

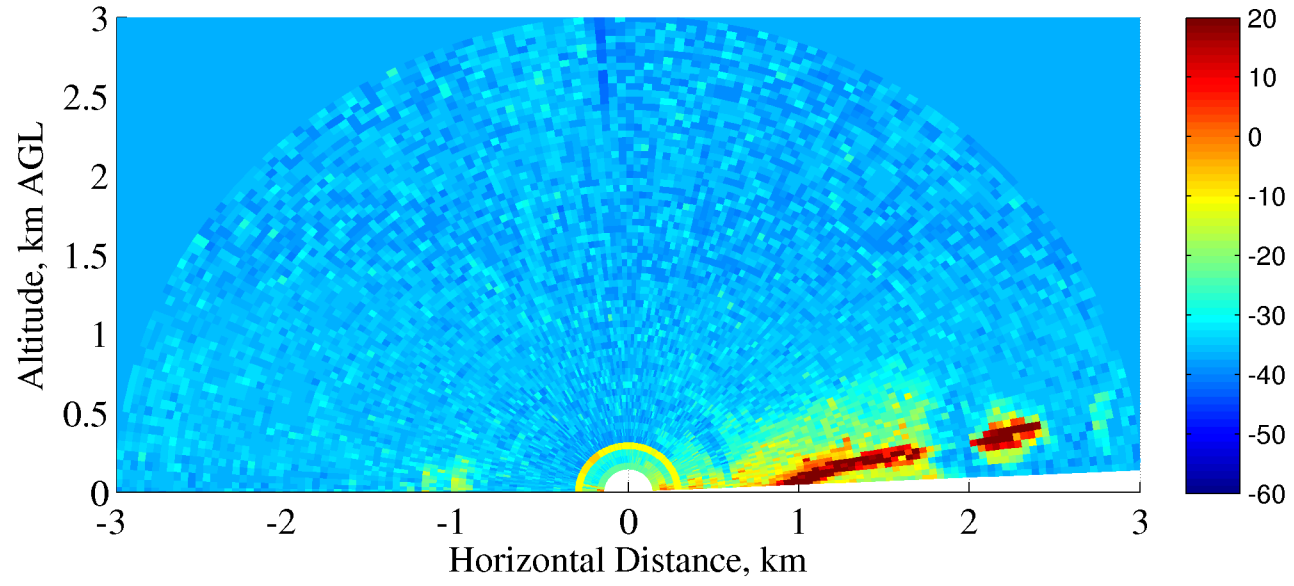
A Preliminary Analysis of StormVEx Radar Reflectivity Spatial Characteristics

Roger Marchand, JISAO/UW

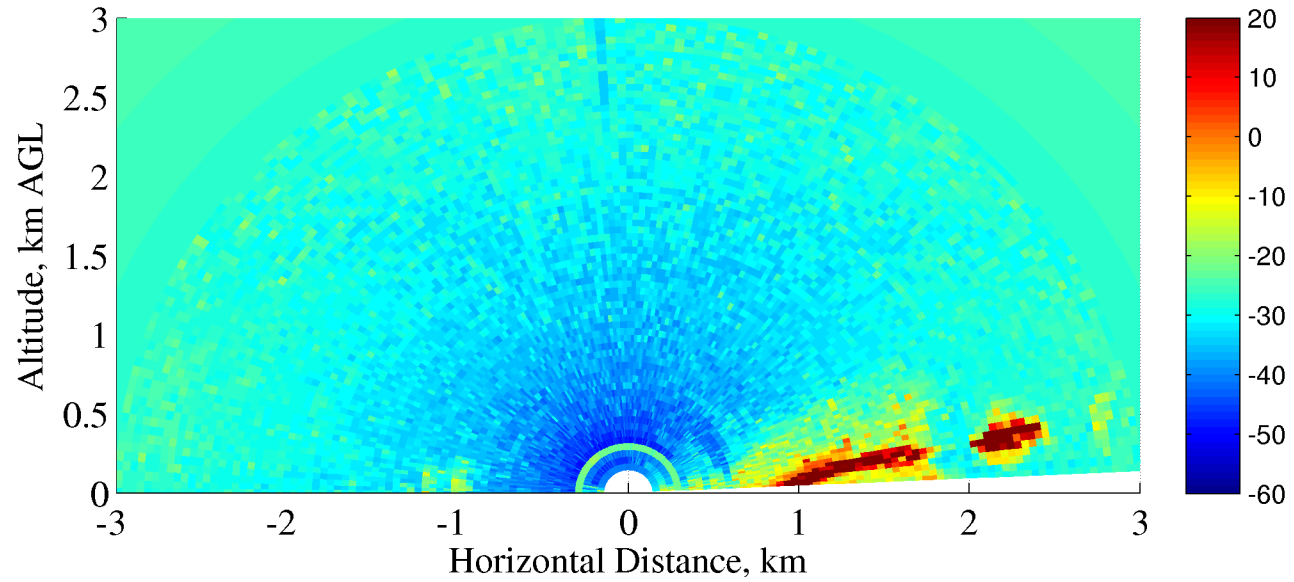
Two key questions

- (1) **Is the distribution of cloud particles observed at SPL the same as that directly above the radar (where Doppler spectra are obtained) ?**
- (2) **Can we use reflectivity observations obtained while pointing directly toward SPL or does surface clutter greatly contaminate the reflectivity data ?**

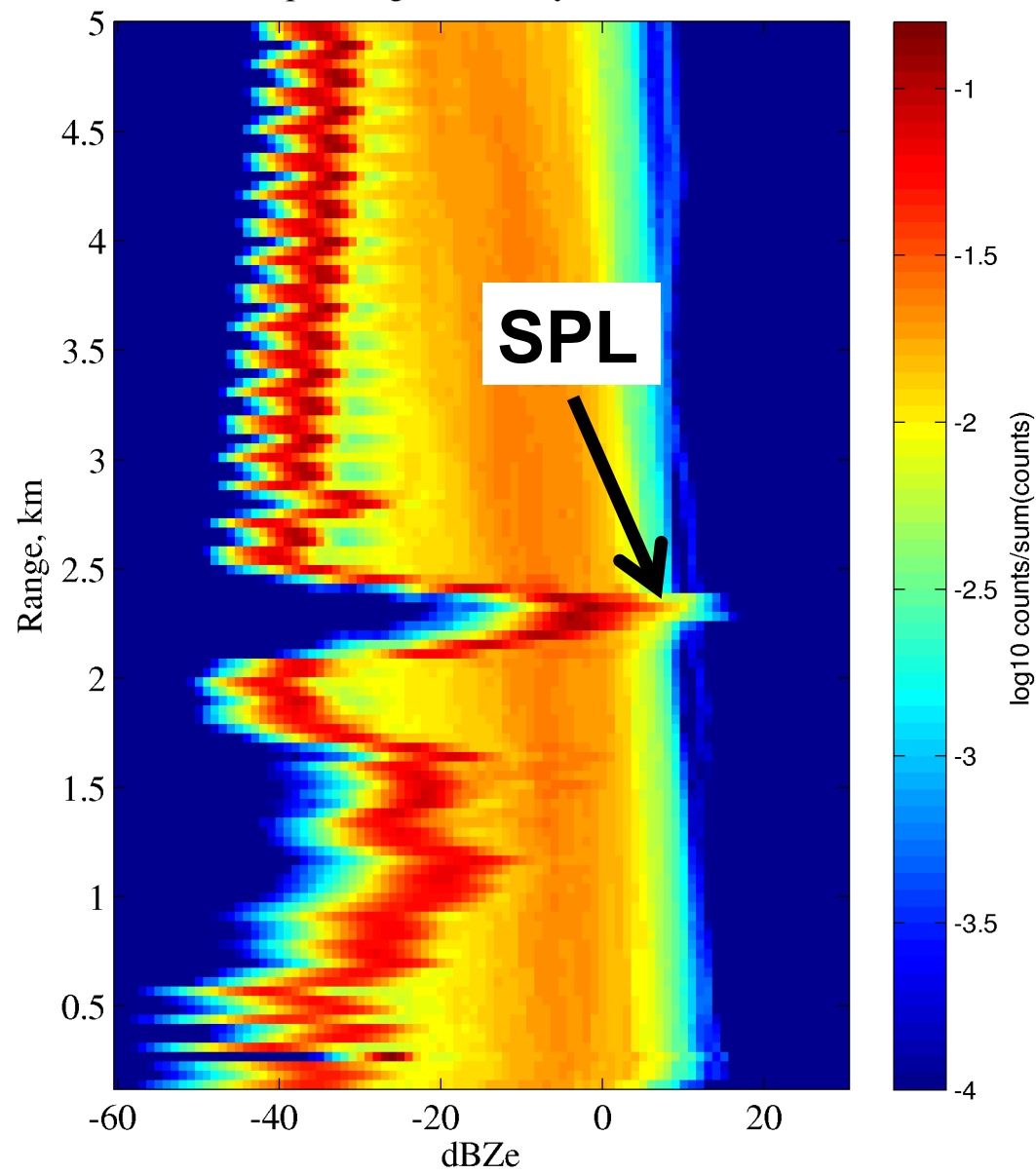
Mask Noise Threshold with out range dependence



