

Platform Scientist Report

DC-8 Flight 12 9/1/10 Hurricane Earl

Science goals: interaction of dry air with the hurricane; eyewall changes and cycles; possible opportunity to take measurements in dust.

Instrument performance: The PIP failed in the microphysics experiment, but other instruments performed well. 29 successful dropsonde launches were made. The track included six eye crossings, but was asymmetric with longer radial legs to the west than the east in order to sample the dry air (see below). Dropsondes were released at the outermost point of each leg, halfway along the leg, and in the eye. In all but one crossing, two sondes were released in the eye in succession. Other dropsonde locations are described below.

Dry air

We carried out several perpendicular passes of the west and southwest edges of the cloud field in Hurricane Earl. Dry air was present just outside the cirrus deck, and we released sondes in the dry air and just inside of the edge of the cirrus on each pass. An upper-tropospheric trough was also coincident with the dry air, and data from the mission also has the potential to describe the role of the trough.

Eye wall cycles

Although a formal eye wall cycle did not develop during the time the DC-8 was in the air, the eye underwent significant change. Near the beginning of the flight it was polygonal with some visual evidence of mesoscale vortices in the eye, whereas by the end of the flight it was almost perfectly circular and smaller. Accompanying this change was an intensification of the storm, especially in the hours immediately after the flight. The evolution of the eye is a potential topic of study from this flight.

Dust

Two sets of measurements were made in dust layers. The first represented a diversion down to 25,000 feet for about 100 km along the aircraft track north of the storm with a second leg over the same region at 11,000 feet. The second set of dust measurements were made on the final leg home to FLL. The return leg was made at 12,000 feet, then down to 7,000 feet, to measure the dust, which was easily visible outside the aircraft.

-- John Molinari and Rich Blakeslee --