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# Assimilation of MODIS AOD measurements during the Sahara dust episode in April 2016

Barbara Scherllin-Pirscher (1), Marcus Hirtl (1), Claudia Flandorfer (1), and Mariusz Pagowski (2)

(1) Zentralanstalt für Meteorologie und Geodynamik (ZAMG), Vienna, Austria (barbara.scherllin-pirscher@zamg.ac.at), (2) NOAA Earth System Research Laboratoy (ESRL), Boulder, Colorado, USA

In April 2016, an air pollution event with highly elevated surface concentrations of particulate matter (PM) has been observed in Europe. At the Sonnblick observatory (an atmospheric monitoring platform at 3100 m in the Alps in Austria), PM10 surface concentrations were considerably elevated ($>$100 $\mu$g/m$^3$) on April 5, 2016. This event was caused by a Sahara dust storm.

In this study we use the WRF-Chem (Weather Research and Forecasting model coupled with Chemistry) model to predict the transport of Sahara dust from northern Africa towards Europe. Simulations were performed from April 1, 2016 to April 8, 2016 using the GOCART (Goddard Chemistry Aerosol Radiation and Transport) aerosol scheme. The GOCART model simulates tropospheric aerosols such as dust and sea salt (both with different size bins), organic carbon (OC), black carbon (BC), and sulfate, enabling the computation of PM2.5 and PM10. Grid-point statistical interpolation (GSI) is then used to assimilate data of the Moderate Resolution Imaging Spectroradiometer (MODIS) total aerosol optical depth (AOD) retrieval products at a wavelength of 550 nm from the Terra and Aqua satellites. Data assimilation is performed at 12 UTC with an assimilation window of $\pm$3 hours.

PM10 analyses are evaluated against PM10 surface measurements provided by EEA (European Environment Agency) and the Austrian Environmental Agency. First results indicate that WRF-Chem underestimates surface concentration of PM10 during the Sahara dust event in April 2016 over Europe but the assimilation of MODIS AOD substantially improves PM10 analyses.