

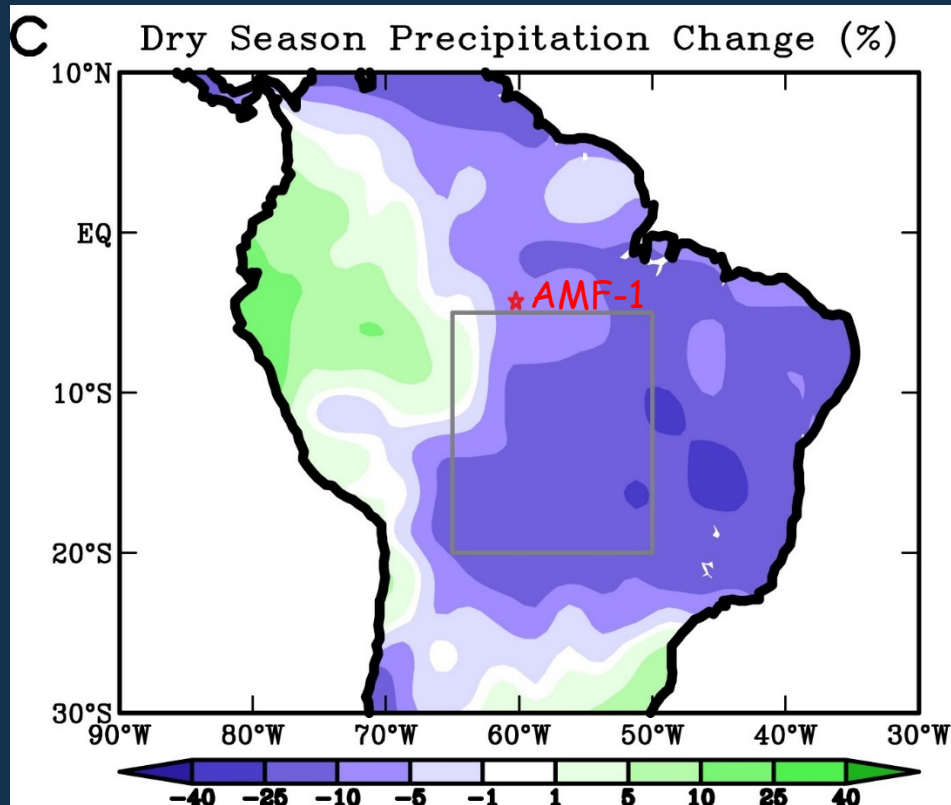
On the controls of daytime precipitation in the Amazonian dry season

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Ghatge V. P. and P. Kollias, 2016: On the controls of daytime precipitation in the Amazonian dry season. *under review, J. Hydrometeorol.*

