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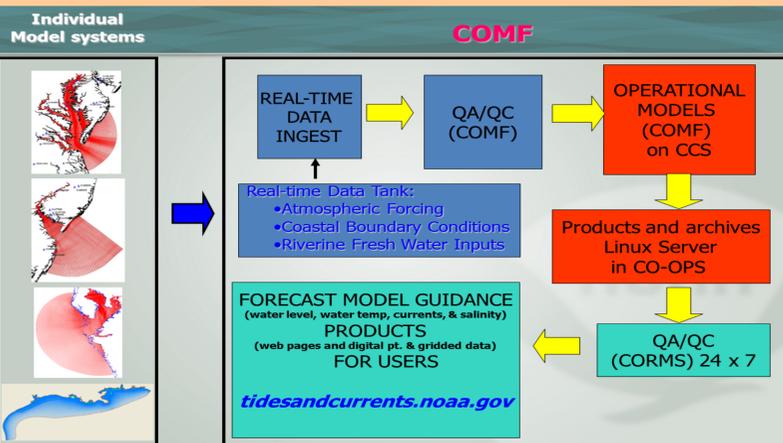
1. INTRODUCTION

- NOAA/NOS develops and implements a national network of nowcast/forecast modeling systems
- The Operational Forecast Systems (OFS) are to support navigational and environmental applications
- The OFS provide water level, current, T and S forecast guidance for 48-72 hours
- OFS jointly developed by two offices: NOS/CSDL and NOS/CO-OPS
- OFS implemented and run on NOAA's high performance computers operated by NWS/NCEP/NCO
- NOS OFS implemented under the Coastal Ocean Modeling Framework (COMF) platform
- NOS requires OFS predictions to adhere to a set of skill assessment criteria which ensures quality control

4. COASTAL OCEAN MODELING FRAMEWORK (COMF)

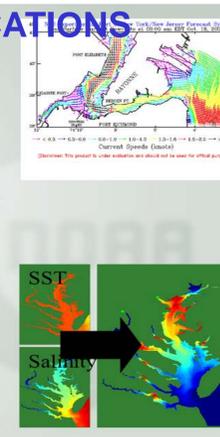
COMF is a set of standards and common tools to develop and operate NOS OFS. It is standardized for any model and any domain

- **PURPOSE:** Efficient R&D, O&M for NOS OFS
- Simplify Data Handling & Maintenance
- Single System for all Locations
- Single Source Graphics and Web Pages
- Share Skill Assessment and Evaluation Tools
- Single NOS Model Image to Users (NetCDF)
- **Various Models Allowed**
ADCIRC, ECOM, EFDC, ELCIRC, FVCOM, MECCA, POM, QUODDY, ROMS, SELFE

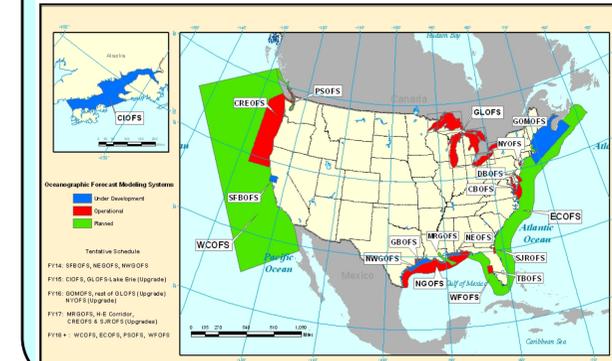


2. REQUIREMENTS AND APPLICATIONS

- ❖ **Support of safe & efficient navigation**
 - ❖ Water levels for under-keel clearance
 - ❖ Currents for right-of-way, maneuverability
- ❖ **Emergency response**
 - OR&R
 - Search & Rescue
 - Homeland Security
- ❖ **For environmentally sound management of the coastal zone**
 - Ecosystem applications
 - Marine geospatial applications



3. CURRENT STATUS



- 13 OFS currently fully operational
- 4 OFS under development:
 - 2 high resolution nests (NEGOFS and NWGOFS) in Northern Gulf of Mexico
 - Cook Inlet, AK (CIOFOS)
 - Gulf of Maine (GoMOFS)

Error Targets (for Quality Control)

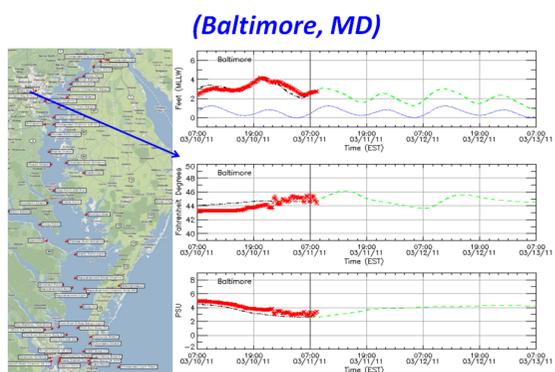
| Variable | Water Level | Currents | Temperature | Salinity |
|--------------|-----------------|-------------------|-------------------|-------------------|
| RMSE | None | None | None | None |
| CF(X) | X=15 cm (>90%) | X=26 cm/s (>90%) | X=3.0 deg (>90%) | X=3.5 psu (>90%) |
| POF/NOF(X) | X=30 cm (<1%) | X=52 cm/s (<1%) | X=6.0 deg (<1%) | X=7.0 psu (<1%) |
| MDPO/MDNO(X) | X=30 cm (24hrs) | X=52 cm/s (24hrs) | X=6.0 deg (24hrs) | X=7.0 psu (24hrs) |
| WOF(X) | X=30 cm (0.5%) | X=52 cm/s (0.5%) | X=6.0 deg (0.5%) | X=7.0 psu (0.5%) |

