

The Properties of Cirrus over the Atlantic Basin Revealed by A-Train and SEVIRI data

Betsy Dupont and Jay Mace, University of Utah
Pat Minnis and Rabi Palikonda, NASA Langley Research Center

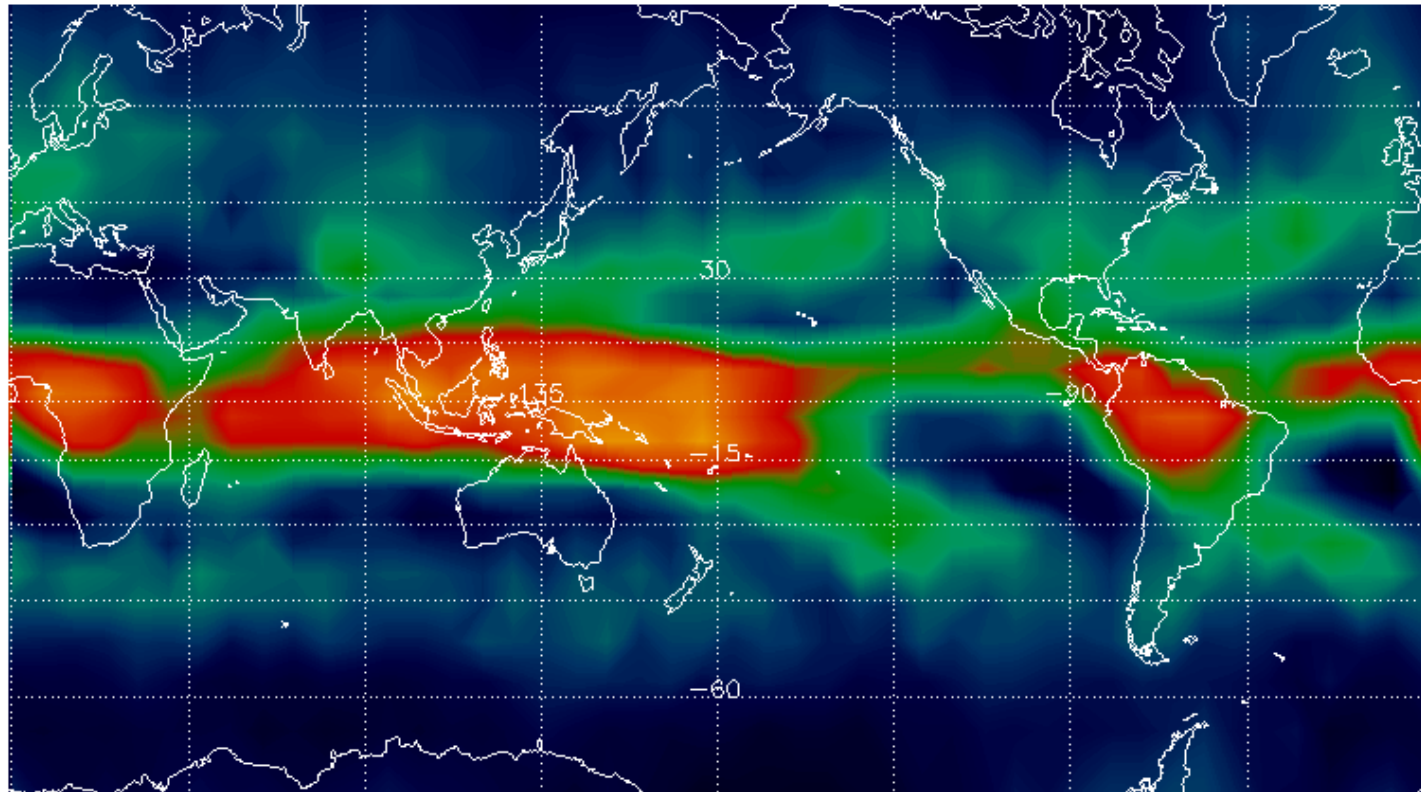
Approach:

- Consider the A-Train constellation as a single synergistic observational suite.
- Augment the instantaneous view of A-Train with the temporal view from geostationary.

