NorthEast Coastal Ocean Forecast System (NECOFS)

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Coastal Hazards

• Areas of US northeast coastline are extremely vulnerable to storm generated inundation
• Projected sea level rise will exacerbate this serious coastal hazard
Stakeholders

• NWS Weather Forecast Office forecasters
• State coastal zone managers
• State and local emergency managers
• U.S. Coast Guard
Northeast Coastal Ocean Forecast System (NECOFS)

- Integrated ocean-atmosphere model system
- Includes multiple subdomains
- Daily 3-5 day forecast
- 30+ year climatology
- Adaptable regional modeling framework
Northeast Coastal Ocean Forecast System (NECOFS)

North American Meso-scale (NAM) Weather Model

Heat Flux
Wind Stress
Wind Stress
BC's

Local Weather Model (WRF)

Regional FVCOM
(NES-FVCOM: 0.1-15 km)

Global-FVCOM
tides, currents, T and S)

River discharges

Groundwater

Neusted

MASS Coastal FVCOM
(up to 10 m)

U,V, Waves
Langmuir Cells

Surface Wave Model
(FVCOM-SWAVE)

Satellite SST
Buoy Winds
Insolation

Satellite SST, SSH
Buoy or Survey
T,S,U,V

Storm Surge (hurricanes, Nor'easter)

Inundation Models

Scituate, MA
Mass Bay/Boston Harbor
Hampton River, NH
Saco, ME

Products:
Weather: winds, air temperature, air humidity, air pressure, heat flux, E-P
Oceans: sea level, currents, T, S, wave heights, wave frequencies, icing
Lands: inundation areas

KEY
Existing Models
NECOFS
Data
Products
NECOFS Inundation Forecasting

Mass-Coastal FVCOM (10 m-5 km)

GOM-FVCOM (0.1-15 km)

Global-FVCOM (1-50 km)

Scituate, MA (up to 10 m)

Boston Harbor, MA (up to 10 m)

Hampton, NH (up to 10 m)

Saco Bay (up to 10 m)
## Access to Model Predictions - THREDDS

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Catalog: [http://www.smast.umassd.edu:8080/thredds/forecasts.html](http://www.smast.umassd.edu:8080/thredds/forecasts.html)
Model Visualization

Hampton-Seabrook, NH

Boston, MA

Scituate, MA
Model Viewer – Model/Obs Comparison

Bouy #: 44013
10 m above the sea surface

Elevation at Tide Gauge: 8443970
Observed total elevation
NECOF-total elevation

Predicted tidal elevation
Residual elevation

from 2017/12/31 - 2018/01/06 GMT
Model Visualization - IOOS

https://eds.ioos.us/
Coastal Modeling Coupling

• Improve inundation predictions
• Hydrologic model coupling
  • NOAA’s National Water Model
  • UNH Water Balance Model
• Supported by IOOS Coastal and Ocean Modeling Testbed (COMT) and NOAA’s Water Initiative
• Coastal Coupling Community of Practice
  https://www.weather.gov/watercommunity/
Climate Change Scenarios

SLR=1.0 ft  
SLR=5.0 ft  
SLR=7.0 ft
Challenges

• Observations - sustain and expand
• Data standard adoption
• Transitioning models from research to operations
• Understanding stakeholder’s decision-making process and needs
• Improving the delivery of products and services for stakeholders
Key Takeaways

• Start with stakeholders
• Data standards
• Sharing information
Thank You

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