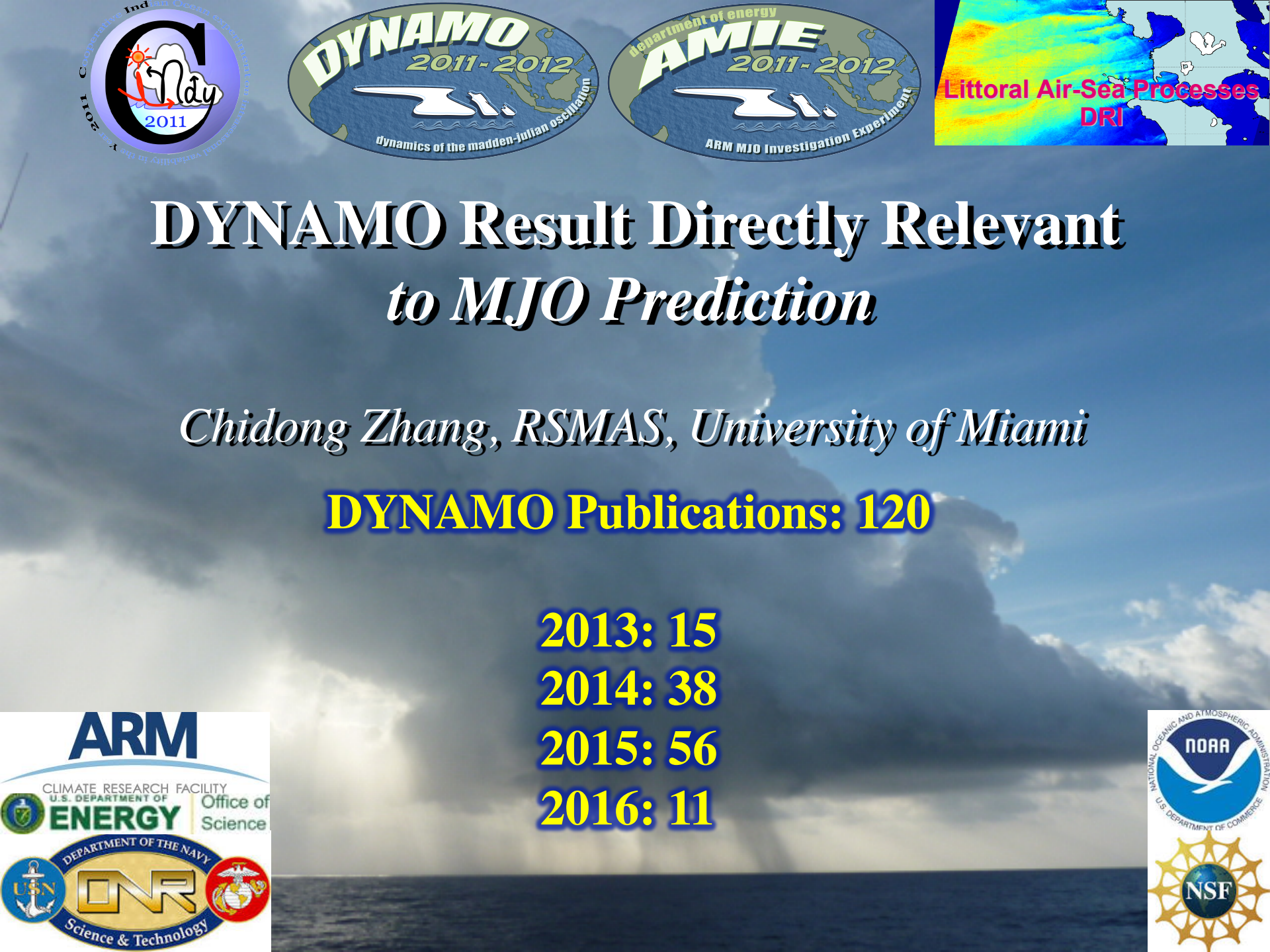


DYNAMO Result Directly Relevant *to MJO Prediction*

Chidong Zhang, RSMAS, University of Miami

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

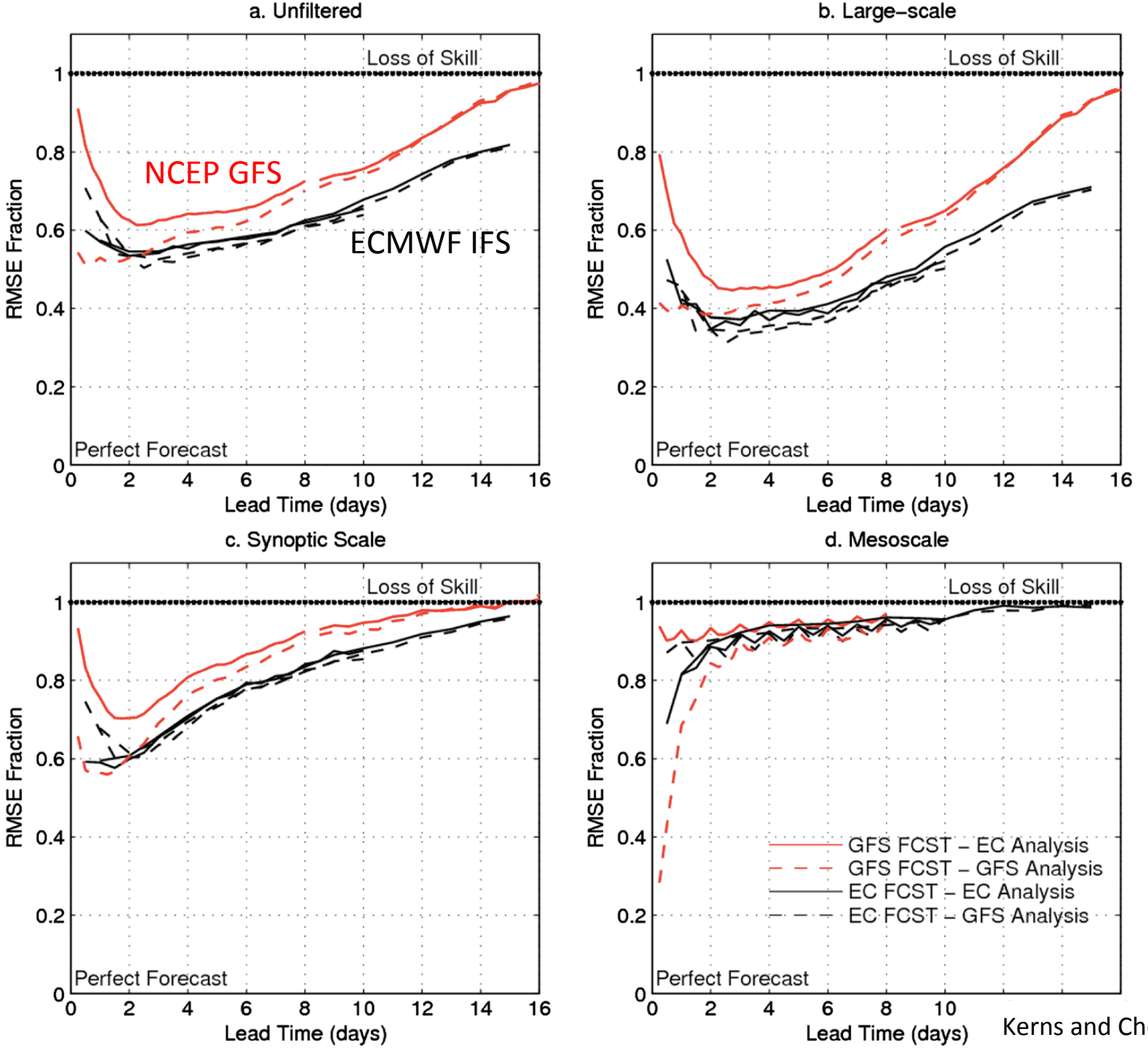
MJO Prediction Skill

Critical factors for accurate prediction of MJO initiation:

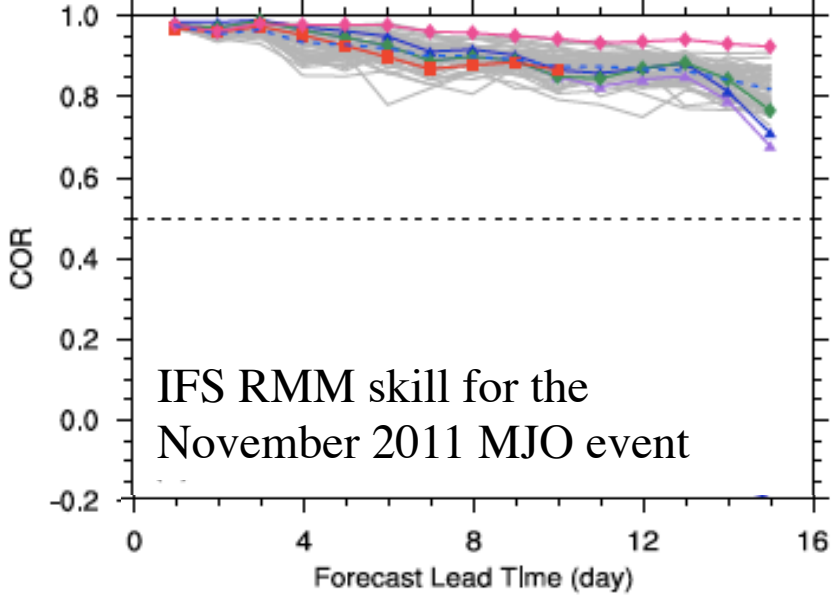
1. Moisture field
2. Air-sea interaction (case dependent)
3. Diurnal cycle