The Global Coverage of High (>6km) Layers From Merged CC Data (RL-GEOPROF)

CloudSat/Calipso Absolute Coverage of Layers Based >6km and All Thickness

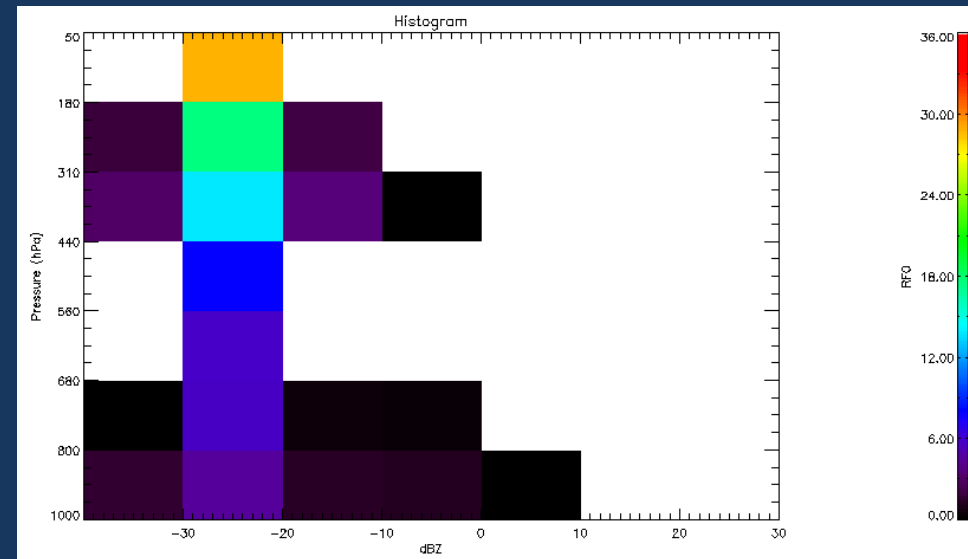
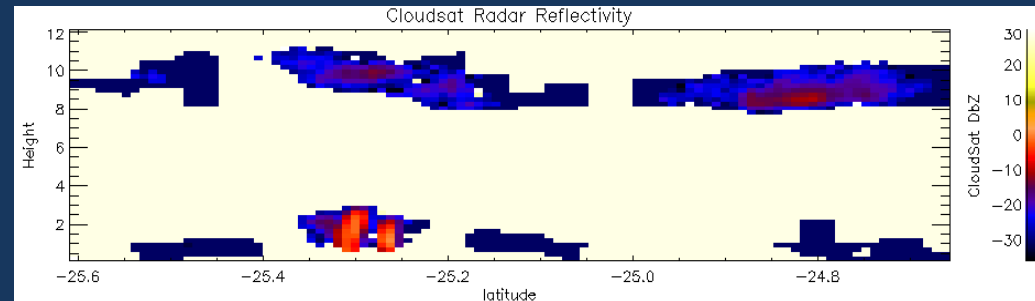
Absolute Hydrometeor Coverage of Layers Based >6km and All Thickness , Avg Box: 6.0X8.0. For Period 200612–200706



Mace et al. (2008)

