13.58 HYBRID SURFACE RAINFALL ESTIMATION FOR OPERATIONAL APPLICATION USING DUAL POLARIZATION RADAR NETWORK IN KOREA

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Dual-polarization capability of weather radar led to significant improvements in radar-based rainfall estimation as well as the quality control of radar data. Radar observations usually suffer from various error sources such as ground clutter, beam blockage, anomalous propagation, sea clutter, attenuation, and so on. Recently, to mitigate the influences of complex terrain in radar-based rainfall estimation, hybrid surface rainfall (HSR) technique based on polarimetric observation has been employed as an operational radar-based QPE in KMA. HSR yields the rainfall estimation at the lowest-observable elevation surface (so called hybrid surface) that immunes to ground clutter, radar beam blockage and other non-meteorological echoes. However, in the case of hail and convective core, the accuracy of HSR decreases significantly due to mis-identification of precipitation echo by unnatural reduction of cross correlation coefficient (hv) and strong attenuation in reflectivity(ZH) and differential reflectivity(ZDR). For more stable routine operation of polarimetric rainfall estimation, we aim to develop HSR technique that is less affected by the strong contamination in polarimetric observation. The ground clutter was identified by combination of radial texutre and difference between raw and filtered reflectivity by IIR. We developed the new quality parameters such as the ratio between Z and ZDR, reflectivity-weighted hv for more reasonable classification of non-meteorological echo. The beam blockage simulation was also updated by using digital terrain with horizontal resolution of 1 arc second instead of 3 arc second. Beam shielding area and non-meteorological echo were more effectively classified comparing to existing technique. Specially, the precipitation echoes over abnormal reduction area of polarimetric observation was succefully preserved and its intensity was also corrected. In comparison to rain gauge data, the accuracy of HSR increases up to 75% with the normalized bias error less than -5%.

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