Overview of Aircraft Observations in DYNAMO: Emerging Science in MJO

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Objectives and Key Results

Observations from the two aircraft provide a unique data set of three-dimensional structure of convective cloud systems and their environment from the flight level, airborne Doppler radar, ocean surface imaging, GPS dropsonde and AXBT data. This overview focuses on some key aspects of the aircraft observations that contribute directly to better understanding of convective cloud systems and their interaction with environmental moisture and the ocean during MJO initiation over the tropical Indian Ocean.

Main objectives:

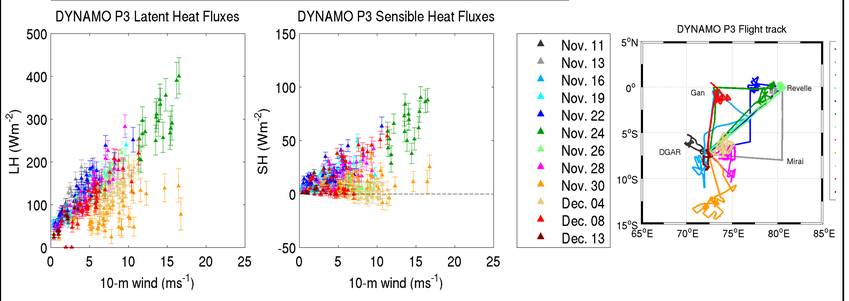
- Convection and environment interactions in MJO
- 3D structure of convective cloud systems
- Microphysical properties of convective cloud systems
- Large-scale atmospheric water vapor and upper ocean variability
- Air-sea fluxes and boundary layer structure

Key results:

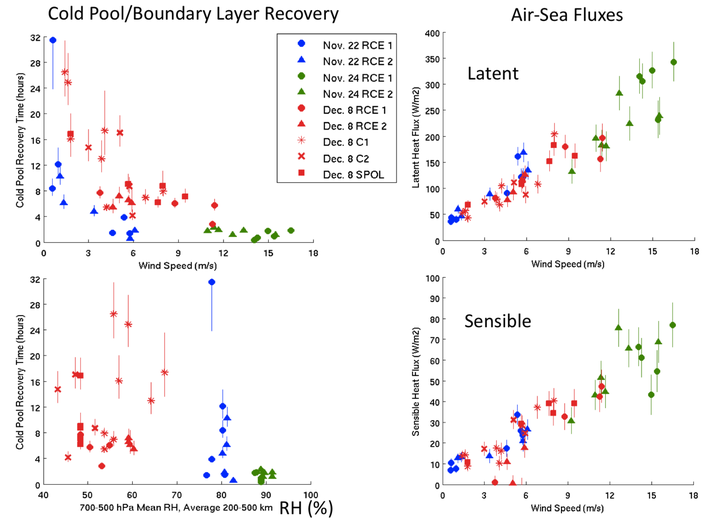
1) Observations from suppressed, transition, and active phases of MJO
2) Large-scale atmospheric moisture, temperature, wind, and upper ocean observations using dropsondes and AXBTs
3) P-3 and Falcon aircraft multi-radar (C-band, W-band) observations of 3D structure of convective cloud systems
4) Convective cold pool structure and recovery in MJO

Air-Sea Fluxes, Convective Cold Pools and Recovery

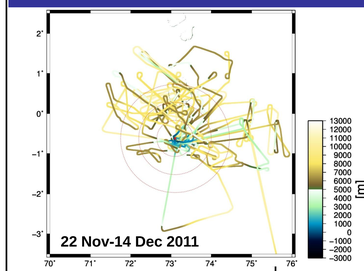
LH & SH fluxes - NOAA P3 Dropsondes & AXBTs (COARE3.1)



Convective Systems in Transition (Nov 22), Active (Nov 24), Suppressed (Dec 8) MJO Phases