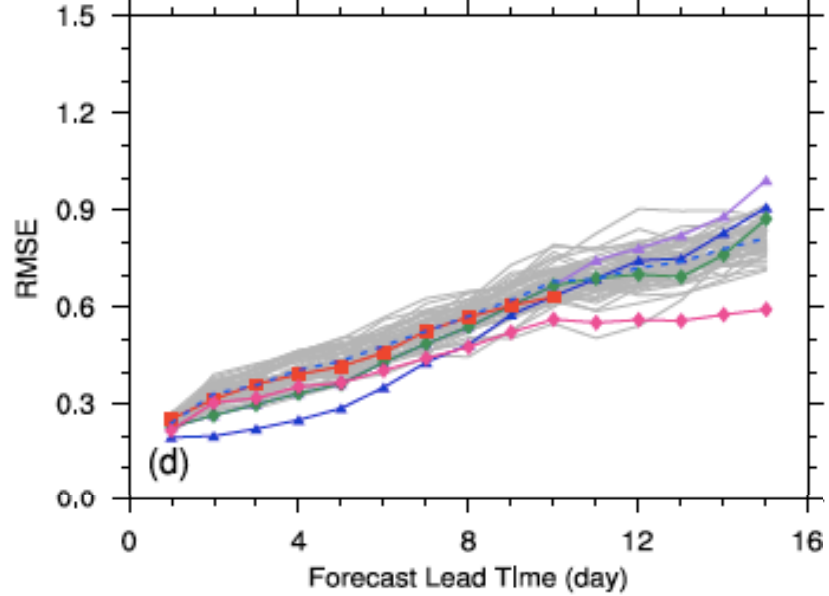
} related

4. **Synoptic variability**
5. **Local vs. Global skill**

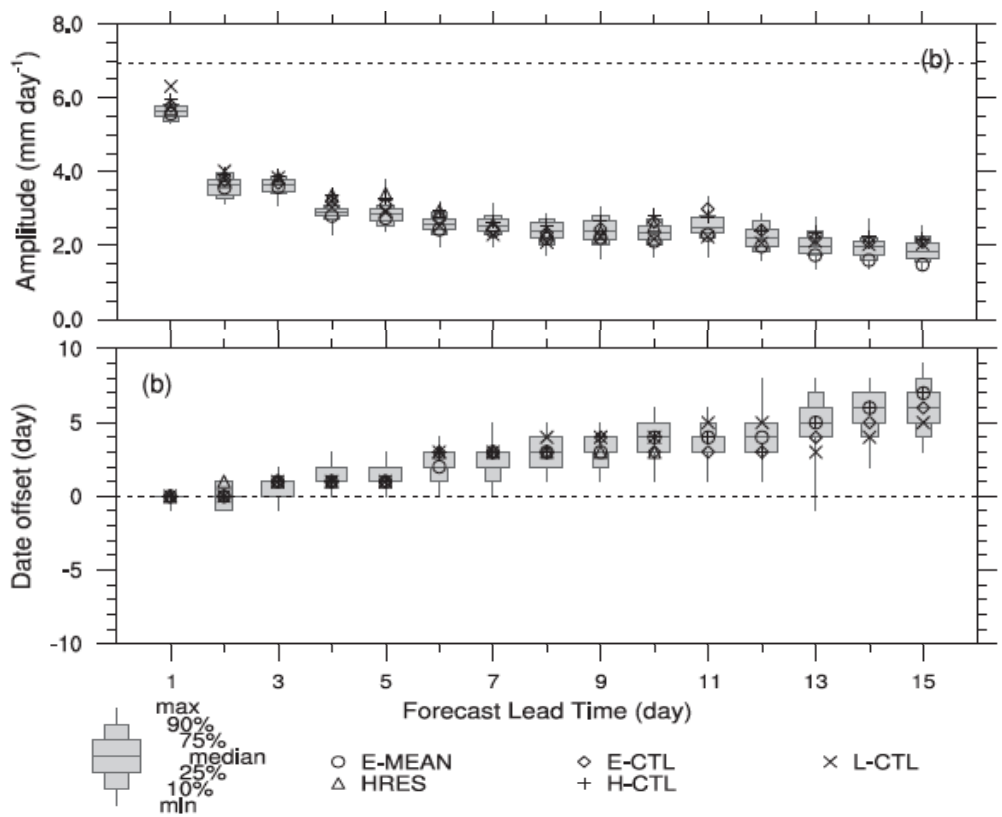


Kerns and Chen (2014)



