Urbanization in convection permitting simulations

Michal Belda, Tomas Halenka, and Tereza Novakova

Charles University, Fac. of Mathematics and Physics, Prague, Czech Republic (tomas.halenka@mff.cuni.cz)

The role of cities is increasing and will continue to increase in future, as the population within the urban areas is growing faster and cities themselves are becoming larger. The artificial urban surfaces are specific by many kind of properties and their complex structures and geometry give rise to specific processes affecting significantly the urban environment. To assess the impact of cities and urban surfaces on climate and weather, the modelling approach is commonly used and the inclusion of urban parameterization in land-surface interactions is of primary importance to capture all the urban effects properly. This is especially important when going to higher resolution, which is common trend both in operational weather prediction and regional climate modeling and which is necessary for proper assessment of potential impacts within the cities as well as of the effectiveness of adaptation and mitigation options cities' authorities can apply. This is extremely important not only in e.g. extreme heat waves impact prediction in urban environment with direct effects on the population, but as well in air-quality prediction and in long term perspective in connection to climate change impacts. These are main tasks of the new big project within Operational Program Prague - The Pole of Growth entitled Urbanization of weather forecast, air-quality and climate scenarios for Prague, with short title URBI PRAGENSI.

In connection to our simulation for EuroCORDEX FPS on convection, we test the effects of urban environment in 3 km resolution runs. In one year simulation both with urban effects switched on and off in CLM land surface parameterization the sensitivity to the urban setting will be shown for the individual seasons and for selected case studies, especially with respect to the urban effects on convection.