



A numerical study of the urban boundary layer over Madrid during the DESIREX (2008) campaign using two different turbulent schemes with WRF

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A new urban canopy parameterization (UCP) implemented in the Weather Research and Forecasting (WRF) model (version V3.2) has been tested over the city of Madrid using two different turbulent parameterizations of the Planetary Boundary Layer (PBL). Two selected days were analyzed coinciding with the DESIREX campaign that took place in summer of 2008 and it was focused on Urban Heat Island (UHI) and Urban Thermography (UT) monitoring and assessment. For the two simulated days a high UHI intensity (5-6 °C) was observed and modelled, and some differences in the air temperature predictions were observed within the two turbulent schemes. The impact of the air conditioning (AC) systems and the energy consumption (EC) were evaluated for the simulated period. The heat fluxes coming from AC systems were responsible of an increase in the air temperature up to 1.5 °C in some dense urban areas. Effects of modifications in the roof albedo and building material properties reduced the total EC by 4.8 % and 3.6 % respectively, affecting the intensity of the UHI. When the heat fluxes coming from the AC systems were not ejecting into the atmosphere, their energy consumption was reduced by 2.5 %.