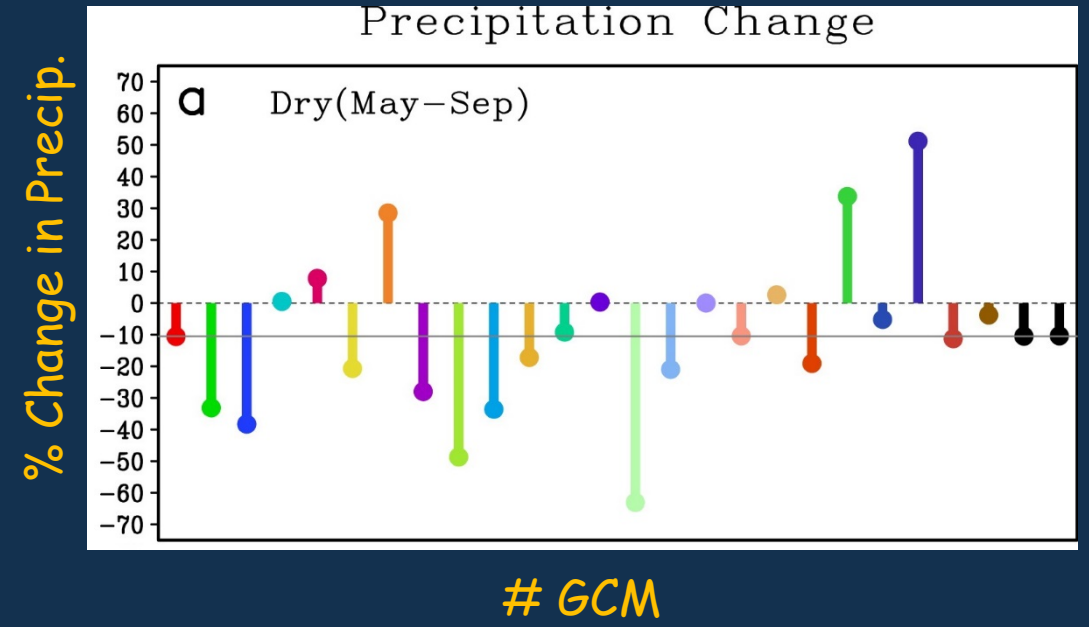


Motivation



Ensemble median difference in dry season precipitation between 2070-2099 and 1961-1990 from 24 IPCC models.

Cook et al. 2012, Earth Interactions



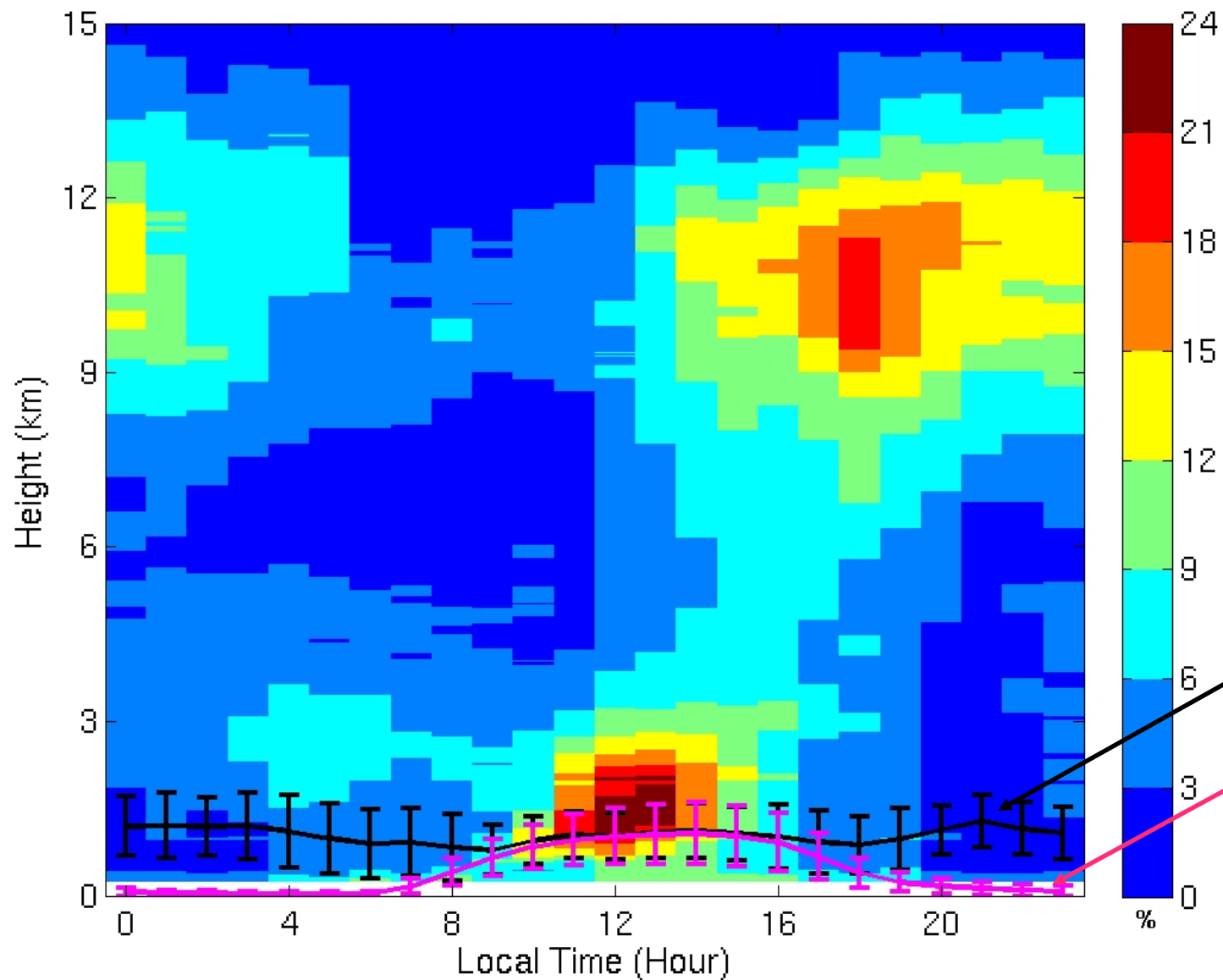
- GCM forecast the dry season to get drier (~11%) and longer (~10 days) in the Southern Amazonia.
- Considerable spread exists between the model projections.
- Dry season precipitation has a huge impact on the rainforest.
- Which factors control precipitation during the Amazonian dry season?

