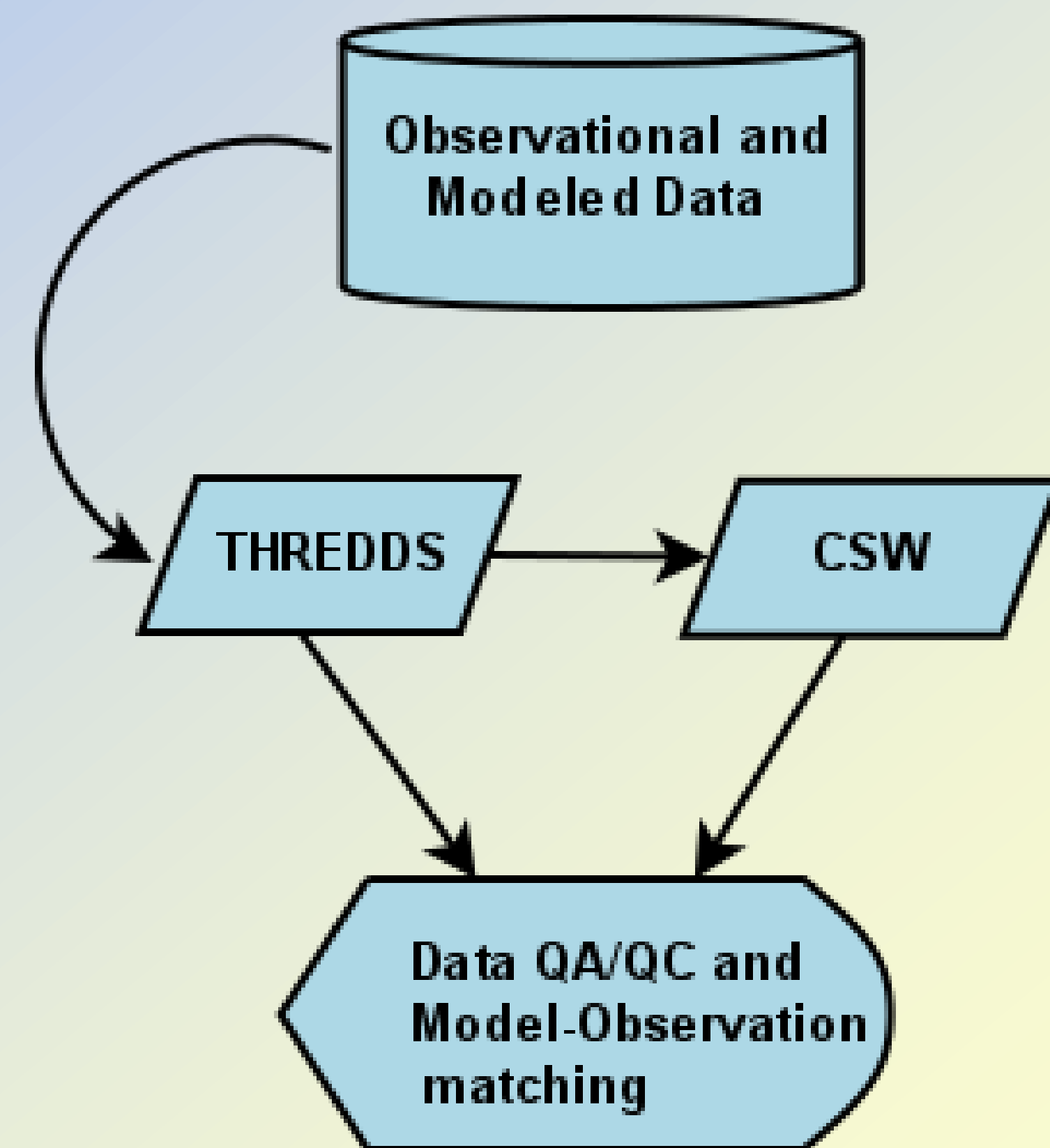


SECOORA is currently supporting a multi-scale, multi-resolution modeling subsystem for the US Southeast coastal waters to deliver model data and products for coastal resource and emergency response managers and other users. The models that are currently supported in the SECOORA foot print include: regional scale nowcast/forecast ocean circulation modeling system; estuarine and surge/inundation prediction (nowcast/forecast); beach water quality modeling in support of swimming advisories and fisheries habitat modeling for improving stock assessment.

To assess the performance of SECOORA ocean forecast models the simulations need to be compared with data. Finding what models and observational data exist at a certain point in time and space has historically been challenging because this information is held and distributed by numerous providers in different formats.

