Geophysical Research Abstracts
Vol. 15, EGU2013-3428, 2013
EGU General Assembly 2013

Evaluation of Model Operational Analyses during DYNAMO

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A primary component of the observing system in the DYNAMO-CINDY2011-AMIE field campaign was an atmospheric sounding network comprised of two sounding quadrilaterals, one north and one south of the equator over the central Indian Ocean. During the experiment a major effort was undertaken to ensure the real-time transmission of these data onto the GTS (Global Telecommunication System) for dissemination to the operational centers (ECMWF, NCEP, JMA, etc.). Preliminary estimates indicate that $\sim$95% of the soundings from the enhanced sounding network were successfully transmitted and potentially used in their data assimilation systems.

Because of the wide use of operational and reanalysis products (e.g., in process studies, initializing numerical simulations, construction of large-scale forcing datasets for CRMs, etc.), their validity will be examined by comparing a variety of basic and diagnosed fields from two operational analyses (ECMWF and NCEP) to similar analyses based solely on sounding observations. Particular attention will be given to the vertical structures of apparent heating (Q1) and drying (Q2) from the operational analyses (OA), which are strongly influenced by cumulus parameterizations, a source of model infidelity.

Preliminary results indicate that the OA products did a reasonable job at capturing the mean and temporal characteristics of convection during the DYNAMO enhanced observing period, which included the passage of two significant MJO events during the October-November 2011 period. For example, temporal correlations between Q2-budget derived rainfall from the OA products and that estimated from the TRMM satellite (i.e. the 3B42V7 product) were greater than 0.9 over the Northern Sounding Array of DYNAMO. However closer inspection of the budget profiles show notable differences between the OA products and the sounding-derived results in low-level (surface to 700 hPa) heating and drying structures. This presentation will examine these differences and their implications for the treatment of convection in models.