A coupled SSA-SVM technique for stochastic short-term rainfall forecasting

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ABSTRACT

Short-term surface flood modelling requires reliable estimation of the distribution of floods over urban catchments with sufficient lead time in order to provide timely warnings. In this paper new improvements to the traditional Support Vector Machine (SVM) prediction technique for rainfall prediction are presented. The results obtained using the new improvements, such as enhancement of SVM prediction using Singular Spectrum Analysis (SSA) for pre-processing the data and combined SSA and SVM with a statistical analysis that give stochastic results to AI-based prediction, are compared with the results obtained using the SVM technique only. When applying the SVM technique to the rainfall data used in this study, the results showed an underestimation of the rainfall peaks. When using SSA for preprocessing the rainfall data the results are significantly better. The new stochastic approach proved to be useful for estimating the level of confidence of the forecast.

KEYWORDS

Pluvial flooding, support vector machine, singular spectrum analysis, rainfall forecasting