Methodology

1. Characterize the mean diurnal cycle during the dry season.
2. Contrast the diurnal cycles of days with cumulus clouds only (no rain) and daytime precipitation.
3. Study the progression of key variables during the dry season.

Related to the basic science question outlined at the ASR workshop on convection "What are the relevant processes leading to organized convection through a seamless sequence, manifested as the diurnal cycle?"

Average Diurnal cycle of Cloud Fraction

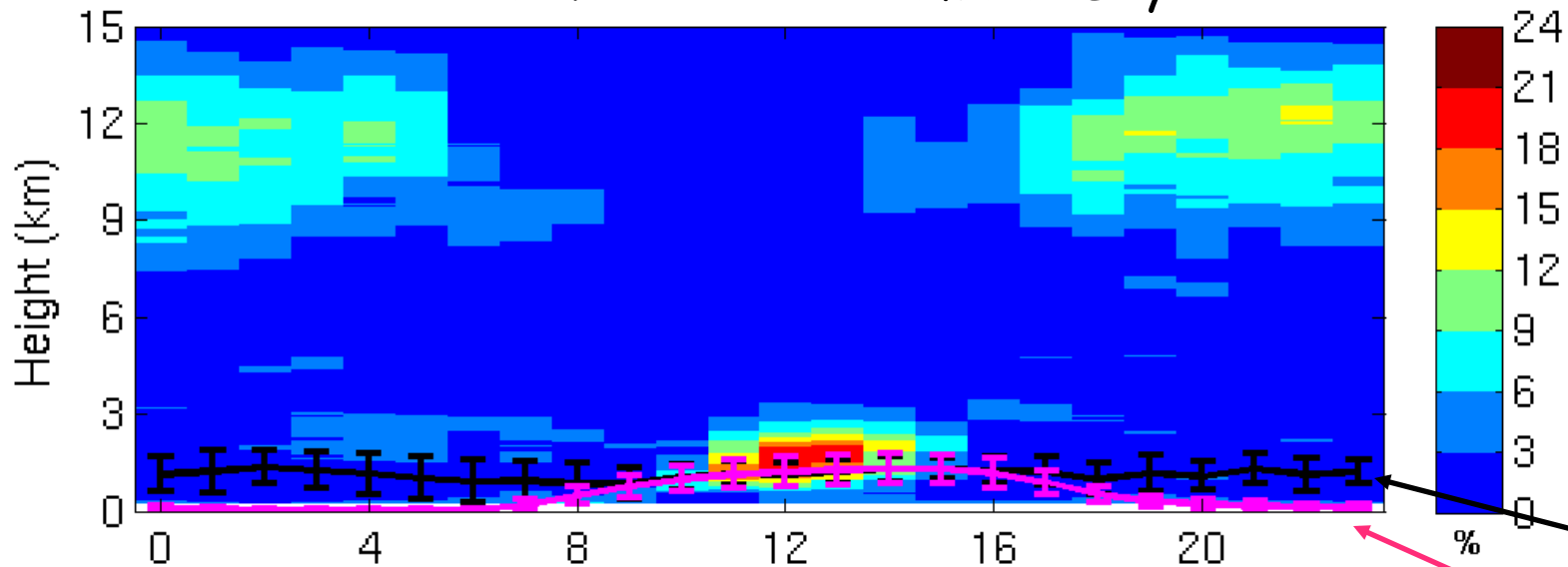


- Presence of low-level clouds during the daytime.
- Ubiquitous presence of Cirrus clouds.

