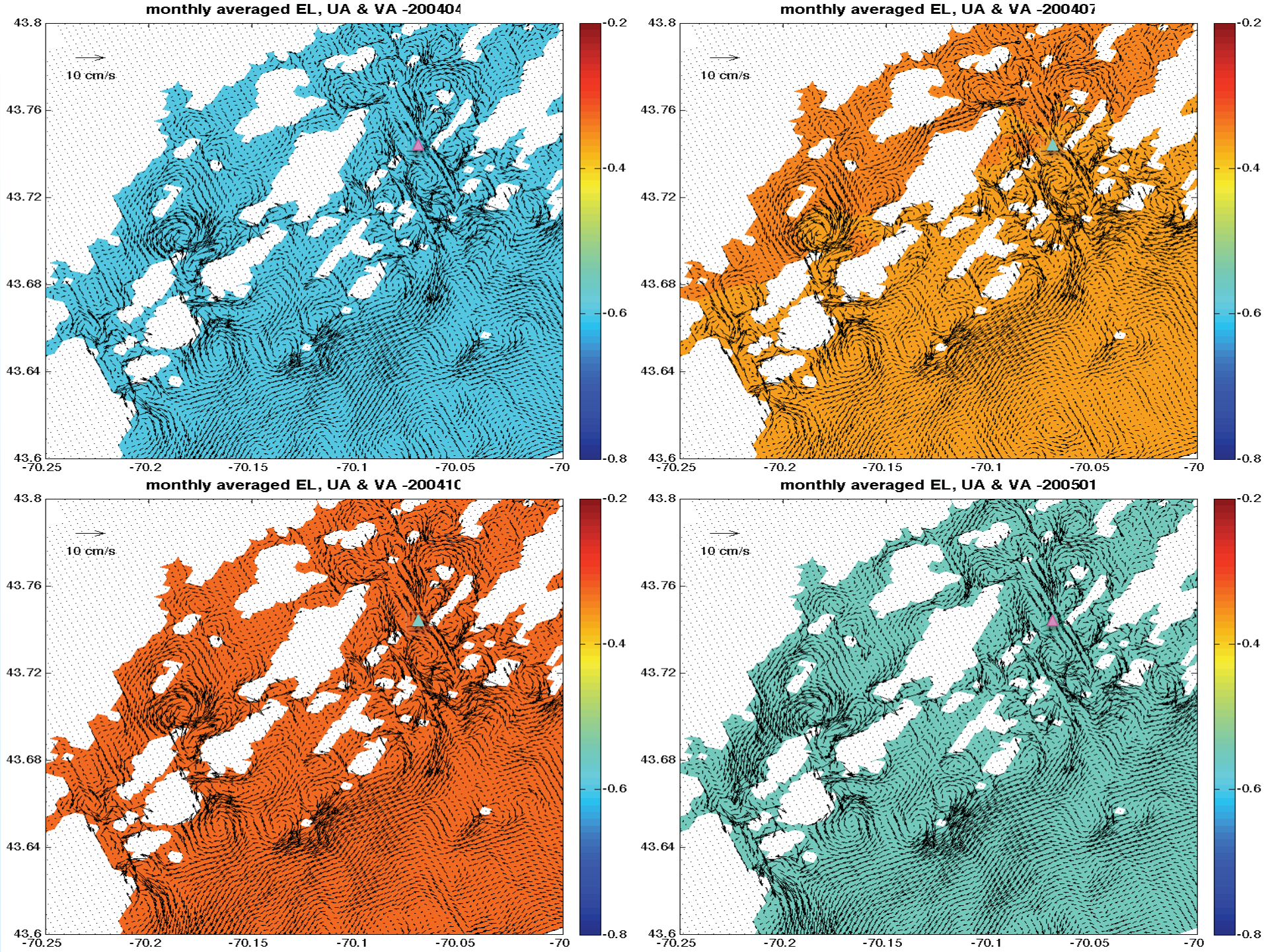
Xue & Du, OceDyn, 2010







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monthly averaged EL, UA & VA -200407
monthly averaged EL, UA & VA -200410
monthly averaged EL, UA & VA -200501
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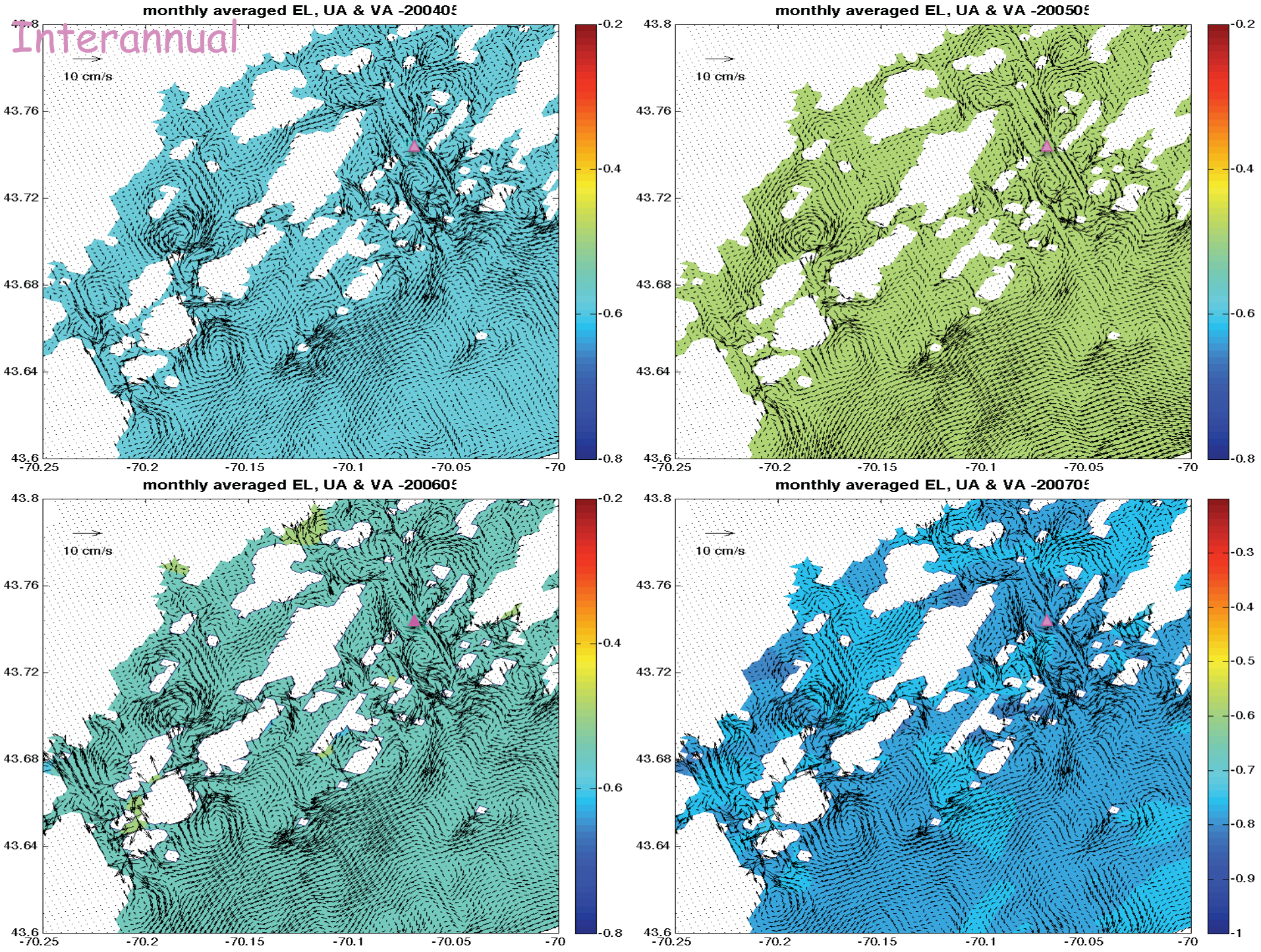
43.8
43.76
43.72
43.68
43.64
43.6
-70.25
-70.2
-70.15
-70.1
-70.05
-70
-0.2
-0.4
-0.6
-0.8