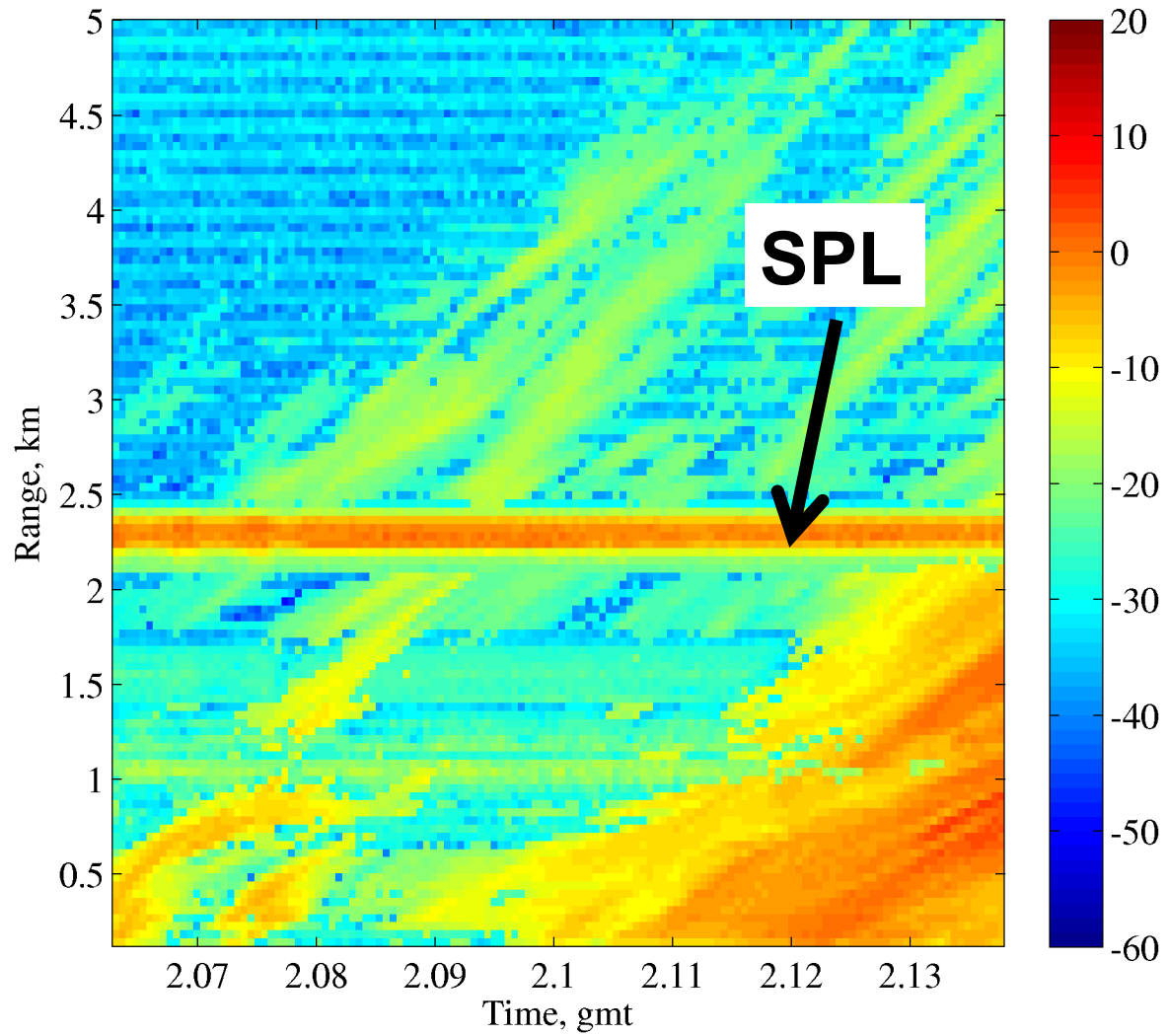
Mask Noise Threshold with range dependence



