Comparison of two stochastic methods for disintegrating daily precipitation to a sub-hourly series

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The importance of sub-hourly precipitation series for modelling urban hydrologic systems and projecting impacts of changes in future climate cannot be emphasized enough. Nevertheless, availability of long-term historical records and local climate scenarios at finer temporal scales are limited. Several stochastic weather generators were developed during the past few decades to disintegrate precipitation records at sub-monthly and sub-daily scales. However, a few focused on generating sub-hourly series and literature that compare performances on a finer temporal resolution are scarce. In order to generate precipitation series of five-minute intervals and make practical use of the existing climate projections, we apply and compare two stochastic methods. These are a non-parametric K-nearest neighbor (KNN) and a parametric Poisson cluster model (PCM) weather generator. The performance of each method was evaluated by assessing how well the generated series reproduced the historical statistics of the observed precipitation series at an hourly and five minutes scales. Results of the present study will be used in conjunction with an urban drainage system model for studying the impacts of climate change and formulating adaptation strategies.