Sensitivity of the STD transition to Environmental Controls based on CRM simulations

Henrique Barbosa, Leandro Viscardi,

David Adams, Giuseppe Torri

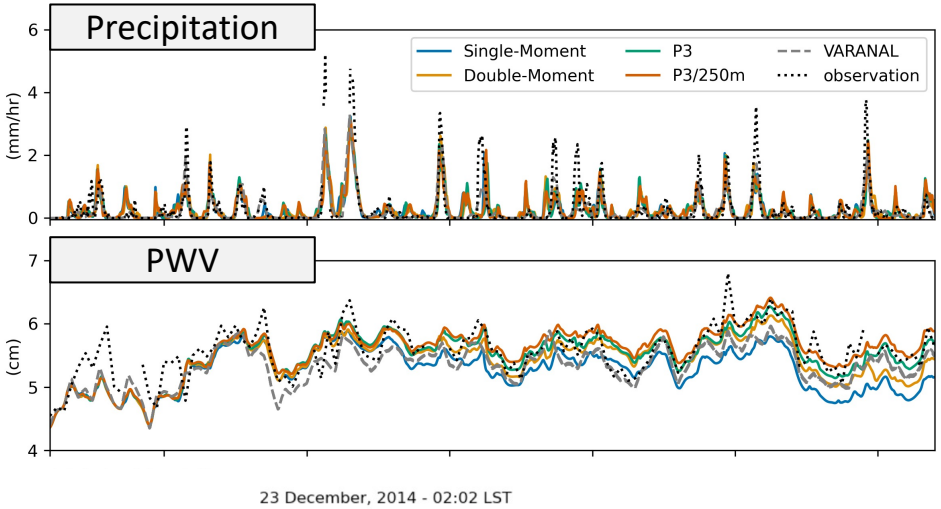
SAM (Khairoutdinov & Randall, 2006)

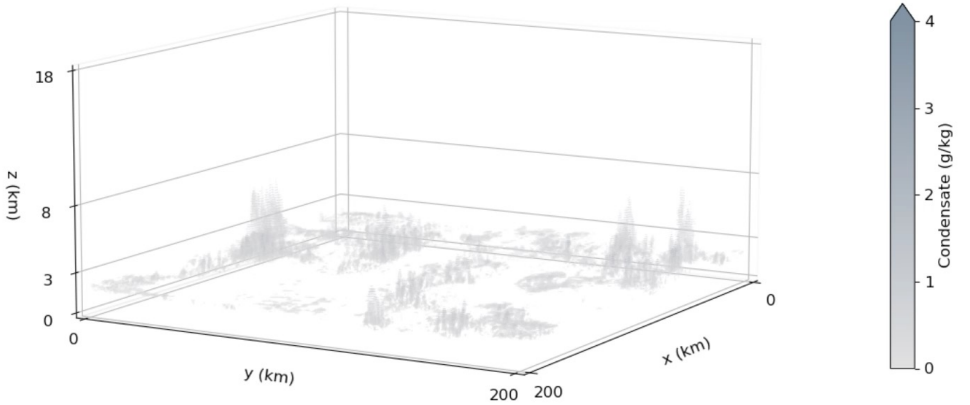
- Domain: 200 x 200 x 27 km
- Horizontal resolution: 500 m (also tried 250 m)
- Vertical resolution: 50-300 m (trop) 300-500 m (strat)
- Time step: 5 sec
- Forcing: VARANAL during December 2014 (GoAmazon)
- Microphysics: P3 scheme (also tried single- and double-moment)
- Nudging: UV every 2-hr
  q every 6-hr, first 5 days (spin-up)
- **Surface fluxes: Simplified Land Model (SLM)**

SLM ‘tunning’

- Vegetation:
  - Type from MODIS
  - LAI from MODIS
  - NIR Albedo
- Soil:
  - 11 layers down to 4 m deep
  - T_{soil} and q_{soil} from GLDAS-2
  - Sand/Clay fractions

OBS of soil and vegetation are key.





