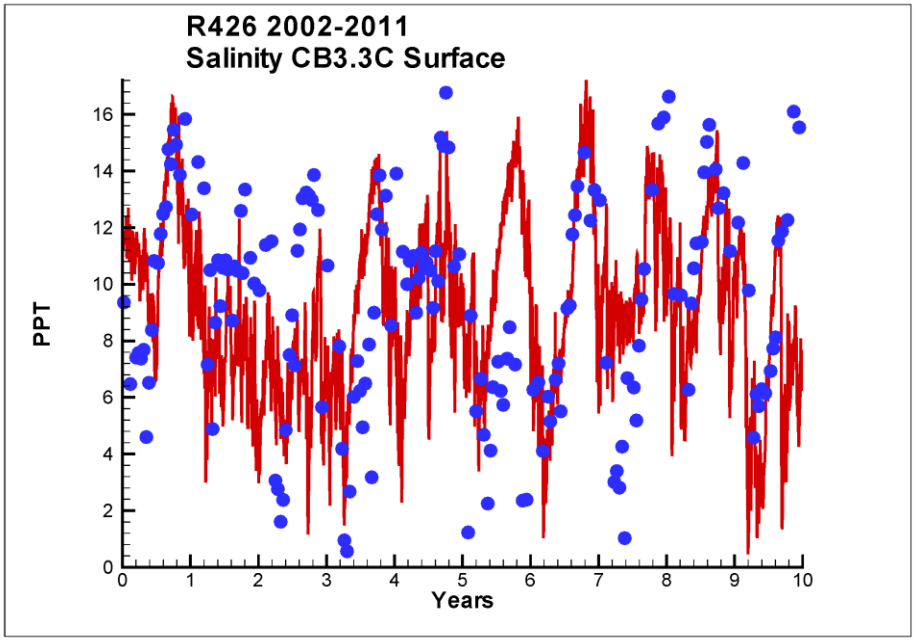
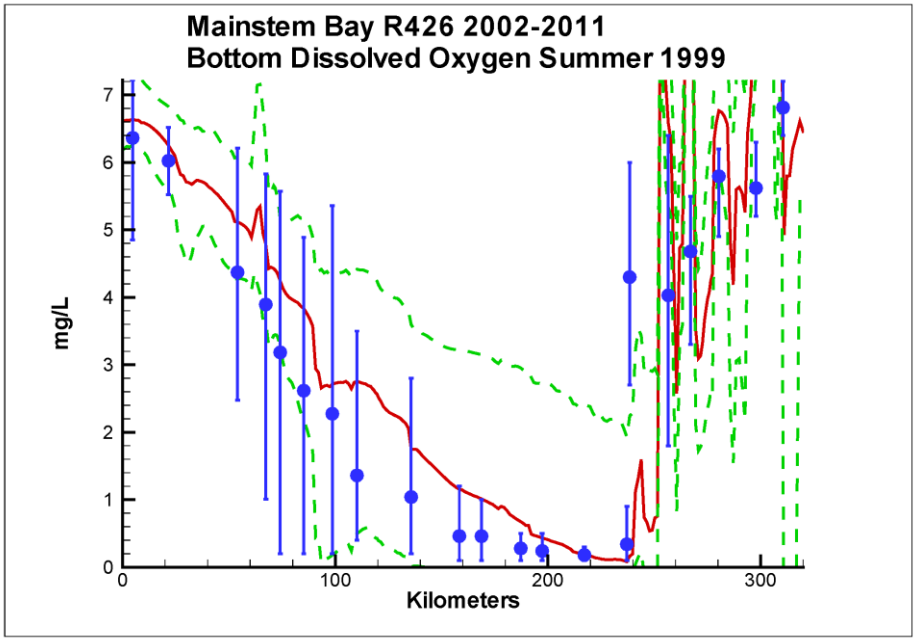