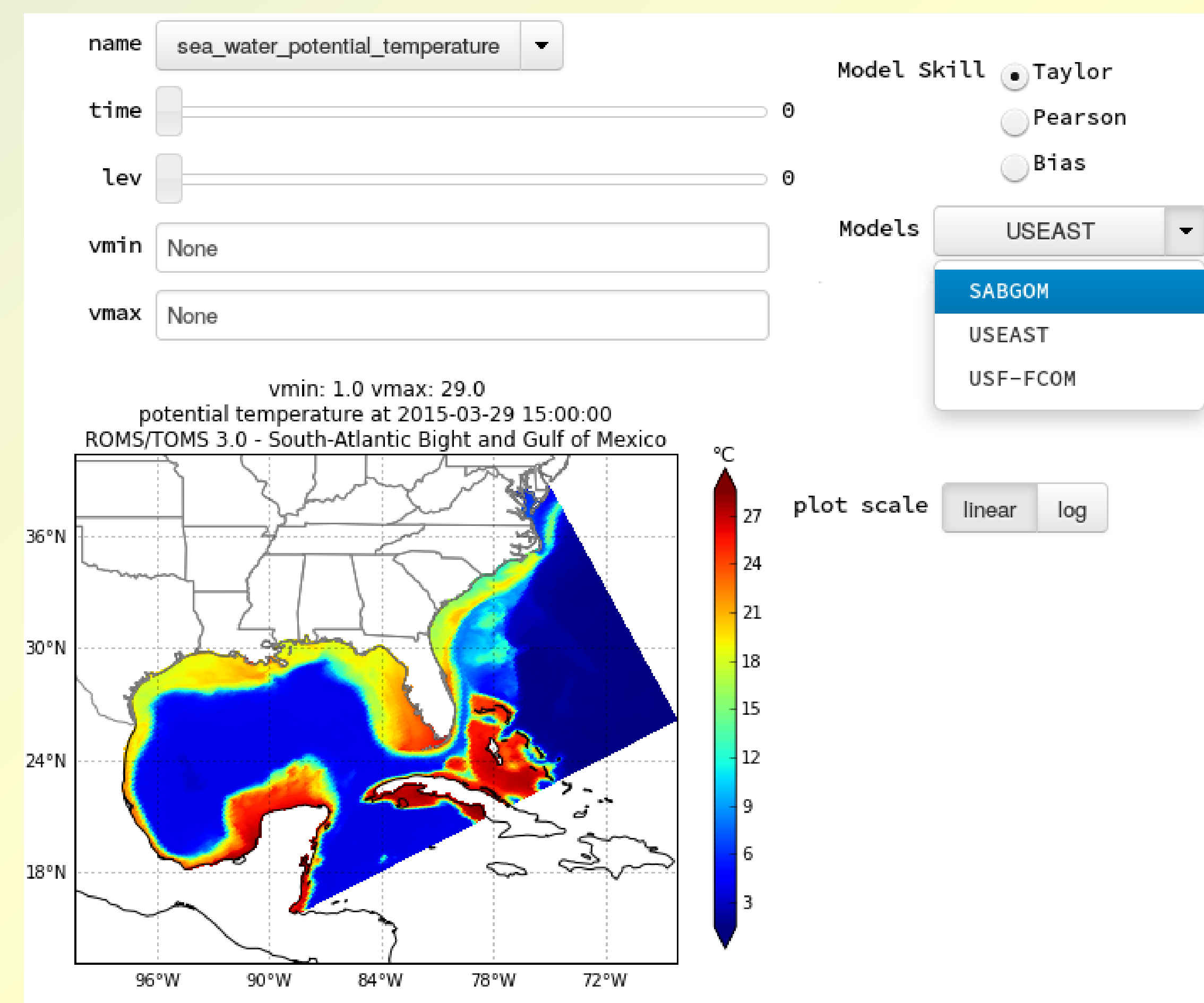
Accessing model data has been challenging because ocean models produce terabytes of information. While it is usually stored in binary data formats like HDF or NetCDF, ocean observations are often stored in scientific data formats or in databases.

To solve this problem, the Southeast Coastal Ocean Observing Regional Association (SECOORA) has been building a distributed information system based on standard IOOS-supported web services for discovery and access.

