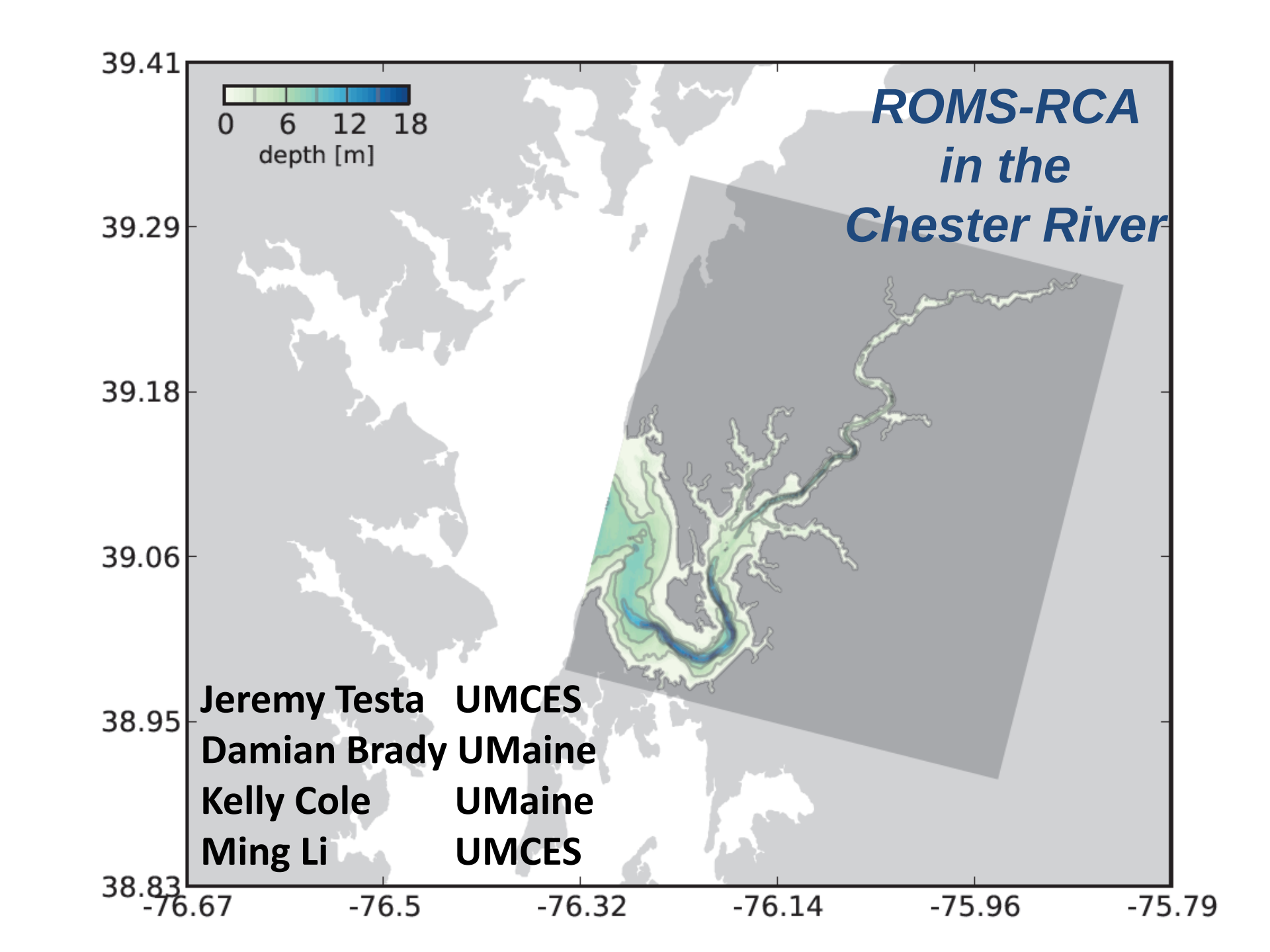
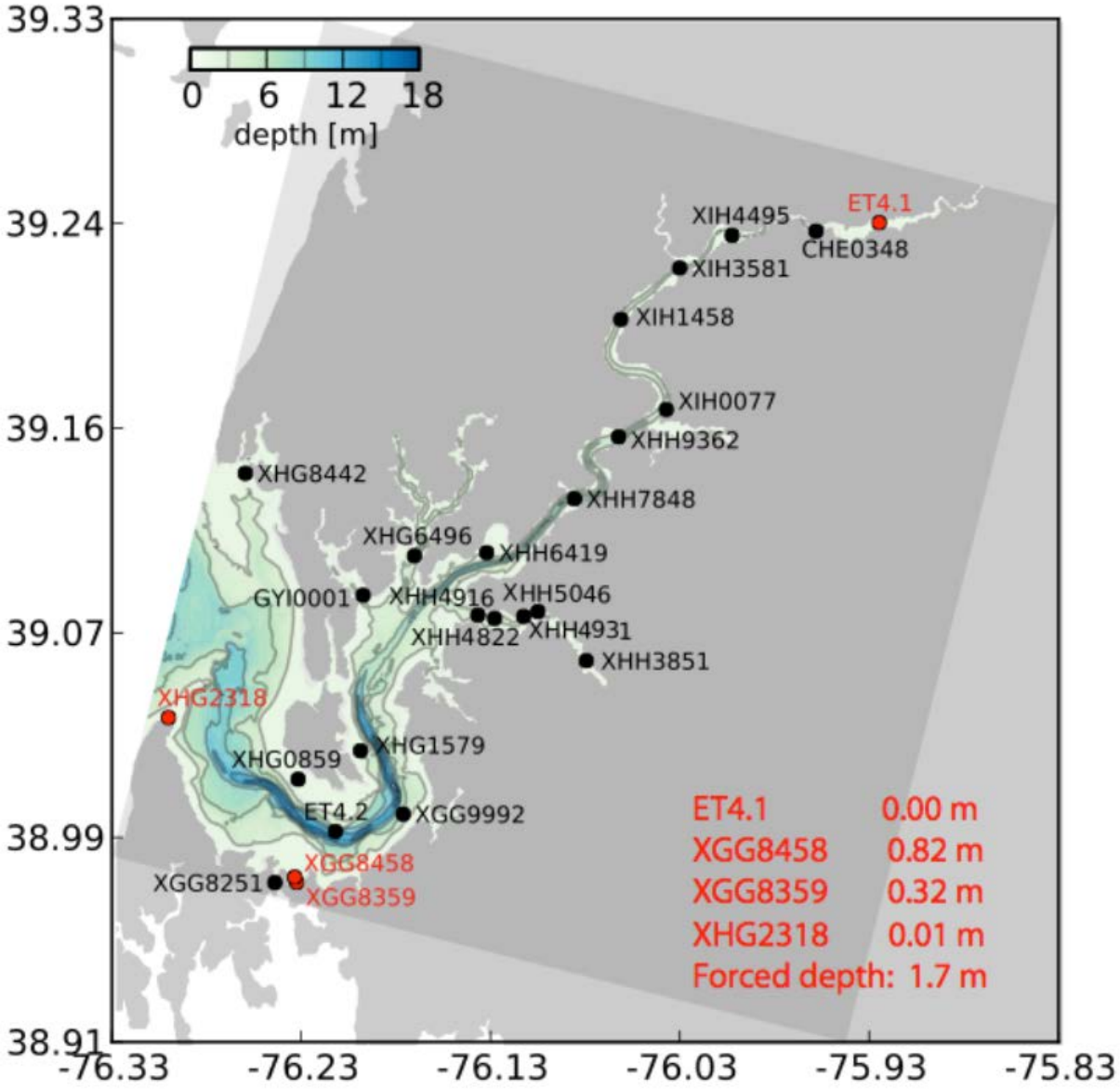
