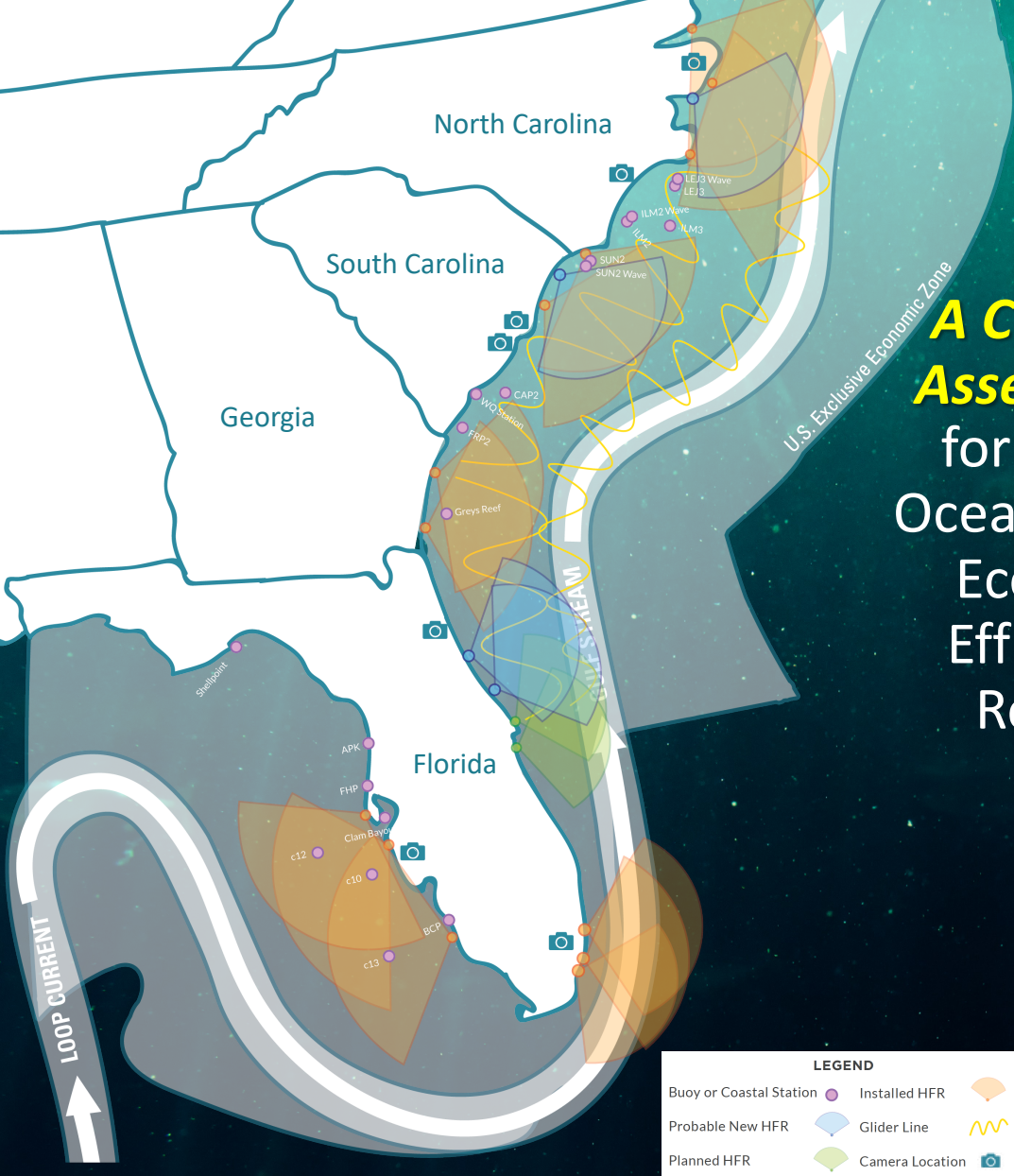




***A Coupled Marine Environmental
Assessment and Prediction System***
for the Southeastern U.S. Coastal
Ocean in Support of Effective Marine
Ecosystem-Based Management,
Efficient Marine Operations, and
Resilient Coastal Communities