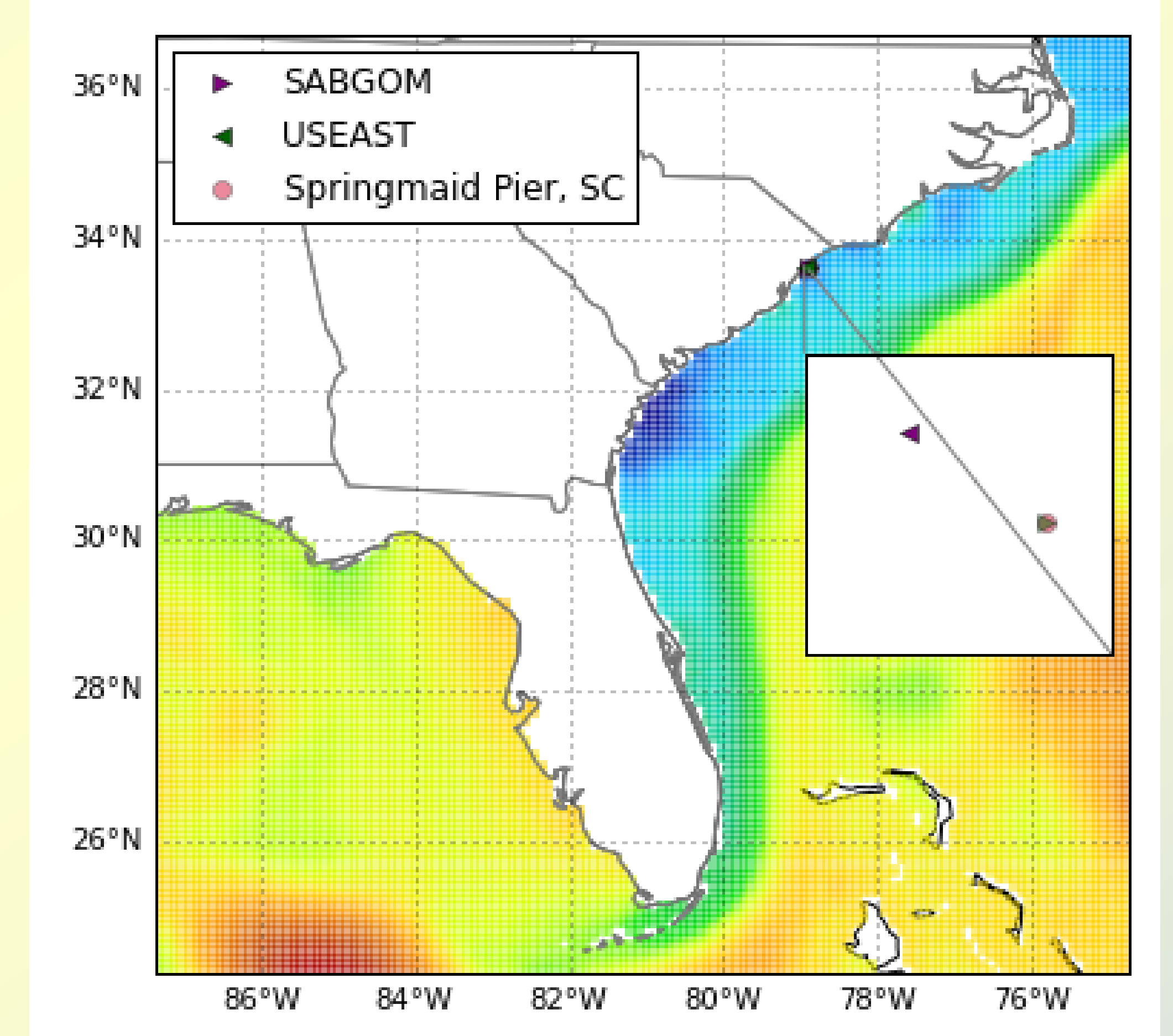


Data acquisition flow. Both modeled and observations are queried via CSW. However, SECOORA platforms observations are fetched directly via SECOORA THREDDS catalog.

