

A dataset of validated aerosol vertical profiles from ground-based and satellite observations above selected sites in Finland



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WP 4: Integrating in-situ, satellite and model components for improved environmental assessment

T 4.3: Sources and sinks and transport of Arctic pollution determined from an integrated analysis of in-situ and satellite data

D 4.3.1: A dataset of validated aerosol vertical profiles from ground-based and satellite observations above selected sites in Finland and Siberia

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Long-range transport of atmospheric aerosols plays significant role in the Arctic environment. We will examine properties of aerosol layers as well as their origin in Finland. We aim to use a combination of ground-based High Spectral Resolution Lidar (HSRL, Shipley et al., 1983) and in situ airborne measurements of aerosol size distribution from 10 nm to 5 μm (a Scanning Mobility Particle Sizer and an Optical Particle Sizer). Moreover, vertical aerosol profiles from the satellite lidar CALIOP will be collocated with our measurements. Origin of aerosol layers will be shown with backward trajectories calculated using Lagrangian models.

First, we would need to identify suitable cases for our studies. HSRL was deployed at SMEAR II (Hari and Kulmala, 2005) for almost a year, from January to September 2014, while airborne campaign took place during April and May. As for CALIOP, it has a very narrow swath, therefore it covers SMEAR II station once in several days. In addition, lidar signal, both satellite and

ground-based, could be attenuated by clouds, thus, affecting the measurements.

The list of the collocated measurements will be available on the iCUPE website with documentation, while HSRL and CALIOP measurements are provided on the external websites. Data from the flight campaigns are available upon request.

References

Hari, P. and Kulmala, M., 2005: Station for Measuring EcosystemAtmosphere relations (SMEAR II), Boreal Environ. Res., 10, 315–322.

Shipley, S.T., Tracy, D.H., Eloranta, E.W., Trauger, J.T., Sroga, J.T., Roesler, F.L. and Weinman, J.A., 1983. High spectral resolution lidar to measure optical scattering properties of atmospheric aerosols. 1: Theory and instrumentation. Applied optics, 22(23), pp.3716-3724.