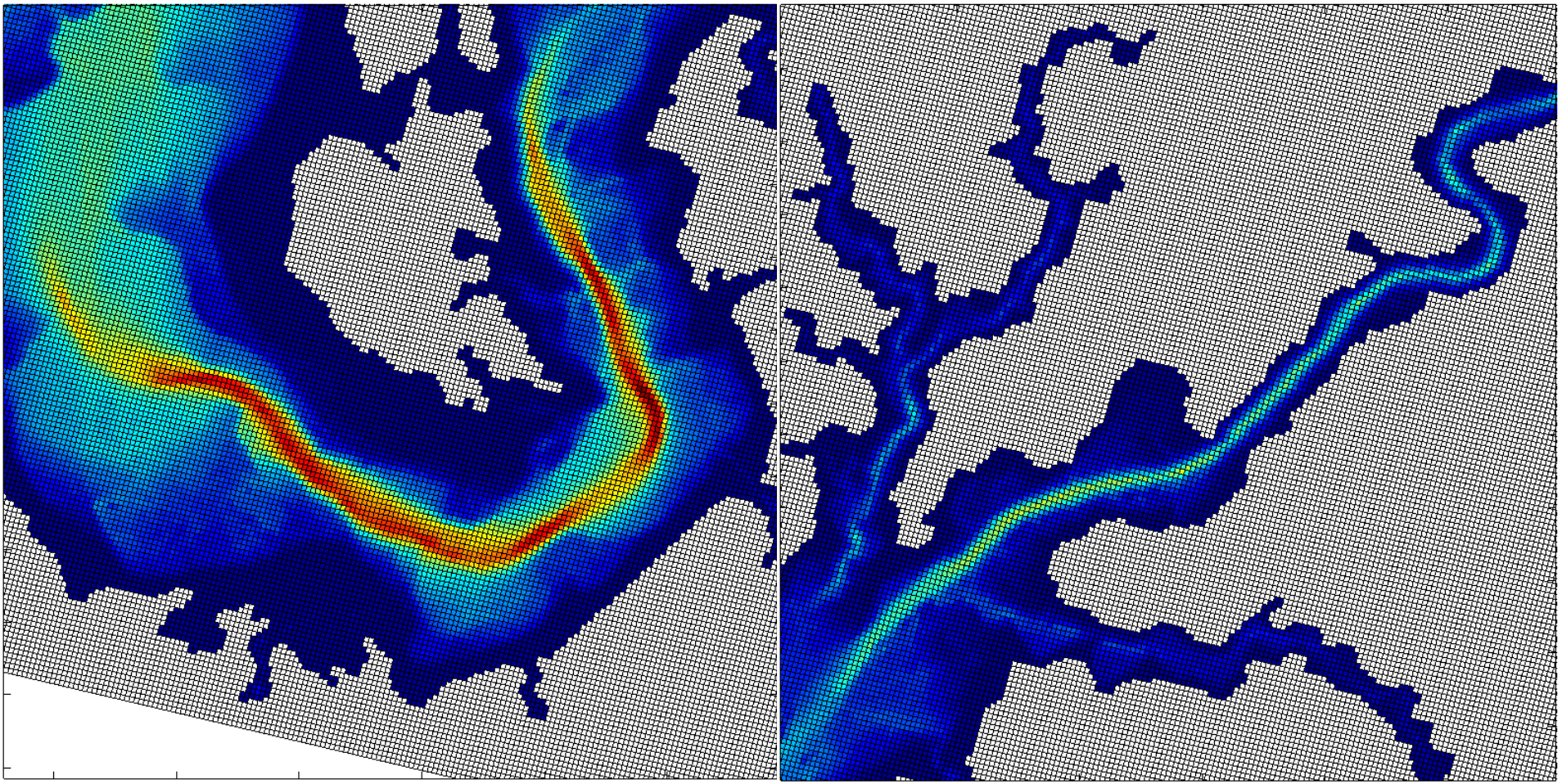

