Super-Regional Testbed for Improving Forecasts of Environmental Processes for the U.S. Atlantic and Gulf of Mexico Coasts

Shelf Hypoxia Progress/ Plans

John Harding
Northern Gulf Institute

2nd Annual Workshop to Coordinate Gulf of Mexico Hypoxic Zone Research
3-4 Mar 2011

Testbed Team Structure

Testbed "Management"
Don Wright, SURA

Doug Levin, NOAA/IOOS
Liz Smith, SURA

25 members

Cyber Infrastructure
Eoin Howlett, ASA

7 members

Testbed Advisory Evaluation Group
Rich Signell, USGS

21 members

Estuarine Hypoxia
Chesapeake Bay
Carl Friedrichs, VIMS

20 members

Shelf Hypoxia
Gulf of Mexico
John Harding, NGI

24 members

Coastal Inundation
Gulf and East Coast
Rick Luettich, UNC-CH

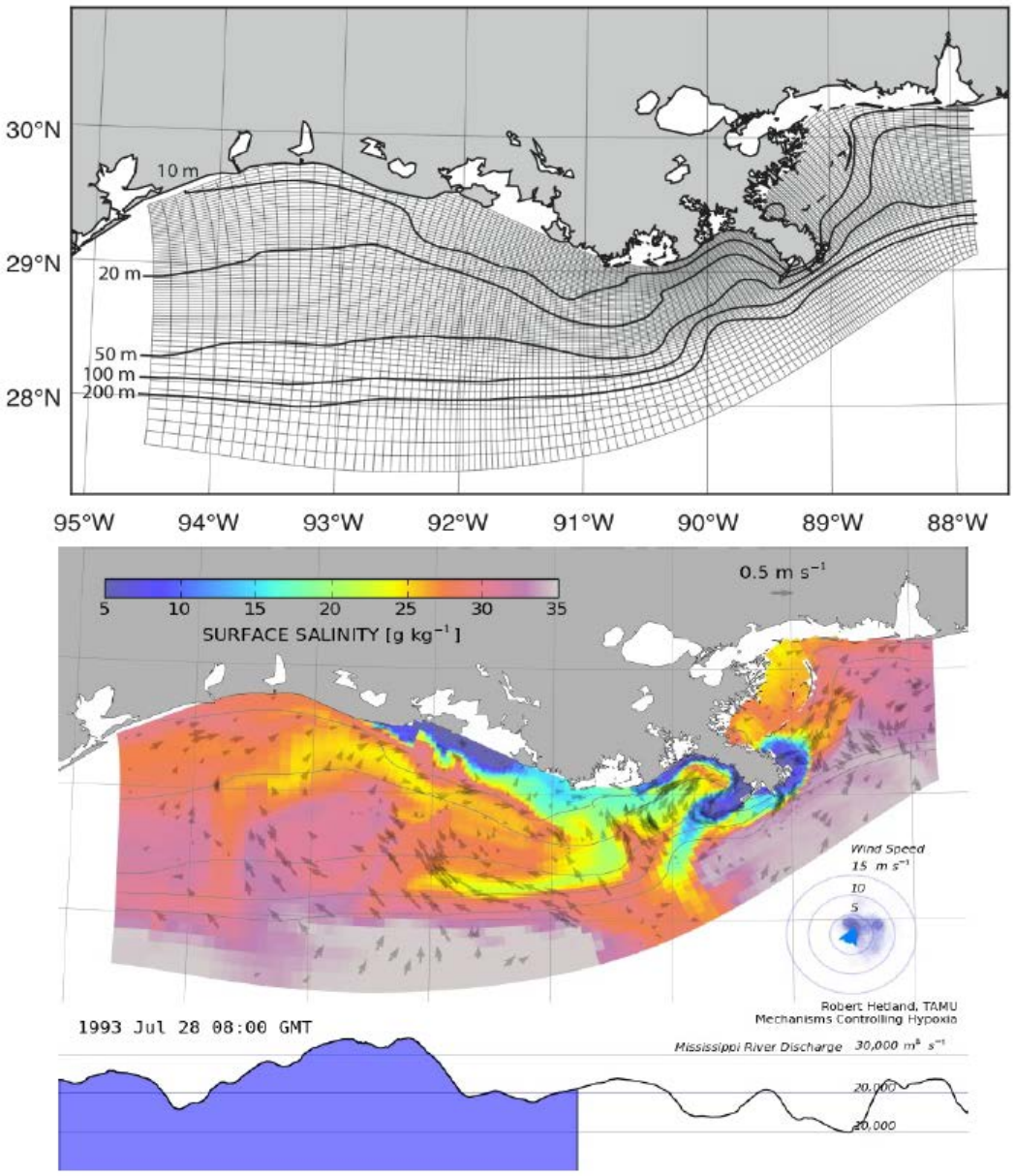
Long Term Goal (5-10 yr)
Gulf of Mexico Shelf Hypoxia

Develop and transition to operations a coupled biogeochemical/ physical model to forecast the real-time, synoptic scale development and evolution of physical and ecosystem processes in the northern Gulf of Mexico.

