# Comparison of Shallow-water Models for Use in Supporting Chesapeake Bay Management Decision-making

Conference Call Update
February 10, 2016

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1. CH3D vs. ICM hydrodynamics
2. Sensitivity to freshwater inflow
3. Hydrodynamic runs required
4. Water quality model comparisons

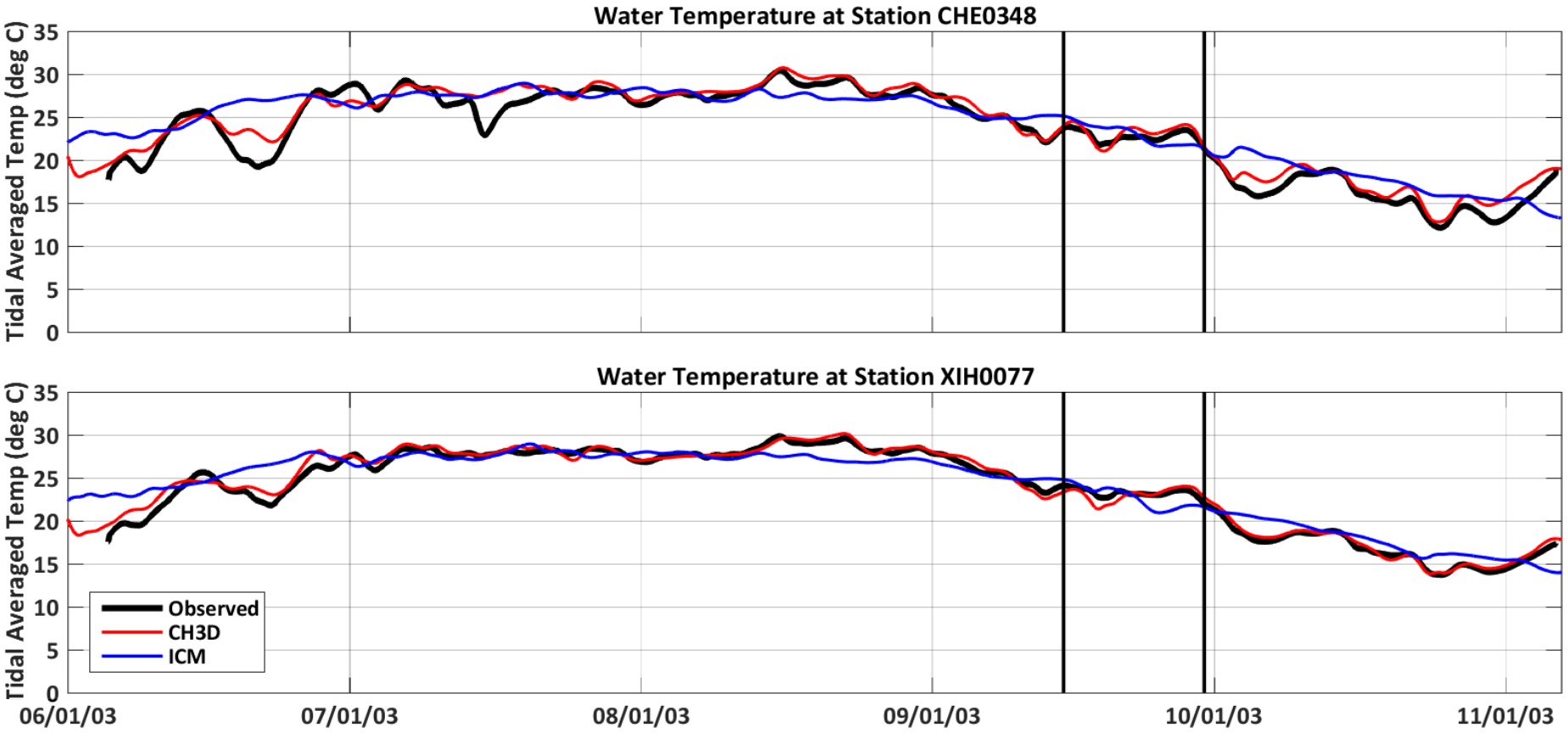
# 1. CH3D hydrodynamics vs. ICM hydrodynamics

*During our last conference call, Carl Cerco asked whether our CH3D results were from CH3D or ICM.*

- The boundary/initial conditions we are using are from ICM, but we have been comparing the shallow water model results to the CH3D model results
- From now on, for consistency, we will compare the shallow water model results with the ICM hydrodynamic results
- Slight differences, but does not alter our conclusions