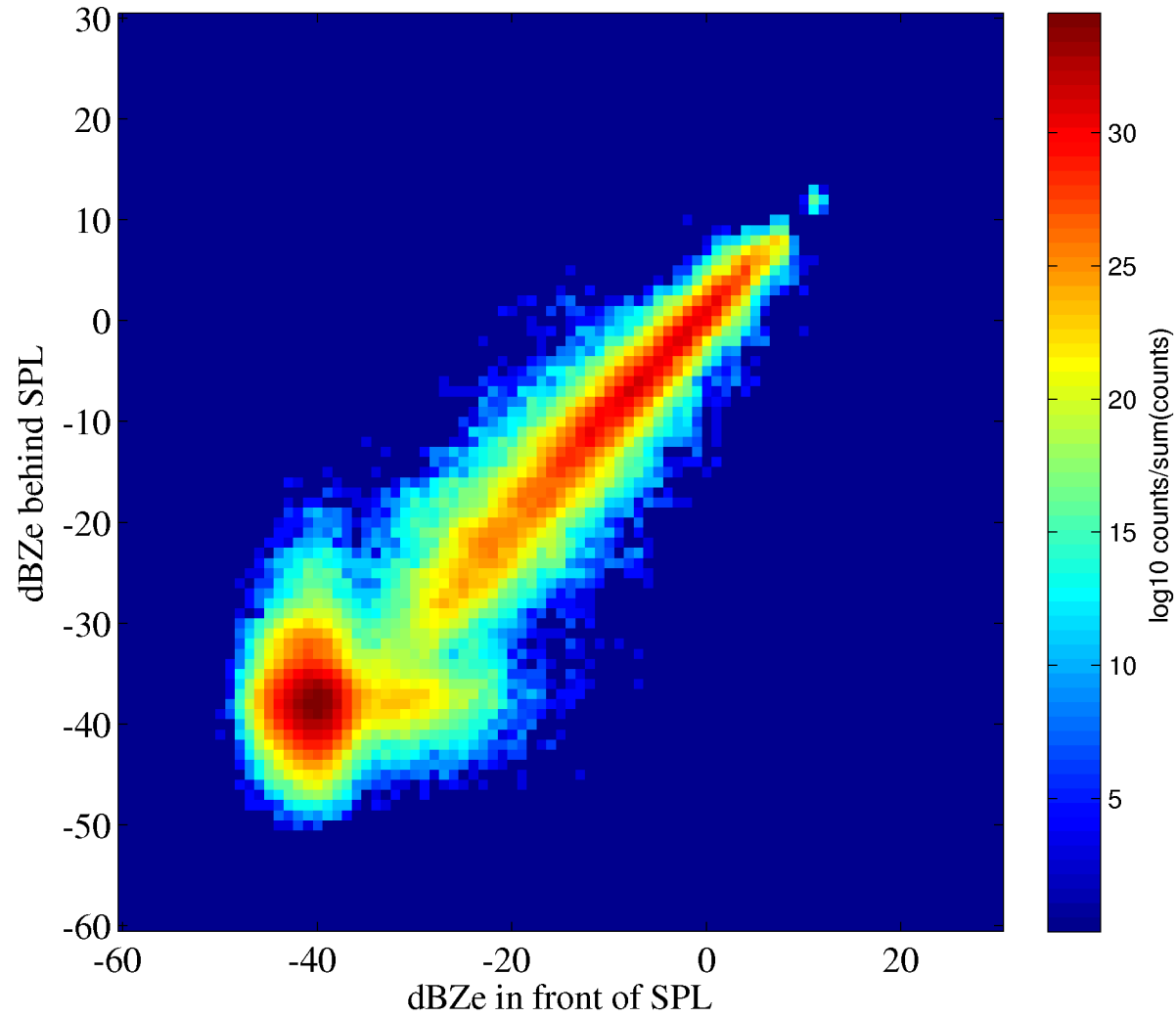
SPL pointing reflectivity distribution

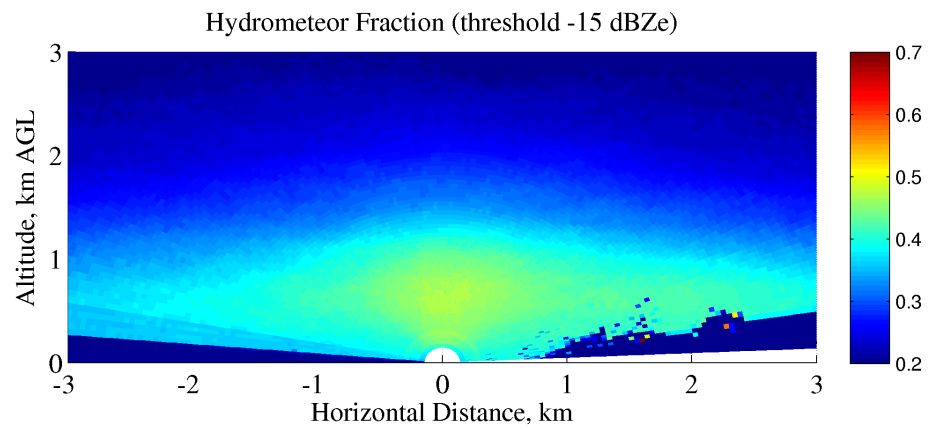
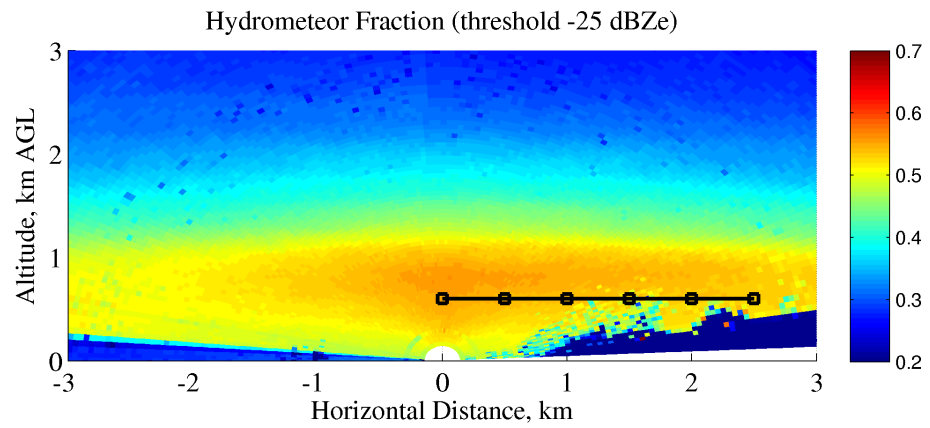
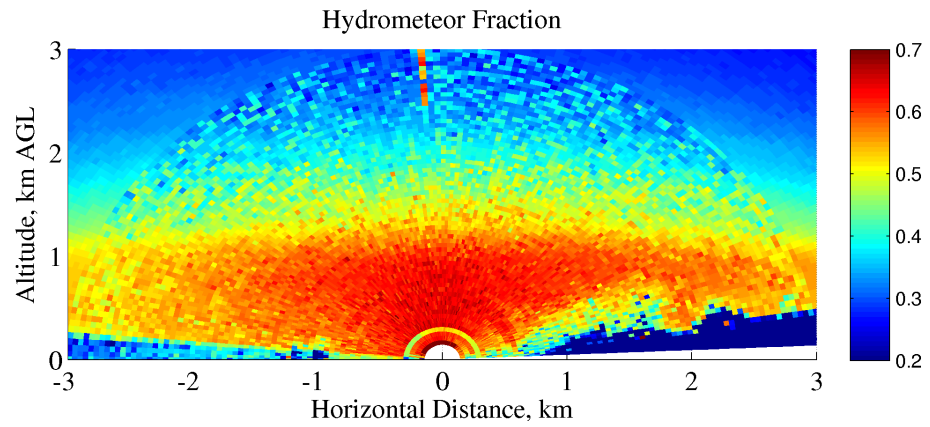


