



Columnar aerosol characterization over Scandinavia and Svalbard

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An overview of sun photometer measurements of aerosol properties in Scandinavia and Svalbard was provided by Toledano et al. (2012) thanks to the collaborative effort of various research groups from different countries that maintain a number of observation sites in the European Arctic and sub-Arctic regions. The spatial coverage of this kind of data has remarkably improved in the last years, thanks, among other things, to projects carried out within the framework of the International Polar Year 2007-08.

The data from a set of operational sun photometer sites belonging either to national or international measurement networks (AERONET, GAW-PFR) were evaluated. The direct sun observations provided spectral aerosol optical depth (AOD) and Ångström exponent (AE), that are parameters with sufficient long-term records for a first characterization at all sites. At the AERONET sites, microphysical properties derived from inversion of sun-sky radiance data were also examined. AOD (500nm) ranged from 0.08 to 0.10 in Arctic and sub-Arctic sites whereas the aerosol load was higher in more populated areas in Southern Scandinavia (average AOD about 0.10–0.12 at 500 nm). On the Norwegian coast, aerosols showed larger mean size than in continental areas. Columnar particle size distributions and related parameters were used to evaluate aerosol volume efficiencies.

The aerosol optical depth characterization revealed that the seasonal patterns in the high Arctic (with the typical hazy spring), in the sub-Arctic region and Southern Scandinavia are all different. The clean continental, polluted continental and maritime aerosols constitute the three main aerosol types, although persistent (Asian) dust was also detected in Svalbard.

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