Interannual



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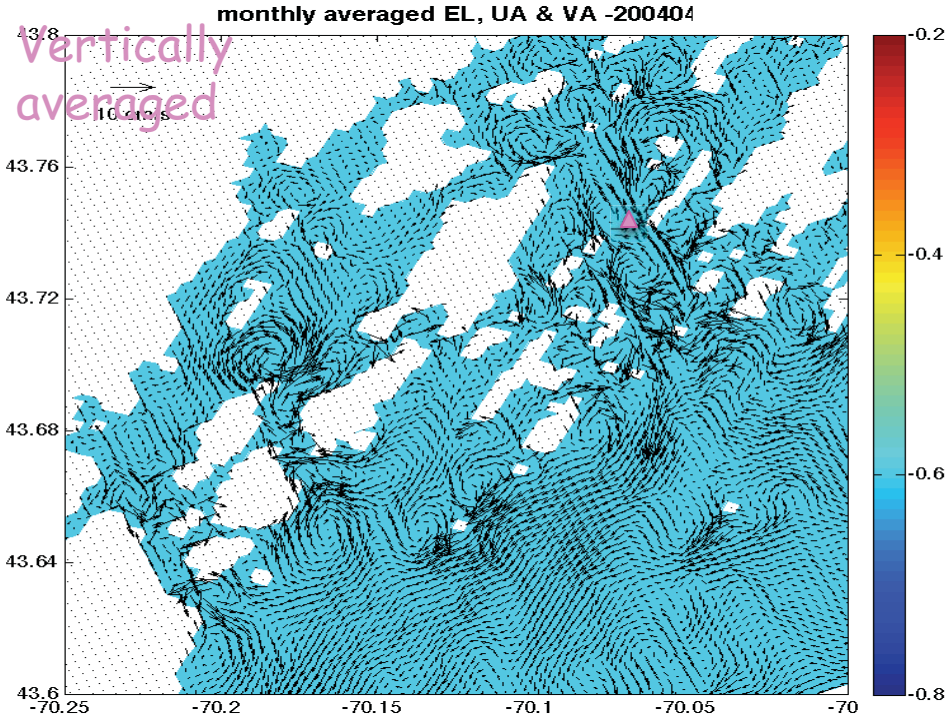
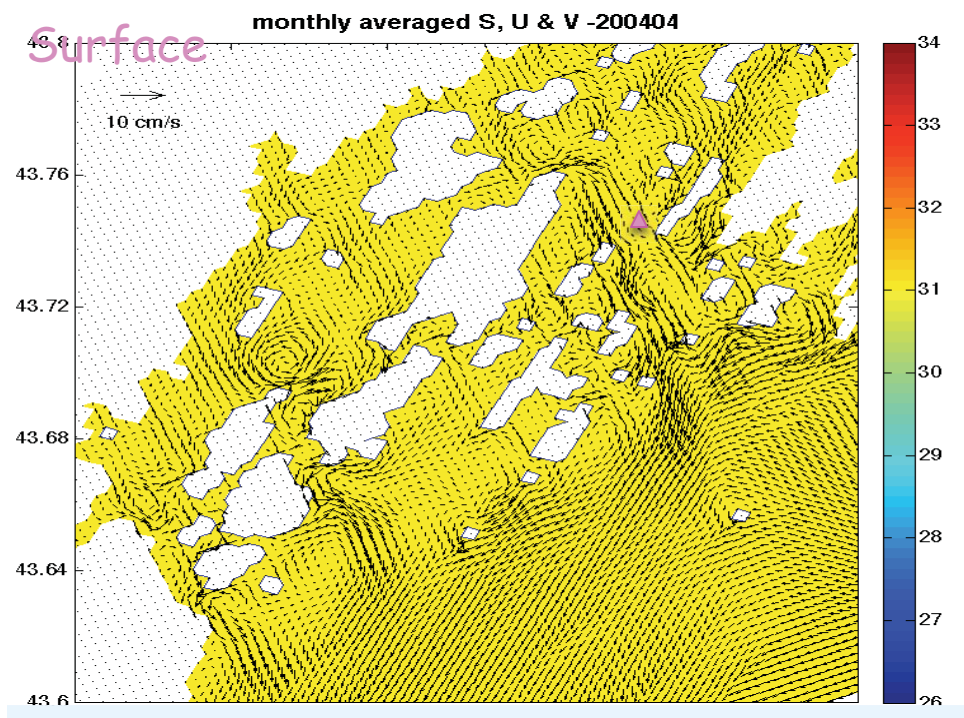