ROMS-RCA
in the
Chester River
0 6 12 18
depth [m]
39.41
39.29
39.18
39.06
38.95
38.83
-76.67
-76.5
-76.32
-76.14
-75.96
-75.79
Jeremy Testa UMCES
Damian Brady UMaine
Kelly Cole UMaine
Ming Li UMCES

ROMS-RCA in the Chester River estuary



- 70 m horizontal resolution
- 10 vertical layers
- Forced by 1 FW source
- dt = 20s
- Initial t/s from CH3D

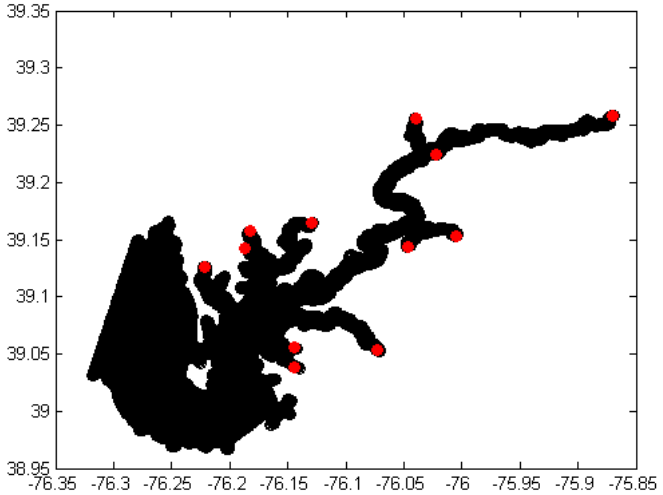
ROMS-RCA Grid Resolution



ROMS-RCA: Where We Stand

Initial run: 1 FW source at upstream boundary, no atmospheric forcing, 2003 only

Run 2 (Right now): 12 FW Sources, no atmospheric forcing, 2003 only

