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

RSMAS/MPO, University of Miami (Brewster, Jaimes, Meyers, Shay)
4600 Rickenbacker Causeway, Miami, FL 33149, USA
Phone: 305.421.4075 - Fax: 305.421.4696 - Cell:305.205.0305
Email: nshay@rsmas.miami.edu - Internet: http://isotherm.rsmas.miami.edu/~nick/

Tasking: On Tuesday, 18 May 2010, a second 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 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.

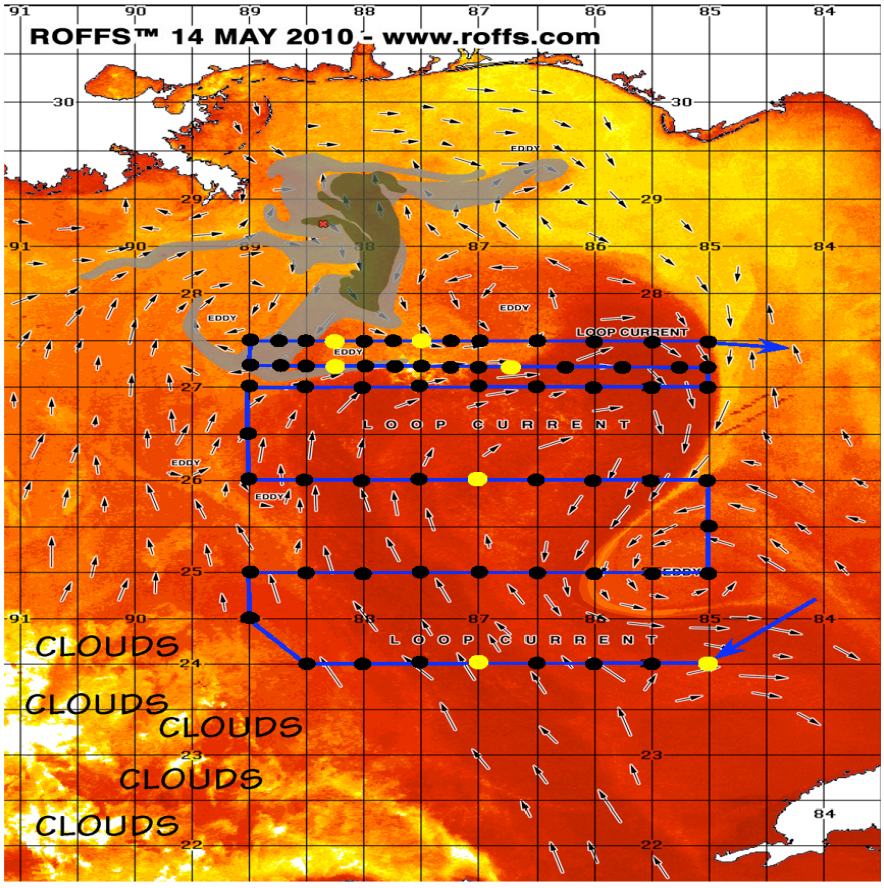

Figure 1: Oceanic measurement grid from NOAA WP-3D aircraft using airborne expendables depicted as black dots (failures are yellow dots) relative to ROFFER's analyses from sequential SST measurements on 18 May 2010.

Flight Tracks: Takeoff time was ~1100 EST 18 May from MacDill United States Air Force Base and the flight duration was ~8.5 hours following the grid in Figure 1. During the entire mission, the aircraft was flown between 5500 feet at an indicated air speed of 190 knots. Except for the lower left part of the grid, no

weather was encountered that disrupted the flight pattern. Oil slicks were observed in the cold core eddy located at 25^{o}N 85^{o}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 grid shown in Figure 1. Four of the six legs of the grid were spaced at 1^{o} intervals in latitude (~110 km) from 24^{o}N to 27^{o}N and spanned from 89^{o}W to 85^{o}W at 0.5^{o} resolution in longitude. Along the last two legs from 27 to 27.5^{o}N, expendable profilers were deployed at 0.25^{o} resolution which is the area where we sampled on 8 May Flight located due south of the no-fly zone. In total, 67 airborne profilers were deployed of which there were seven failures (~10%). Four failures along the two northern-most tracks were due to the profilers being in immersed in oil (The deeper profilers such as the current and salinity profilers have a seawater switch that activates the surface unit and profilers). In three of the four cases, these new profilers did not turn on at all. 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. These data have not been processed.

Next Flight: The next flight is scheduled of 21 May to assess differences in the structure as the Loop Current changes with respect to the eventual eddy shedding behavior.