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Recent advancements in coastal ocean prediction at the U.S. Naval Research Laboratory

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The Oceanography Division of the Naval Research Laboratory conducts a coordinated program of research and development (R&D) supporting Navy operational ocean nowcast and prediction. This paper provides and update on current NRL R&D efforts with a focus on observations and prediction in the Gulf of Mexico. Observational results from an NRL-deployed array of bottom mounted ADCP's and pressure gauges in the northern Gulf of Mexico shelf slope region will be presented. These instruments were underlying the path of Hurricane Ivan as it approached the coasts of Alabama and Florida. Observations of both currents and wave heights associated with the storm passage are presented. In addition, results will be presented from recent storm surge simulations associated with the 2005 landfall of Hurricane Katrina along the Louisiana and Mississippi Gulf coasts, Hurricane Rita along the Texas and Louisiana coasts and Hurricane Wilma along the Florida coast. Two models were used to study the hurricane landfall events: the Intra Americas Sea (IAS) Navy Coastal Ocean Model (NCOM) and the ADvanced CIRCulation model (ADCIRC). The IAS simulations are the result of a real-time ocean prediction system driven by real-time Navy atmospheric forcing. The ADCIRC model simulations, focused on Hurricane Katrina, were driven by reanalysis wind and pressure fields from NOAA's National Hurricane Research Center. Results of these simulations are presented and compared to observations.