Geophysical Research Abstracts
Vol. 19, EGU2017-14898, 2017
EGU General Assembly 2017
© Author(s) 2017. CC Attribution 3.0 License.

Use of EARLINET climatology for validation of vertical model profiles

Augustin Mortier, Michael Schulz, and the EARLINET and CAMS Team
Norwegian Meterological Institute, Oslo, Norway, (augustinm@met.no)

For over a decade, intensive in-situ, ground-based and spaceborne remote observations are dedicated to the aerosols, a major component of the Earth atmosphere. These observations are mostly motivated by the high variability of the particles in space and time and their effect on the climate at a global scale, and at a regional scale on air quality. In the meantime, global and regional models provide aerosol concentrations (as projection, reanalysis or in near real time in chemical weather forecasting) respectively for the calculation of radiative effects and the assessment of air quality. The vertical distribution of the aerosol is a key-parameter since it affects its lifetime and reflects physical processes such as wet and dry deposition or chemical reactions. The aerosols present in low levels of the troposphere directly affect local air quality, while elevated aerosol layers can be transported long-range and contribute to pollution in remote regions. The evaluation of aerosol column and simulated vertical profiles are thus of particular interest for the performance characterisation of air quality models.

The Copernicus Atmosphere Monitoring System (CAMS) delivers daily near real time aerosols products over Europe. In the framework of producing a regional a posteriori validation of the CAMS models, we propose, through this study, a validation exercise of the vertical aerosol profiles. This shall rely on the ACTRIS European Aerosol Research Lidar Network (EARLINET) measurements because of their quality and the opportunity to derive a climatology from long-term measurements. PM10 profiles are given from the models while mostly backscatter profiles are available from EARLINET database. After studying the representativeness of the EARLINET data (2006-2014), we present a comparison with the modeled vertical profiles (7 models and the Ensemble) at the location of measurement stations for the different seasons of the year 2016. The challenge of comparing the measured backscatter and modelled mass profiles, requiring considerable approximations, leads to recommendations for both model and observation communities. A meaningful comparison needs more information from the models and complementary aerosol-optical observations.