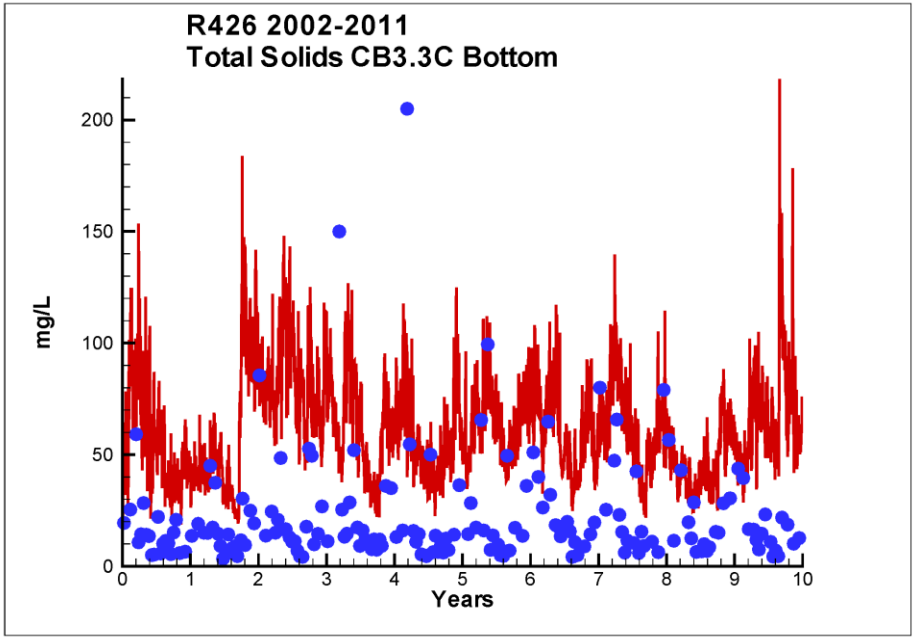
EXTENSION OF THE WQSTM TO 2011 AND SHALLOW WATER ASSSESSMENT PLANS

