EMS Annual Meeting Abstracts
Vol. 8, EMS2011-675, 2011
11th EMS / 10th ECAM

Forecasting the weather
- ensemble techniques
in probabilistic weather prediction

Evaluation of COSMO-EU cloud fraction, LWC and precipitation and estimation of the impact of uncertainties in meteorological parameters on modelled wet deposition fluxes

S. Banzhaf (1), E. J. O'Connor (2,3), A. Kerschbaumer (1), P. Builtjes (1,4)

(1) Institute of Meteorology, Freie Universitaet Berlin, Germany (sabine.banzhaf@met.fu-berlin.de), (2) Department of Meteorology, University of Reading, United Kingdom, (3) Finnish Meteorological Institute (FMI), Helsinki, Finland, (4) Air Quality and Climate Team, TNO, Environment and Geosciences, The Netherlands

The biodiversity of terrestrial and aquatic ecosystems is endangered by enhanced deposition of sulphur and nitrogen compounds eutrophying and acidifying soils and fresh water. Critical loads of these compounds are still exceeded over large parts of Europe indicating a continued need for further implementation of air pollution abatement strategies. Planning policy actions require the calculation of emission scenarios using a Chemistry Transport Model (CTM) to estimate the impact of emission changes on the atmospheric concentration, and the dry and wet deposition fluxes.
Wet deposition processes refer to the scavenging of pollutant gases and particles by cloud water and precipitation, and the subsequent transfer to the ground. Hence, when modelling wet deposition fluxes, a precise description of cloud parameters and precipitation are of paramount importance.
The aim of this study is to estimate the NWP model skill for meteorological parameters relevant for wet deposition modelling, and to quantify the contribution of uncertainties in the meteorological fields to the uncertainties in the wet deposition fluxes modelled by the CTM.
Therefore, fields of LWC, cloud fraction and precipitation in the German Weather Services COSMO-EU model are evaluated using measurements provided by the Cloudnet Project (www.cloud-net.org) and operational precipitation observations. Furthermore, the sensitivity of wet deposition fluxes to variations in the meteorological input is investigated using the CTM REM-Calgrid.
Finally, by combining the results of the REM-Calgrid sensitivity study with the outcome of the evaluation of COSMO-EU cloud fraction, LWC and precipitation, we can quantify the contribution of uncertainties in the meteorological fields to the uncertainties in the modelled wet deposition fluxes.