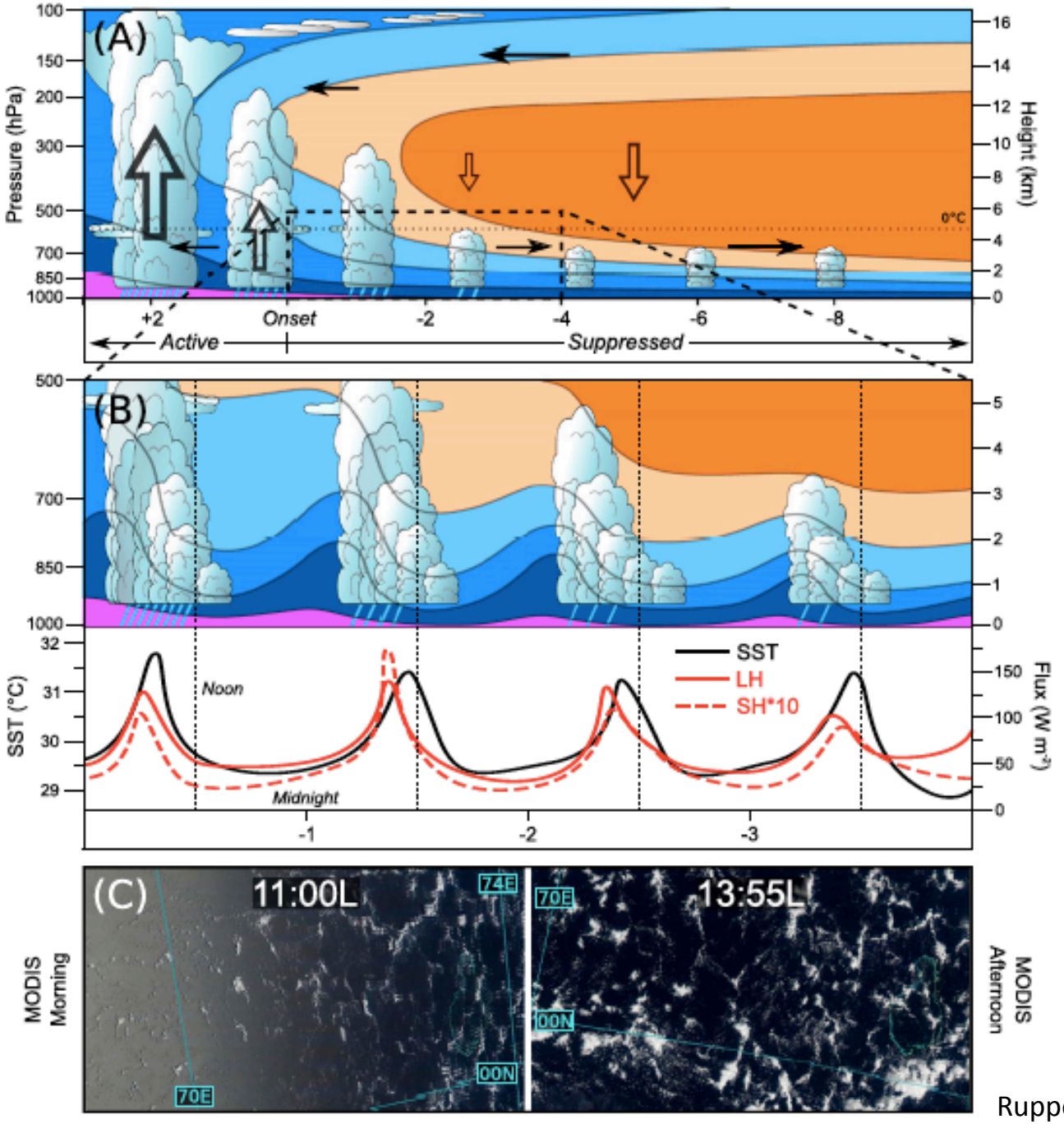


IFS rainfall skill for the
November 2011 MJO event



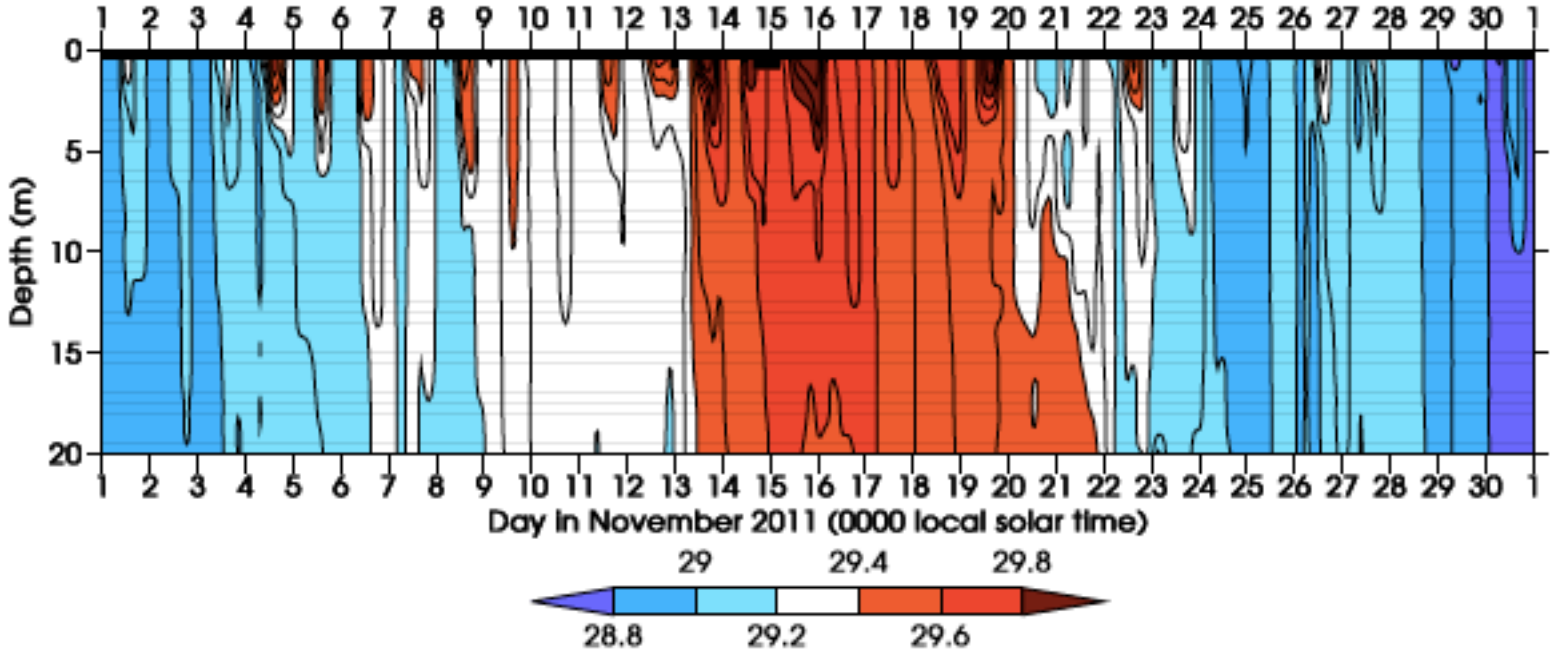
Ling et al. (2014)