CBP Activities

- Hydrodynamics
  - Hydrodynamics completed for 2002 – 2011 based on new Watershed Model application
  - Accompanying bottom-shear stress file
  - Received and tested by ERDC







- Quick check on hydrodynamics
- Substitute new files into existing 1991 – 2000 simulation.
- They work, reproduce bottom-water hypoxia.
- Need to check shear-stress files.

CBP Activities

- Watershed Model
  - 2002 – 2011 watershed loads provided to ERDC.
  - 2002 – 2011 point-source loads provided to ERDC.
- Atmospheric Deposition
  - Annual total nitrogen, total phosphorus loads to water surface provided to ERDC.
  - Need to be partitioned into fractions, time sequence.

CBP Activities

- Meteorlogical Files
  - WQM met files for 2006 – 2012 provided to ERDC.
  - Based on same information as met files for hydrodynamic model.

ERDC Responsibilities

- Shoreline Erosion
  - Need to compute daily bank erosion based on wave energy, water level.
  - We haven't done this in a long time.
  - Will require info on wind-waves created for bottom shear-stress computation.
- Process WSM outputs in WQM input files
  - Should be a routine process.

ERDC Responsibilities

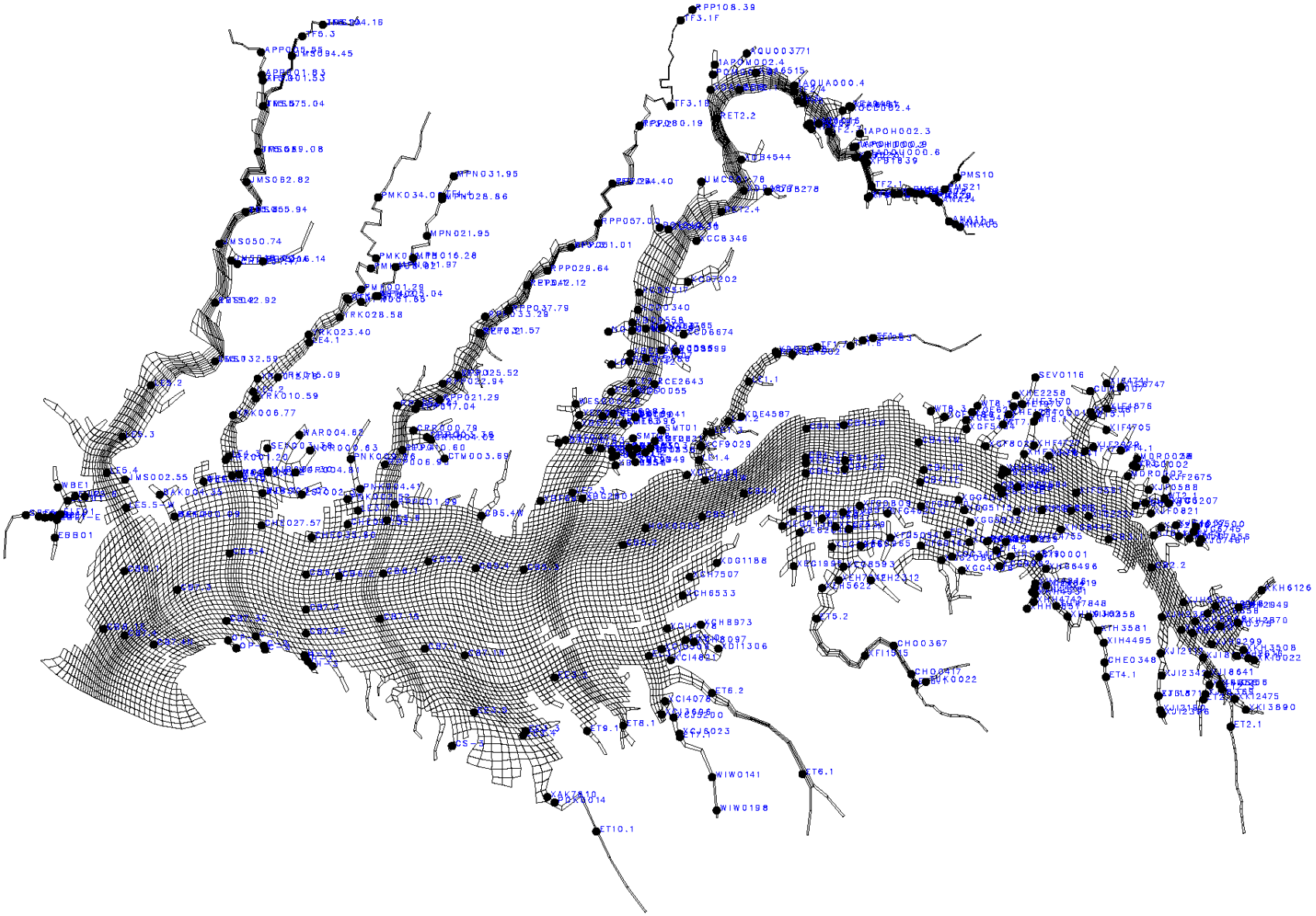
- Open-Mouth Boundary Conditions
  - Haven't done this in a while but should present no problems.
- Prepare Data for Calibration and Verification
  - We have downloaded data through 2011 from CBP.
  - Laborious process.
- Other Data e.g. SAV, SONE, PriPro
  - We have assembled the data but not processed for model employment.

