COMT CI: Y3 in Review & Goals for Y4

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RPS ASA

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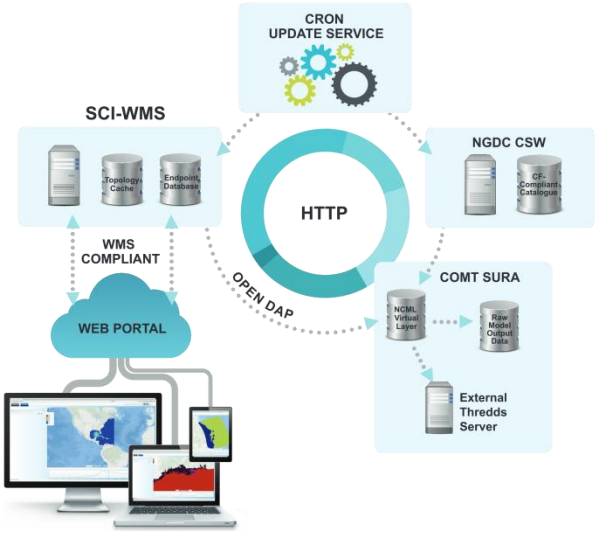
COMT Cyber-Infrastructure

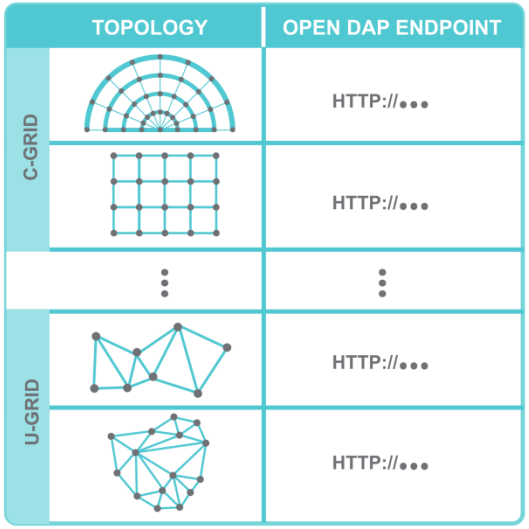


Motivation

- *facilitate **collaboration** across various institutions and models*
- *enable **exploration**, presentation and archive of research results*
- *provide **community** access and tools to the COMT research*

Implementation/Tools

- *modelers upload data via FTP to central server*
- *CI works with modelers to make all data CF-compliant*
- *direct data access available via TDS (OPeNDAP and HTTP)*
- *visualization via Python based SCI-WMS for graphic display of data*
  - *handles structured, staggered and unstructured GRIDS*
- *user interface enables exploration of catalog and graphics for all projects*



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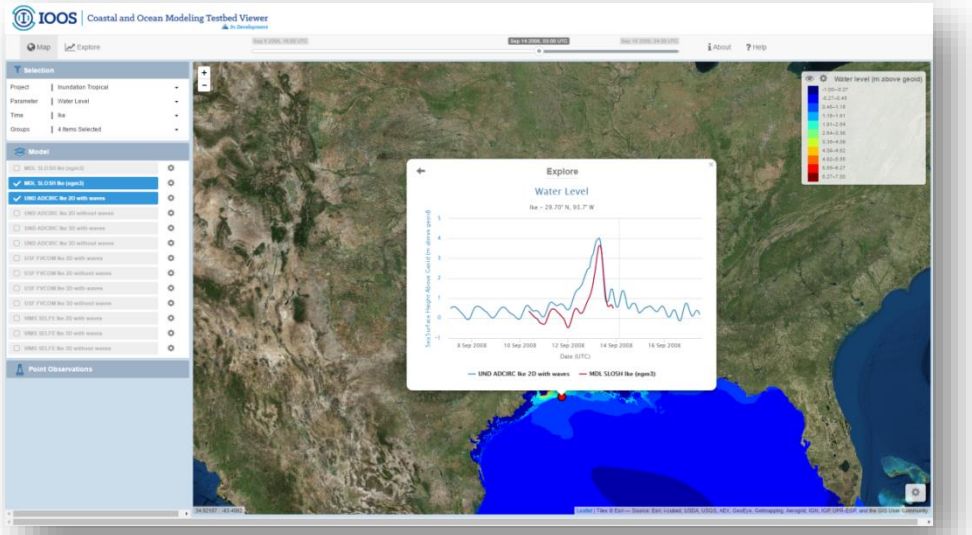
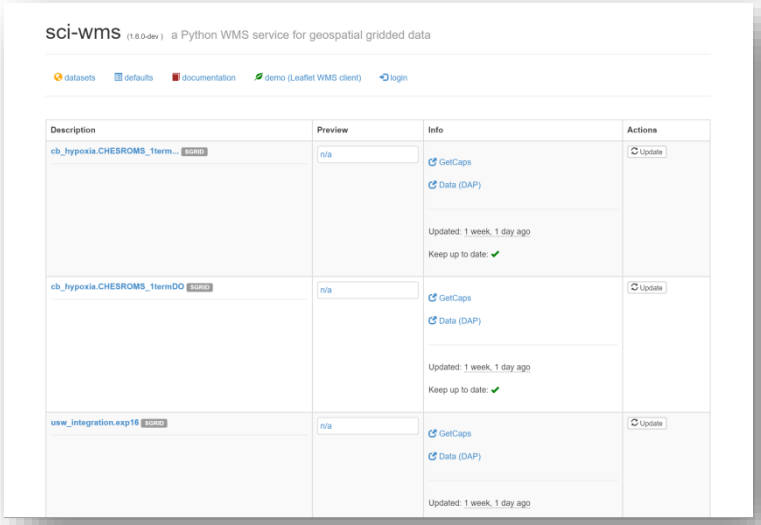
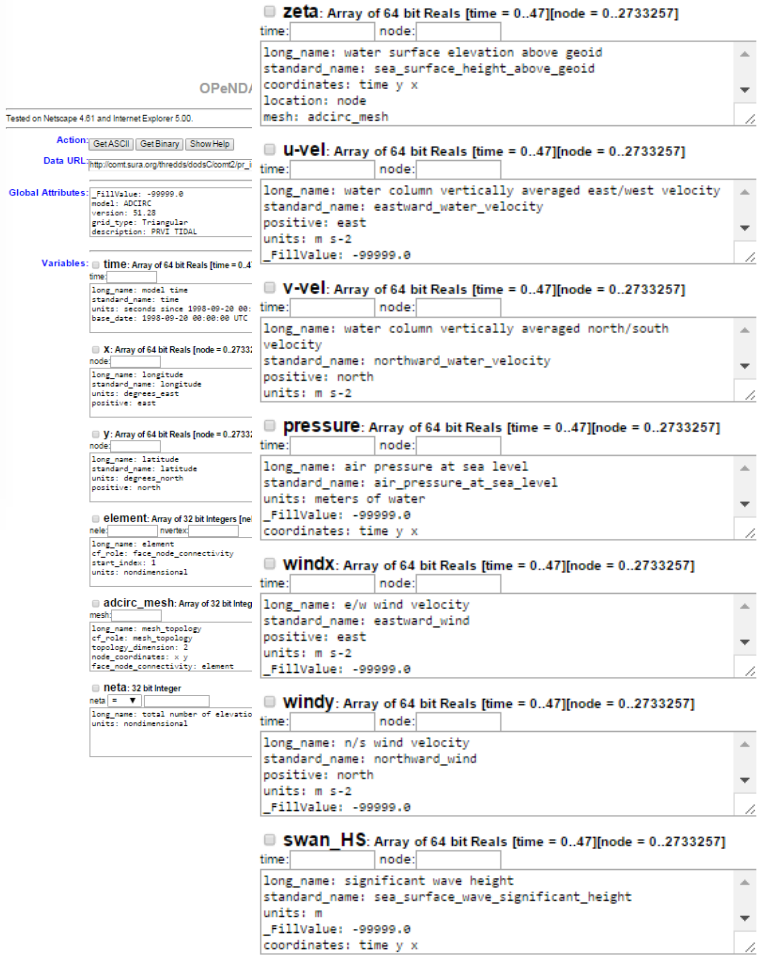
Presentation/User Interface



Services



Data Access (eg. OPeNDAP)



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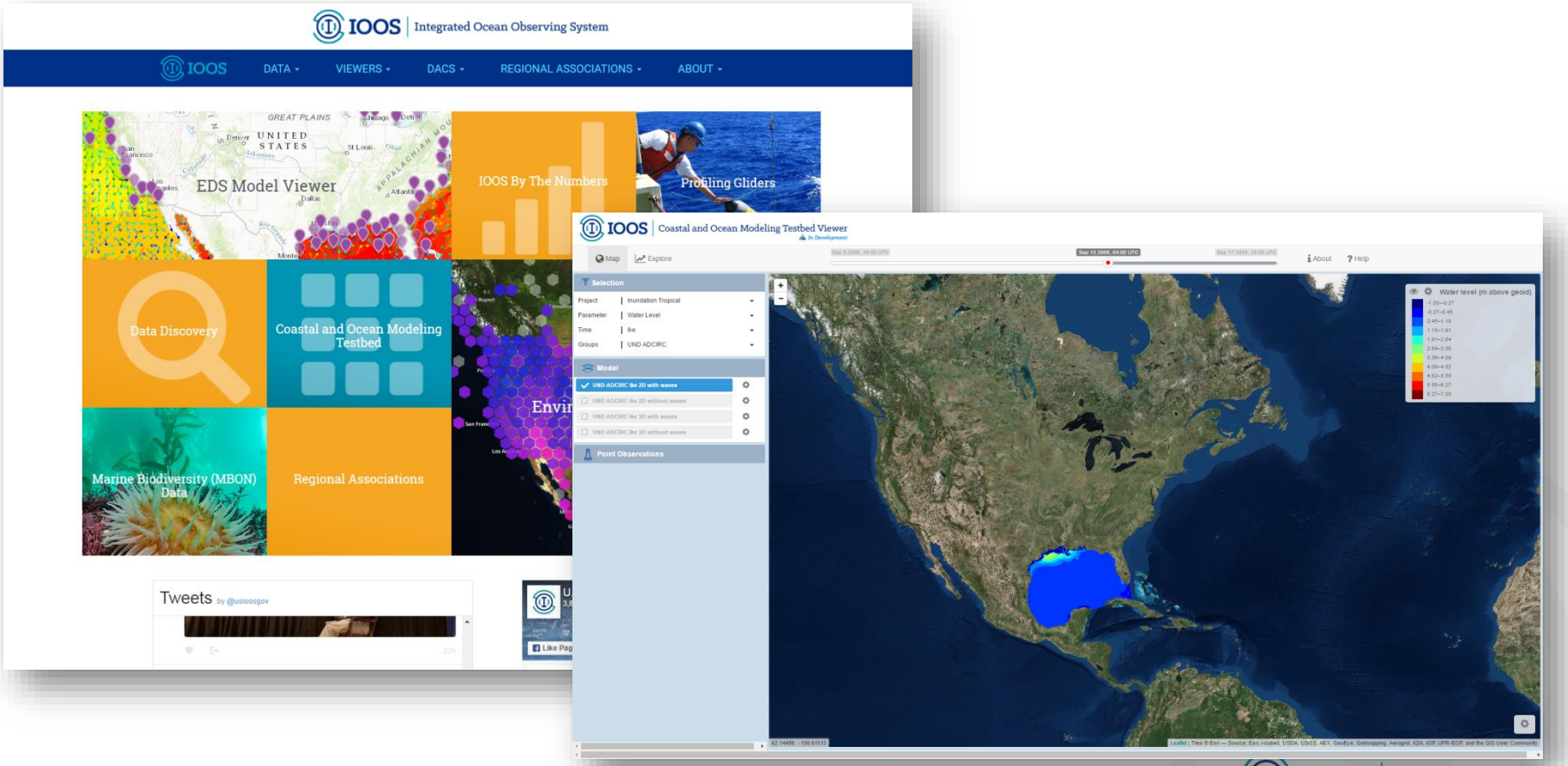
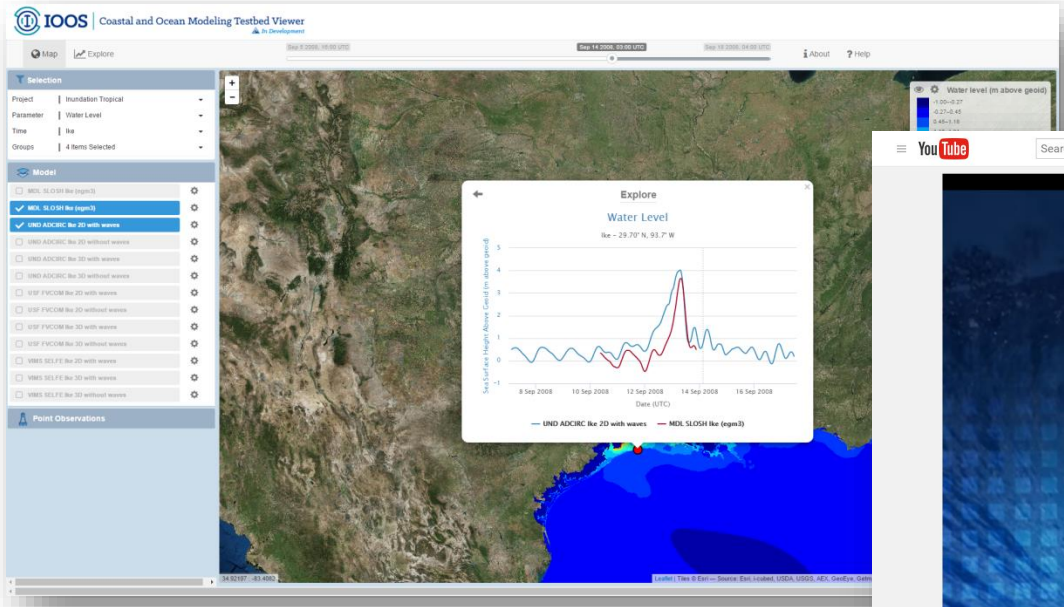
Year 3 In Review