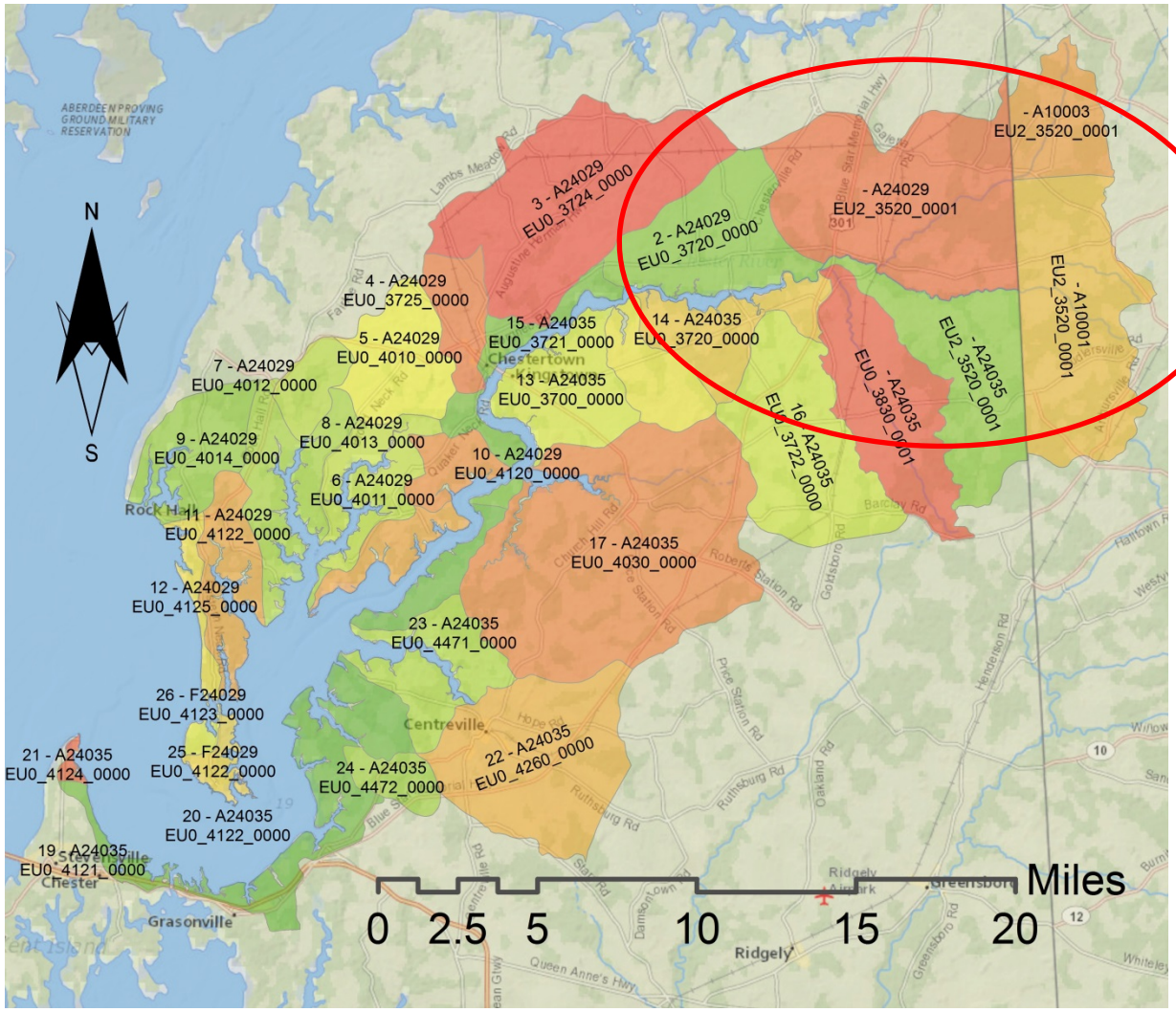


Run 3 (Early June): 12 FW Sources, full atmospheric forcing, 2003 only

Run 4 (July…): 12 FW Sources, full atmospheric forcing, 2003-2011

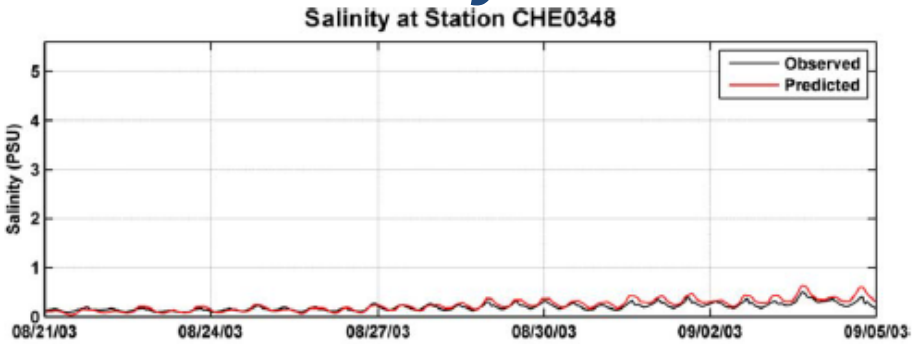
….and then the fun begins

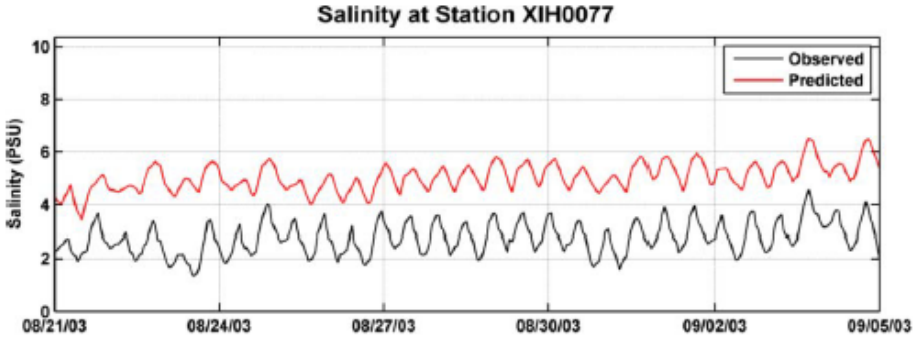
Freshwater Inputs to the Chester ROMS

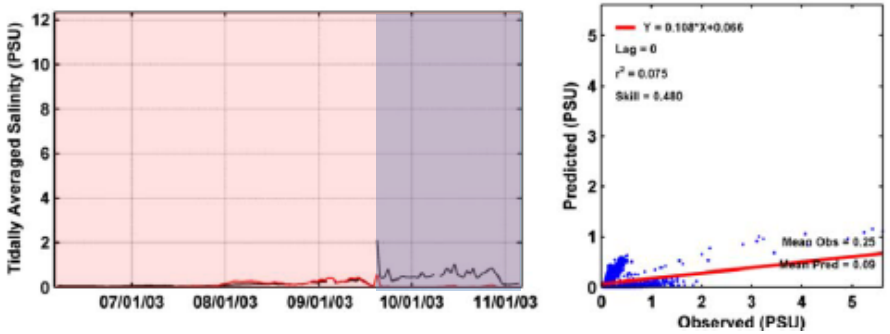


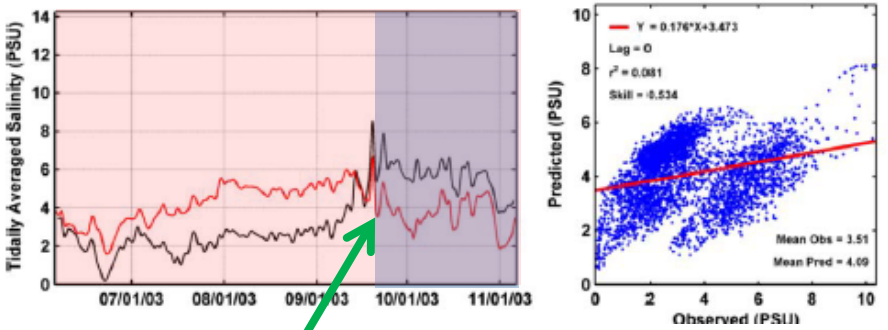
- Initial Runs forced with FW to 1 upstream cell that Represents 8 watershed units ~41% of total watershed flow
- Realistic t/s in FW flow