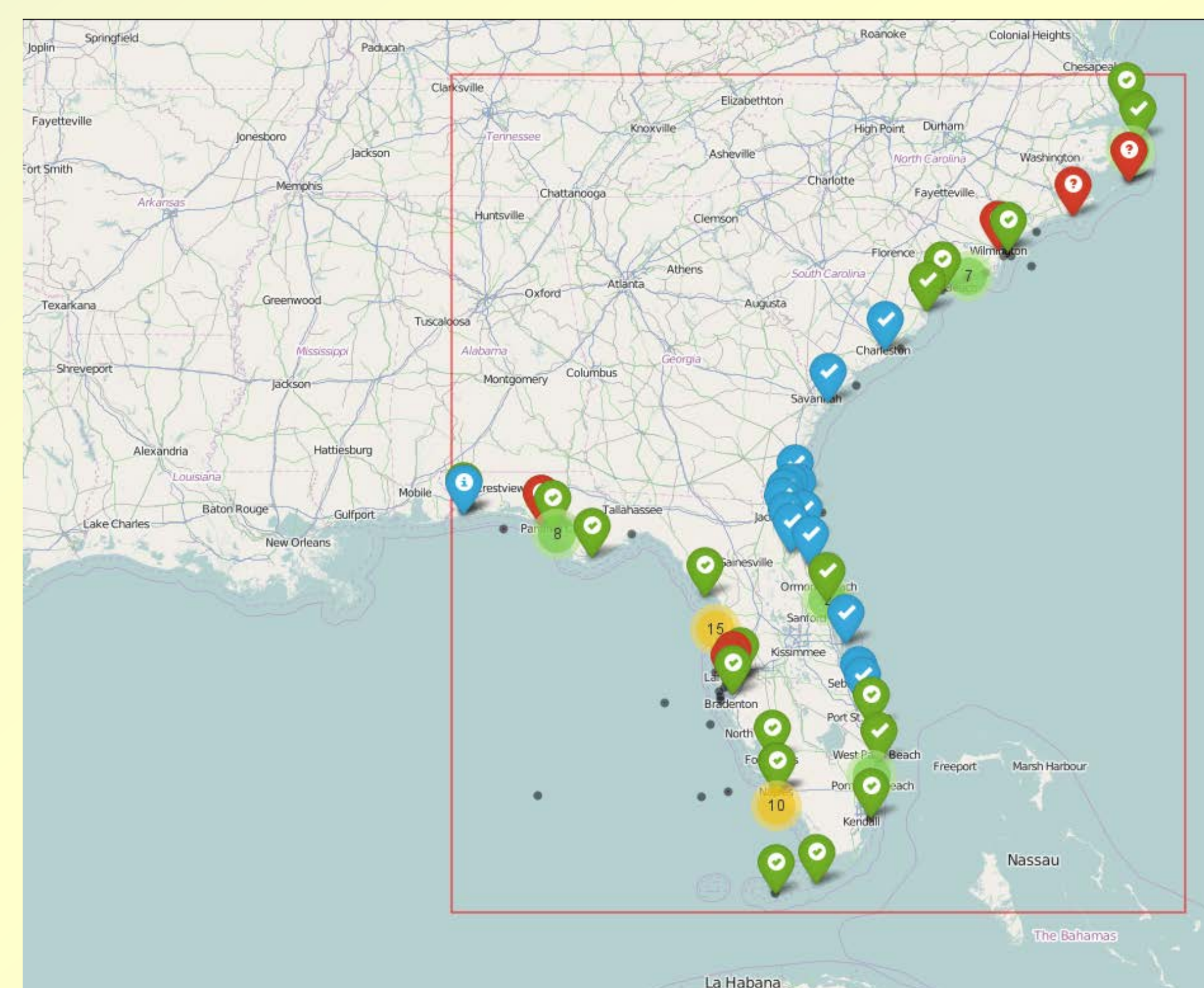
The Observed and Modeled time-series are interpolated or sub-sampled, depending on the original resolution, to a 30-min resolution. The model skill (and bias for SSH) are then computed via a linear correlation (Pearson). The final version of the online tool will let the user choose between RMS, Event-driven skill, and Taylor diagrams (to compare different models all together.)



