



Simulation of European air pollution with the mesoscale model system M-SYS

O. Ross, D. Grawe, M. Uphoff, and K.H. Schlünzen

Meteorological Institute, KlimaCampus, University of Hamburg, Germany (ole.ross@zmaw.de)

The EU FP7 project MEGAPOLI investigates air quality and climate interactions with a focus on the impact of megacity emissions and possible consequences for megacity development. Within the project, various models from global to local scale are applied.

The numerical model system M-SYS is applied in the context of this project to calculate pollutant concentrations for Europe with a focus on the Rhine-Ruhr metropolitan region. Three nested domains are used in order to achieve high resolution of $1 \times 1 \text{ km}^2$ for the focus area and consistent concentration for the surrounding.

M-SYS contains the mesoscale meteorological model METRAS and the corresponding Eulerian chemistry and transport model MECTM. It is first employed for meteorology and chemistry simulations for a domain with a horizontal resolution of $12 \times 12 \text{ km}^2$ covering a large part of Western and Central Europe with an area of ca. $2200 \times 2300 \text{ km}^2$. The meteorology simulations are constrained to ECMWF data at the boundaries. Emission data for the year 2005 is provided by TNO (Utrecht, Netherlands) on a grid with 0.125×0.065 degree resolution. Hourly emissions are derived by application of specific time factors. The VOC and NO_x species are calculated applying typical branching ratios.

A model domain of mainly Germany with a horizontal resolution of $4 \times 4 \text{ km}^2$ is nested into the European grid. Subsequently, a domain with 1 km grid spacing focuses on Rhine-Ruhr in more detail. Model runs for Rhine-Ruhr are performed for 2005 with emission data in 1 km horizontal resolution provided by IER (Stuttgart, Germany). A study on the impact of different emission scenarios for Rhine-Ruhr is planned.

In this conference contribution first results for concentration fields of gaseous species for June 2005 are shown and evaluated by comparison with other model studies and available observation data.

In the further course of the project the air quality for the megacity Paris is simulated in high resolution. MEGAPOLI project partners conducted comprehensive measurement campaigns in and around Paris in June 2009 and January/February 2010. For those periods M-SYS simulations of the Paris region will be performed and thoroughly evaluated in a common framework.