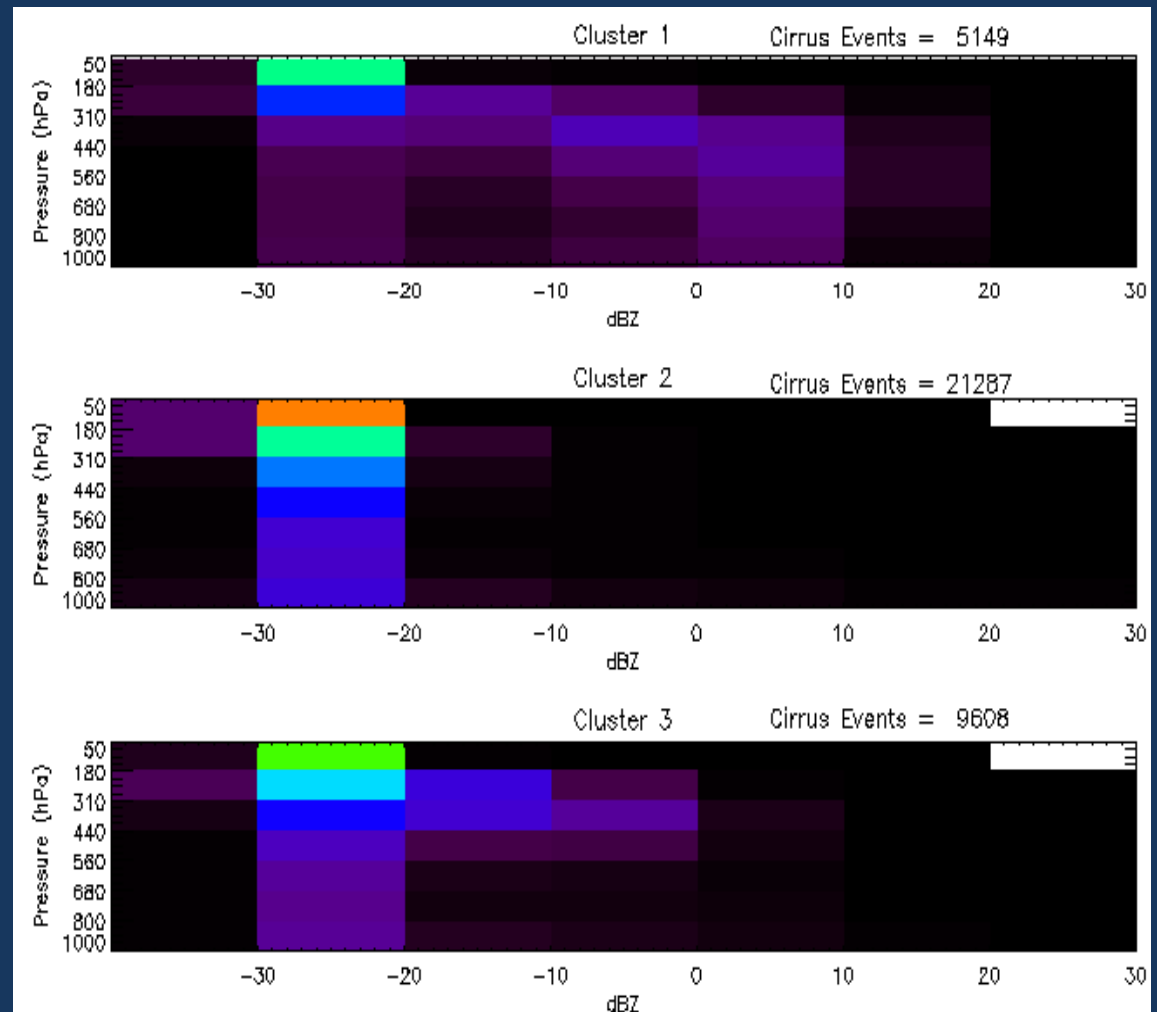
Clustering of Cirrus Events

- 100-profile Atlantic cirrus events from 2007
- followed approach of Zhang (2007)
- Clustering based on histograms of reflectivity and pressure



P-dBZ Pattern for Resulting Cirrus Cluster Centroids

- Anvil Cirrus
 - 13% of events
- High, Thin cirrus
 - 60% of events
- Thick Cirrus
 - 27% of events



