DYNAMO Result Directly Relevant to MJO Prediction

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DYNAMO Publications: 120

2013: 15
2014: 38
2015: 56
2016: 11
Selected Topics in This Presentation (new, unexpected):

• MJO prediction skill
• Shallow convection
• Ocean warm layer
• Ocean memory of the MJO
• Radar retrieval of microphysics
MJO Prediction Skill

Critical factors for accurate prediction of MJO initiation:

1. Moisture field
2. Air-sea interaction (case dependent) \[\text{related}\]
3. Diurnal cycle
4. Synoptic variability
5. Local vs. Global skill
IFS RMM skill for the November 2011 MJO event

IFS rainfall skill for the November 2011 MJO event

Ling et al. (2014)
MJO Convective Onset in the Indian Ocean

(A) Pressure (hPa) vs. Height (km)

(B) SST (°C) vs. Time

(C) MODIS Images
Ocean Warm Layer

Matthews et al. (2014)
Shallow Convection

Feng et al. (2014)

Zermeno et al. (2015)
**Implication:** Shallow cumulus parameterization is as important as deep cumulus parameterization to MJO prediction.
Ocean Memory of the MJO

Moum et al. (2014)
Microphysics Retrieval from Dual-Polarimetric Radars

Barnes and Houze (2014)
Microphysics Retrieval from Dual-Polarimetric Radars

Barnes and Houze (2014)
Take-Home Messages:

• Accurate representations of shallow convection and its diurnal cycle, synoptic variability, warm layer of the upper ocean, wind-driven shear-generated turbulence mixing are needed in MJO prediction models.
• We now have tools (radar retrievals of microphysics) to help the development of MJO prediction models at cloud-permitting resolutions.
• MJO prediction skill needs to be measured at both global and local scales.