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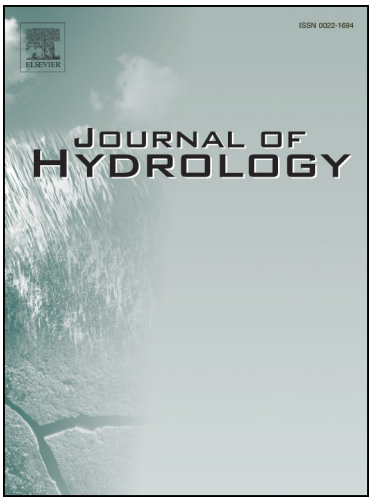

Research papers

Simulation and forecasting of streamflows using machine learning models coupled with base flow separation

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Simulation and forecasting of streamflows using machine learning models coupled with base flow separation

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Abstract

Efficient simulation of rainfall–runoff relationships is one of the most complex problems owing to the high number of interrelated hydrological processes. It is well-known that machine learning models could fail in simulating streamflows from only meteorological variables in the absence of antecedent streamflow values. The main reason for this could be low and lagged relationships between streamflow and meteorological variables. To overcome this inefficiency, for the first time, we developed a simulation framework by coupling a base flow separation method to three machine learning methods. It was demonstrated that separating streamflow into different components such as base flow and surface flow can be useful for improving simulation and forecasting capabilities of machine learning models. We simulated streamflow in four rivers in the United States with Support Vector Regression (SVR), Artificial Neural Networks (ANNs) and Random Forest (RF) as a function of precipitation (P), temperature (T) and potential evapotranspiration (PET). We concluded that the base flow separation method improved the simulation performances of the machine

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