Geophysical Research Abstracts, Vol. 7, 07613, 2005
SRef-ID: 1607-7962/gra/EGU05-A-07613

Evaluation and intercomparison of an Eulerian and a Lagrangian long-range transport model

L. Frohn, J. Brandt, J. H. Christensen, O. Hertel, C. A. Skjøth and T. Ellermann

National Environmental Research Institute (NERI), Department of Atmospheric Environment, Roskilde, Denmark

During 1994-2004, the ACDEP model (Atmospheric Chemistry and DEPosition model) has been used for calculation of concentrations and deposition of nitrogen in Denmark as a part of the national monitoring programme in Denmark. In the latest years a new model, DEHM-REGINA (Danish Eulerian Hemispheric Model - REGIonal Nested Atmospheric model version), has been developed as the next generation air pollution model. This model is planned to replace ACDEP in the monitoring programme. Furthermore, DEHM-REGINA will be used for air pollution forecasting, scenario studies, air quality management and assessment in general.

The ACDEP model is a Lagrangian type model, using 96 hours back trajectories from predefined receptor points with a 30 km x 30 km resolution covering Denmark. The model includes an extended version of the CBM-IV chemical scheme (37 species and about 80 reactions). DEHM-REGINA is an Eulerian type model with a two-way nesting capability and includes an extended EMEP chemical scheme with 60 species and about 150 reactions. The model is setup with a relative coarse 150 km x 150 km resolution mother domain, covering the Northern Hemisphere, and a nested finer resolution domain covering Europe with a 50 km x 50 km resolution. The model is furthermore prepared for a second nest with 16.67 km x 16.67 km resolution, covering over Denmark and nearest surroundings.

Both air pollution models are driven by meteorological data from the numerical weather forecast model, Eta, applied operationally at NERI. Furthermore, both models have been applied with use of the same emission database, which is based on a combination of EMEP and GENEMIS emission data and national estimates for the Danish area.

In this work, the models have been run for the year 2000, and results from both models have been compared to EMEP measurements from about 200 monitoring stations over Europe and from Danish monitoring stations for a range of chemical species. The results from the evaluation and intercomparison of the models will be presented.