On the Regional Climate Modeling in High Resolution Involving Atmospheric Chemistry

T. Halenka, P. Huszar, M. Belda

Charles University, Fac. of Mathematics and Physics, Dept. of Meteorology and Environment Protection (tomas.halenka@mff.cuni.cz)

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, the development of coupling of regional climate model and chemistry/aerosol model has been started recently on the Department of Meteorology and Environmental Protection, Faculty of Mathematics and Physics, Charles University in Prague. For this coupling, existing regional climate model and chemistry transport model are used. Climate is calculated using model RegCM while chemistry is solved by model CAMx. Meteorological fields generated by RegCM drive CAMx transport, dry/wet deposition and chemistry as well. A preprocessor utility was developed on the department for transforming RegCM provided fields to CAMx input fields and format. As the first step, the distribution of pollutants can be simulated for long period in the model couple. There is critical issue of the emission inventories available. Long term one way coupled climate/chemistry/aerosol model runs are scheduled in framework of ongoing projects with further studies with interactive impact implementation in regional climate simulations. At this moment, one way coupling on lower resolution is compared with the high resolution simulation at 10 km nested into the lower resolution run to have better boundary conditions both for meteorology and chemistry. Sensitivity of the model couple to the development of urban and industrialized areas in the central Europe is studied for the EC FP6 project CECILIA, local and regional effects of emissions from transport systems are assessed in Activity 2 of EC FP6 integrated project QUANTIFY.