FAst-physics System TEstbed & Research

FASTER

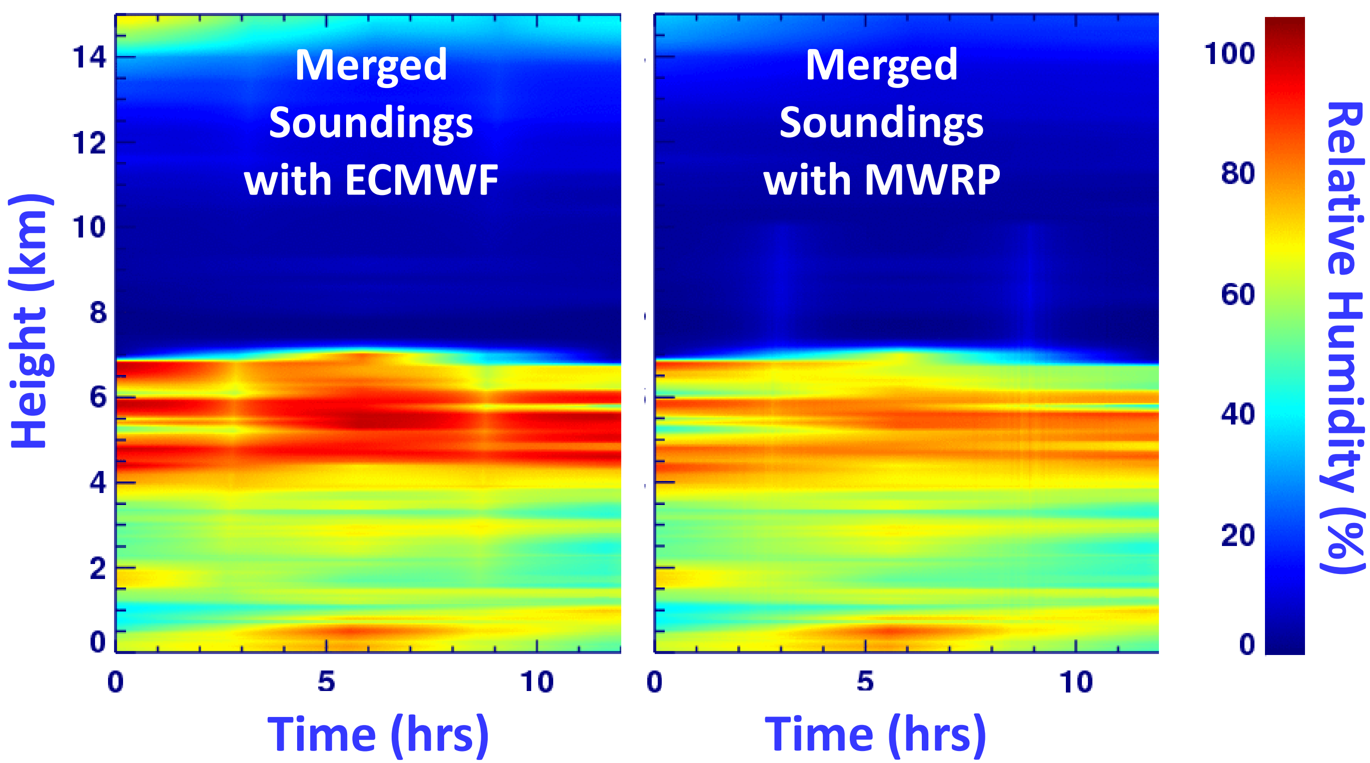
Data Integration Update

Tami Toto, Michael Jensen, Andrew Vogelmann, Scott Giangrande

The Data Analysis and Integration Team supports FASTER research by producing quality controlled data products that *fill important gaps* and *meet specific needs*.

Integrating the Microwave Radiometer Profile Into a Merged Soundings Product

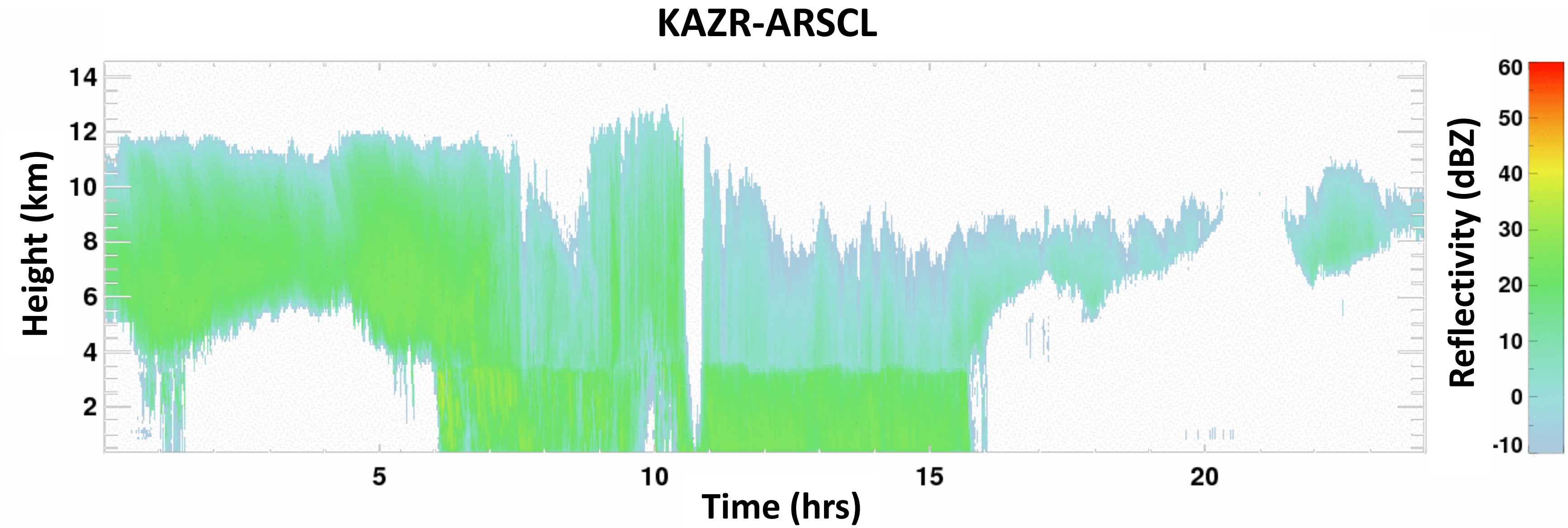
- Trial with Niamey data
- Working with Lynne DiPretore and Mark Miller