Ruoying He

Ocean Observing and
Modeling Group (OOMG)

NC State University

Objective and Approach

Objective

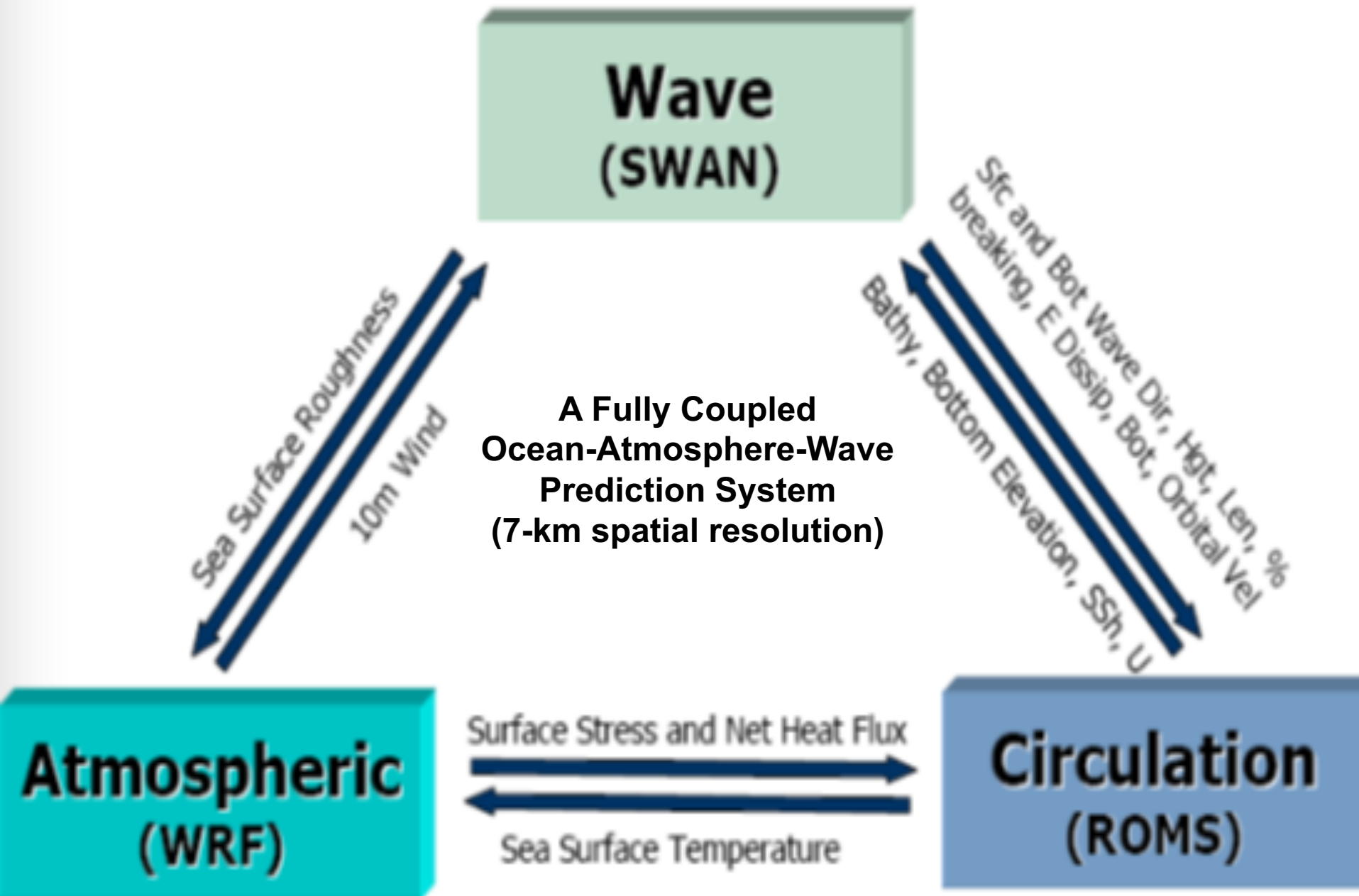
- Developing an advanced regional marine environment assessment and prediction capability
- Contributing to the effort of building a regional ocean observatory
- Providing marine environment hindcast, nowcast, forecast to support research and operations in climate change, coastal hazards, safe and efficient marine operations, water quality and living marine resource management

