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Spatio-temporal variability of extreme temperatures in the Iberian Peninsula.

Sonia Fernández-Montes and Fernando S. Rodrigo
Universidad de Almeria, Física Aplicada, Almeria, Spain (frodrigo@ual.es, 0034-950-015477)

Climate change is manifested not only by changes in mean values, but also in the occurrence of extremes. In this work, the spatial-temporal variability of the frequency of extreme temperatures in the Iberian Peninsula during the period 1919-2008 is analysed. From daily data of maximum and minimum temperature in 25 stations across the Iberian Peninsula, the frequencies of cold days/nights in extended winter (accumulated from November to April), and warm days/nights in the extended summer (May to October) are analysed. Threshold values to define an extreme have been assessed for every month at each station. A cold day (night) is defined in a given month when maximum (minimum) temperature is lesser than the 10th percentile of the daily distribution of temperatures of that month corresponding to the reference period 1971-2000, and a warm day (night) when maximum (minimum) temperature is higher than the 90th percentile of the distribution for the reference period. These indices correspond to moderate extremes, but they are probably related to major impacts of extreme events. Principal component analysis in s-mode of these indices is made, using Varimax normalized rotation. Results show that the frequency of cold extremes in winter has decreased, while the frequency of warm extremes in summer has increased during the period analysed. It is worth highlighting the following regional patterns:
-A sharp increase in the summer frequency of warm nights in the East and Southeast of the IP since 1990 to the present.
-A progressive increase in the summer occurrences of warm days, more remarkable in the North fringe of the IP and Mediterranean Coast.
-A slight reduction in the winter frequency of cold nights since 1970 to the present, mainly significant for South Mediterranean and South Atlantic regions.
-A widespread decrease in the winter frequency of cold days, significant for the whole IP (except in the North). In central and Western parts of the IP stand out a long-term pattern of decreasing cold days, while in the Mediterranean Fringe this change is remarkable since 1970.