Initial Focus (1-2 yr)

Challenge the Testbed Cyberinfrastructure to Create Capability to Enhance Academic/Operational Collaboration

- Evaluate impact of *regional* model boundary conditions on current *coastal* hypoxia modeling in the northern Gulf of Mexico
- Compare NOAA and EPA Approaches to Gulf hypoxia modeling
- Transition potential *regional* circulation component of this initial system as a baseline operational capability for application to:
  - real-time Coast Guard search and rescue operations
  - harmful algal bloom tracking
  - oil spill response applications

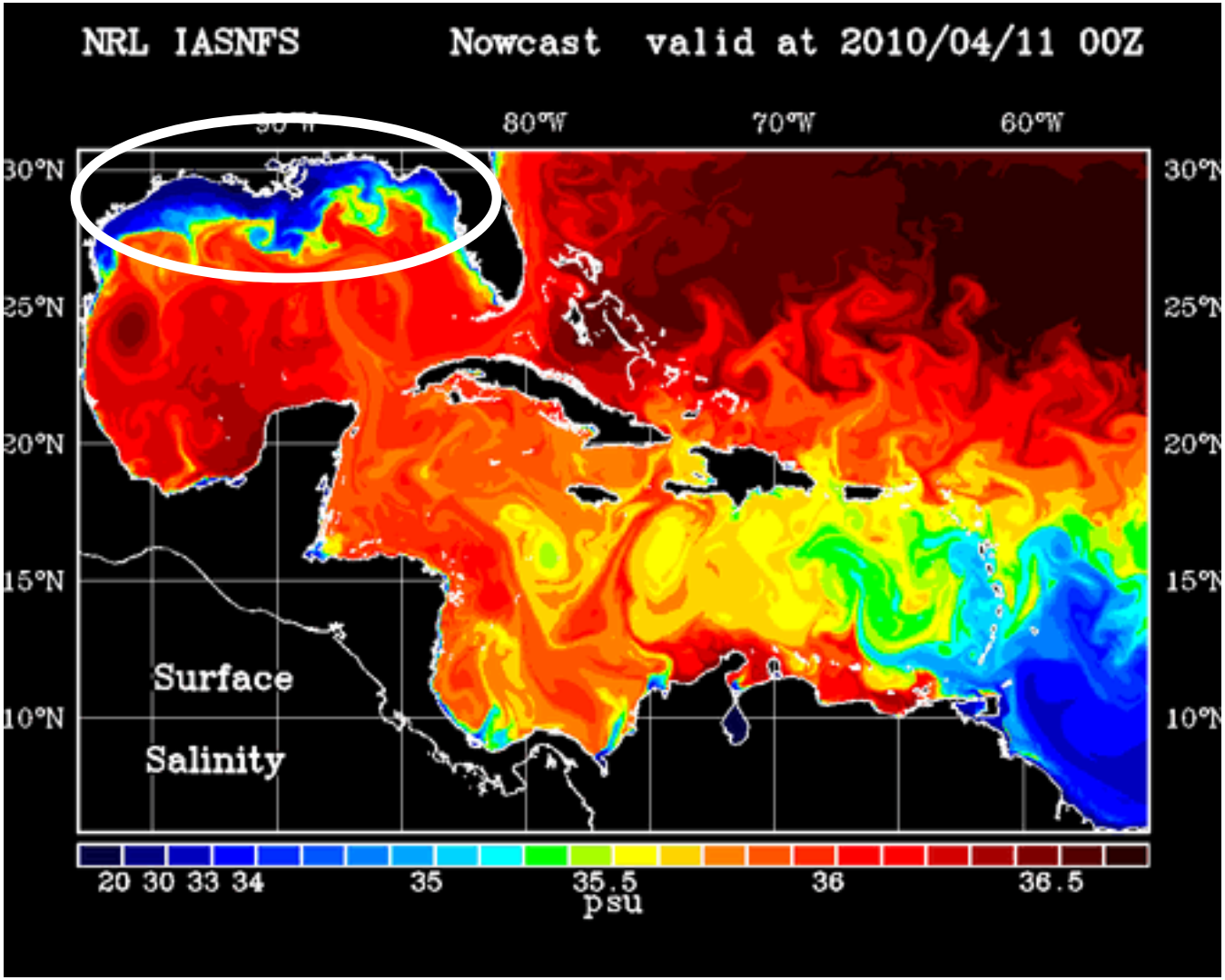


Fennel/ ROMS Model Grid, Bathymetry & Sample Salinity Snapshot for 28 Jul 93

Courtesy Dr. Rob Hetland, TAMU

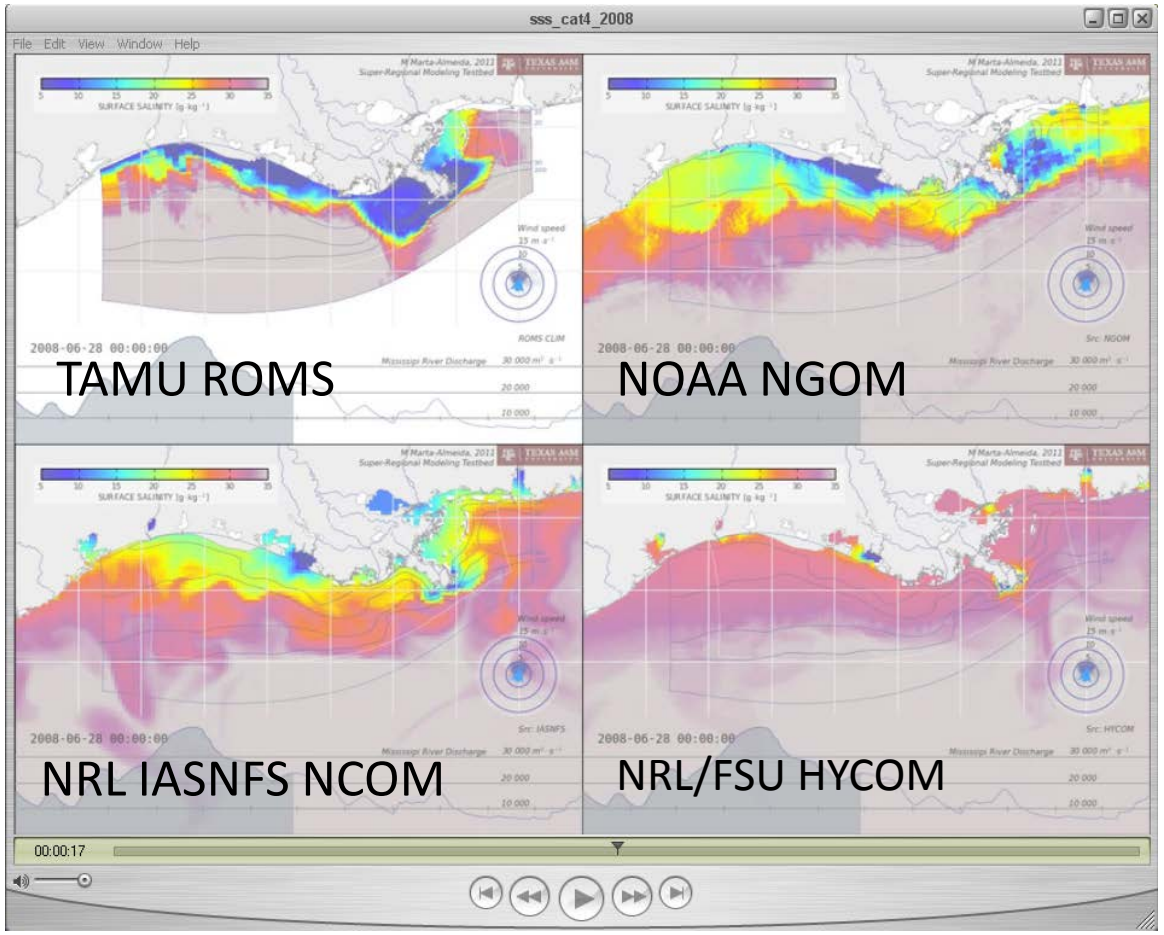
What is impact of not having offshore forcing?

