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Trends in summer tropical nights on the Iberian Peninsula and their connection with large-scale atmospheric circulation patterns

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In this work, we analyse the variability and trends of summer Tropical Nights (>20 °C) (TNs) on the Iberian Peninsula (IP) over the 1961–2007 period. The analyses were performed with the mean series calculated for the whole IP and for three subregions: the Mediterranean (M) region, the centre-north of the peninsula (CN) region, and the Atlantic (A) region. The mean summer TN series for the whole IP shows a significant increase along the all period. Nevertheless, we detected some regional differences, as the CN and M regions present higher rates of increase than the A region. We conducted a Canonical Correlation Analysis (CCA) in order to detect those large-scale atmospheric circulation patterns controlling the interannual variability of TNs over the IP. The occurrence of TNs in the M and CN subregions is highly dependent on anticyclonic conditions over Western and Central Europe in the mid-troposphere level. The increase in the positive phase of this canonical mode during the recent decades might explain part of the positive trend of the TNs detected in summer on the IP.