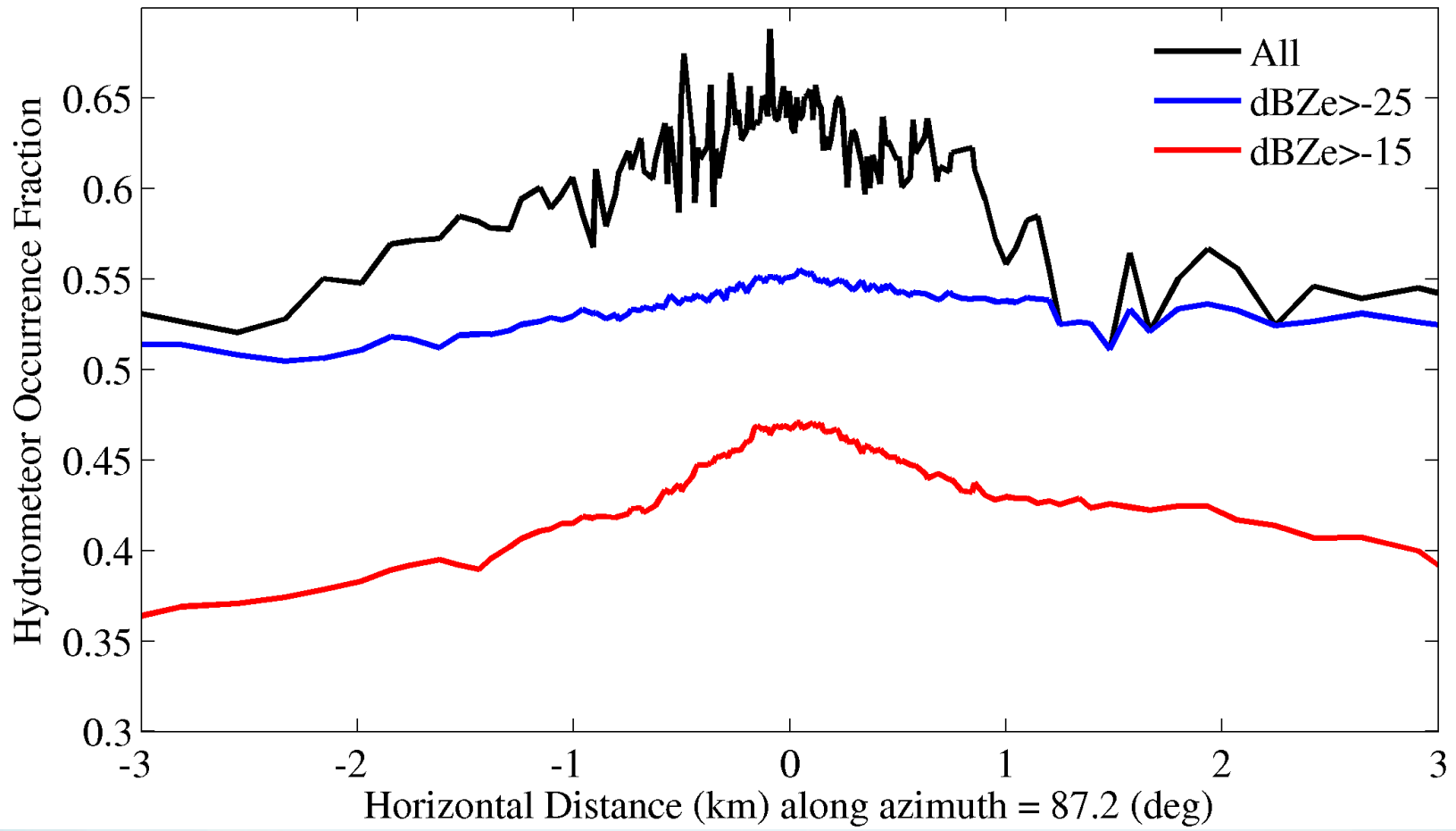
Reflectivity, fixed SPL pointing 2010.931747 (year fraction)



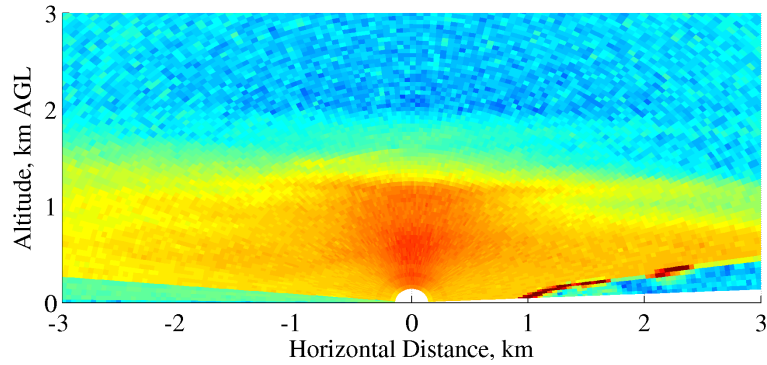
"Instantaneous" joint reflectivity PDF, corr-coef. = 0.94



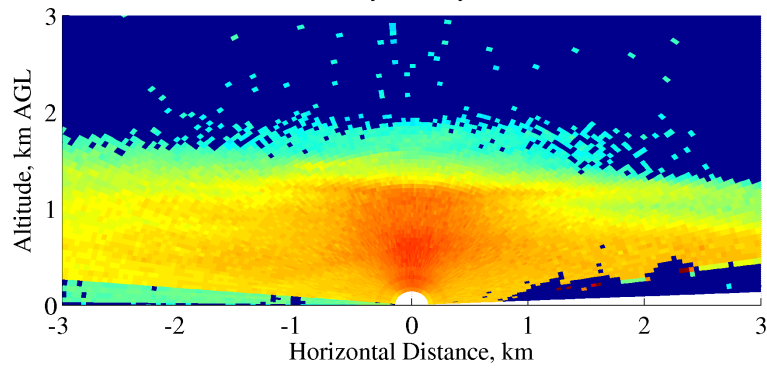




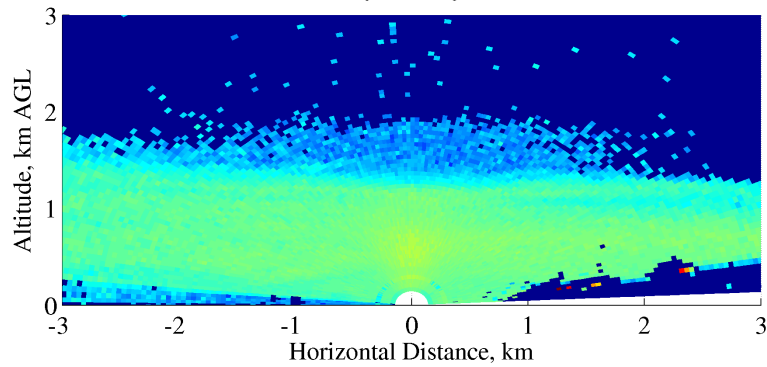
scan #165, azimuth =87.2, time = 2010.9164(year fraction)



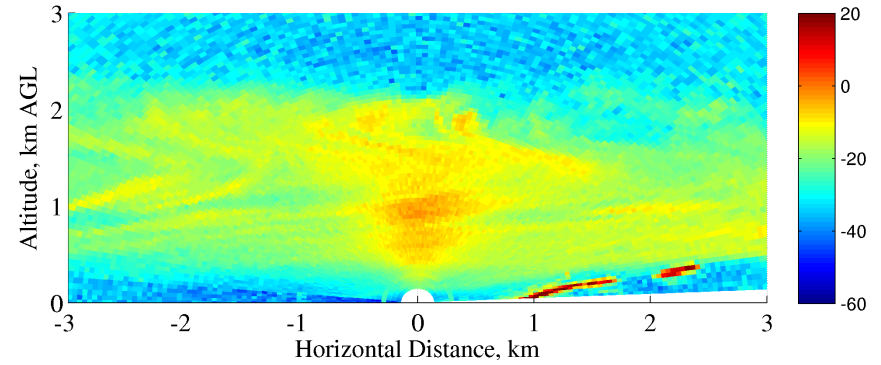
Co-Pol Reflectivity with Hydrometeor Mask