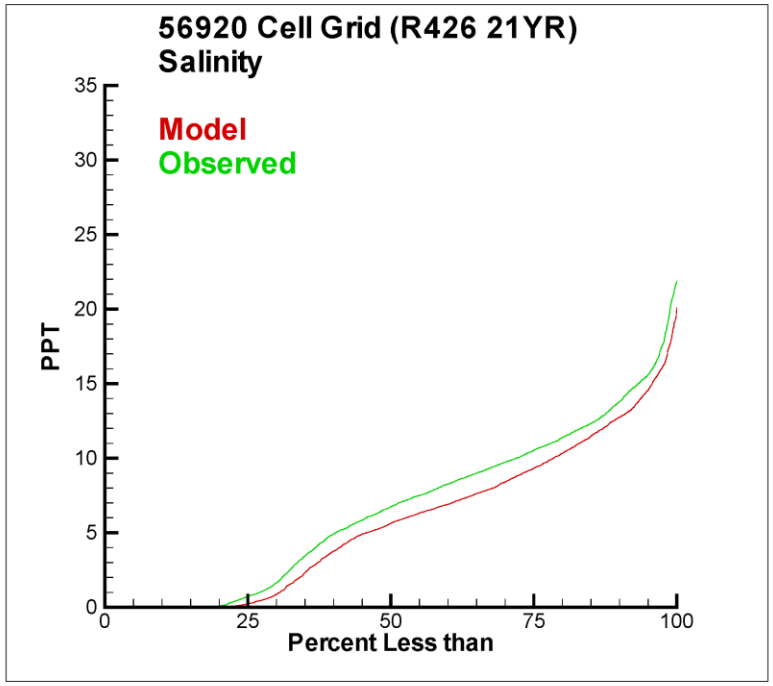
Shallow-Water Monitoring Program

- Program commenced circa 2001.
- Most observations post 2005.
- The shallow-water data found limited use in the previous phase of Chesapeake Bay modeling.
- This phase plans full examination of the data and employment to the greatest extent possible.

Shallow-Water Monitoring Program

- Three classes of observations
  - Grab samples.
  - Continuous monitoring at fixed station.
  - Continuous monitoring from moving vessel.
- The database of grab samples provided by CBP to ERDC
  - Cleaned up and mapped to model grid.
  - Observations extend from 2003 to 2011.
  - Initial comparison to our 1985 – 2005 simulation.




56920 Cell Grid (R426 21YR)
Salinity
Model
Observed
PPT
Percent Less than
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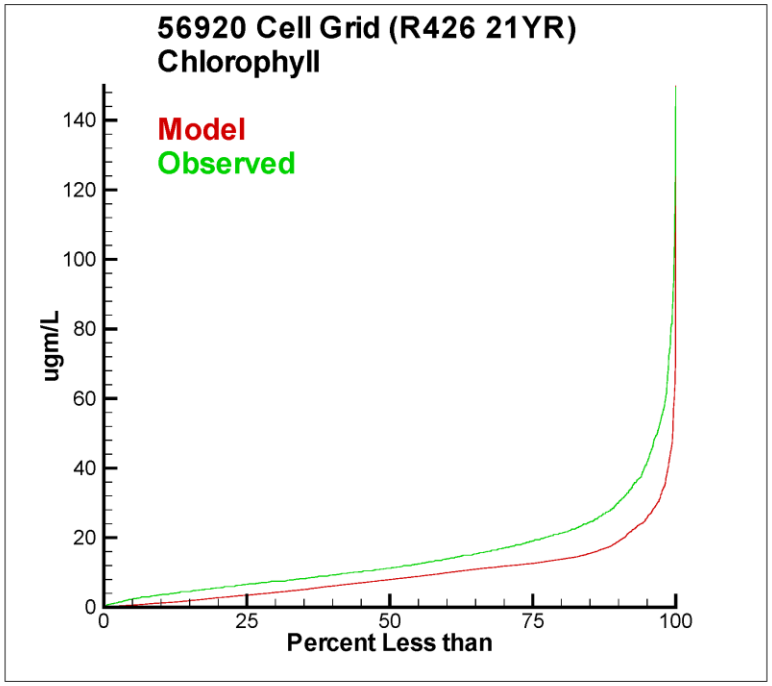
5
10
15
20
25
30
35
0
25
50
75
100


