



Influence of the North Atlantic Oscillation on winter daily rainfall parameters in the Iberian Peninsula

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Variations in total precipitation can be caused by a change in the frequency of precipitation events, or in the intensity of precipitation per event, or a combination of both. In order to improve the understanding of precipitation behaviour as an indicator of climate changes, daily precipitation series must be analyzed. A simple statistical model of daily precipitation based on the gamma distribution is applied to winter (DJF) data from 22 stations in the Iberian Peninsula from 1951 to 2002. The Mann-Kendall test was applied to look for trends of this distribution parameters. It is shown that the scale parameter and the frequency of rainy events remain stable, while the shape parameter is most variable spatially and temporally, with significant negative trends in 10 stations, indicating a decrease of the median of precipitation data. The influence of the North Atlantic Oscillation (NAO) is detected on the scale parameter in southwestern Iberian Peninsula, while the frequency of rainy events is related to the NAO in the whole Iberian Peninsula, except the northern stations. There is not a significant relationship between NAO and shape parameter, suggesting that the decrease of this parameter must be explained by other mechanisms. The comparison between the parameters corresponding to extreme NAO phases shows higher scale parameter (ranging from 20 to 40%), and frequency of precipitation events (from 25 to 60%) for the extreme negative NAO phase. In agreement with the previous result, the changes in the shape parameters corresponding to NAO extreme phases are of less magnitude, without a clear spatial and temporal pattern.