

Urban Impacts on Climate through Air Quality Changes in Local Scale

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Recently, UHI project within the Operation Programme Central Europe has been started where this couple will be used in high resolution for the Central Europe urbanization and industrialized areas. Such areas with their emissions contribute significantly to the atmospheric composition, or air quality, which considerably affects atmospheric chemistry and thus has impact 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, the couple of regional climate model and chemistry/aerosol model was developed for the EC FP6 Project QUANTIFY and EC FP6 Project CECILIA. For this coupling, existing regional climate model and chemistry transport model have been used at very high resolution of 10km grid. Climate is calculated using RegCM while chemistry is solved by CAMx. The experiments with the couple have been performed for EC FP7 project MEGAPOLI assessing the impact of the megacities and industrialized areas on climate. Here, some results are preliminarily discussed focussing on the Central Europe urbanized or heavily industrialized regions.

TNO emissions are adopted for the study in 10km resolution. Results for year 2005 are presented and discussed. The effect of interactive coupling is analysed to study the potential of possible impact of urban air-pollution chemistry to the urban area climate. Scenarios runs are compared for 2020, 2030 and 2050 years with respective emission changes. Sensitivity to urban emission impact is tested in all the simulations to discuss the effect of urban environment on regional or local scale.