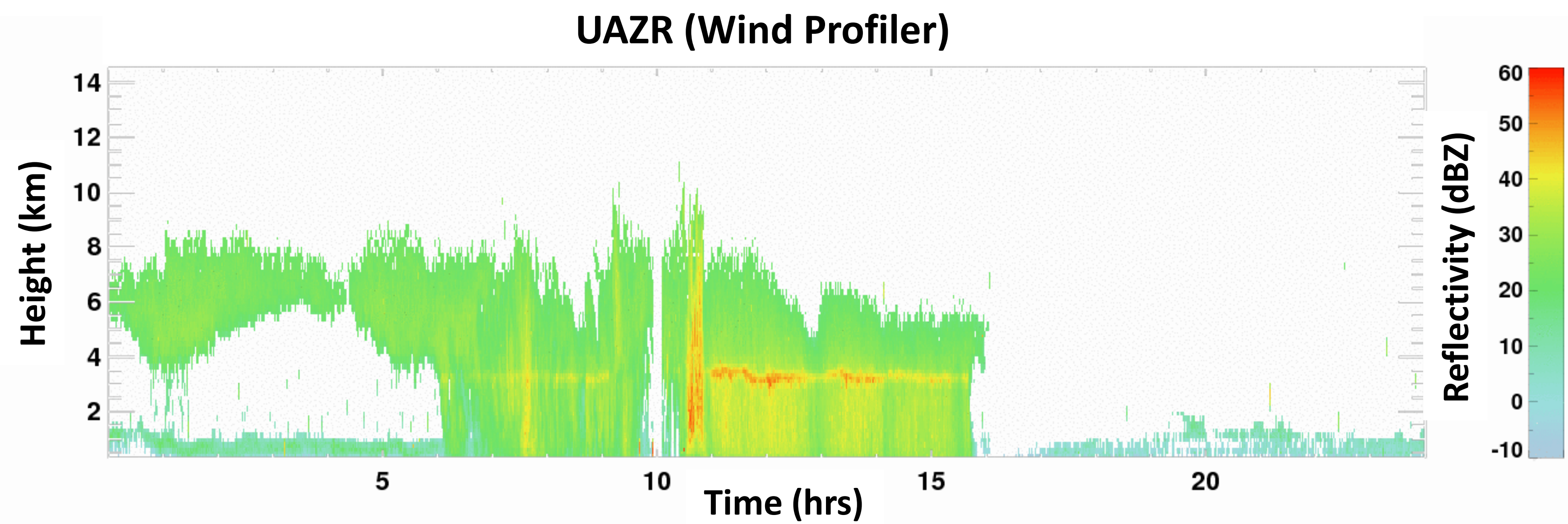


Convective/Stratiform Rain Partitioning

S. Giangrande, T. Toto, P. Kollias

May 20, 2011 (MC3E)