Salinity Simulations in Chester ROMS

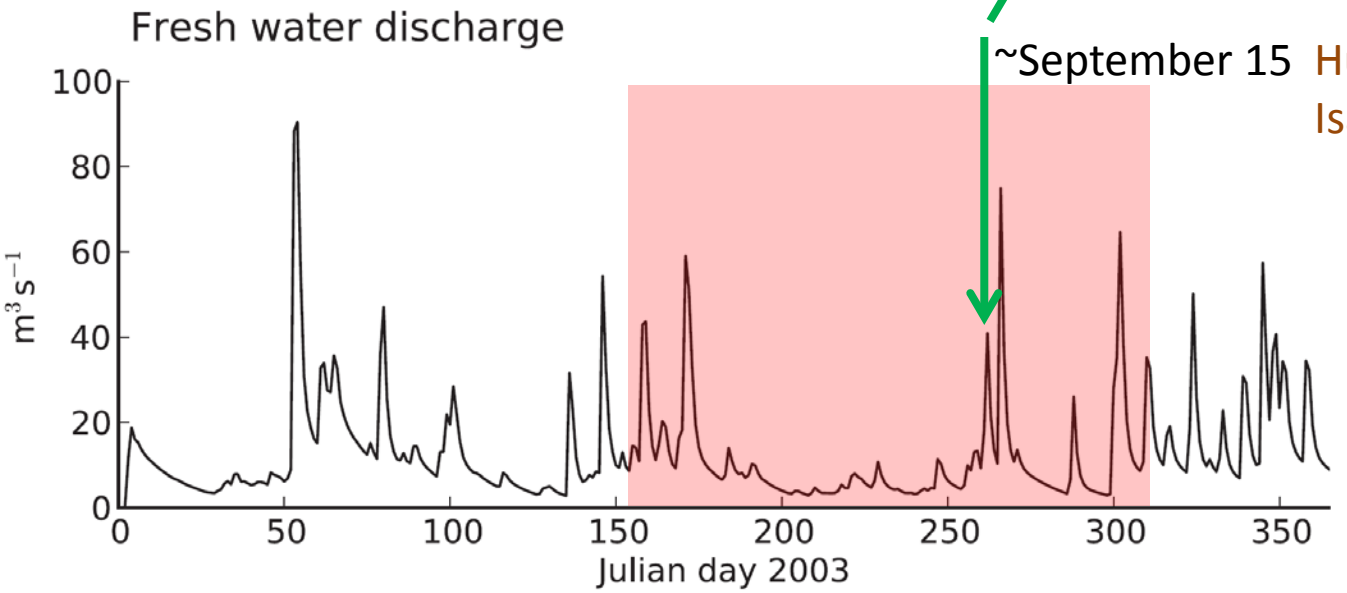




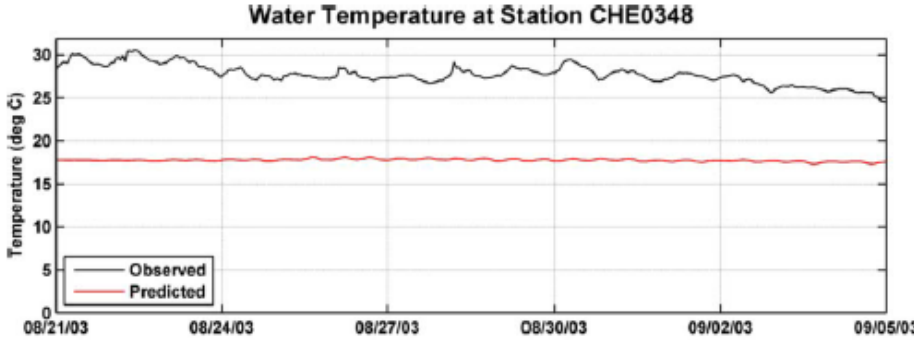


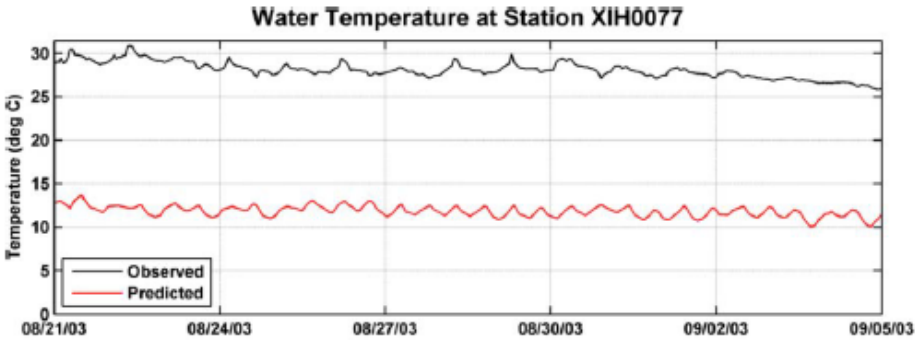


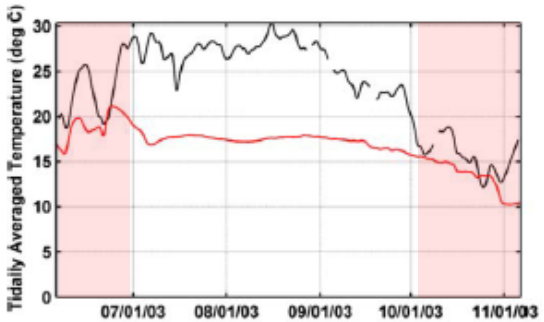
~September 15 Hurricane Isabel

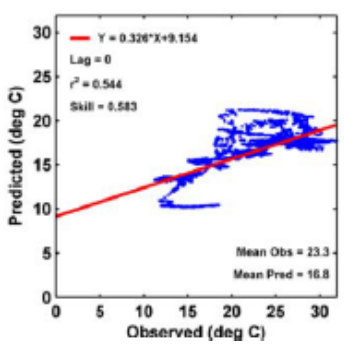


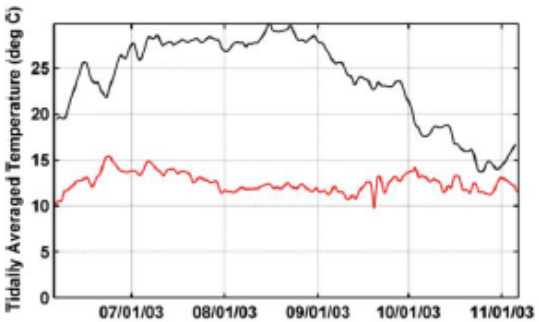
Temperature Simulations in Chester ROMS

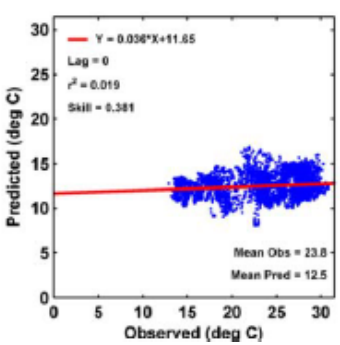