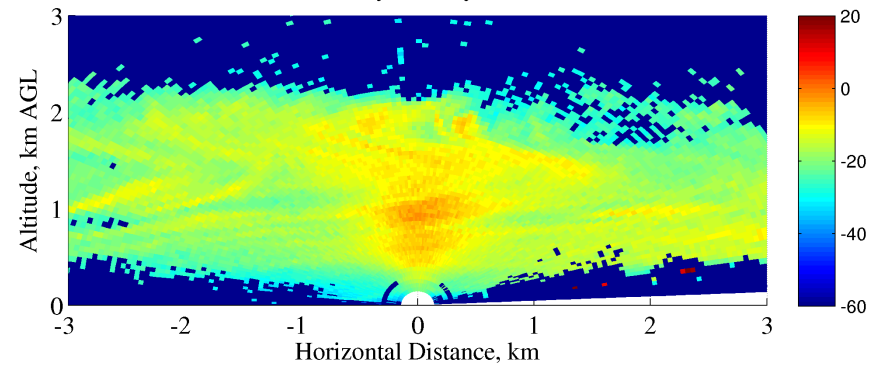
X-Pol Reflectivity with Hydrometeor Mask



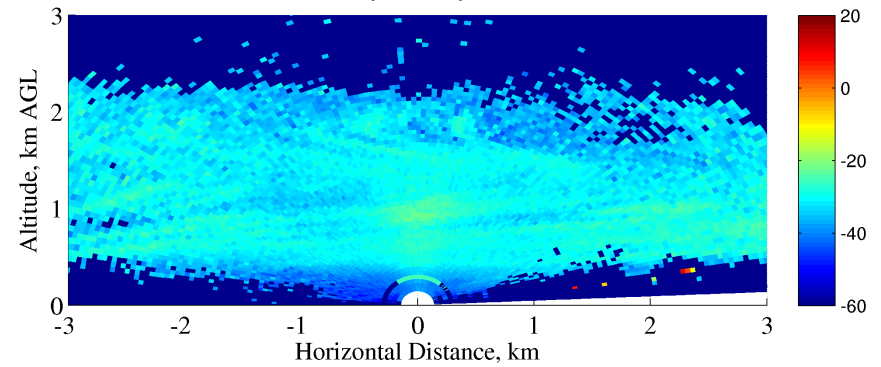
scan #345, azimuth =87.2, time = 2010.9278(year fraction)



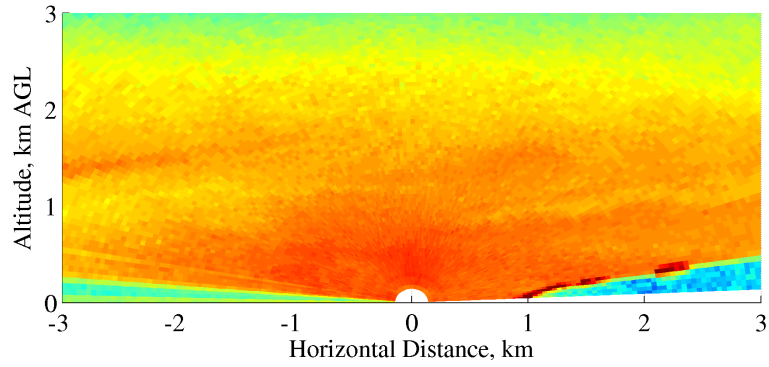
Co-Pol Reflectivity with Hydrometeor Mask



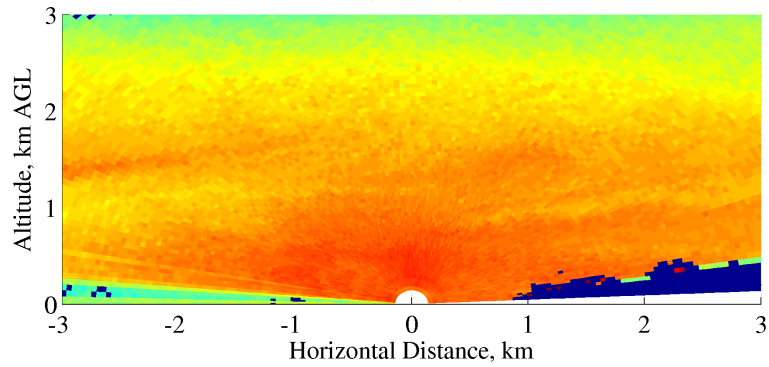
X-Pol Reflectivity with Hydrometeor Mask



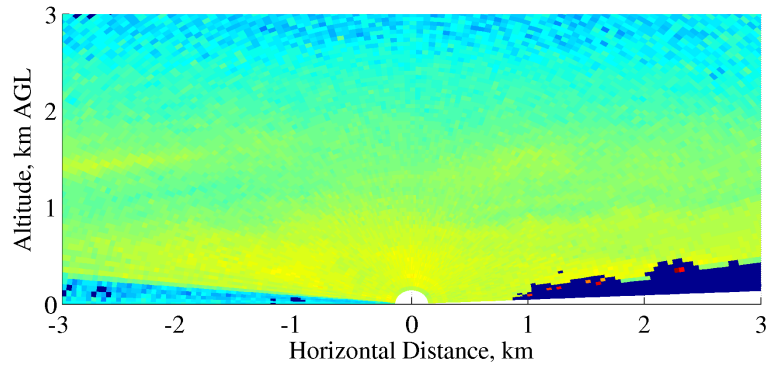
scan #75, azimuth =87.2, time = 2010.911(year fraction)



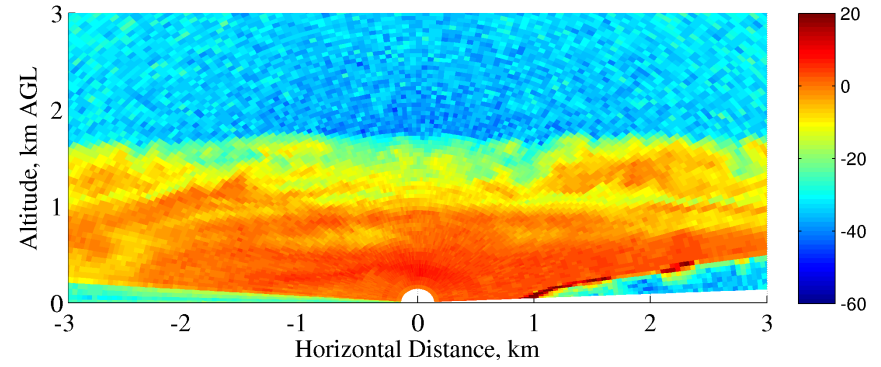
Co-Pol Reflectivity with Hydrometeor Mask



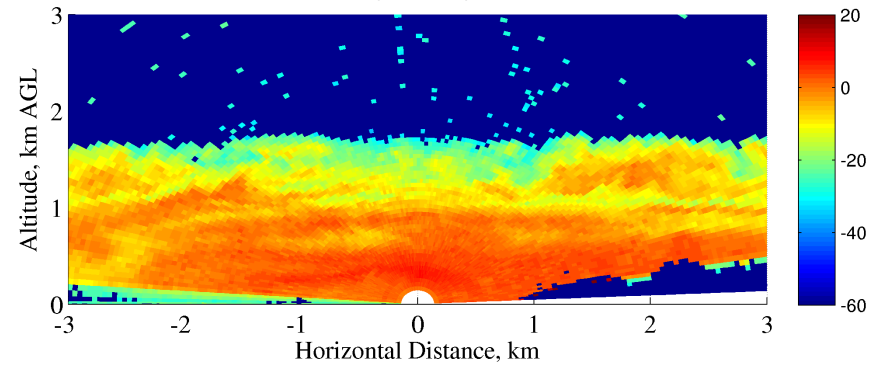
X-Pol Reflectivity with Hydrometeor Mask