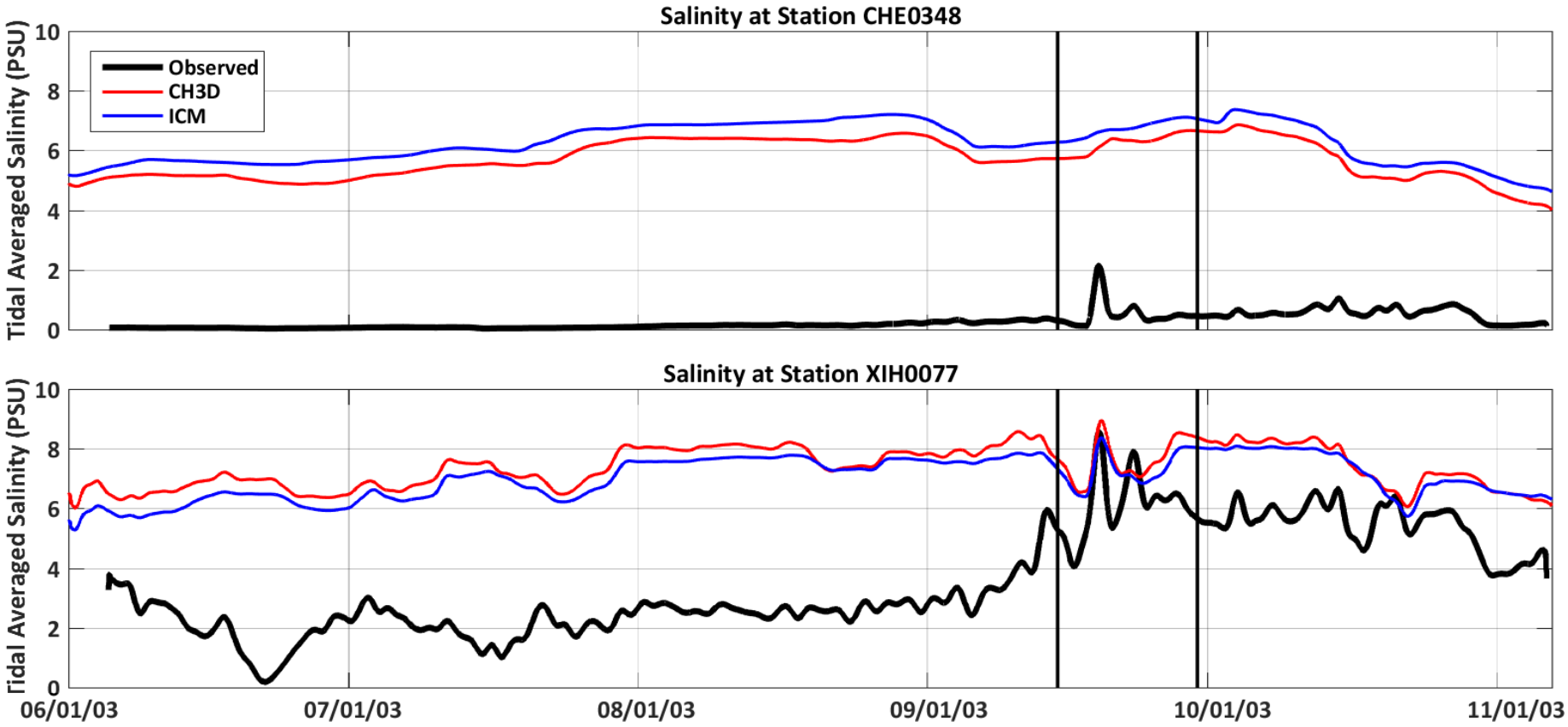
# Temperature ICM vs. CH3D comparison - 2003

ICM and CH3D temperature are very similar, however ICM produces temperatures that are smoother than the observations



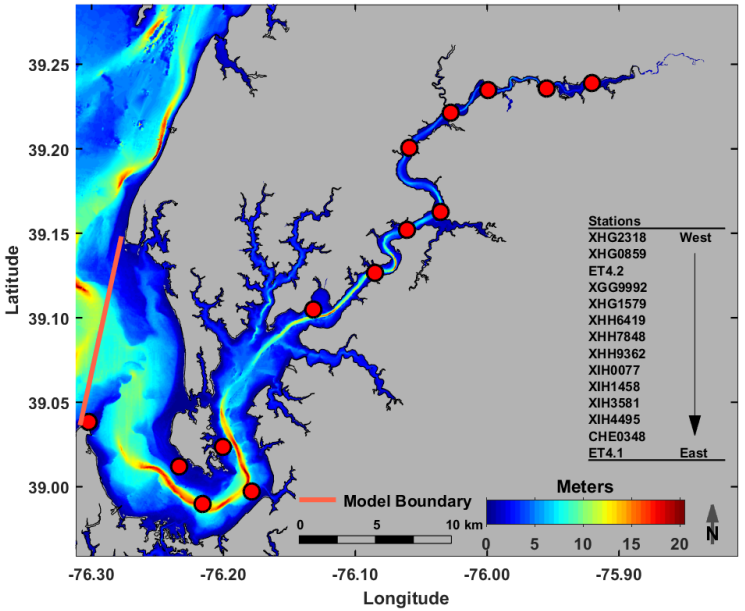
# Salinity ICM vs. CH3D comparison - 2003

