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Forecasting the weather
- ensemble techniques
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Evaluation of Air Quality models for one year in the MEGAPOLI project

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The evaluation of Air Quality (AQ) models is very important for checking the applicability of AQ models. Within the EU funded project MEGAPOLI an evaluation methodology was developed that is used to determine reasons for differences in model performance. First results on this are summarised in Schlünzen and Haller (2011).

The evaluation methodology is applied to model simulations performed for the full year 2005 with the models CHIMERE, FARM, SILAM and LOTOS-EUROS. The evaluation methodology follows the COST 728 / ACCENT concept and includes a general and scientific evaluation. The benchmark test case is the full year 2005, which is used for a dynamic and probabilistic evaluation.

All evaluations are done using routine hourly observational data. The operational evaluation includes not only annual means but also exceedences. Focus of the evaluation method is on concentrations of PM, O_3, NO_2. For diagnostic and dynamic evaluation meteorological parameters are evaluated as well and the evaluation is done in dependence of the meteorological situation. For that NCEP reanalysis data are classified into 9 weather types using cluster analyses.
The models evaluated here have not been evaluated in detail for applications over the regions selected here, which includes the megacity of the Rhine Ruhr area plus its neighbouring rural areas as well as the Greater London area. All in all the models agree quite well with the observations. The meteorology data used by the models as input are reliable in the range found for other meteorology model evaluations in literature. Mean values of meteorological parameters temperature and wind are well represented; the hit rates reach values over 50%. The differences found for the annual average of meteorological parameters are consistently found for different weather situations.

The models for the concentrations reach a different agreement with observations for the various chemical components. The differences are not only visible in the annual average data but also under different weather conditions. From the evaluation study presented here it can be concluded that the introduction of weather clusters and frequency distributions of model results and observations into the model evaluation can help to better understand reasons for differences in model performance.

Reference

Schlünzen K.H., Haller M. (2011): Evaluation of Integrated Tools. MEGAPOLI Deliverable 7.2., submitted