NRL Inter-American Seas Nowcast/ Forecast System (IASNFS) Real-Time Prediction



Courtesy Dong Shan Ko, NRL

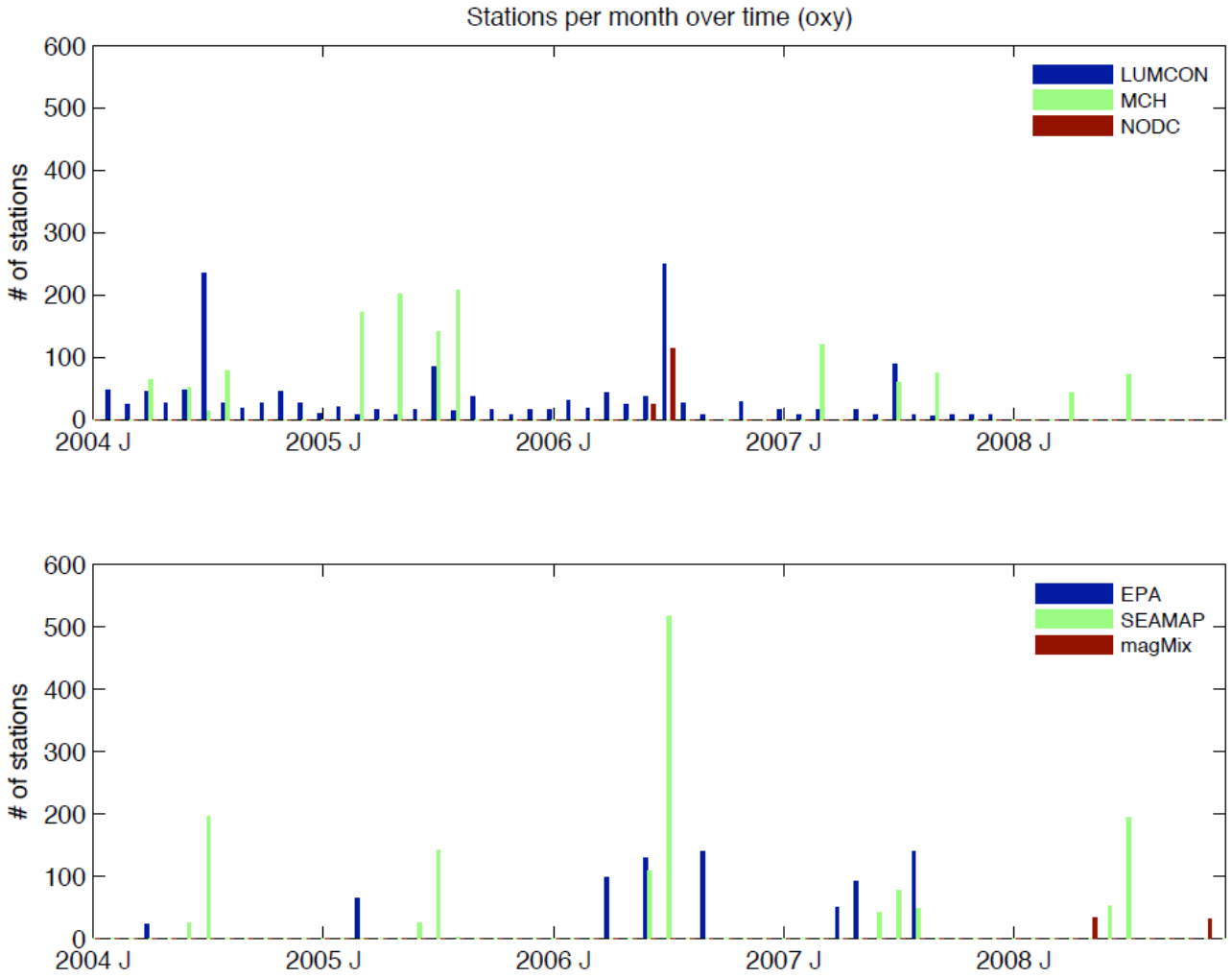
Initial Hydrodynamic Comparisons



Courtesy Rob Hetland, TAMU

