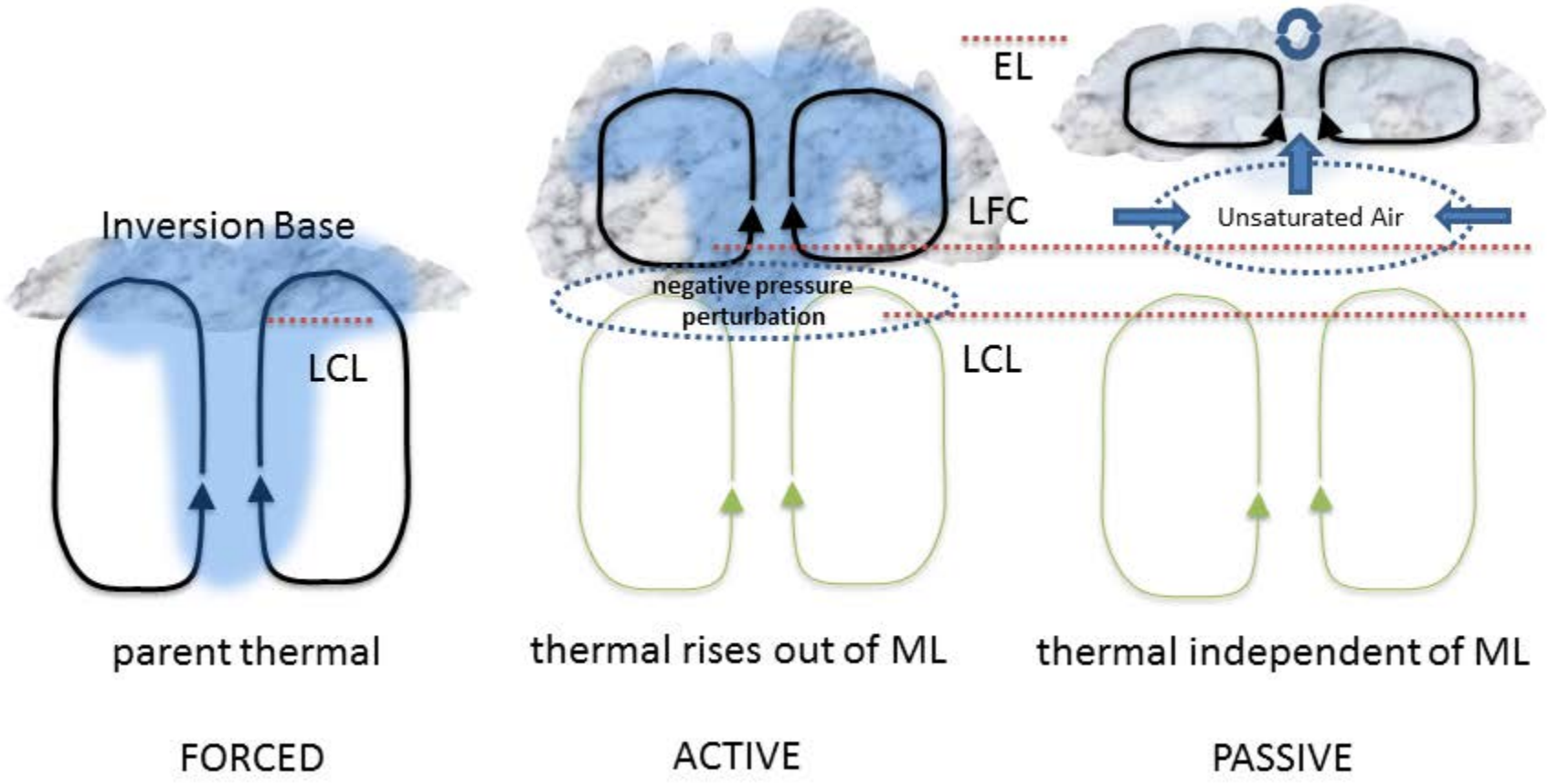
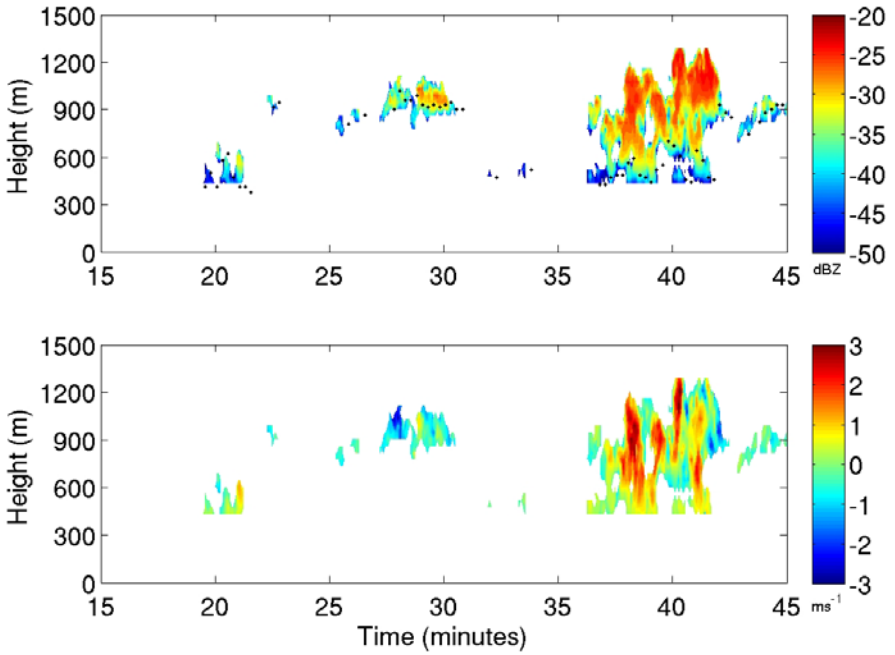
Site Science: AMF1