Convective/Stratiform Rain Partitioning

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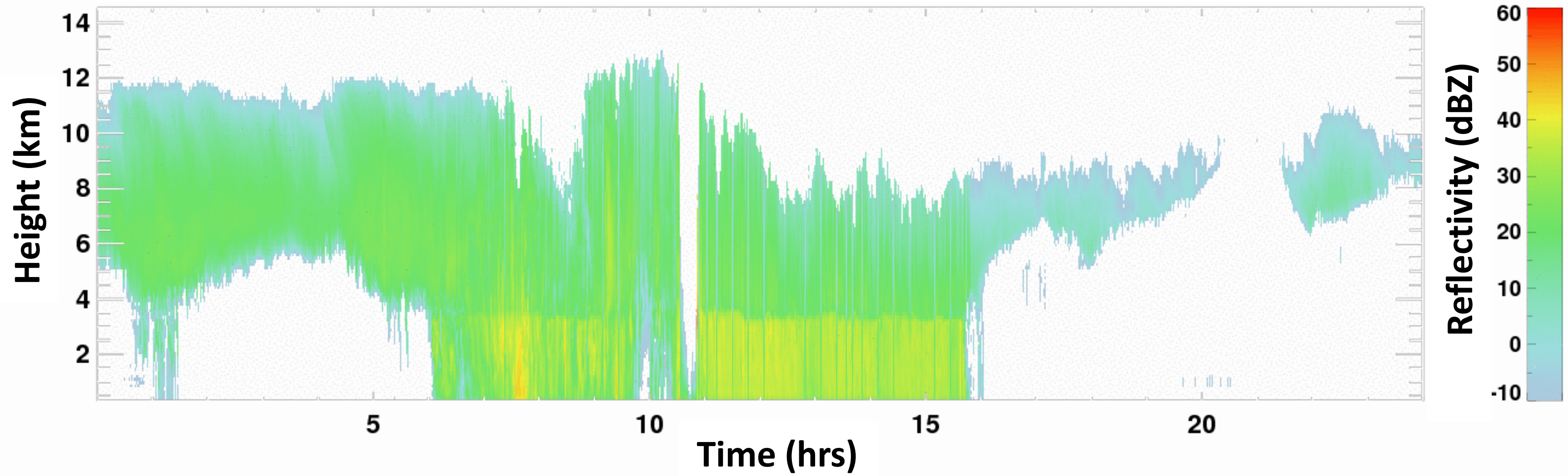
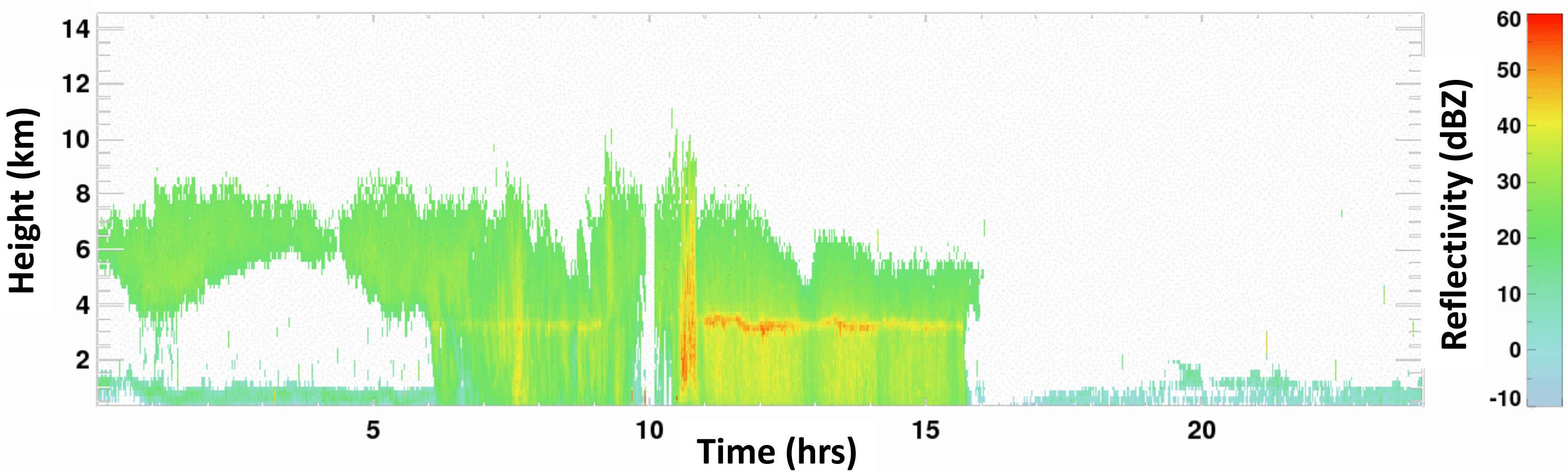
May 20, 2011 (MC3E)

KAZR Calibrated & Corrected for Rain Attenuation



UAZR (Wind Profiler)