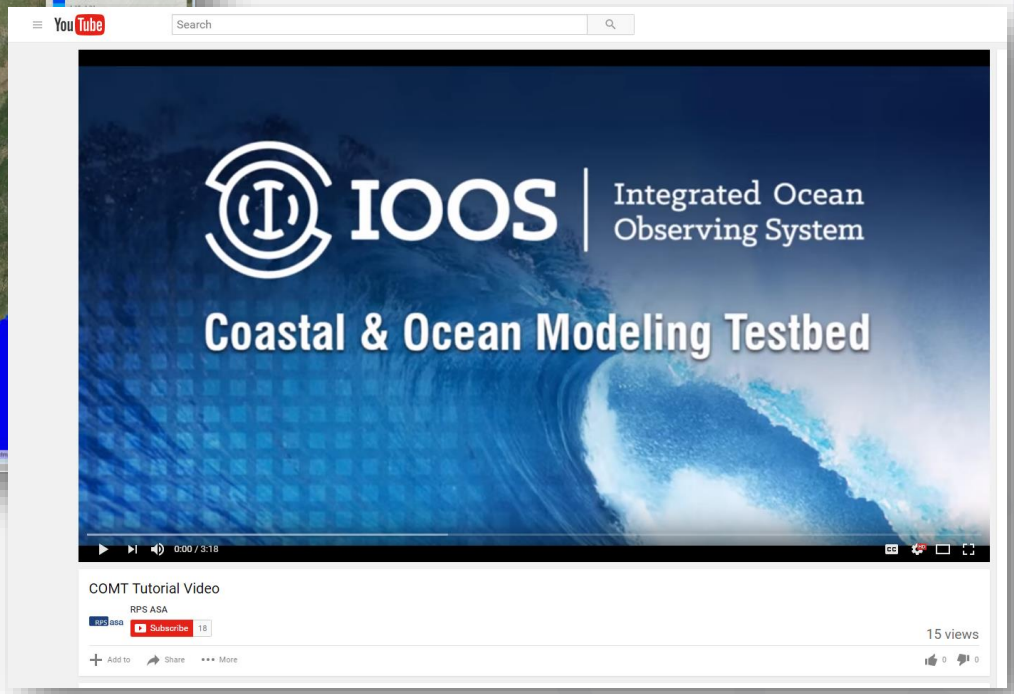
- Deployment of comt.ioos.us
- Addition of http://comt.sura.org/thredds to RPA ASA's operational service monitoring system
- Model Viewer Improvements



Year 3 In Review

- Coordination with modeling teams & participation on team calls
- Demos and tutorials
- **Development of Data Upload Tool**
- Review of draft Data Management Plan





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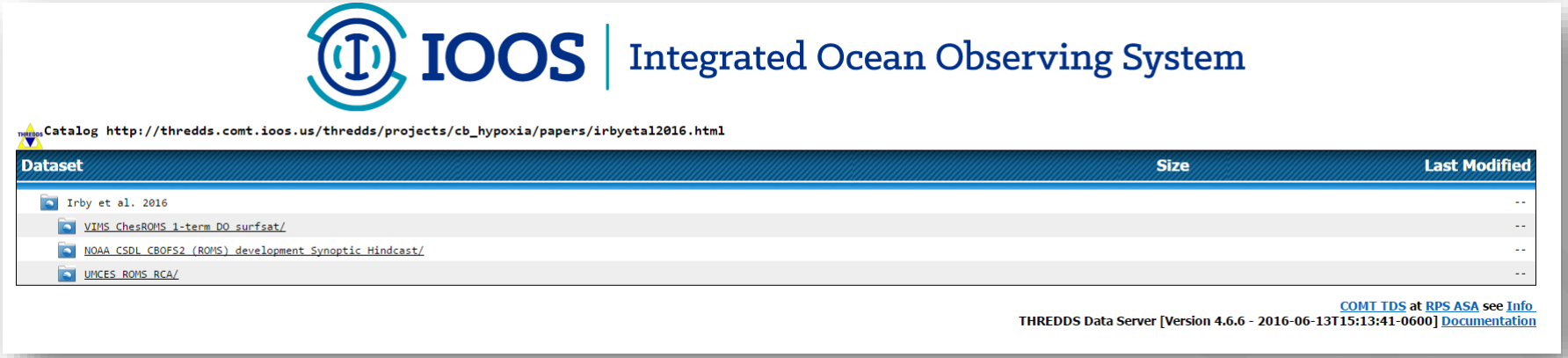
Year 3 In Review: CB Hypoxia

Challenge: Downloadable Publication Archives

- Create unique and stable (and now branded!) TDS catalog location for archiving publication model runs & related observations
  - http://comt.sura.org/thredds/catalog/comt_2_full/cb_hypoxia/2004-2005/catalog.html
  - http://thredds.comt.ioos.us/thredds/projects/cb_hypoxia/papers/irbyetal2016.html



Year 3 In Review: CB Hypoxia

- Added new model runs
  - ChesROMS
  - CBOFS
  - ROMS_RCA
- Organized model runs by project period
  - 2004-2005
  - 1984-2013
  - 2014-2015
- Re-organization of Model Viewer filters to allow multiple time periods per project
- Enabled water temperature variable in the model viewer
- Integrated the Chesapeake Bay Program observation data with the TDS catalog and Model Viewer
- Added CBIBS buoy data to the Model Viewer

Year 3 In Review: CB Hypoxia

Outstanding Requests:

- Process observation data
- Enable model-observation comparisons
- Enable inter-comparison of models with sigma coordinates at various depths
- Add additional biogeochemical variables (chlorophyll and nitrate)
- Integration of 'Station' data from simulations
- Allow Model Viewer to generate longer (2-yr) time-series
- Calculation of hypoxic volume

Year 3 In Review: GoM Hypoxia

Challenge: Calculation of bottom boundary layer

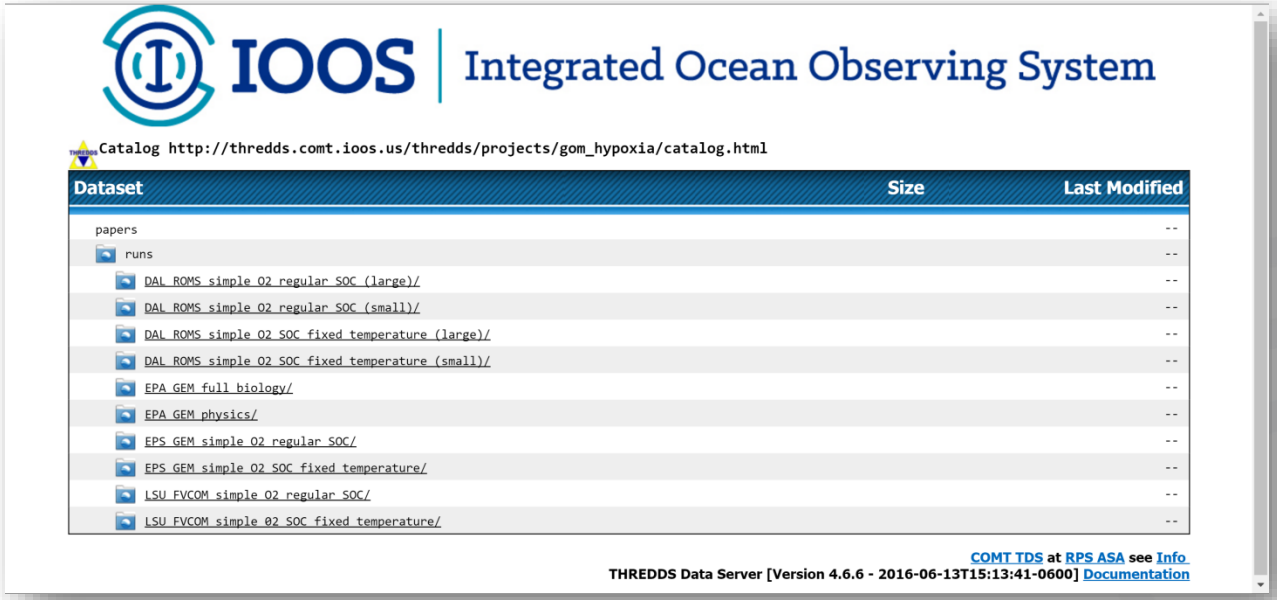
- Boundary layer thickness, as compared to NGOFS, is a key diagnostic for inclusion of new models.
- Review existing Matlab code for boundary layer calculation provided by modeling team
- Convert to Python and performed test integration with data ingest process as a post-processing step

Potential Next Steps

- Testing!
- Add boundary layer thickness as 2D variable to model output files;
  - Requires discussion of CF convention for new variable
- Determine best practices for visualization, color scheme, etc
- Comparison with NGOFS

