Geophysical Research Abstracts
Vol. 14, EGU2012-7794, 2012
EGU General Assembly 2012

ENSCLIM - A multi-model study of impacts of climate change on surface ozone in Europe

J. Langner (1), M. Engardt (1), A. Baklanov (2), M. Gauss (3), C. Geels (4), G.B. Hedegaard (4), D. Simpson (3,5), J. Soares (6), M. Sofiev (6), and A. Zakey (2)

(1) Swedish Meteorological and Hydrological Institute, SE-601 76, Norrköping, Sweden, (2) Danish Meteorological Institute, Lyngbyvej 100, DK-2100, København Ø, Denmark, (3) EMEP MSC-W, Norwegian Meteorological Institute, NO-0313 Oslo, Norway, (4) Department of Environmental Science, Aarhus University, DK-4000 Roskilde, Denmark, (5) Chalmers University of Technology, SE-412 96 Gothenburg, Sweden, (6) Finnish Meteorological Institute, P.O. Box 503, FI-00101 Helsinki, Finland

As part of the ENSCLIM project funded by the Nordic Council of Ministers the impact of climate change on surface ozone over Europe was studied using four offline regional chemistry transport models (CTMs) and one online regional integrated climate-chemistry model (CCM) driven by the same global projection of future climate under the SRES A1B scenario. Anthropogenic emissions of ozone precursors from RCP4.5 for year 2000 were used for simulations of both present and future periods in order to isolate the impact of climate change and to assess the robustness of the result across the different models. The sensitivity of the simulated surface ozone to changes in climate between the periods 2000-2009 and 2040-2049 differs among the models, but the general pattern of change with an increase in southern Europe and decrease in northern Europe is similar across different models. Emissions of isoprene differ substantially between different CTMs ranging from 1.8 to 8.0 Gt yr-1 for the current climate, partly due to differences in horizontal resolution of meteorological input data. Also the simulated change in isoprene emissions varies substantially across models explaining part of the different response. Ensemble mean changes in summer mean ozone and mean of daily maximum ozone exceed 1 ppb(v) in parts of the land area in southern Europe. Corresponding changes of 95-percentiles of hourly ozone exceed 2 ppb(v) in the same region. Over land areas in northern Europe ensemble mean changes in all these measures are mostly negative.