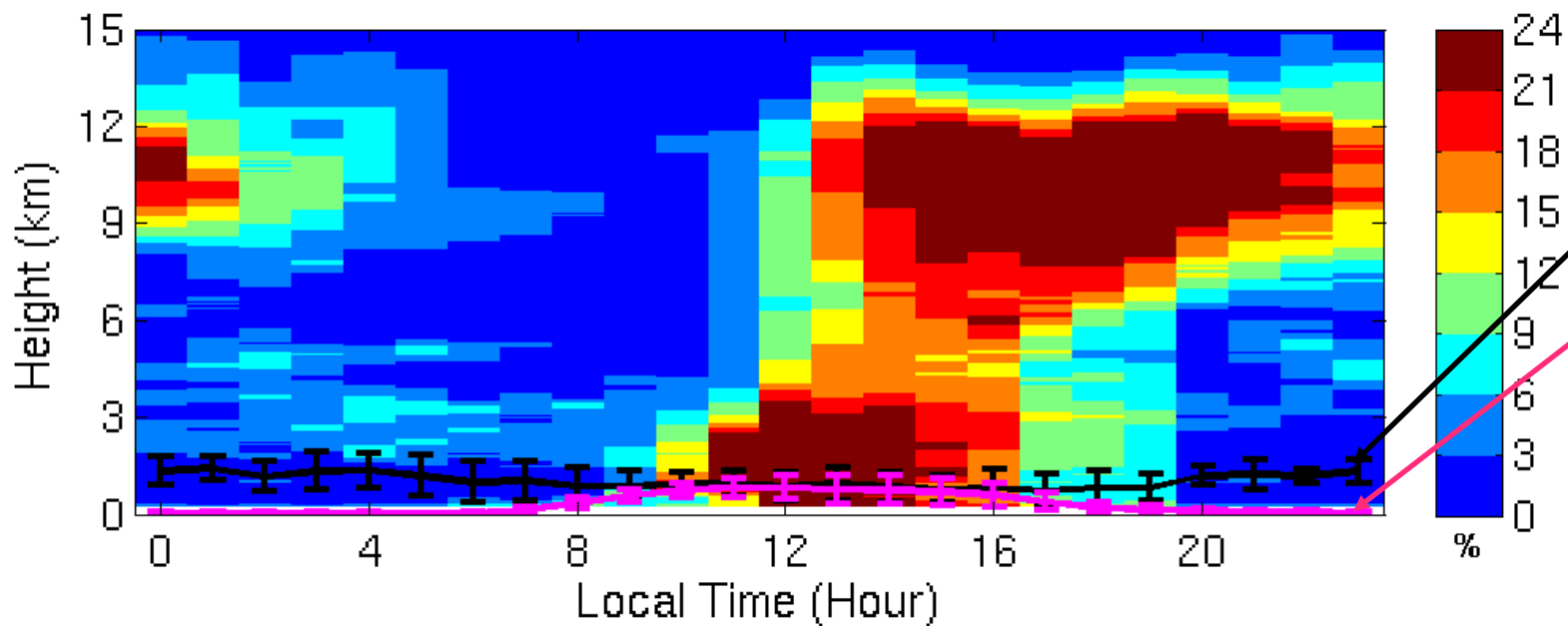
Cloud Base Height

Lifting Condensation Level

