Spatio-temporal dependent errors of radar rainfall estimate for rainfall-runoff simulation

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Abstract

Radar rainfall estimates have been widely used in calculating rainfall amount approximately and predicting flood risks. The radar rainfall estimates have a number of error sources such as beam blockage and ground clutter hinder their applications to hydrological flood forecasting. Moreover, it has been reported in paper that those errors are inter-correlated spatially and temporally. Therefore, in the current study, we tested influence about spatio-temporal errors in radar rainfall estimates. Spatio-temporal errors were simulated through a stochastic simulation model, called Multivariate Autoregressive (MAR). For runoff simulation, the Nam River basin in South Korea was used with the distributed rainfall-runoff model, Vflo. The results indicated that spatio-temporal dependent errors caused much higher variations in peak discharge than spatial dependent errors. To further investigate the effect of the magnitude of time correlation among radar errors, different magnitudes of temporal correlations were employed during the rainfall-runoff simulation. The results indicated that strong correlation caused a higher variation in peak discharge. This concluded that the effects on reducing temporal and spatial correlation must be taken in addition to correcting the biases in radar rainfall estimates.

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Key words : Errors; Rainfall-Runoff simulation; Radar Rainfall Estimate; Spatial dependent; Time dependent;

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