

Microphysical Properties of Ice Clouds and Melting Layers from LPVEX, MC3E and GCPEX

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Microphysical Data Set

- Light Precipitation Validation Experiment (LPVEx), Finland, Sept. 15-Dec. 31, 2010
 - University of Wyoming King Air
 - 16 Flights, 23 Hours in Cloud with $T < 0^{\circ}\text{C}$.
 - 6+ Melting Layer Descents/Climbs
 - In-Cloud Temperatures -25 to $+22^{\circ}\text{C}$.
 - Microphysical Probes: FSSP, CDP, 2DC-2DP, King, Nevzorov TWC/LWC, RICE
 - Measurement Issues: Overlap between 2DC and 2DP Probes

Midlatitude Continental Convective Clouds, Experiment (MC3E), South-Central Oklahoma, April 22-June 6, 2011

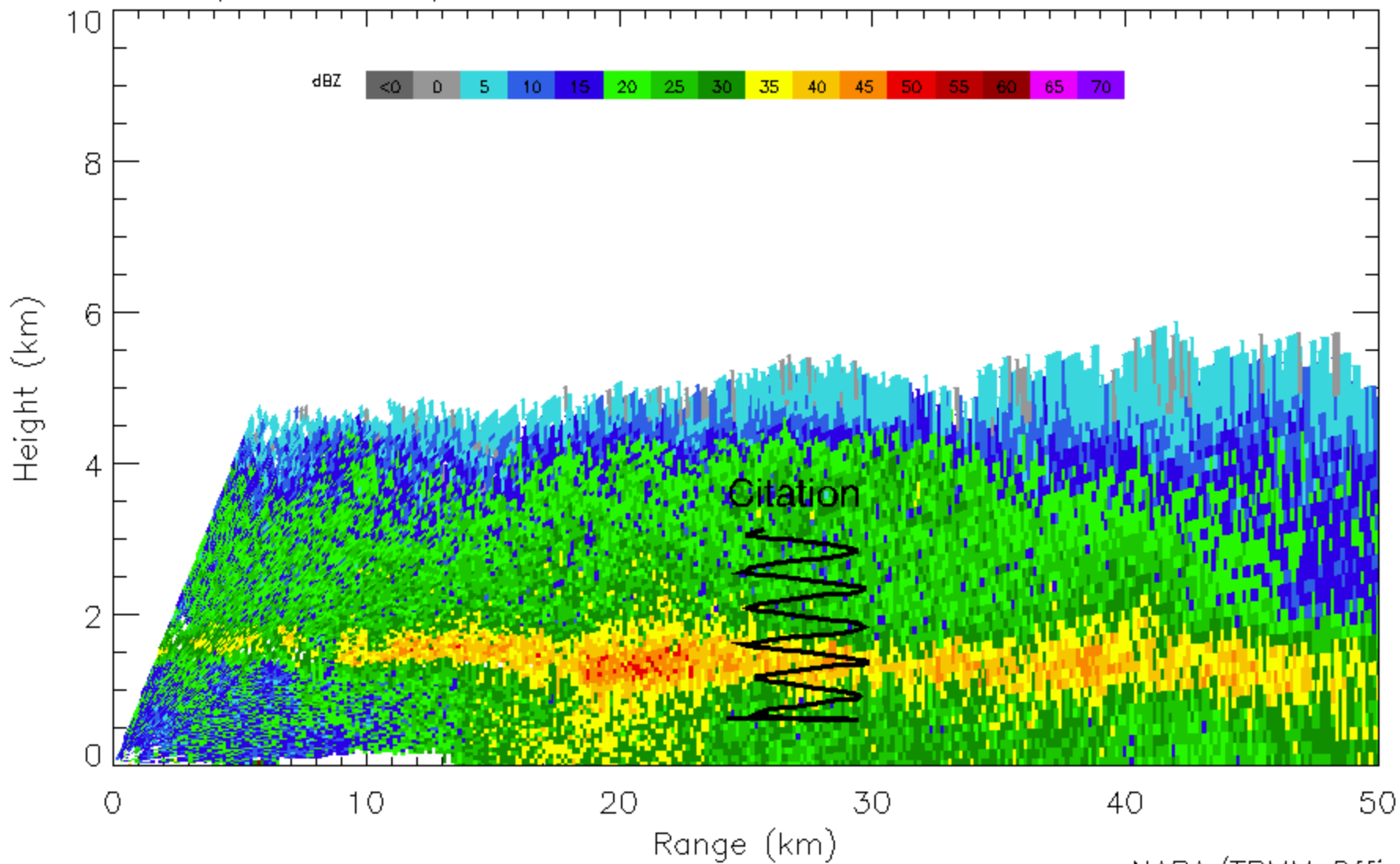
- University of North Dakota Citation
- 15 Flights, 15 Hours in Cloud
- 4+ Melting Layer Descents
- Microphysical Probes: CDP, 2DC, HVPS-3, King, Nevzorov TWC/LWC, RICE
- Measurement Issues: Some questions about the Nevzorov Probe.

