Geophysical Research Abstracts
Vol. 15, EGU2013-3072, 2013
EGU General Assembly 2013

Comparison of aerosol modeling with lidar observations and assimilation for aerosol forecasting in the frame work of MEGAPOLI Paris summer experiment

Yiguo Wang (1,2), Karine Kata-Sartelet (1), Marc Bocquet (1,3), and Patrick Chazette (2)

(1) CEREA, joint laboratory Ecole des Ponts ParisTech - EDF R\&D, Université Paris-Est, 77455 Champs sur Marne, France, (2) LSCE, joint laboratory CEA - CNRS, UMR8212, 91191 Gif-sur-Yvette, France, (3) INRIA, Paris-Rocquencourt Research Center, Le Chesnay, France

In air quality, aerosols have an impact on regional and global climate as well as on ecological equilibrium and human health. Thus their accurate forecasting is important. Data assimilation (DA) is an analysis technique which uses observations to reduce the uncertainties in input data of the model, and improve the forecast. In general, in air quality applications, in situ surface measurements are assimilated. However, they do not provide direct information on the aerosol properties along the vertical. Thanks to the new generation of portable lidar systems developed over the past years, one can now carry out spatially denser observations of aerosol optical properties in the mid and lower troposphere. In this study, we investigate the ability of the chemistry transport model (CTM) of the air quality modeling platform POLYPHEMUS for the simulation of lidar backscattered profiles from the model aerosol concentration outputs. The results are compared with lidar observations performed during the MEGAPOLI (Megacities: Emissions, urban, regional and Global Atmospheric POLlution and climate effects, and Integrated tools for assessment and mitigation) summer experiment in July 2009, where a ground-based mobile lidar was deployed around Paris on-board a van. The comparison is described and applied to different measurement days, corresponding to different levels of pollution and atmospheric conditions. The ability of the CTM to correctly reproduce the vertical distribution of aerosol optical properties and their temporal variability is presented, as well as a new algorithm for the assimilation of lidar observations. We evaluate the model aerosol forecasts using the AIRPARIF (a regional operational network in charge of air quality survey around the Paris area) data base to demonstrate the feasibility and the usefulness of assimilating lidar profiles for aerosol forecasts.