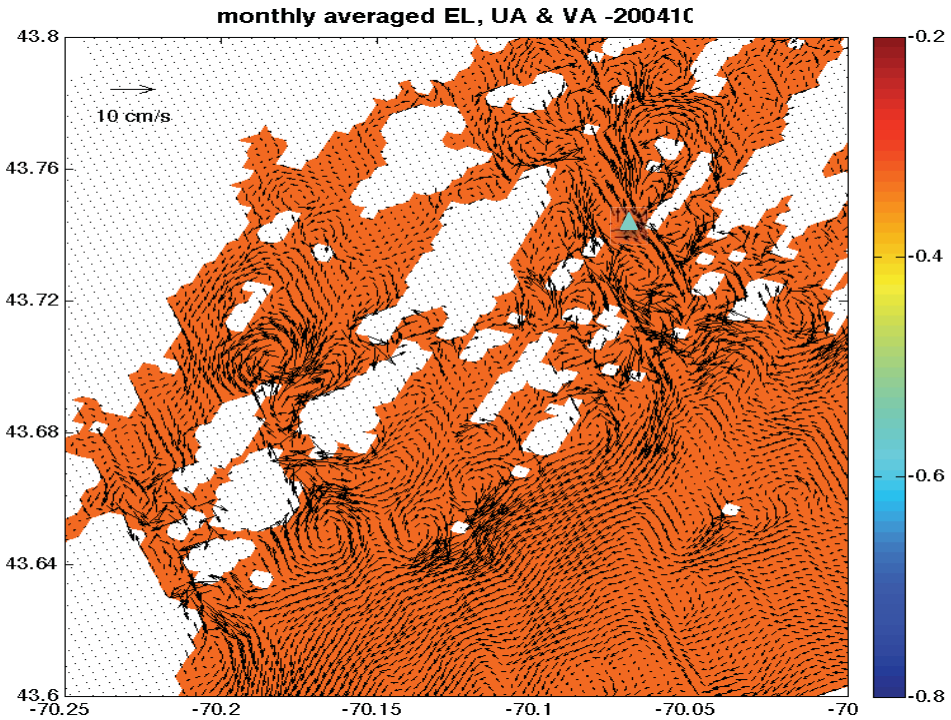
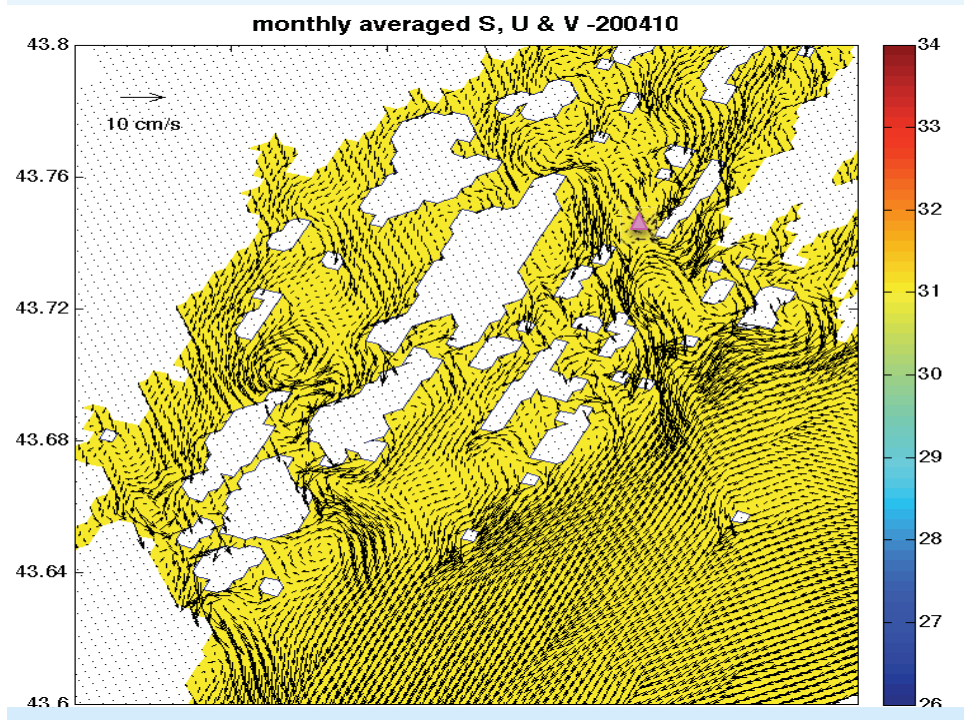
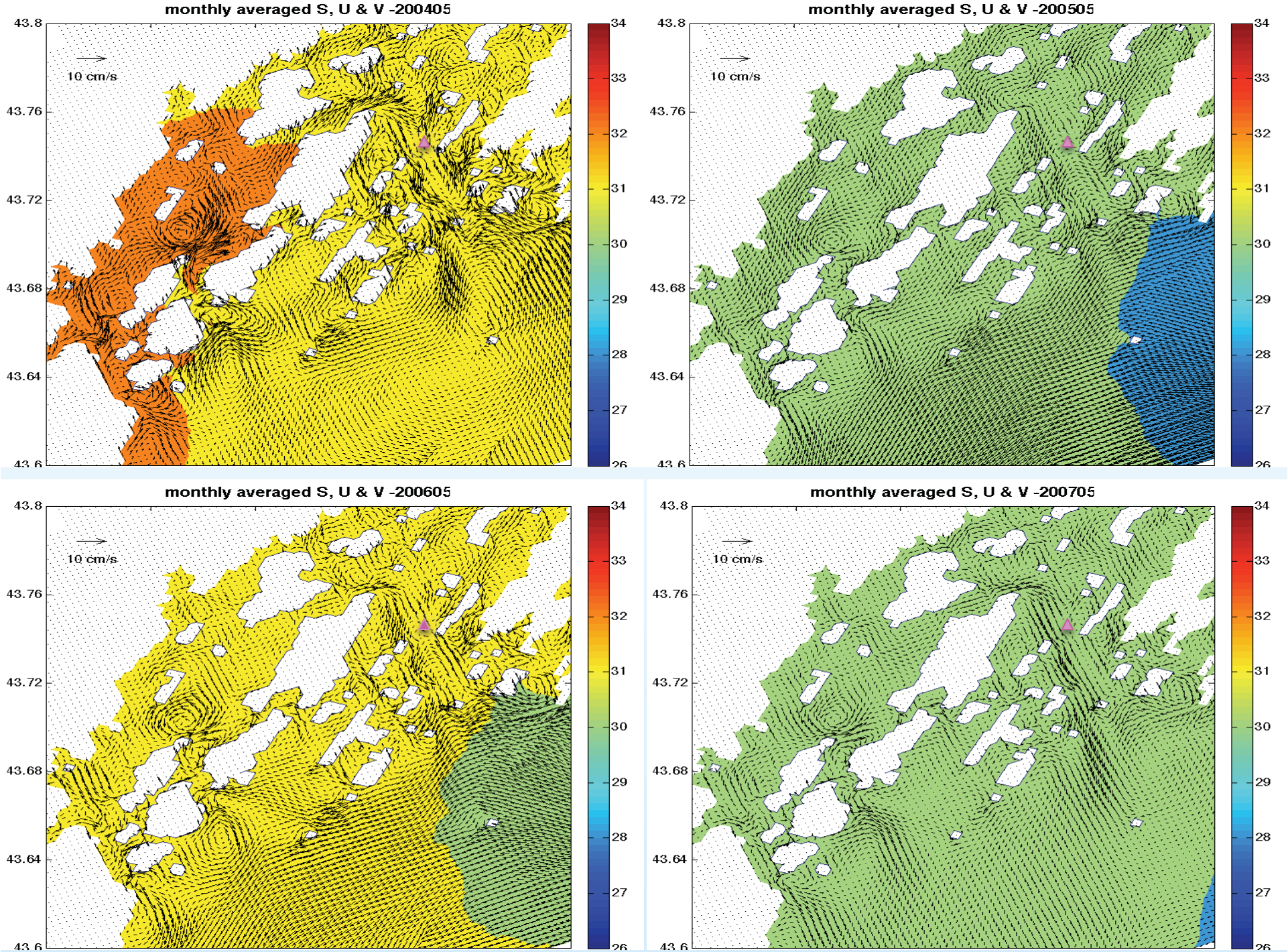


