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Adjustment of radar precipitation estimation based on the kriging methods

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Accurate quantitative precipitation estimation (QPE) is one of the most important elements in meteorological and hydrological applications. In this study, we adjust the QPE from an S-band weather radar based on co-kringing method using the geostatistical structure function of error distribution of radar rainrate. In order to estimate accurate quantitative precipitation, the error of radar rainrate which is a primary variable of co-kriging is determined by the difference of rain rates from rain gauge and radar. Also, the gauge rainfield, a secondary variable of co-kriging is derived from the ordinary kriging based on raingauge network. The error distribution of radar rain rate is produced by co-kriging with the derived theoretical variogram determined by experimental variogram. The error of radar rain rate is then applied to the radar estimated precipitation field. Locally heavy rainfall case during 6-7 July 2009 is chosen to verify this study. Correlation between adjusted one-hour radar rainfall accumulation and rain gauge rainfall accumulation improved from 0.55 to 0.84 compared to before adjustment of radar error. And the root mean square error was adjusted from 7.45 mm to 3.93 mm.