Hypoxia Data Compilation

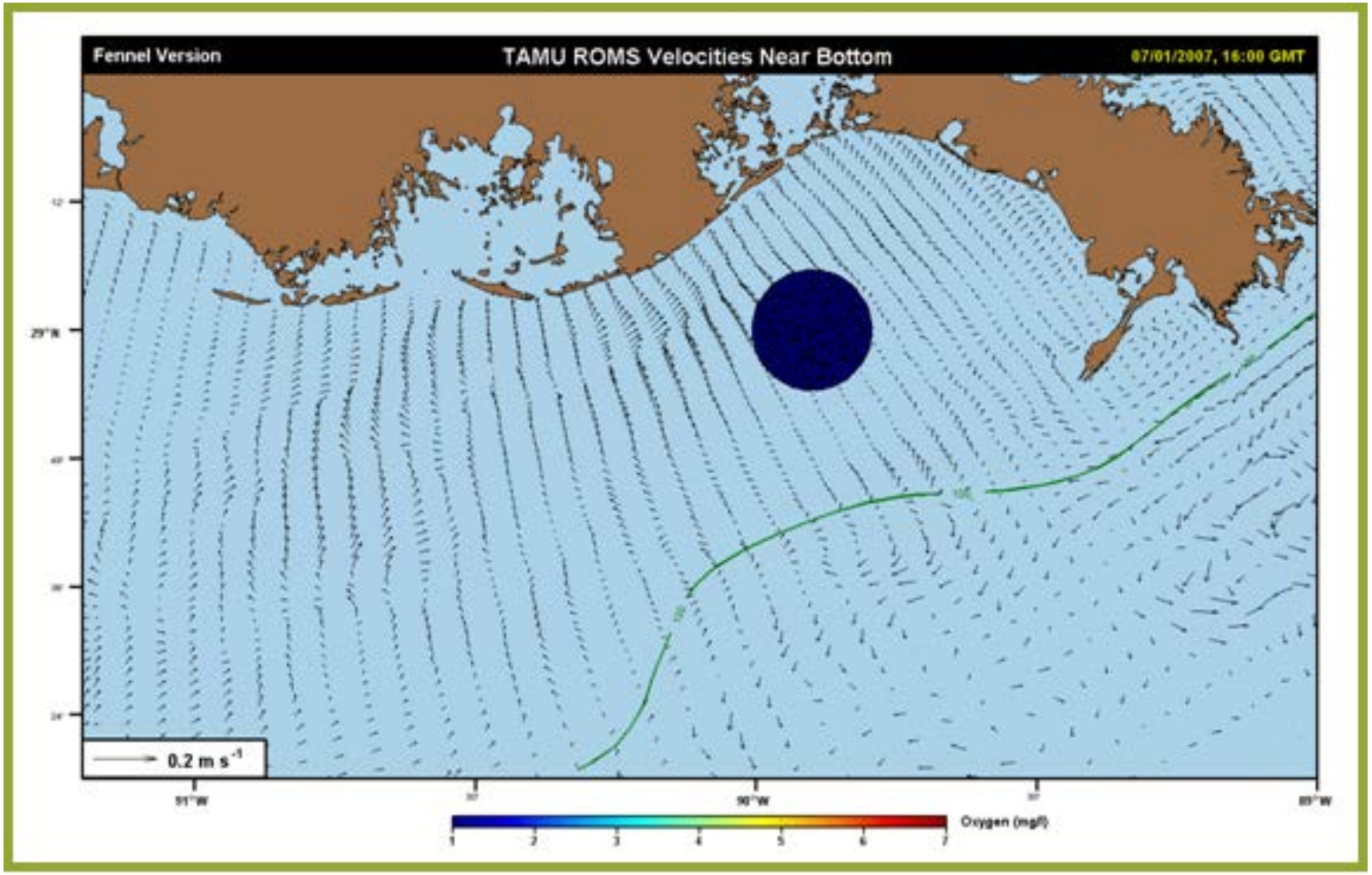
Combined Data set for SURA and NODC



Courtesy Katja Fennel, Dalhousie University

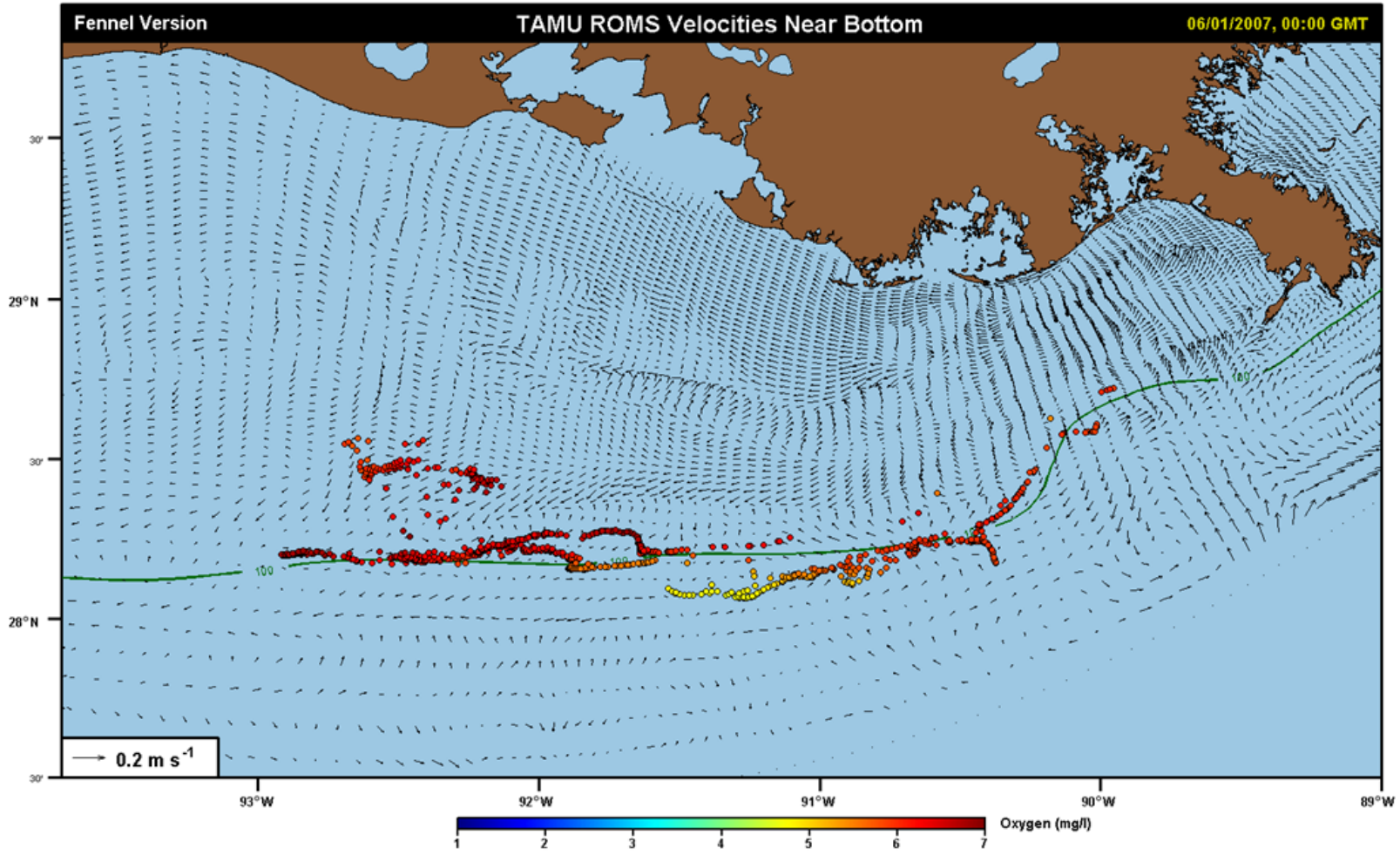
Where Does Hypoxic Bottom Water Come From?