Surface





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monthly averaged S, U & V -200505
monthly averaged S, U & V -200605
monthly averaged S, U & V -200705
10 cm/s
43.8
43.76
43.72
43.68
43.64
43.6
34
33
32
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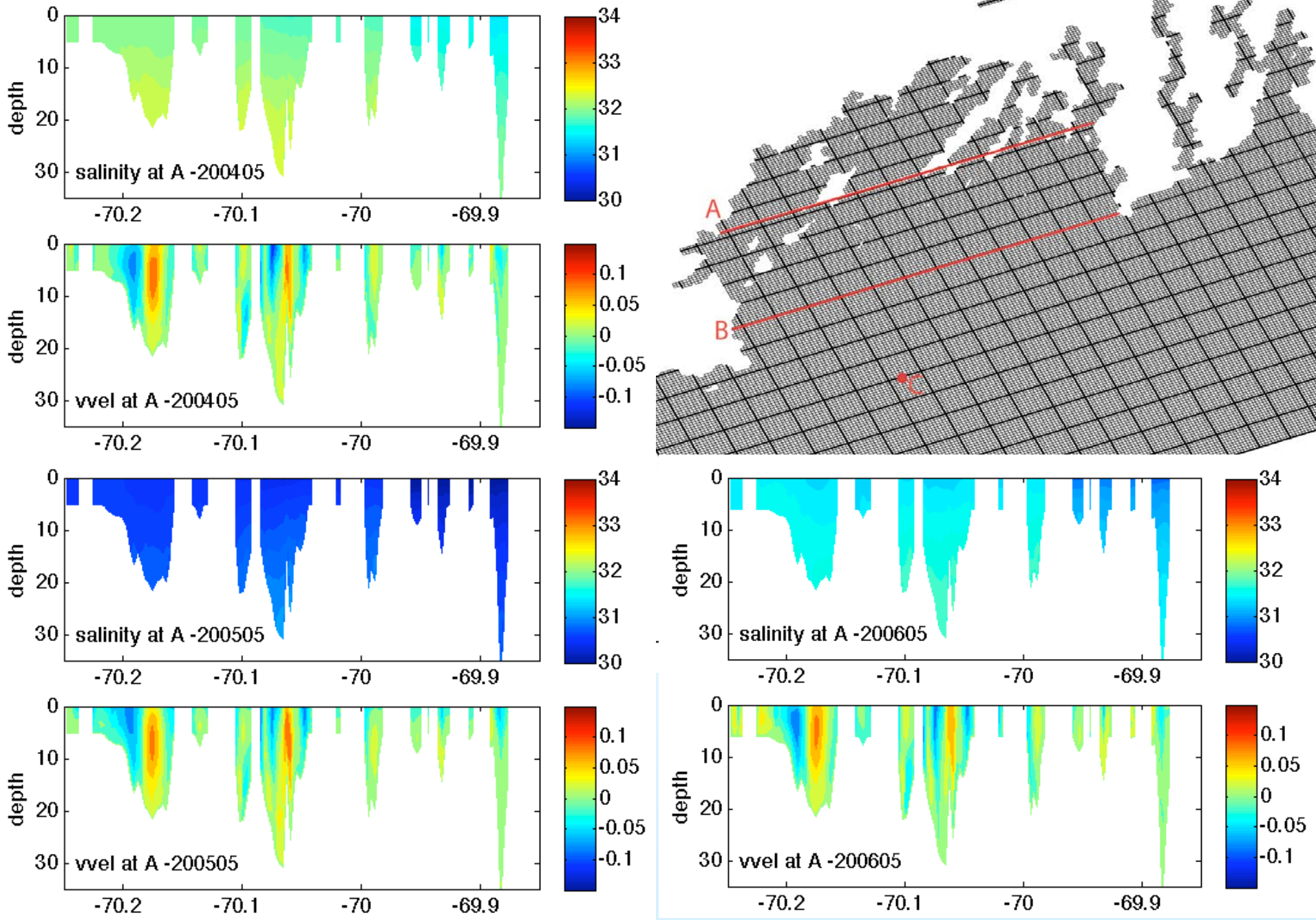
30
29
28
27
26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vvel at A -200405
salinity at A -200505
vvel at A -200505
salinity at A -200605
vvel at A -200605
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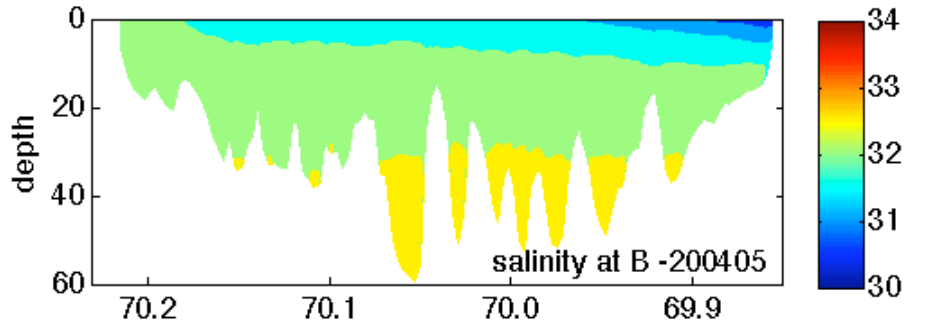
-70.1
-70
-69.9
A
B
