DYNAMO Workshop
3-8 March 2013, Hapuna Beach Resort, Kohala Coast, HA

The Characteristics of Mesoscale Convective Systems During Active and Suppressed Phases of the MJO: Insights from NOAA P-3 Aircraft during the DYNAMO

David P. Jorgensen
NOAA/National Severe Storms Laboratory
Norman, Oklahoma

Bradley "Nick" Guy
National Research Council & NOAA/National Severe Storms Laboratory
Norman, Oklahoma

Shuyi Chen
University of Miami
Coral Gables, Florida

E-Mail: David.P.Jorgensen@noaa.gov

ABSTRACT

One of the primary goals of the DYNAMO project (Dynamics of the Madden-Julian Oscillation - MJO) are to better understand the structure of convective cloud systems and their large-scale environment in the MJO region to improve MJO forecasts within the climate-system models. During the MJO field campaign of 2011-12 (CINDY2011-DYNAMO-AMIE-LASP) one of the NOAA P-3 instrumented aircraft was deployed to Diego Garcia, a small island in the British Indian Ocean Territories, to gather data on cloud systems within the DYNAMO domain. In particular, the vertically scanning tail-mounted X-band radar and GPS dropwindsones, are used to document the structures of various mesoscale convective systems (MCS) observed during phases of the MJO. An overview of the convective structures seen during the project will be given and a few selected case studies will be presented to illustrate typical MCS structures seen in the airborne Doppler and dropsonde data sets. Bulk characteristics of MCSs in various MJO phases will be shown such as reflectivity and airflow relative to convective features, the depth and strength of near-surface cold pools from dropsonde data, and typical environmental proximity soundings of the MCSs. From a statistical viewpoint, various contoured frequency by altitude diagrams of reflectivity and vertical velocity derived from the 3-D Doppler winds will be shown that will characterize the convective systems in suppressed and active phases of the MJO, and other field project data such as TOGA/COARE.