



## **The use of non-linearity techniques (correlation dimension) to analyze western Mediterranean rainfall time series**

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The Mediterranean climate patterns are characterized by the great rain variability between years combined with recurrent drought periods and highly intense rain events. These last become critical in this area because, usually, immediately after the summer dry period, when the vegetation cover is less capable to protect the soil against rainfall aggressiveness and the wildfire period is finishing. These circumstances favour the intensification of erosion processes and the incidence of landslides, floods, etc.

Within the scope of the Valencia Community (Western Mediterranean Region), rain displays a high variability as a result of the Mediterranean sea influence and certain local factors, which favour that great part of the precipitations, take place at micro-scale level, assuming a random behaviour of precipitations.

In order to have a better knowledge on rain dynamics and to detect the possible differences caused by the regionalization, four temporal series (40 years) have been selected pertaining to climate stations (Castellón, Valencia, Sueca and Alicante) located in the coastal zone of the study area (Valencia Community, Spain). They are characterized by three concrete climatic regions, and are analysed under the deterministic chaos perspective. A non-linear technique, correlation dimension, is used to carry out this analysis. This technique allows calculating the necessary variables to explain the rain behaviour and to establish suitable models that assume their complexity. The results suggest a possible chaotic behaviour in the four series analysed, obtaining a great variability in the zones of Sueca and Castellón. Statistically, the comparison of the results with the coefficient of variation shows coincidences in almost all the series considered. The only exception was the station of Sueca, where an inverse relation is obtained. Similarly, from a geographic perspective, the obtained results are related favourably to the particular characteristics of each station, according to their climatic typology. For that reason, the differences obtained in Sueca could remark the importance of the influence of certain specific local factors due to its location.