Year 3 In Review: GoM Hypoxia

- Defined the model data expectations for Y3 and Y4 for all three models (ROMS, GEM, FVCOM)
  - Y3: (1) simple oxygen model and (2) the diagnostic run
  - Y4: full biogeochemical model results
- Created a stable TDS catalog link for use in publications
- Continued coordination with FVCOM group to work through topology and time variable issues
- Added first round of simple O2 models to the TDS catalog



Year 3 In Review: GoM Hypoxia

Outstanding Requests:

- Process observation data
- Enable model-observation comparisons
- Add full biogeochemical model output
- Add bottom boundary layer thickness to UI
  - Perform a simple difference calculation between NGOFS and the testbed runs

Year 3 In Review: USWC Integration

Challenge: Integration of real-time simulations

- Primarily leveraging remotely served ongoing forecast products
- A single case study dataset has been added to the COMT TDS catalog: full aggregation available at http://comt.sura.org/thredds/dodsC/comt2/usw_integration/Exp16/roms.xml.html

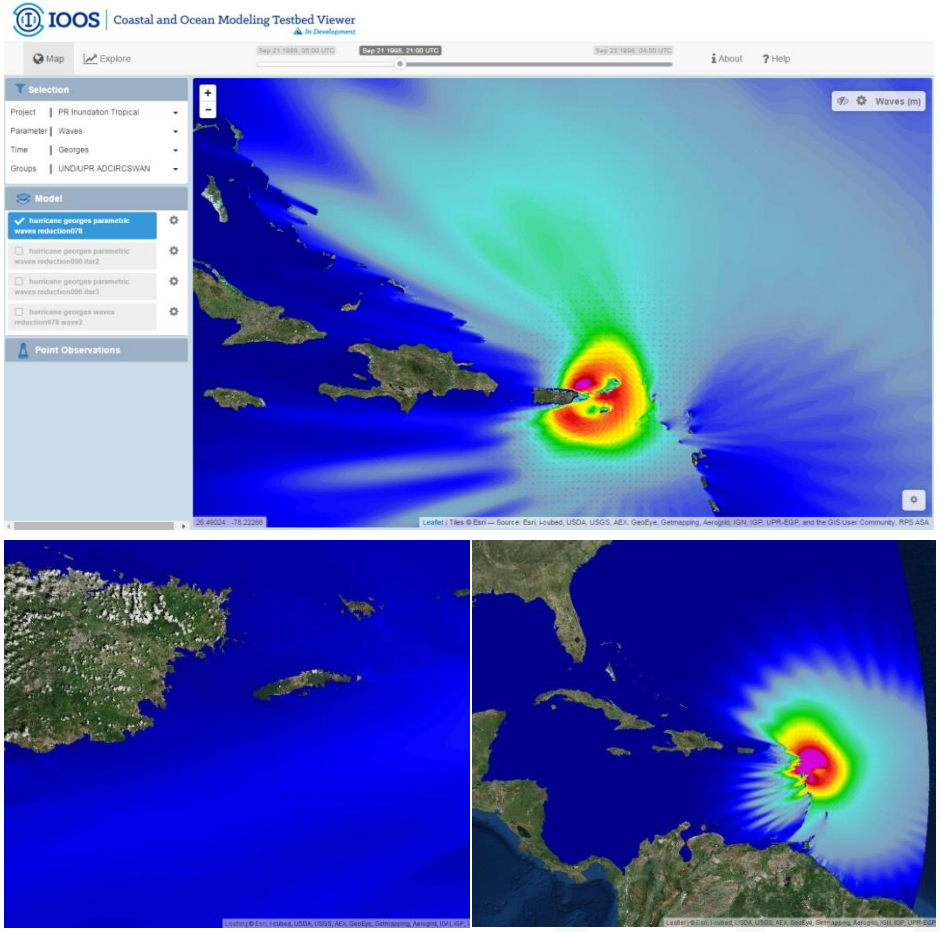
Outstanding Requests:

- Add time-series of public buoys to compare with model
- Mechanism for analyzing past month of model performance

Year 3 In Review: PR Inundation

Challenge: Many, massive, model runs

- Pushing boundaries of fast & efficient integration of new model runs
- Datasets with millions of nodes too slow to draw in Model Viewer
- Leveraged a python-based tile cache for key model results



Year 3 In Review: PR Inundation

- Addition of Georges, Irene, and Sandy ADCIRC runs to the TDS Catalog
- Addition of Georges observation data to the TDS catalog
- Support of NOAA Testbed Conference abstract and presentation
- Continued coordination with PR team to work through SLOSH basin issues

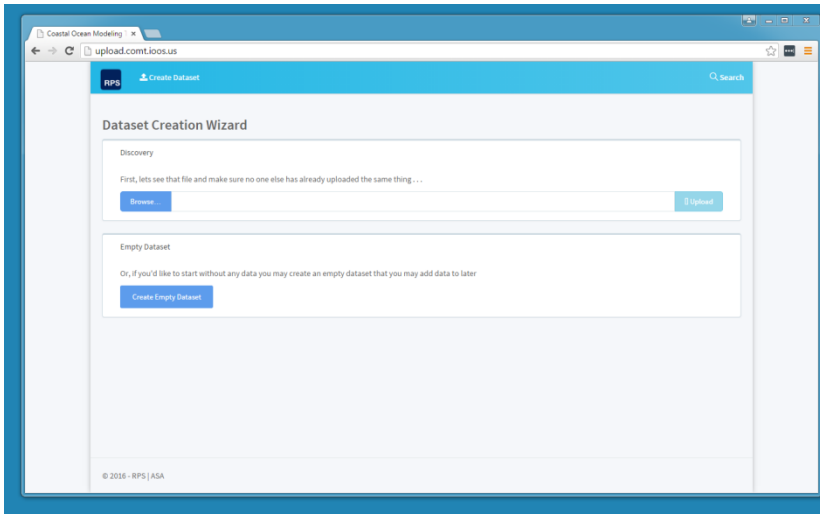
Outstanding Requests:

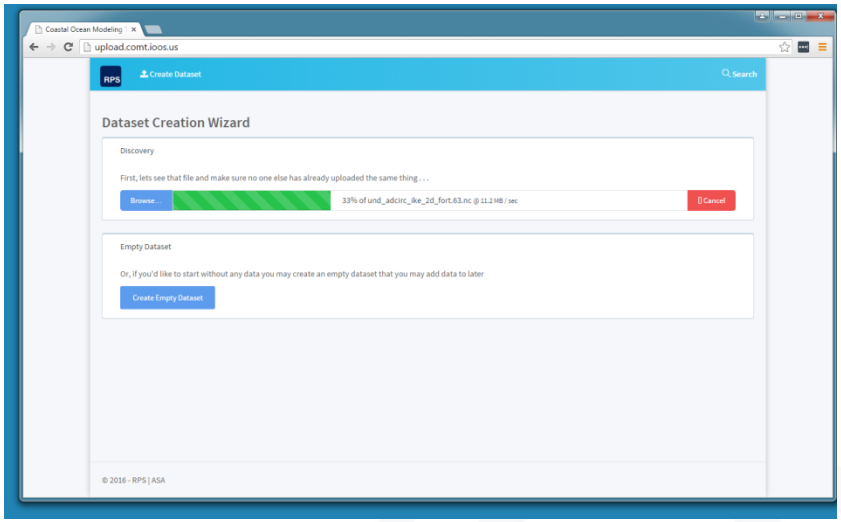
- Integration of observation data
- Enable model-observation comparisons
- Continued coordination with NHC on SLOSH integration
- Difference calculation

Data Upload Tool

Upload View/Creation Wizard allows local files to be uploaded

(checks file hash before upload to see if this file has been processed)





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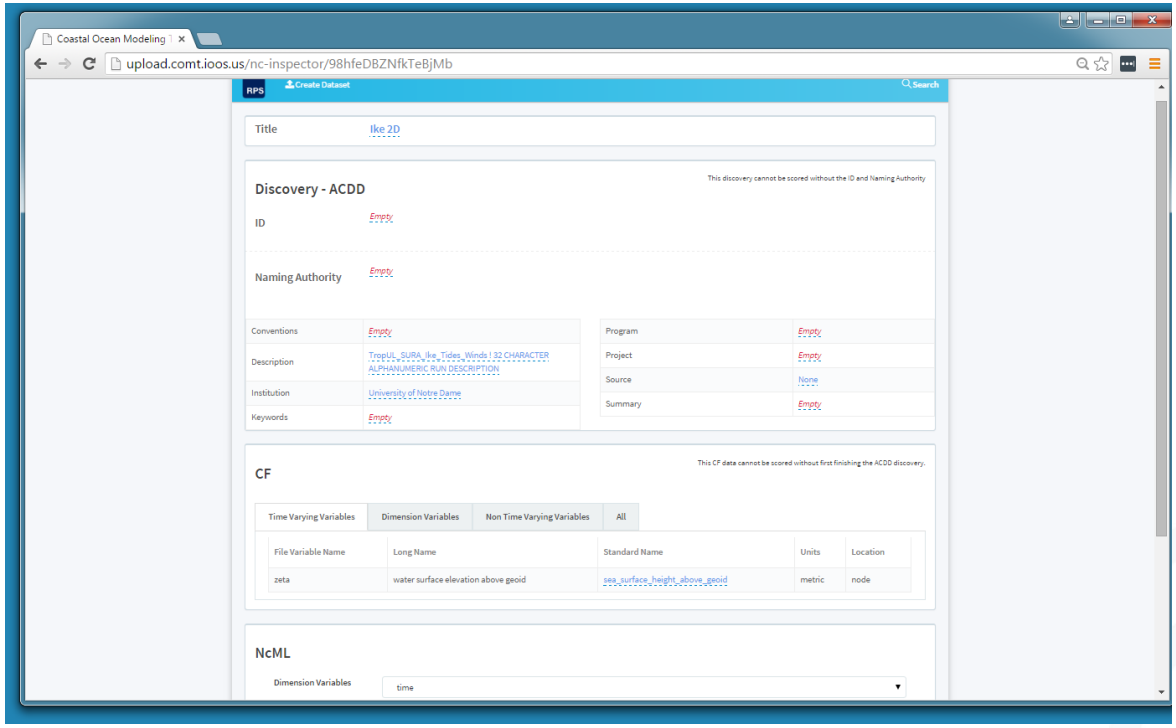
Data Upload Tool

Once uploaded, metadata is used to fill in initial dataset profile

(standards such as ACDD and CF are initial targets)