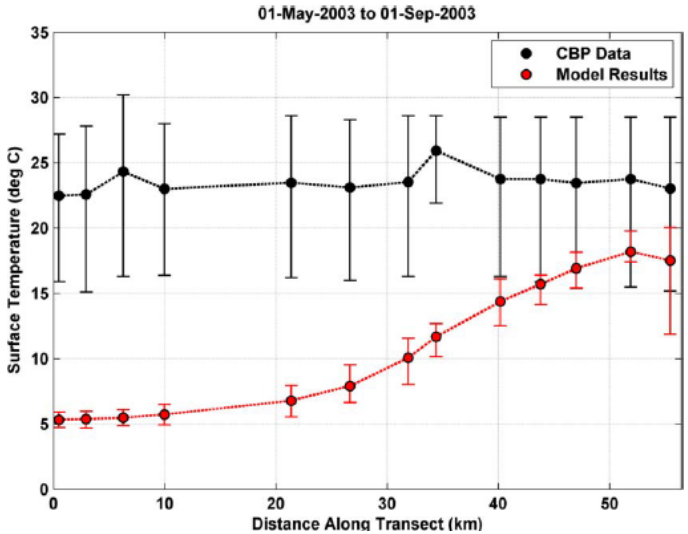








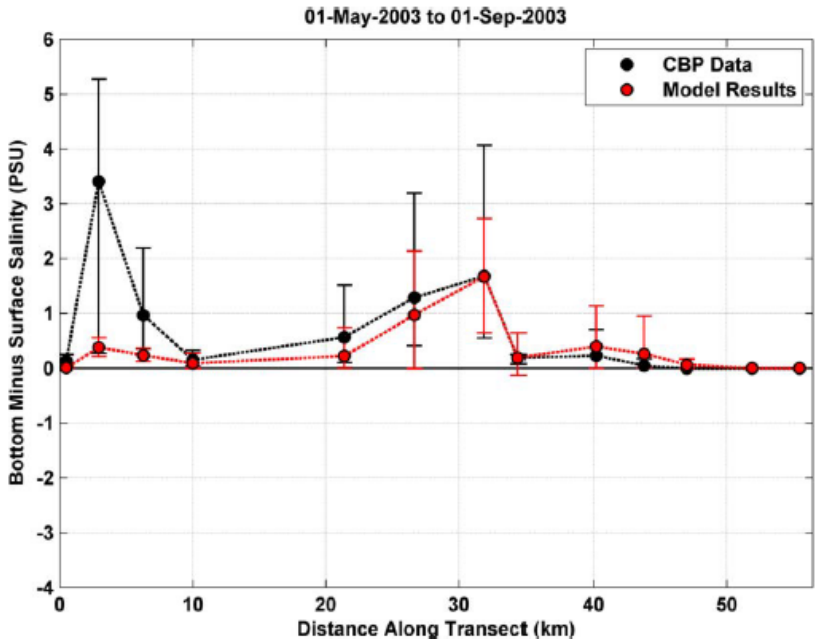




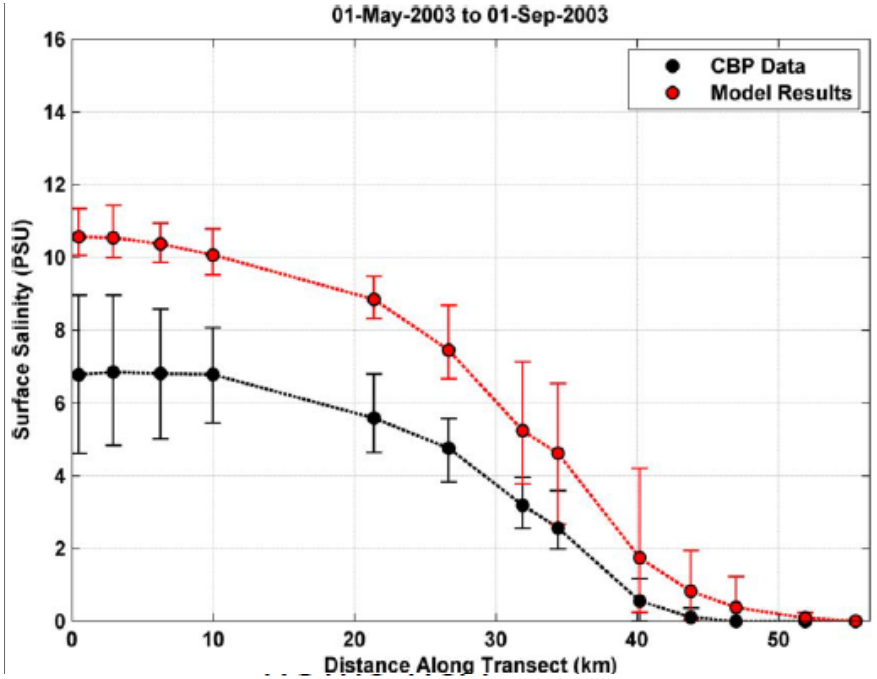
Cleary, atmospheric temperature fluxes are important …

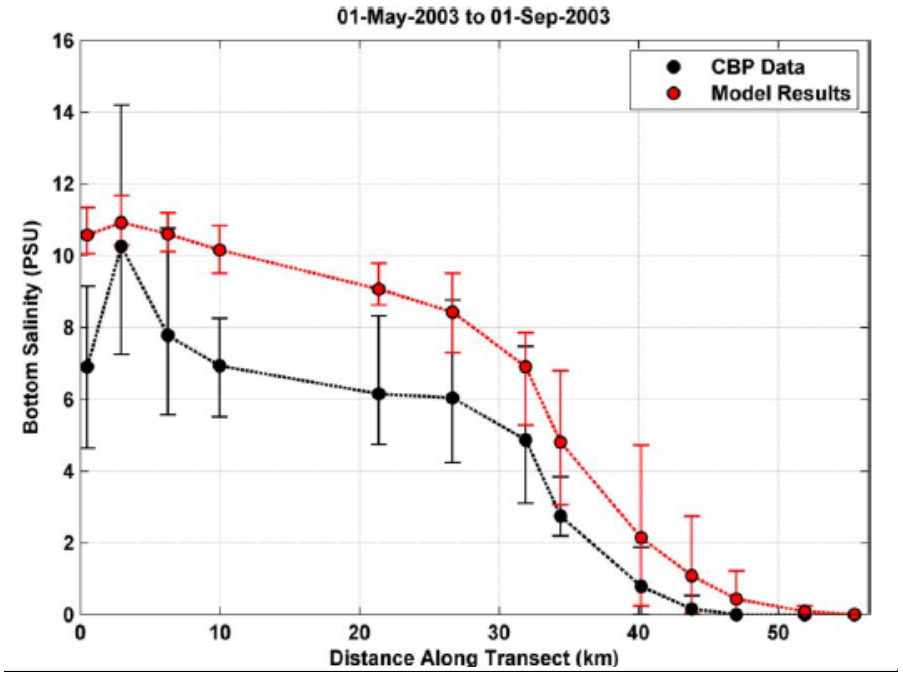
Problem biggest downstream

Stratification Weak, but Present



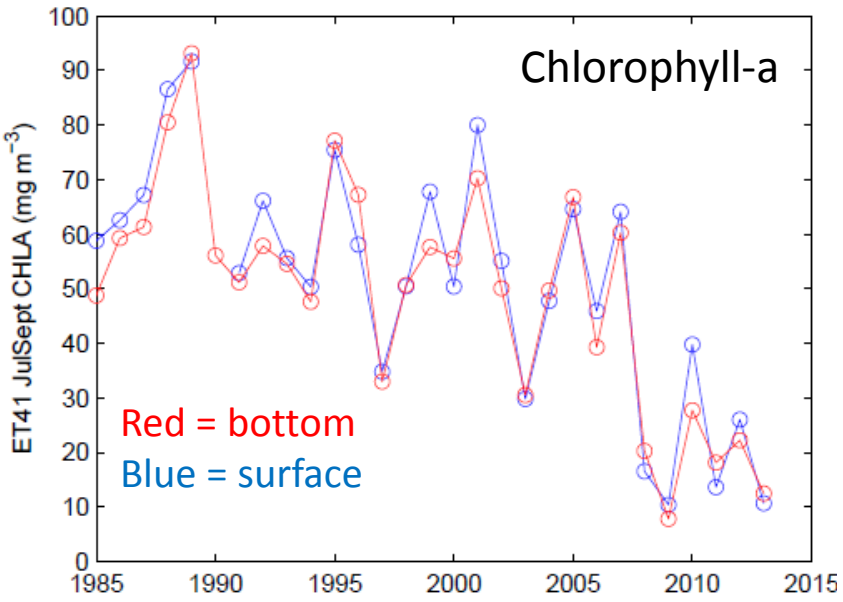
- ROMS misses near-seaward boundary stratification
- Currently, no salt forcing at boundary

