Composite Analysis of GFDL SCM: Implications for FASTER

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FASTER breakout
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Composite based on 500 mb vertical motion using 3-year ARM OBS, AM2, and AM3

- Top heavy cloud fraction for model
- Model has more low and upper level cloud when subsidence dominates
Composite based on total precipitation rate using 3-year ARM OBS, AM2, and AM3

- Model has larger upper level cloud fraction

- OLR is close between OBS and models, while TOA SW absorbed is different, which implies diurnal cycle may be not correct in model.
Composite of cloud fraction, LWP, IWP, OLR, and TOA SW absorbed

The connection between SCM and GCM is not obvious

Need of separation between stratiform and convective precipitation from ARM observations
Some conclusions

1. SCM precipitation is well constrained by forcing, but cloud is not.

2. For the same stratiform precipitation, GCM generally has larger cloud fraction than SCM.

3. Convection triggering is too frequent in AM2 SCM.

4. Composite analysis using long term SCM simulations is helpful to identify some systematic errors.
Future work

Diurnal cycle