Preliminary Evaluation of the GPM Full-swath Combined Precipitation Retrievals

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with contributions from

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Motivation

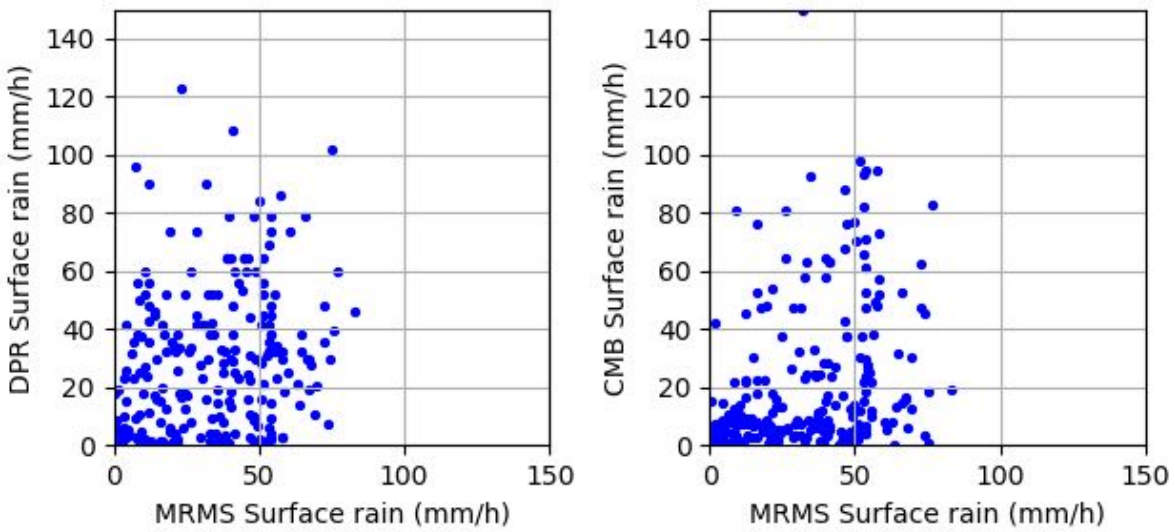
- “Poets do not go mad; but chess-players do. Mathematicians go mad, ….; but creative artists very seldom.
- I am not, as will be seen, in any sense attacking logic: I only say that this danger does lie in logic, not in imagination.”

G.K. Chesterton

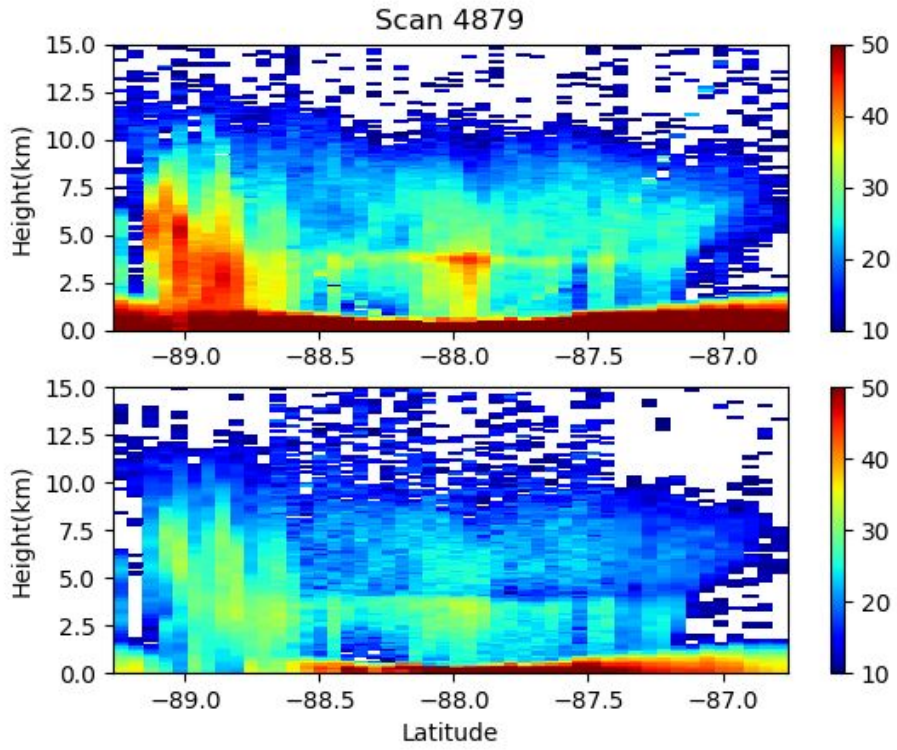
Expected impact of DPR scan pattern changes

