Upper Ocean Dynamics Laboratory:
Flight Summary: NOAA WP-3D
18 June 2010

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Tasking: On Friday 18 June a seventh grid flight flight on the NOAA P-3 aircraft was tasked to the Deepwater Horizon oil spill area and the Loop Current (LC) and its eddy field in the Gulf of Mexico.

Objective: The experimental objective is to provide data over a large scale to measure the possible shedding of a warm core eddy from the LC and provide oceanic structural data for predictive ocean models at the NAVOCEANO (this has been successful). The flight focused on temperatures, currents and salinity in an approximate geographical location essentially the same pattern as 28 May, 3, 11 June (Figure 1). These flights are sampling the same grid points to provide the evolving oceanic variability of the LC and the warm core eddy shedding. In addition, these measurements provide the important data to correlate to surface images and data from satellite measurements. From a scientific perspective, these data will be useful in improving our understanding of the complex eddy shedding processes and the associated ocean modeling.

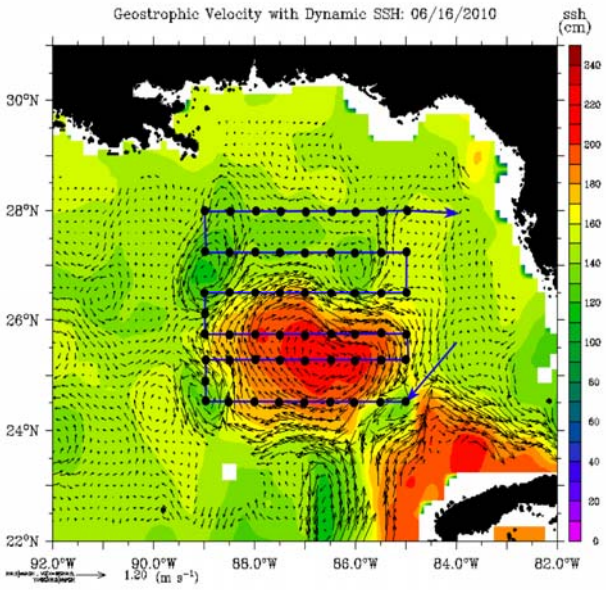

Figure 1: Flight tracks on 18 June flight from NOAA WP-3D aircraft.

Flight Tracks: Takeoff time was ~0858 EST 18 June from MacDill United States Air Force Base and the flight duration was ~8.5 hours. During the mission, the aircraft was flown between 5500 feet at an indicated air speed of 180 to 185 knots. Transects were shifted slightly southward 0.25^{o} from 11 June to reflect the changes in the Loop Current and Warm Core Eddy field. We are maintaining 0.5^{o} resolution along each transect.

Measurements: Atmospheric dropsondes (for surface winds) and airborne ocean profilers sampling to as deep as 1500 m (from expendable current profilers) were deployed in a lawnmower style. In total, sixty-five airborne profilers were deployed of which there were sixty profilers that returned signals to the aircraft (~83%) that acquired data. Five of eleven failures were associated with the AXCPs (22 total). For these failures, the AXCPs either did not turn on or release from the airborne canister similar to the problems

encountered on previous flights. We had six bad AXBTs (mostly very old channel 16's). Note that all eight AXCTDs returned signals to the aircraft. As part of the plan we are also deploying AXBTs at some of the same points to compare T(z) profiles in the upper 350 m. Usually first-look AXBT profiles have been placed on the PhOD website (courtesy of Dr. Eric Uhlhorn at NOAA's Hurricane Research Division), however we did experience some Analog to Digital conversion problems with the onboard AXBT receiver units. Thus, the AXBT data have to be replayed in the RSMAS Laboratory and sent to AOML to upload on GTS. All data are stored on digital analog tapes for subsequent playback and detailed processing and analyses. We have found a better method to record and store data.

Vendor Interaction: The software glitch in processing the current and salinity profilers using Mark21 and Mark 10A software remains unresolved. However, the vendor returned eleven AXCTD profiles using the TSK approach. We now have their approach to process all the AXCTD data. We have been assured that the vendor is working on the problem. In addition, we sent Lockheed Martin/Sippican six AXCPs to diagnose the unusual high failure rates of the the AXCPs. They found three major problems. Hence all AXCPs have returned to the vendor to correct the problems as soon as possible.

Data Assimilation: The temperature profiles are being assimilated into the US Navy Models according to the email to Dr. Frank Bub at NAVOCEANO and we are working with NCEP on this important issue.

Next Flight: The next flight is tentatively scheduled of Friday 25 June 2010 to assess weekly differences in the structure as the LC changes of the complex eddy shedding process and help vector ships into areas of anomalous variability. These measurements are of equal importance for the upcoming hurricane season for calibration of our radar altimeter-derived oceanic heat content variability that injest the data into Statistical Hurricane Intensity Prediction Scheme for intensity forecasting at the National Hurricane Center.