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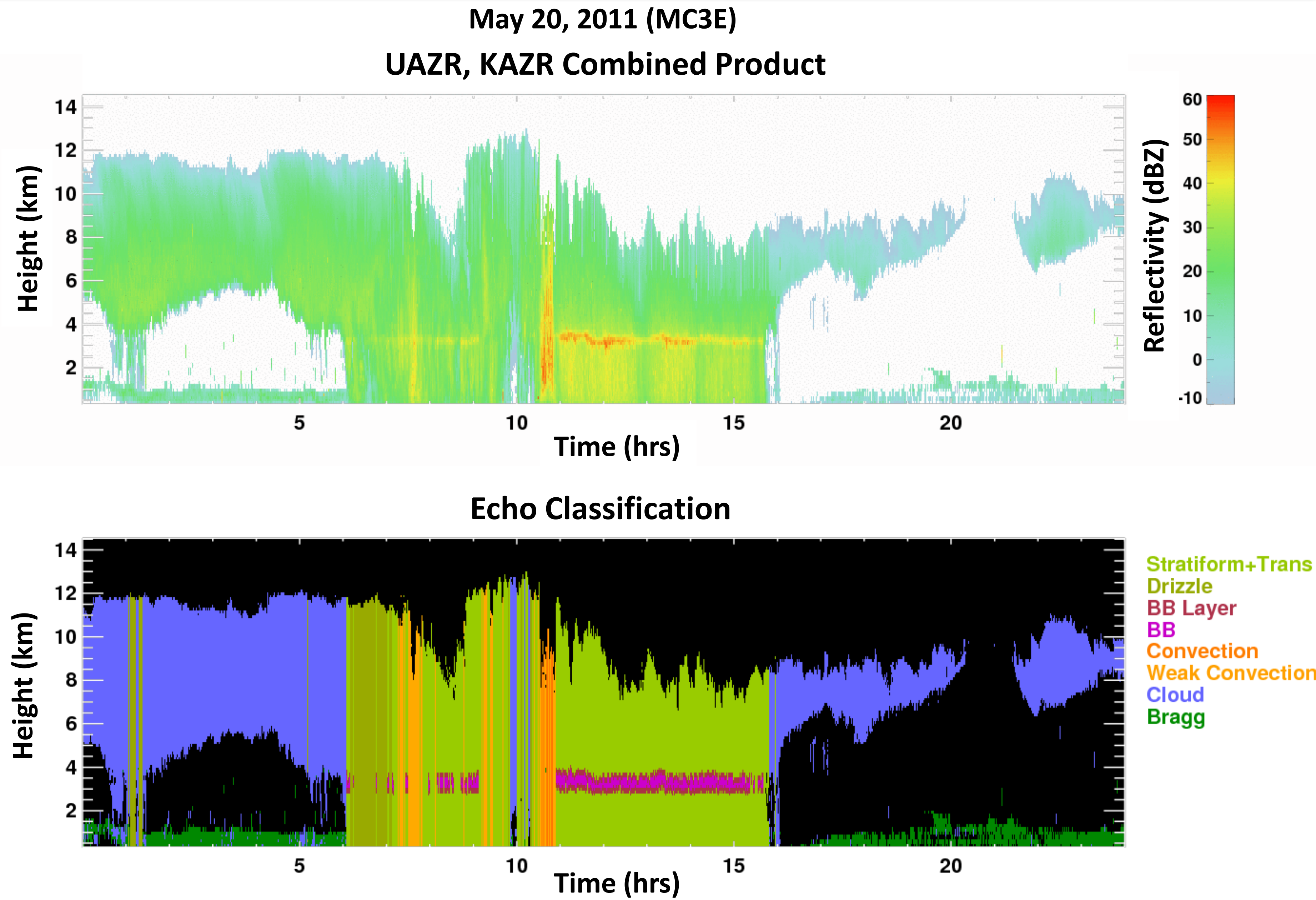