Initial Lagrangian Tool Application



Courtesy Bruce Lipphardt, U. Delaware

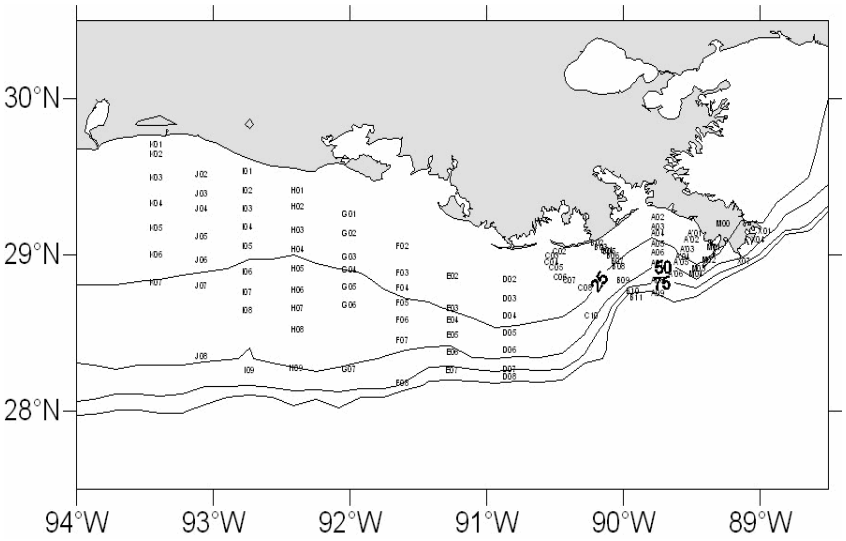
Where Does Hypoxic Bottom Water Come From?