- Team: Mark Miller, Virendra Ghate, Lynne DiPretore (Ph.D. student), Robert Zahn
- Brazilian Partners: David Adams (University of the Amazon), Paulo Artaxo (University of Sao Paulo), Gilberto Fisch (CTA), Luiz Machado (INPE) and others


Inversion Base
LCL
EL
LFC
Unsaturated Air
negative pressure
perturbation
LCL
parent thermal
thermal rises out of ML
thermal independent of ML
FORCED
ACTIVE
PASSIVE

Cloud Radar Analysis

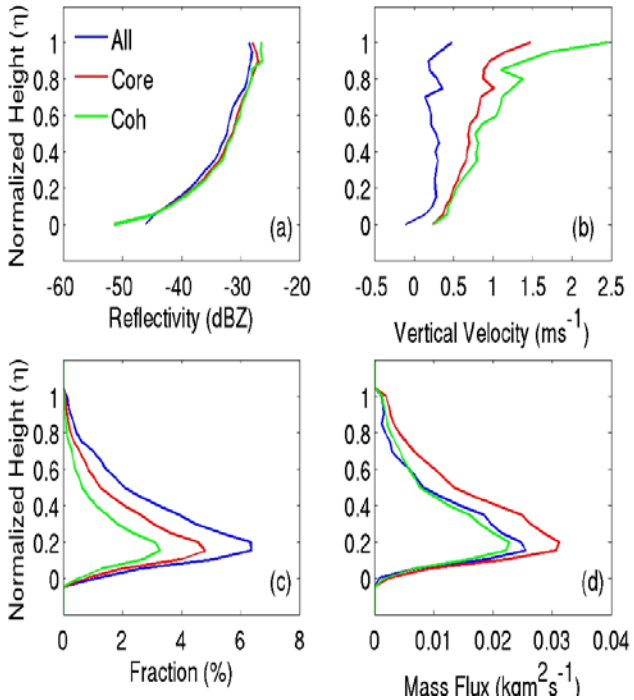
- Cloud Dynamics and Microphysics



Sample 30-min period showing the reflectivity (top) and mean Doppler velocity as observed by AMF cloud radar