56920 Cell Grid (R426 21YR)
Chlorophyll
Model
Observed
ugm/L
Percent Less than
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20
40
60
80
100
120
140
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25
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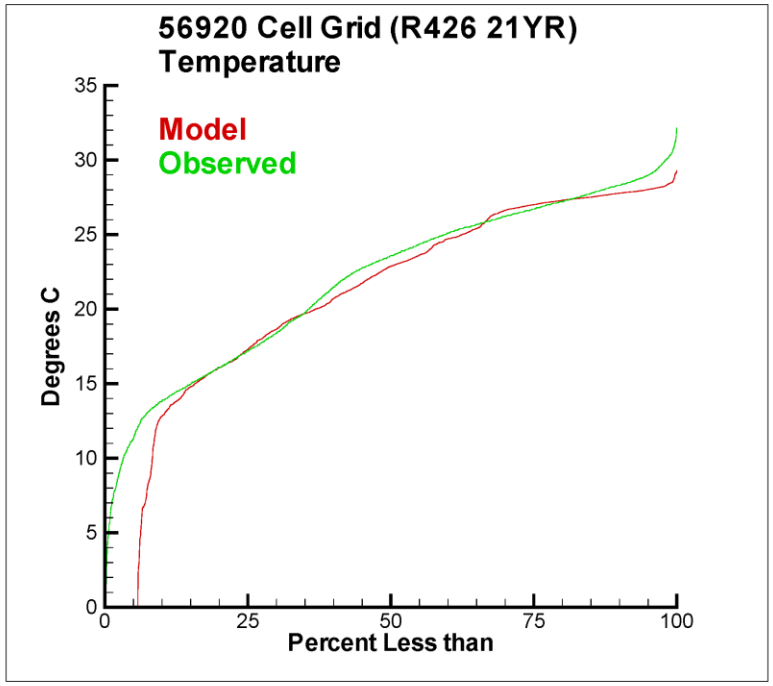
56920 Cell Grid (R426 21YR)
Temperature
Model
Observed
Degrees C
Percent Less than
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5
10
15
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30
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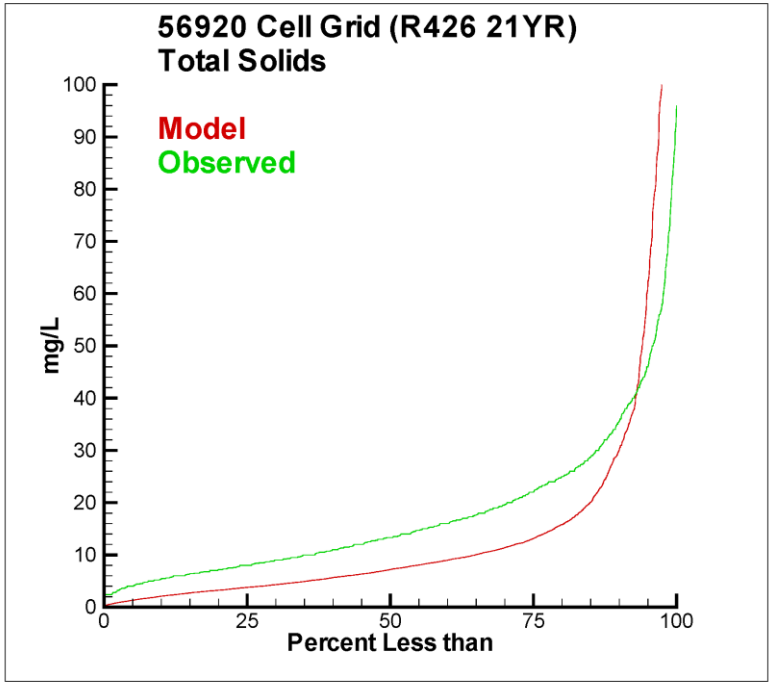
56920 Cell Grid (R426 21YR)
Total Solids
Model
Observed
mg/L
Percent Less than
0
10
20
30
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50
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70
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90
100
0
25
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75
100