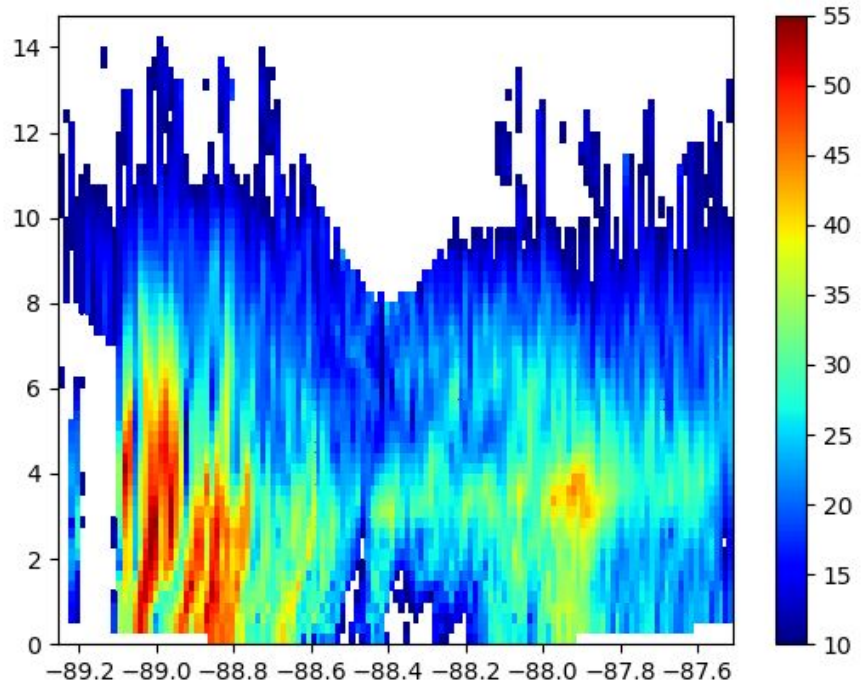
- Stratiform retrievals are reasonable
  - Downscaling and MS models are not so crucial
  - SRT PIA estimates generally reliable
  - Dual frequency retrievals generally work
- Convective retrievals are hard to interpret
  - Large uncertainties
  - Highly sensitive to ”a priori” assumptions and models/parameterizations
  - More useful models may be/need to be developed

