Mission Summary
991004I Aircraft 43RF
Tropical Cyclone Air-Sea Interaction
Gulf Loop Current/Eddy "Pre-Storm 2" Flight

Scientific Crew (43RF)

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Mission Briefing:

This was a follow on to the "Pre-Storm 1" mission conducted 2 days earlier. This flight was necessitated due to the cracked windshield incurred on the 10/02/99 flight. The goal was to conduct a simple triangle flight pattern that sampled the areas missed as a result of aborted 10/02 mission. As with the 10/2 mission (as well as the early-season AXBT air-sea interaction flights 990803H and 990806H) the mission goal to map the boundaries of the Gulf Loop Current and associated warm anticyclonic eddies and obtain estimate of heat content anomalies associated with these features. Also similar to the 3 previous eddy flights, AXBTs (measures temperature vs. depth), AXCPs (measures temperature and current vector vs. depth) and AXCTDs (measures temperature and conductivity (salinity) vs. depth) probes were deployed in order to determine detailed vertical ocean structure.

Mission Synopsis

The flight departed MacDill AFB at 1811 UTC on 10/4 and landed there at 2244 UTC, on 10/5 a duration of ~4.5 hours. This relatively short flight pattern consisted of a NE-SW oriented flight leg out of MacDill followed by a short NW-SE leg followed by the last SW-NE leg which eventually took us back to MacDill (see LPS sketch of 'flight triangle' for more detail). In all the approximate distance of the flight pattern was just over 900 nm. The main region that was to be sampled was the core and gradient regions of the main Loop Current/Eddy region (MLCER) located in the eastern Gulf. The eddy located to the south and west of the MLCER was not sampled on this mission. As with the 991002H pre-storm mission, flight level throughout the experiment was maintained at 5 K ft. In addition, AXCTDs and AXCPs were deployed at 190 kt indicated air speed.

A total of 20 ocean profilers were deployed, 8 AXBTs, 7 AXCPs and 5 CTDs. Clean signals were observed below the mixed layer for 6 AXBTs and good signal strength (below 1000 m) was noted for 6 AXCPs and 4 AXCTDs. There were 2 AXBT, 1 AXCP and 1 AXCTD failures. In all a 20% (4/20) failure rate was observed for the ocean profilers. In addition to the 20 ocean probes, 6 GPS dropsondes were deployed. One of which did not receive winds (although PTH was ok). Also, Ed Walsh's SAR was in operation during this mission. SFMR was also turned on due to the slightly higher surface winds present (~15-20 kts on average). No problems with either system were reported. SFMR surface wind estimates varied widely and approached 25 kts in and around areas of convection and fell to ~ 5 kts south and east of the convection (southernmost leg of the pattern as well as near turning point 1). Due to the presence of both convective and stratiform precipitation (mostly on the outbound leg), both Doppler and C-band radar systems were turned on for this mission. The belly radar went down shortly into the flight but coverage was quickly restored. No other problems were reported. ASDL transmissions (including SFMR surface wind speed estimates) were transmitted throughout the flight.

Ocean mixed layer depths (MLD) ranged from 85m near the central regions of the warm core structure to minimum values ~40m closer to the coastal shelf and outside the MLCER. Similar to the 10/2 flight, SSTs did not exhibit a large degree of variability and ranged between 27.7-28.9^{o}C.

Problems:

There were only a few problems reported. As mentioned above, the C-band radar system was down between 1950-2002Z. The final leg of the 'triangle' pattern was where all of the 5 probe failures occurred. Of these 5 failures, 2 were backed up with additional probes (1 AXCTD and 1 AXBT). Exactly why all 5 failures occurred along this leg is unclear (maybe we discovered a new 'Gulf triangle' phenomenon?) In any event, the mission was a success and should provide excellent initial conditions for the 'Eddy storm flight' which will hopefully follow in the coming days/weeks.

Joe Cione, 10/7/99