1. Objective

- Provide vertical cloud distribution statistics observed by AMF KAZR during DYNAMO/AMIE
- Compare S-Pol and SMART-R observed clouds to KAZR, and characterize the hydrometeor detecting capabilities of the S/C-band radars

2. Data and Methodology

- AMF: KAZR ARSCL reflectivity, rain gauge
- Collocate S-Pol, SMART-R RHI scans over KAZR
- QC S-Pol/SMART-R to remove noise, ground clutter, then compare with KAZR

3. Comparison between radars

All Clouds

- Both S-Pol & SMART-R underestimated freq. of thin clouds (<H < 1-km)

4. Producing Merged dataset

- Convert S/C band Z to equivalent Kz band Z
- Correct KAZR attenuation, replace KAZR during heavy “rain events” (Feng et al. 2009) to produce seamless merged dataset

5. Cloud microphysics and radiative heating rate retrievals

- S-Pol high clouds compare well with KAZR
- SMART-R has less vertical variability due to lower sensitivity
- Congestus agree well
- S-Pol provides excellent dynamic range at 10-km distance, suited for characterizing 3D cloud structures of convective and high clouds

6. Summary

- Largest difference in cloud detection is low cloud, both S-Pol & SMART-R user should be cautious
- Precipitating convective & non-precipitating high clouds agree much better in cloud frequency, cloud top height and Z profiles, especially for S-Pol
- A merged KAZR/S-Pol PI data product, along with cloud microphysics and radiative heating rate retrievals were produced for evaluation

Reference

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