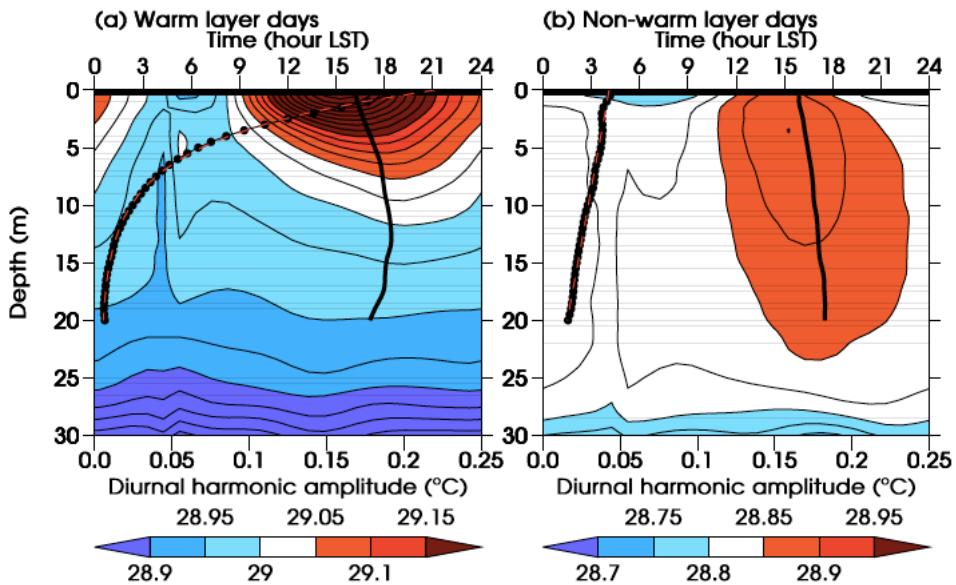
MJO Convective Onset in the Indian Ocean



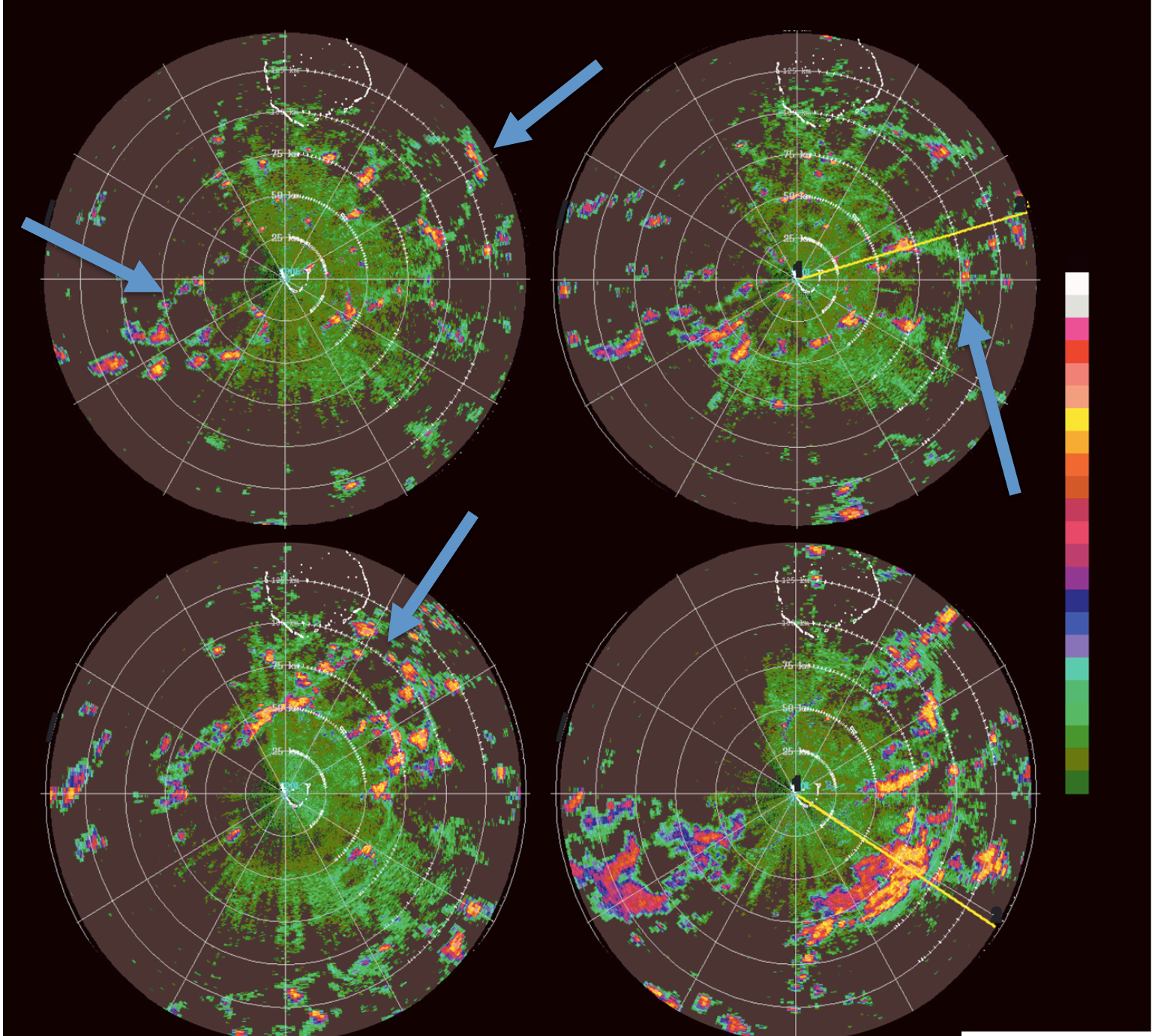
Ruppert and Johnson (2015)