Cloud Fraction on Cumulus Days



Cloud Fraction on Precipitation Days

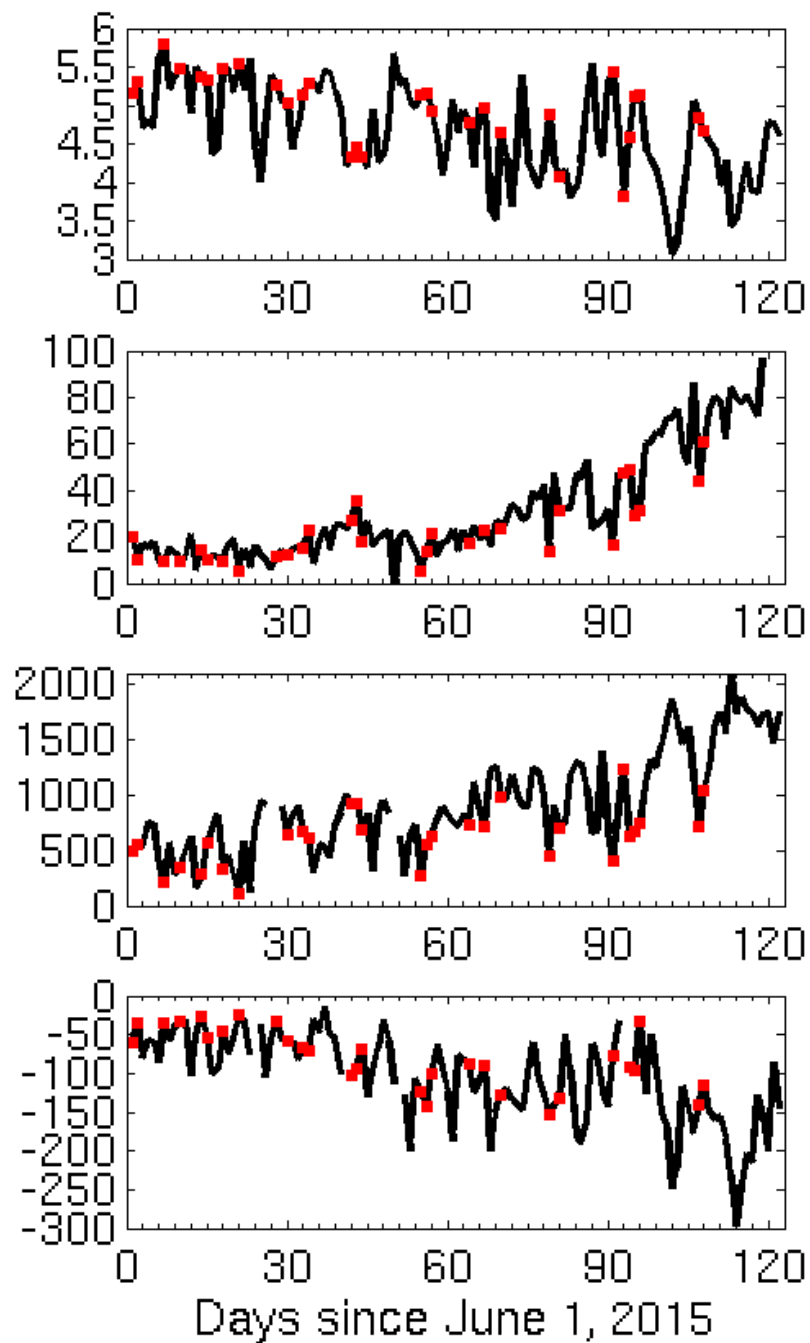
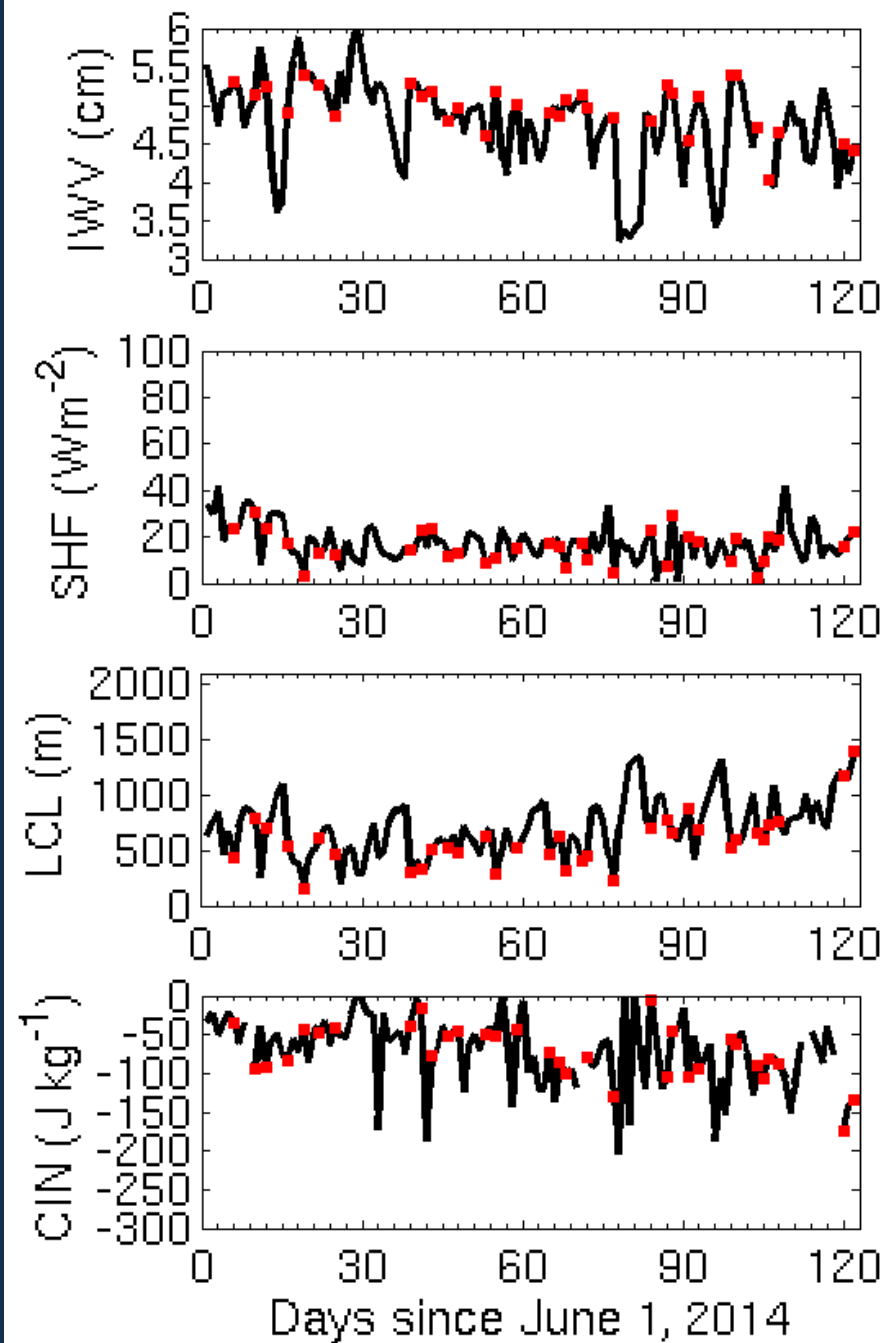