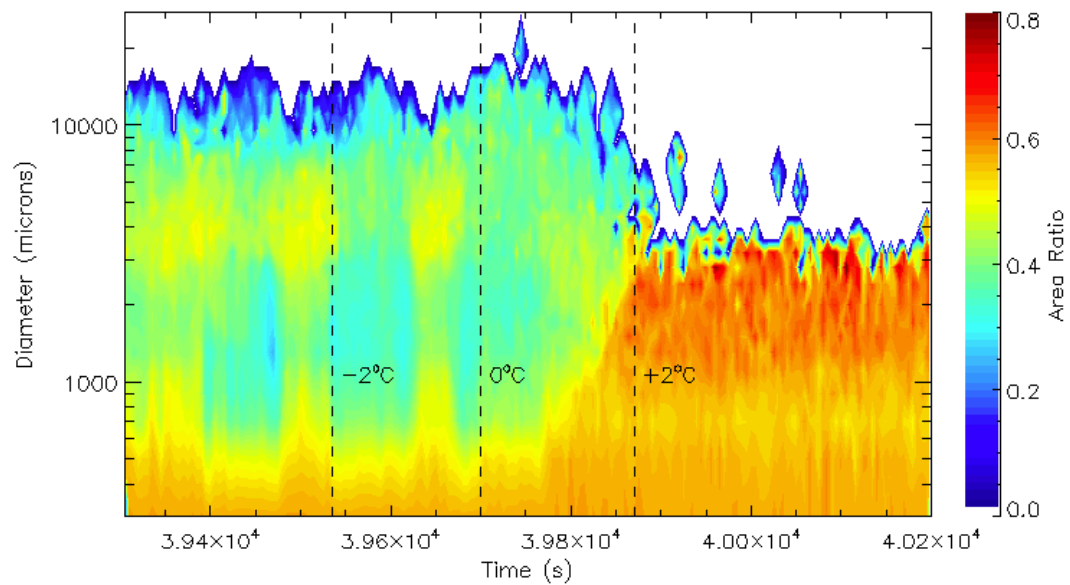
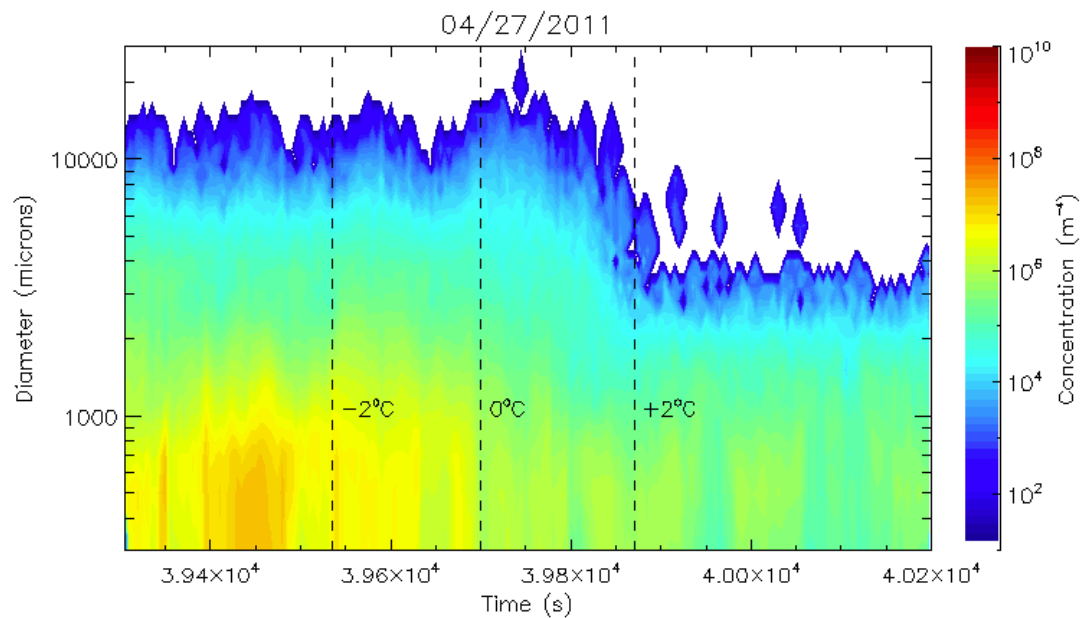
GPM Cold-season Precipitation Experiment (GCPEX)

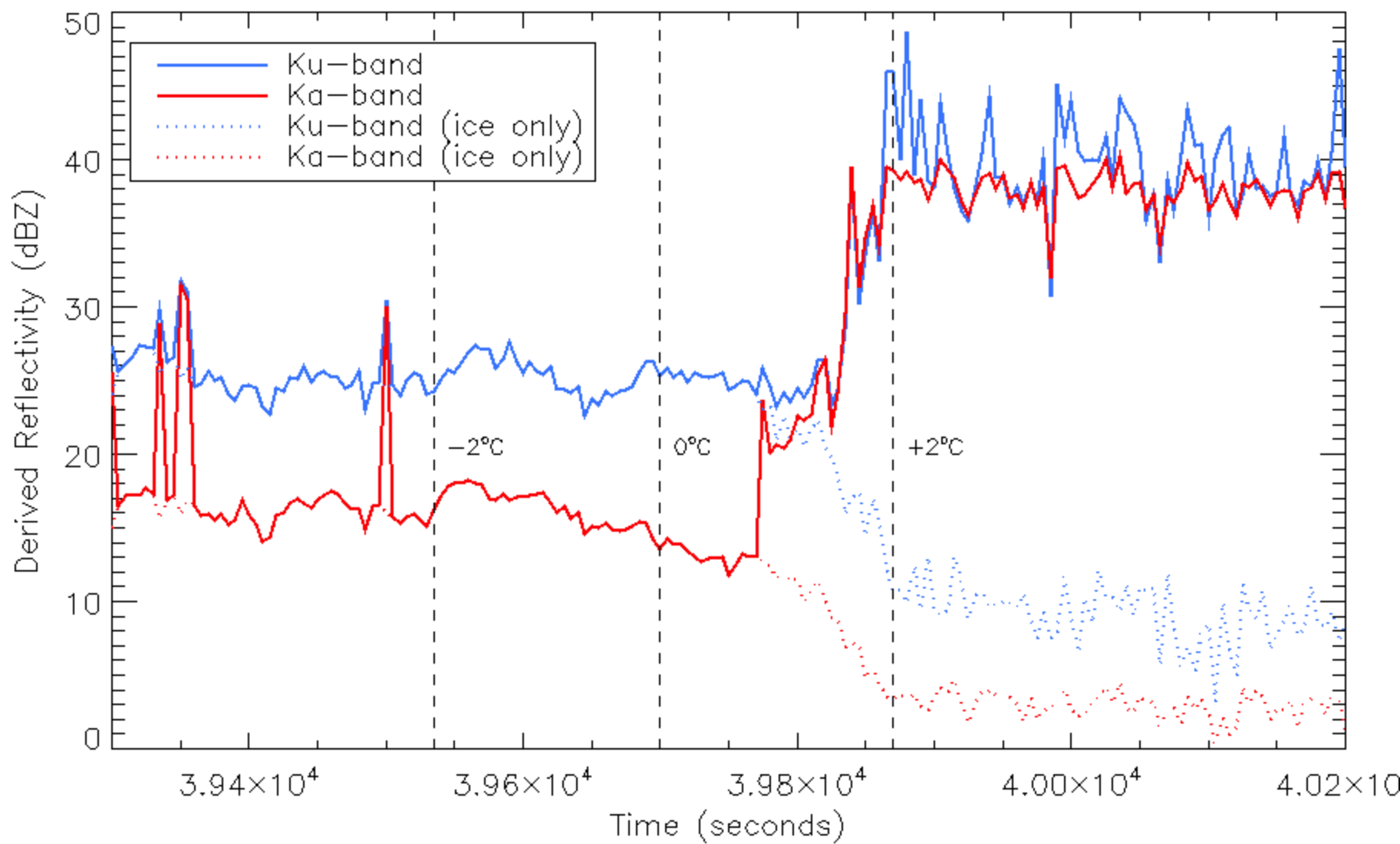
Ontario, Canada, Jan. 17-Feb. 29th, 2012