Ocean Warm Layer



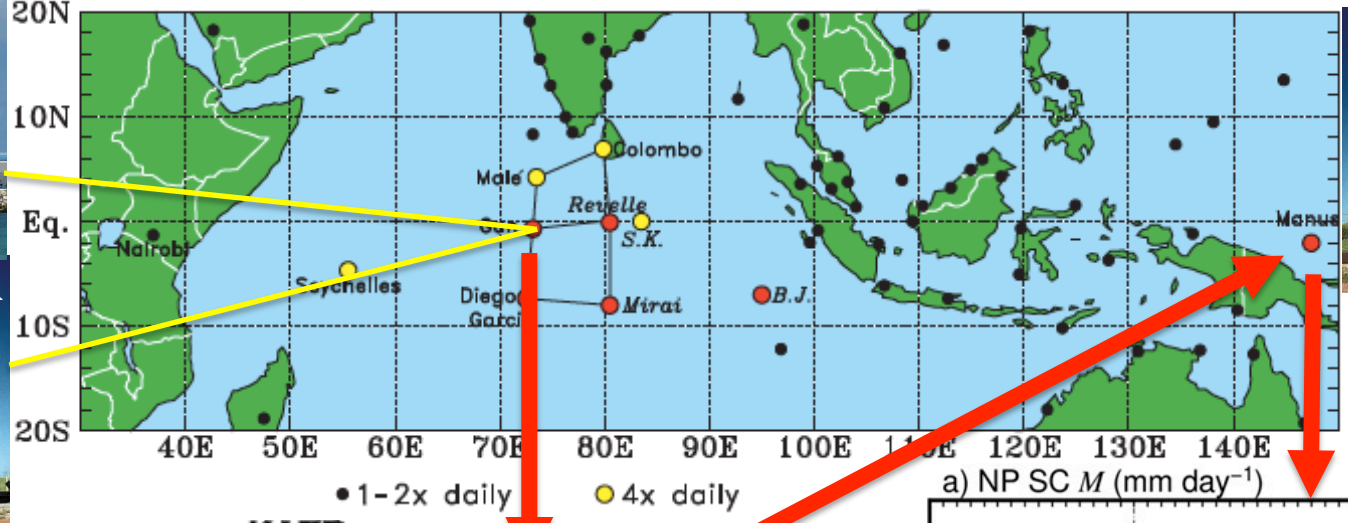


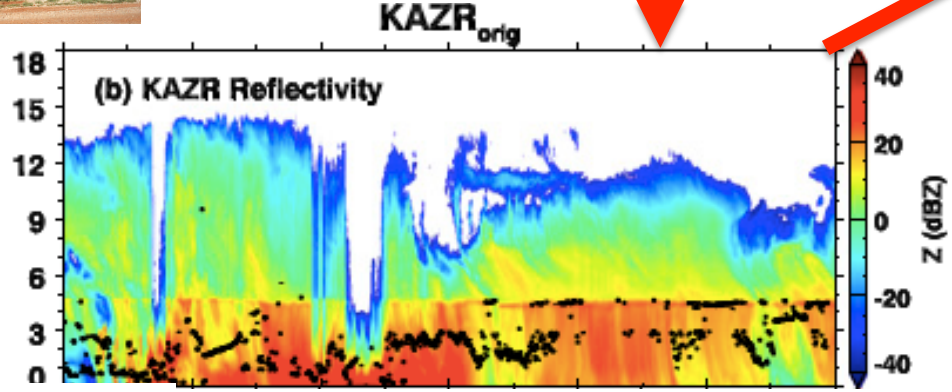
Matthews et al. (2014)



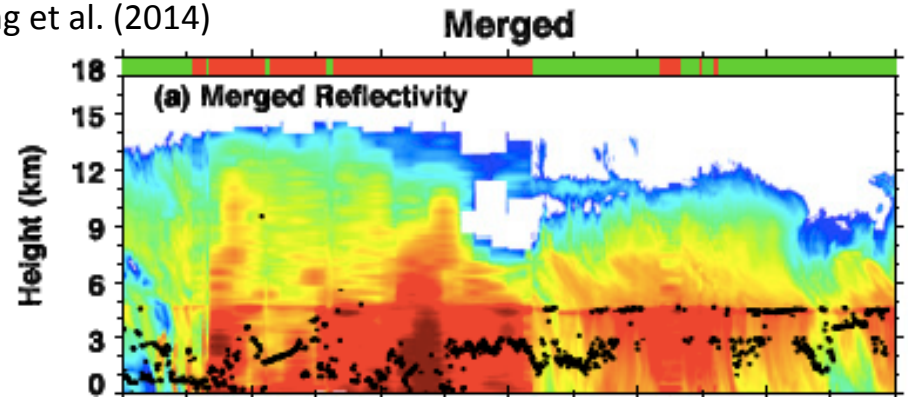
Rowe and Houze (2015)