ICM and CH3D salinity are very similar, however ICM overestimates observed salinity slightly more

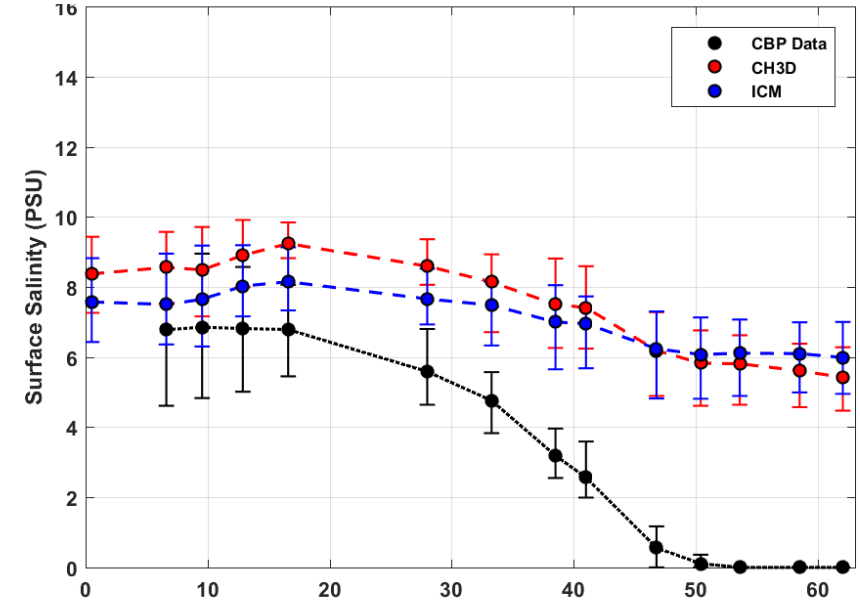


# Salinity comparison along Chester transect

At Bay mouth, ICM matches observed salinity better than CH3D; upstream CH3D matches better

