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Frequency Analysis of Convective Phenomena in different Climatic Zones in Spain

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One of the most important consequences of precipitation is hazard phenomena like floods due to social and economical implications. Hence the importance of the study of rainfall episodes that causes such adversity. To reach a good and deep knowledge about this issue, not only the intensity but also the frequency of convective precipitation events must be analyzed. In this work a time series of hourly precipitation from 1998 to 2012 is treated in order to analyze the frequency of convective phenomena in areas with different climatic characteristics. The database has been provided by the Spanish Meteorological Agency (AEMET).

Total precipitation is composed of convective and stratiform components and these two components are present in every precipitation rate. A critical precipitation intensity (Rc) is obtained in order to classify the events. Those whose precipitation rate is above the threshold value, Rc, are considered convective. This Rc is an average of all critical intensities rc found for every season in every year during the whole period of study. Each of the seasonal rc for every year has been obtained through an algorithm based on an exponential fit of the precipitation curve which has some anomalies from this adjustment. The amount of precipitation considered by the exponential is related to the stratiform precipitation and, on the other hand, that considered inside the anomalies is associated to the convective one. After drawing these curves, a second algorithm is developed to calculate the minimum value of precipitation rate in which at least, the 60% of total precipitation is convective and the rest is stratiform. Finally, with all the rc, an average has been computed for obtaining Rc. This is the value used to study the frequency of convective episodes.

A comparison has been carried out between the frequency of convective phenomena in the different sectors for each of the season, and the preliminary results show that are distinct not only in number of events but also in their intensity.