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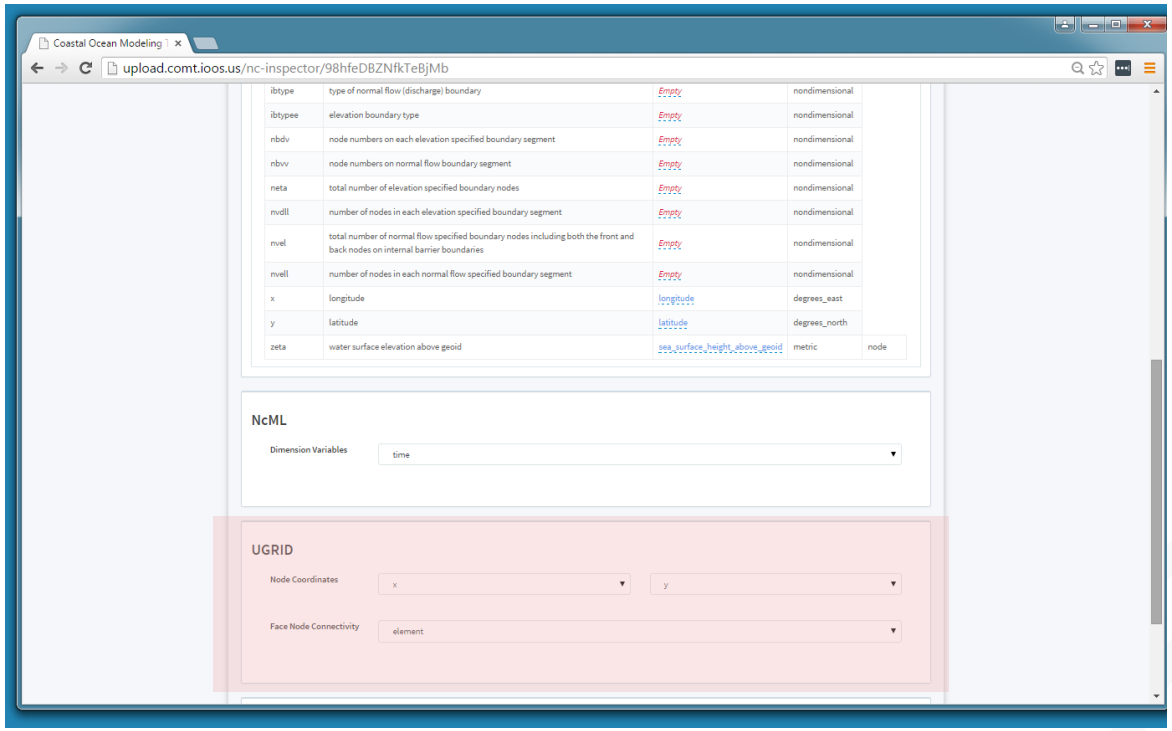
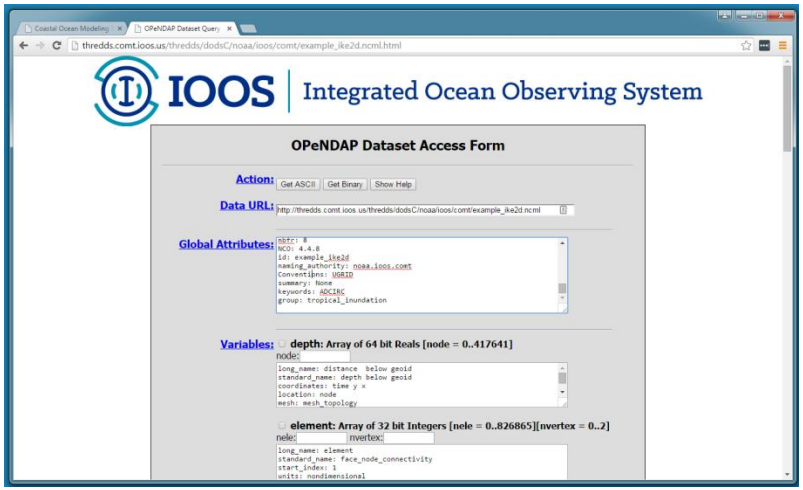
Data Upload Tool

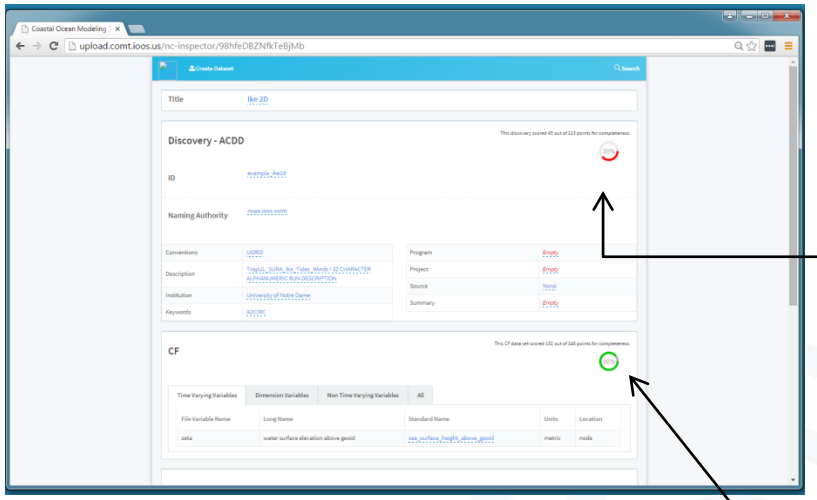
Additional conventions/standards such as UGRID are presented



Data Upload Tool

When required metadata is provided *(e.g.. id and naming_authority)* OPeNDAP endpoint is dynamically created using provided metadata and IOOS compliance checker is run using DAP

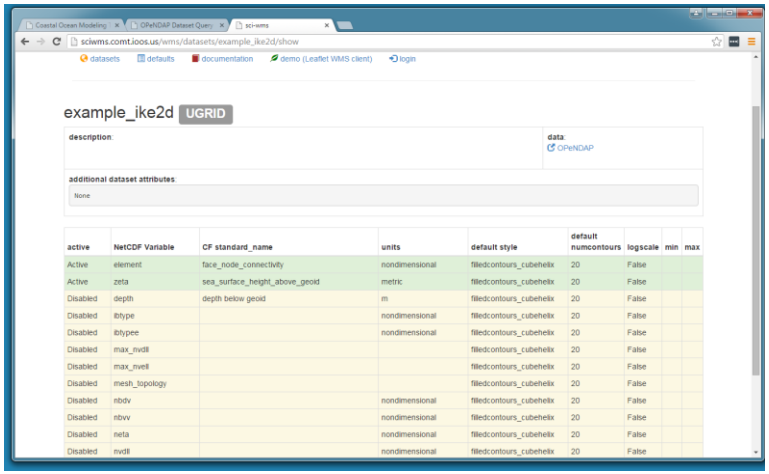


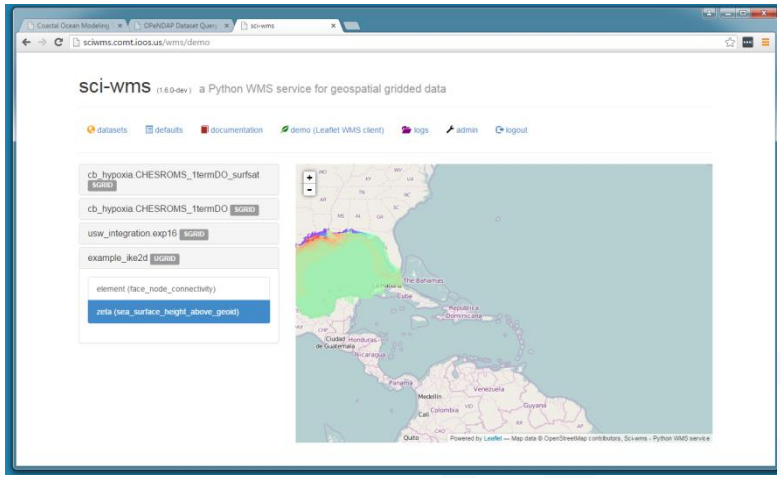


compliance checker scores

Data Upload Tool

If sufficient metadata is provided (eg. CF + UGRID)
a **sci-wms** dataset is created automatically allowing
visual access to the data via WMS





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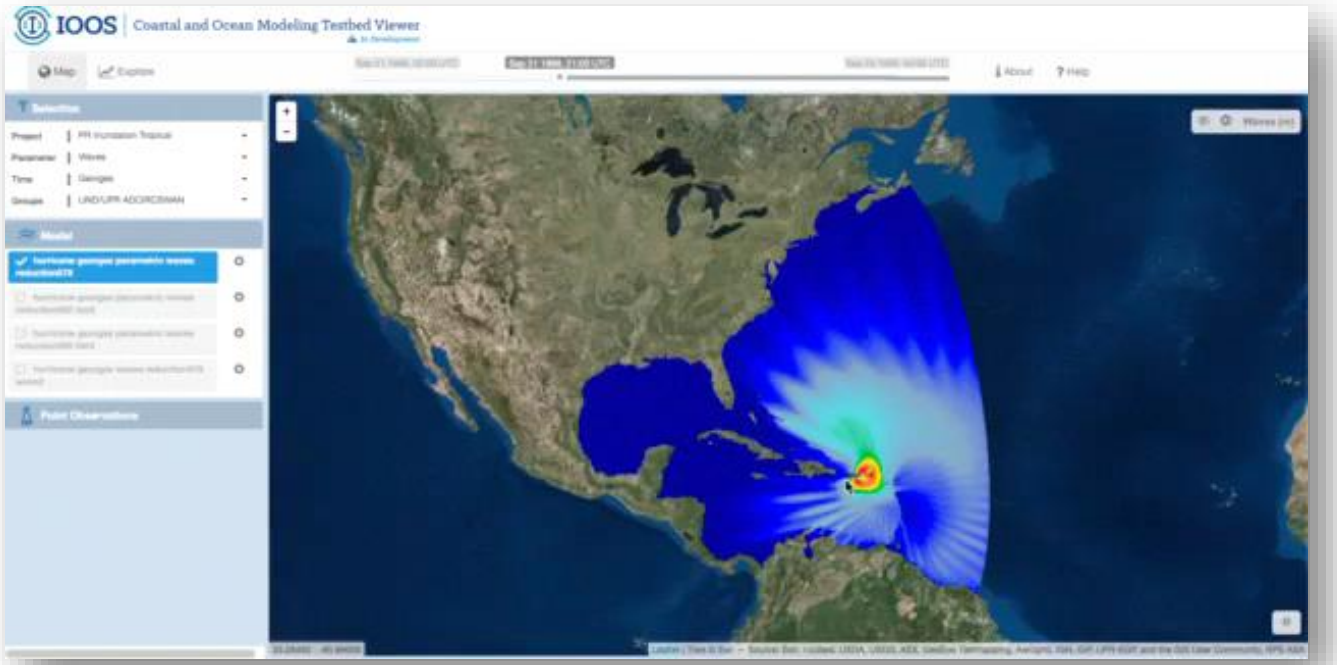
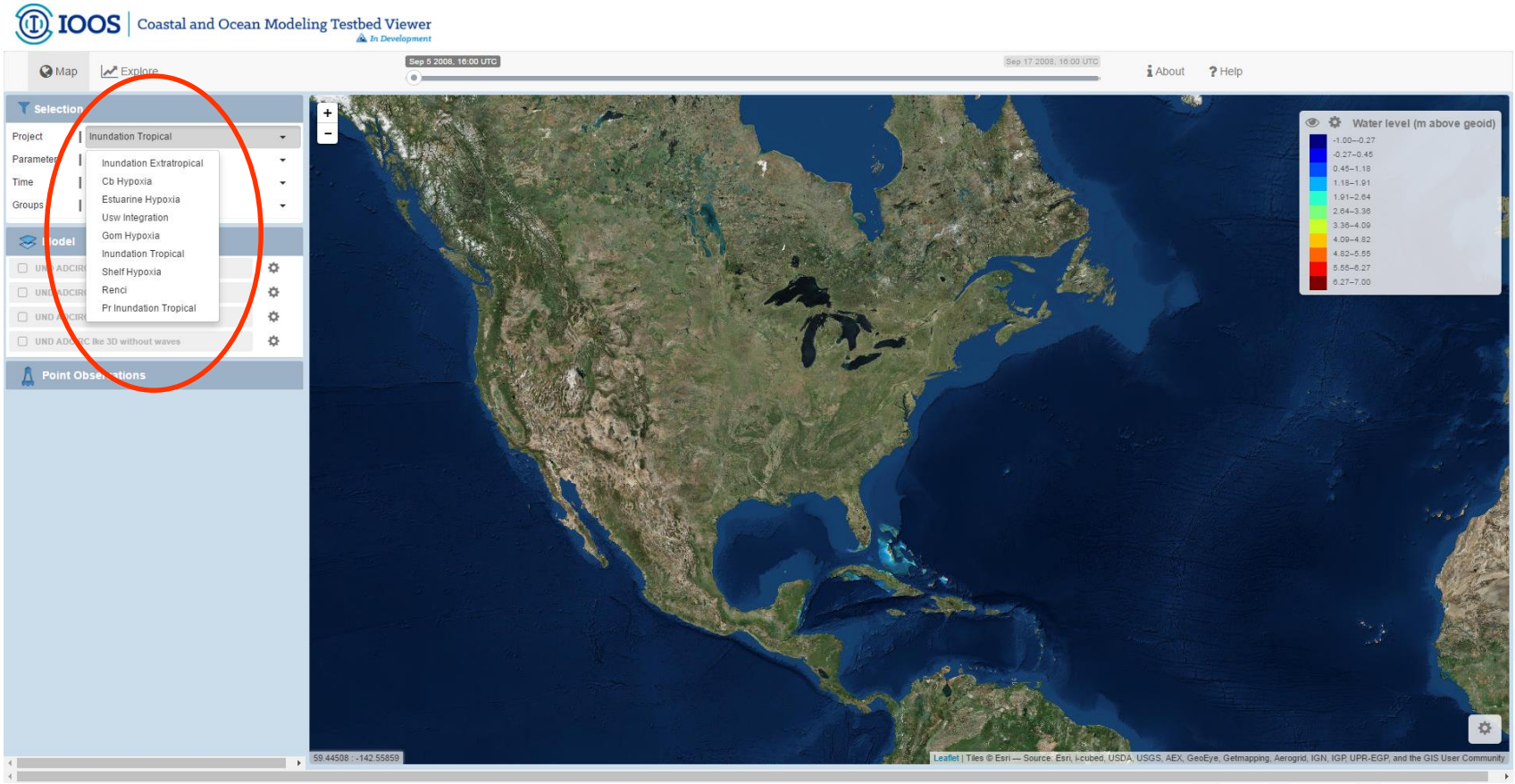
Model Viewer

