SECOORA Project Updates: Modeling and Prediction

Bob Weisberg
University of South Florida
“A coordinated observing and modeling system for the west Florida Continental shelf”

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“A coupled marine environmental assessment and prediction system for the Southeastern U.S. coastal ocean in support of effective marine ecosystem-based management, efficient marine operations, and resilient coastal community”
West Florida Coastal Ocean Model (WFCOM)

- WFCOM is designed to *downscale* from the deep-ocean, across the continental shelf and into the estuaries by nesting the *unstructured grid FVCOM* in the structured grid Gulf of Mexico HYCOM.

- Resolution varies from ~8 km along the open boundary to 150 m in the estuaries.

- The WFCOM domain is designed to benefit from HYCOM data assimilation (constraining the deep-ocean/WFS interactions); without which deep-ocean errors along the open boundary would render the WFS simulations less than useful.

- **Daily, automated Nowcast/Forecasts** are posted on the web and distributed to NOAA GOODS via THREDDS.

- Recent published societal and ecological applications include: How *Deepwater Horizon oil* arrived on northern Gulf beaches, Origins and pathways of water upwelled onto the WFS, Season prediction of *K. brevis red tide*, Solving the *gag grouper recruitment* conundrum. More generally, we have shown that there exists a certain spatial order to ecological observations on the WFS and this spatial order is associated with the coastal ocean circulation.
Tampa Bay and Charlotte Harbor Regions

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

Months shaded in blue have dates available. Click on month.

Charlotte Harbor Region

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

Months shaded in blue have dates available. Click on month.

Charlotte Harbor Region (Zoomed)

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

http://ocgweb.marine.usf.edu/Models/FVCOM/fvcom_index.html
Surface current and surface salinity on March 28, 2017
Publications


• Liu, Y., C. Merz, R.H. Weisberg, B.K. O'Loughlin, and V. Subramanian (2017), Data return aspects of CODAR and WERA high frequency radars in mapping ocean currents, in Observing the Oceans in Real Time, edited by Venkatesan et al., Springer (in press).


Products

Coupled Northwest Atlantic Prediction System (CNAPS)

The Coupled Northwest Atlantic Prediction System (CNAPS) is a three-dimensional marine environment nowcast and forecast model developed by the Ocean Observing and Modeling Group. This fully coupled ocean circulation, wave, and atmosphere modeling system predicts conditions over a wide area of the coastal northwest Atlantic Ocean on a daily basis. The model domain covers from the eastern edge of Nova Scotia to...

Marine Environment in the South Atlantic Bight and Gulf of Mexico (SABGOM)

The South Atlantic Bight – Gulf of Mexico (SABGOM) model is a three-dimensional marine environment nowcast and forecast model developed by the Ocean Observing and Modeling Group. This system provides predictions of ocean circulation, wave, and atmosphere conditions over the South Atlantic Bight and Gulf of Mexico on a daily basis. The model domain covers the U.S. east coast from New Jersey...
A Fully Coupled Ocean-Atmosphere-Wave Prediction System (CNAPS) (7-km spatial resolution)

Coupled Northwest Atlantic Prediction System (CNAPS)
http://omgsrv1.meas.ncsu.edu:8080/CNAPS/
Multi-level two-way nesting

7-km resolution CNAPS Model

1.4-km resolution NC Model
Physical-Biogeochemical Interactions

(1) Marine Ecosystem  
(2) Major Riverine System  
Nutrient/Carbon Dynamics  
(3) Harmful Algal Bloom  
(4) larval transport and connectivity

- Runoff
- Carbon
- Nitrogen


• He, R., W. Woods, J. B. Zambon, and Z. Xue (2016) Monitoring the Gulf Stream and shelf environment in the South Atlantic Bight through integrated autonomous underwater glider observations and data assimilative ocean model predictions, OCEANS 2016 – Shanghai. doi: 10.1109/OCEANSAP.2016.7485539 [PDF]