Future Activities

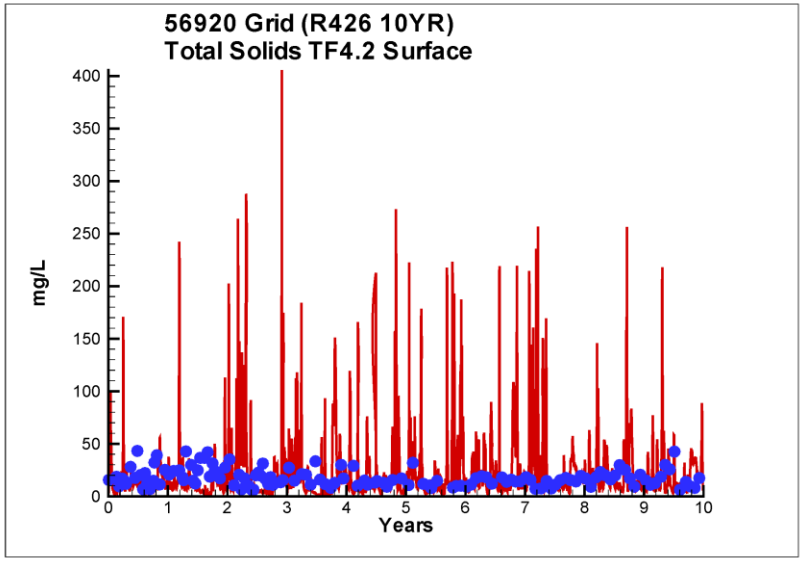
- Improving Understanding and Simulation of Shallow Water Processes in Chesapeake Bay
  - Larry Sanford, UMCES.
  - Improved estimates of shoreline erosion loads.
  - Physical processes in Susquehanna Flats.

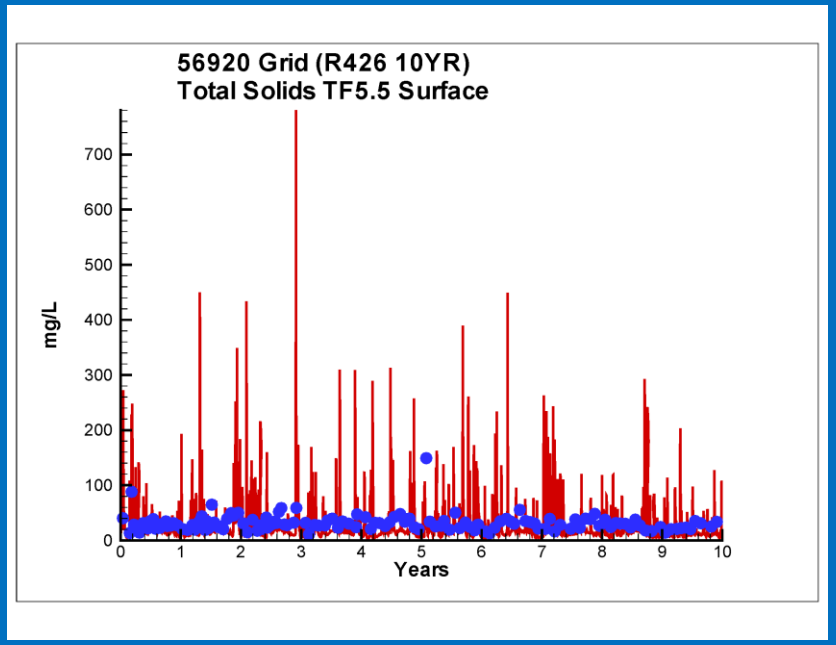
Future Activities

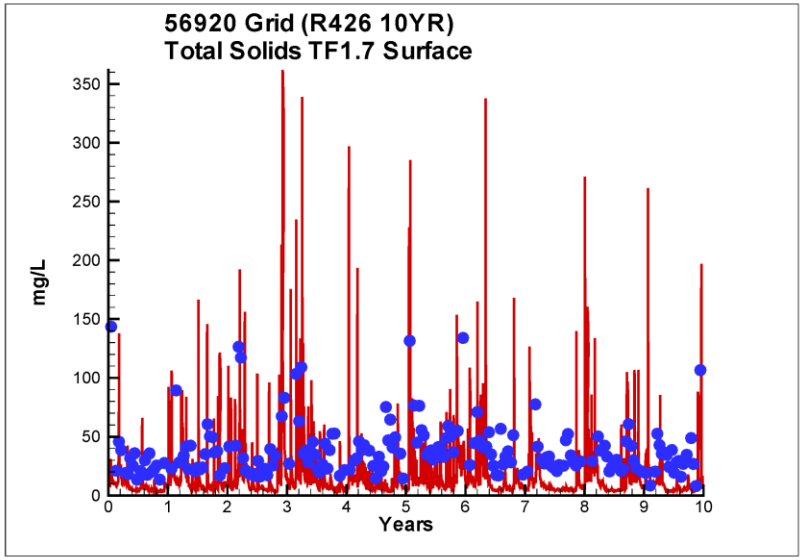
- Chesapeake Bay Modeling Symposium 2014
- Modeling the Shallows in Chesapeake Bay