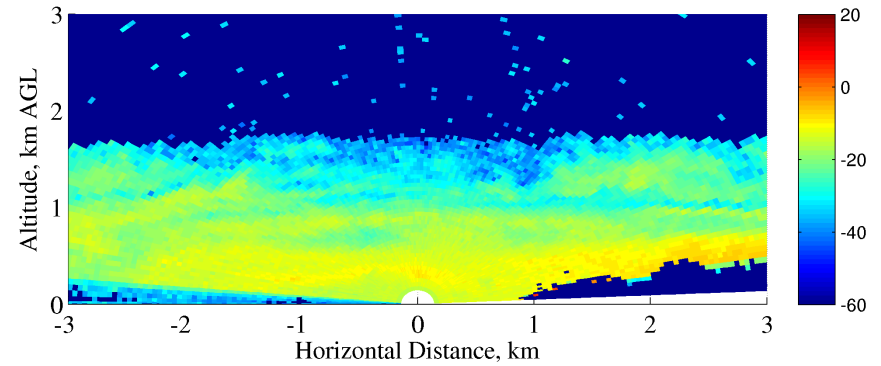
scan #105, azimuth =87.2, time = 2010.9128(year fraction)

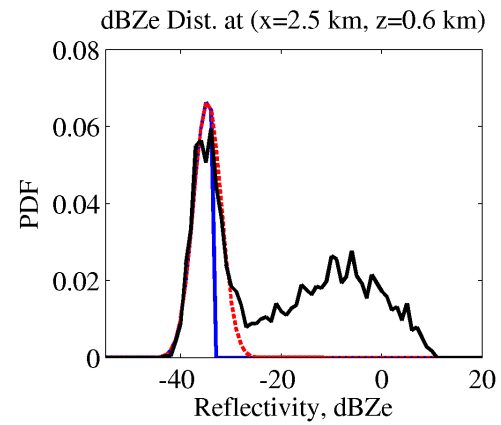
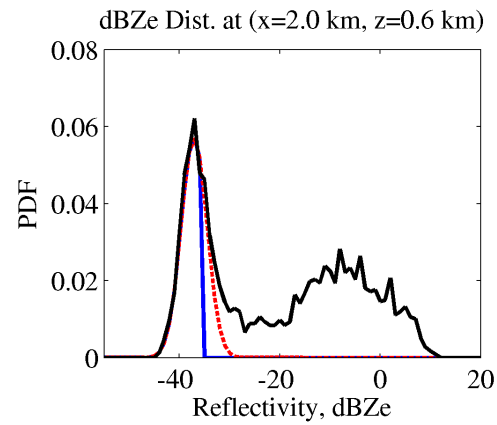
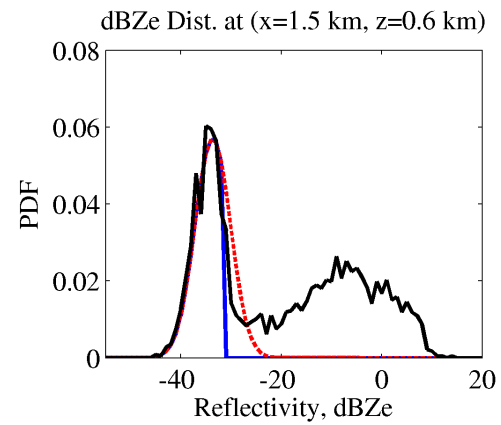
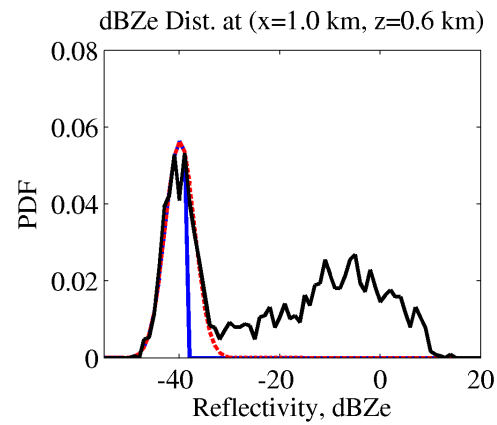
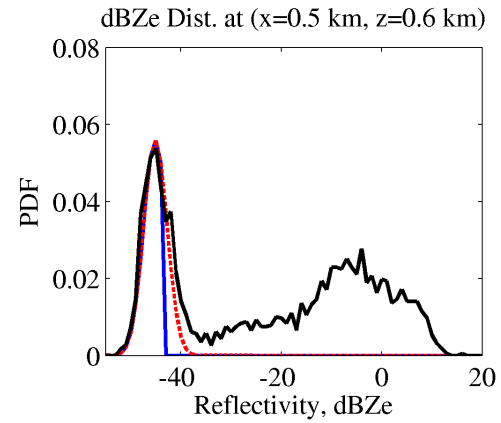
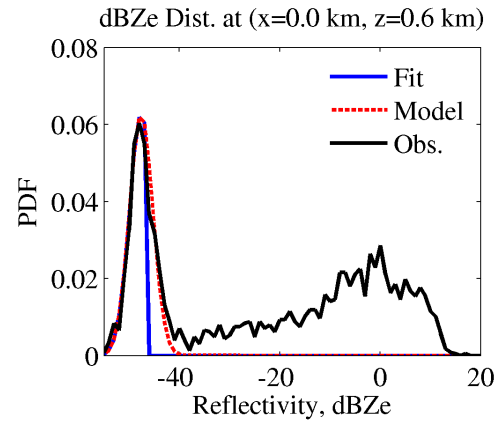


