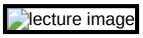

CCT Colloquium Series

Air-sea Interactions and Hurricane Intensity Changes over the Gulf of Mexico Loop Current and Its Eddies

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Johnston Hall 338
September 22, 2006 - 03:00 pm

Abstract:
Hurricane track forecasting has improved steadily over the past three decades whereas the forecasting of hurricane intensity changes has not, due mainly to insufficient real-time information on atmospheric thermodynamics and upper ocean heat exchange. The passage of Hurricane Ivan, a category 4 hurricane, across the Gulf of Mexico in September 2004 provided a unique opportunity to study responses of the upper ocean to hurricane wind forcing, as clear sky conditions prevailed in its wake. Using GOES-12 night-time sea surface temperature composites and multi-sensor sea surface height measurements, we show that maximum sea surface cooling occurred in two areas of cyclonic circulation, which were intensified by the hurricane-forced winds. The cool upwellings provided immediate negative feedback to Ivan by decreasing hurricane wind speeds, despite its tracking over the Loop Current and a warm core ring, features that should have intensified its strength. In 2005, both Katrina and Rita intensified rapidly from category 1 to 5 hurricanes in close proximity to the high heat content Loop Current and detached warm core eddies in the Gulf, whereas Hurricane Ivan did not. These catastrophic hurricanes provided new insights on the potential role of deep and warm mixed layers in driving rapid and extreme hurricane intensity changes. This paper investigates oceanic and atmospheric conditions before, during and after several hurricane crossings of the Gulf using satellite data from passive IR radiometers and active microwave sensors with the goal of assessing the role that real-time satellite measurements can play in providing better predictor variables for hurricane intensity changes over the Gulf of Mexico.

Speaker's Bio:
Dr. Nan Walker is an Associate Professor in the Dept of Oceanography and Coastal Sciences and Director of the LSU Earth Scan Laboratory within the Coastal Studies Institute, School of the Coast and Environment. Since 1991, she has specialized in the use of real-time satellite measurements for the surveillance and study of coastal/ocean circulation and air-sea interactions in the Gulf of Mexico. She received her PhD in physical oceanography from the University of Cape Town, South Africa, in 1989. She received an M.S. in Marine Sciences from LSU in 1982 and a B.S. in Marine Zoology from Duke University in 1976.

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