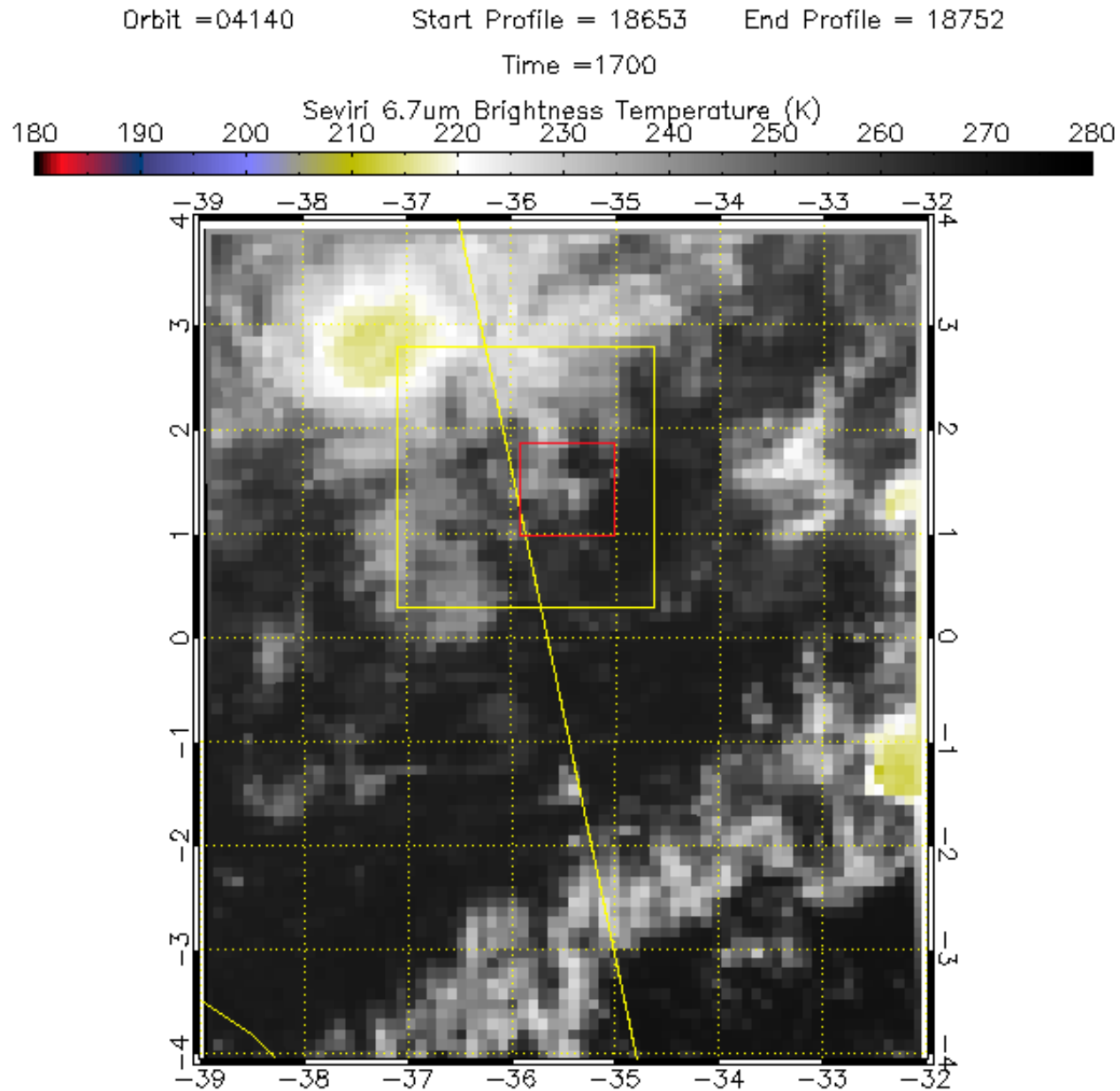
Question:

What are the relationships between cirrus properties (and their temporal change) and the large-scale dynamics?