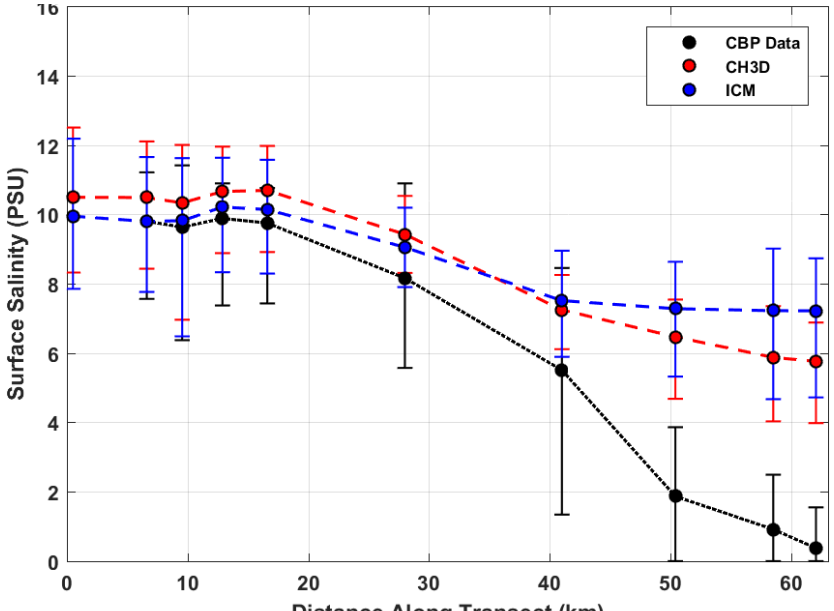



May – August 2003




Bay → upstream

May – August 2006




Bay → upstream

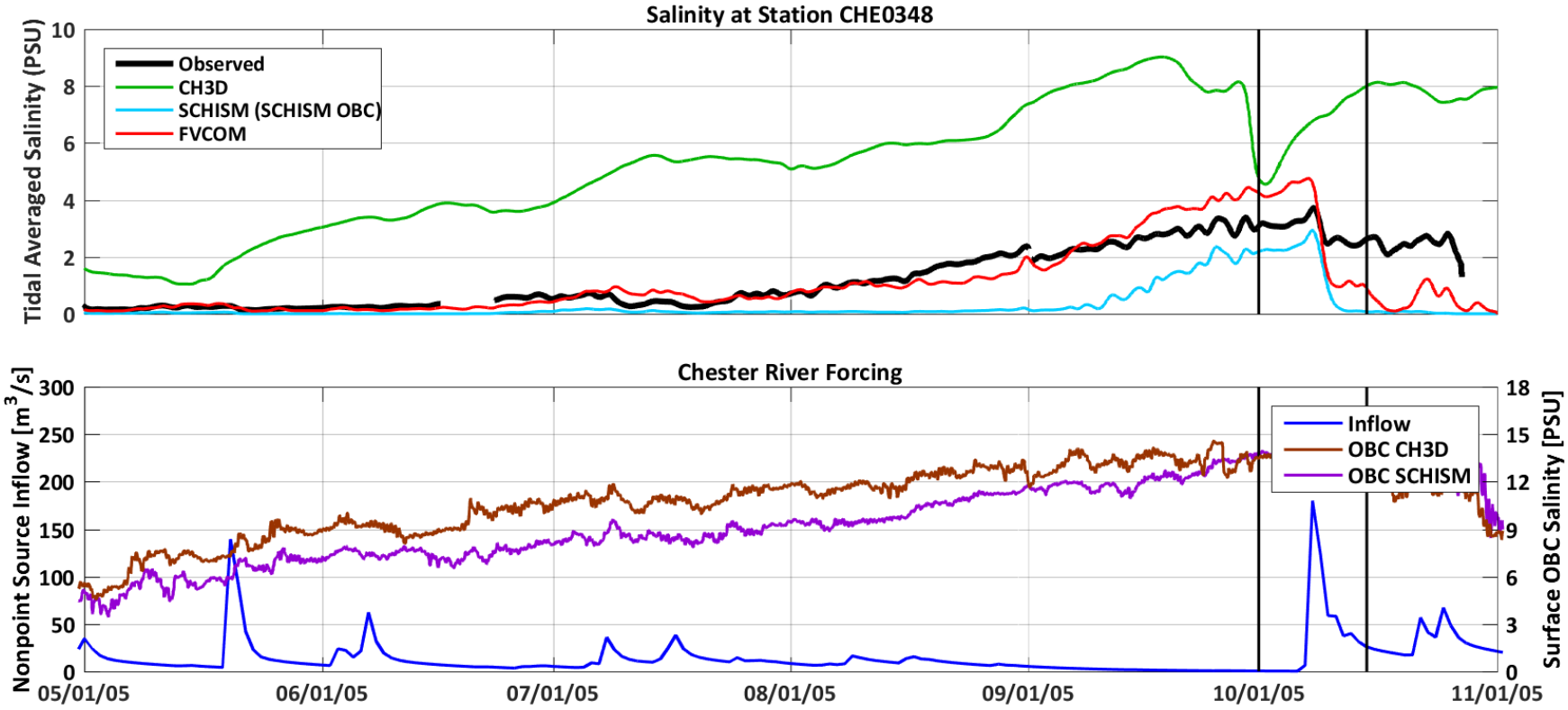
# 2. Sensitivity test for freshwater inflow

*During our last conference call we decided that a sensitivity analysis for freshwater flow was necessary, but hadn't completely decided on methodology.*

- Gary recommended that instead of forcing the models with multiple versions of the CBWM, we should just change freshwater flow by ~10%
- Because the models overestimate the response to freshwater inflow in the far upper reaches of the Chester, we will do a sensitivity analysis that **decreases freshwater input by 10%**

# Salinity time series in 2005 for uppermost Chester station

In response to the October 2005 freshwater inflow event, CH3D and SCHISM both show a larger reduction in salinity than the observations



# 3. Final Hydrodynamic Runs Required

*Three required runs (2003-2006); additional are optional:*

**1. Base Case** – Must use all forcing provided on ftp site (atmospheric, boundary cond's, initial cond's, river inputs…