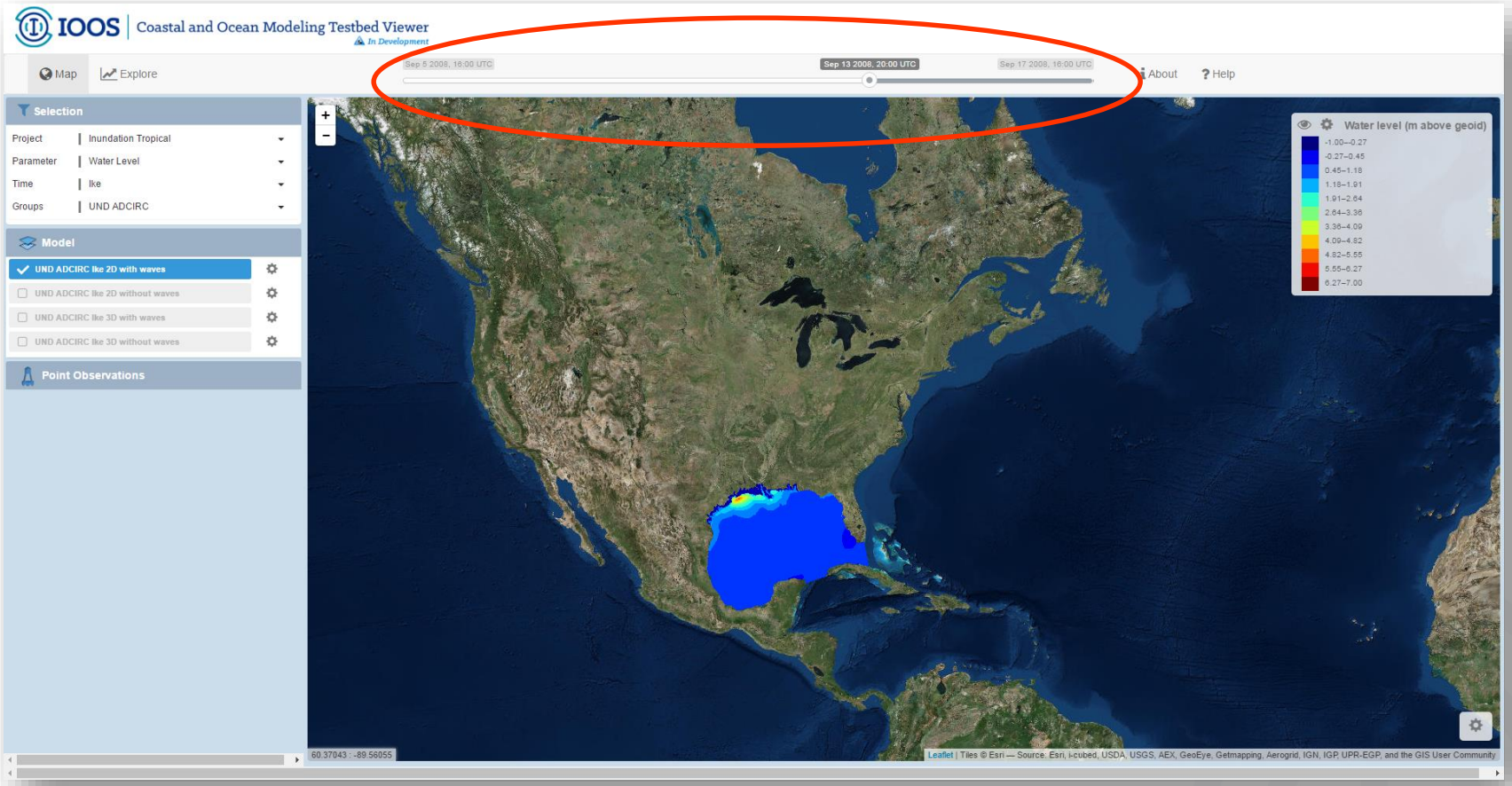


- Web-based map view enabled rapid exploration of model output from large scale to local
- Inter-comparison of models regardless of grid or domain
- Time-series comparison across models available for any point within domain via OGC WMS GetFeatureInfo requests

Model Viewer



Model Viewer



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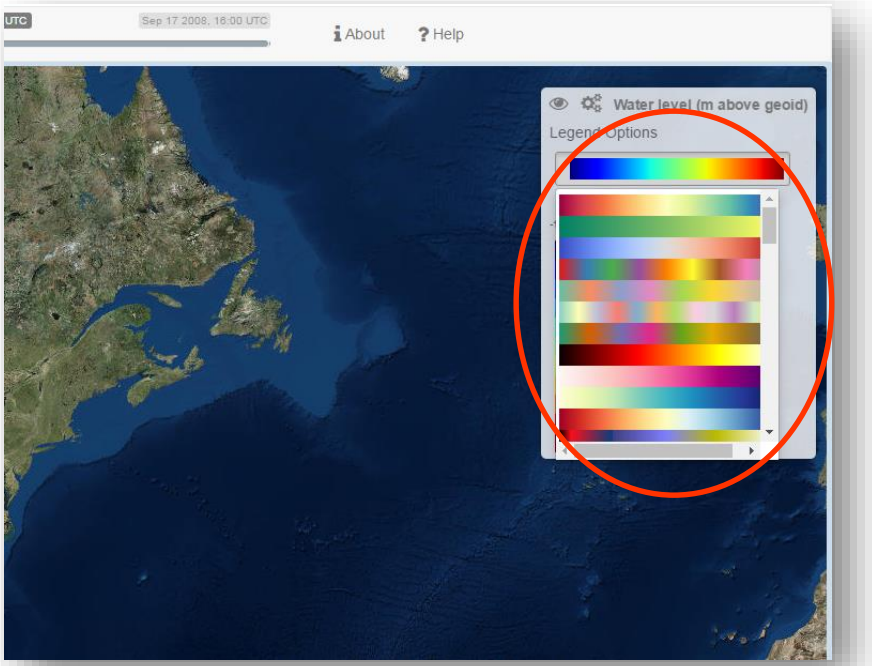
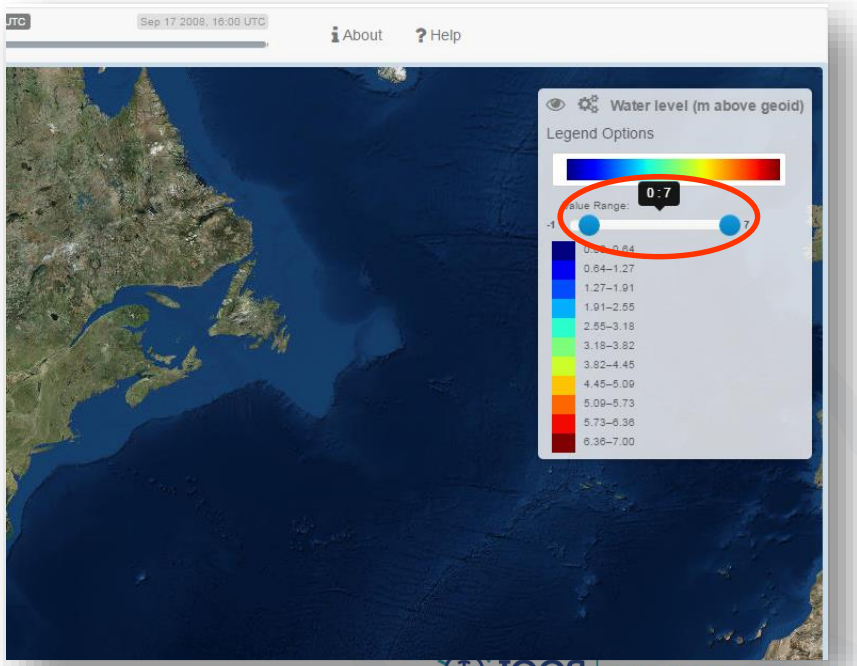
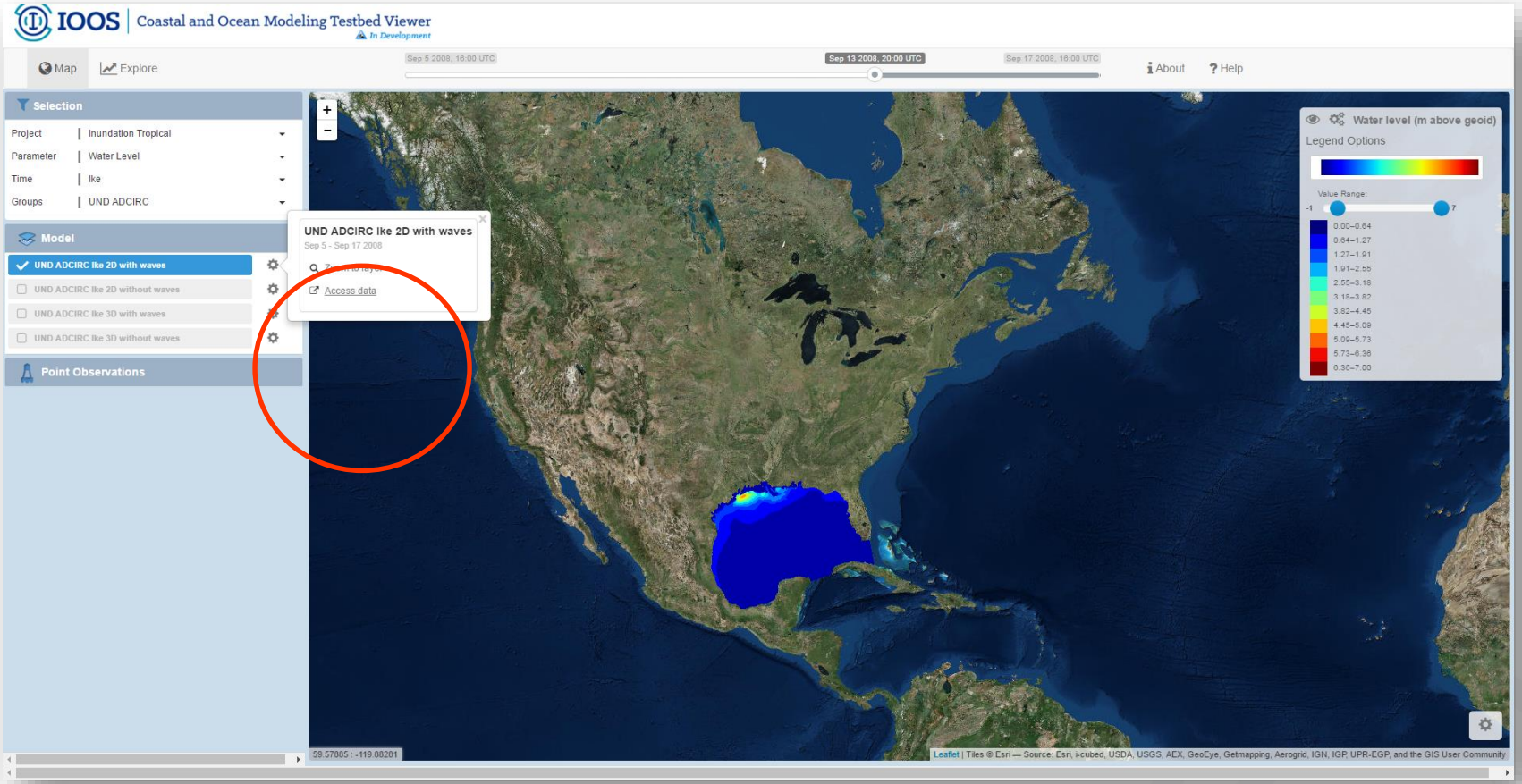
Model Viewer