December 20

SENSITIVITY EXPERIMENTS

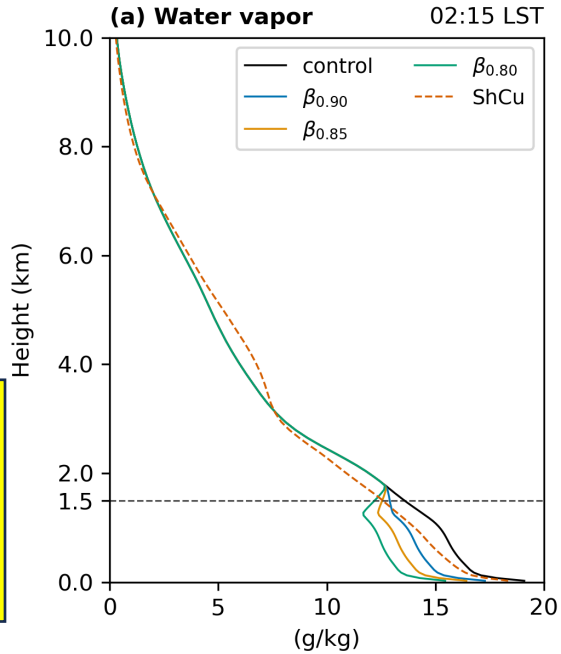
We also did perturbations:
- Moisture convergence
- Wind shear

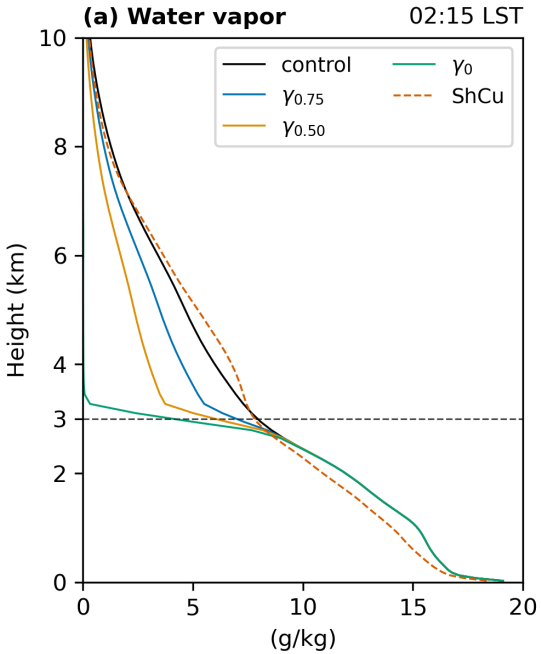
Moisture perturbation on STD days at 02 LST

- Low levels (< 1.5 km)
- Free troposphere (> 3 km)

- Composites for
  - 2014 Dec-17, 21, 23, 26

OBS used to define ShCu, Cong, and Deep days. Could we agree on one classification?

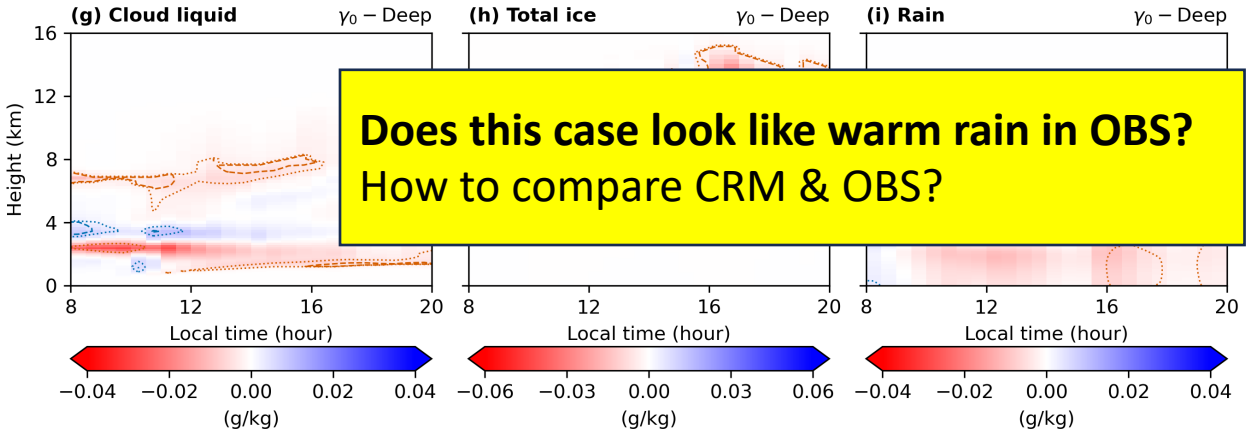




Free troposphere

100% less Q

Big perturbation, small impact: no cold phase, but still rains



Does this case look like warm rain in OBS?
How to compare CRM & OBS?

PBL

20% less Q

Minor perturbation, huge impact: no STD transition & no rain