

Impact of urbanization on the surface air temperature across Bulgaria

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This study investigated the impact of urbanization on the surface air temperatures across Bulgaria. Our target locations are the major Bulgarian cities –Sofia, Plovdiv and Varna. In this study, we use the Weather Research and Forecasting (WRF) model with 1-km horizontal resolution to simulate month of July between 2011 and 2013. First, the results from the control simulation were verified against observations. The results show that the WRF model reproduced reasonably the diurnal temperature distributions for both of urban and rural areas. The model mean biases ranged from -0.76 to 0.19 °C. Second, the impacts of the urbanization on the surface air temperatures are evaluated. The results showed significant nocturnal temperatures increases by 2.6, 2.9 and 2.2 °C in Sofia, Plovdiv and Varna compared to those in the rural areas, while in daytime these increases are around 1.0 °C.

Keywords: Urbanization, Weather Research and Forecasting model, Bulgarian cities