



## **Effects of different meteorological model set-ups on vertical profiles of meteorological parameters and the influence on chemistry transport of benzo(a)pyrene.**

**M. Quante, V. Matthias and A. Aulinger**

(markus.quante@gkss.de / Phone: ++49 4152872378)

Meteorological fields are required as inputs for air quality models. But they can be a source of significant errors which contribute to uncertainties in simulations of the atmospheric distribution of chemical species and aerosols. Therefore, the evaluation of the quality of meteorological simulations used for chemistry transport studies is indispensable, since adequate meteorological input fields are of paramount importance for the overall quality of air pollution studies.

The Models-3 Community Multiscale Air Quality (CMAQ) model is set up on a 54 x 54 km<sup>2</sup> grid for Europe and on a nested smaller domain with a 18 x 18 km<sup>2</sup> grid for the North Sea region. At GKSS Research Centre Geesthacht currently an addition to CMAQ is being developed to study the trans-boundary transport of polycyclic aromatic hydrocarbons (PAHs; i.e. benzo(a)pyrene) and their deposition within coastal regions. The system is linked to the 5<sup>th</sup> Generation NCAR/PennState University mesoscale model (MM5) for the calculation of meteorological input fields. The goal of our studies are multi-year runs of MM5-CMAQ for the assessment of past trends in PAHs concentrations and deposition.

An evaluation of the meteorological input fields using different set-ups of MM5 was performed in order to prepare the long term runs with the model system. For the tests several MM5 runs with 30 vertical layers were performed for April, 2000. For meteorological initial and boundary conditions, ERA 40 reanalysis data were used. The influence of i.e. different nudging procedures, the surface module in use, and the representation of the SST on the vertical structure of the temperature field, absolute and relative humidity field and the wind-field was examined. The observational vertical

profiles for the comparison were taken from more than 40 European radiosonde stations (using 2 ascents per day) and for selected locations from wind profiler systems. In addition, modelled precipitation at ground was compared to precipitation measurements at the radiosonde locations and at 16 EMEP stations.

Selected results from the evaluation expressed in different measures will be presented. The impact of the different meteorological input fields on the concentrations and deposition of benzo(a)pyrene will also be shown.