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Air-Quality and Climate Interaction within Urban Environment

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Recent studies show considerable effect of atmospheric chemistry and aerosols on climate on regional and local scale, especially within the industrial and urbanized areas. Moreover, there is strong potential of urban environment to affect these processes, especially due to urban heat island.

For the purpose of qualifying and quantifying these effects the surface parameterisation in regional climate model RegCM has been extended with Single Layer Urban Canopy Model (SLUCM), which can be used both in dynamic scale within BATS scheme and more detailed SUBBATS scale. Experimental tests of the urban parameterization has been performed on Central Europe region in 10 km resolution with 2 km resolution of SUBBATS scheme. Results show clearly urban heat island (UHI) patterns for most the big cities or urbanized areas in the region and sensitivity tests with eliminating urban and suburban land use types provide the estimate of urban parameterization influence.

Parameters of the scheme are tuned for Central Europe cities with special emphasis to Prague within the UHI Project. Detailed analysis at 2 km scale shows the local features of the UHI in Prague region. These improved simulations with urban parameterization included are used for offline coupling with CAMx to assess the effects on air quality in the region.