Convective/Stratiform Rain Partitioning

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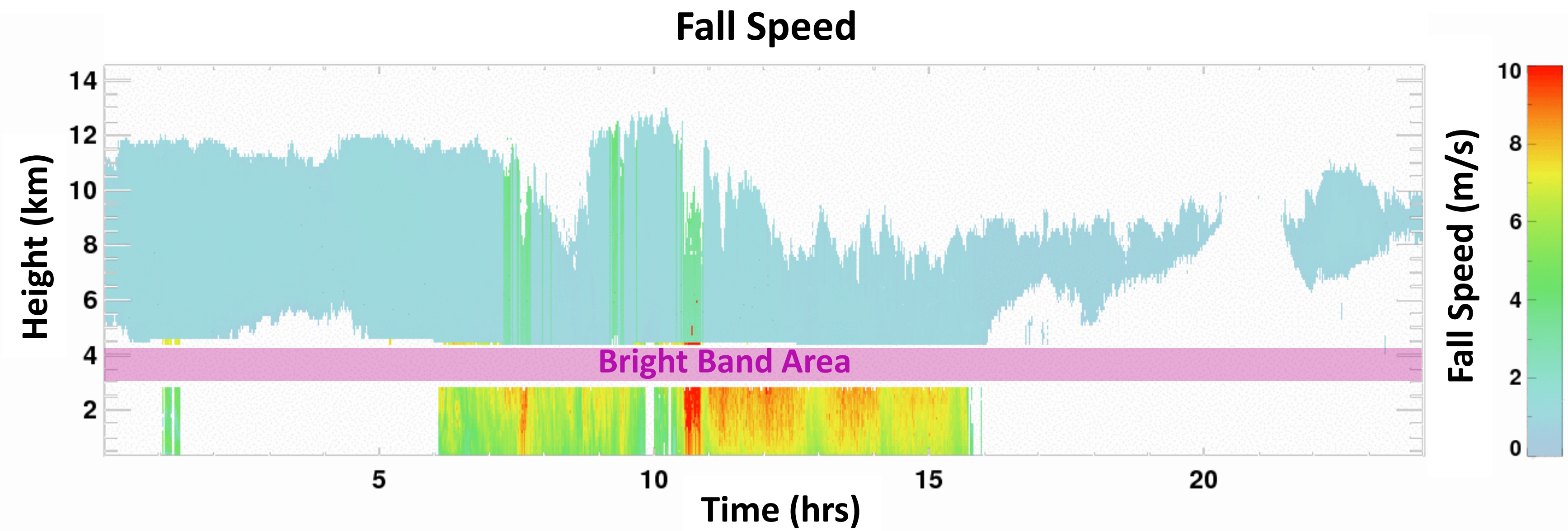
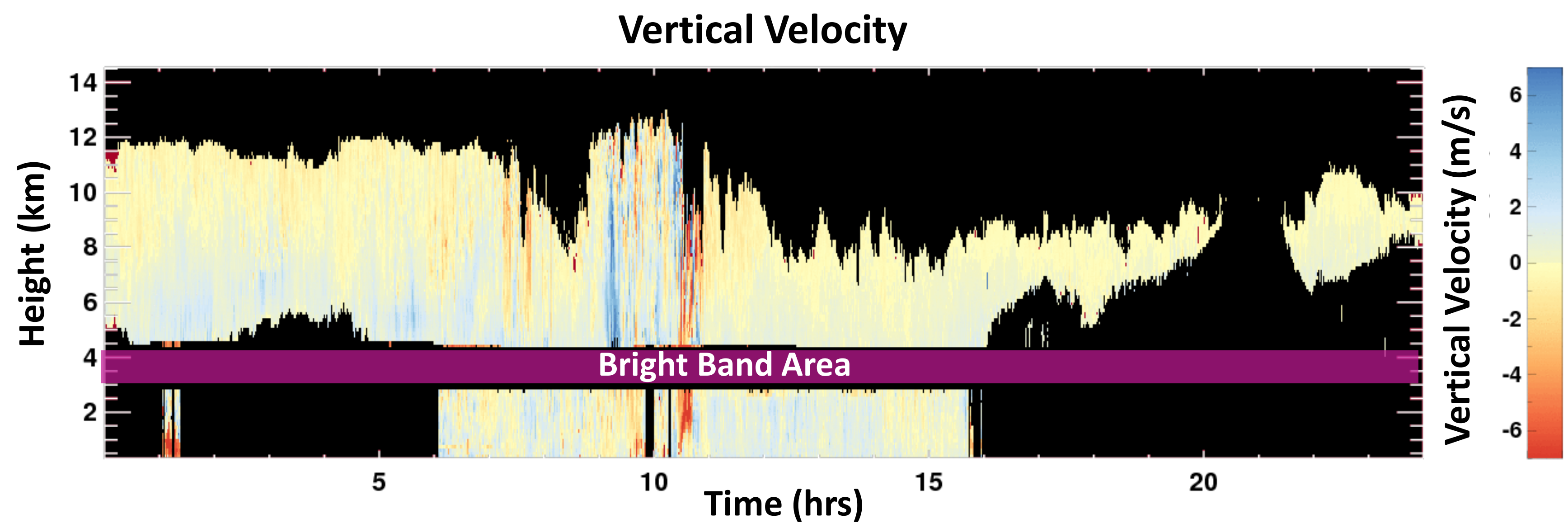
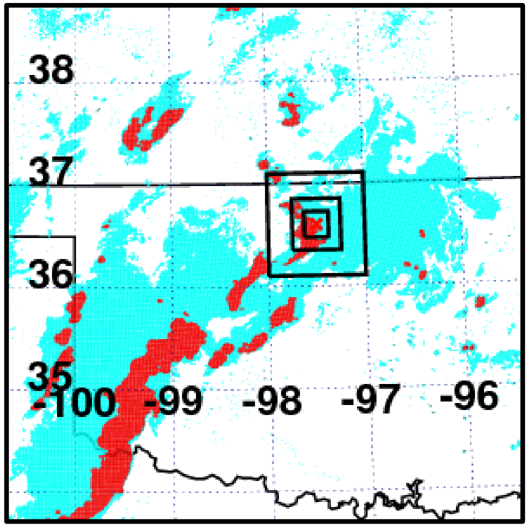




Convective/Stratiform Rain Partitioning

S. Giangrande, T. Toto, P. Kollias

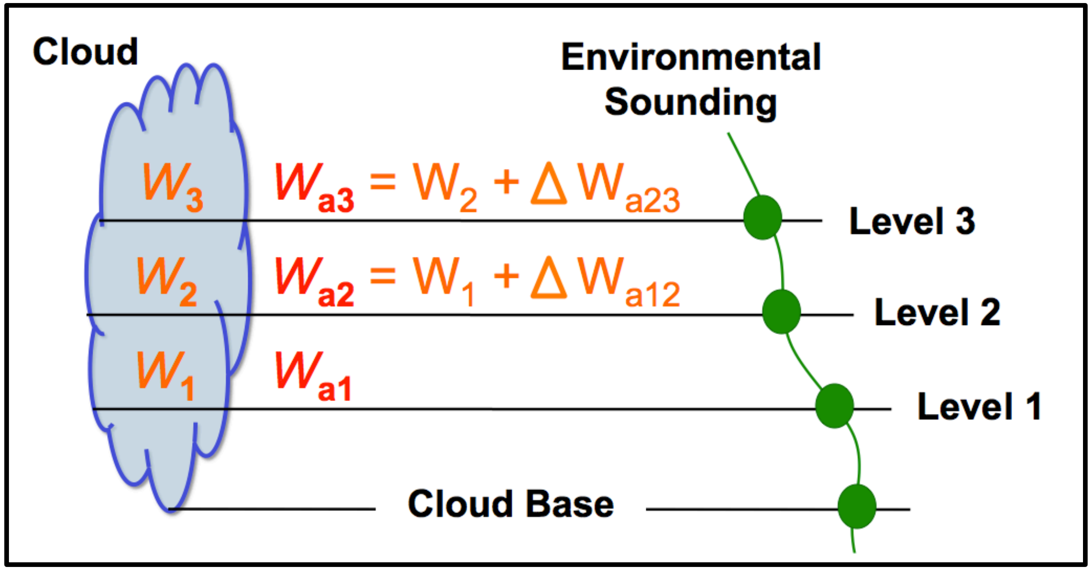
- Planning an evaluation with other convective/stratiform methods
- Processed all of the MC3E events, but can extend this into the future
- Conducted a comparison to our KAZR-only method for the MC3E period, in order to improve MMCR long-term convective/stratiform dataset
- Comparison to (X. Dong) NEXRAD partitioning
- Conditional CFADS in stratiform rain, based on surface reflectivity and drop size
- Compare to aircraft measurements



