



Evaluation and comparison of O₃ and PM₁₀ forecasts of ALARO-CAMx and WRF-Chem

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ZAMG runs two models for air-quality forecasts operationally: ALARO-CAMx and WRF-Chem.

ALARO-CAMx is a combination of the meteorological model ALARO and the photochemical dispersion model CAMx and is operated at ZAMG since 2005. The emphasis of this modeling system is to predict ozone peaks in the north-eastern Austrian flatlands. To improve daily model forecasts, various new features have been implemented in the model in the past, e.g., the assimilation of O₃ and PM₁₀ observations from the Austrian measurement network (with optimum interpolation technique), use of MACC-II boundary conditions, and use of highly resolved emission data for Austria, which are merged with TNO and EMEP data. The biogenic emissions are provided by the SMOKE model. The model runs two times per day for a period of 48 hours.

The second operational air quality model at ZAMG is the on-line coupled model WRF-Chem. Meteorology is simulated simultaneously with the emission, turbulent mixing, transport, transformation as well as the fate of trace gases and aerosols. Two modeling domains are used for these simulations. The mother domain covers Europe with a resolution of 12 km. The inner, nested domain covers the Alpine region with a horizontal resolution of 4 km. The model runs two times per day for a period of 72 hours and is initialized with ECMWF forecasts.

The evaluation of both models is conducted for the period from February to September 2018 with the main focus on the forecast of ozone. The summer 2018 was the 4th warmest summer since the beginning of the meteorological measurements in Austria more than 200 years ago. Although this summer had favorable conditions for Ozone production (sunny and hot weather, less rain), only five air quality stations in eastern Austria have measured exceedances of the ozone information threshold (180 $\mu\text{g}/\text{m}^3$). The measurements of the air-quality stations are compared with the area forecasts for every province of Austria. Besides the evaluation, air quality forecasts of ALARO-CAMx and WRF-Chem are compared. Finally, the daily and long-term means of the PM₁₀ forecasts are evaluated with measurements.