This meeting session is seeking presentations covering research pertaining to Chesapeake Bay's shallows, specifically on: (1) physical modeling, (2) biogeochemical modeling, (3) coupled bio-physical interaction modeling and, (4) field observations (to evaluate model parameterizations and simulations). This topic is both timely and urgent, given the recently announced Multiple Shallow Water Model Evaluation Program and the need to incorporate improved shallow water modeling capabilities in the USEPA CBP Water Quality model by 2015.

Future Activities

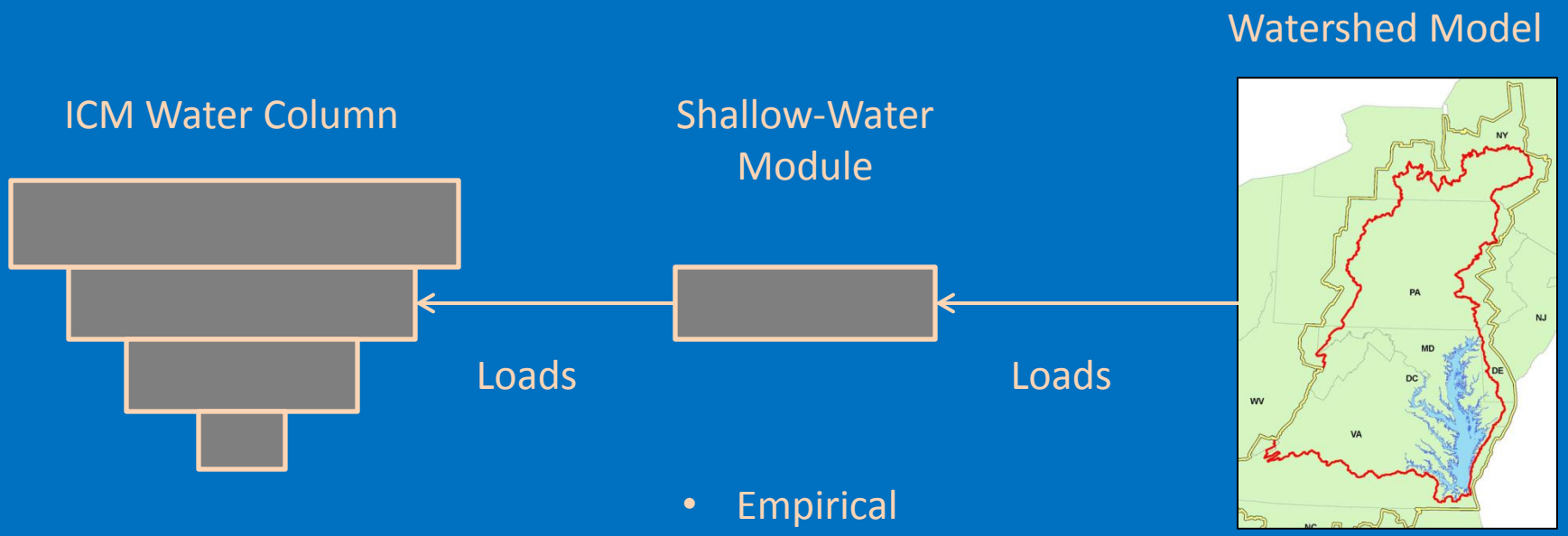






Regions of the bay indicate periodic pulses of solids and solid forms of nutrients that are not supported by observations. These are related to loads. Is there a process (e.g. wetland interaction) that is modifying these loads?

Shallow-Water Module



- Empirical Wetlands Model
- Revised Shoreline Erosion Model
- Other Processes

A Few Other Thoughts

- We are working mostly with the “ground truth” discrete shallow-water data. We don’t really know how to use dataflow and continuous monitoring in model studies.
- This work has “stalled out” while devoting attention to the LSRWA. Time to get back to work.