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A Numerical Model for the prediction of flooding in Water Rivers

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Abstract

A numerical model is presented for the explanation and prediction of the daily water discharge time series derived by three locations nearby Mohawk River, New York during the period 2005-2013. For the analysis of the model, we use daily water discharge time series, daily data of ground water level and the climatic variables in Mohawk River, New York. A methodology is used for the decomposition of the time series of all the variables into different components (long, seasonal and short term component). The long term component describes the fluctuations of a time series defined as being longer than a given threshold; the seasonal component describes the year-to-year fluctuations, while the short term component describes the short term variations. The Kolmogorov-Zurbenko (KZ) filter is used for the decomposition of the time series. The KZ filter, which separates the long term variations from the short term variations in a time series, provides a simple design and the smallest level of interferences between the scales of a time series. The application of the KZ filter in an example of Schoharie Creek (nearby Mohawk River) has improved the prediction of the water discharge up to 81%. This methodology has been also applied for Sussex Rivers in United Kingdom.

Key words: Flooding Prediction, decomposition of time series, KZ filter.