



Building a stochastic rainfall generator model with Self Organizing Maps

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An extreme rainfall stochastic model is presented here in order to better assess flood risk in Europe. Model is developed from an hybrid approach combining the Self-Organizing Map (SOM) and the Hidden Markov Model (HMM).

High moisture transport or atmospheric rivers have been recently shown to be major flood agents. A method using a Kohonen neural network is proposed here for the clustering of favorable conditions leading to the development of heavy rainfall precipitation events. Although many large scale atmospheric variables are relevant to predict extreme precipitation, only precipitable water and low-level wind from ECMWF reanalyses are used as precipitation predictors. These parameters help for atmospheric rivers tracking.

Hidden Markov Model is used with states of favorable precipitation patterns given by SOM to generate time series sequences of large-scale rainfall events across Europe. Analysis of severity of consecutive wet days is performed locally to estimate potential for major flood development.