Scatter plot of instantaneous GPM radar and MRMS surface estimates

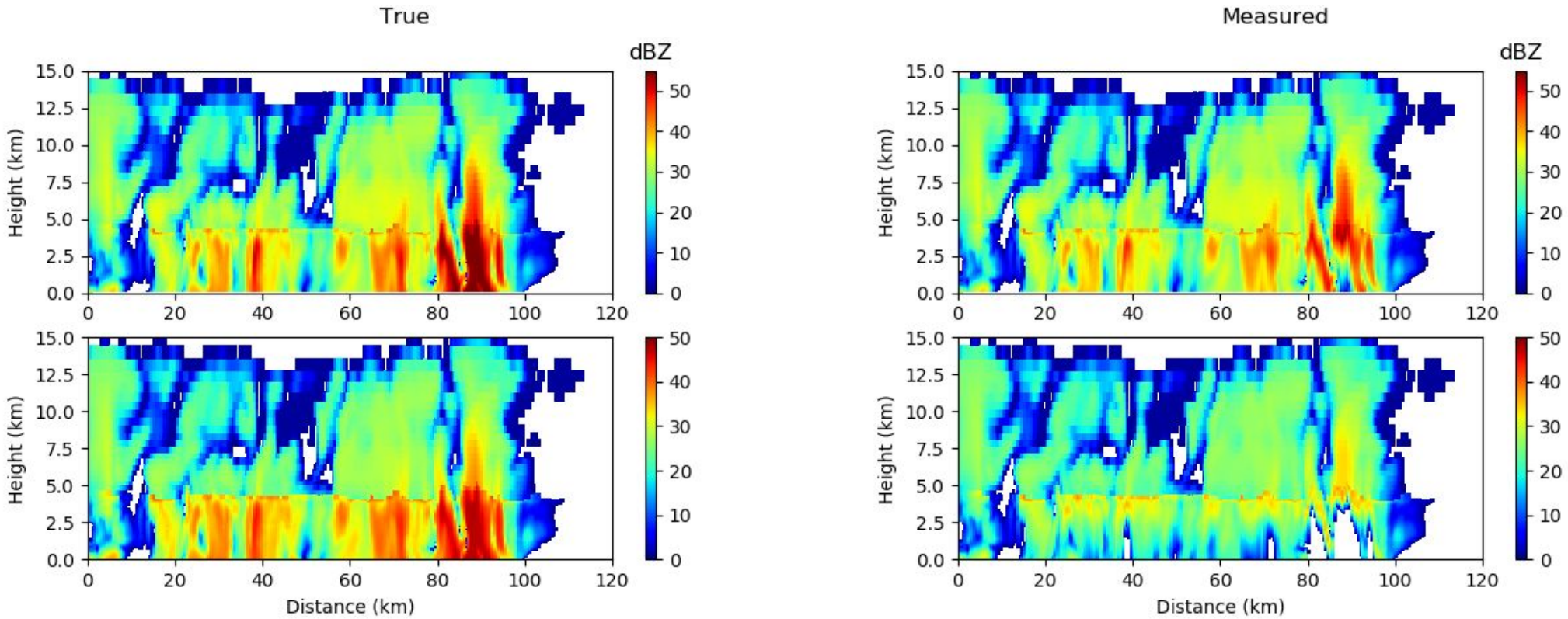


Example of coincident DPR and NEXRAD observations





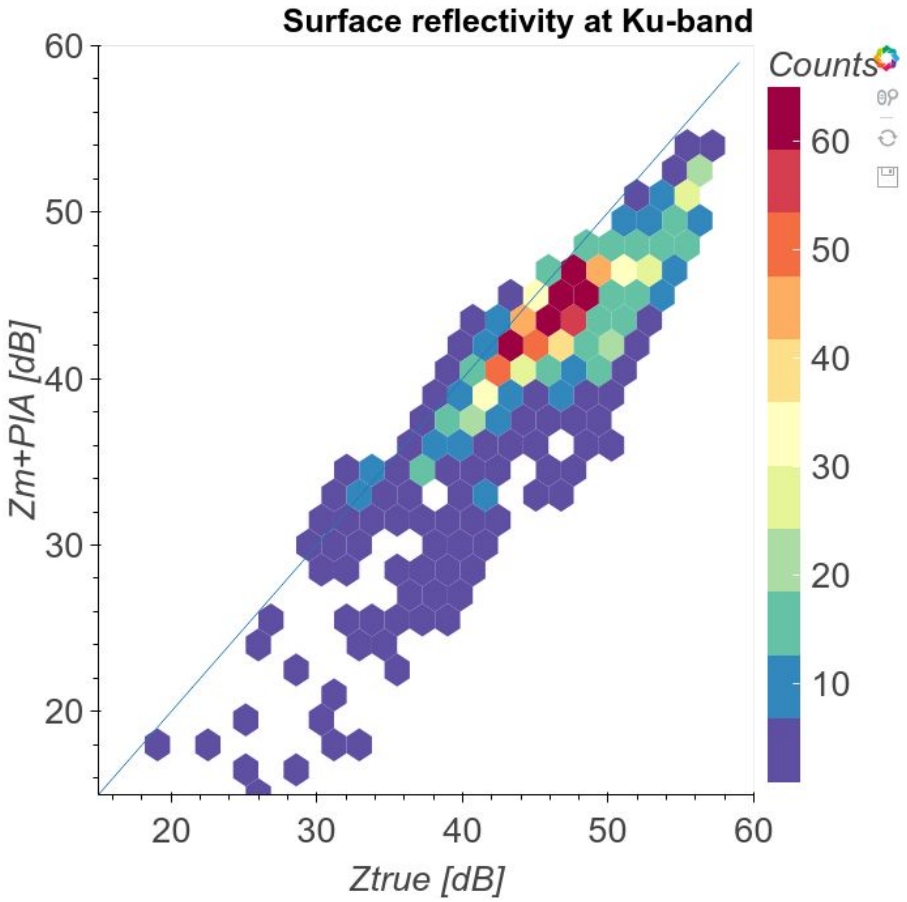
Example of simulated Ku- and Ka-band radar reflectivity

