

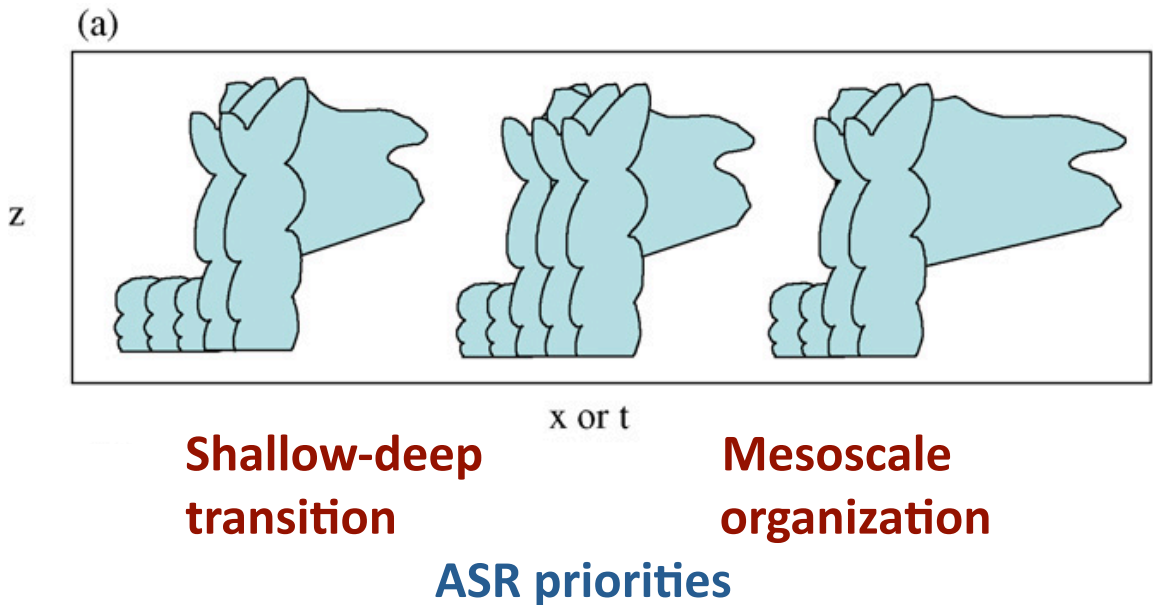
Cumulus Parameterization Development in ASR and FASTER

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NASA/GISS

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The convective lifecycle

Mapes et al. (2006)



Convection-related problems in GCMs:

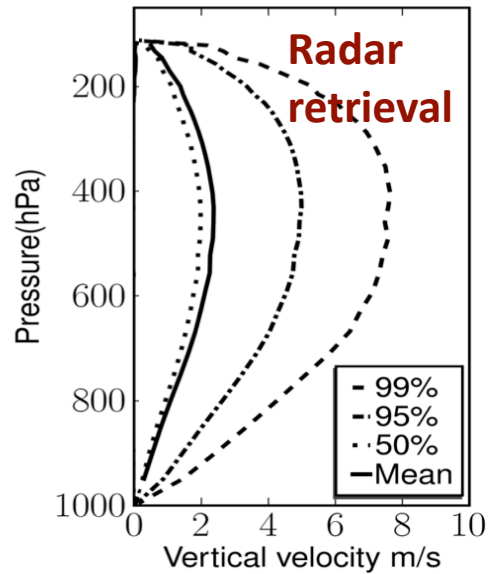
- Deterministic quasi-equilibrium behavior
- Madden-Julian Oscillation
- Double ITCZ
- Diurnal cycle of continental precipitation

Recent progress on MJO and (to some extent) diurnal cycle via stronger convective entrainment

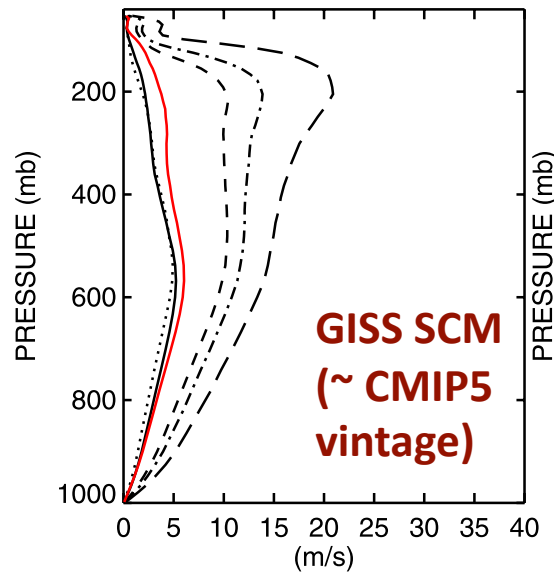
How to validate entrainment?

