Spatial and temporal precipitation patterns of the Ebro River Basin, Spain

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The Ebro River Basin, with around 85 000 km2 and located in NE Spain, is characterized by the high spatial heterogeneity of its geology, topography, climatology and land use. Rainfall is one of the most important climatic variables studied owing to its non-homogenous behaviour in event and intensity, which creates drought, water runoff and soil erosion with negative environmental and social consequences.

In this work we characterized the rainfall variability pattern in the Ebro River Basin using universal multifractal (UM) analysis, which estimates the concentration of the data around the precipitation average (C_1, codimension average), the degree of multiscaling behaviour in time (α index) and the maximum probable singularity in the rainfall distribution (γs). A spatial and temporal analysis of the UM parameters is applied to study the possible changes.

With this porpoise, 60 daily rainfall series were selected from 132 synthetic series generated by Luna and Balairón (AEMet). These daily rainfall series present a length of 60 years, from 1950 to 2009. Each one of them was subdivided (1950–1970 and 1980–2009) to analyse the difference between the two periods.

The range of variation of precipitation amounts and the frequency of dry events between both periods are discussed, as well as the evolution of the UM parameters through the years.