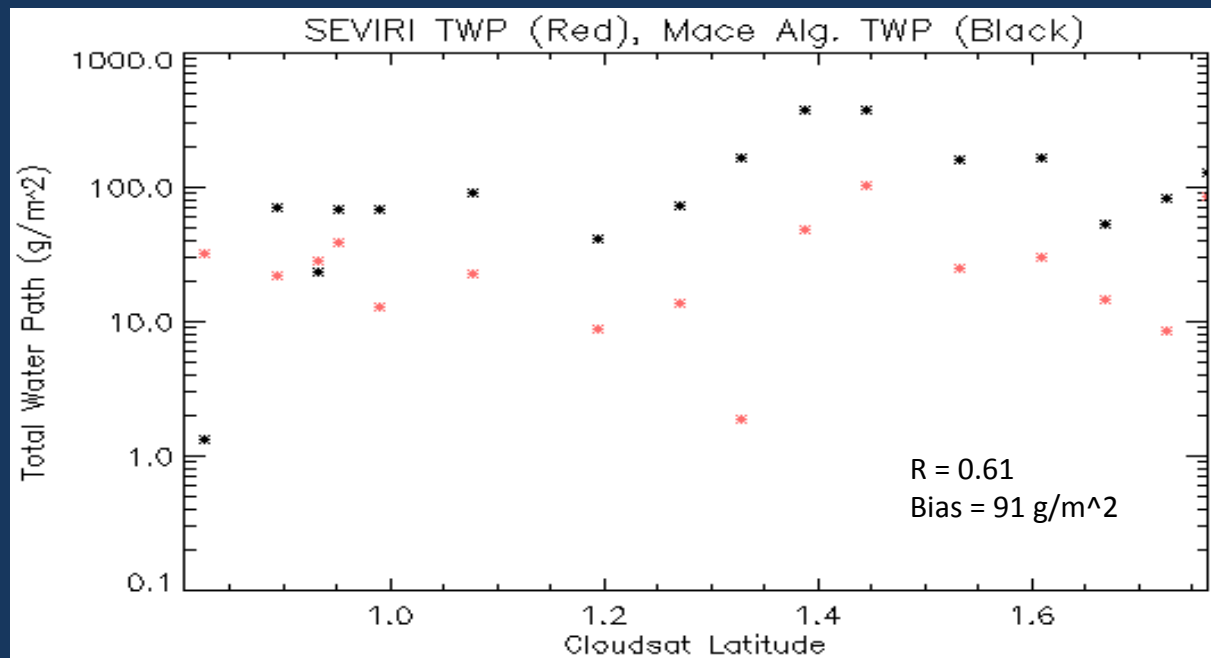
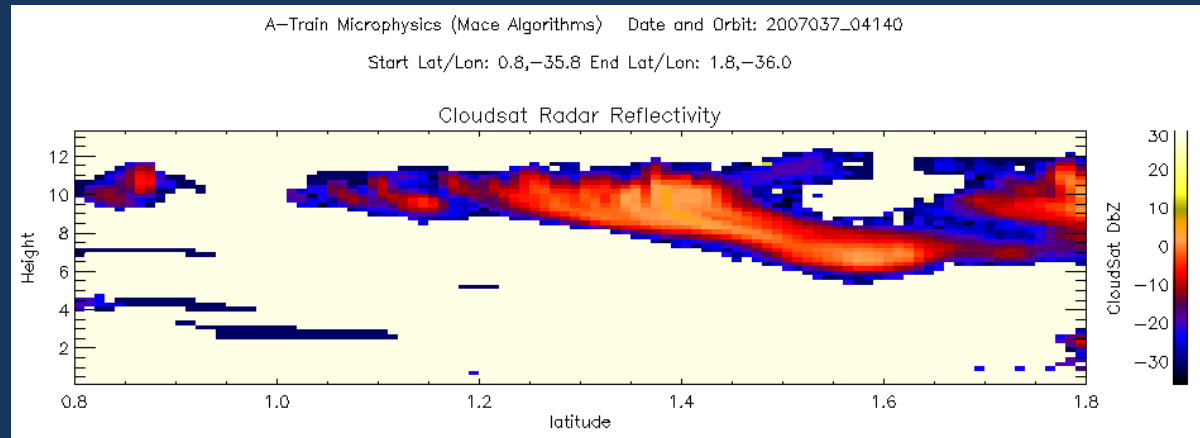
Next:

- Track Cirrus in time following Soden (1998) technique
 - Case study of a dissipating aging anvil
- Examine composite large-scale dynamics derived from NCEP/NCAR reanalysis for thickening and thinning cirrus in the northern and southern hemispheres

Case Study: A region of thinning AGING anvil cirrus



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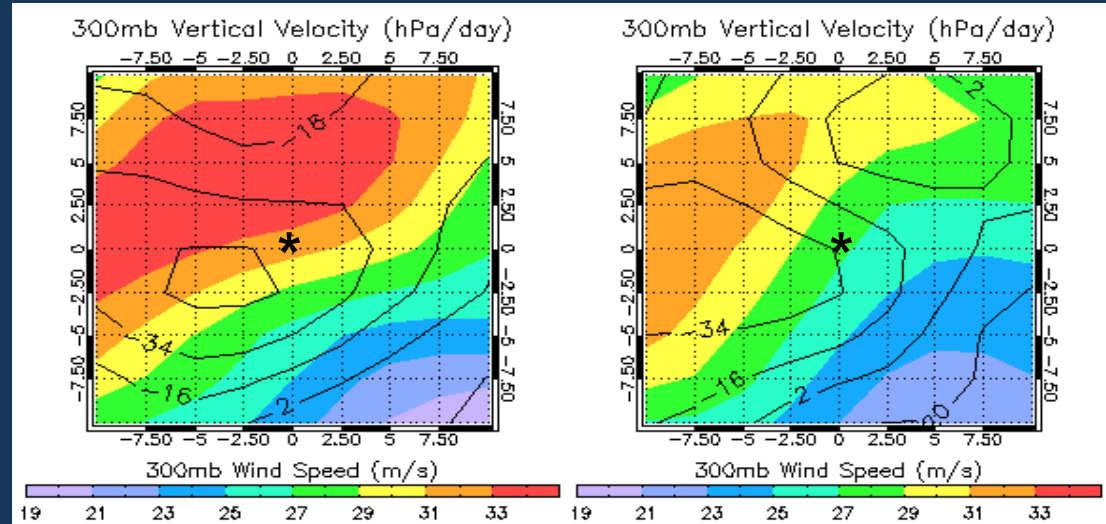


