

Improvements in Detection of Light Precipitation with the Global Precipitation Measurement Dual-Frequency Precipitation Radar (GPM/DPR)

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We demonstrate the impact of the enhancement in detectability by the dual-frequency precipitation radar (DPR) on board the Global Precipitation Measurement (GPM) core observatory. By setting two minimum detectable reflectivities--12 and 18 dBZ--artificially to 6 months of GPM DPR measurements, the precipitation occurrence and volume increase by ~21.1% and ~1.9%, respectively, between 40S and 40N.

GPM DPR is found to be able to detect light precipitation, which mainly consists of two distinct types. One type is shallow precipitation, which is most significant for convective precipitation over eastern parts of subtropical oceans, where deep convection is typically suppressed. The other type is probably associated with lower parts of anvil clouds associated with organized precipitation systems.

While these echoes have lower reflectivities than the official value of the minimum detectable reflectivity, they are found to mostly consist of true precipitation signals, suggesting that the official value may be too conservative for some sort of meteorological analyses. These results are expected to further the understanding of both global energy and water budgets and the diabatic heating distribution.

These results are almost based on Hamada and Takayabu (2016, J. Atmos. Oceanic Technol.), but we will also report the results for other seasons, and results used the next version product (V04), which is scheduled to be released within several months.

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