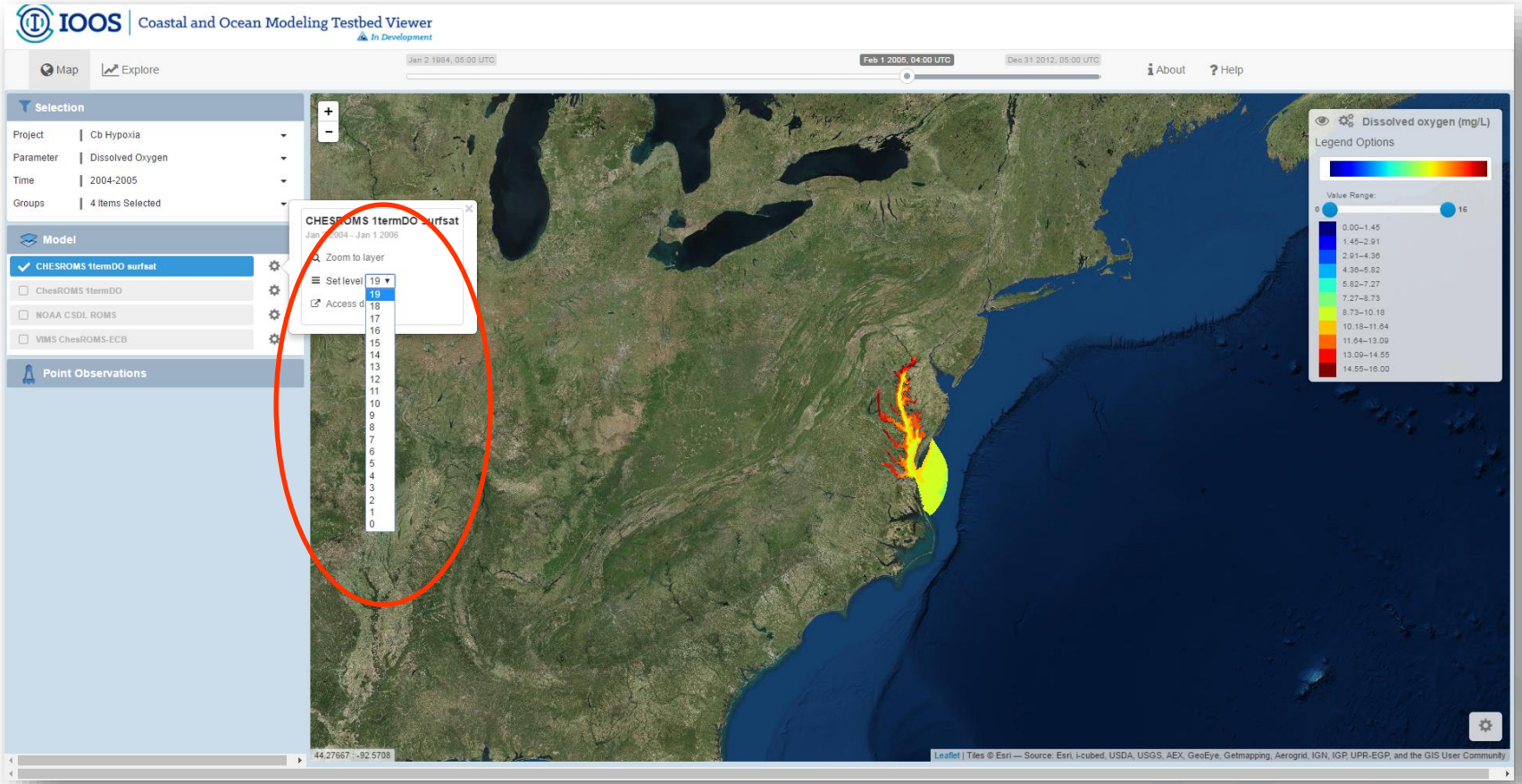




Model Viewer



Model Viewer



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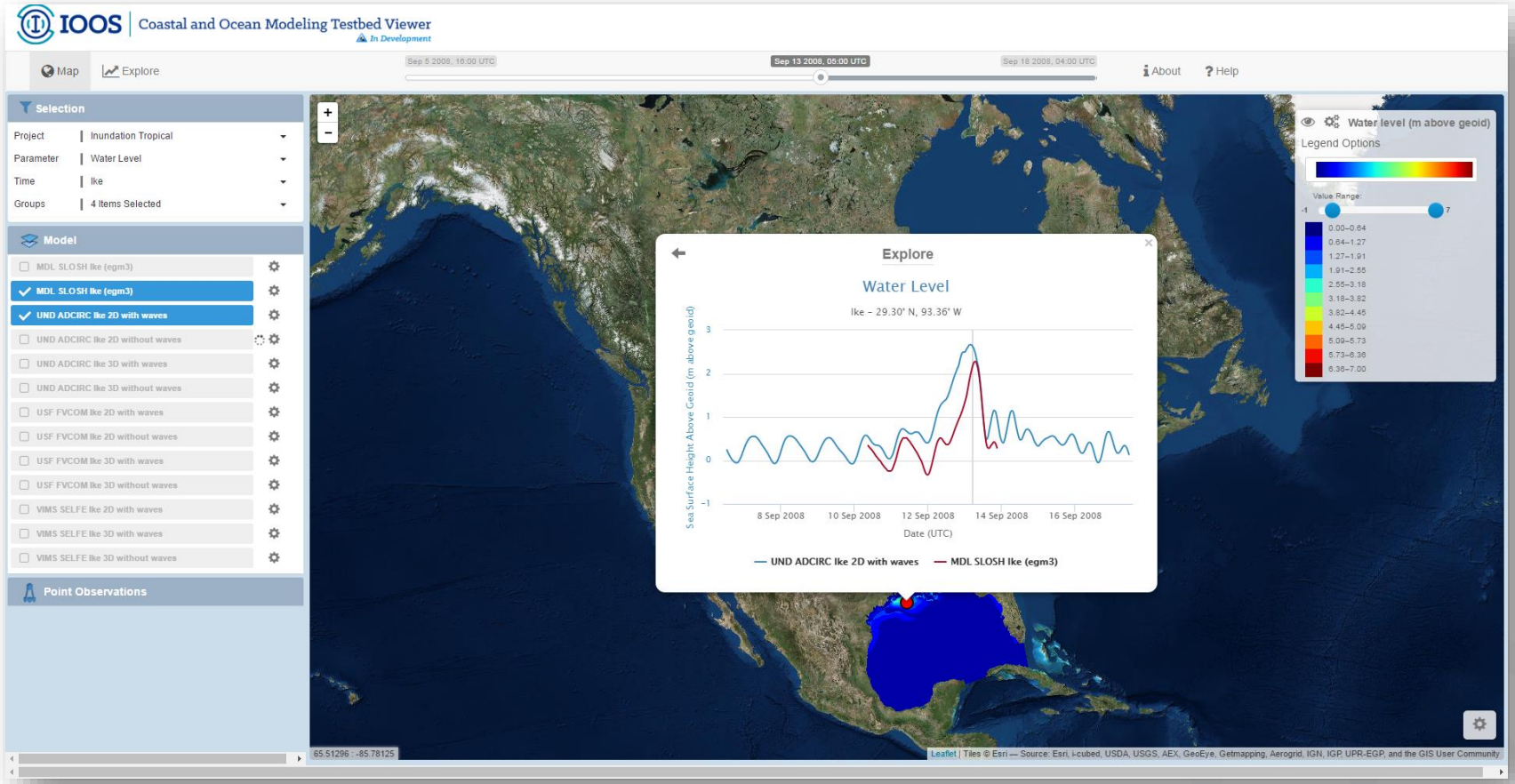