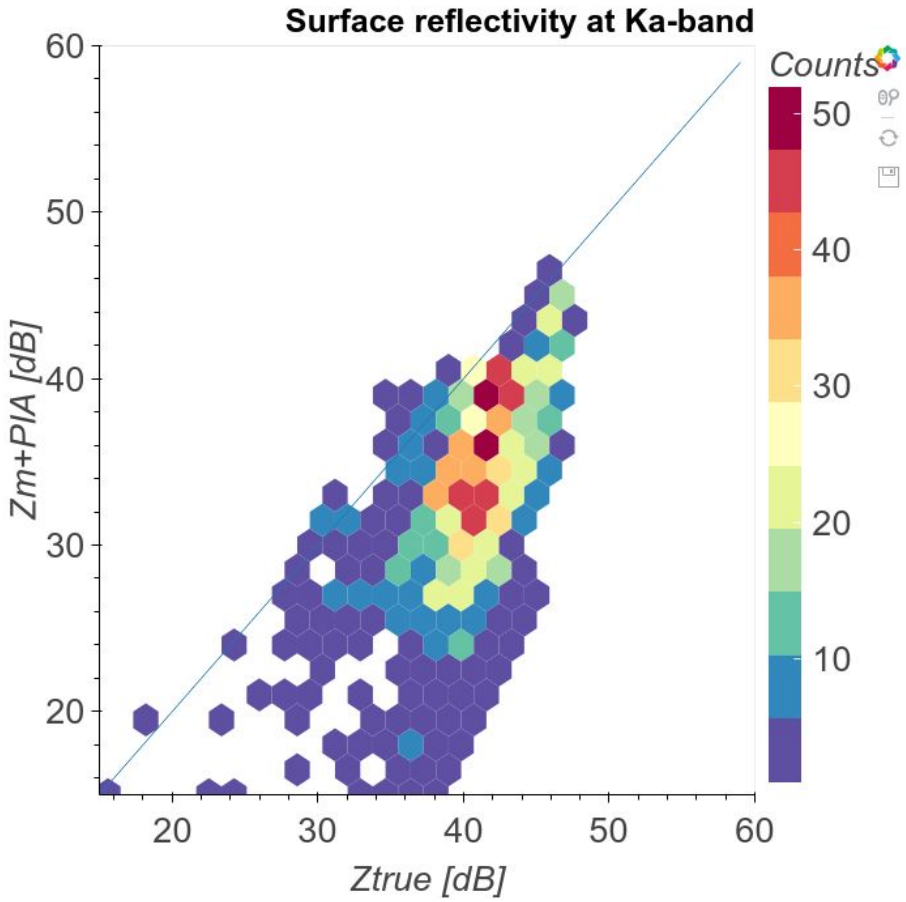


Why cloud resolving models?

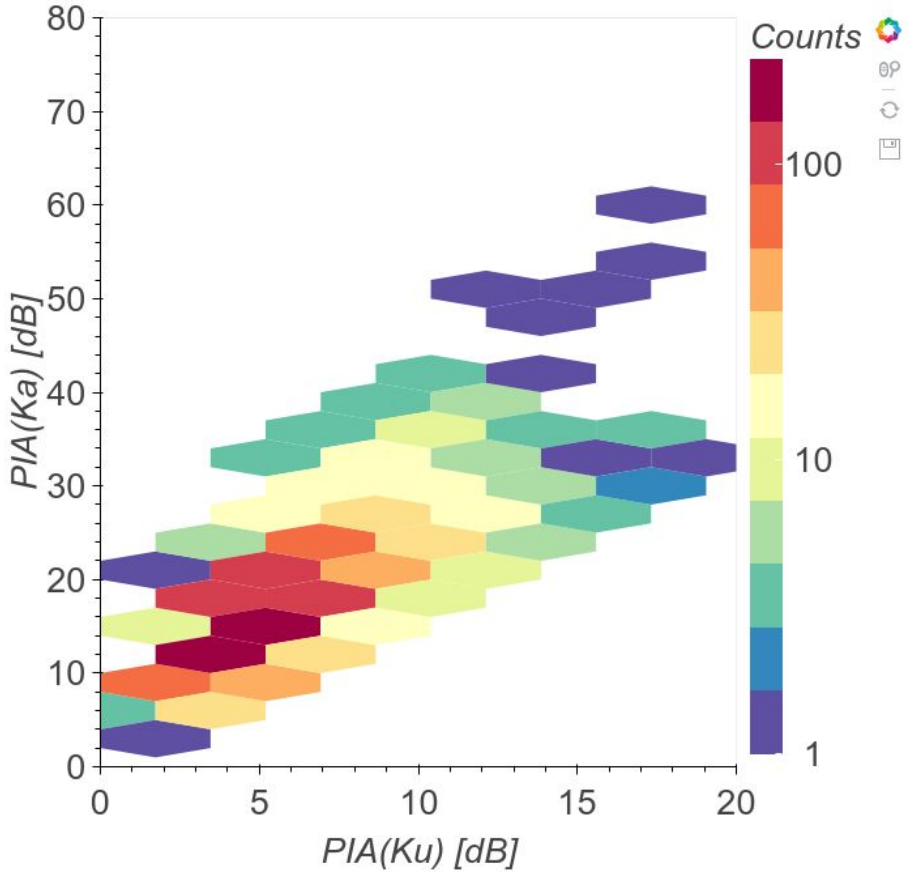
- Better than poetry in preventing madness. May be used to:
  - Investigate the impact of NUBF and multiple scattering on observed reflectivity
  - Quantify and mitigate biases in the attenuation correction procedure
  - Develop statistical parameterization to complement physical inversion methodologies

