



Characterisation of the urban heat island phenomenon in the Barcelona (NE Spain) metropolitan area along the 2006–2017 period

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Some characteristics of the urban heat island phenomenon in the Barcelona metropolitan area are analysed by taking as reference daily minimum temperature records along the last decade at different locations within the Barcelona conurbation area. Daily minimum temperatures in Barcelona city centre (El Raval) are compared with those recorded in Barcelona Airport (El Prat), and two other nearby urban locations (Badalona and Viladecans), with different characteristics of urbanisation and vegetation. These four locations have similar altitude above sea level and their distances to Mediterranean shore line do not differ significantly, which make them suitable for comparisons. Taking as fundamental variable the daily difference in minimum temperatures (ΔT_{\min}) between Barcelona city centre and the other three locations, the frequency–distribution of ΔT_{\min} at annual and seasonal scales, time trends, periodicities, dependence on minimum temperatures and wind velocity, and distribution of the urban heat island intensity along the calendar days are analysed. The results verify the robustness of the urban heat island phenomenon in Barcelona city, where most of nights (more than 95%) are warmer than at the other locations. It is worth mentioning that extreme positive ΔT_{\min} values reach 8–9 °C and are generally linked to the coldest months.