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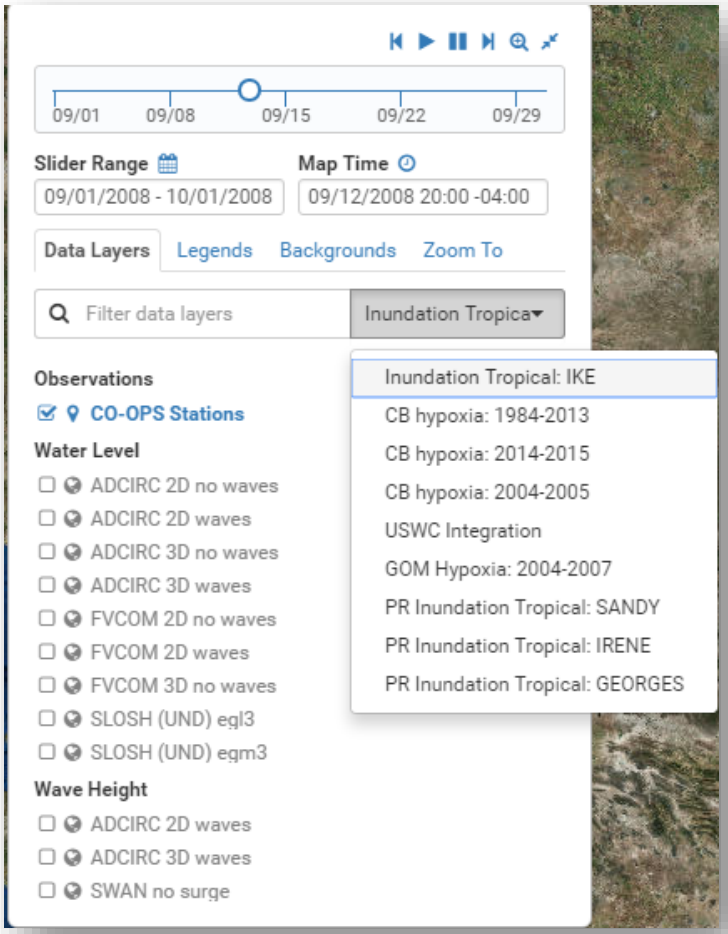
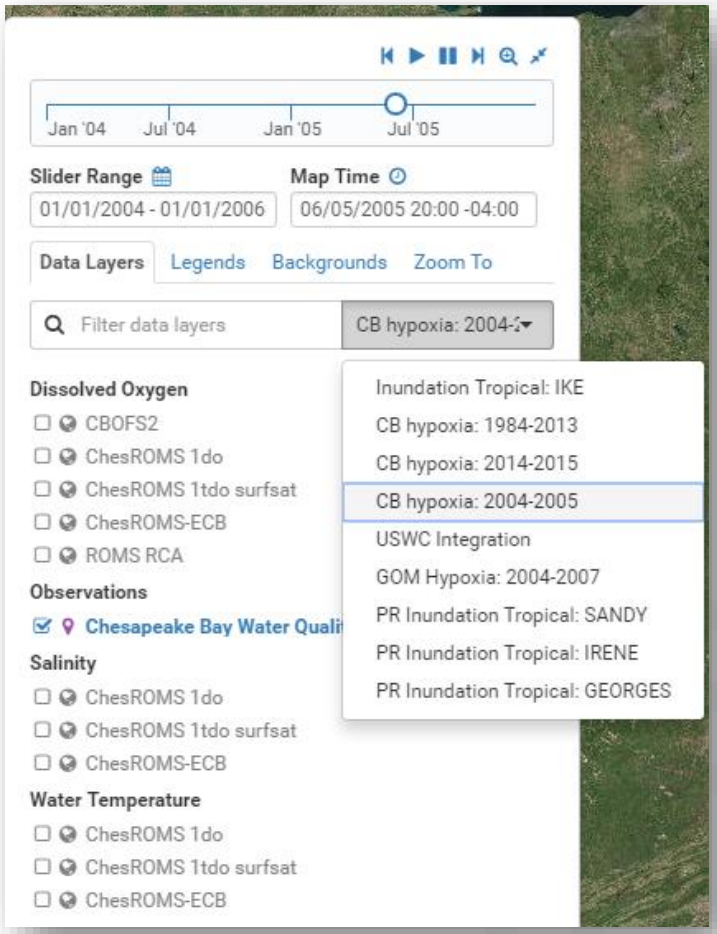
Model Viewer Updates

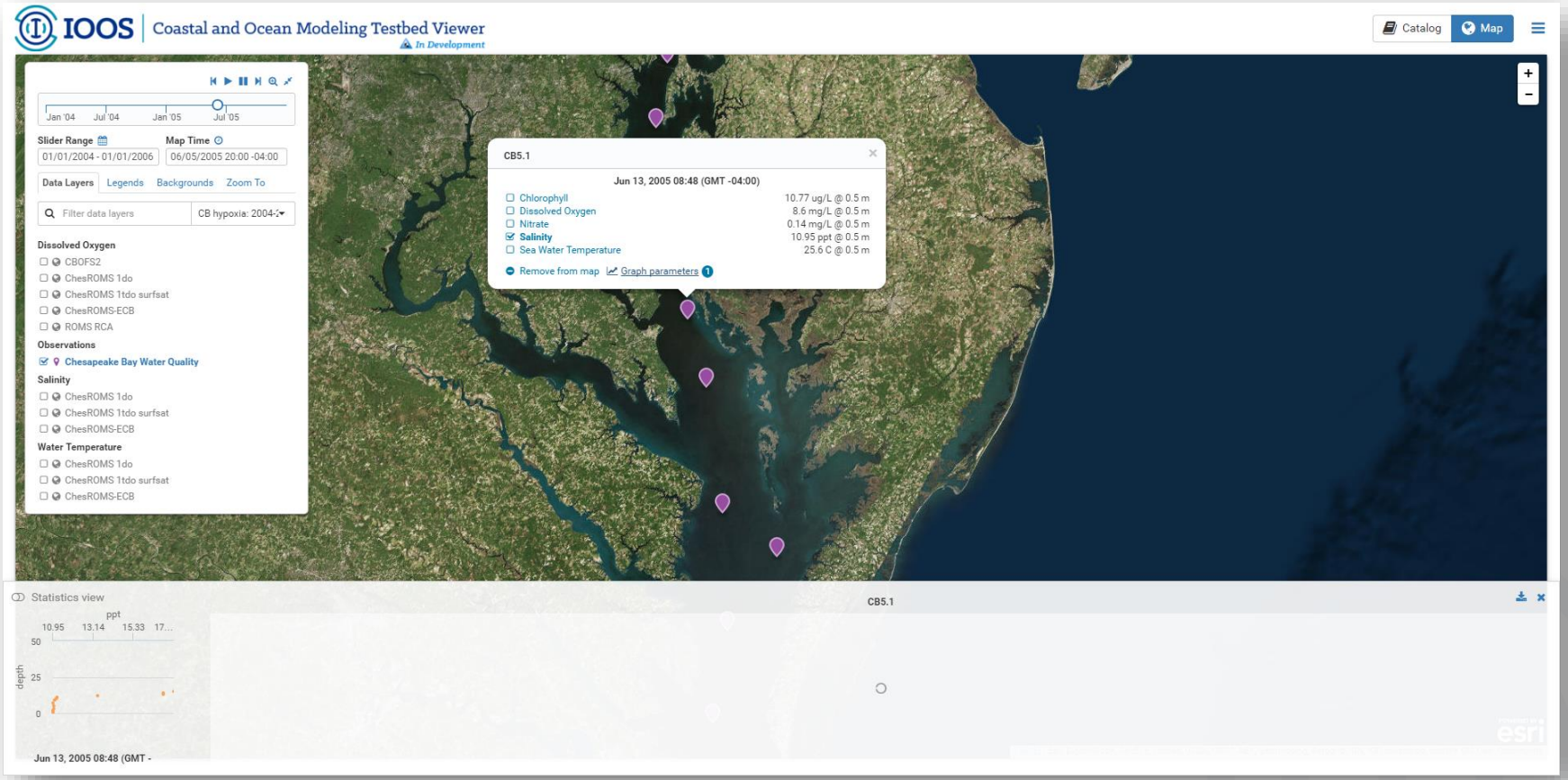
Simplified Project Filters & Addition of Search





Model Viewer Updates

Addition of Observations



Model Viewer Updates

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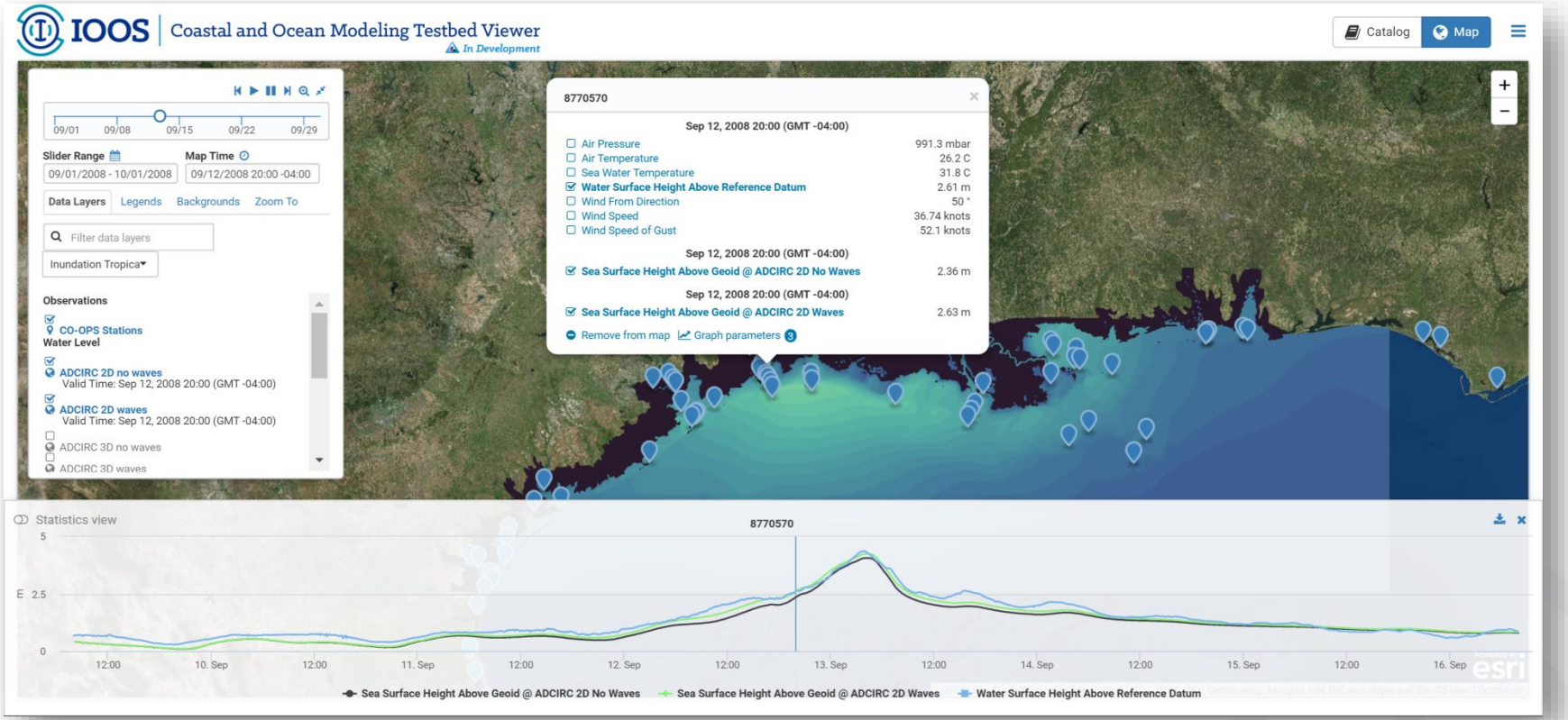
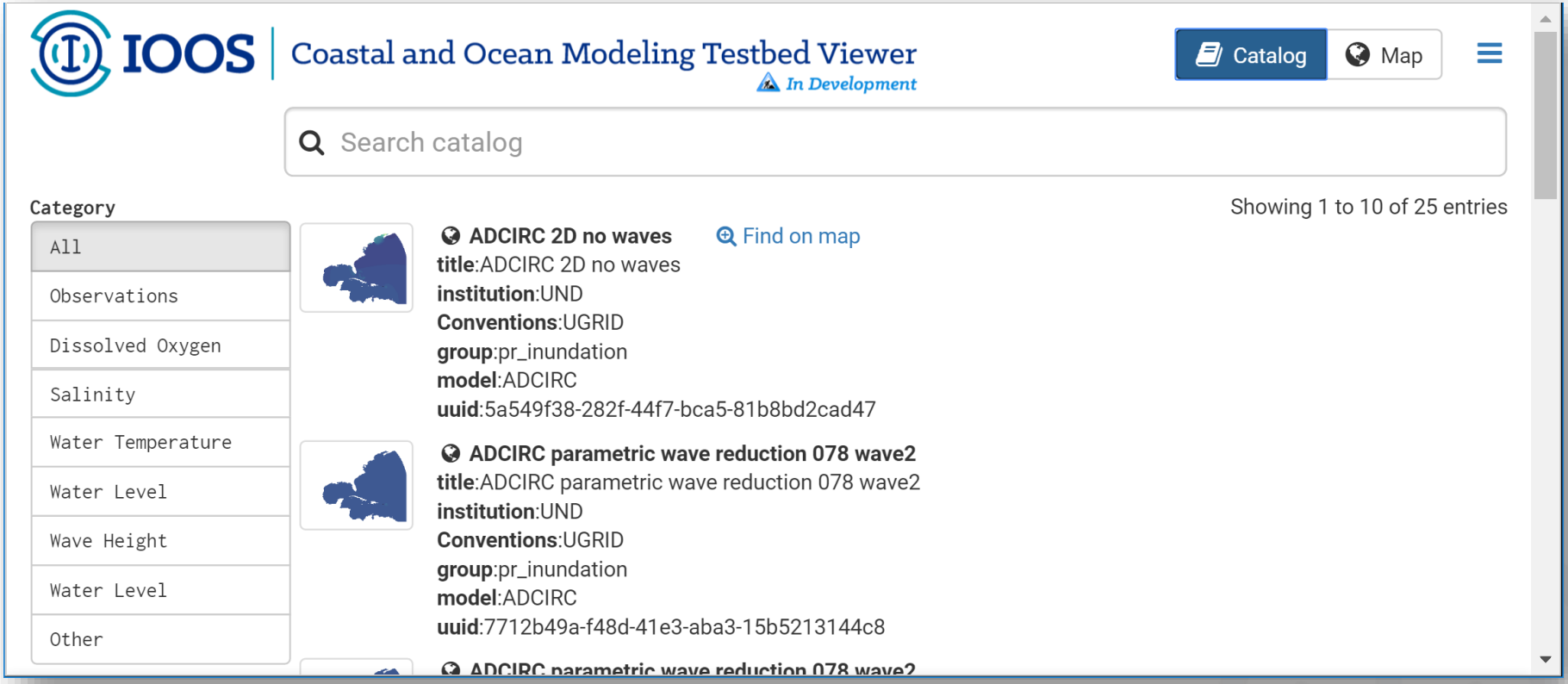