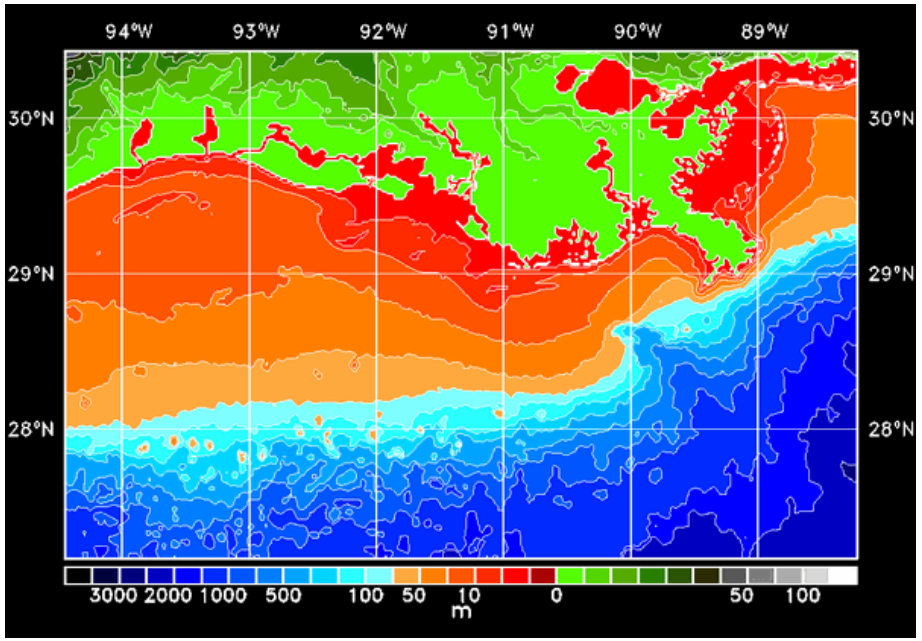
Courtesy Bruce Lipphardt, U. Delaware

NRL Coastal Circulation Model coupled with EPA Ecosystem Model (Nested in NRL IASNFS)

