Abstract to the **8th International Conference on Harmonisation within Atmospheric Dispersion Modelling for Regulatory Purposes** in Sofia, Bulgaria

Inter-comparison of two air quality modelling systems for a case study in Berlin

Peter Suppan* and Andreas N. Skouloudis#

* Institute for Meteorology and Climate Research
Unit Environmental Atmospheric Research
Research Centre Karlsruhe
Kreuzeckbahnstr. 19
82467 Garmisch-Partenkirchen
Germany

Sustainable Env. Applications, TP. 280
Institute for Environment & Sustainability
Joint Research Centre Ispra
European Commission
21020 Ispra (VA)
Italy

Key topic: model inter-comparison

Abstract:

Air quality models assist more and more on legislative decisions within the environmental issue of urban air quality. To figure out the fluctuation of errors it would be essential to run a number of - time and money consuming - simulations. The true results should then be within this bandwidth. In order to reduce the time of finding the correct results nowadays it is easier to select different models out of numerous well performing models, which are offered by the modelling community.

The case study for this comparison was carried out in the region of Berlin. The results will take into account comparisons of time series of meteorological parameters as well as of O_3 and NO_2. In detail 2d graphics of O_3 and NO_2 of the region will focus on basic differences of the chemical part of the models. Furthermore the different technique of handling the nesting capability and the different treatment of the excellent database on emissions in the compared modelling systems will give a wide range of interpretation at a glance. For this specific case study 2 dispersion models were selected. Numerous applications in the US and in Europe have shown the excellent performance of these models as well as the variety of issues on different locations.

The MCCM - Multiscale Climate Chemistry Model is based on the well-documented fifth-generation NCAR/Penn State Mesoscale Model, MM5. The dispersion part of the model includes full chemistry and additional to this, two separate gas-phase chemistry mechanisms (RADM2 and RACM) with 39 and 47 chemical species respectively and particulate matter (PM_{10}) as a passive tracer are included. The online coupling of meteorology and chemistry provides fully consistent results with no interpolation of data in contrast to off-line coupled chemistry and transport models.

The second model is a off-line coupled dispersion model. The meteorology was generated by the prognostic meteorological model SAIMM (Systems Applications International Mesoscale Model). The meteorological model (hydrostatic, incompressible) is carrying out 4-dimensional data assimilation with the input of measurements on wind, temperature and humidity. The dispersion modelling was carried out with a modified european version of the urban airshed model (UAMV) and includes the Carbon Bond IV chemical mechanism This well documented and published model is a fully three dimensional model with a two way nesting capability.