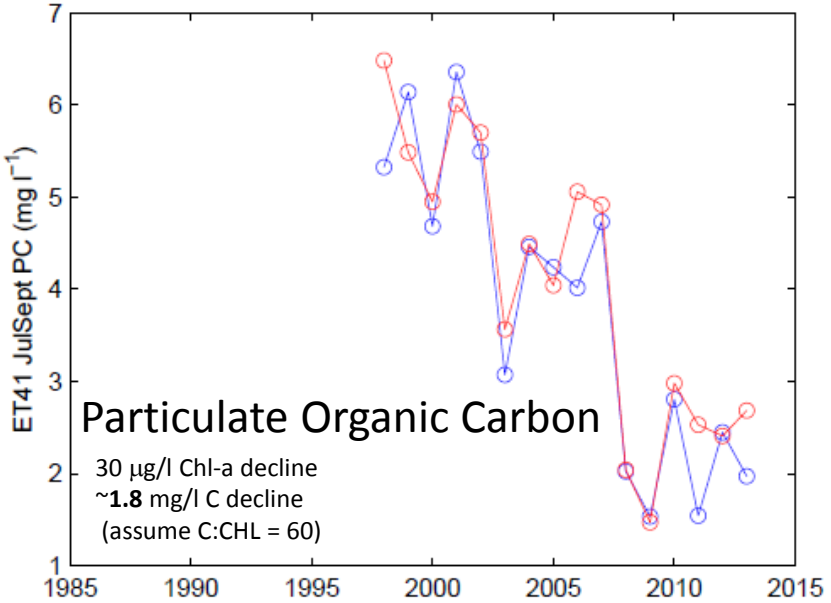


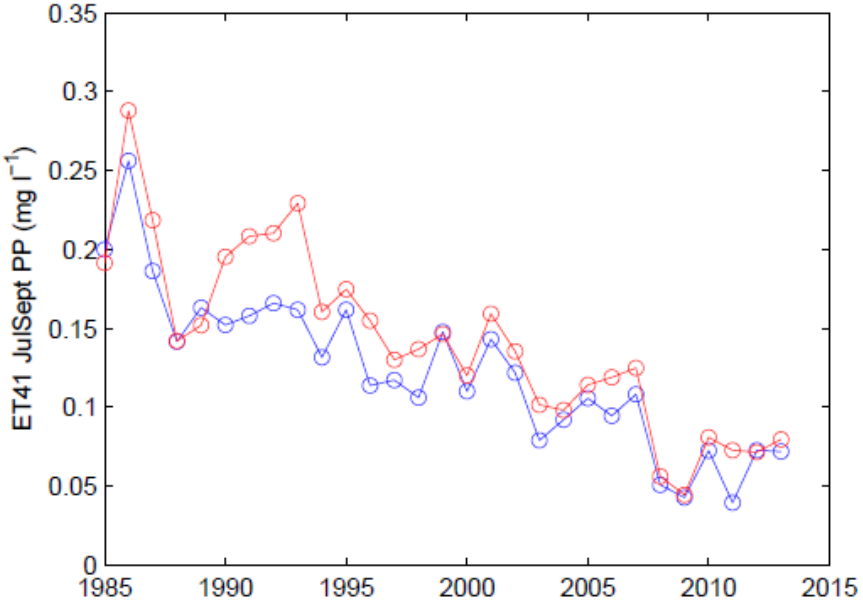


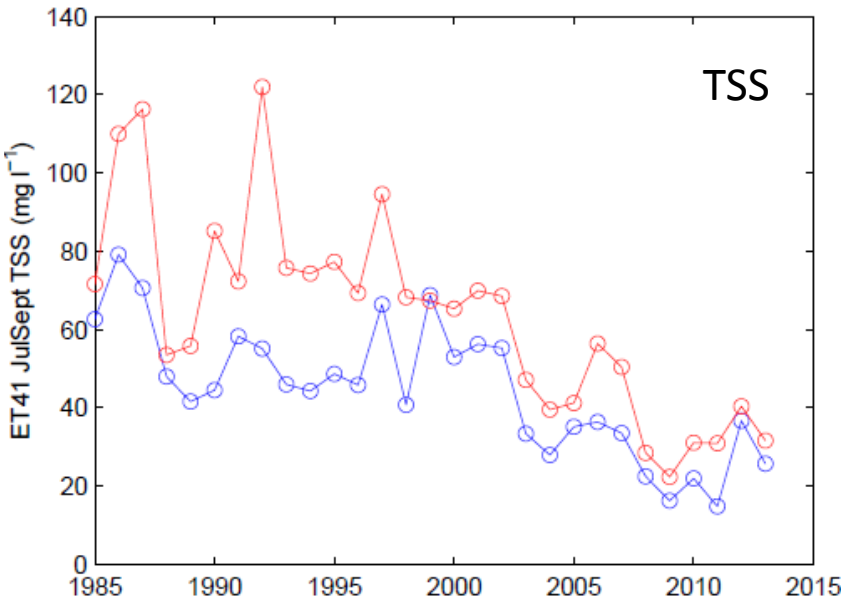
Anticipated Issues with Water Quality Simulations

(1) Can We Capture Abrupt Decline in Chlorophyll-a in Upper Chester?