EPA Sampling Stations

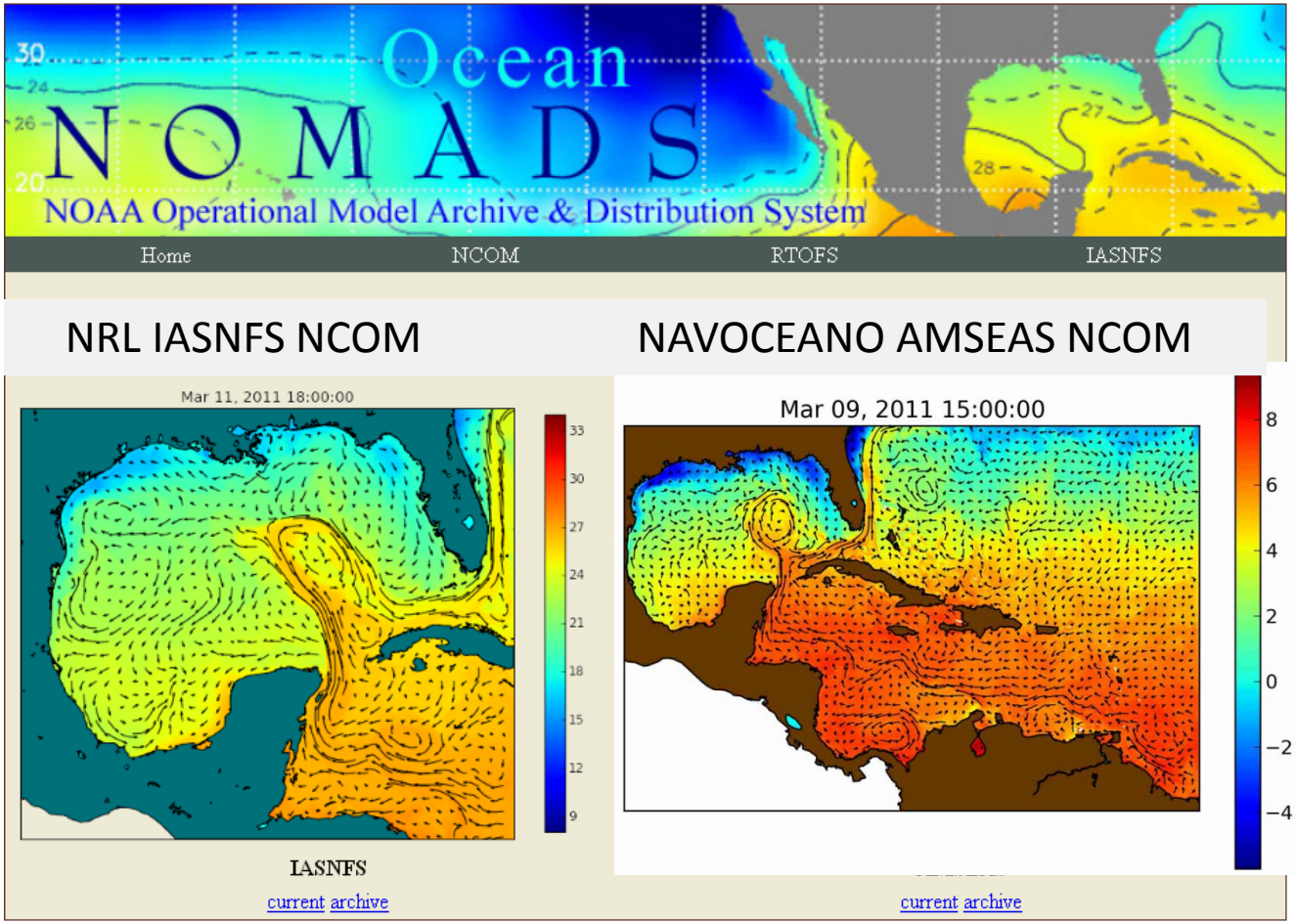


EPACOM Model Domain



Courtesy Dong Shan Ko, NRL

NGI/NCDDC Developmental Coastal Ocean Forecast Archive

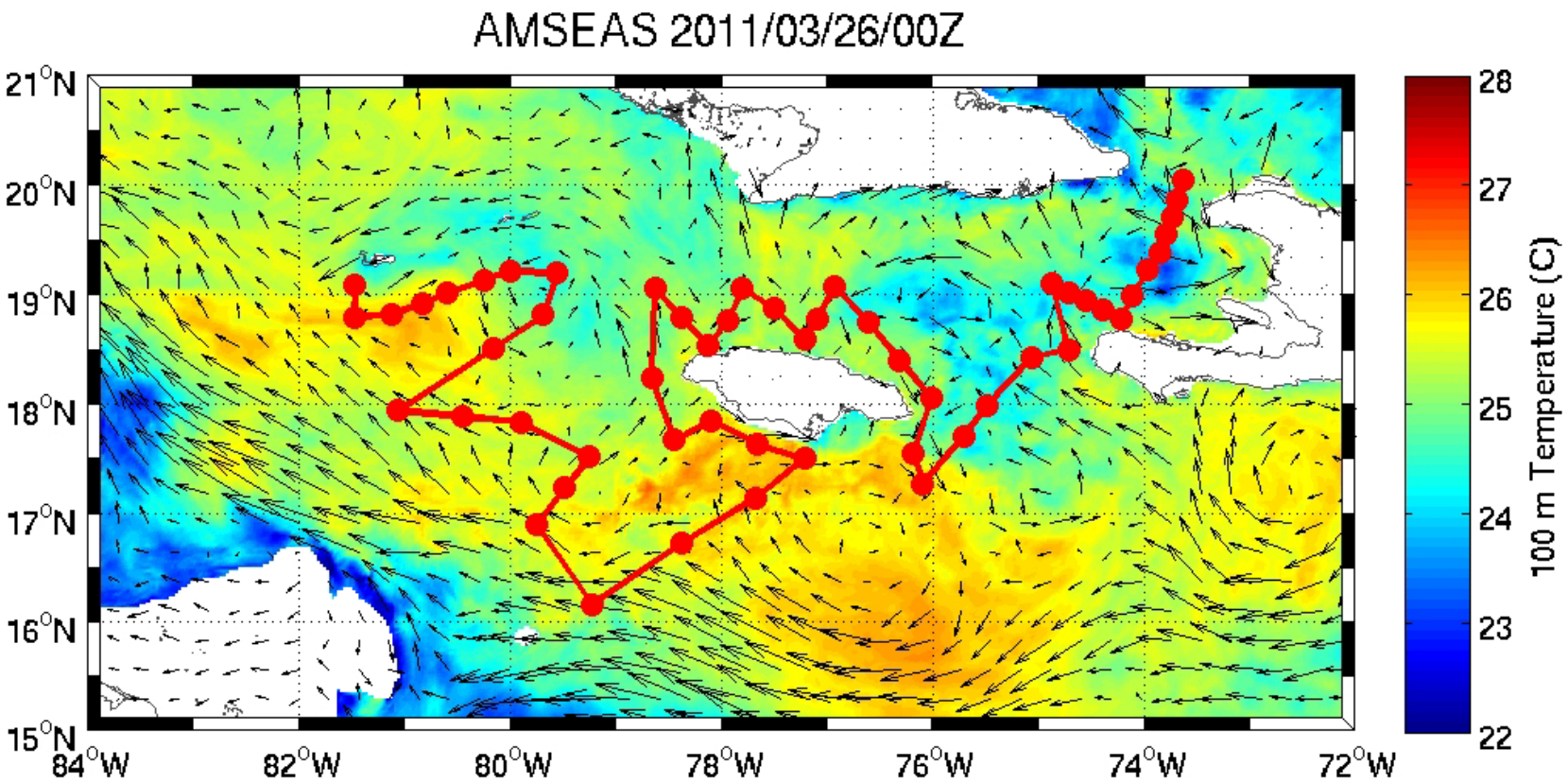


http://edac-dap3.northerngulfinstitute.org/thredds/catalog/

NOAA NMFS Application

Gordon Gunter Tuna Spawning Research Cruise

Current Leg ~30 Mar – 15 Apr 2011 – Real-Time Forecast Maps



100 m Temperature and Currents

Courtesy Woody Nero, NOAA NMFS