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Climate Change Impact on Air Quality in High Resolution Simulations

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Recently the effects of climate change on air-quality and vice-versa are studied quite extensively. In fact, even at regional and local scale especially the impact of climate change on the atmospheric composition and photochemical smog formation conditions can be significant when expecting e.g. more frequent appearance of heat waves etc. For the purpose of qualifying and quantifying the magnitude of such effects and to study the potential of climate forcing due to atmospheric chemistry/aerosols on regional scale, chemistry-transport model CAMx was coupled to RegCM. Off-line one way coupling enables the simulation of distribution of pollutants over 1991-2001 in very high resolution of 10 km in framework of the EC FP6 Project CECILIA, model performance is compared to the EMEP observations for the area of Central Europe and some station data for the Czech Republic. Simulations driven by climate change boundary conditions for time slices 1991-2000, 2041-2050 and 2091-2100 are presented to show the effect of climate change on the air quality in the region. Preliminary results of two-way interactive coupling will be presented as well. These very high resolution coupled simulations planned for EC FP7 project MEGAPOLI can provide some information on climate change impacts of megacities or the areas of high urbanization or industrialization. The inclusion of the effects of dilution processes in plumes for such modelling studies was tested in case of ship emissions in framework of EC FP6 project QUANTIFY. The performance of this parameterization in comparison to the simulation for different resolutions is evaluated.