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The Evolution of Deep Convective Cloud Kinematic Properties over the Amazon Rainforest with Cloud Lifetime

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October 24, 2022

2022 ARM/ASR Joint User Facility and PI Meeting

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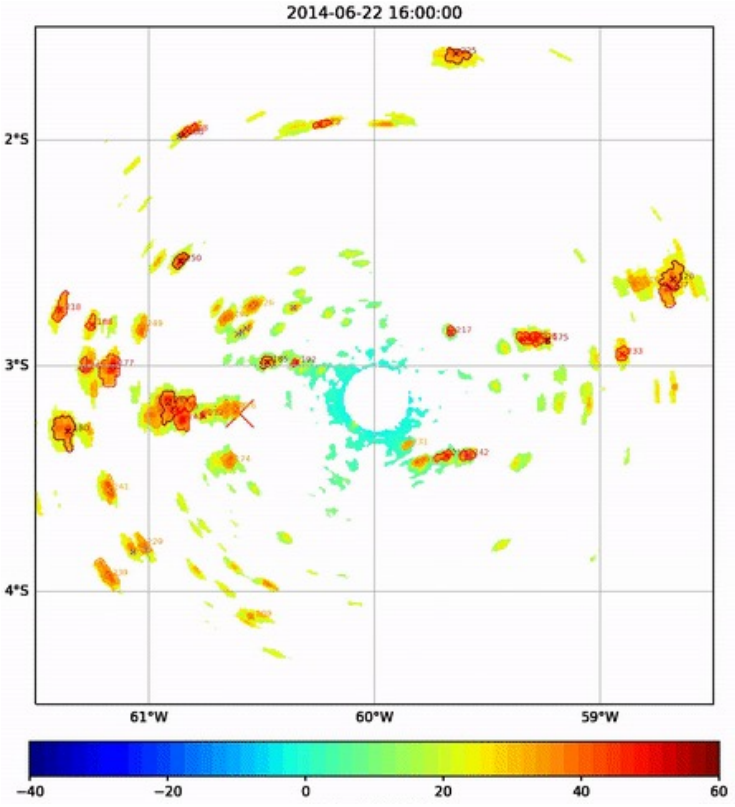
Introduction

Aerosol effects on deep convective cloud (DCC) vigor and underlying processes are uncertain

Limited observations of updrafts and mass flux over cloud lifetime

S-band radar reflectivity from GoAmazon used to track DCC cores using *tobac* (Heikenfeld et al., 2019)

Vertical velocity and mass flux from radar wind profiler examined over different stages of DCC lifetime.



Isolated DCCs tracked for 2014/06/22

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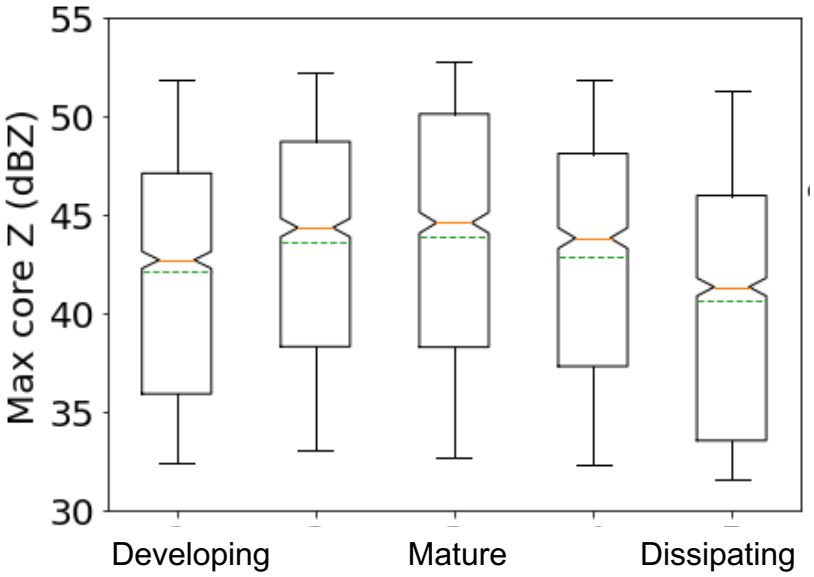
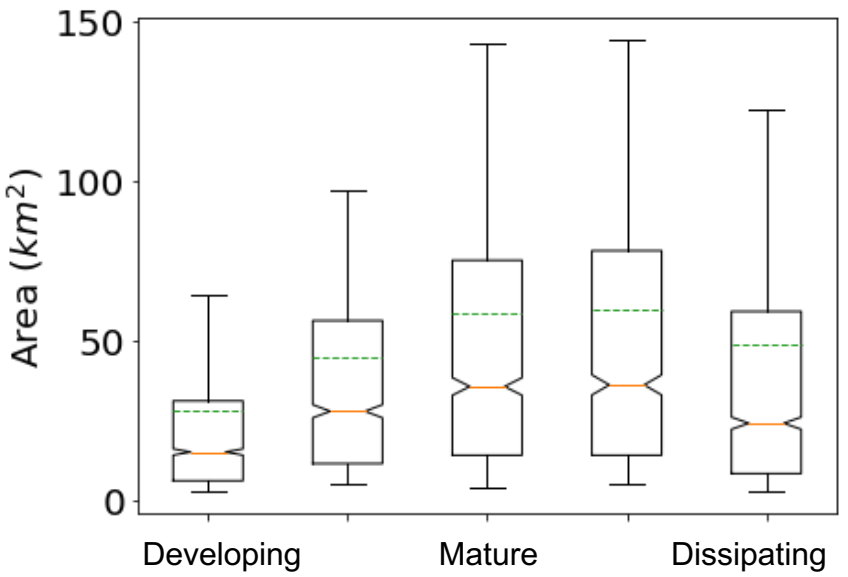
Cloud lifecycle stages