- University of North Dakota Citation
- 14 Flights, 12 Hours in Cloud
- 1+ Melting Layer Flights
- Microphysical Probes: CDP, 2DC, HVPS-3, King, Nevzorov TWC/LWC, RICE
- Measurement Issues: Nevzorov LWC did not function

npol1 27 Apr 2011 11:00:06 UTC RHI CZ Az: 283.5

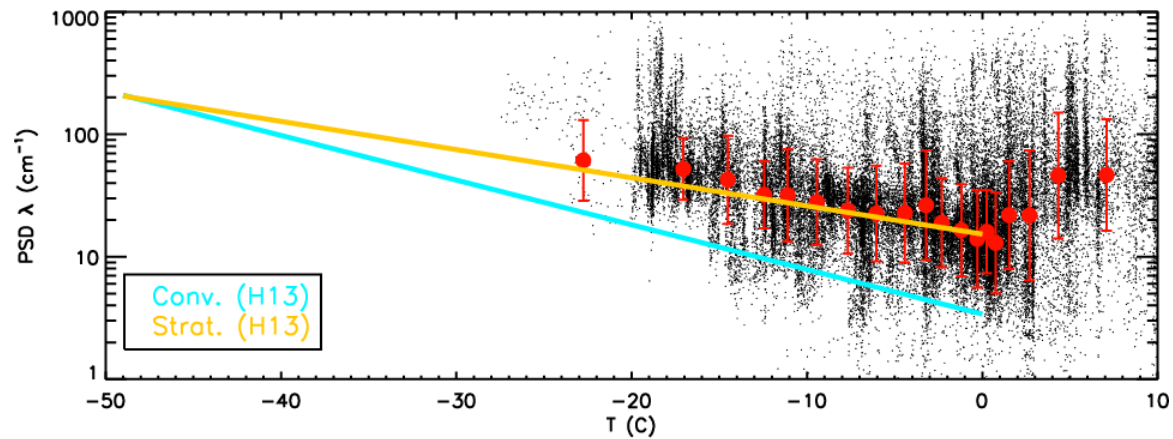




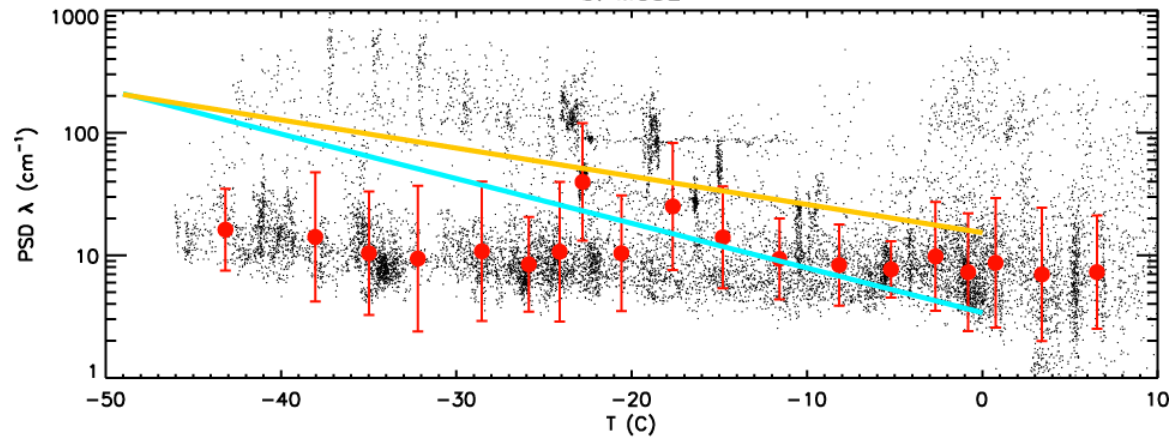


Temperature Dependence of PSD Slope

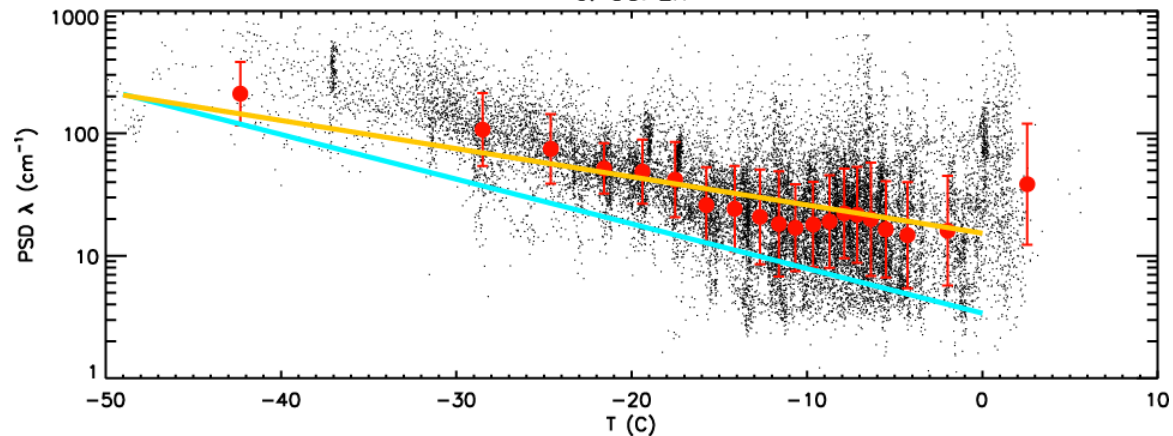
a: LPVEX



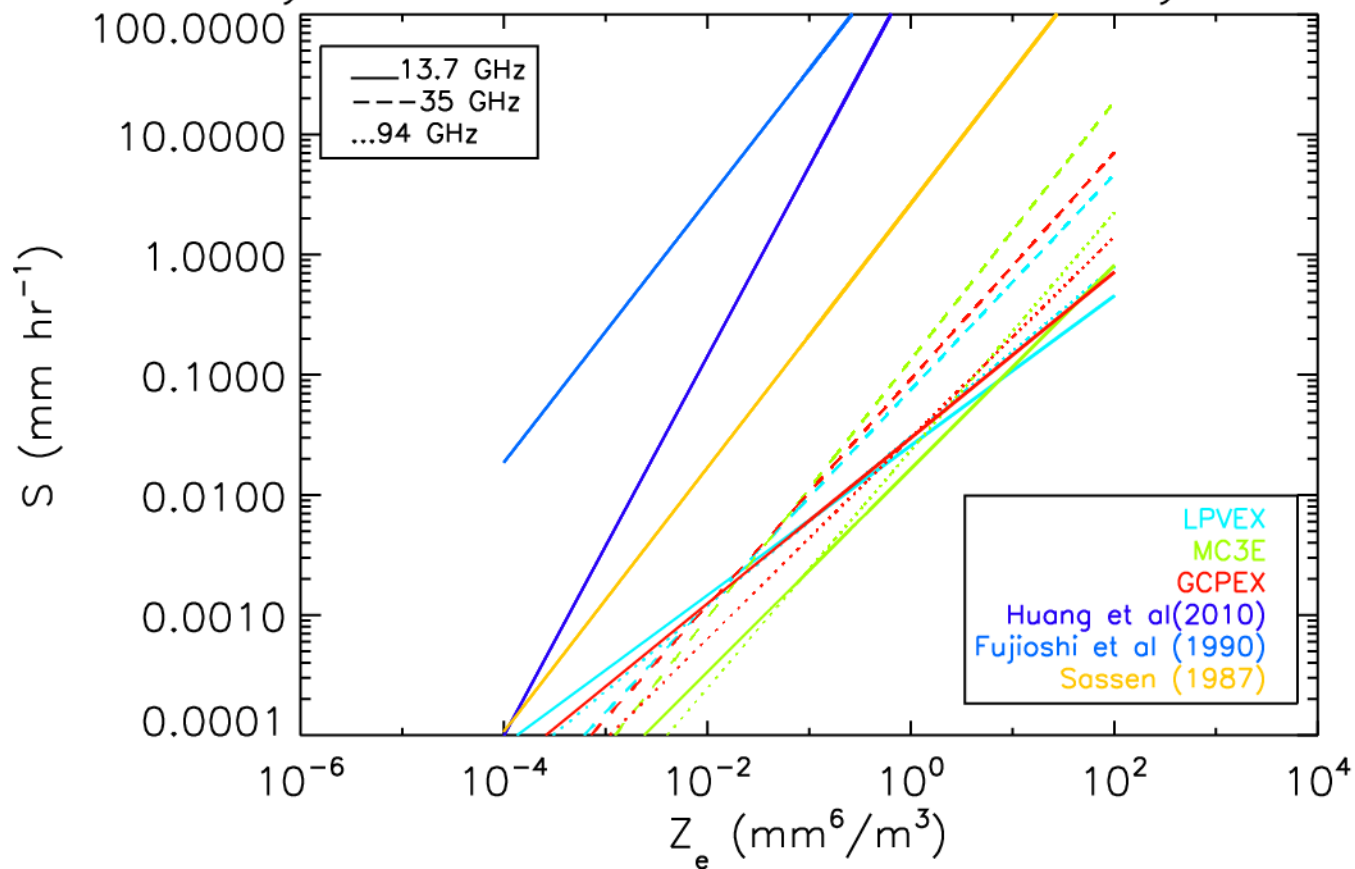
b: MC3E



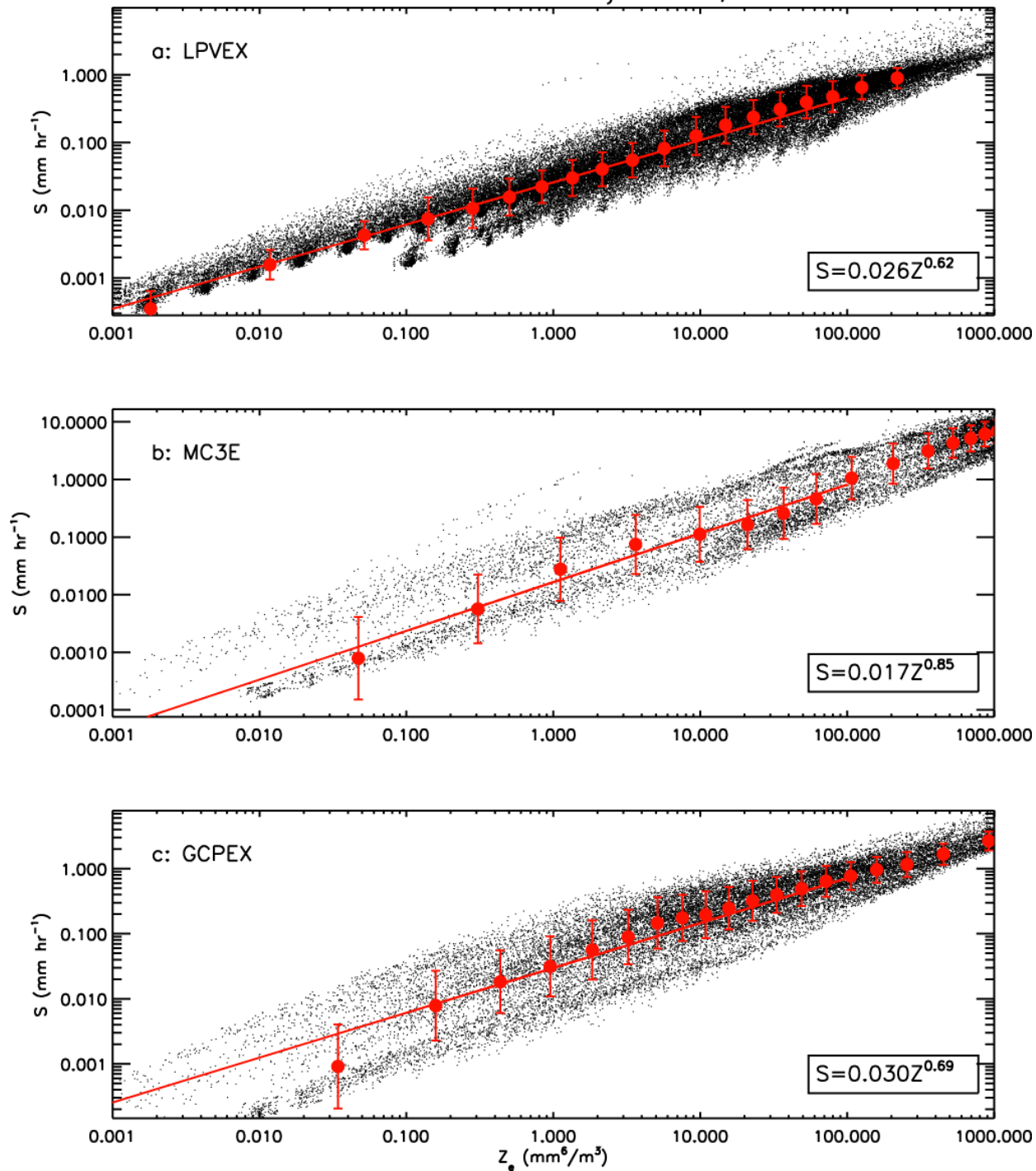
c: GCPEX