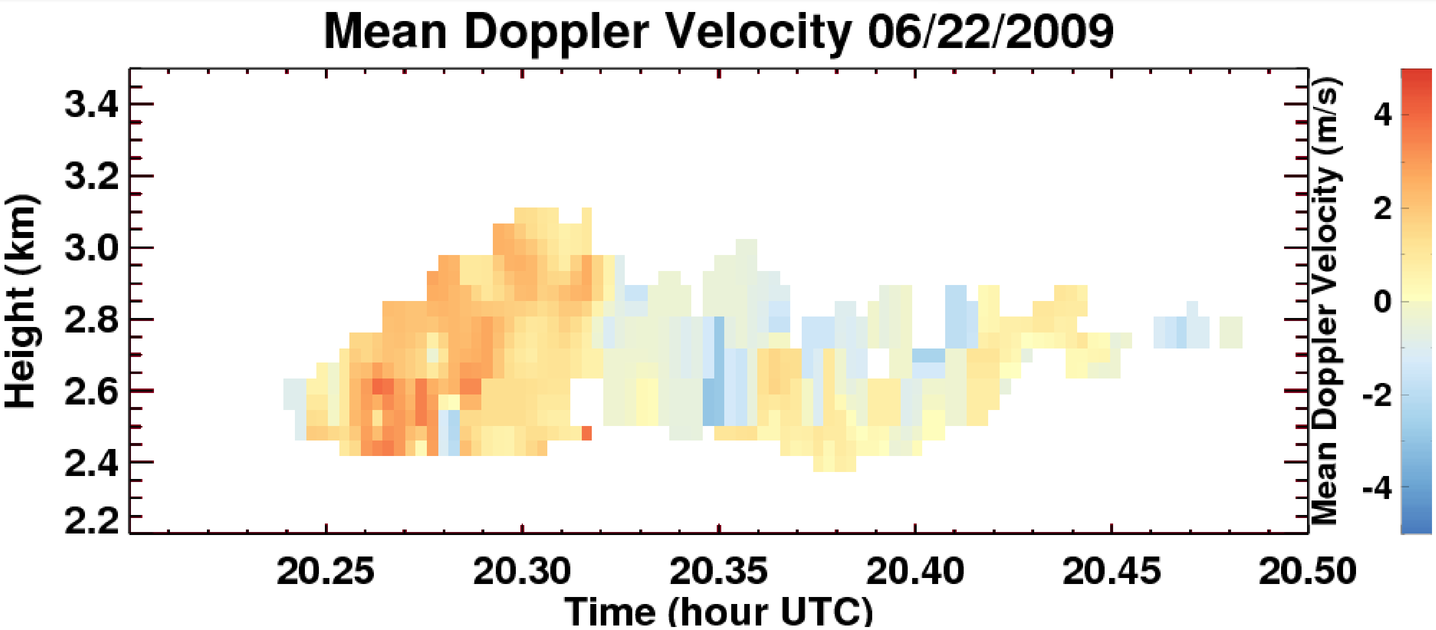
Estimating vertical profiles of entrainment rate From millimeter-wavelength radar observations

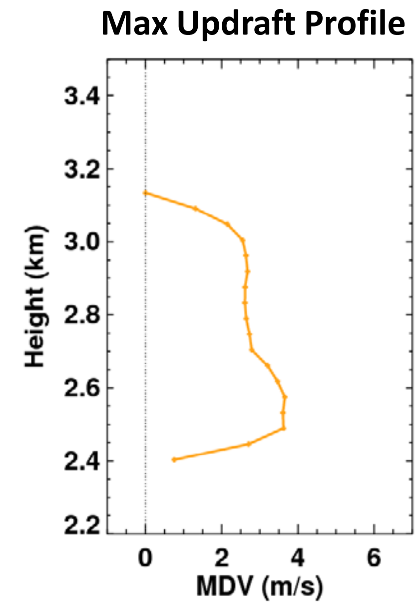
Using a method developed by Pavlos Kollias and Chunsong Lu

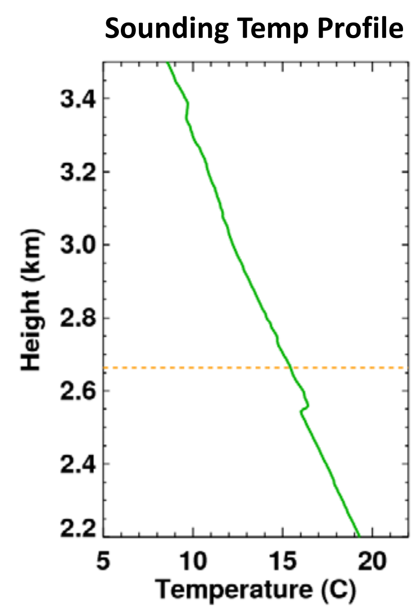
- The cloud grows adiabatically from cloud base and then experiences the first entrainment event and isobaric mixing at Level 1.
- After a new saturation is achieved during isobaric mixing, the cloud ascends adiabatically without entrainment from Level 1 to Level 2.
- It then experiences the second entrainment event and isobaric mixing at Level 2.
- The process is repeated for Level 3 and higher levels.