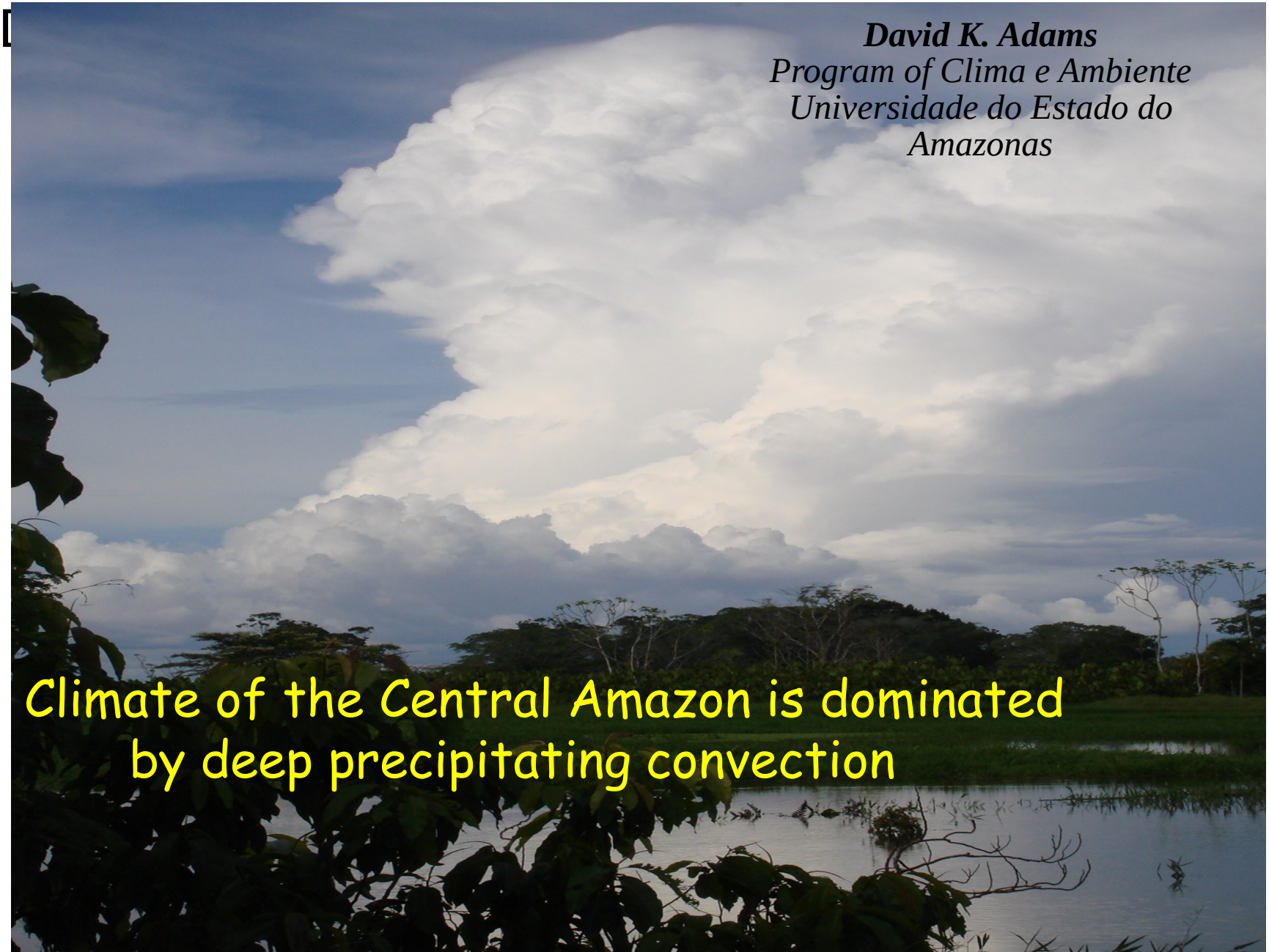
Dots: laser ceilometer observed first cloud base height

