

Dodge, R. E., A. V. Soloviev, T. Gustafson, M. E. Luther, R. H. Weisberg. 2006. Response of the Coastal Ocean on the Southeast Florida Shelf to Tropical Cyclones During 1999-2005 Hurricane Seasons. Eos Trans. AGU, 87(36), Ocean Sci. Meet. Suppl., Abstract OS16H-14.

Abstract:

The response of the coastal ocean to several tropical cyclones (including Hurricane Katrina), which passed through or near the NSU/USF mooring array during seven hurricane seasons is analyzed. The mooring array is located on the shelf south of Port Everglades, Florida. It contains acoustic Doppler current profiler (ADCP), temperature and temperature/ salinity sensors, a wave and water level gauge. Data from the bottom mooring at 11 m isobath have been collected almost continuously since July 1999. Our present observational statistics includes response to hurricanes Floyd and Irene in 1999, Frances and Jeanne in 2004, and Katrina in 2005 (data on Hurricane Rita have not yet been retrieved on the moment of the abstract submission). Local response of the current velocities to the passage of hurricanes was prominent with significant increase of both along- and cross-shelf components. This increase, however, did not significantly exceed maximum current velocity fluctuations during non-hurricane conditions associated with energetic internal tides or submescale eddies. Sediment concentrations inferred from the ADCP echo intensity signal show dramatic increase of sediment load during hurricanes Irene and Katrina, which is related to more intense wind waves developed in the Straits of Florida during those two hurricanes. Sea level deviations observed during the passage of 1999-2005 hurricanes through the Straits of Florida were relatively small. Nonlocal response of the Straits of Florida to hurricanes and potential impact on coral reefs will also be discussed. Impacts to local eco-systems and beach renourishment efforts will be discussed in context with anticipated governmental responses thereto.