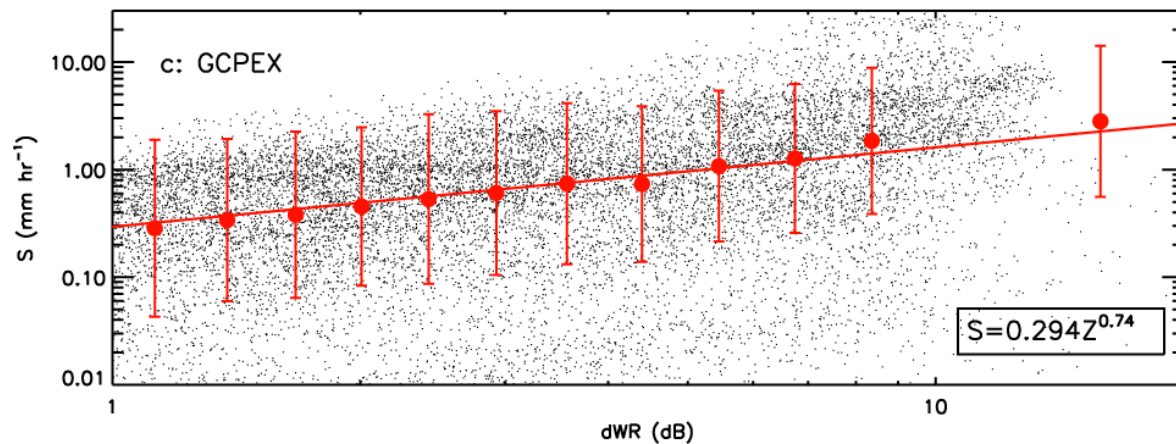
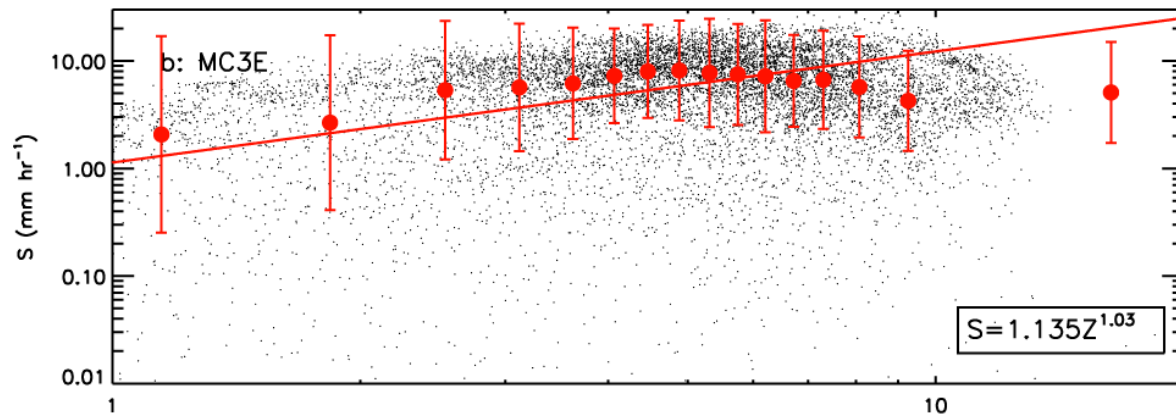
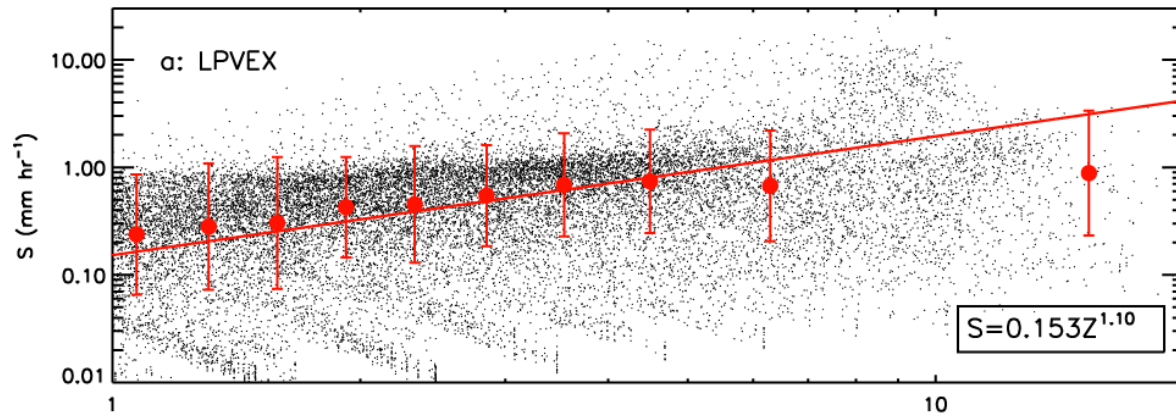
Summary of Snow Rate–Radar Reflectivity Relationships



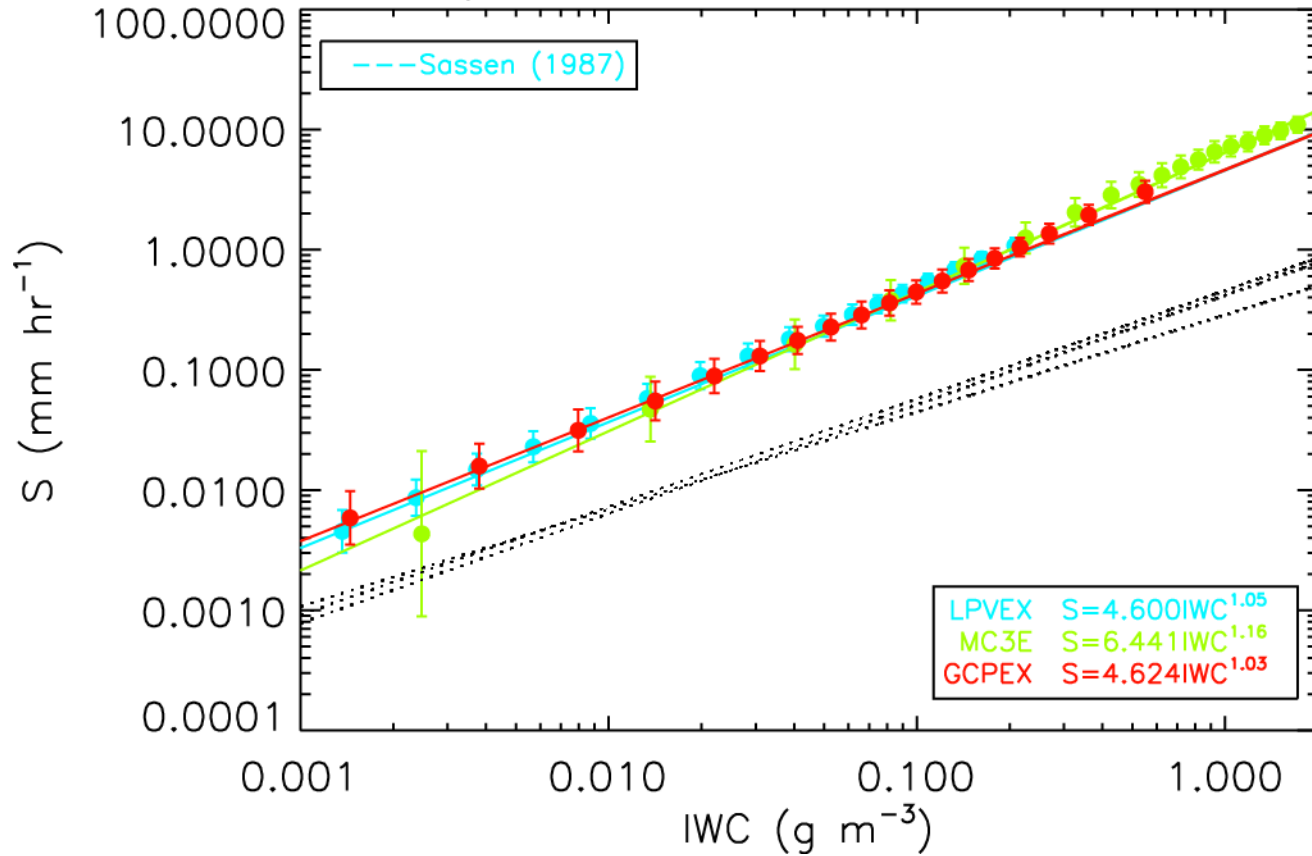
Snowfall Rate–Radar Reflectivity Relations, Ku band