Composites for 557 Cumulus



BL depth normalized profile of hourly averaged (a) effective reflectivity factor, (b) vertical velocity, (c) cloud fraction and (d) mass flux. (see poster for details)

Ghate, Miller, and DiPretore (2011; JGR submitted)



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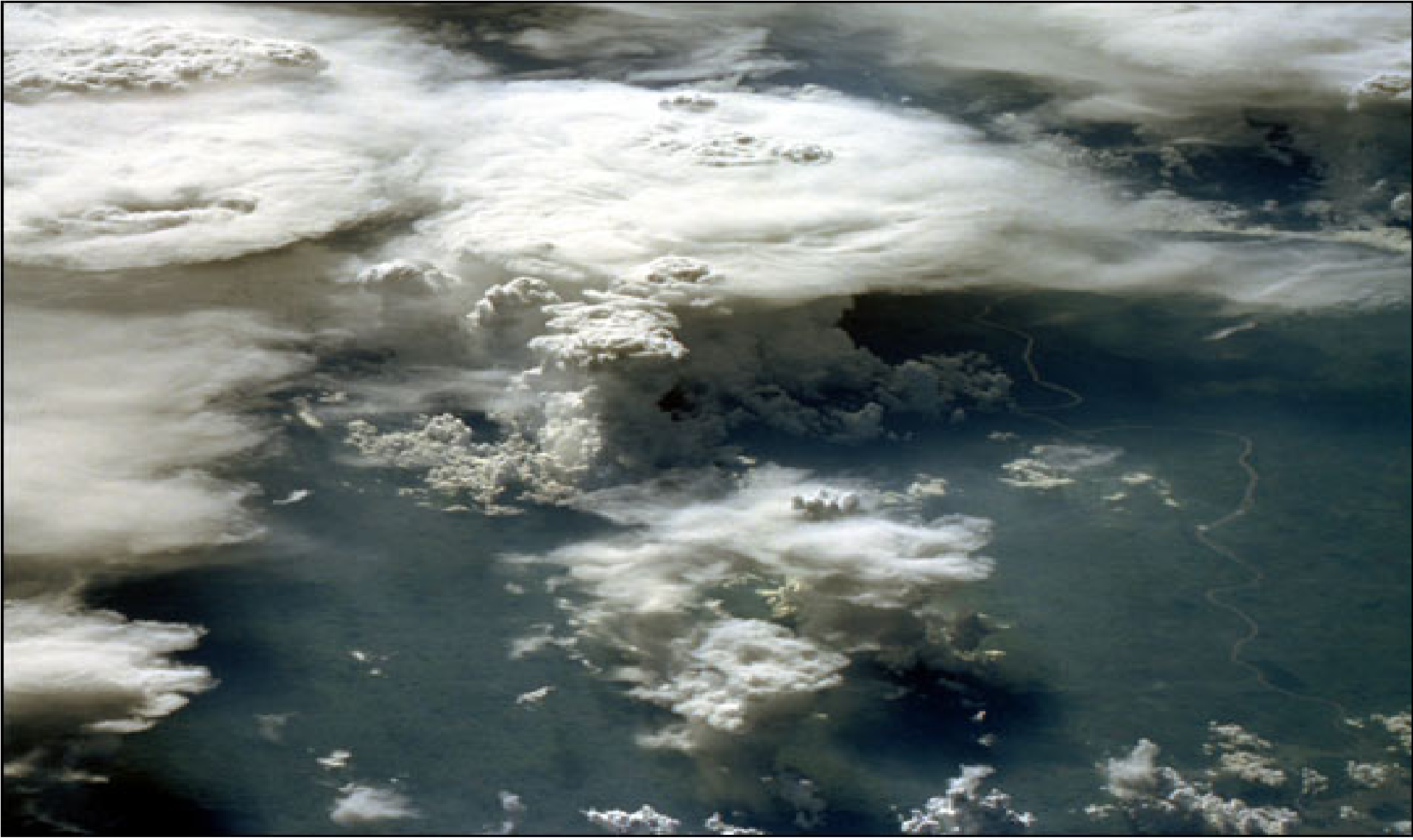
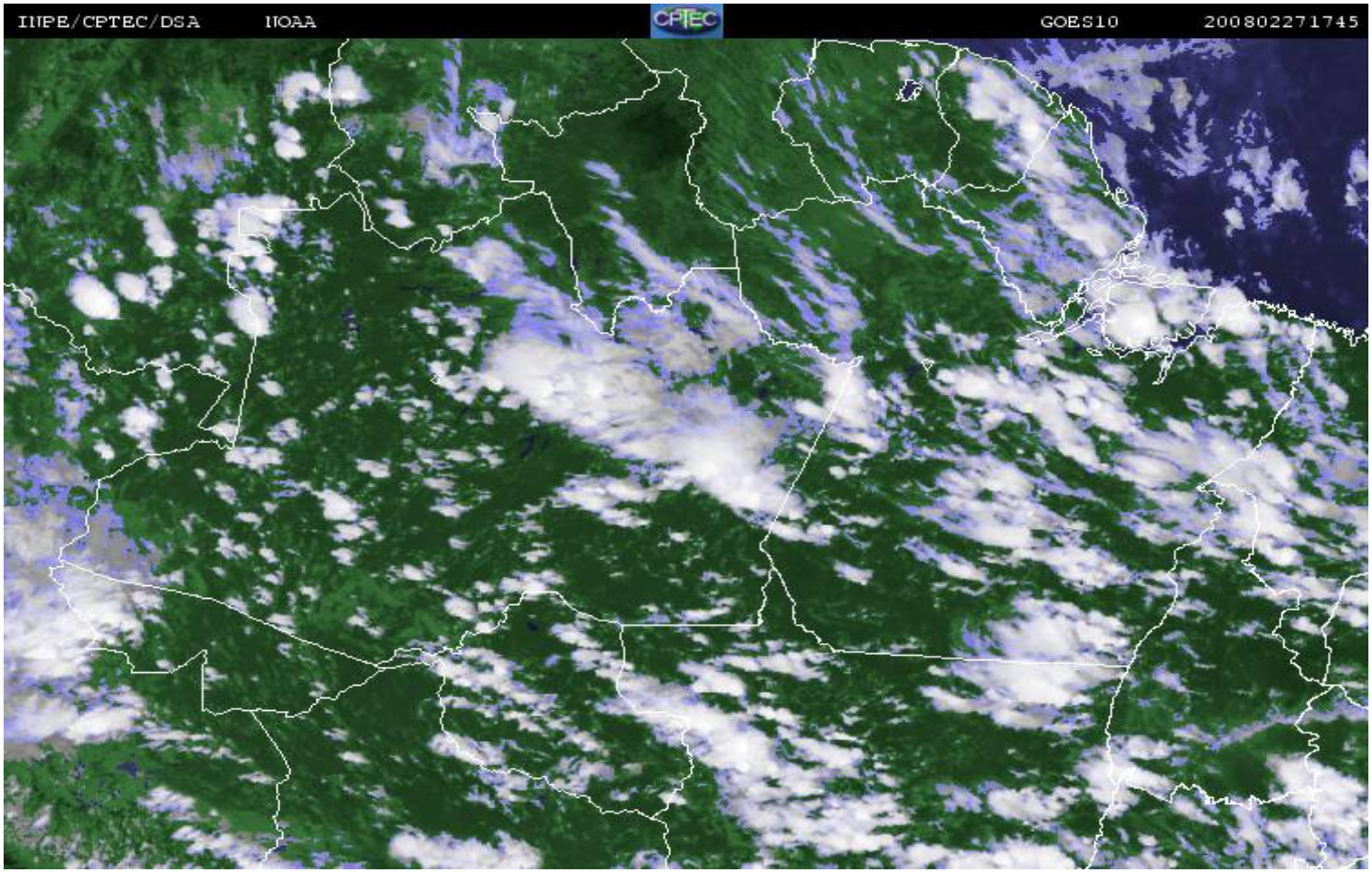
Universidade do Estado do Amazonas

