Model Network for the Simulation and Forecast of the Air Pollution in the Troposphere - Mesoscale Simulation

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Objectives

In the frame of the German Tropospheric Research Programme (TFS) a model network has been established. It consists of the following four groups:
- IGM, University Cologne
- DWD, Offenbach
- IER, University Stuttgart
- IMK, Research Centre / University Karlsruhe

The main aim of the network is the prediction of the air pollution in Europe and in subregions with complex Chemical-Transport Models (CTM). Of special interest in this context is the ozone concentration distribution during summer smog episodes.

The model system KAMM/DRAIS

The model system KAMM/DRAIS consists of the non-hydrostatic meteorological model KAMM and the dispersion model DRAIS. Its inclusion in the model network is shown in Fig. 1.

The results of the forecasts

During the summer 1999 the model network has been applied for the first time to perform ozone concentration forecasts for Europe with the DWD model and for the mesoscale area of Southwest Germany with the model system KAMM/DRAIS. The grid resolutions have been 21 km and 5 km, respectively. Figure 2 shows as example the ozone distributions close to the ground at 15 UTC for two different days.

For 11 days the simulated and measured ozone concentrations at about 60 stations in Baden-Württemberg have been compared and analysed. As example, the diurnal cycle at the station Stuttgart is shown (Fig.3) for the days in Figure 2.

The scatter diagram of the measured and simulated ozone concentrations at all stations for the 11 days in the time period (11-16) UTC, where usually the highest ozone concentrations occur, shows that most of the points are located close to the agreement line (Fig.5). In 20 % of the cases the predicted and measured ozone concentrations differ less than 8 ppb from each other (Fig.6). But on an average the higher ozone concent-

Conclusions

- The implementation of the KAMM/DRAIS model system into the model network is realised.
- It is successfully applied in summer 1999 conducting ozone concentration forecasts in Southwest Germany.
- The average diurnal cycle of the ozone concentration in Baden-Württemberg was well predicted.
- The statistical evaluation of the comparison between measured and simulated ozone concentrations confirms the results of the model evaluation study.

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