



On the role of urbanization in weather (and air/quality) forecasting

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The modelling approach is commonly used to assess the impact of cities and urban surfaces on climate. The inclusion of urban parameterization in land-surface interactions is necessary to capture the urban effects properly, which is of a special interest when going to high resolution in weather forecasting, especially in scales of up-to-date convection permitting resolutions. From climate simulations there are clearly seen the strongest effects in extreme weather events, i.e. heat waves. We are testing the effects of different implementations of urban parameterizations available in WRF model, which is simplistic “bulk” version, single layer urban canopy model (SLUCM) and multilayer urban canopy model with building processes involved (BEP-BEM), to assess the uncertainty of the urban effects description as well as the sensitivity of the parameterizations in different situations. The analysis of weather forecasts in 3 km resolution will be presented with some examples of 1 km performance for comparison and to test the sensitivity of the urban parameterization on the resolution. To assess this uncertainty is important for adaptation and mitigation measures often applied in the large cities, especially in connection to climate change perspective, which is one of the main task of the project OP-PPR Proof of Concept UK and new big one OP-PPR URBI PRAGENSI.

There are some differences in sensitivity of individual canopy model implementations to the UHI effects, depending on season and size of the city as well. For specific case of a heat wave the effect of the urban area is well captured in the prediction reaching up to 5°C for the City of Prague, which is significant difference worth to be considered in numerical weather forecasting. Moreover, this might be important for other applications, especially in air-quality prediction.