



## **Extreme rainfalls in the context of a mediterranean mountainous region: the Cévennes-Vivarais massif.**

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The southeast part of France is prone to severe rainfall. The combination of fall severe precipitation with the non-linear response of the mountainous watershed runoffs has induced flash flood with dramatical social and economical impacts still in the recent past. Forecasting such events including processes in the fields of meteorology, earth-atmosphere interface and hydrology, is a challenge supported by the french public research funds by the mean of an hydro-meteorological observatory (OHMCV: <http://www.lthe.hmg.inpg.fr/OHM-CV>).

However, before such an effort of data collection was institutionalized, a dense rain-gauge network was maintained in a  $150 \times 150 \text{ km}^2$ -sensitive area at the daily (48 stations) and hourly (52 stations) time steps during periods spending over at least 10 years, often lasting 30 years and in some cases available from 1920 to 1990. From such a data collection, a statistical analysis of extreme rainfall have been performed. A well known relationship between rainfall amounts is the intensity-duration-frequency of occurrence (FO) relationship. For instance, higher the rainfall intensity, lower its FO and its duration are. In order to analyze this 3 features in the case of extreme rainfalls, the statistical variables studied correspond to the monthly maximum amount of rainfall collected over time steps of 1, 2, 4, 6, 12 and 24 hours. The geostatistical analysis tools include the FO of a given rainfall amount, the GRADEX (the statistical variable tendency relatively to its FO), the variogram (a kind of spatial correlation coefficient) and maps of kriged variables.

The study shows a good correlation between terrain elevations and rainfall amounts collected over larger time steps. Nevertheless, the correlation is faded as the time step is shortened. Study results will be discussed in terms of orographic convection and

time and spatial scales of atmospheric flows and mountain regions.