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Aerosol simulation with EDGAR-CIRCE emissions with the EMAC model

Andrea Pozzer (1,2), Alexander de Meij (1), Kirsty Pringle (3), Holger Tost (2,4), Ulrike Doering (5), John van Aardenne (6), Jos Lelieveld (1,2)

(1) The Cyprus Institute, EEWRC, Nicosia, Cyprus (pozzer@cyi.ac.cy, +357 22 208 625), (2) Air Chemistry Department, Max-Planck Institute of Chemistry, P.O. Box 3060, 55020 Mainz, Germany, (3) School of Earth and Environment, University of Leeds, Woodhouse Lane, Leeds, LS2 9JT, United Kingdom, (4) Institut für Physik der Atmosphere, Johannes - Gutenberg Universität Mainz, (5) Federal Environment Agency (UBA), Woerlitzer Platz 1, D-06844, Dessau, Germany, (6) Air and climate change - mitigation, European Environment Agency, Kongens Nytorv 6, 1050 Copenhagen K, Denmark

The newly produced high quality global anthropogenic emission inventory (EDGAR-CIRCE) of pollutant gas and aerosol emissions has been incorporated in the chemistry general circulation model EMAC (ECHAM5/MESSy Atmospheric Chemistry).
A high horizontal resolution simulation (T106L31, corresponding to $\sim$ 1x1 degree) is performed for the years 2005-2008 to evaluate the emissions and the capability of the model to reproduce observed aerosol distributions.
Model output is compared with observations from the several sampling networks (CASTNET, EMEP and EANET) and Aerosol Optical Depth (AOD) from satellites (MODIS, MISR).

The model reproduces the main spatial and temporal atmospheric features of the sulfate, ammonium and nitrate aerosol distributions when compared to the large-scale measurements networks.
Good agreement with the spatial distribution is obtained for sulfate and ammonium, while nitrate shows some differences with observations.
The simulated temporal development of these aerosols is in line with measurements of sulfate and nitrate aerosol, while for ammonium aerosol some deviation from observations occur over the USA.

The AOD from the model results agrees well with the satellite observations (level 3 data) in most of the regions, while a negative bias is present in the equatorial area and in the dust outflow regions (i.e. Central Atlantic and Northern Indian Ocean), due to an underestimation of biomass burning and aeolian dust emissions, respectively.