- Direct estimates: FASTER (e.g., Lu et al.), ASR (e.g., Jensen/Toto)
- Indirect (but still cloud-scale) indicators? → vertical velocity

Convective cores
to 2350Z 22/01/2006



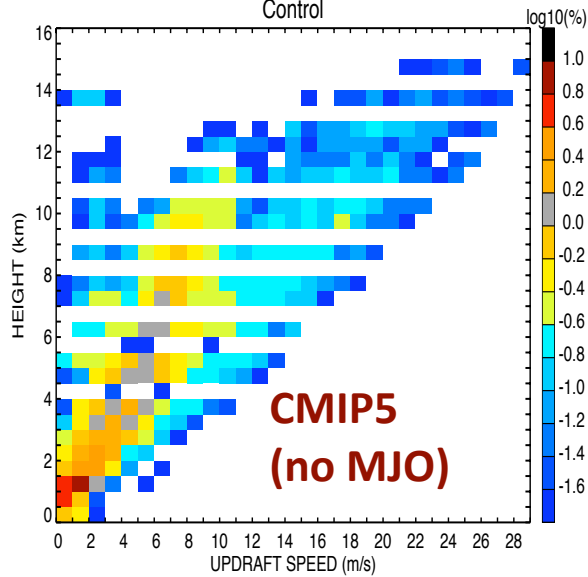
ACTIVE



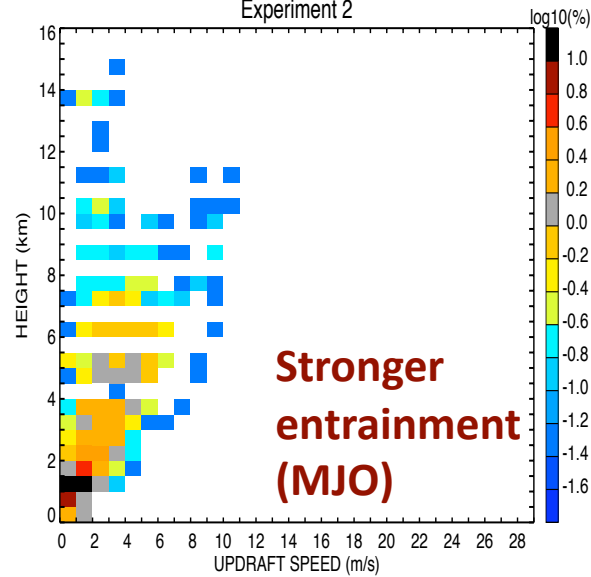
Convective vertical velocity pdf at Darwin

Obs: Collis et al (2013)
SCM: Wu et al. (2009)

