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Air-Quality and Climate Coupling in High Resolution for Urban Heat Island Study

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Recent studies show considerable effect of atmospheric chemistry and aerosols on climate on regional and local scale. For the purpose of qualifying and quantifying the magnitude of climate forcing due to atmospheric chemistry/aerosols on regional scale and climate change effects on air-quality the regional climate model RegCM and chemistry/aerosol model CAMx was coupled. Climate change impacts on air-quality have been studied in high resolution of 10km with interactive two-way coupling of the effects of air-quality on climate. The experiments with the couple were performed for EC FP7 project MEGAPOLI assessing the impact of the megacities and industrialized areas on climate. New experiments in high resolution are prepared andsimulated for Urban Heat Island studies within the OP Central Europe Project UHI.

Meteorological fields generated by RCM drive CAMx transport, chemistry and a dry/wet deposition. A preprocessor utility was developed for transforming RegCM provided fields to CAMx input fields and format. There is critical issue of the emission inventories available for 10km resolution including the urban hot-spots, TNO emissions are adopted for the experiments. Sensitivity tests switching on/off urban areas emissions are analysed as well. The results for year 2005 are presented and discussed, interactive coupling is compared to study the potential of possible impact of urban air-pollution to the urban area climate.