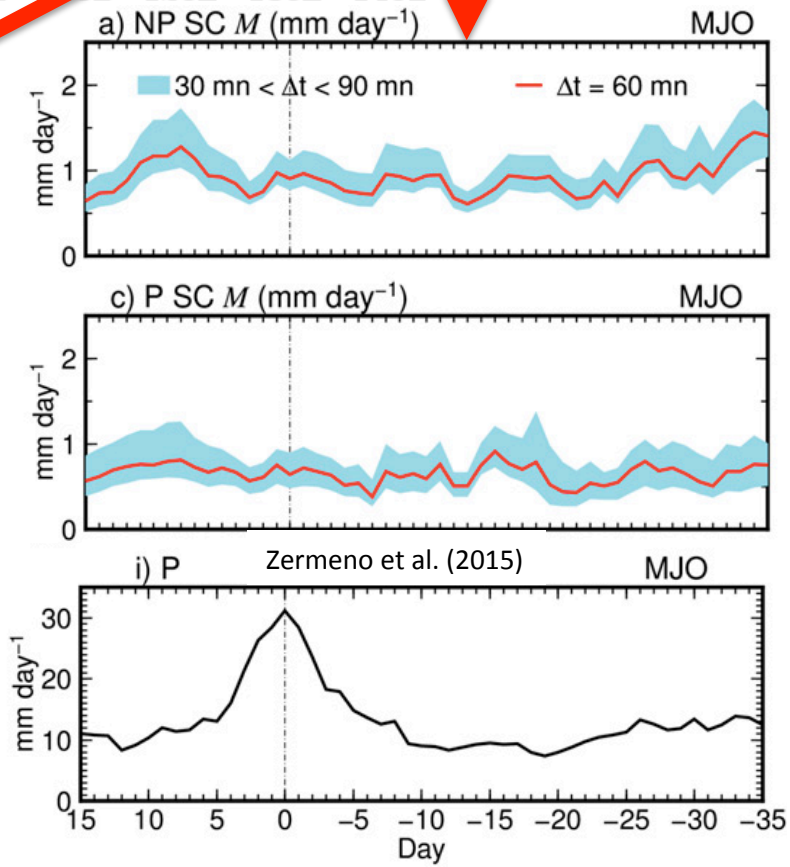
Shallow Convection





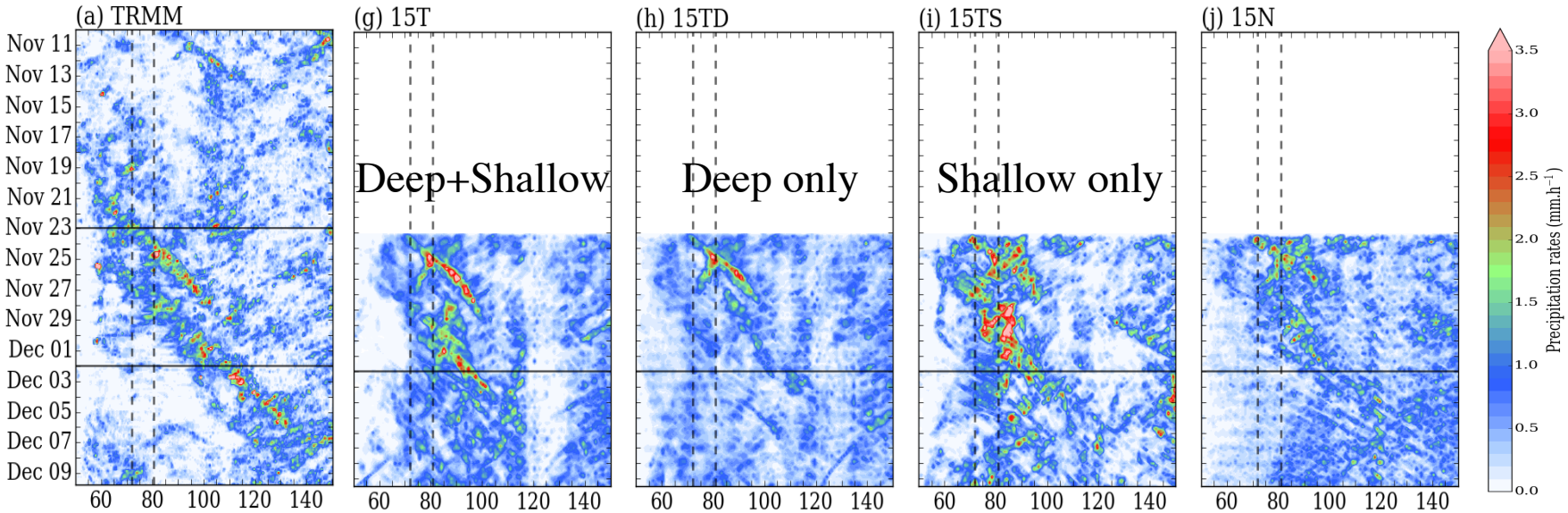
Feng et al. (2014)





Zermeno et al. (2015)