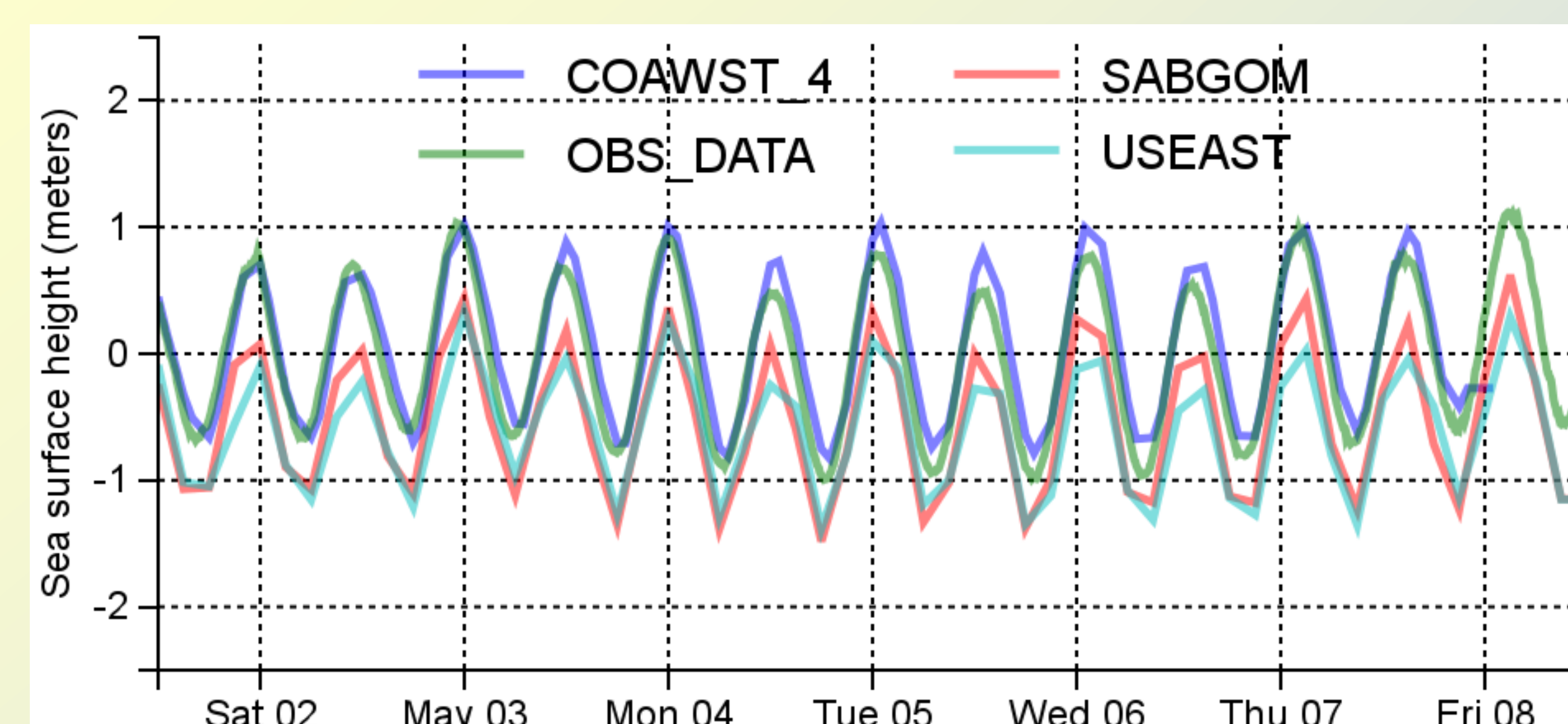
User interface for the Model Skill online tool.



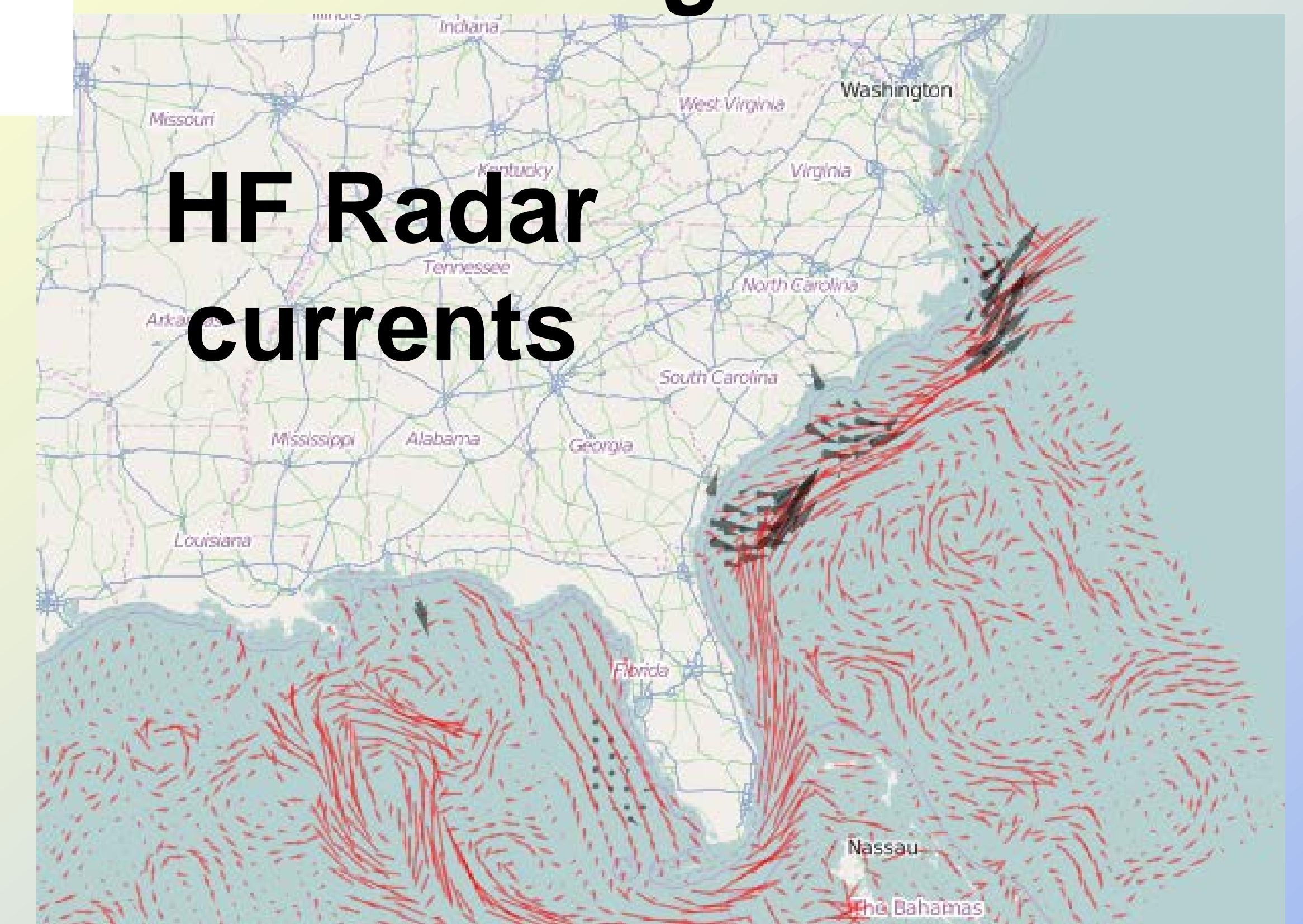
Model-observation matching  
**Coming soon...**



