Evaluation of a precipitation classification and quantification method using X-band dual polarization radar observation

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In this study, we evaluated an integrated precipitation processing system that combines quality control, hydrometeor classification, specific differential phase retrieval, and rainfall estimation using the KICT X-band dual-polarization radar. The radar is installed (Latitude: 37.6688, Longitude: 126.7389) close to Seoul metropolitan area to carry out especially urban precipitation study. The fuzzy logic hydrometeor classification is based on the use of two two-dimensional membership functions established by integrating signal-to-noise ratio and other radar variables such as texture of differential propagation phase ($\sigma(\phi DP)$) and copolar correlation coefficient($10^\rho HV$). Strength of this classification technique is that it doesn't use attenuation-affected factors such as reflectivity and differential reflectivity. In addition, this system adopts a specific differential phase distribution method which incorporates attenuation corrected reflectivity and total differential phase in the rain region. This algorithm has an advantage that it is not significantly affected by backscatter phase shift compared to the conventional filtering method. This specific differential phase distribution method is evaluated by comparing with the CASA legacy method (Wang and Chandrasekar, 2009). The preliminary results show that the methodology works fairly well for the rainfall events which are shown here for urban area.