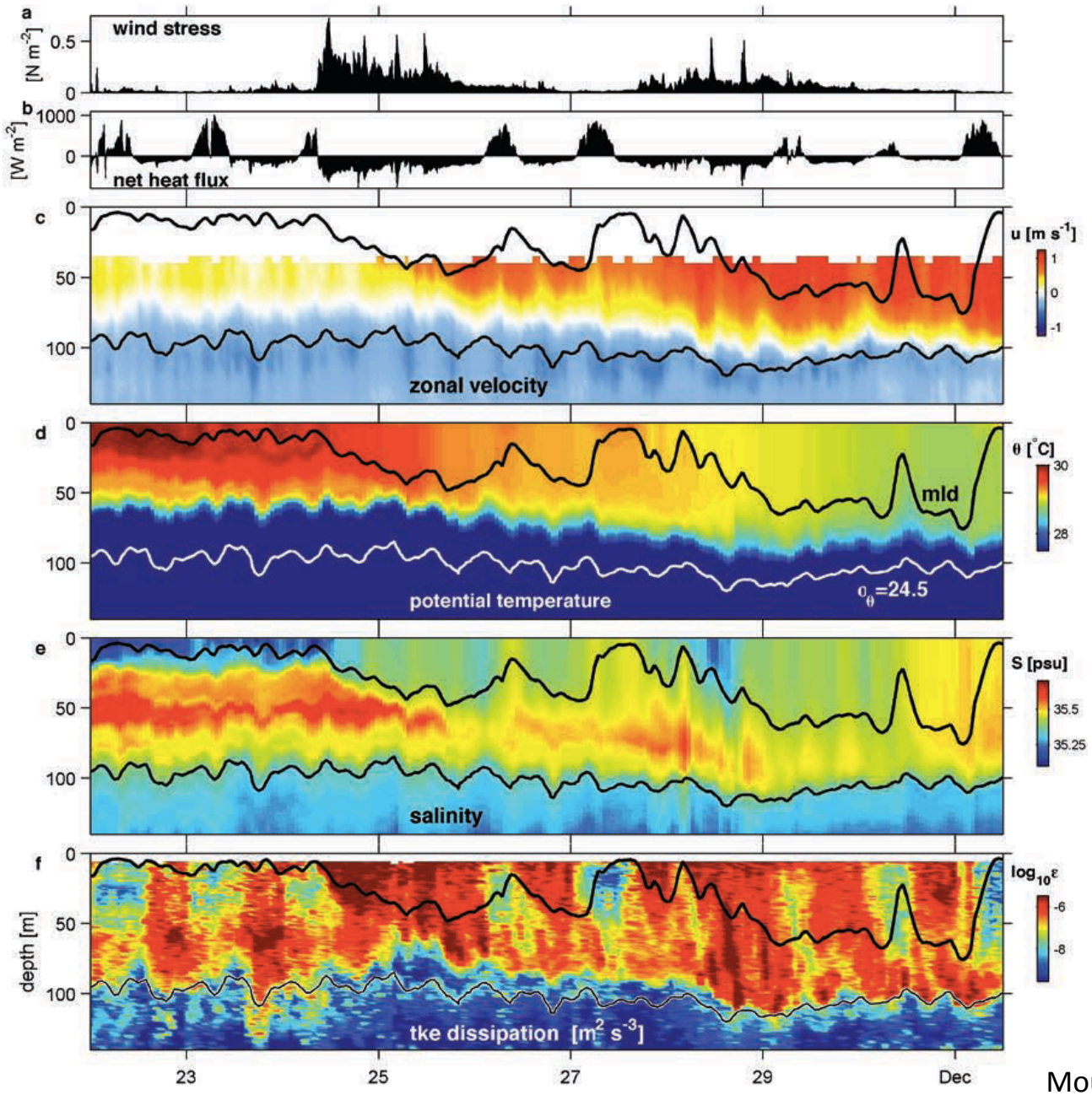
Shallow Convection



Pilon et al. (2016)

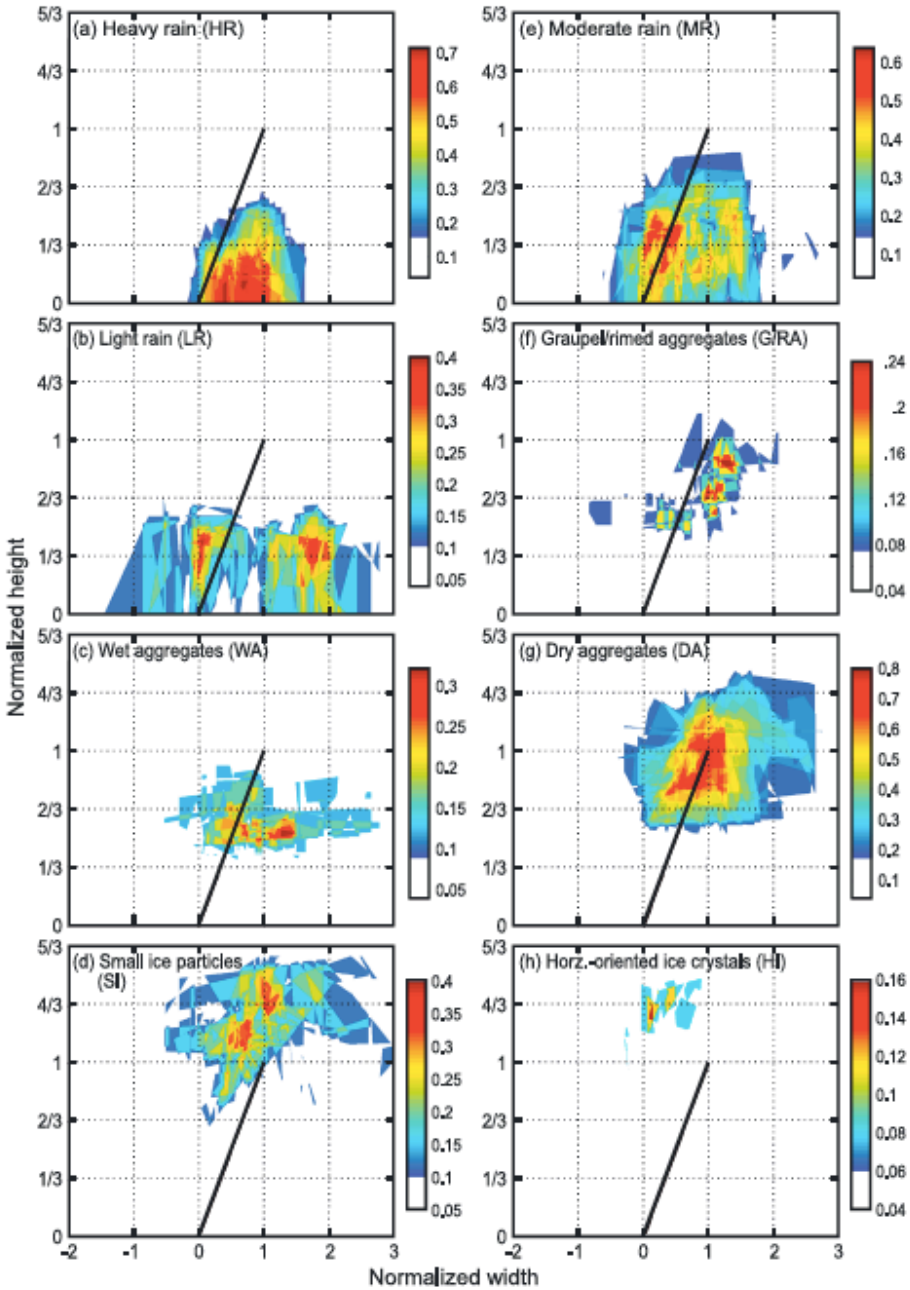
<u>Implication:</u> **Shallow cumulus parameterization is as important as deep cumulus parameterization to MJO prediction.**