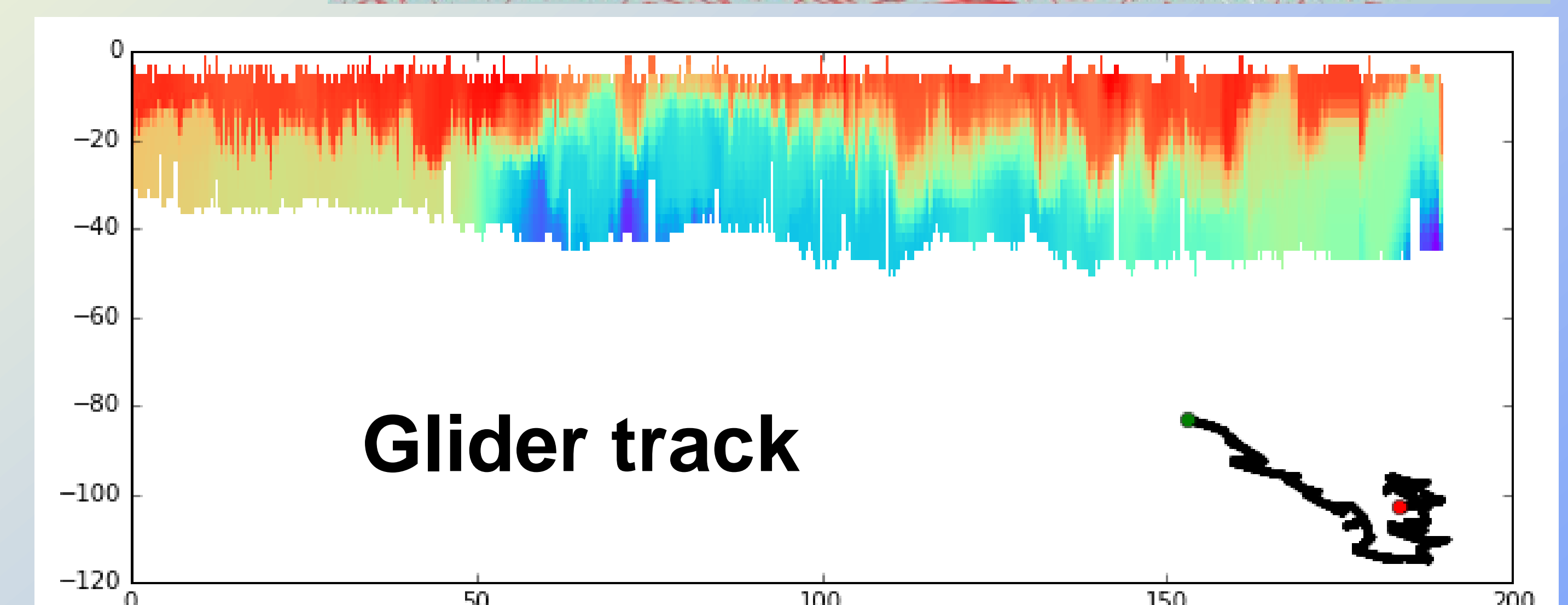
Interactive web-map displaying all the observations and models found. Every dot, when clicked, show a time-series together with the model-data comparison. (See figure below.)