C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salinity at B -200405
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32
31
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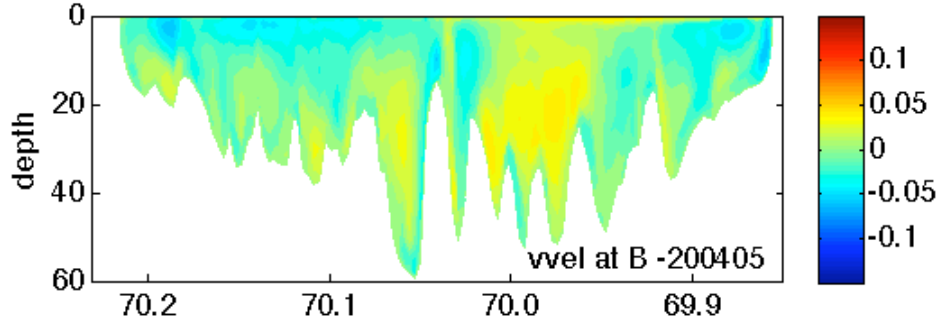
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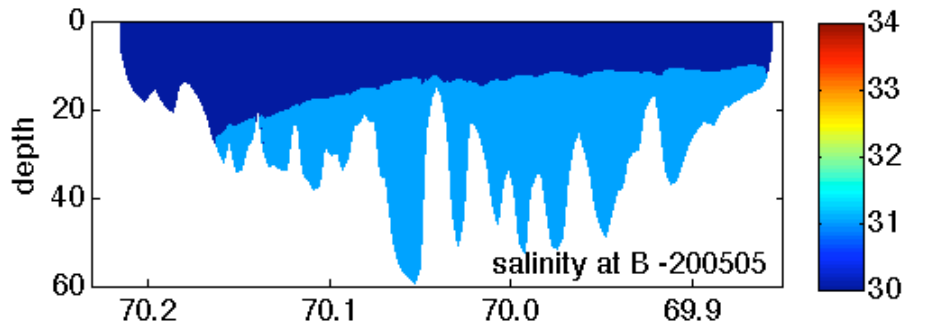
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salinity at B -200505
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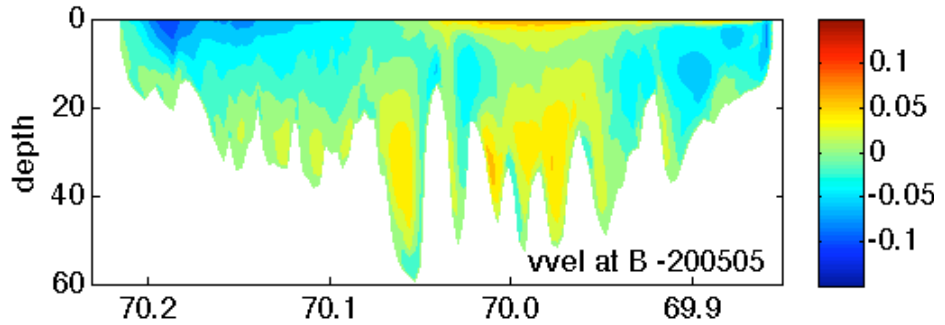
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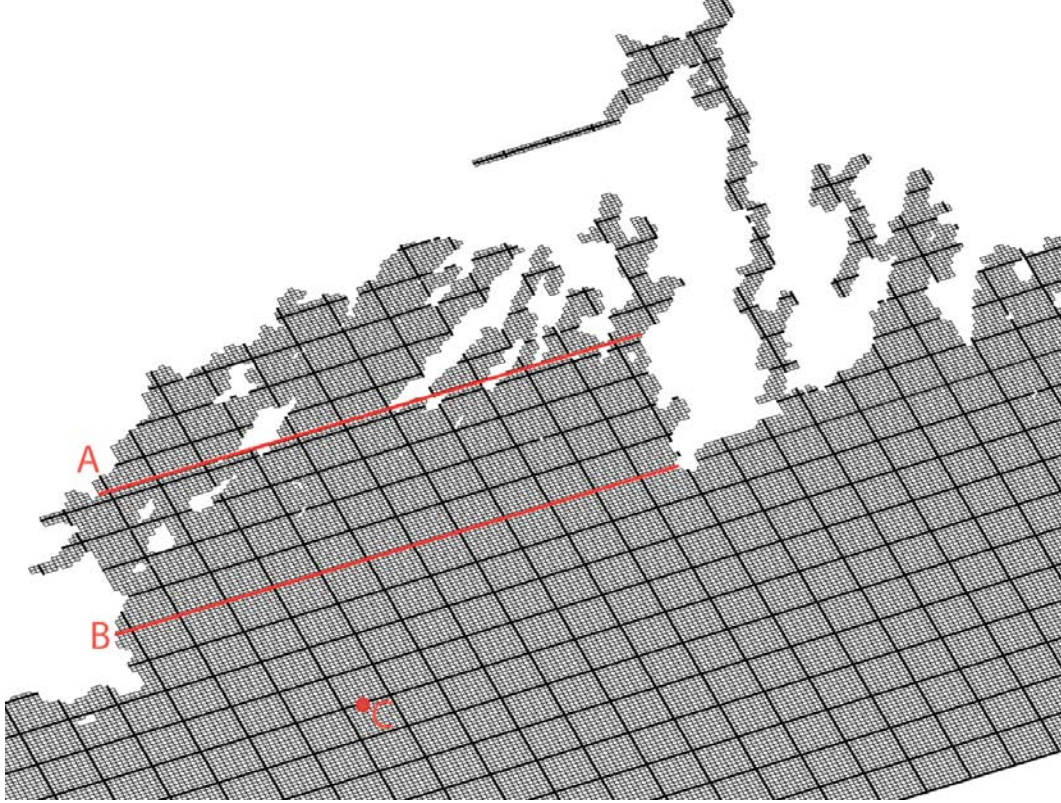
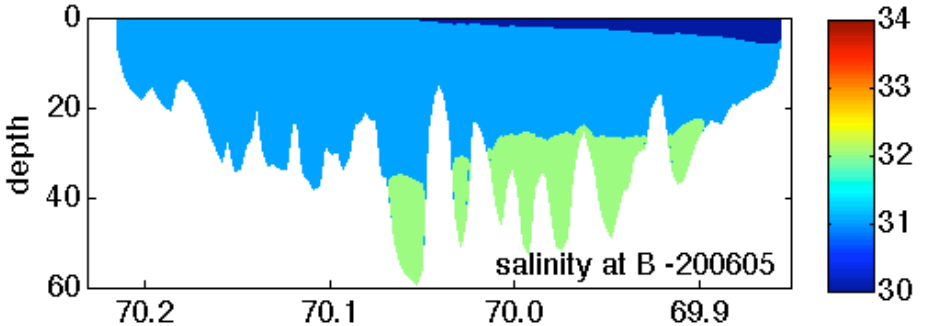

