Assessment of DSDs obtained from Micro Rain Radar with UHF/VHF profilers

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Micro Rain Radar (MRR) is a potential instrument for providing vertical profiles of the raindrop size distribution with high temporal resolution. The shortcomings of MRR, in particular, related to vertical wind, are revealed using lower atmospheric wind profilers (LAWP) and Mesosphere-Stratosphere-Troposphere (MST) radars. MRR products show flaws during convection due to severe attenuation and vertical wind. The MRR-derived mass-weighted mean diameter (D_m) shows smaller values (~0.25 to 0.4 mm) than the LAWP/MST. Micro Rain Radar D_m shows an increase with decreasing altitude in the presence of a downdraft/updraft couplet, where LAWP/MST indicates a decrease. MRR requires additional care to correct the precipitation echo picking and delineate the deep and shallow rain.

Keywords: Lower atmospheric wind profiler, Micro Rain Radar, raindrop size distribution, VHF wind profiler (MST radar).

with decreasing altitude at Thiruvananthapuram during the southwest monsoon. Das *et al.*[6] classified the MRR-observed vertical profiles of precipitation into convective, stratiform, shallow-convective, and mixed convective-stratiform and studied the DSD characteristics of the southwest monsoon over the Mahabaleswar region.

Considering the potential of MRR in deciphering precipitation microphysics, Garcia-Benadi *et al.*[11] devised a new postprocessing algorithm to process the MRR data. The algorithm mainly unfolds the spectral folding with a better noise-level estimation and identifies the hydrometeors as snow, mixed precipitation, drizzle, rain, and hail. As MRR operates at a high frequency, the retrieved rain integral parameters suffer from attenuation, the type of scattering, vertical wind, and spectral broadening due to turbulence. Using S-band and MRR vertically pointing radar data, Tokay *et al.*[3] showed a good agreement in reflectivity at the 175 m height range bin. However, they showed significant differences in the derived vertical profiles of rainfall. The rainfall obtained from MRR shows an increase with height at low, moderate, and high reflectivity values, while S-band radar shows an increase with altitude