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Regional air quality modelling for Europe in a changing climate

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Within the EU-FP6 project CECILIA (Central and Eastern Europe Climate Change Impact and Vulnerability Assessment) photochemical model simulations were performed for present and future climate in a European domain with 50 km x 50 km resolution, similar to the common domain of the EU Project ENSEMBLES. For this purpose regional climate model simulations of RegCM3 were used to drive off-line the air quality model CAMx for 4 decadal runs namely a) 1990-2001 with ERA-40 to drive RegCM3, b) 1991-2000 with ECHAM5 to drive RegCM3, c) 2041-2050 with ECHAM5 to drive RegCM3 and d) 2091-2100 with ECHAM5 to drive RegCM3 under the A1B future scenario. The domain's vertical profile contained 12 layers of varying thickness, extending up to 450 hPa. The chemistry mechanism invoked was Carbon Bond version 4 (CB4). The same "clean air" boundary concentrations, albedo, total ozone column and turbidity files as well as anthropogenic emissions were used for every time slice in order to distinguish the signal of climate change clearly in the pollutant concentrations. The results will further be used within CECILIA as boundary concentrations for regional model runs with higher spatial resolution. Model results of the ERA40 run were validated with measurements from the EMEP database for several European stations. For the concentration fields of the major photochemical species, O3 and NOx, the model seems to reproduce the expected spatial features for

the monthly averages. A comparison of the different decades showed a stronger formation of ozone in most parts of Europe for the end-of-century decade (2090-2100). Detailed results will be discussed.