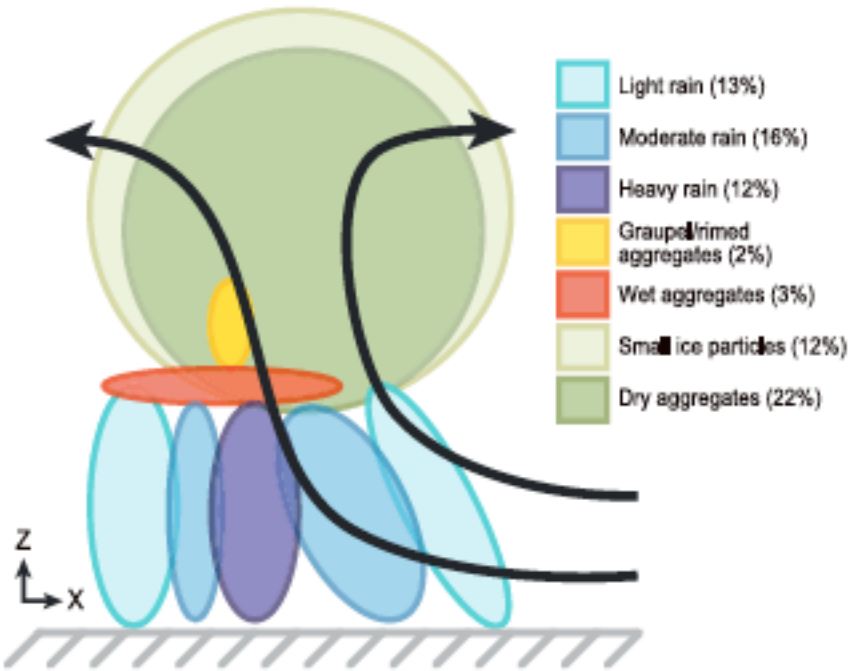
Ocean Memory of the MJO



Moum et al. (2014)

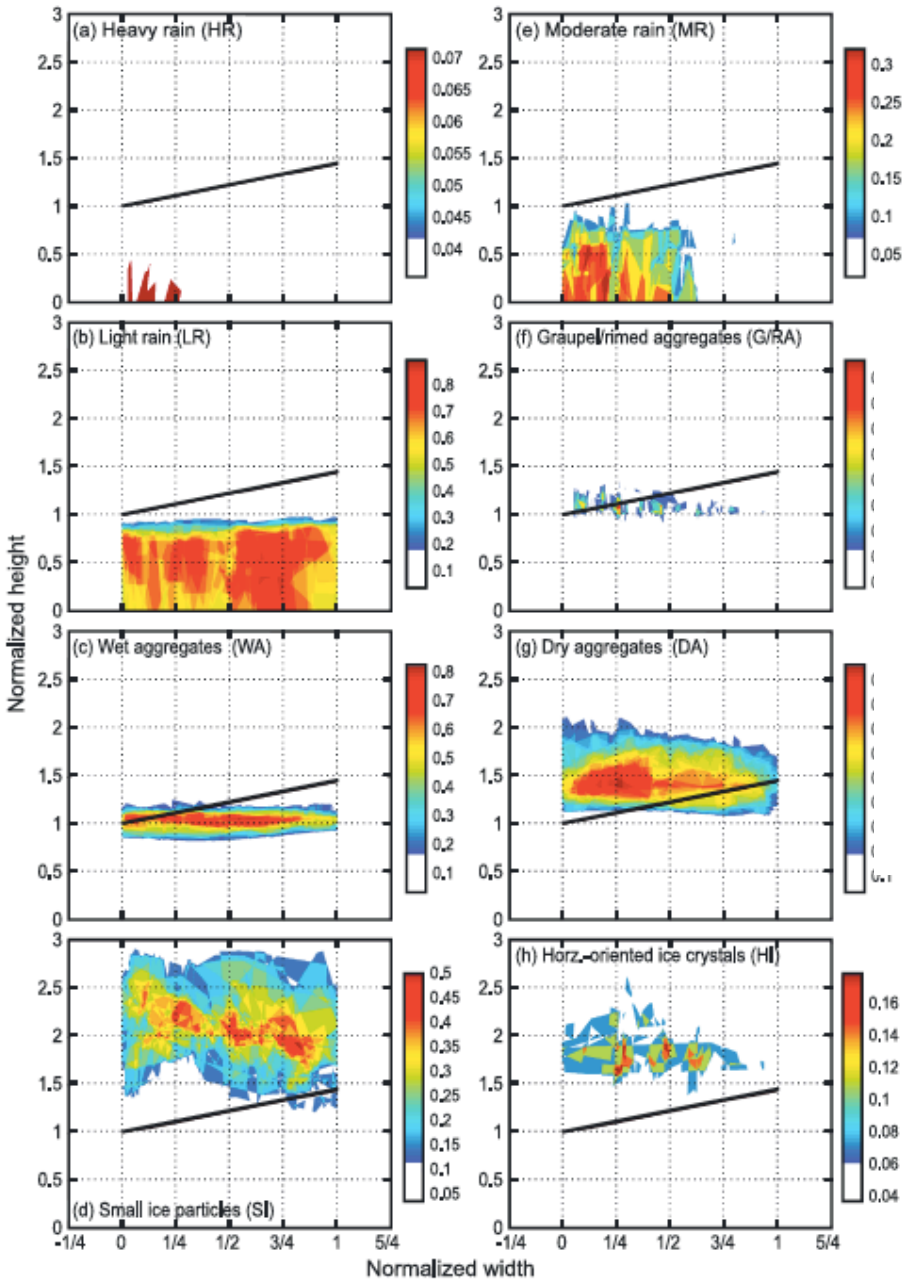
Microphysics Retrieval from Dual-Polarimetic Radars

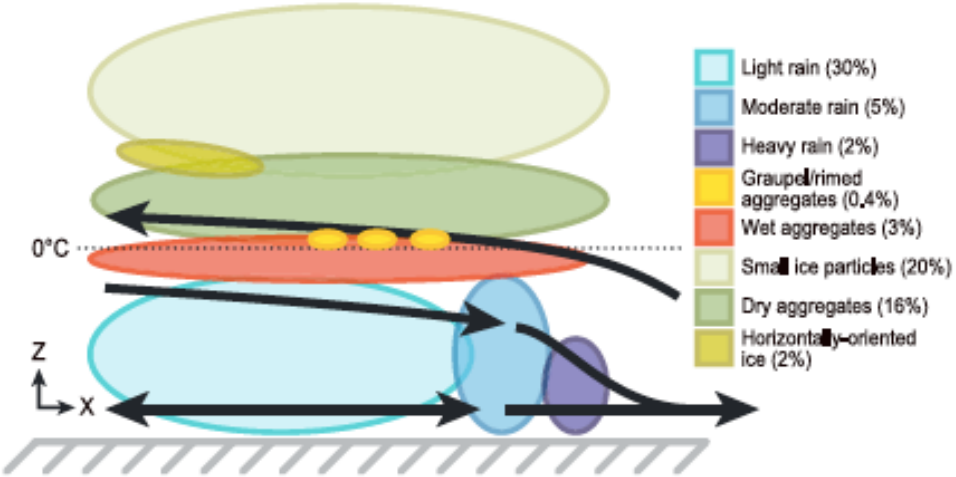




Barnes and Houze (2014)

Microphysics Retrieval from Dual-Polarimetic 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.