Composite of Large-Scale Dynamics for Mid Latitude Thick Cirrus

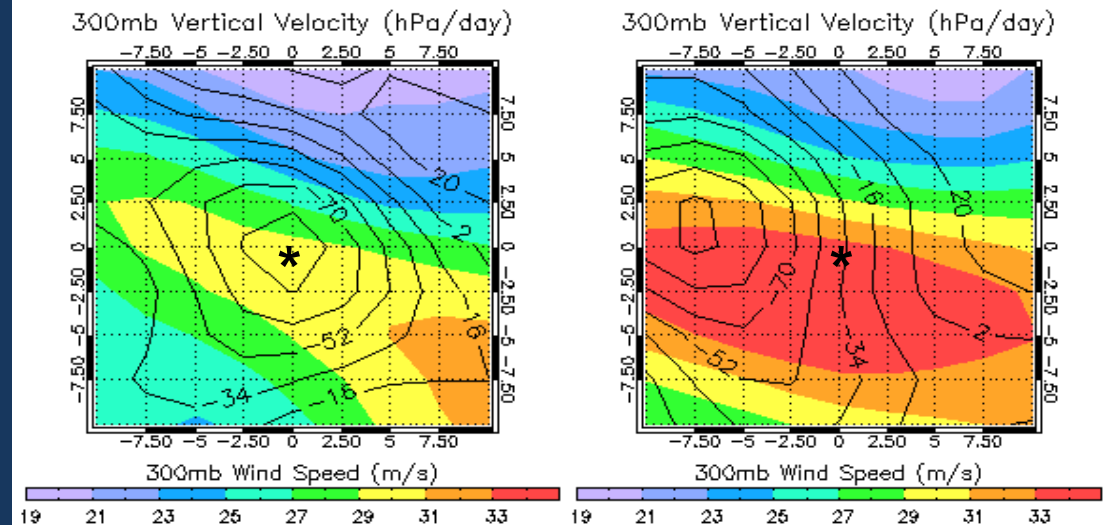
Tb decreasing (thickening)

Tb increasing (thinning)

