VALIDATION OF ATMOSPHERIC CHEMISTRY/AEROSOLS MODEL COUPLED TO REGIONAL CLIMATE MODEL IN HIGH RESOLUTION

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Abstract: 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, the coupled regional climate model and chemistry/aerosol model has been broadly used 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 adopted, regional climate simulations are calculated using model RegCM while chemistry and aerosols are solved by model CAMx. Meteorological fields generated by RegCM drive CAMx transport, dry/wet deposition as well as the chemistry of the species. A pre-processor utility was developed on the department for transforming RegCM provided fields to CAMx input fields and format. As the first step, off-line one way coupling enable the simulation of distribution of pollutants over longer period of years. There is critical issue of the emission inventories available when going to very high resolution of 10 km as scheduled in framework of ongoing EC FP6 project CECILIA. Long period runs of one way coupled climate/chemistry/aerosol models are scheduled in this project with further studies of on-line 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 for the decade 1991-2000 based on reanalysis with the validation of the model couple. Sensitivity to emission data is tested in this simulation as well.