Climate of the Central Amazon is dominated by deep precipitating convection

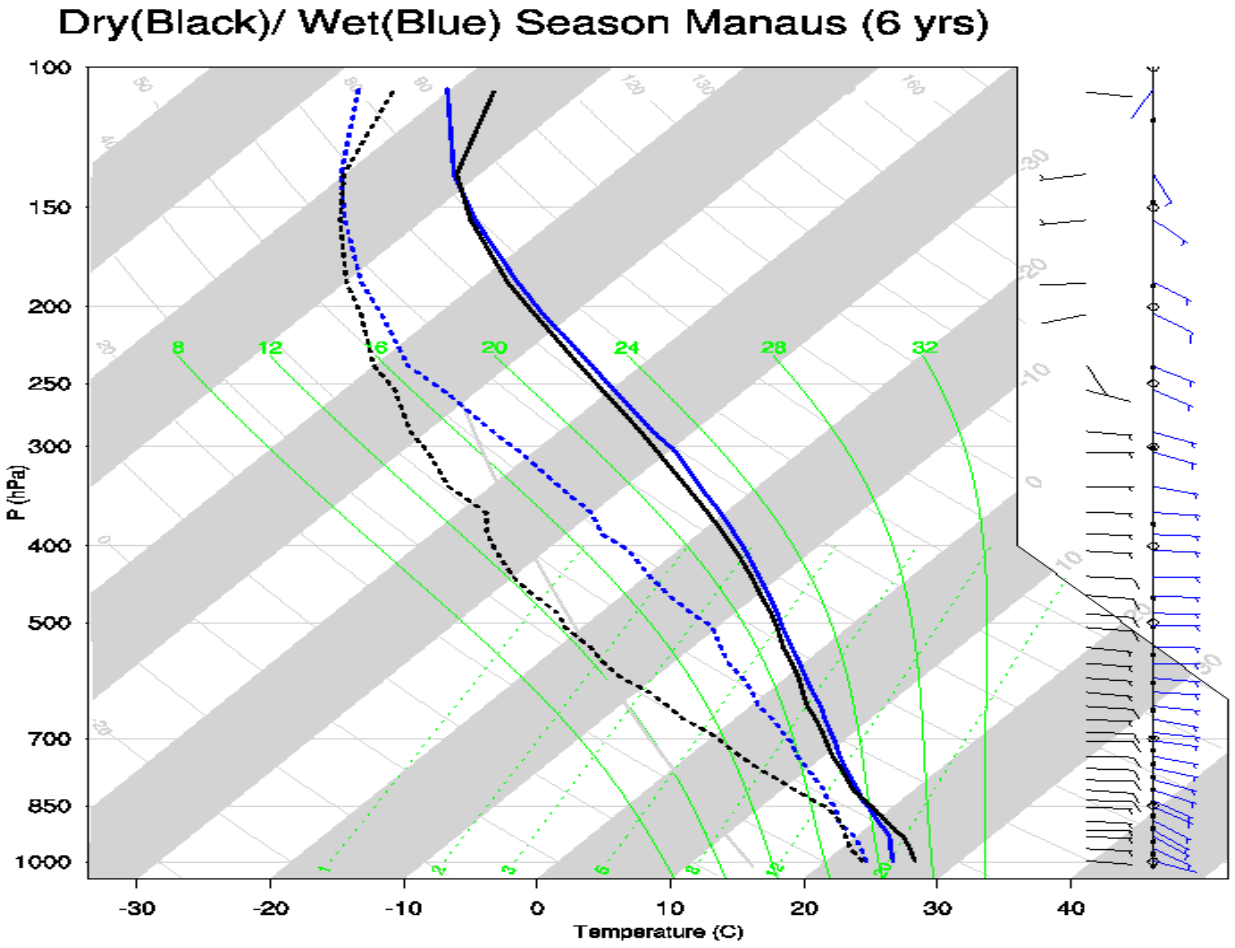


Deep Convection in the Amazon transfers mass, heat, momentum, water vapor/liquid/ice and chemical species vertically