Co-Pol Reflectivity with Hydrometeor Mask

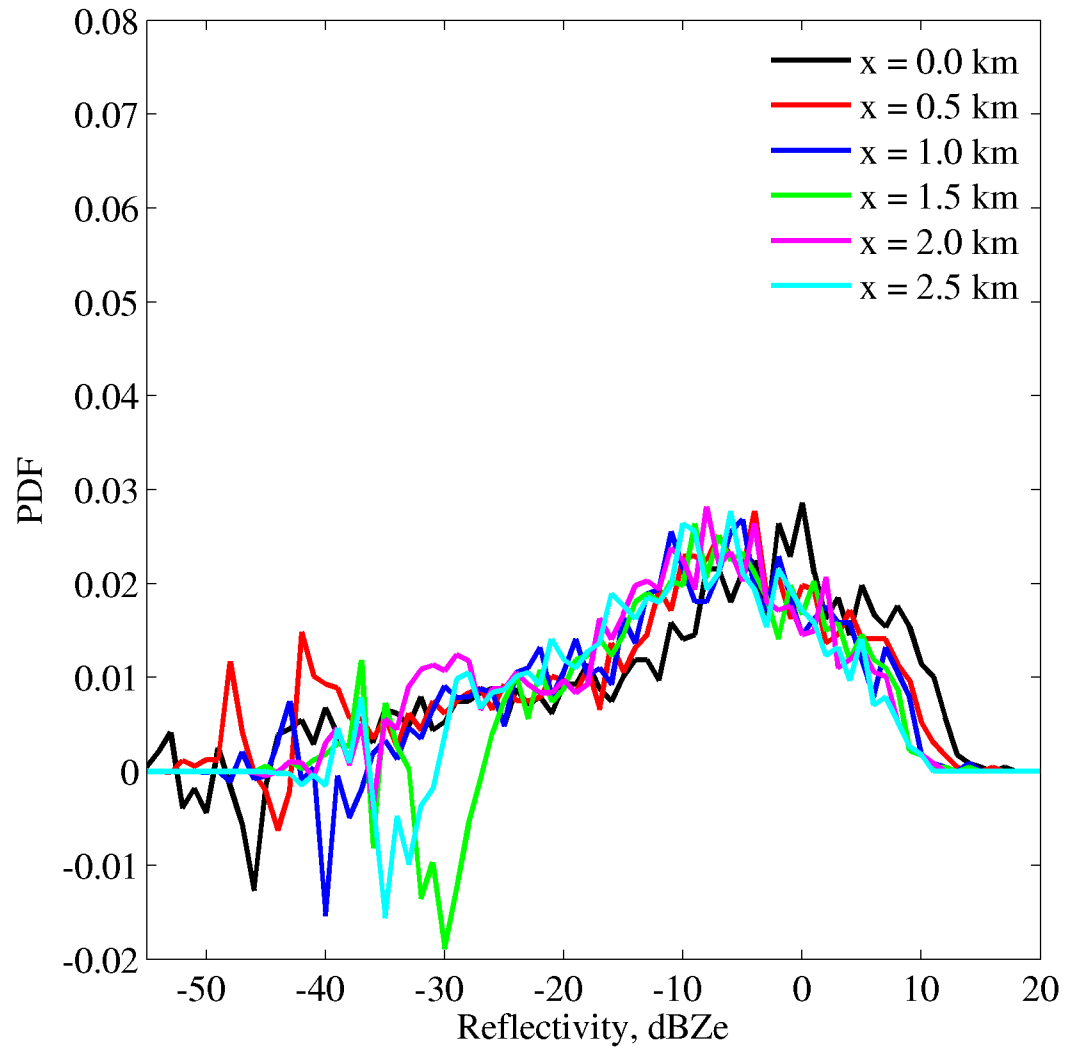


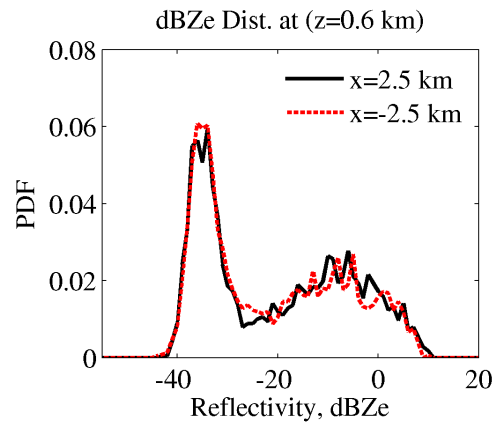
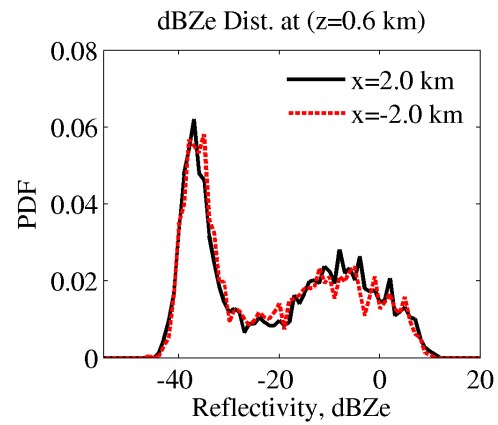
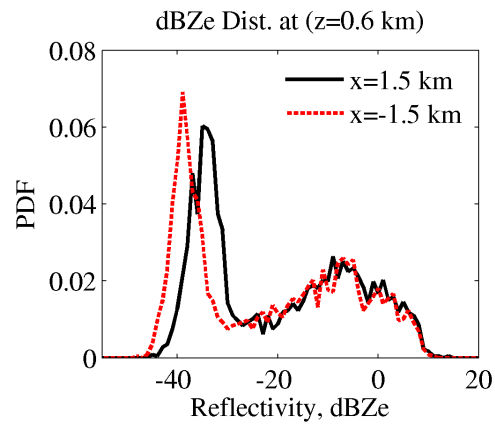
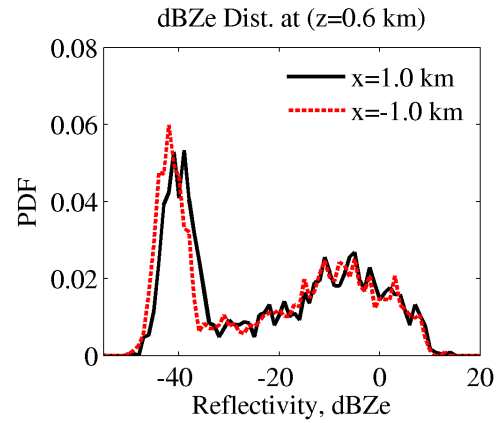
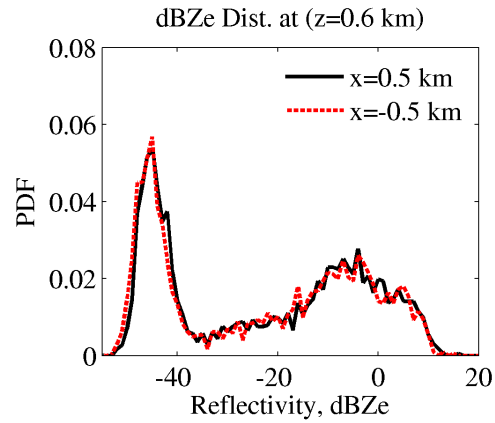
X-Pol Reflectivity with Hydrometeor Mask