138 Cumulus Days
64 Precipitation Days

Cloud Base Height

Lifting Condensation Level

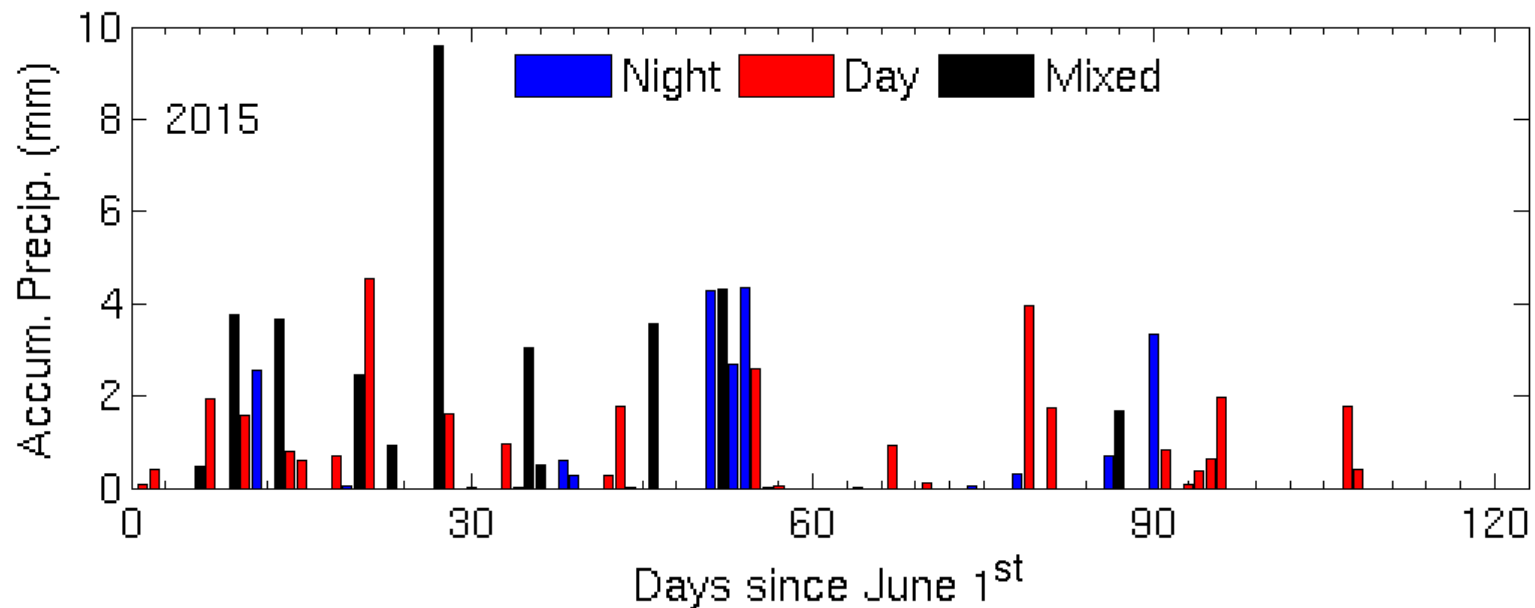
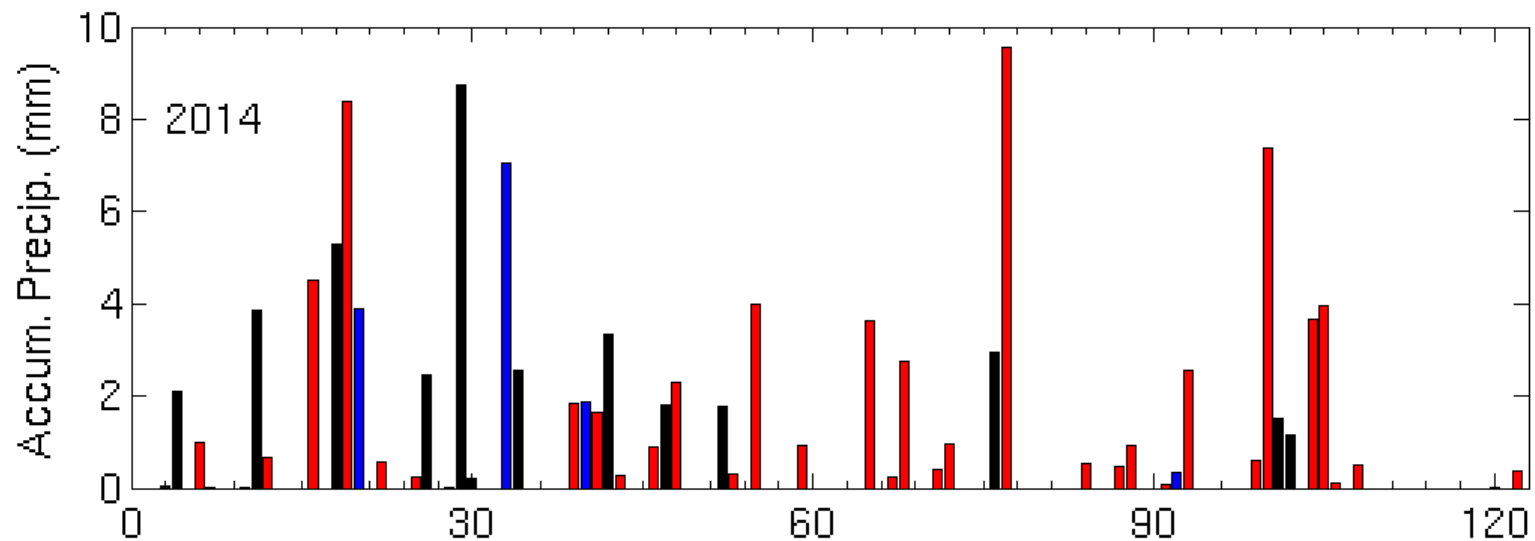
Parameter	Cumulus Days (# 138)	Precipitation Days (# 64)	t value
Integrated Water Vapor (cm)	4.41	4.98	6.77
Lifting Condensation Level (m)	1010	608	21.22
Sensible Heat Flux (Wm^{-2})	28.44	18.47	6.77
Convective Inhibition (J Kg^{-1})	-98.94	-76.40	3.32



