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Urban effects in weather and climate simulations – Project URBI PRAGENSI

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To assess the impact of cities and urban structures on weather, climate and air-quality, modelling approach is commonly used and the inclusion of urban parameterization in land-surface interactions is of primary importance to capture the urban effects properly. This is especially important when going to higher resolution, which is common trend in operational weather forecast, air-quality prediction as well as regional climate modeling, and which is necessary for proper assessment of impacts within the cities and of the effectiveness of adaptation and mitigation options applied in cities. It is valid not only for extreme heat waves impact prediction, but as well in air-quality prediction and in long term perspective in connection to climate change impacts. This provides the background for the new project within Operational Program Prague - The Pole of Growth "Urbanization of weather forecast, air-quality and climate scenarios for Prague", shortly URBI PRAGENSI.

There are main objectives of the project: i) the urbanized weather forecast for Prague in very high resolution of 1 km, ii) the urbanized air quality prediction for Prague in that resolution, i.e. air quality prediction using chemistry-transport model coupled to the urbanized weather model, iii) climate change and its impacts for Prague in high resolution of 3 km, i.e. downscaled scenarios runs for Prague region, with coupled air quality model option, and iv) microscale studies for hot-spots, using LES to test eventual measures to solve the critical local problems.

The preliminary results show that while urban heat island effect is captured reasonably well using even the simplistic bulk setting (especially in summer), to assess properly some parameters important for air pollution dispersion like mixing layer and wind velocity, more complex parameterizations provide better results.