Anvil Studies

- Near field outflow
- First few hours of convection

Research Goals

- What is the impact of the anvil environment and how do effects evolve with time?
    - Presence of Ice
    - Change in photolysis rates
    - Possible electrification and lightning
- How we characterize the anvil environment with DC3 observations?

Preliminary Findings (Available data products)

- June 21st case interesting case to look at anvil chemistry for many groups
- GV flew axially along anvil and ladder pattern across anvil a few times
- Suite of trace gas and aerosol measurements from both GV and DC8
- SPEC probe on the DC8 ice water content and threshold for when in cirrus
- 2D cloud probes on the GV and DC8 for ice or water drop concentration
- When signal, DIAL product to indicate cloud top, bottom, and height
- DC8 nadir camera images to identify when in cloud and when not

Issues to Address (Gaps to be filled)

- Establish what data is available to define when the aircraft is in the cloud
- Identify cases with good GV cross sections along anvil and ladder patterns
- Tie together times and relevant data coverage from the GV and DC8 aircraft
- Each group look at potential inlet issues for trace gases as well as aerosols
- Look at ice water content data from the DC8 SPEC and the cloud probes
- Look at cloud height data from DIAL along with data on photolysis rates
- Is oxidation of aerosols from the surface to the anvil consistent with OH?
- Bill to list pulse times of the ATHOS laser for groups to investigate spikes
- Information from LMAs on electrification of anvils
- With a lightning flash, what do we get?

- Did we ever cross GV or DC8 exhaust?
- Look at instances where lightning occurs at varying distances from the storm core in the anvil and how this affects the evolution of ice crystals

Possible Papers (Most likely will be part of other papers)

- Several groups – Look at the Jun 21st case
- ATHOS group – Investigate radical chemistry in the anvil
- CIT-CIMS group – Possibly investigate peroxides in the anvil
- AMS – Oxidation of aerosols for biomass burning case and in general
- Barth and Bela – Incorporate ice deposition, heterogeneous chemistry, and wet scavenging