- Considerable differences between 2014 and 2015 dry seasons.
- Greater than 2cm fluctuations in IWV over short periods.

END

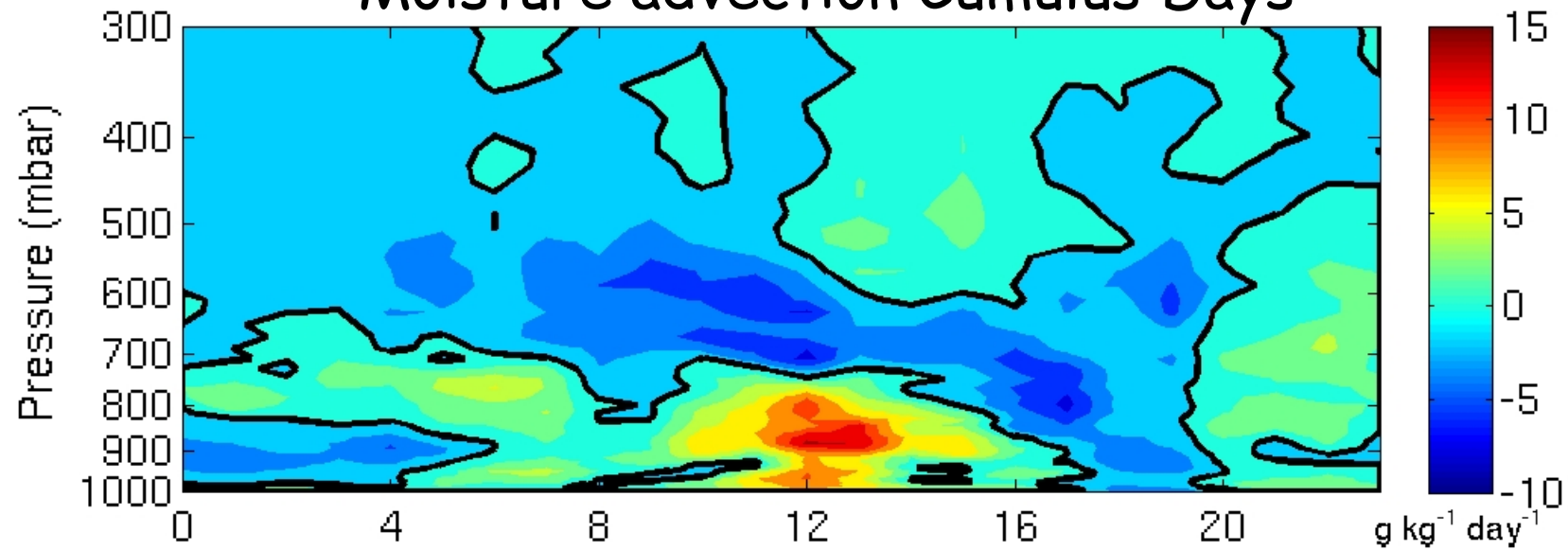
- Poster#30 in the GO Amazon session.



- Day: 9am-9pm
- Night: 9pm-9am
- Mixed: Intersection of Day and Night

- 63 daytime Rain Events
- 42 nighttime rain events
- 26 mixed rain events

Moisture advection Cumulus Days



Dry advection
above the
boundary layer on
cumulus days.

Moisture advection on Precipitation Days

