

Multisite temporal rainfall disaggregation using methods of fragments conditioned on circulation patterns

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A multisite method of fragments-based rainfall temporal (daily to hourly) disaggregation procedure conditioned on circulation pattern (CP) classification is developed and its performance in representing key simulated hourly rainfall characteristics are well evaluated in 143 rain gauges in German part of Rhein River basin. The sensitivity of the performance of disaggregation procedures to different total numbers of CP classes is also well examined. Compared with standard (monthly-based method of fragments) disaggregation procedure, the CP classification-based disaggregation procedure can prominently improve the simulation ability in subdaily rainfall extremes (represented by high percentiles), although it shows no obvious improvement in reproducing standard rainfall statistics, such as mean, standard deviation and coefficient of skewness. The CP classification schemes with more total classes of CP tend to perform better in separating rainfall features and in turn better simulating rainfall extremes in subdaily scale, when applied in rainfall disaggregation procedure. Overall, rainfall disaggregation model conditioned on CP classification has a promising application prospect in generating subdaily rainfall series, and the model's flexibility allows further modification according to implementation objectives.