SRT PIA myths





More PIA insights

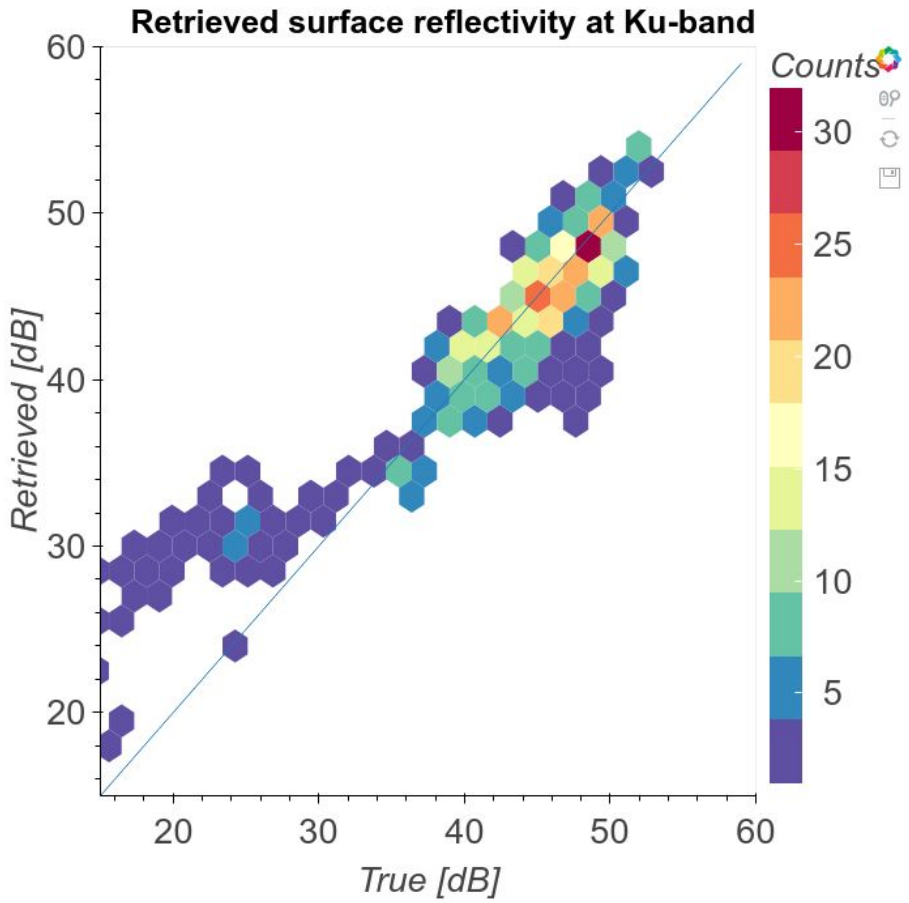


Improved Ku-band reflectivity attenuation correction

- May be achieved by statistically “blending” the SRT PIA with Hitschfeld Bordan PIA.
- Traditionally, this is achieved by parametrically or procedurally relating the two types of PIAs.
- Current approaches may be too simplistic or computationally too costly to be worth refining
- Better approach might be to non-parametrically blend SRT and HB PIAs, e.g.

  If SRT==X && HB==Y then Z_sfc=Z

Example of retrieved surface Z(Ku)



What’s next?

- Additional evaluations:
- More storms, other regimes, other realistic parameterizations, multiple scattering effects
- Similar investigation for stratiform precipitation
- Implementation along with other components (e.g. VPR correction) into the combined algorithm