**2. Base Case with Reduced River Discharge** – Use reduced CBWM river inputs posted on the ftp site

**3. Base Case with SCHISM bc's** – Use the alternate SCHISM boundary conditions posted on the ftp site

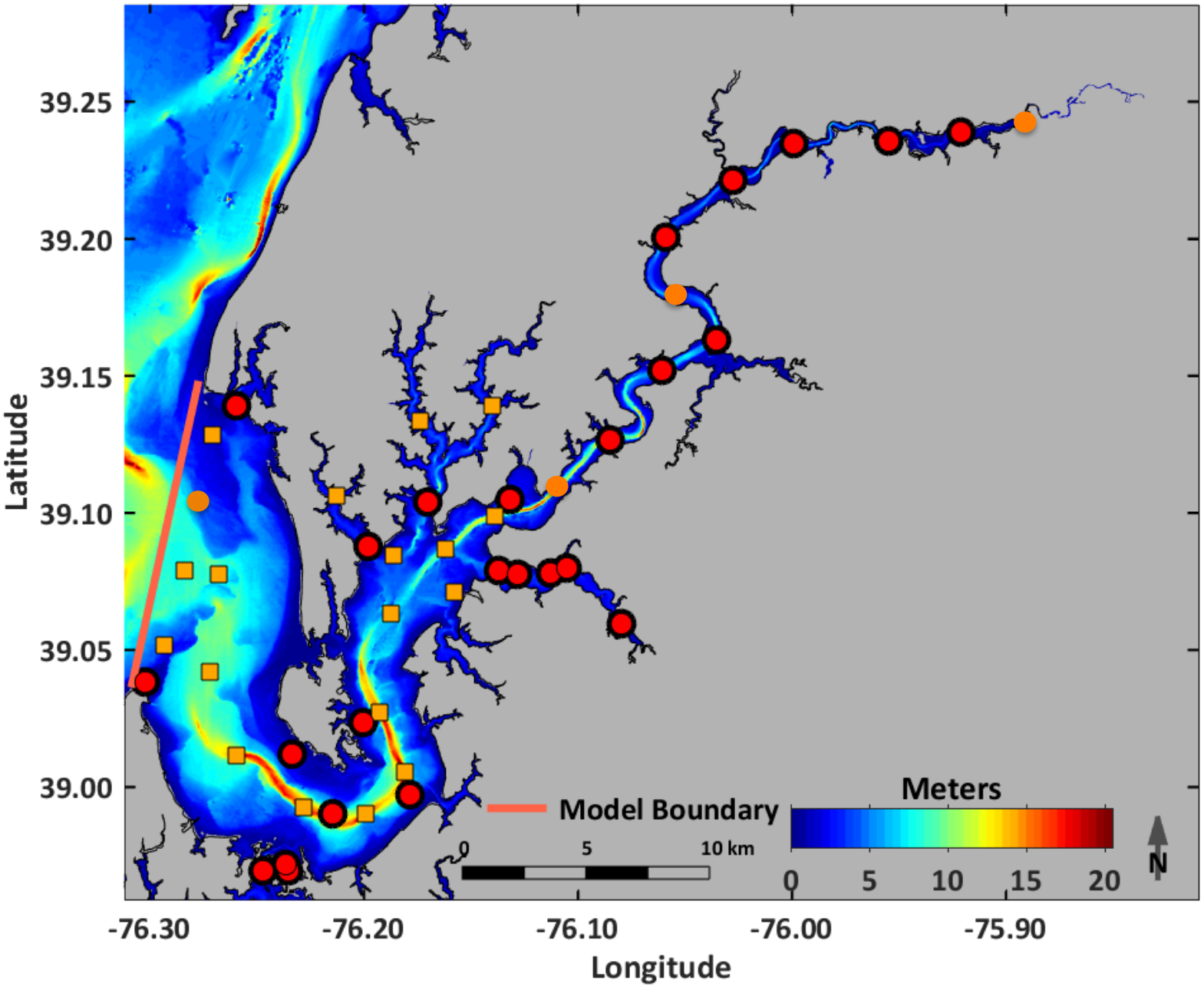
**4. Optional Sensitivity Run** – change any individual forcing … (please provide forcing)

**5. Optional Best Run** – send one "best run" that includes multiple changes to forcing, etc…

**Note:**

- Longer simulations are welcome
- Please include total water depth (including surface elevation)
- Please use new station set!

# New Station Set



# 4. Water Quality Model Comparisons

**Comparisons for workshop:**

Only base case for 2003-2006

Only Chl and DO (before spring workshop)?

**Spring Workshop logistics:**

one day or two?

at VIMS?

connected with CheMS Symposium?

(but could mean traveling on Memorial Day)

Doodle Poll soon; possible dates (must be before June 1st) include:

April 19-22

April 25

May 5-6

May 16-18

May 31