Breakout Session 4B "Convection-Environment Interaction"

Presenters: Carl Schreck, Brandon Kerns, Dick Johnson, Paul Ciesielski, Hannah Barnes, Scott Powell, Falko Judt, Fernando Hirata, Boualem Khouider, Mitch Moncrieff, Rit Carbone

- ***key issues of convection-environment interaction in MJO Initiation***
  - **3-D moisture distribution and variability in various spatial and time scales**
  - **Equatorial wave(s) with emphasis on convectively coupled properties**
  - **Convective momentum transports and vertical shear**
  - **Atmospheric boundary layer variability in suppressed and active phases of MJO as well as in different MJO events**
  - **Temporal and spatial variability of SST/upper ocean**

- ***Emerging science, new hypotheses, controversies, and remaining issues***
  - **Influence of dry air surge/intrusion on convective organizations (e.g., ITCZs, MJO, equatorial waves, etc.)**
  - **Upper-level wind/dynamic process influence on convection (e.g., subsidence?)**
  - **Convective feedback (moistening their environment, e.g., shallow vs. deep, gradual vs. rapid, precipitating vs. non-precipitating)**
  - **Stochastic response of convection to large-scale forcing**

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- **Momentum transports**
  - convection momentum transport can impact the large-scale flow associated with MJO (e.g., descending westerly wind jet associated with large MCSs enhancing the near surface westerly wind "burst")
- ***Air-sea interaction/coupling processes***

  - SST gradients and boundary layer convergence/divergence providing dynamic forcing for large convective systems

  - Convective cold pools and surface/boundary layer recovery on various time and spatial scales

➢ ***Proposed future studies that need coordination among different groups***

- Kelvin/Rossby/synoptic wave-like structure: dynamic and thermodynamic
- Diurnal and 2-day cycles: air-sea coupling mechanism(s) and coupled modeling
- November MJO event as an "integrator" for various data/components
- "Non-developing MJO" in January 2012 (upper-level signal, but no convection)?

➢ ***Suggestions for the next phase of research***

Unprecedented in situ and remote sensing data collected in CINDY/DYNAMO/AMIE/LASP over the Indian Ocean to study PHYSICAL PROCESS relevant to MJO initiation in general.