

MJO Data and Analysis Workshop

4 – 8 March 2013, Kona, HI

Workshop objectives:

- (i) Review and summarize the status of data (collection, quality control, comparison, products) and modeling activities;
- (ii) Exchange the latest scientific results and ideas;
- (iii) Identify new science issues, set goals for the next phase of research, and make a roadmap of synthesizing research results.

- 119 participants from 9 countries (including remote participants via teleconferencing)
- 107 posters
- 7 plenary overview talks

Data and Products

- The DYNAMO Data Archive(http://data.eol.ucar.edu/master_list/?project=DYNAMO) currently includes 96% of the field data;
- Links between the DYNAMO, CINDY, AMIE data archives are provided for one-stop data search;
- All archived field data will be release on March 31 for public use (DOE ARM data have been released at near real time):
 - (a) six types of radars from Addu/Gan, Manus, R/V Revelle and Mirai, and P-3;
 - (b) ~ 26,000 sondes (including both upsondes and dropsondes) from 71 sites;
 - (c) Surface flux data from R/V Revelle and Mirai;
 - (d) Upper ocean biochemistry data from R/V Revelle and Mirai;
 - (e) Profiles of current, temperature, salinity and microstructure from R/V Mirai and Seagliders
 - (f) Surface meteorological data (including radiation) from Gan, Manus, R/V Sagar Kanya and Baruna Jaya;
 - (g) Aerosol data from R/V Revelle,

Data and Products (cont.)

Data products to be released between June and August 2013:

- (a) Uniform radar rain rate estimates at Addu, R/V Revelle and Mirai
- (b) Combined radar latent and radiative heating profiles at Gan
- (c) Updated cloud microphysics ID labels at Gan
- (d) Q1, Q2, and forcing data for the two sounding arrays and at Gan
- (e) Updated COARE flux algorithm 4.0
- (f) Local MJO indices at Addu, Manus, and Darwin

Modeling

- Simulations/hindcasts by cloud system resolving models of local, limited and global domains, coarse resolution (with parameterized convection) models of regional and global domains, and atmospheric, oceanic, and coupled models.
- Evaluation of skill for rainfall forecast
- Extension of the MJO Vertical Structure and Heating Profiles Project under the MJO Task Force (MJOTF) and Global Atmospheric System Studies (GASS):
 - (i) adds the 2011 November MJO event during the field campaign as the third case;
 - (ii) adds limited-domain and local cloud system resolving models to the project.

Scientific Issues:

DYNAMO hypotheses:

- I. Interaction between convection and its environmental moisture
- II. Cloud population evolution
- III. Air-sea interaction and upper-ocean processes

Emerging science issues:

- (a) Cold pool, its structure, evolution, air-sea interaction, and role in MJO initiation;
- (b) Dry-air intrusion, its origin, structure, evolution, dynamics, and effects on MJO convection;
- (c) Scale interaction between convective, diurnal, 2-4 day, synoptic, MJO, seasonal variations in convection and the circulation;
- (d) Necessary and sufficient conditions for MJO initiation;
- (e) Convective organization vs. stochasticity during MJO initiation;
- (f) Ocean dynamics (e.g., equatorial waves, near inertial waves, the Wyrтки jets, the thermocline ridge, Langmuir circulation) and its role in MJO initiation;
- (g) Large-scale atmospheric dynamics (e.g., vertical wind shear, upstream and extratropical influences, upper-level perturbations, moisture transport and convergence, the ITCZ) and its role in MJO initiation;
- (h) MJO and non-MJO convective activities; “failed MJO” events.