Control

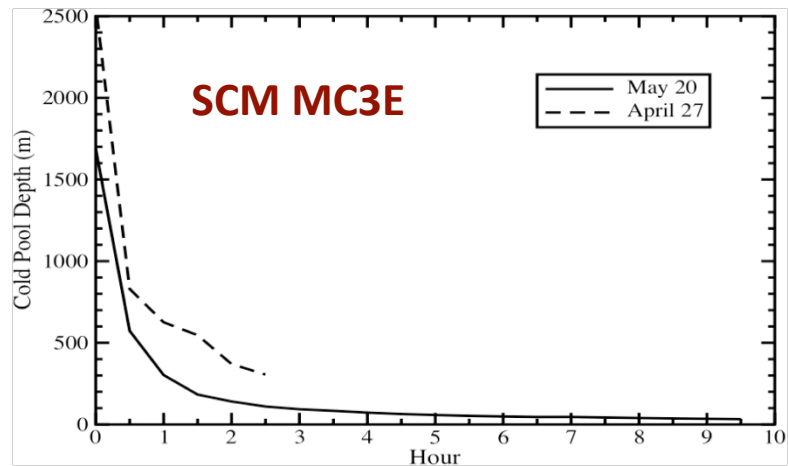
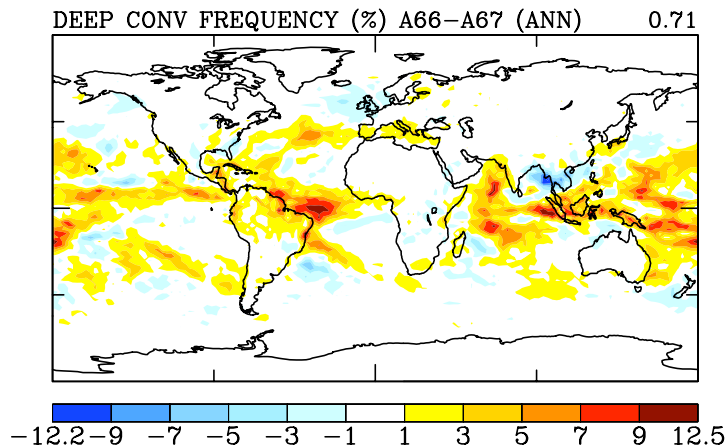
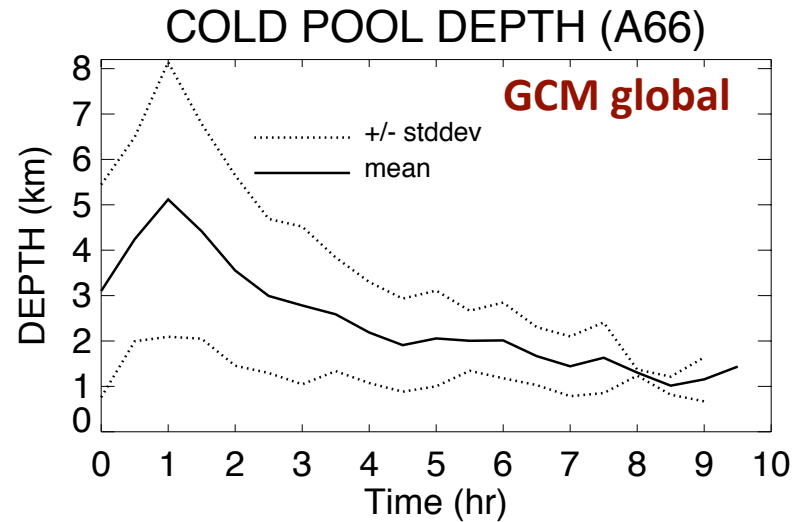
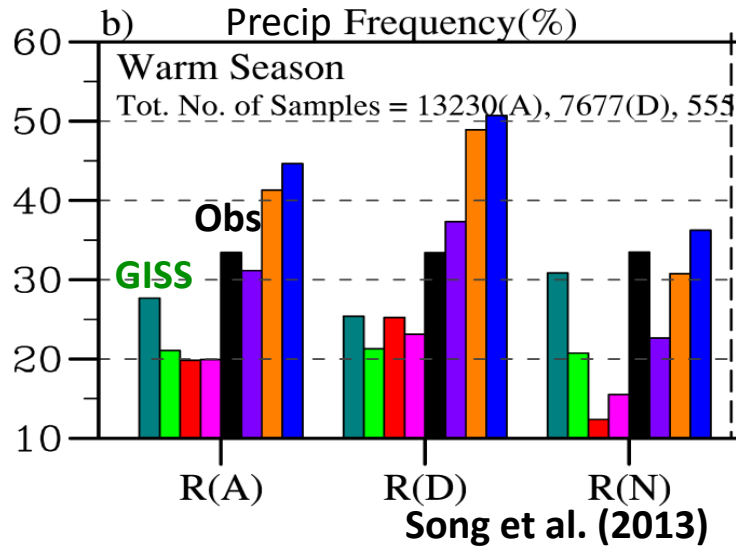


Experiment 2



Semi-prognostic SCM tests at AMIE-Gan

Cold pool parameterization



- Frequency of deep convection an issue for triggered Cu parameterizations
- Cold pools increase frequency, but not in midlatitudes – mesoscale forcing?