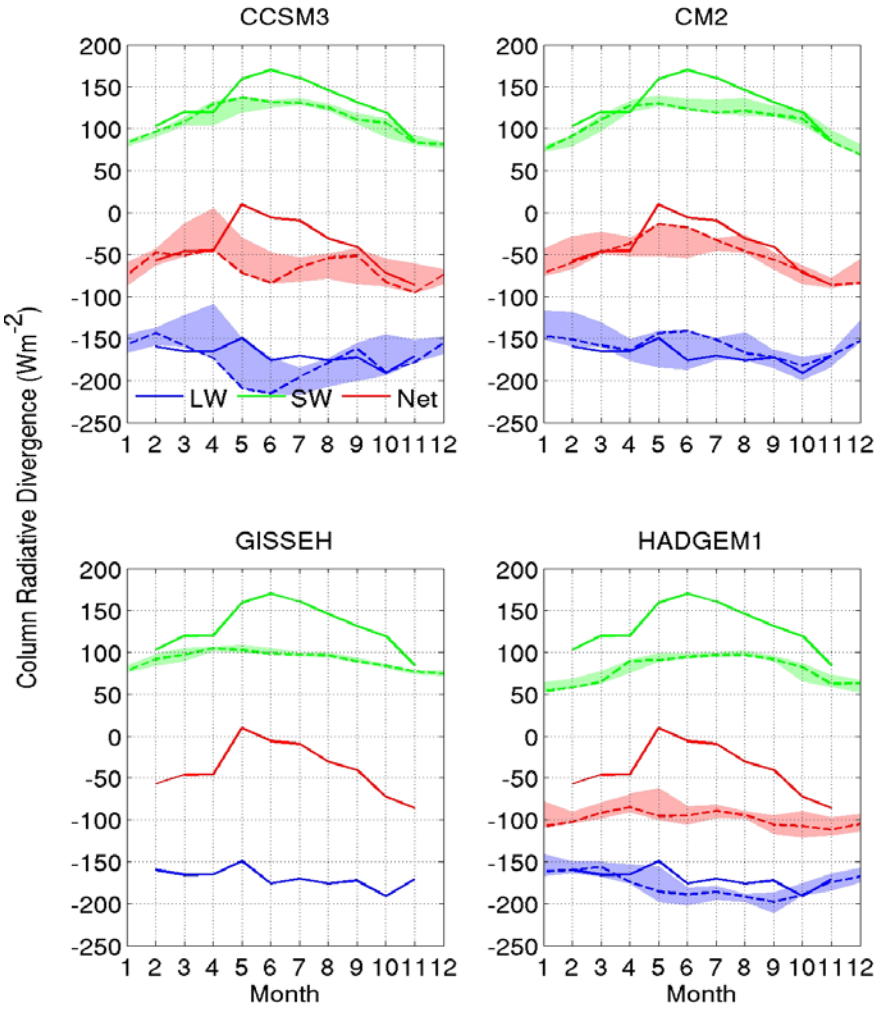
- Strong tendency for convection to organize from individual cells to mesoscale convective systems

Vertical distribution of WV strongly modulates the occurrence of Deep Convection



Radiative Flux Divergence in the Sahel:
AMF-GERB measurements versus four IPCC-AR4 GCMs

- **Broadband longwave radiative flux divergence accurately simulated**
- **Significant discrepancies in broadband shortwave radiative flux divergence**



Shaded Regions: 10-year envelope of GCM monthly averages centered on 2006

Solid Lines: Monthly averages of AMF-GERB measurements for 2006

Dashed lines: GCM monthly averages for 2006

Miller, Ghate, and Zahn, 2011 (J. Climate, submitted)

Summary of Interests

- Analysis of cloud radar data
  - Mass flux
  - Vertical velocity statistics
  - Link to thermodynamics
  - Investigate entrainment?
  - Cloud life cycle (particularly shallow convection)
- Cross-atmosphere radiative flux divergence
  - Cloud Radiative Divergence Forcing (CRDF)
  - Seasonal variation
  - Comparison of measurements with AR-4 and AR-5 GCM simulations