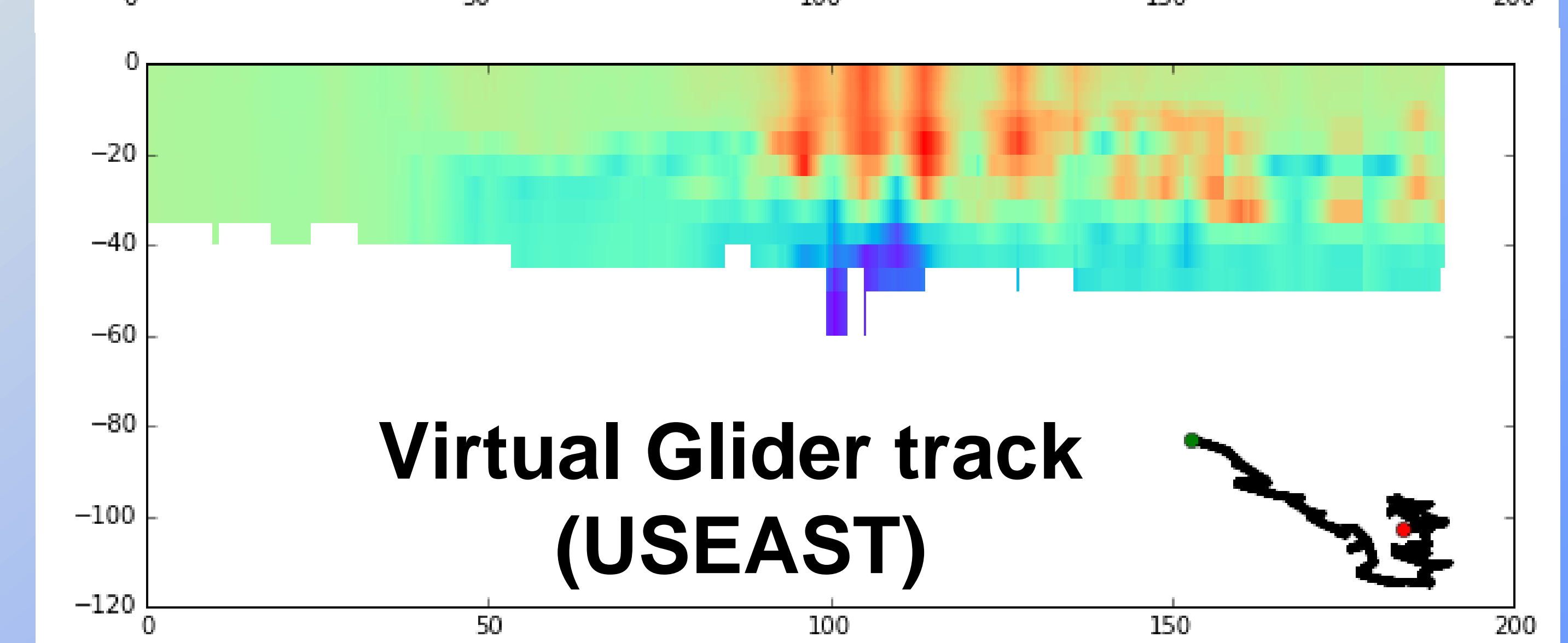
**HF Radar currents**



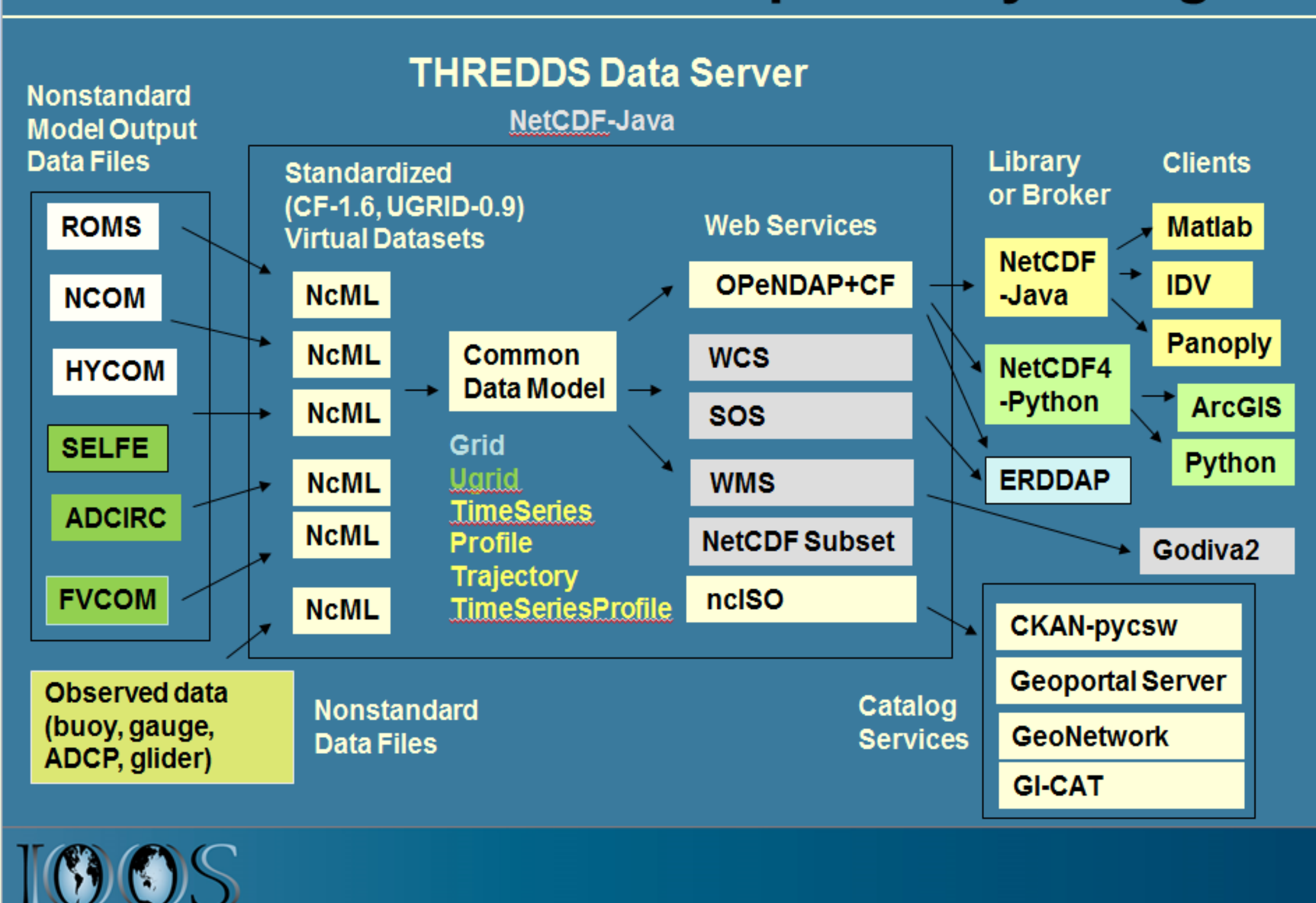
**Glider track**



**Virtual Glider track (USEAST)**



### IOOS Model Data Interoperability Design



Schematic of the IOOS Coastal and Ocean Modeling Testbed (COMT) model data interoperability design. J. Mar. Sci. Eng. 2014, 2(1), 194-208; doi:10.3390/jmse2010194

In order to find the models and observational data we use a Catalog Services for the Web (CSW) for discovery and access. We search for data endpoints such as Sensor Observation Service (SOS), Data Access Protocol(DAP), and National Data Buoy Center (NDBC). SECOORA data is handled separately via direct access to the THREDDS catalog to ensure all SECOORA model and buoys data available are found.

Using automatic discoverable data we create weekly time-series of Sea Surface Temperature (SST), Sea Surface Salinity (SSS), and Sea Surface Height (SSH) comparisons of modeled and observed data.

Thanks to the metadata rich Common Data Models (CDM) we are able to match every observation to a model point in space and time.

For now SST, SSS, and SSH are fetched and processed into time-series, sampled at every 30 min. The models are assessed via a linear Pearson correlation.

Analysis and visualization is performed with NumPy and Pandas for the skill and time-series handling, and Folium to create interactive maps. The entire workflow is shared as in IPython Notebooks.

### Acknowledgements

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