SECOORA Focus Area

- Marine Operations
- Coastal Hazards
- Ecosystems: Water Quality and Living Marine Resources
- Climate Variability

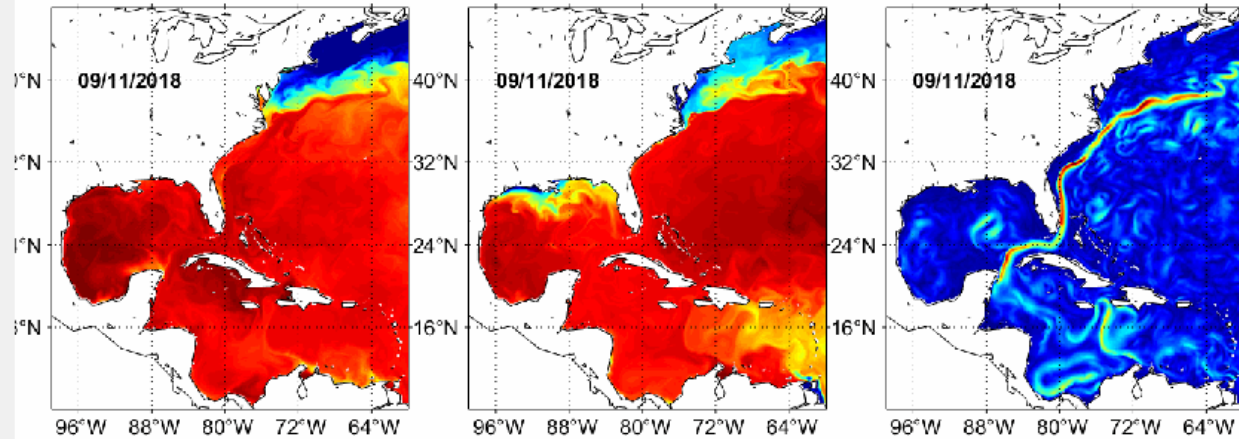
Stakeholders

- U.S. Coast Guard
- NOAA National Marine Fisheries Service
- NOAA Office of Response and Restoration
- Bureau of Ocean Energy Management
- NC Department of Environmental Quality
- Florida Fish and Wildlife Conservation Commission
- the South Atlantic Fishery Management Council
- individual fisherman
- Students (graduate, undergraduate, k-12)