Residual dBZe Distribution





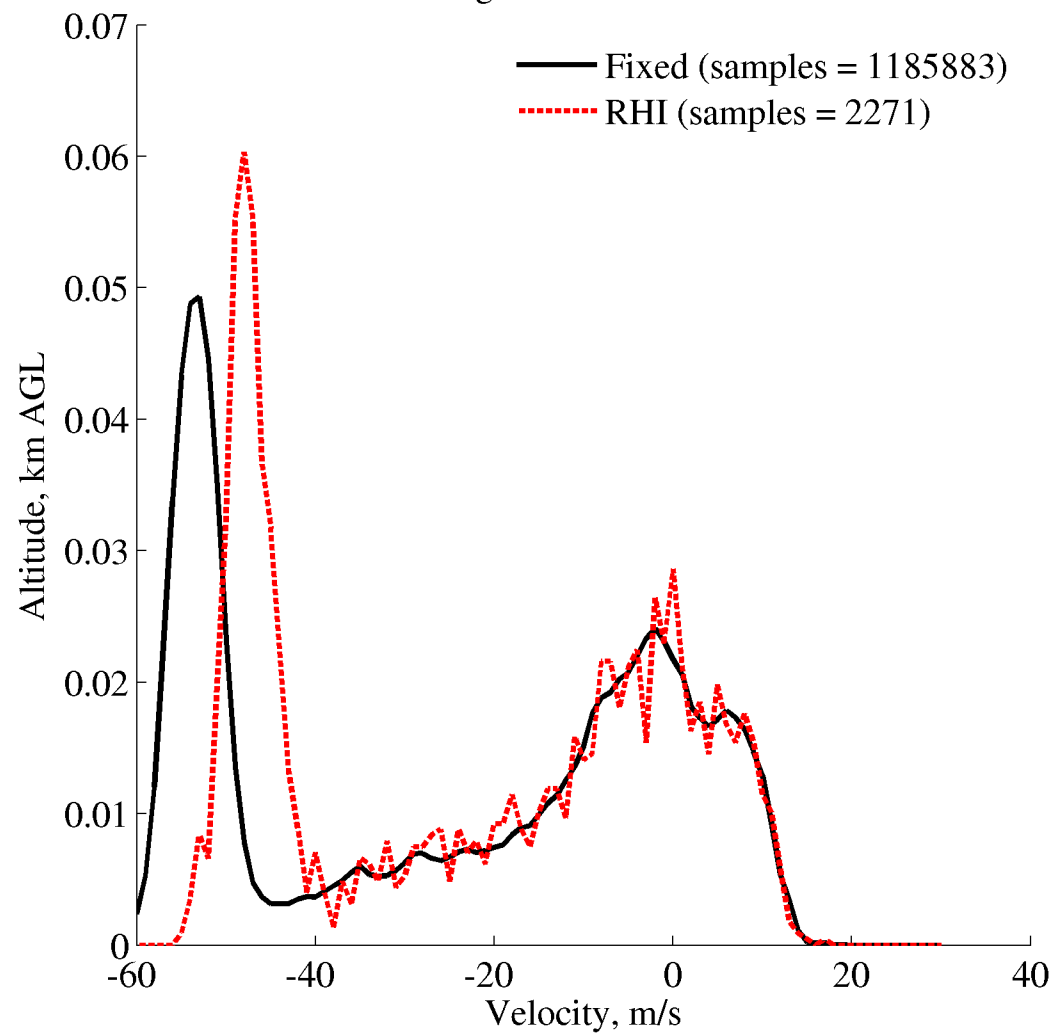
Two key questions - revisited

- (1) **Is the distribution of cloud particles observed at SPL the same as that directly above the radar (where Doppler spectra are obtained) ?**
 - **Preliminary analysis of radar detection frequencies and reflectivity distributions strongly suggest that the cloud radar is sufficiently close to SPL that the distribution of cloud particles observed at SPL is the same as that directly above the radar.**
- (2) **Can we use reflectivity observations obtained while pointing directly toward SPL or does surface clutter greatly contaminate the reflectivity data ?**
 - **Radar reflectivity observations are strongly spatially correlated on scale of a kilometer and there are ample low-clutter observations in the near vicinity to SPL which are suitable for correlative analysis with SPL microphysical observations.**

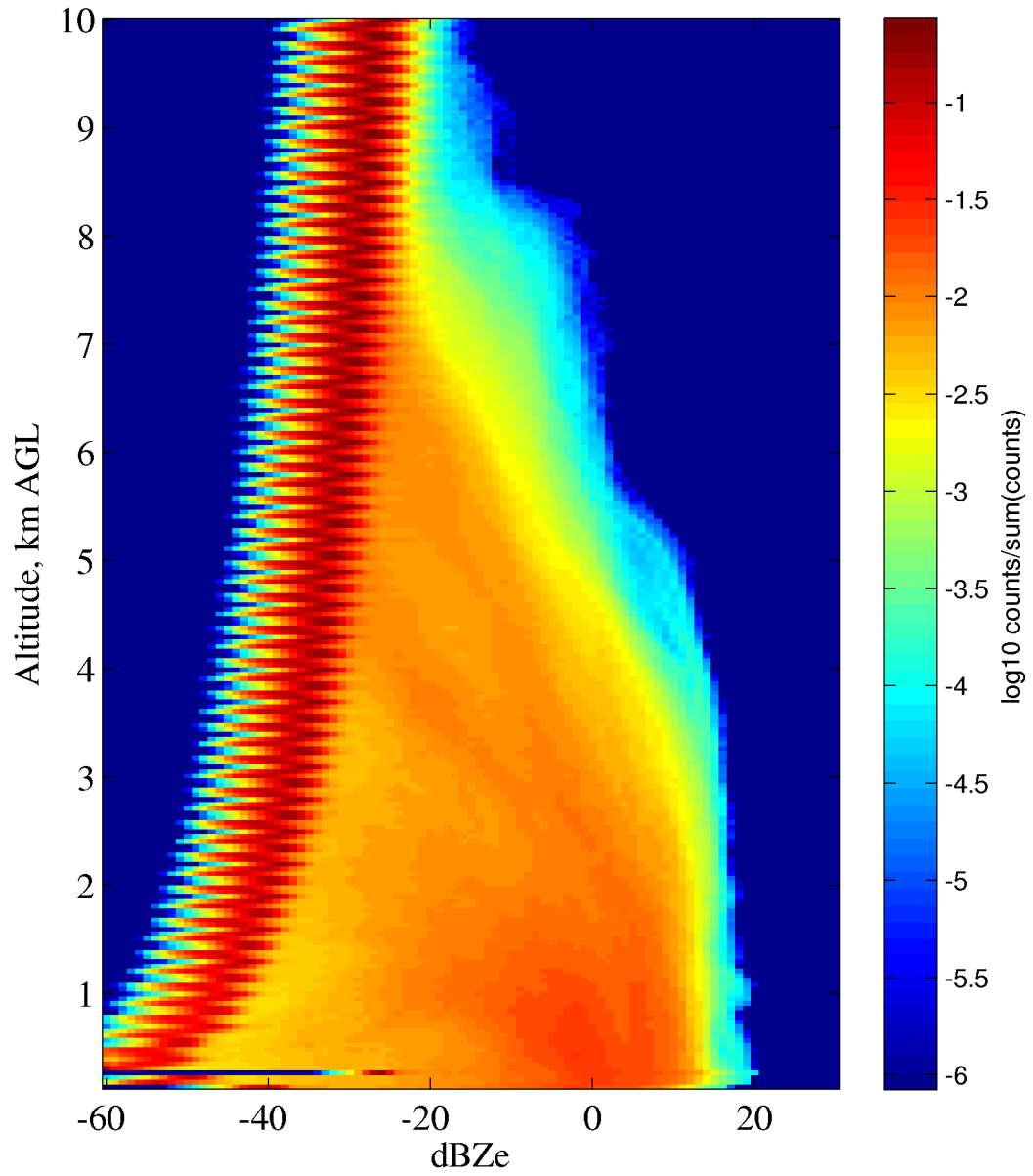
Still much to do ...

- Lots of instruments → lots of QC (ASSIST, HSRL, MWR, MPL, etc.)
- SWACR Calibration issues (comparisons with JPL radar & CloudSat)
- Microphysics data
 - Remove periods where deicing probes.
 - Determine uncertainty due to flow rates.
 - Blowing Snow ?
 - Combine data from multiple probes in coherent fashion.
 - Determine habits from CPI/CIP/PIP
- Comparison of radar (co & cross-pol) with forward model reflectivity from microphysics probe data
- Develop case studies (Aircraft data too!)

Reflectivity Distribution above radar at altitude 0.6 km, AGL
Fixed Vertical Pointing vs. Extracted from RHI Scan



Nadir pointing reflectivity distribution



"~ 5 min. mean" joint reflectivity PDF, corr-coef. = 0.99