Estimating vertical profiles of entrainment rate From millimeter-wavelength radar observations







Mixing is based on the ratio of the vertical velocity of the relative adiabatic parcel and radar-measured vertical velocity.

Estimating vertical profiles of entrainment rate From millimeter-wavelength radar observations

Radar-measured

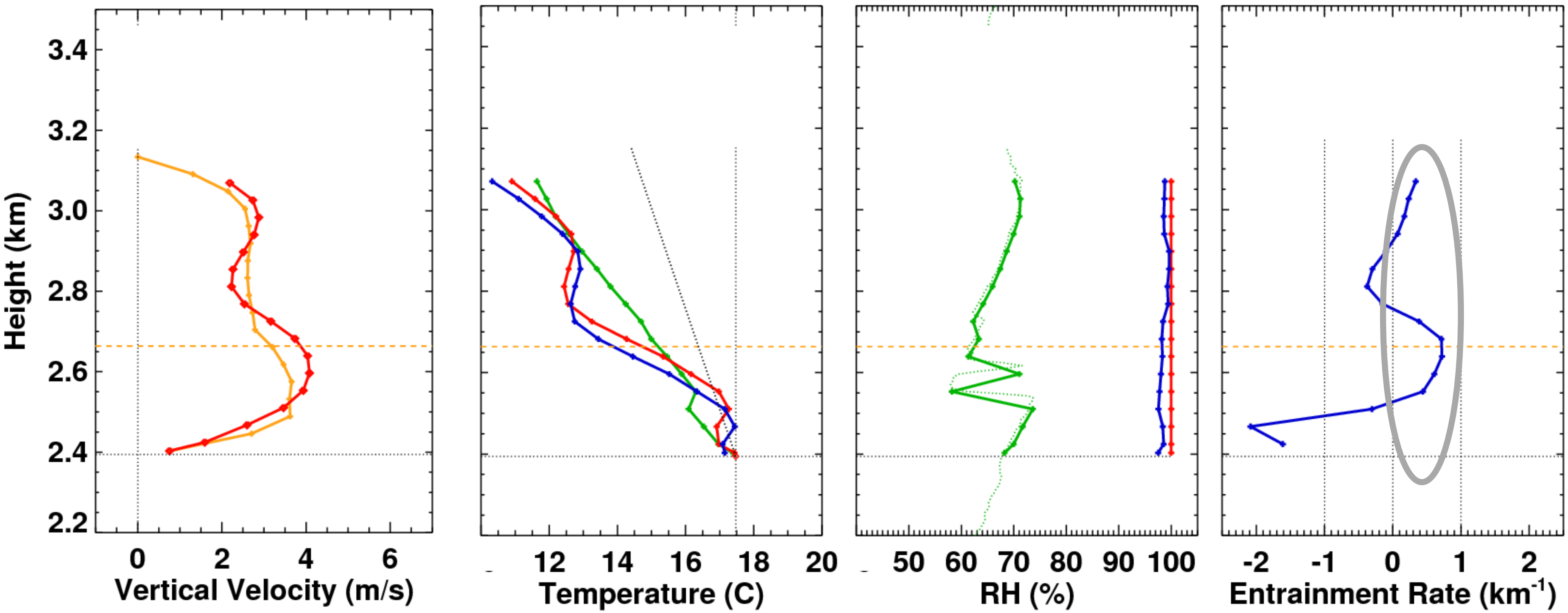
Relative Adiabatic Cloud Parcel

Entrained Dry Air (Sounding)

In-Cloud

Evaluation:

We have done some comparisons to the Entrainment Rate in Cumulus Algorithm(ERICA) (Wagner, T.), an observationally-based bulk entrainment rate method and we have preliminary found very good agreement.



Estimating vertical profiles of entrainment rate From millimeter-wavelength radar observations