Model Viewer Updates

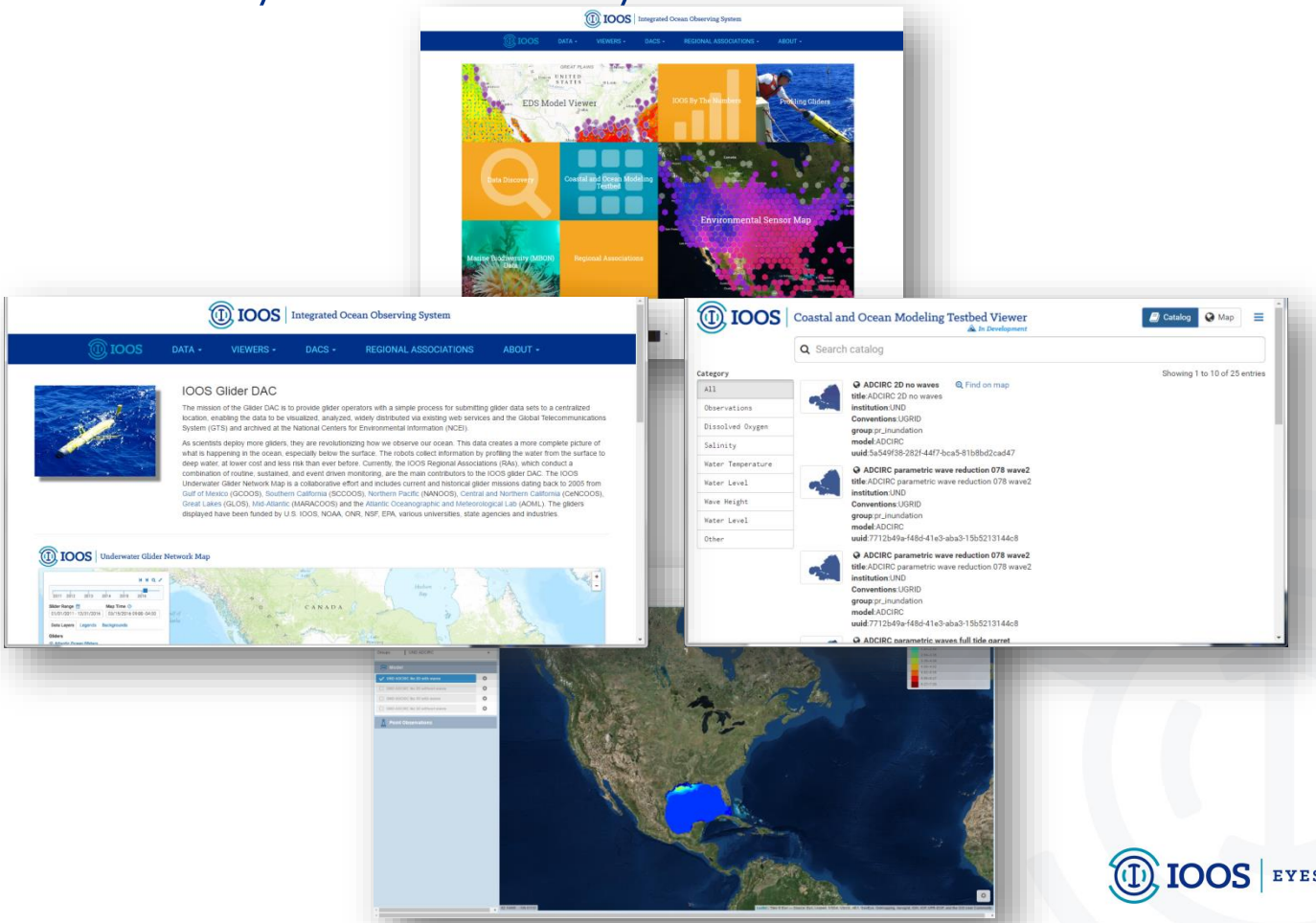
Web-based Catalog



Y4 Draft Workplan

Landing Page/Catalog

- Intuitive & self-explanatory
- Discoverability & accessibility



Y4 Draft Workplan

sciWMS Enhancements

- Improved color schemes/scales

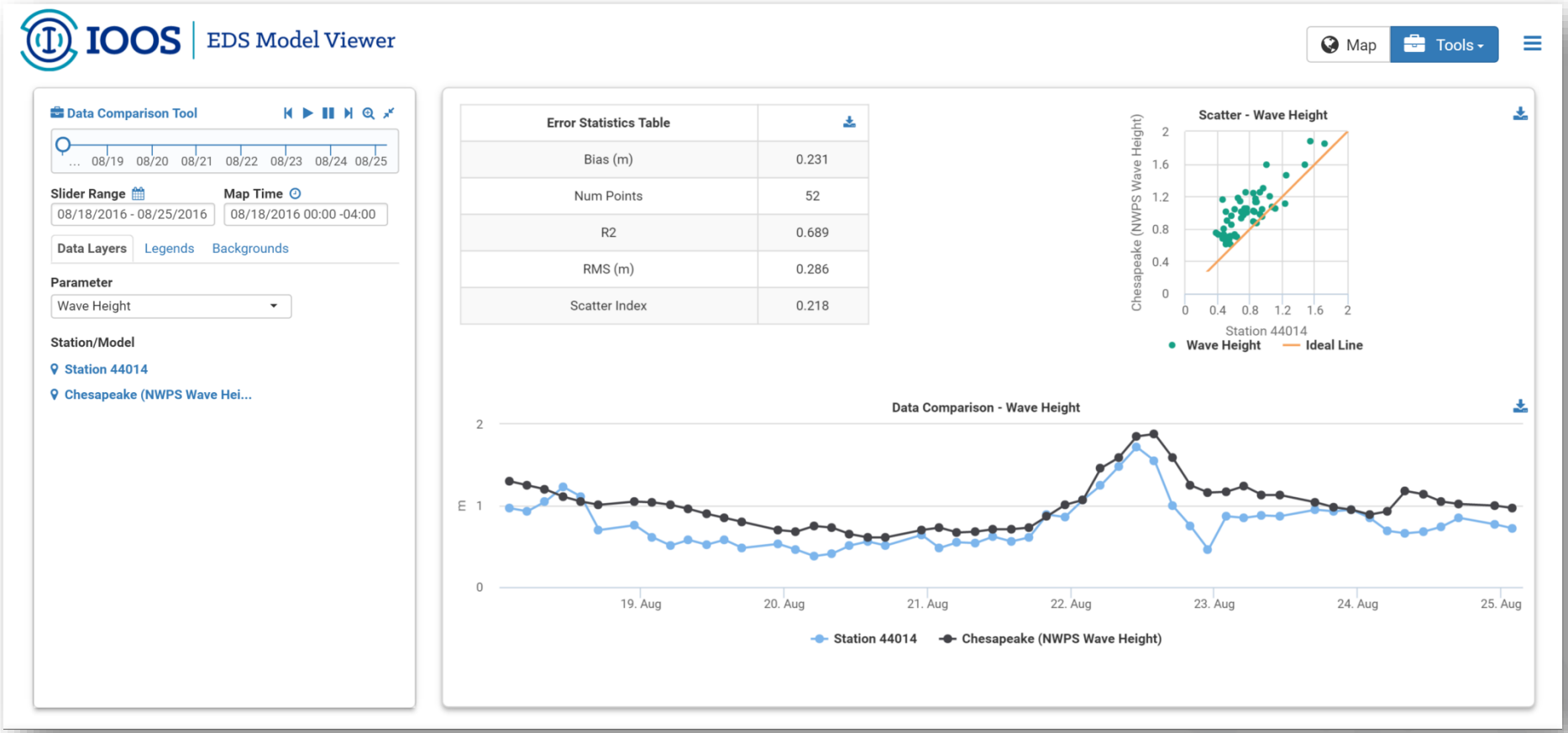
Modeling Team Support

- Identify key datasets for Y4
- Launch data upload tool and provide training
- Hands on facilitation of data ingest
- Maintenance and oversight of TDS catalog
- Finalize data management plan
- Approach/Tools for deriving new parameters (e.g. BBL, Hypoxic Volume, Difference)

Model Viewer

- Continued integration of observation data
- Enhanced data comparison tools
- Animations
- Landing page/catalog view
- Balance between sciWMS & tile services
- Additional 3D visualization tools

Y4 Draft Workplan



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Questions

Enables decision making

Fosters Advances in Science and Technology

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