MJO Field Data and Science Workshop
4-8 March 2013, Kohala Coast, HI

Aircraft Observations of Convective Characteristics throughout an MJO event

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ABSTRACT

The DYNAMO (Dynamics of the Madden-Julian Oscillation) field experiment employed a large number of measurement platforms with which to study environmental and convective cloud system characteristics of the MJO initiation region in the Indian Ocean. One such platform, the NOAA P-3 instrumented aircraft, provided mobility to sample intense convective cloud systems along with the surrounding environment. In this presentation, characteristics of mesoscale convective systems are explored during the onset, peak, and decay time periods of the late November Madden-Julian Oscillation event. The tail-mounted, X-band Doppler radar allowed a pseudo-dual-Doppler analysis technique to study system kinematics and derive vertical wind motion. GPS dropwindsondes provided a robust means for thermodynamic characterization of the convective environment. Similar convective environments were observed, though distinct differences in convective morphology were observed. Changes in both horizontal and vertical structure were consistent with the transition from isolated to more widespread convection in the region of interest. Changes in echo top height and radar reflectivity distributions indicate the presence of deep updrafts lofting hydrometeors to high levels, supporting the importance of ice microphysics in the maintenance of MJO convection, especially during the peak MJO period.