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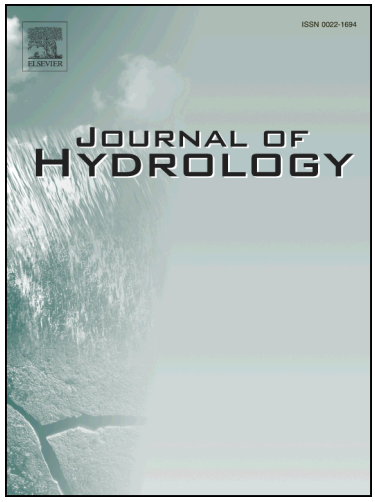

Research papers

The effect of rain gauge density and distribution on runoff simulation using a lumped hydrological modelling approach

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ACCEPTED MANUSCRIPT

The effect of rain gauge density and distribution on runoff simulation using a lumped hydrological modelling approach

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Abstract

Most lumped hydrological models use areal average precipitation data as model input. Though weather-radar-based and satellite-based precipitation estimation methods have been proposed in recent years, the rain gauge is still the most widely used precipitation-measuring tool. Optimal selection of rain gauge number and location will improve the accuracy of areal average precipitation estimations with minimum cost. In this study, the impacts of rain gauge density and distribution on lumped hydrological modelling uncertainty with different catchment sizes are analysed. To this end, the performances of a lumped hydrological model, the Xinanjiang model, in a densely gauged river basin, the Xiangjiang River basin, and its sub-basins under different gauge density and distribution are compared. First, seven levels of rain gauge density are defined. For each density level, several samples of different rain gauge distributions are randomly selected. Then, the areal average

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