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AQA – Air Quality model for Austria: comparison of ALADIN and ALARO forecasts with observed meteorological profiles and PM10 predictions with CAMx

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In AQA, Air Quality model for Austria, the regional weather forecast model ALADIN-Austria of the Central Institute for Meteorology and Geodynamics (ZAMG) is used in combination with the chemical transport model CAMx (www.camx.com) to conduct forecasts of gaseous and particulate air pollutants over Austria. The forecasts which are done in cooperation with the University of Natural Resources and Applied Life Sciences in Vienna (BOKU) are supported by the regional governments since 2005.

In the current model version AQA uses the operational meteorological forecasts conducted with ALADIN which has a horizontal resolution of 9.7 km. Since 2008 the higher resolved ALARO is also available at the ZAMG. It has a horizontal resolution of 4.9 km and models the PBL with more vertical layers than ALADIN. ALARO also uses more complex algorithms to calculate precipitation, radiation and TKE. Another advantage of ALARO concerning the chemical modelling with CAMx is that additionally to the higher resolved meteorological forecasts it is possible to use finer emission inventories which are available for Austria.

From 2006 to 2007 a SODAR-RASS of the ZAMG was operated in the north-eastern Austrian flat lands (Kittsee). In this study the measured vertical profiles of wind and temperature are compared with the model predictions. The evaluation is conducted for an episode in January 2007 when high PM10 concentrations were measured at the air quality station Kittsee. Analysis of the RASS-temperature-profiles show that during this episode a strong nocturnal inversion developed at the investigated area. The ability of the models ALADIN and ALARO to predict this complex meteorological condition is investigated. Both models are also used as meteorological driver for the chemical dispersion model CAMx and the results of predicted PM10 concentrations are compared to air quality measurements.