A
B
C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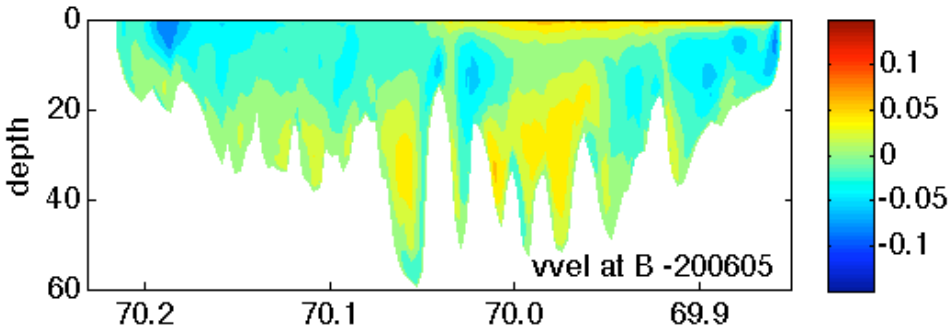
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vvel at B -200605
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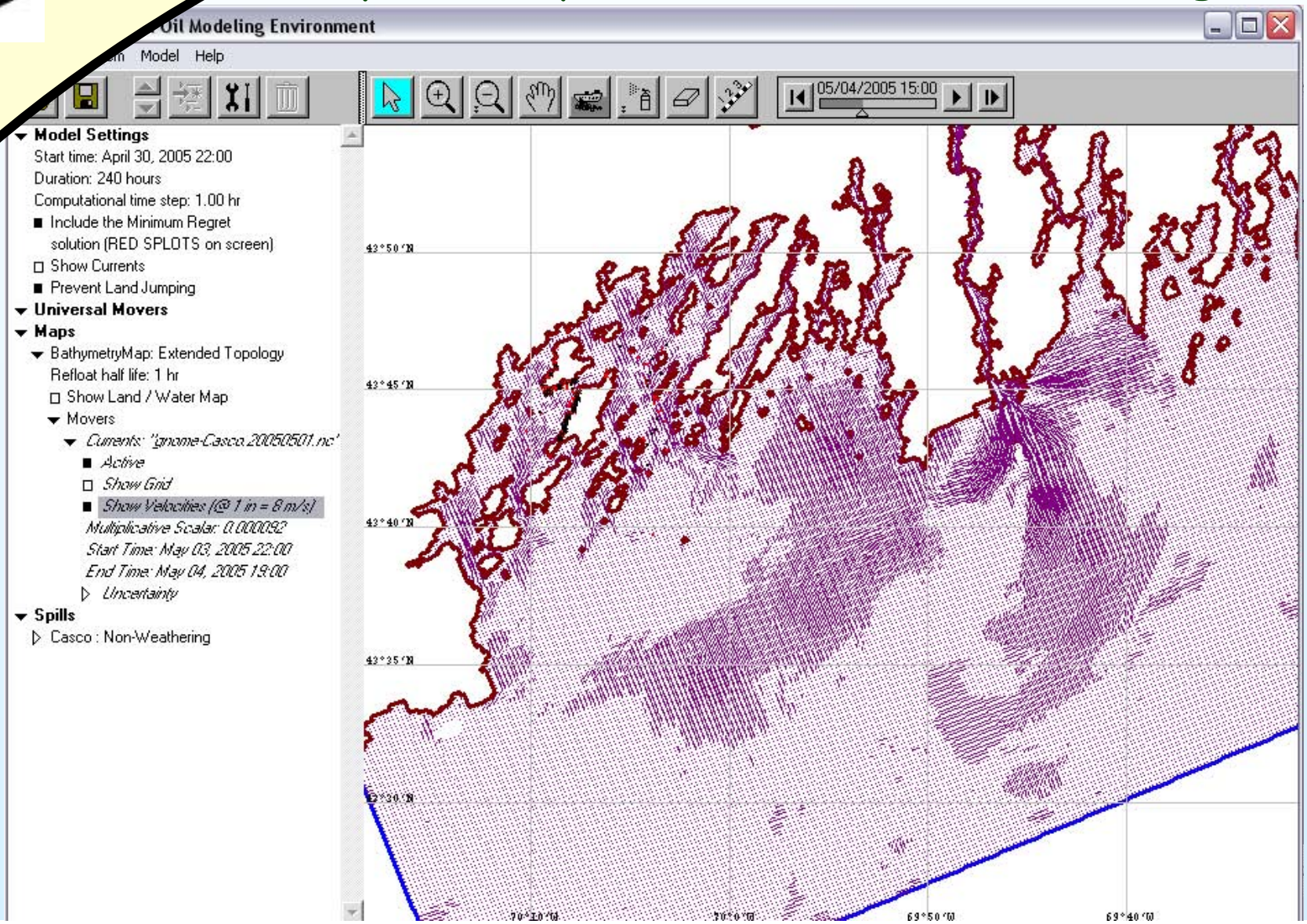
-0.05
-0.1

