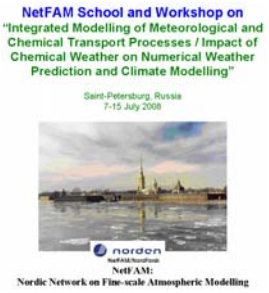

POSTER PRESENTATION

P-07. Angelina Todorova: Preliminary results from numerical simulations of high PM10 level episodes in January-April 2003

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The goal of this study is to perform numerical experiments aiming at: (i) to examine the ability and the limitations of US EPA Models 3 system to adequately reproduce air pollution episodes; (ii) outline the influence of meso-scale meteorology on air pollution transport; (iii) to evaluate the effect of horizontal grid resolution on Models 3 system performance.

The case study focuses on the meteorological situation in Germany in February and March of 2003 during which three major PM10 episodes could be identified: Between Feb 10 and Feb 14 with observed peak PM10 concentrations from 11 to 13 Feb, the core episode between Feb 21 and Mar 5 with peak PM10 concentrations from Feb 28 to Mar 4, and the episode between 24 and 31 Mar with PM10 maxima at 27-28 Mar.
The US EPA Models 3 system (the meteorological pre-processor MM5 and the chemical transport model CMAQ) is applied as the modelling tool. Model domains and nesting: the MM5 downscaling abilities are applied to define three nested domains with 90, 30 and 10 km horizontal resolutions, the innermost domain covering the territory of Germany. As input data the US NCEP Global Analyses data for 2003 is used as a large scale meteorological input for the MM5 model. The emission input for the CMAQ is prepared on the basis of the TNO emission inventory. Speciation and temporal variation are introduced according to the methodology developed in USA EPA.

For simulations, the MM5 has been run on both outer grids (90 and 30-km) simultaneously with “two-way” nesting mode on. Then, after extracting the 10-km initial and boundary conditions from the resulting fields MM5 is run on the finest grid as a separate simulation with “one-way” nesting mode on. All simulations are made with 23 σ-levels going up to 100 hPa height. CMAQ has been run day by day on both inner domains. The pre-defined (default) concentration profiles are used for initial conditions in both domains at the beginning of the simulation. The concentration fields obtained at the end of a day’s run are used as initial condition for the next day. Default profiles are also used as boundary conditions of the 30-km domain during all period.

Based on numerical experiment results it was found that the simulated meteorological fields agree well with the patterns described in the case study definition. The simulated PM10 agreement with measurements is as good (or “as bad”) as many other model runs demonstrate for many other cases. As a conclusion: the simulation results obtained so far are tentative. The numerical experiments are still going on, testing the effect of varying model options and parameters.