- Northern Hemisphere



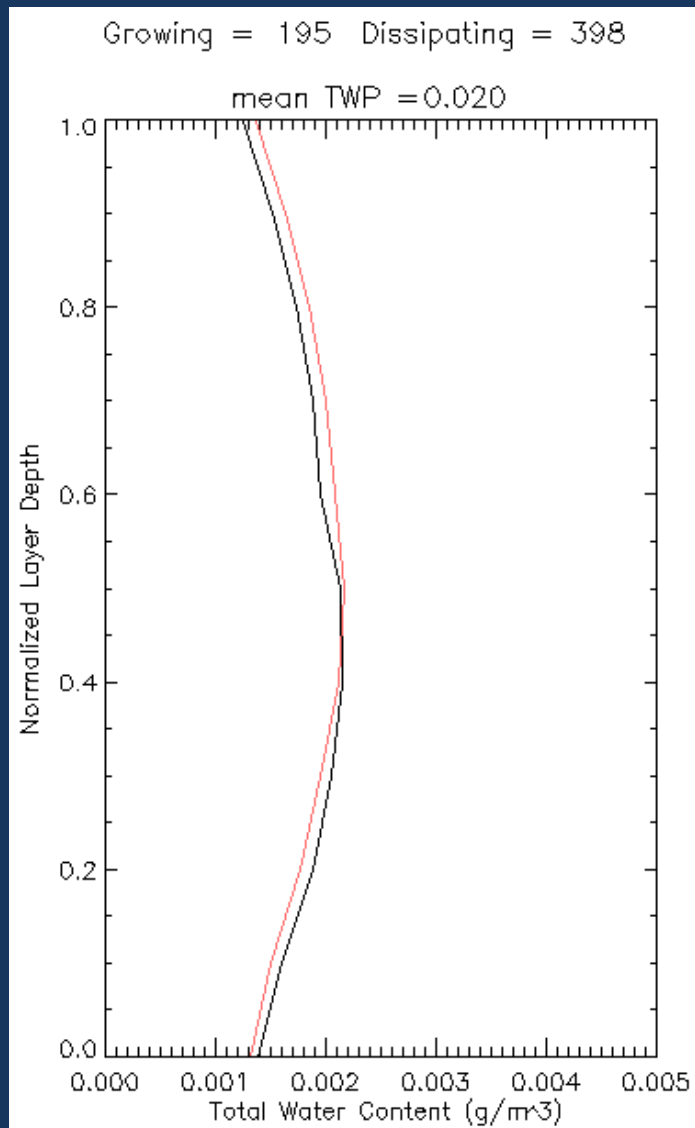
- Southern Hemisphere



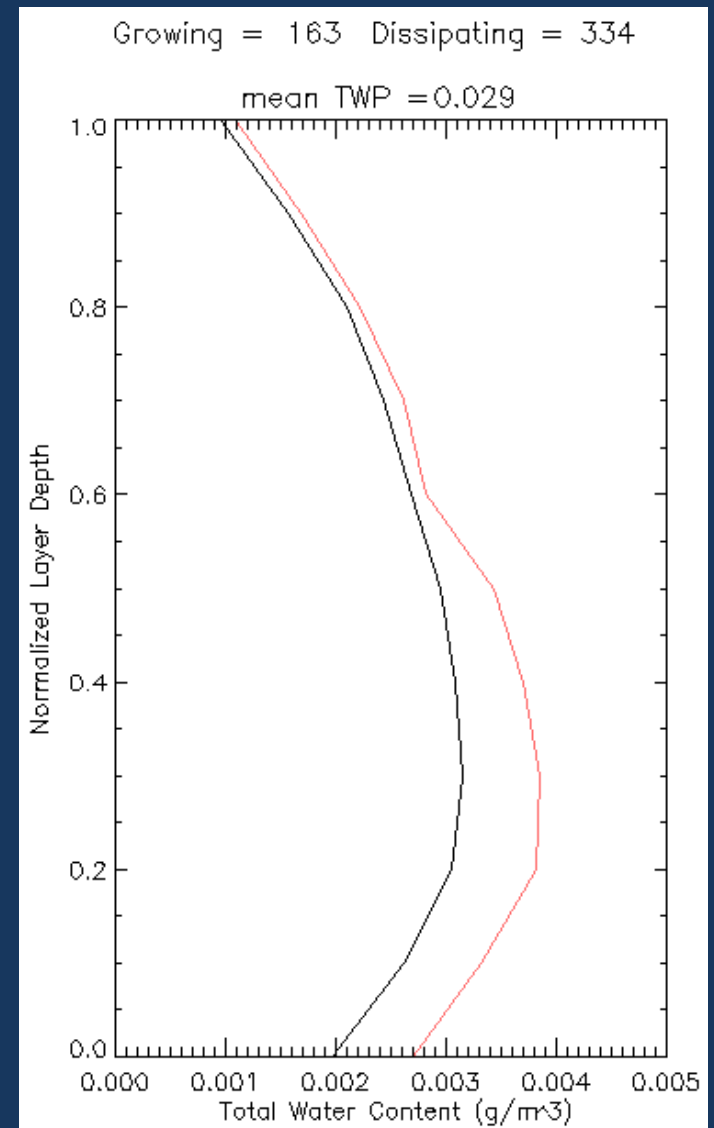
Vertical Structure of Cirrus Layer Microphysics

Thickening = red Thinning = black

High, Thin Cirrus



Thick Cirrus



Summary:

Combining A-Train with Geostationary time series allows us to place events within a temporal context adding knowledge of changes in the hydrometeor field.

Compositing of large-scale dynamics suggests strong relationships between temporal changes in the cloud field and meteorology.

Work in Progress:

Clustering cirrus based on large-scale dynamics

What are the microphysical processes that control the differences in thickening and thinning cases?

How do tropical anvils evolve from injected ice into long-lasting cloud fields?