Assessing the ability of WRF-Chem to forecast aerosol optical depth over Poland

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Aerosol particles affect Earth's energy budget by scattering and absorbing solar radiation and by altering cloud properties and also influence weather and air quality.

The ability of models to describe aerosol optical properties is relevant to reduce uncertainty in aerosol direct radiative forcing and further improve forecasts of meteorology and air quality.

Here we evaluate the performance of high-resolution simulations with the Weather Research and Forecasting model with Chemistry (WRF-Chem) in capturing temporal distribution of aerosol optical depth (AOD at 550 nm) over Poland. The simulations are run operationally for this area to forecast air quality since June 2016. The model is run with two domains – mother domain over Europe at 12 km x 12 km and inner domain over Poland at 4 km x 4 km. The model results were compared with ground-based observations from 2 stations from Aerosol Research Network Poland-AOD. The results show that the model can reproduce the variability of observed AOD, however in general overestimates measured values.