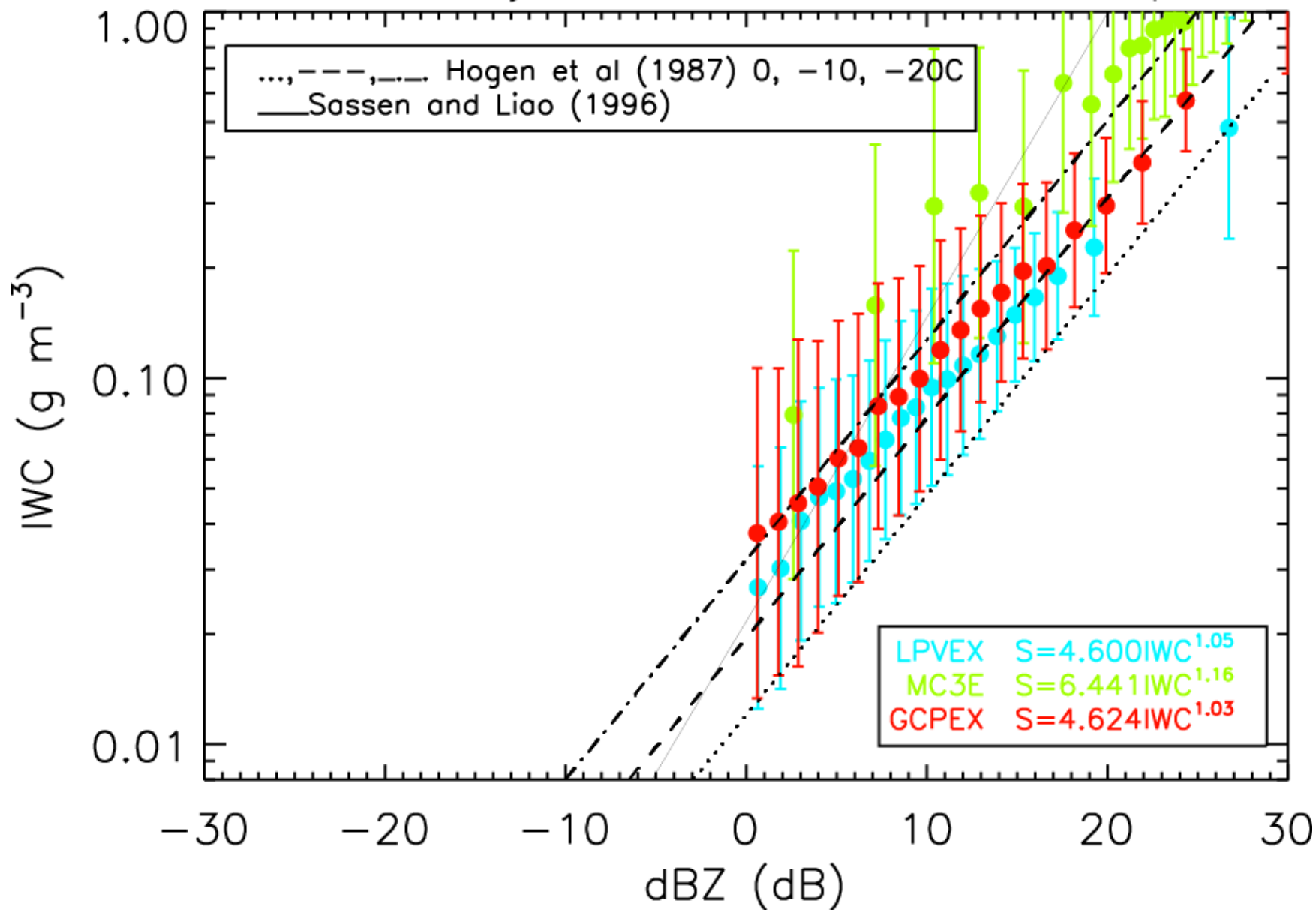
Snowfall Rate vs Ku-Ka Reflectivities



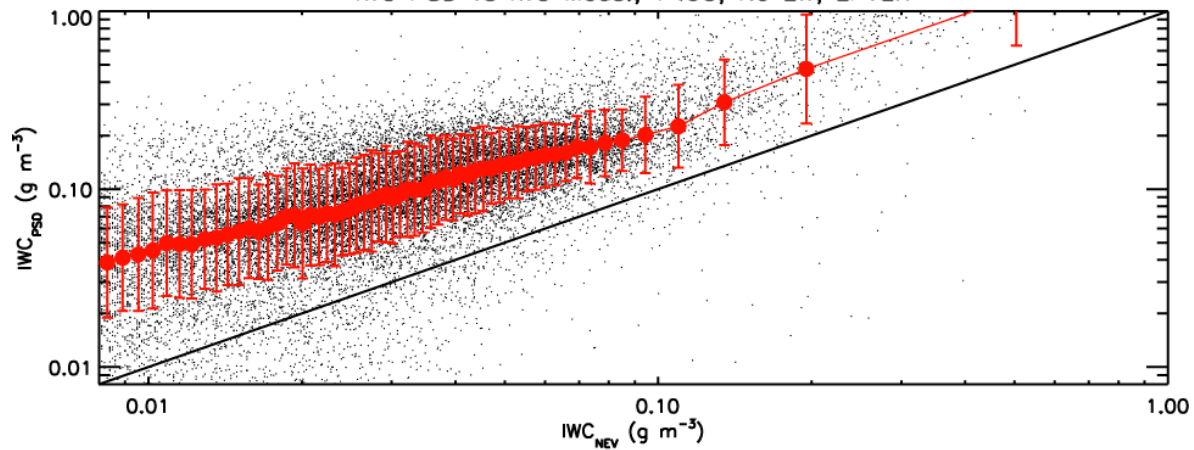
Summary of IWC–Snow Rate Relationships



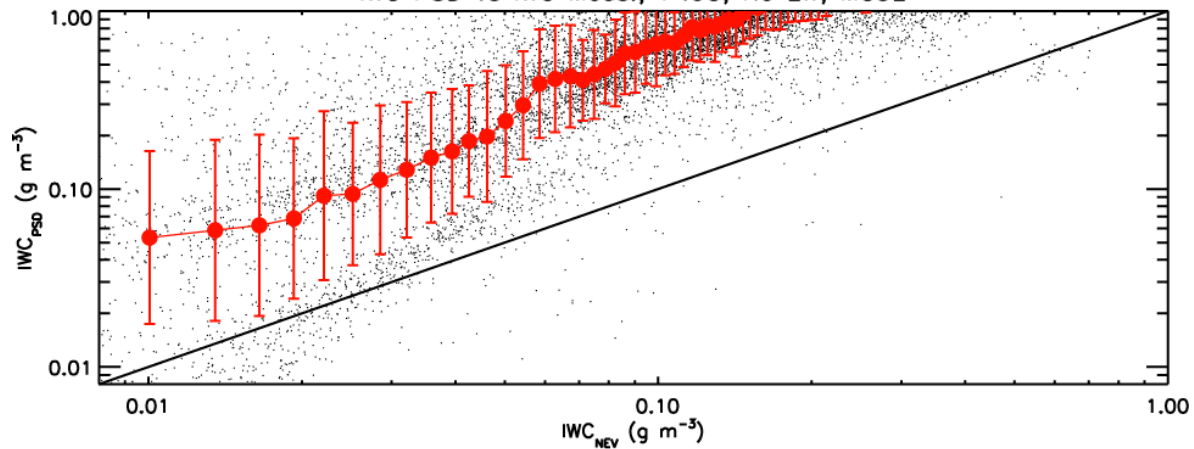
Summary of Z-IWC Relationships



