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Distribution of extreme rainfall events over Ebro River basin

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The purpose of this work is to provide a description of the heavy rainfall phenomenon on statistical tools from a Spanish region.

We want to quantify the effect of the climate change to verify the rapidity of its evolution across the variation of the probability distributions. Our conclusions have special interest for the agrarian insurances, which may make estimates of costs more realistically.

In this work, the analysis mainly focuses on:

1. The distribution of consecutive days without rain for each gauge stations and season. We estimate density Kernel functions and Generalized Pareto Distribution (GPD) for a network of station from the Ebro River basin until a threshold value u. We can establish a relation between distributional parameters and regional characteristics. Moreover we analyze especially the tail of the probability distribution. These tails are governed by law of power means that the number of events n can be expressed as the power of another quantity $x : n(x) = x^{\tau}$. τ can be estimated as the slope of log-log plot the number of events and the size. The most convenient way to analyze n(x) is using the empirical probability distribution. $\Pr(X > x) \propto x^{-\tau}$.
2. The distribution of rainfall over percentile of order 0.95 from wet days at the seasonal scale and in a yearly scale with the same treatment of tails than in the previous section.
3. The evolution of the distribution in the second XXth century and the impact on the extreme values model.

After realized the analyses it does not appreciate difference in the distribution throughout the time which suggests that this region does not appreciate increase of the extreme values both for the number of dry consecutive days and for the value of the rainfall

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