

New Hybrid Method to Model Extreme Rainfalls

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Abstract : Modeling and forecasting dynamics of rainfall occurrences constitute one of the major topics, which have been largely treated by statisticians, hydrologists, climatologists and many other groups of scientists. In the same issue, we propose in the present paper a new hybrid method, which combines Extreme Values and fractal theories. We illustrate the use of our methodology for transformed Emberger Index series, constructed basing on data recorded in Oujda (Morocco). The index is treated at first by Peaks Over Threshold (POT) approach, to identify excess observations over an optimal threshold u . In the second step, we consider the resulting excess as a fractal object included in one dimensional space of time. We identify fractal dimension by the box counting. We discuss the prospect descriptions of rainfall data sets under Generalized Pareto Distribution, assured by Extreme Values Theory (EVT). We show that, despite of the appropriateness of return periods given by POT approach, the introduction of fractal dimension provides accurate interpretation results, which can ameliorate apprehension of rainfall occurrences.

Keywords : extreme values theory, fractals dimensions, peaks Over threshold, rainfall occurrences

Conference Title : ICSRD 2020 : International Conference on Scientific Research and Development

Conference Location : Chicago, United States

Conference Dates : December 12-13, 2020