Geophysical Research Abstracts
Vol. 20, EGU2018-13604, 2018
EGU General Assembly 2018

Evaluation of urban climate model performance in prediction mode during extreme hot and cold weather conditions in Vienna

Brigitta Hollosi and Maja Zuvela-Aloise
Zentralanstalt für Meteorologie und Geodynamik, Vienna, Austria (brigitta.hollosi@zamg.ac.at)

This study presents the evaluation of MUKLIMO_3 urban climate model performance when applied in a NWP mode, using daily forecast data from the operational regional numerical weather forecast model ALARO. The aim of the unidirectional coupling of the two different scale models was to simulate the development of the thermal conditions in urban area on a daily basis and analyse the added value from the high-resolution model to simulate the urban heat load. Most studies investigate the UHI phenomenon during the summer period as the most extreme temperature peaks are observed in this time of the year. In this study, model simulations for two selected periods with different characteristics of weather conditions were analysed for Vienna: 4-14 August 2015, when an unusual and prolonged heat wave occurred across Central Europe and 18-28 January 2017, the dry and exceptionally cold period shortly after the cold wave and snowy weather affected mainly the eastern and central part of Europe. The simulations with a horizontal resolution of 100 and 200 m were evaluated with the monitoring data at the weather stations in the area of the city. The model results show good agreement with the hourly observations, especially at the urban and suburban stations where the mean bias is low. The results are highly dependent on the input data from the meso-scale model that leads to larger deviation from observations if the prediction is not representative for the given day. In addition, anthropogenic heat and precipitation as well as snow cover are not included in the micro-scale simulations. However, the performance of the model for the cold and dry weather conditions does not differ substantially from the obtained results for the hot period, leading to conclusion that the micro-scale model can be used to improve the weather forecast for urban areas for selected extreme temperature situations. The information obtained in this study can be used to support urban planning strategies for climate adaptation under different extreme events and to improve existing practices to alert decision-makers and the public to impending dangers of extreme temperature in urban areas.