



## Long-term aerosol study on continental scale through EARLINET vertical profiles

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Lidar techniques offer the opportunity for investigating the aerosol vertical profiles, which is an important information for climatological, meteorological and air quality issues. EARLINET (European Aerosol Research Lidar Network) has been providing aerosol optical properties vertical profiles over Europe since May 2000. Long-term aerosol observations performed within EARLINET allows a climatological study of aerosol properties over Europe. All EARLINET stations perform almost simultaneously measurements three times per week following a scheduling established in 2000. Besides these climatological measurements, additional measurements are performed in order to monitor special events (as volcanic eruptions and desert dust intrusion), for satellite data evaluation and integrated studies and during intensive measurements campaigns. Aerosol optical properties vertical profiles are freely available at [www.earlinet.org](http://www.earlinet.org) and through ACRIS data center <http://www.actris.net/>. This data are currently published on the CERA database with an associated doi number.

Based mainly on Raman technique, EARLINET stations typically provide direct measurement of extinction profiles, and therefore of the aerosol optical depth (AOD), a key parameter for understanding the aerosol role on radiation budget. The free troposphere contribution to AOD and altitude of lofted layers are provided thanks to the vertical profiling capability of lidar technique. The representativeness of EARLINET regular scheduling for climatological studies is investigated through the comparison with AERONET and MODIS measurements. We find that the regular measurements schedule is typically sufficient for climatological studies. In addition lidar punctual measurements are representative for a larger area ( $1^{\circ} \times 1^{\circ}$ ) in a climatological sense. Long term analysis of EARLINET profiles shows that the AOD is generally decreasing over Europe in agreement with both passive-sensors and in situ measurements.

Mean vertical profiles and aerosol intensive properties are investigated for improving knowledge about aerosol property modifications and trends over the European continent.

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