Pre-Depression Investigation of Cloud Systems in the Tropics: Overview and Some Preliminary Results

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The principal hypotheses of a new model of tropical cyclogenesis, known as the marsupial paradigm, were tested in the context of Atlantic tropical disturbances during the Pre-Depression Investigation of Cloud-systems in the Tropics (PREDICT) experiment in 2010. PREDICT was part of a tri-agency collaboration, with the National Aeronautics and Space Administration's Genesis and Rapid Intensification Processes (NASA GRIP) experiment and the National Oceanic and Atmospheric Administration's Intensity Forecast Experiment (NOAA IFEX), intended to examine both developing and non-developing tropical disturbances.

During PREDICT, a total of 26 missions were flown with the NSF/NCAR G-V aircraft sampling eight tropical disturbances. Among these were four cases (Fiona, ex-Gaston, Karl and Matthew) for which three or more missions were conducted, many on consecutive days. Because of the scientific focus on the Lagrangian nature of the tropical cyclogenesis process, a wave-relative frame of reference was adopted throughout the experiment in which various model- and satellite-based products were examined to guide aircraft planning and real-time operations. Here, the scientific products and examples of data collected are highlighted for several of the disturbances. The suite of cases observed represent arguably the most comprehensive, self-consistent dataset ever collected on the environment and mesoscale structure of developing and non-developing pre-depression disturbances.