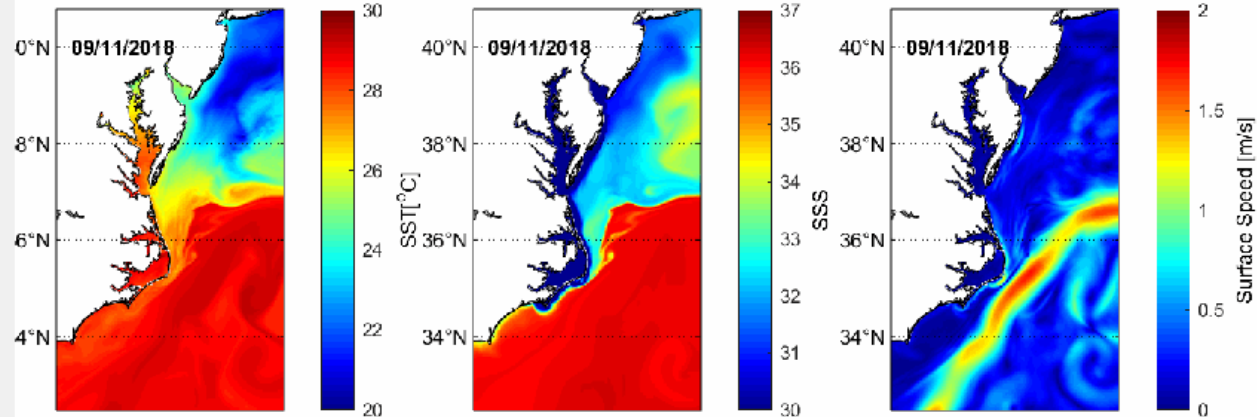


Multi-scale two-way nesting prediction: Ocean response to Hurricane Florence

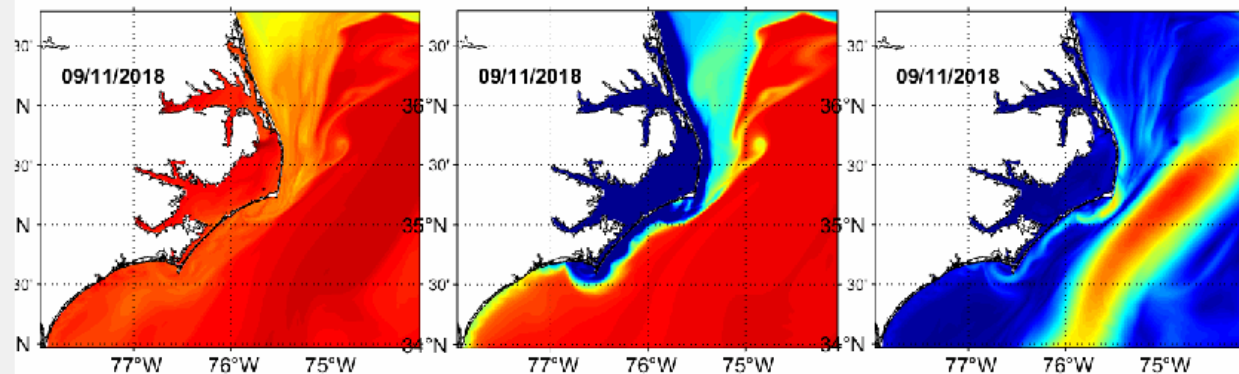
**L1
(7.5 km)**



**L2
(2.5 km)**



**L3
(800 m)**



Accomplishments

Peer-reviewed publications

- Allahdadi, M. N., R. He, and V. S. Neary (2019) Predicting ocean waves along the U.S. east coast during energetic winter storms: Sensitivity to the whitecapping parameterizations, *Ocean Science*, 15, 692-725, doi: [10.5194/os-15-691-2019](https://doi.org/10.5194/os-15-691-2019)
- Allahdadi, M. N., B. Gunawan, J. Lai, R. He, and V. S. Neary (2019) Development and validation of a regional-scale high-resolution unstructured model for wave energy resource characterization along the US East Coast, *Renewable Energy*, 136:500-511, doi: [10.1016/j.renene.2019.01.020](https://doi.org/10.1016/j.renene.2019.01.020)
- He, R., A. C. Todd, C. Lembke, T. Kellison, C. Taylor, and D. A. Mann (2018) Cross-shelf exchange associated with the Gulf Stream in the South Atlantic Bight: Direct observations using an autonomous underwater glider, *Marine Technology Society Journal*, doi: [10.4031/MTSJ.52.3.5](https://doi.org/10.4031/MTSJ.52.3.5)
- McGee, L., and R. He (2018) Mesoscale and submesoscale mechanisms behind asymmetric cooling and phytoplankton blooms induced by hurricanes: A comparison between an open ocean case and a continental shelf sea case, *Ocean Dynamics*, doi: [10.1007/s10236-018-1203-3](https://doi.org/10.1007/s10236-018-1203-3)
- Robbins, L. L., K. L. Daly, L. Barbero, R. He, H. Zong, J. T. Lisle, W.-J. Cai, and C. G. Smith (2018) Spatial and temporal variability of pCO₂, carbon fluxes, and saturation states on the West Florida Shelf, *Journal of Geophysical Research: Oceans*, 123, doi: [10.1029/2018JC014195](https://doi.org/10.1029/2018JC014195)
- Zeng, X., A. Adams, M. Roffer, R. He (2018) Potential connectivity among spatially distinct management zones for bonefish (*Albula vulpes*) via larval dispersal, *Environmental Biology of Fishes*, doi: [10.1007/s10641-018-0826-z](https://doi.org/10.1007/s10641-018-0826-z)

A dozen conference presentations