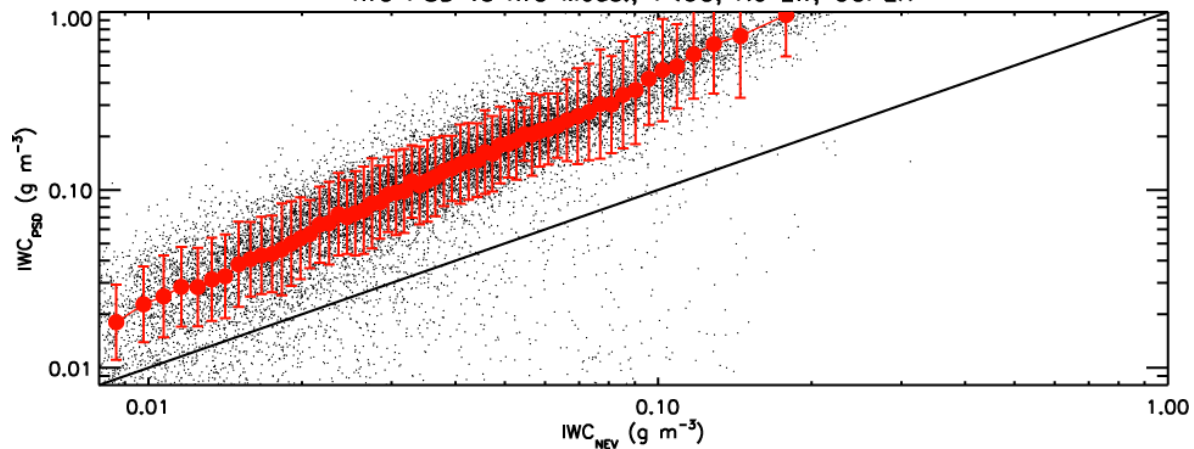
IWC PSD vs IWC Meas., T<0C, No LW, LPVEX



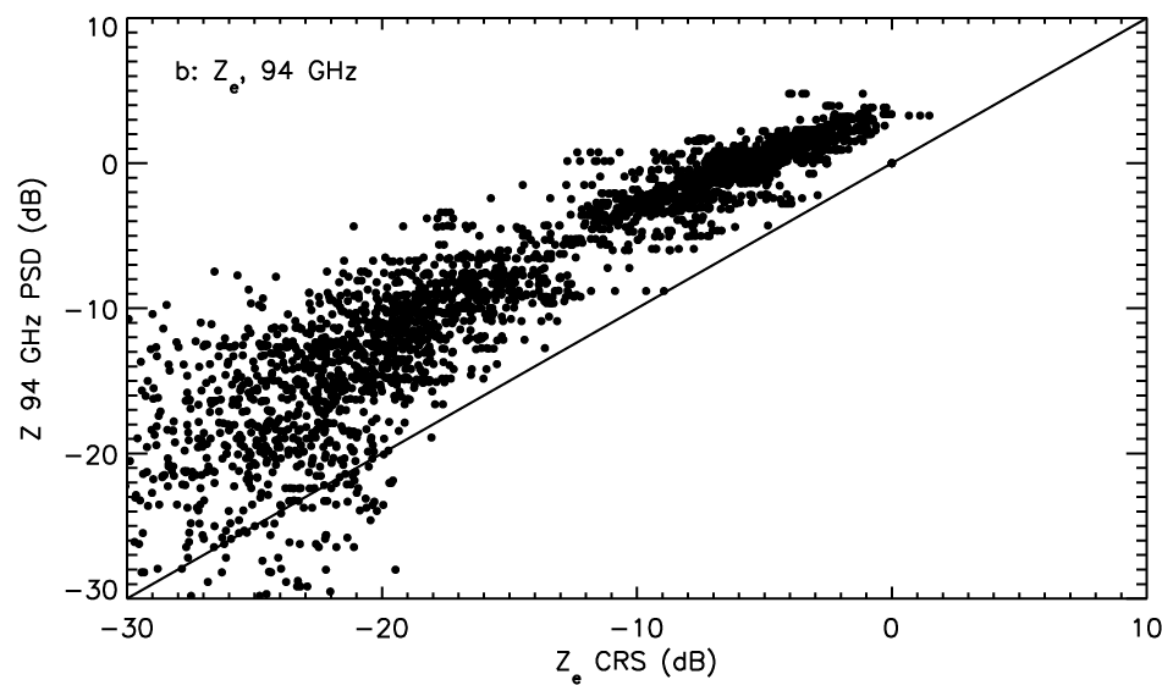
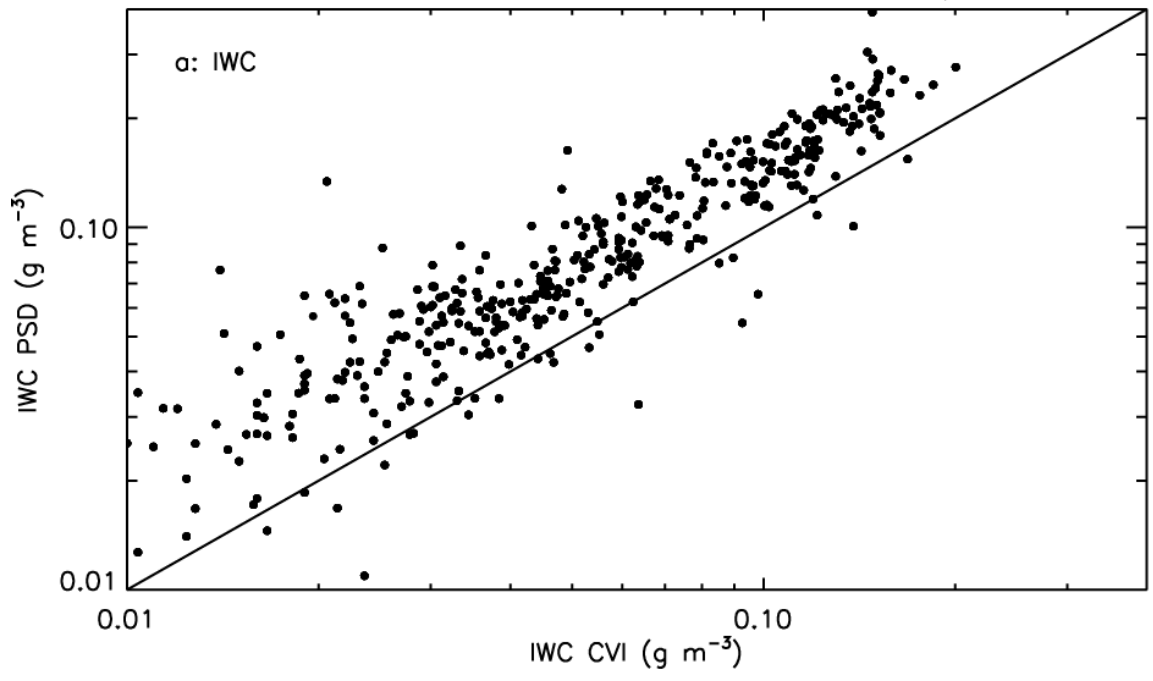
IWC PSD vs IWC Meas., T<0C, No LW, MC3E