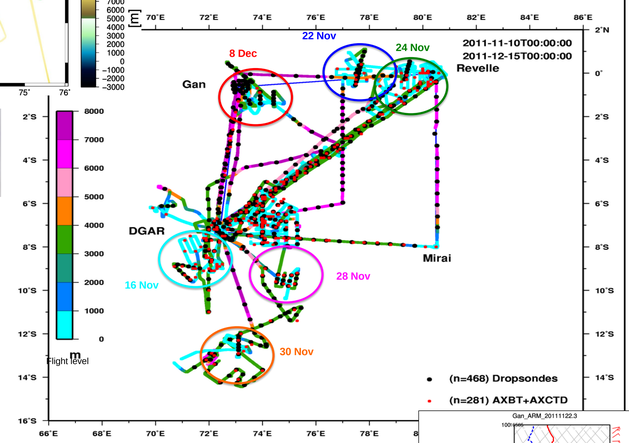


NOAA P-3 and French Falcon Flights During DYNAMO

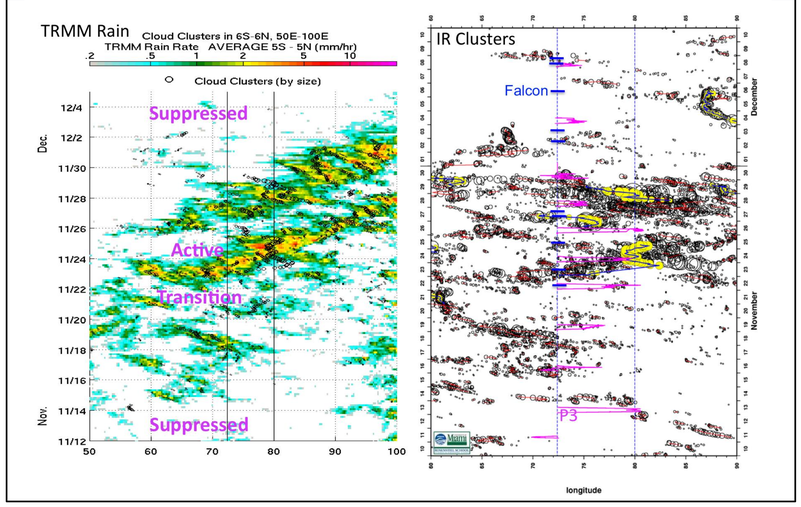


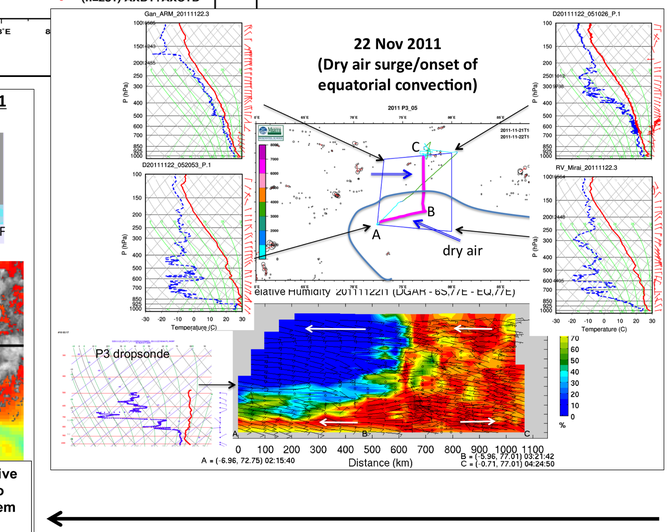
French Falcon (13 flights)
Objectives:
• Cloud structure
• Microphysical properties

NOAA P-3 (12 flights)
Objectives:
• Convective structure
• Water vapor variability
• Air-sea fluxes

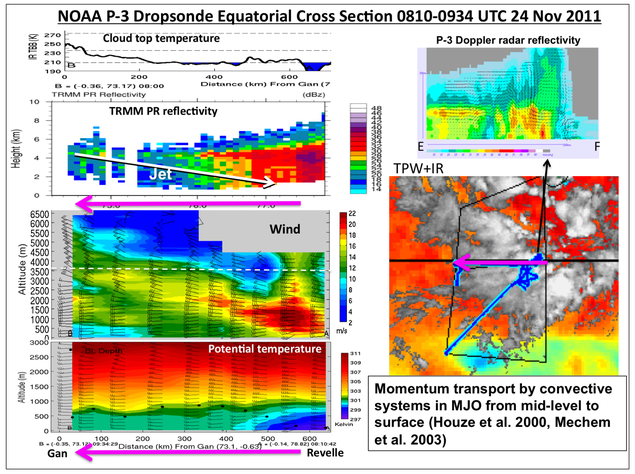


Sampling in Suppressed/Transition/Active MJO Phases

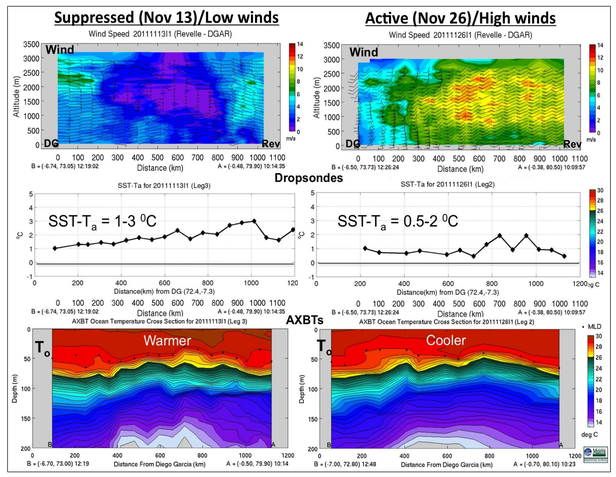




NOAA P-3 Dropsonde Equatorial Cross Section 0810-0934 UTC 24 Nov 2011



Momentum transport by convective systems in MJO from mid-level to surface (Houze et al. 2000, Mechem et al. 2003)



P-3 C-band and Falcon W-band Doppler radar 0750-0759 UTC 8 Dec 2011