

A Machine Learning-Based Approach to Capture Extreme Rainfall Events

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Abstract : Increasing efforts are directed towards a better understanding and foreknowledge of extreme precipitation likelihood, given the adverse effects associated with their occurrence. This knowledge plays a crucial role in long-term planning and the formulation of effective emergency response. However, predicting extreme events reliably presents a challenge to conventional empirical/statistics due to the involvement of numerous variables spanning different time and space scales. In the recent time, Machine Learning has emerged as a promising tool for predicting the dynamics of extreme precipitation. ML techniques enables the consideration of both local and regional physical variables that have a strong influence on the likelihood of extreme precipitation. These variables encompasses factors such as air temperature, soil moisture, specific humidity, aerosol concentration, among others. In this study, we develop an ML model that incorporates both local and regional variables while establishing a robust relationship between physical variables and precipitation during the downscaling process. Furthermore, the model provides valuable information on the frequency and duration of a given intensity of precipitation.

Keywords : machine learning (ML), predictions, rainfall events, regional variables

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