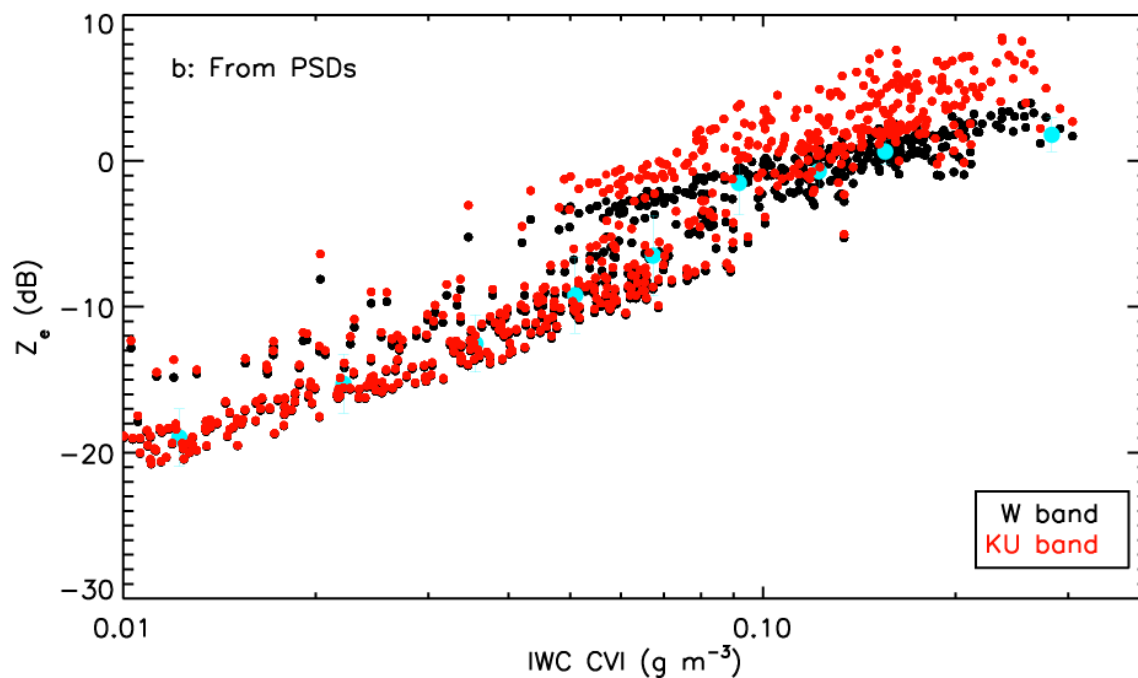
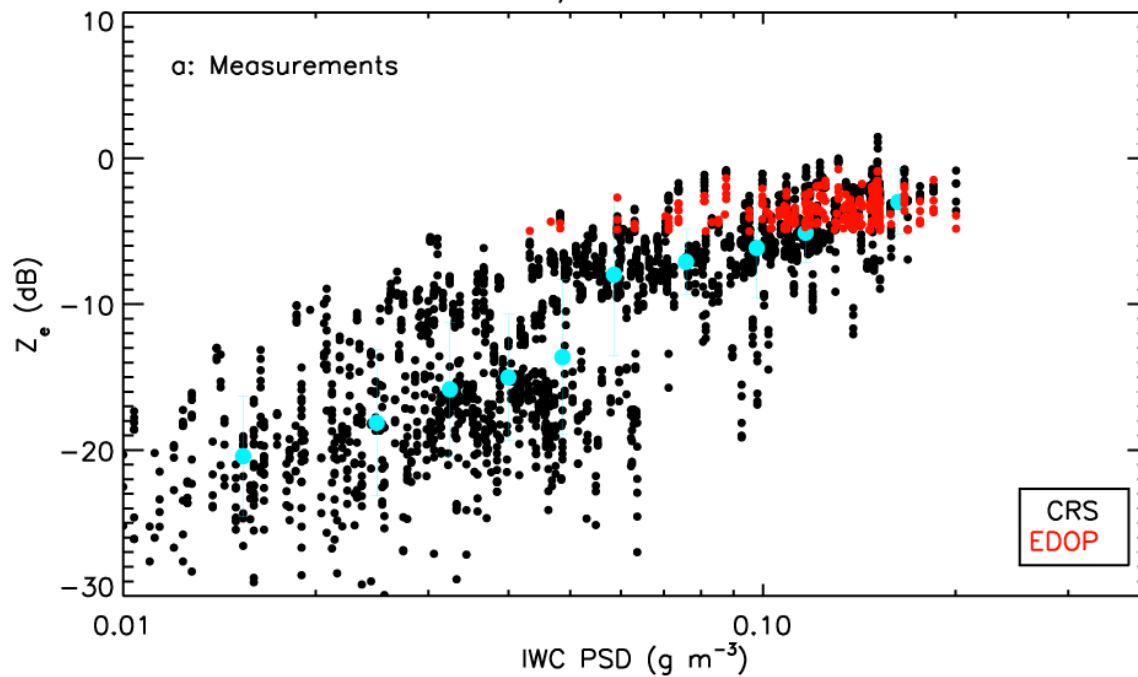
IWC PSD vs IWC Meas., T<0C, No LW, GCPEX



Measurements vs Calculations from PSDs, TC4



TC4 ER-2, DC-8 Colocations



Opportunities

- Tweak the mass-diameter relationship
- Compare colocations of radar and in-situ aircraft (Steve Nesbitt's efforts for colocations)
- Derive modified gamma PSDs-straight forward
- Develop Z-S and Z-IWC, and dWR-S relationships
- Coordinate with other PMM Researchers