Shallow Water Modeling Conference Call

February 19, 2015

CBPO Conference Room - The Fishshack
410 Severn Avenue Annapolis, MD 21403

Shallow Water PI Conference Call Notes

All presentation material for this conference call can be found on the meeting webpage.

Initial Analysis of Chester River Observations: 1985-2011 – Jeremy Testa

Jeremy presented important information on how observed water quality conditions in the Chester were changing in the upper tidal fresh and lower mesohaline. His preliminary conclusions are that: 1) There has been an apparent decline in chlorophyll-a in the upper Chester River, while winter chlorophyll has increased in the lower Chester; 2) In the upper Chester, this decline is associated with declines in particulate phosphorus, carbon, and TSS; 3) There is no obvious associated decline in TP or TN loading; and 4) A clear explanation for this decline is lacking.

Jeremy's initial work on this analysis will be expanded and presented at an upcoming Shallow Water PI meeting. His presentation can be found here.

Chester River Watershed Observational System – Doug Levin

Doug described the assets & programs available to the Chester River Multiple Shallow Water Modeling effort from the Washington College Center for Environment & Society. Given that the simulation period of the shallow water work closes in 2011, it's unlikely that the detailed Chester River Observation System data can be used directly for calibration, but as ancillary sets of detailed data it can perhaps be useful to the shallow water PIs. The following data types are available:

1. **Geographic Information Systems** is part of the Center for Environment & Society at Washington College. We have the entire Chester River watershed mapped to 3m resolution with land use designation. LIDAR DTMs of the watershed are also available for runoff analysis. More information concerning the GIS Lab can be found here.

2. **Chester River Watershed Observatory** is being implemented to make this river the best understood in the country. Once our permit is received and the weather improves, 5 water quality observation buoys and 4 dock systems will be deployed from the mouth of the Chester all the way to Millington, near its headwaters. Three current meters will also be deployed.

3. **5 NOAA approved weather stations** are being installed on the watershed perimeter. In partnership with NASA we are also using their radar installations to measure precipitation at 1km resolution within the Chester River watershed. This will allow meaningful analysis of runoff contribution to water quality in the River.

4. All data will be fed to and visualized on the MARACOOS web site. The data graphs and archives will be available through this site and automatically updated on a water quality specific web page/portal. The data will be transmitted to large monitors installed in K---12 schools in

Queen Anne's and Kent Counties. The visualization will be just one part of the educational objectives of the Chester River Watershed Observatory.

5. CES operates two research boats that are available for hire; a 46' USCG certified floating classroom and a 27' customized whaler with an 18" draft. Available equipment includes survey grade GPS, EdgeTech multi---beam, dual frequency side scan sonar, sub bottom profiler, magnetometer, and seabed classification system, and a multitude of cameras and water/sediment samplers.

For more information contact: Douglas R. Levin, PhD (Doug) 757.710.1631
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The presentation link can be found here.

HM Progress Reports:
A key purpose of the conference call call was make sure everyone is on track for developing hydrodynamic model (HM) outputs to provide to the Evaluation Team by the March 1 deadline. Marjy introduced the various team's HM progress reports with the following reminder of the Shallow Water Modeling Comparison Protocol (Version: February 19, 2015):

- All teams can use all data available to evaluated/validate their model from 2003-2010 (but not 2011!)
- Data prior to 2003 can be used, but recall that submitted simulations will begin on January 1st 2003
- All data used for evaluation should be placed in the project ftp site. This insures that the same data sets are available to all teams. (https://archive.chesapeakebay.net/Modeling/ShallowWaterProject/Observation)
- For riverine inputs, all teams will use the CBP Watershed Model outputs (point and non-point). USGS information is available on the website, but is not to be used for forcing.

By March 1st, please try to submit preliminary simulated temperature and salinity fields in netCDF format for the time period 2003-2010 (or at least the first few years in that time period). Remember these are just preliminary results; all teams are welcome to submit improved results at any time prior to manuscript submission!

The Shallow Water Modeling Workshop for team participants is scheduled for May 20, 2015 at VIMS.

Jeremy, Damian, and UMCES Team: The HM work is in progress using 10 vertical layers w/ a ROMS-RCA simulation and using a 70m grid. The tradeoffs between the scale needed for shallow water processes and a practical scale for the scale –up to whole Bay are being considered. This is an application of the COAWST modeling system that's capable of coupling HM, water quality (WQ), wave, and sediment diagenesis models.

Joseph, Harry, and VIMS Team: Running the HM from 2003 to 2006 in the current draft model. The comparison team will get these 2003-2006 years to the comparison team by the March 1 deadline. Comparisons between CH3D forcing and VIMS Upper Bay Simulation boundary condition are being made as a scoping-type comparison. The VIMS Upper Bay Simulation is a finite element model that covers the entire upper Bay with a southern boundary at the Patuxent River

John, Dick, and ODU Team: Actively working to get the GrassLight model and the existing light model in ROMS to calculate similar values. They have made some progress but they are not there yet. The ROMS light model purports to be based on the Greg and Cater (1990) light model but a full and complete documentation of this portion of ROMS is lacking, complicating progress.

Richard Tian: An application of FVCOM-ICM w/ preliminary hydrodynamic outputs is ready to go for the March 1, deadline. The particular format needed by the comparison team is required. It's suggested that if the HM outputs are being compared at particular stations, then ASCII files rather than NetCDF files may be best to use. Also, getting ready to start on the ICM WQ model. The initial conditions and boundary conditions are in hand and now getting ready for initial ICM runs. A preliminary set of water quality initial conditions and boundary conditions are now available, but they will be updated with an improved version in a few weeks.