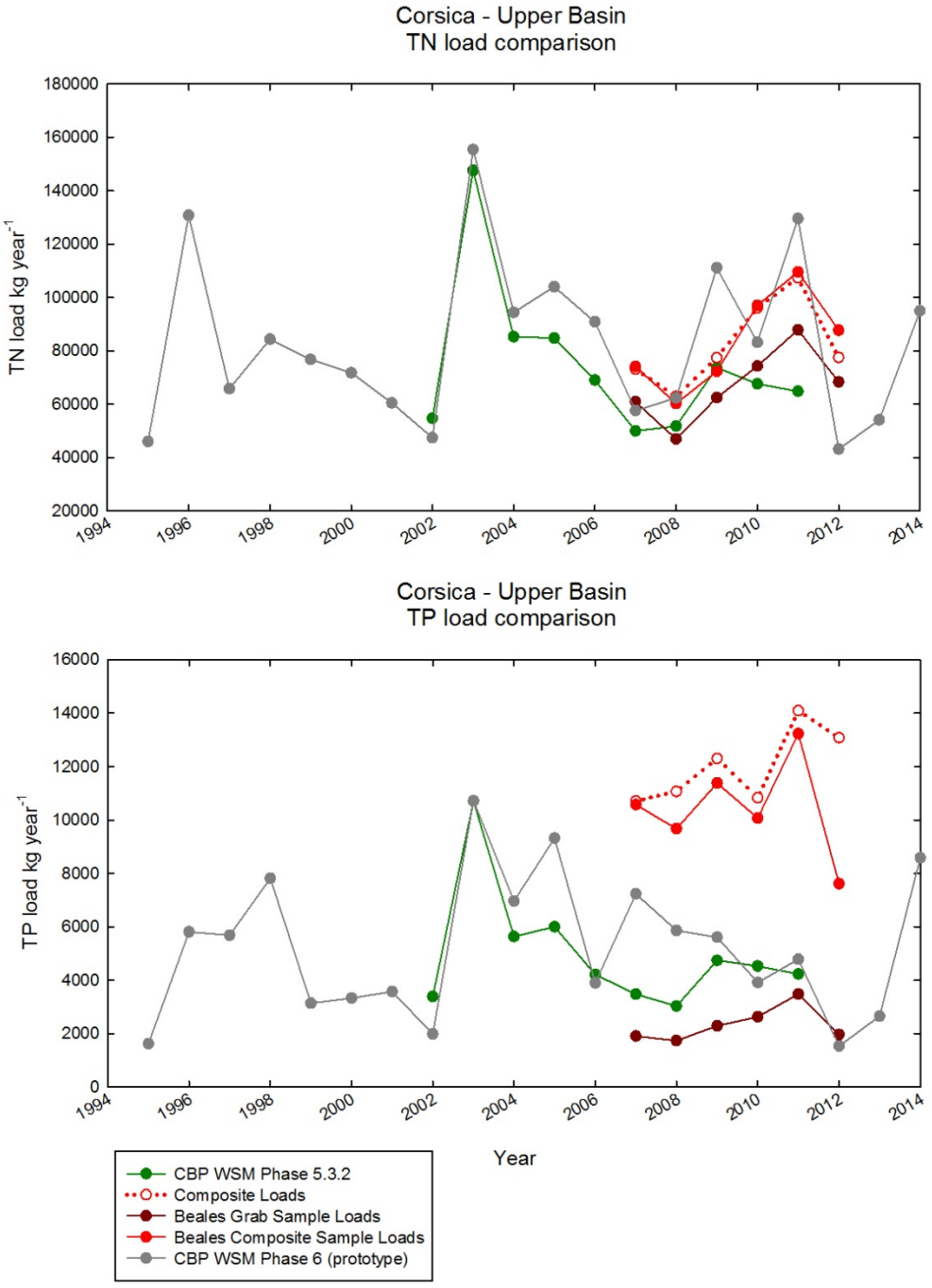




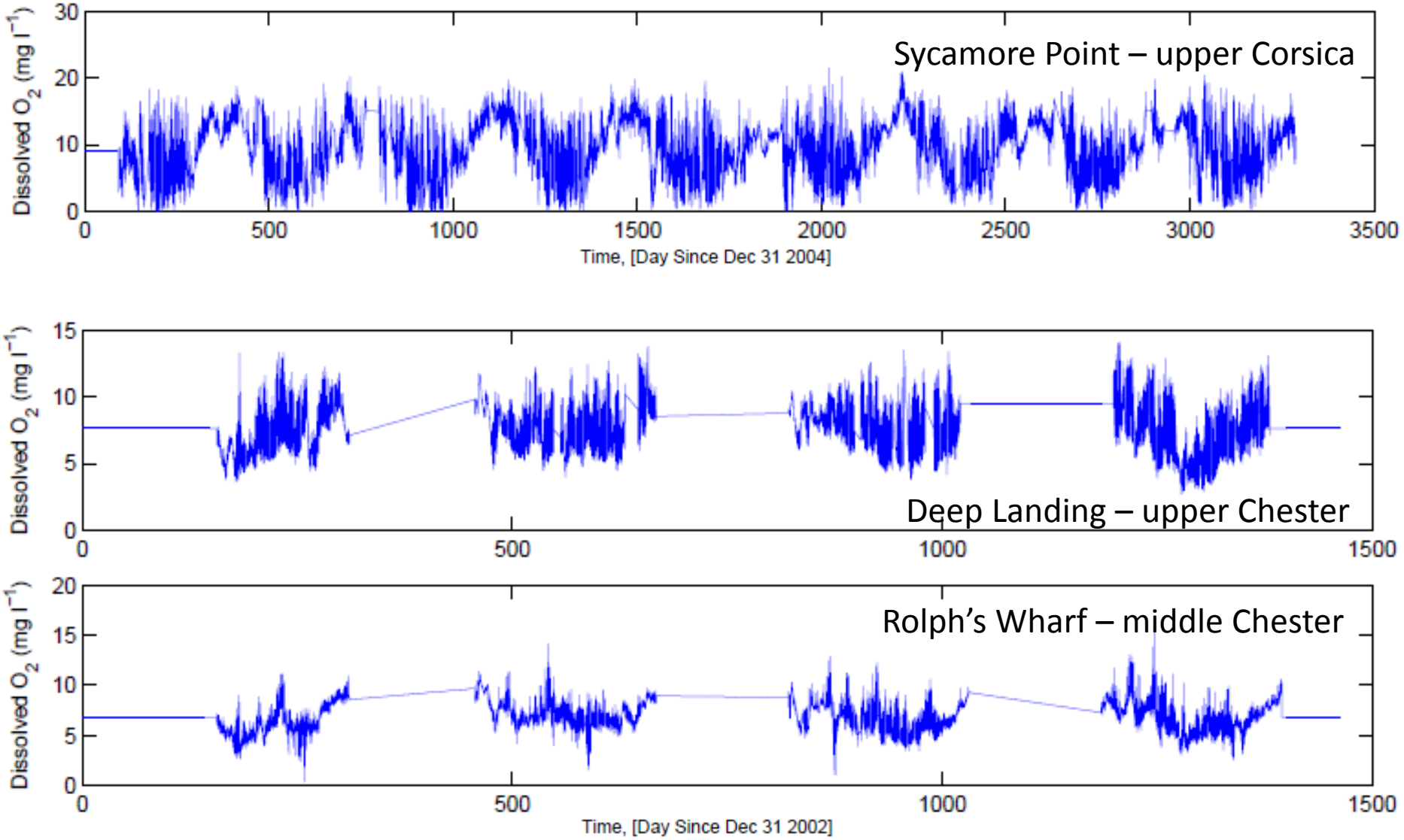


(2) Can We Capture Storm Flow P?

- 1994-2014 (Model and Measured)
- TN and TP



(3) Can We Capture High Diel Variability in O_2, Chla, etc?



ConMon Oxygen data courtesy Maryland Department of Natural Resources

Summary

(1) Which aspects of your model work well, and why?

*?

*Detailed grid and resolution of small tributaries allow a run given key missing forcing

*Encouraged that next simulations will be much better

(2) Where is improvement most needed and most possible?

*Temperature simulation – should be much better once atmospheric loading added

*Salinity will be improved – adding /distributing FW sources will improve simulation

(3) Do you have specific ideas for future improvements of your T,S simulations?

*Adding additional 11 FW sources, atmospheric forcing, shallower forced depth

(4) Future Work:

* Turn on biogeochemistry in year 2003

* Work with ODU group for SAV in COAWST?

* Continue long-term Chester water-quality analysis

* Try to account for TP during storm flow

* Historic Chester data (early 1980s…perhaps earlier)