Title

Observation of the Shallow-to-Deep Convection Transition in Amazonia

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Abstract

In tropical continental regions, atmospheric convection spans a wide range of spatial and temporal scales and is hardly properly captured by regional or global atmospheric models. The representation of shallow-to-deep (STD) convective transition is particularly challenging, which limits the confidence of modeled climate change impacts on the hydrological cycle.

Here we make use of Cloud Top brightness Temperature (CTT) from GOES13 and ground observations from DOE/ARM deployment in the Amazon region (GoAmazon 2014/5, Martin et al., 2017) to study the STD transition. Following the approach of Adams et al. (2017), we identified 86 afternoon STD events from sep-2014 to aug-2015, and built composites centered at the time of minimum CTT (t_0) for various thermodynamic variables.

Our results show the PBL (LCL) height rising from 250 m (200 m) at -12h to 800 m (600 m) a -4h, while the LFC is dropping from 1750 m to 750 m, and CAPE is increasing from 800 J/kg to 2200 J/kg. Warm (CTT > 0^{o}C) and cold (CTT < -38^{o}C) cloud fractions are rather constant during these first hours, around 25% and

Results from previous studies for the dry season (Jun-Nov) indicate anomalously high PWV at begin of days with the STD transition (Ghate and Kollias, 2016). We found that this is not the case during the wet season (Dec-May), and we are currently investigating other possible mechanisms.

References

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