Homogeneous Nucleation and its role in CRYSTAL-FACE anvil cirrus
Part I: Observations

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Motivation

• How do cirrus anvil size, lifetime, microphysical properties, and optical properties depend upon the intensity of the generating convective systems

• Are the anvil ice number densities consistent with our understanding of ice nucleation in convective updrafts, dilution by entrainment, and precipitation?
Primary Instruments

• UND Citation
• Particle Probes: 2D, HVPS, FSSP, CPI
• RICE, King
• CVI
• CIN
• Temperature, Vertical Velocity Msmts.
Updraft Region Observations

A: Water Content

B: FSSP Conc.

C: RH

D: Asymm. Param.
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SUMMARY AND CONCLUSIONS

- Demonstrated a case of homogeneous ice nucleation in CRYSTAL-FACE updrafts.
- Ice concentrations are of order several hundred per cc.
- Non-homogeneous ice nucleation component in PSD tail amounts to concentrations of several tenths per cc, much affect homog. process.
- Cloud droplet sizes at -34C are 7 to 20 microns in concentrations of cc. Surprisingly, large cloud droplets up to 70 microns diameter in updraft are found,
- Model appears in general to simulate the homogeneous ice nucleation component.
- In weaker updraft regions as in tropical convection, much lower concentrations of ice are found from the model.