

Upper Ocean Dynamics Laboratory:

Flight Summary: NOAA WP-3D

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Tasking: On Friday, 21 May 2010, a third flight on the NOAA P-3 aircraft was tasked to the Deepwater Horizon oil spill area of the Gulf of Mexico. The overall objective is to provide data over a large scale to measure the possible shedding of a warm core eddy from the Loop Current (LC), which has a surface current speed of 3 knots. As part of the tasking, the flight focused on currents, temperatures and salinity in an approximate geographical location from 24 to 27.25°N and 85 to 89°W (same pattern as 18 May) to include some of the area measured during the 8 May 2010 research flight. Such measurements provide the important data to correlate to surface images and data from satellite measurements as well as provide initial subsurface structural conditions for predictive ocean models. These data will be useful in improving our understanding of the eddy shedding process.

Flight Tracks: Takeoff time was ~0900 EST 21 May from MacDill United States Air Force Base and the flight duration was ~9.2 hours. During the entire mission, the aircraft was flown between 5500 feet at an indicated air speed of 185 knots. No significant weather was encountered that disrupted the flight pattern. More oil slicks were observed in the cold core eddy located at 25°N 85.5°W and an oil sheen was observed at 24°N, 85°W as well as along the northern part of the domain from the aircraft (two upper most legs) along the northwest part of the grid-south of the well site.

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. As on the 18 May flight, four of the six legs of the grid were spaced at 1° intervals in latitude (~110 km) from 24°N to 27°N and spanned from 89°W to 85°W at 0.5° resolution in longitude. In addition, higher resolution measurements (0.25°) were acquired through the cold core eddy at 25°N, 85.5°W. Along the last two legs from 27 to 27.5°N, expendable profilers were deployed at 0.25° resolution which is the area where we sampled on 8 May Flight located due south of the no-fly zone. In total, sixty-six airborne profilers were deployed of which there were five failures (~10%). A couple of profilers produced noisy signals that will be revised in the laboratory. First look AXBT profiles are now on the PhOD website (courtesy of Dr. Eric Uhlhorn at NOAA's Hurricane Research Division), and we are resolving a software glitch in processing the current and salinity profilers using Mark21. All data are stored on digital analog tapes for subsequent playback and detailed processing and analyses.

In addition, the NOAA WP-3D research aircraft was also outfitted with the Stepped Frequency Microwave Radiometer (SMFR) and the downward looking Infrared Radiometer Thermometer (IRT) acquired data on sea surface properties such as Sea Surface Temperatures (SST) and Brightness Temperatures from the multiple channels from the SFMR. These measurements allow us to distinguish between the oil slick mass and the surrounding sea water. We are requesting these remote sensing data be carefully processed over the cold core eddy from both flights ~1.5 hr of data per flight.

Next Flight: The next flight is tentatively scheduled of Friday, 28 May to assess differences in the structure as the LC changes as the eddy shedding process continues and help vector ships into areas of anomalous variability.

