Comparison of Snowfall Rates from CloudSat, GPM, and Quasi-Direct Measurements from IMPACTS

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In this study, the composite CloudSat/GPM data set developed by Turk et al. (2021) is used to examine the relationship of CloudSat and GPM Ku band retrieved snowfall rate (S) to measured radar reflectivity (Z_e). Likewise, W and Ku band radar reflectivity measurements from and overflying aircraft with calculations of snowfall rates from collocated in-situ measurements are compared with those from the satellite-based products. The airborne measurements in stratiform precipitation and snowbands were acquired during the IMPACTS (Investigation of Microphysics and Precipitation for Atlantic Coast-Threatening Snowstorms) in 2020. The comparisons reveal the strengths, weaknesses, and limitations of the retrievals.