Geophysical Research Abstracts
Vol. 14, EGU2012-183, 2012
EGU General Assembly 2012

Improving Air Pollution Modeling Over The Po Valley Using Saharan Dust Transport Forecasts

Dr. P. Kishcha (1), C. Carnevale (2), G. Finzi (2), E. Pisoni (2), M. Volta (2), S. Nickovic (3), and P. Alpert (1)

(1) Tel Aviv University, Geophysics and Planetary Sciences, Tel Aviv, Israel (pavel@cyclone.tau.ac.il, 972-3 640-9282), (2) The University of Brescia, Italy, (3) WMO, Geneva, Switzerland

Our study shows that Saharan dust can contribute significantly to PM10 concentrations in the Po Valley. This dust contribution should be taken into account when estimating the exceedance of pollution limits.
The DREAM dust model has been used for several years for producing operational dust forecasts at Tel-Aviv University, Israel. DREAM has been producing daily forecasts of 3-D distribution of dust concentrations over the Mediterranean region, Middle East, Europe, and over the Atlantic Ocean (http://wind.tau.ac.il/dust8/dust.html). In the current study, DREAM dust forecasts were used to give better model estimates of the contribution of Saharan dust to PM10 concentration over the Po Valley, in Northern Italy. This was carried out by the integration of daily Saharan dust forecasts into a mesoscale Transport Chemical Aerosol Model (TCAM). The Po Valley in Northern Italy is frequently affected by high PM10 concentrations, where both natural and anthropogenic sources play a significant role. Our study of TCAM and DREAM integration was carried out for the period May 15 – June 30, 2007, when four significant dust events were observed. The integrated TCAM-DREAM model performance was evaluated by comparing PM10 measurements with modeled PM10 concentrations. First, Saharan dust impact on TCAM performance was analyzed at eleven remote PM10 sites which had the lowest level of air pollution (PM10 $\leq$ 14 μg/m3) over the period under consideration. For those remote sites, the observed high PM10 concentrations during dust events stood prominently on the background of low PM10 concentrations. At the remote sites, such a strong deviation from the background level can not be attributed to anthropogenic aerosol emissions because of their distance from anthropogenic sources. The observed maxima in PM10 concentration during dust events is evidence of dust aerosol near the surface in Northern Italy. During all dust events under consideration, the integrated TCAM-DREAM model produced more accurate PM10 concentrations than the base TCAM model. Then, a comparison between modeled concentrations and PM10 measurements was carried out at 230 PM10 monitoring sites, distributed within the model domain. This model-vs.-measurement comparison showed that the integrated TCAM –DREAM model more accurately reproduced PM10 concentrations than the base TCAM model, both in term of correlation and mean error.
Our results are of importance to countries which have to pay a penalty for exceeding the pollution limit. By extracting dust contribution from PM10 measurements, these countries could show lower rates of man-made pollution.