

Merging single and dual-polarization radar rainrates to improve the accuracy of quantitative rainrate estimation

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The limits of S-band dual-polarization radars in Korea are not reflected on the recent weather forecasts of Korea Meteorological Administration and furthermore, they are only utilized for rainrate estimations and hydrometeor classification researches. Therefore, this study applied four combining methods (SA (Simple Average), WA (Weighted Average), SSE (Sum of Squared Error), TV (Time-varying mergence)) to the QPE (Quantitative Precipitation Estimation) model (called RAR (Radar-AWS Rainrate) calculation system) using single-polarization radars and S-band dual-polarization radar in order to improve the accuracy of the rainrate estimation of the RAR calculation system.

As a result, the combining results of the WA and SSE methods, which are assigned different weights due to the accuracy of the individual model, performed better than the popular combining method, the SA (Simple Average) method. In particular, the results of TVWA (Time-Varying WA) and TVSSE (Time-Varying SSE), which were weighted differently due to the time-varying model error and standard deviation, were superior to the WA and SSE. Among of all the combining methods, the accuracy of the TVWA combining results showed the best performance.

Therefore, combining the rainrates from the RAR calculation system and S-band dual-polarization radar using the combining method proposed by this study enables to improve the accuracy of the quantitative rainrate estimation of the RAR calculation system. Moreover, this study is worthy of the fundamental research on the active utilization of dual-polarization radar for weather forecasts.