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Temporal disaggregation of daily precipitation for hydrological modelling under data scarcity conditions by using data from neighboring station as a reference for Chaohu, China.

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The demand for high-resolution precipitation data at temporal scales fluctuating from daily to hourly or even higher resolution is an enormous problem for hydrological modelling. For many locations around the globe, rainfall data quality and quantity are very poor, and consistent measurements are only available at a coarse time resolution. Models for spatially interpolating hourly precipitation data and temporally disaggregating daily precipitation to hourly data have developed for application to multisite scenarios at Chaohu watershed scale. The specialized tool for rainfall disaggregation, in particular at fine time scales, has been examined in more detail. Disaggregation tool called DiMoN based on multiplicative random cascade model used to disaggregate rain data from Chaohu, China whose meteorological data are scarce. A special disaggregation technique, which, instead of using simultaneously both coarser and finer time scales in one mathematical expression, couples independent stochastic model, at each time scale, have been further analyzed. According to the absence of hourly data at Chaohu station, Data from a station called Luogang, approximately 57 kilometers from Chaohu have been used as a reference station for disaggregation of daily values of Chaohu into hourly and 15 minutes resolution. Correlation between observed and model generated data have been found to be 0.84 and 0.77 for hourly and 15 minutes resolution respectively. NSE (Nash-Sutcliffe Efficiency), RMSE (Root Mean Square Error), and RSR (RMSE-observation standard deviation ratio) shows that the model has generated data within an acceptable range. Improvement in the model performance has been demonstrated by the use of finer resolution of longer time series from Chaohu itself.
Keywords: Disaggregation, Nash-Sutcliffe Efficiency, Root Mean Square Error, RSR, Uncertainty