Geophysical Research Abstracts
Vol. 12, EGU2010-5259-4, 2010
EGU General Assembly 2010

Preliminary modelling results of the chemical composition of particulate matter in NE Spain for the DAURE campaign

Matthias Piot (1), María Teresa Pay (1), Oriol Jorba (1), Sara Basart (1), Santiago Gassó (1), Xavier Querol (2), Marco Pandolfi (2), José María Baldasano (1,3)

(1) Earth Sciences, Barcelona Supercomputing Center, Barcelona, Spain (matthias.piot@bsc.es), (2) Institute of Environmental Assessment and Water Research, Spanish Research Council, Spain, (3) Environmental Modeling Laboratory, Technical University of Catalonia. Barcelona, Spain

The campaign "Determination of the sources of atmospheric Aerosols in Urban and Rural Environments in the western Mediterranean" (DAURE) took place in northeastern Spain in both an urban and rural sites (Barcelona city and Montseny Natural Park; Spain) from end of February until March 2009 and July 2009. The main objective of the campaign is to study the formation and transport processes of particulate matter in the region, with particular attention to carbonaceous aerosols. Several groups collaborated in an extensive measurement campaign with aerosol monitoring, meteorological measurements, atmospheric vertical structure retrievals from LIDAR and supported by numerical simulations of the meteorological and air quality conditions over the region.

A high-resolution air quality modelling system, WRF-ARW/HERMES/CMAQ/BSC-DREAM8b is applied to the Iberian Peninsula domain (4km x 4km, 1hr) and to the DAURE domain in the NE Spain (1km x 1km, 1hr). Emissions are computed with the HERMES emission model at the required resolution. HERMES considers both anthropogenic (power generation, industrial activities, on-road traffic, ports, airports, solvent use, domestic and commercial fossil fuel use, agriculture and livestock) and biogenic sources (vegetation), using a bottom–up approach, up-to-date information and state-of-the-art methodologies for emission estimations.

In this contribution preliminary model results are presented and discussed. Special attention is given on secondary inorganic and organic aerosols. The simulated chemical composition of particulate matter is evaluated with DAURE measurements. Strengths and drawbacks of the modelling system are identified. The aerosol chemical mechanism of the chemistry transport model CMAQ produces reasonably good results for secondary inorganic aerosols (e.g., nitrate and sulphate) while larger underestimation is noted in the organic carbon fraction. The DAURE measurements will contribute to better understand the formation processes of secondary organic aerosols and improve current modelling systems.