Changes in the probability of extreme daily temperatures observed from 1951 to 2002 in Spain

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There is evidence from observed climate records showing a change not only in the mean climate variables but also in extremes. In formal language, this points to the importance of assessing/quantifying changes in the probability density function of the climate variables which include changes in the bulk as well as the tails of the distribution. In this work, a simple statistical model of daily maximum and minimum temperature based on the Gaussian distribution is applied to seasonal data from 15 stations in the Iberian Peninsula from 1951 to 2002. Changes of the distribution function parameters provoke changes in the probability of extreme events. The Mann-Kendall test is applied to look for trends in the probabilities of daily extreme temperatures (lesser than the 5th percentile and higher than the 95th percentile). Results show that, in general terms, the probabilities of daily extreme temperatures lesser than the 5th percentile are decreasing in winter, spring, and summer, meanwhile the probabilities of daily extreme temperatures higher than the 95th percentile are increasing in winter and summer. In autumn significant trends were not detected. This behaviour show slight spatial differences between the different seasons of the year. Some causal mechanisms are discussed.