Radar-measured

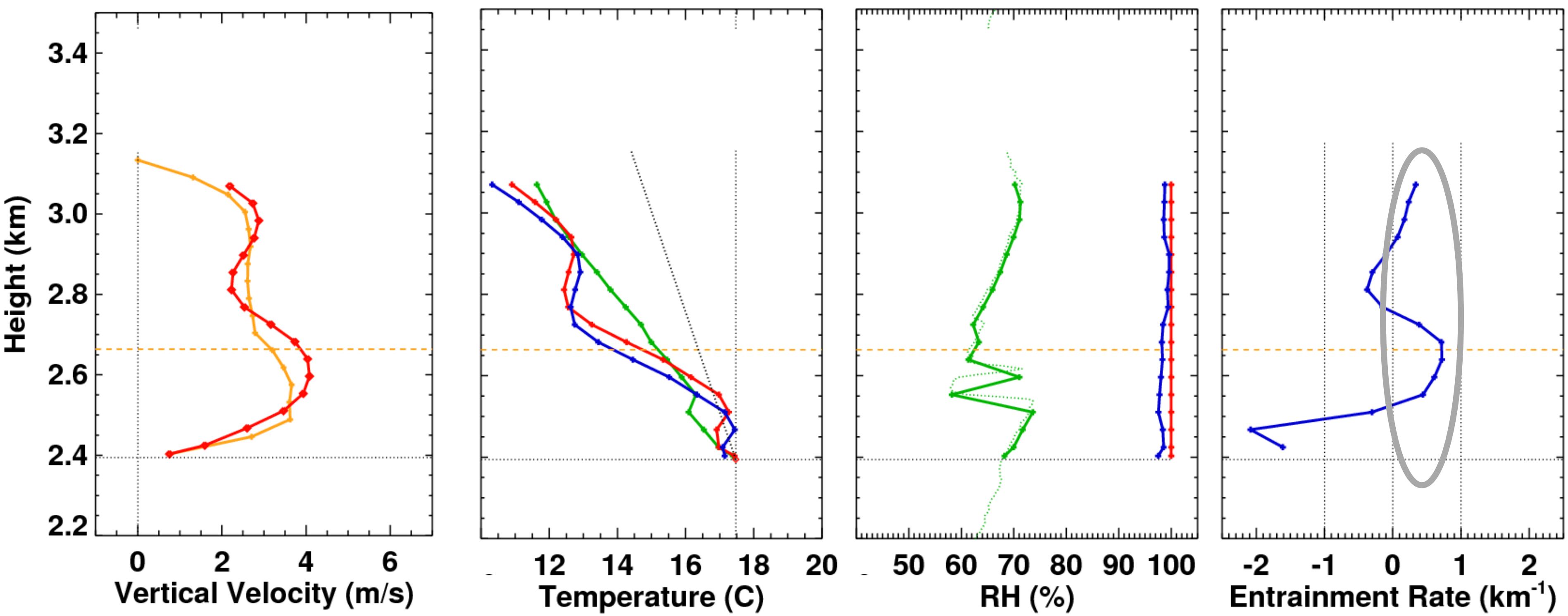
Relative Adiabatic Cloud Parcel

Entrained Dry Air (Sounding)

In-Cloud

Future Plans:

- Apply to other cloud types
- Extend to other ARM sites, particularly the Azores and tropical sites
- Produce long-term dataset



Thank You

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Convective/Stratiform Rain Partitioning

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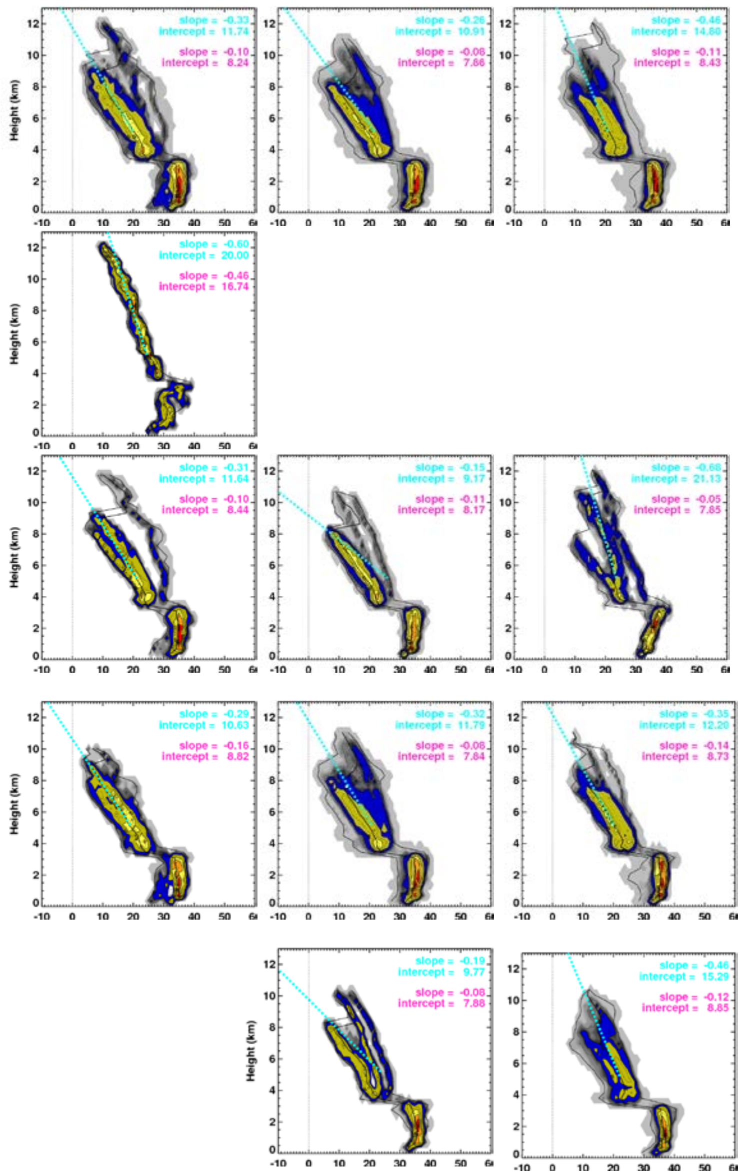
- Conditional CFADS in stratiform rain
- Compare to aircraft measurements

Reflectivity at surface

29-31 dBZ | 31-34 dBZ | 34-36 dBZ

Drop Size: all | .8-1.1 mm | 1.1-1.3 mm | 1.3-1.6 mm | 1.6-1.9 mm



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