GNOME – Casco Bay

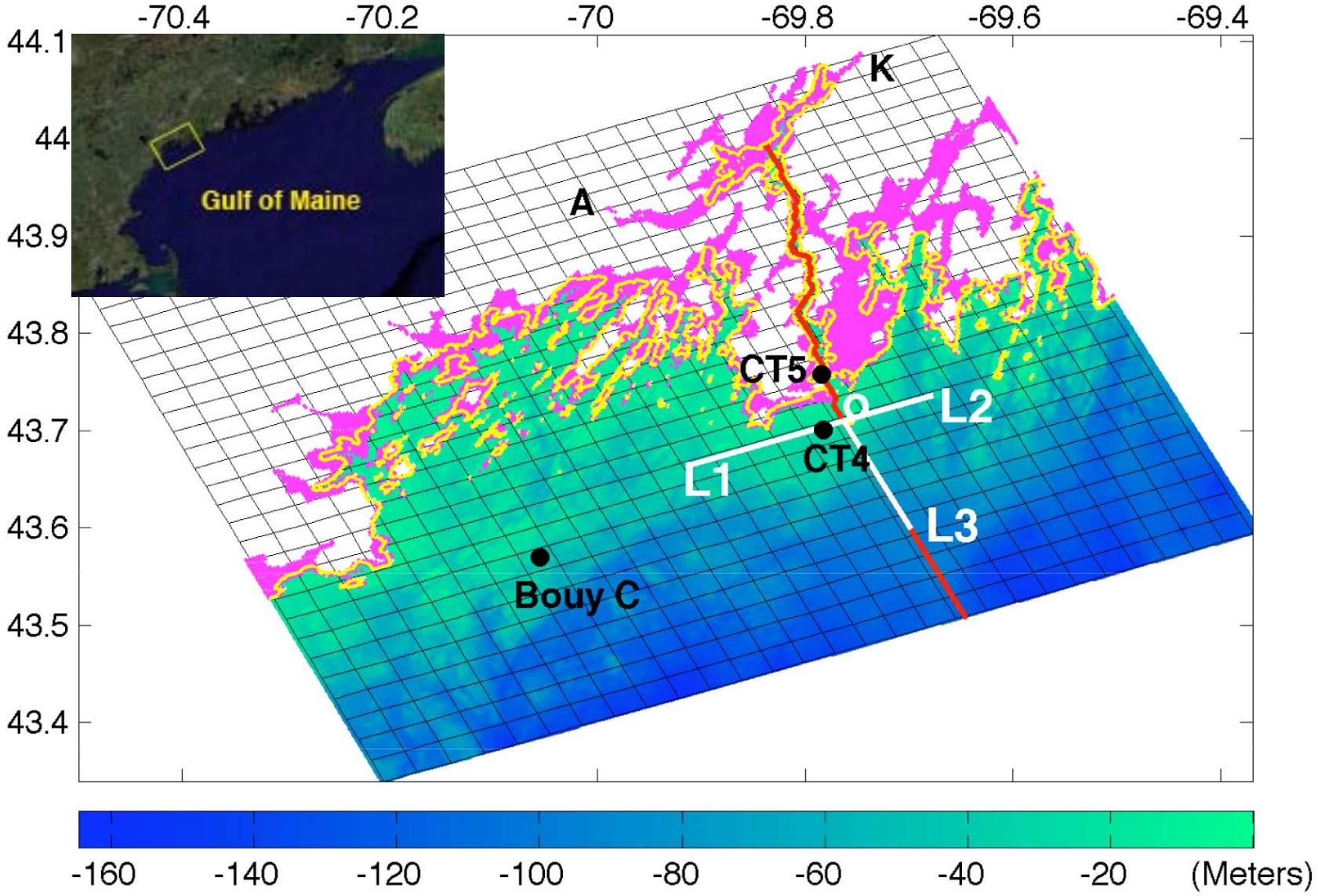
http://rocky.umeoce.maine.edu/casco_gnome



Summary

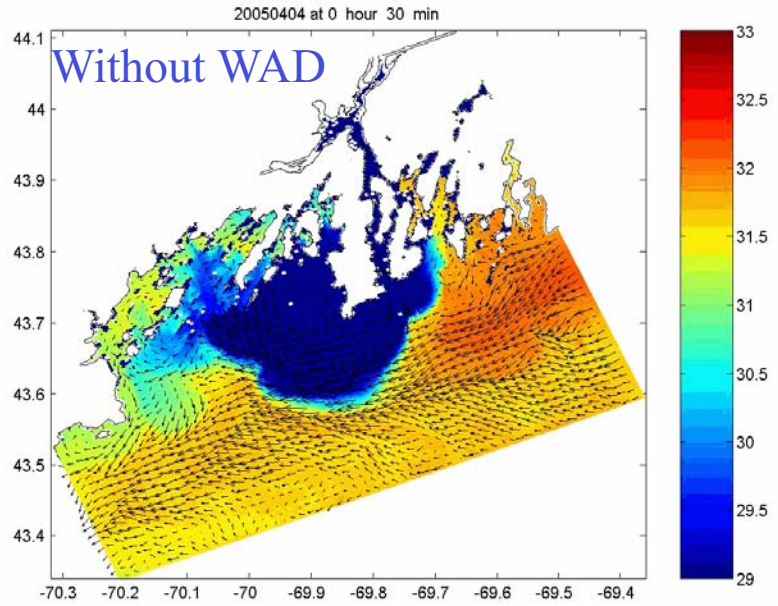
- A working circulation model with hindcast from March 2004 to September 2007
  - Compared with limited observations
- Combined with NOAA GNOME, the model simulation can be used to assist ecological and water quality studies of the bay.
- There were a number of extreme events during the simulation period, e.g., 2005 and 2006 were among the wettest years on the record; Nor'easters occurred in May 2005.

