

Estimation of radar rainfall and its accuracy Improvement in Korea

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The purposes of this study are the estimation of radar rain rate and improvement of the accuracy by using WPMM (Window Probability Matching Method). First, to estimate the radar rainrate, this study experiments the sensitivities of time and space windows of WPMM and computes the Z-R relationships on cases of Changma front and typhoon. Second, this study developed the algorithm for the estimation of radar rain rate by using WPMM in real-time.

This study tried to obtain the most relevant time and space windows for Changma front (CASE I) and Typhoon 'SANBA' (CASE II) in 2012. The matching Z-R pairs were made and then the optimal Z-R relationships were investigated. The sizes of the space window used were 3 km (S3), 5 km (S5), 7 km (S7), 9 km (S9) radar grid pixels, above the point of rain gauges. The time windows of radar measurement were set to four sizes, depending on the time of radar with 10 min. intervals: 1) the present time that is the same time as the measurement of rain gauges (T0); 2) T0-10min. (T10); 3) T0-20min. (T20) and 4) T0-30 min. (T30).

The variation of the correlation coefficients between the rain rates of the raingauges and radar according to the extension of time window is larger than the space window on CASE I. The variation of correlation coefficients according to the expansion of space window is larger than the time window on CASE II, and it is contrast to CASE I. The accuracy increase significantly both of CASE I and CASE II when the time windows extend from T0 to T30 at the same space window. The space and time window of S7T30 is most accurate on CASE I and S3T30 is most accurate on CASE II.

The developed algorithm shows higher accuracy of the radar rain rates for the high rain rates of rain gauges above the 10 mm/h on CASE I and the 20 mm/h on CASE II.