Rainfall estimation for the first operational S-band polarimetric radar in Korea

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Rainfall estimation relations with different drop shape assumptions were obtained using by long period disdrometer data. Their accuracy using polarimetric variables observed from Bislsan radar which is the first polarimetric radar in Korea was evaluated. Three rainfall cases caused by different synoptic conditions, which are Changma front and typhoon, Changma front only, and typhoon only occurred in 2011 were analysed.

For quantitative use for polarimetric parameters, data quality algorithm was applied. The algorithm is composed of the removal non-weather echo and the unfolding ϕDP. The standard deviation of ϕDP for 9 gates was good feature to remove non-meteorological echo, especially for the noise of differential phase shift. And all folded ϕDP were occurred in the case 3 for this study and the algorithm showed good performance.

It was found that depending on the rainfall cases, the performance of each relation along with the drop shape assumptions was different. The accuracy of each relation with the drop shape assumptions and the error with rain rate were examined by using all three cases. R(KDP) relation with Bringi et al. (2003) drop shape, R(KDP, ZDR) with equilibrium drop shape and R(Z, ZDR) with Bringi et al. (2003) drop shape showed the best score in all relations for this study.