Estimation of Quantitative Rain Intensity from Radar reflectivity using a Window Probability Matching Method

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[Abstract] Remote Sensing Research Laboratory of Korea Meteorological Research Institute (METRI), Korea Meteorological Administration (KMA) has been improved the technique of Window Probability Matching Method (WPMM) to estimate the quantitative rain intensities from radar reflectivity. WPMM drives the improved Z-R relationship using probability density function between radar-observed reflectivity and gauge-measured rain intensities. It is based on matching the probabilities of the two variables observed at the same window. This ensures that the rain measured by the radar is equal to that observed at the gauges.

The objective of this study is to estimate the quantitative rain intensities of 1 km horizontal resolution with the Z-R relationships obtained by WPMM every 10 minutes. Radar reflectivities are collected from 9 KMAąŕs radars of Gwanaksan, Gosan, Gunsan, Donghae, Backryungdo, Busan, Gwangdeoksan, Jindo, and Myunbongsan. Gauge measured rainfalls are obtained from 613 Automatic Weather Stations (AWS) over Korean Peninsula. We evaluated the performance of quantitative precipitation estimation from the operational radar reflectivity of Korea meteorological administration (KMA) about heavy rainfall during summertime. Rain intensities of radars derived by WPMM were more accurate than by Marshall-Palmer relationship (Z=200R1.6) and S-band radars (i.e. Jindo and Gwangdeoksan radars) were more accurate than C-band radars (i.e. Gwanaksan, Backryungdo, Gunsan, Busan, Cheju radar).

In the future, this study result support the digital forecast system of KMA on real time and with high resolution. And the estimated rain intensities with the various Z-R relationships will be applied to initial input data to improve the prediction abilities at

Very Short-Range Forecast of precipitation (VSRF).