- Tracking DCCs within 100 km of radar wind profiler
- Convective core lifetime divided into 5 parts: *developing, early mature, mature, late mature, and dissipating stages*

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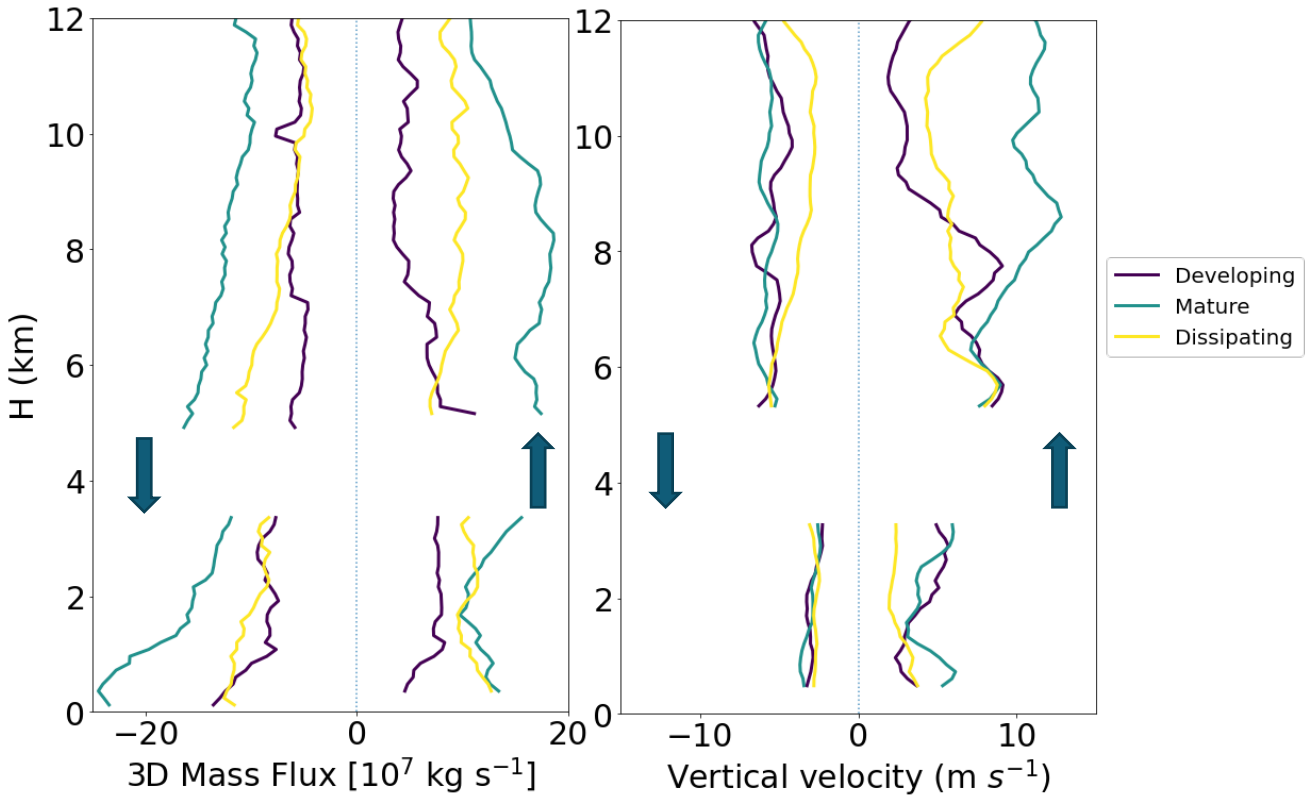
Updraft/Downdraft intensity and Mass Flux



Using high-resolution radar wind profiler data (6s, ~ 1km)

- *Developing* – weak updrafts near surface, strong updrafts at mid-level and low mass flux (smaller cores)
- *Mature* – strongest up/downdrafts, highest mass fluxes
- *Dissipating* – weakest up/downdrafts, net downward mass flux at mid-levels

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Summary

- Amazonia DCCs sampled by S-band radar and tracked using *tobac*
- Convective core lifetime classified into five lifecycle stages
- Strongest up/downdrafts and highest mass fluxes during convective mature stage

2-year dataset with high-resolution vertical velocity profiles, estimates of convective core motion/intensity, and ARM soundings/surface observations – unique dataset for model evaluation

Ongoing work

- Gupta et al. (in prep.) will examine DCC life cycle, precipitation, cold pools, convective organization and their variability across seasons*
- Tracking datasets being developed for SGP and TRACER domains using NEXRAD data to evaluate DCCs over different climate regimes**

**poster 98, **Dié Wang's poster*

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