5. SKILL ASSESSMENT

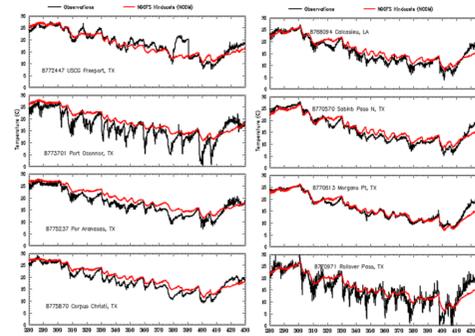
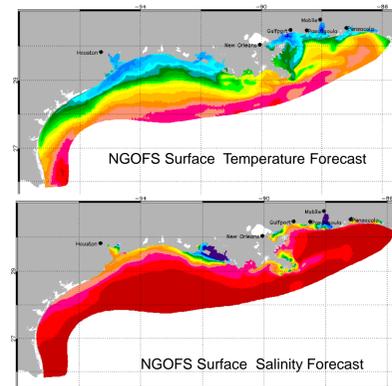
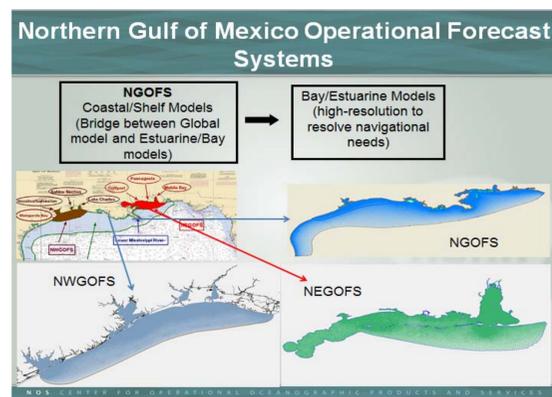
Statistical Metric Definition

| Variable | Explanation |
|----------|---|
| Error | The error = the predicted value - the observed |
| RMSE | Root Mean Square Error |
| CF(X) | Central Frequency. Fraction (percentage) of errors that lie within the limits $\pm X$. |
| POF(X) | Positive Outlier Frequency. Fraction (percentage) of errors that are greater than X. |
| NOF(X) | Negative Outlier Frequency. Fraction (percentage) of errors that are less than -X. |
| MDPO(X) | Maximum Duration of Positive Outliers. MDPO is the length of time of the longest positive outliers event. |
| MDNO(X) | Maximum Duration of Negative Outliers. MDNO is the length of time of the longest negative outliers event. |
| WOF(X) | Worst Case Outlier Frequency. Fraction (percentage) of errors that exceed X, and model forecast is worse than tidal prediction. |

7. SAMPLE OFS OUTPUT AND EVALUATION



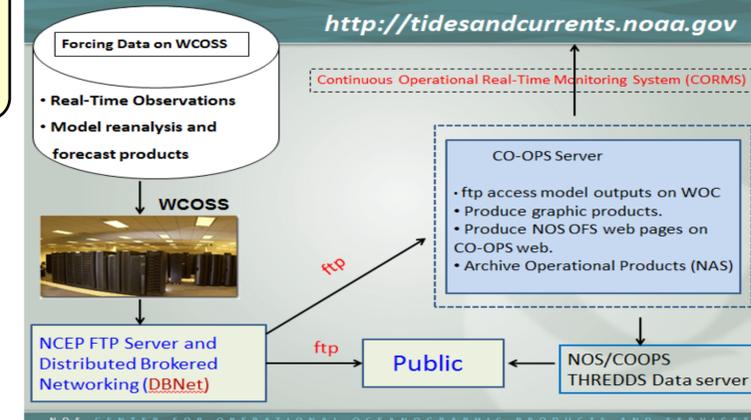
WL, T, and S time series at Baltimore, MD from CBOFS web pages



Near surface water temperature comparison between observations and NGOFS simulations at NOS NWLON stations from Louisiana to Texas.

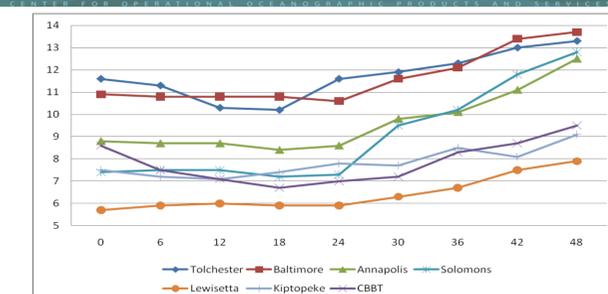
6. PRODUCT DISSEMINATION

NOS OFS PRODUCT FLOW CHART



Deliverable Modeling Products

- 1. Model Output:**
 - NOAA/NWS/NCEP FTP Server: pub/data/nccfs/com/nos/prod
 - CO-OPS THREDDS: <http://opendap.co-ops.nos.noaa.gov/thredds/catalog.html>
 - ❖ Station NetCDF file (6 minutes output)
 - ❖ time series model nowcast and forecast at selected stations for water levels, currents, water temperature, salinity, surface winds
 - ❖ Field model output NetCDF file (hourly output)
 - ❖ 2-D water levels and surface winds.
 - ❖ 3-D currents, temperature and salinity on every model node or element.
 - ❖ Water Level Forecast Guidance SHEF Bulletins
- 2. Graphics products:**
 1. Time Series Plots (24 hour nowcast and 48 forecast) of water levels, currents, water temperature, salinity, and surface winds at selected locations (all PORTS and NWLON stations and more)
 2. Contour and vector map plots and animation of water levels, currents, water temperature, salinity, and surface winds



RMSE (cm) variation with forecast hour for WL Forecasts from OFS for Chesapeake Bay (CBOFS).