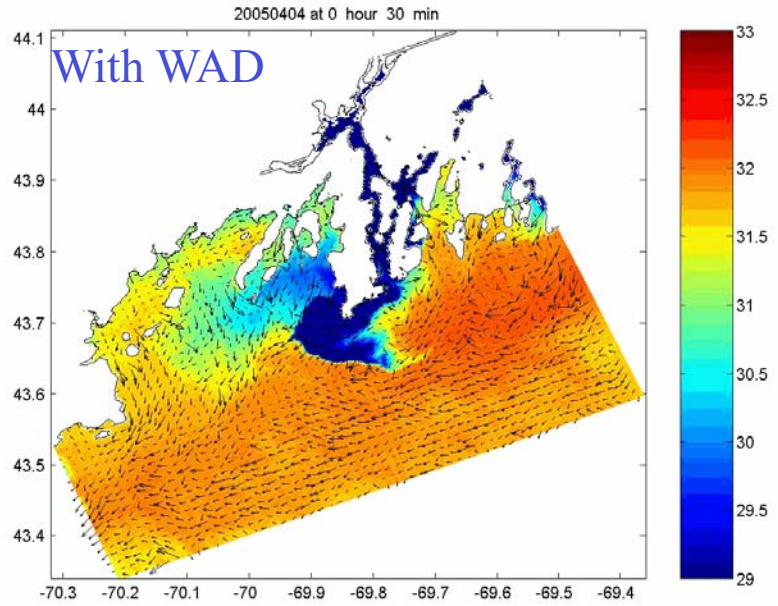
Effects of Wetting-and-Drying



Xue & Du, OceDyn, 2010

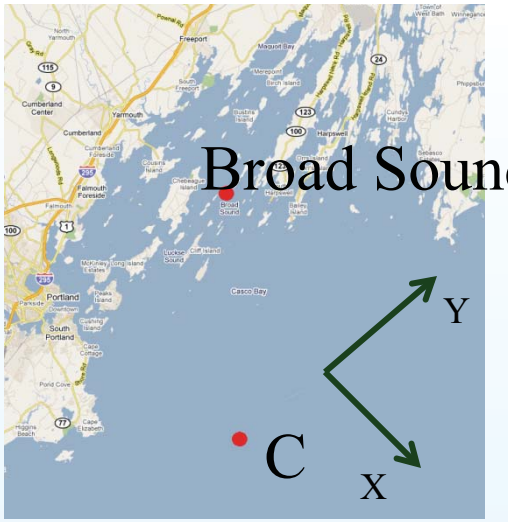
Effects of Wetting-and-Drying

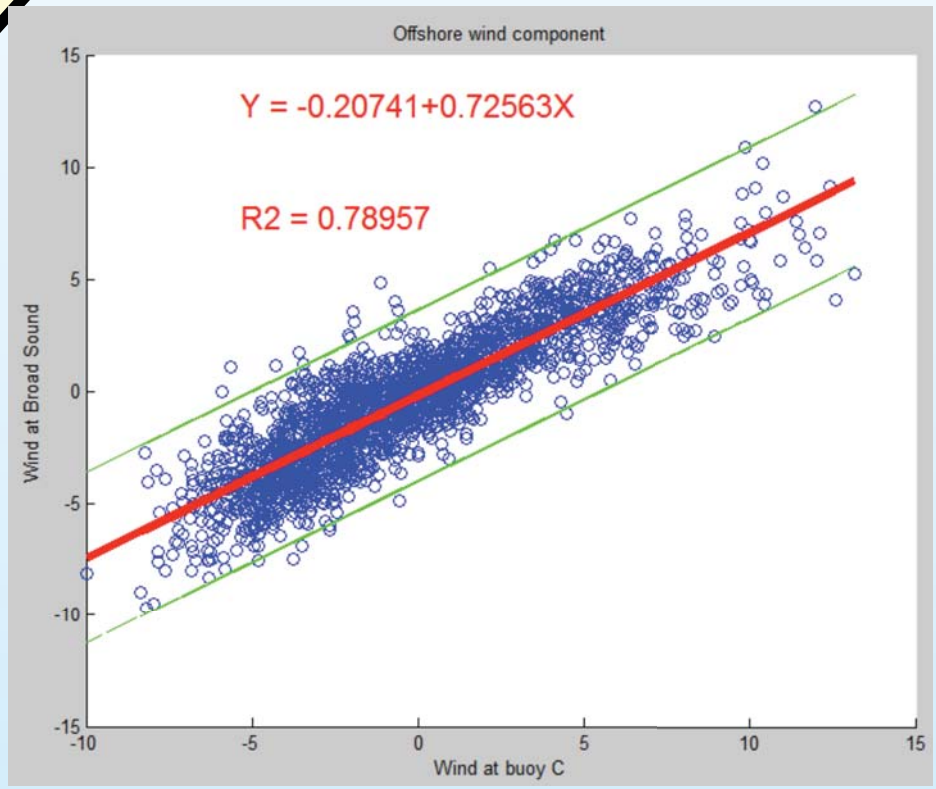


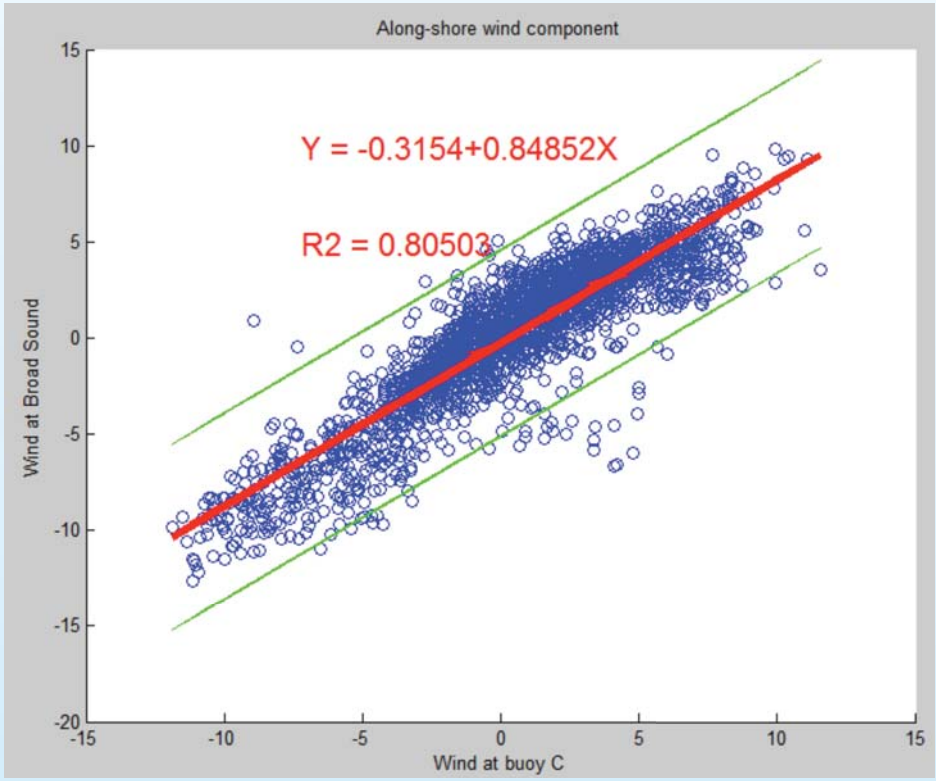


Xue & Du, OceDyn, 2010

Comparison of winds
(from Greg Sinnett)







Future Improvements…

- Topography data (Portland, ME 1/3 arc-second MHW DEM from NGDC, http://www.ngdc.noaa.gov/dem/squareCellGrid/download/606)
- Resolution
- Better representations of coastal processes
- Wind data
- Integration with in situ observations