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Investigating the small-scale vertical and horizontal variability of the atmospheric boundary layer aerosol using unmanned aerial systems (UAS)

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WP1: Ground-based component for SLCFs

Task 1.3 Interactions with planned intensive observations in the polar regions,

D 1.3.2 Integrated data collection of Arctic parameters received via ground-based remote sensing and airborne platforms for submission to WP5

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A field campaign was performed from April 25 until May 25, 2018 in Ny-Ålesund (Svalbard) using two different types of unmanned aerial systems (UAS) equipped with meteorological and aerosol sensors. The main goal was to study the vertical and horizontal variability of aerosol particles affected by the complex terrain in Ny-Ålesund that led to different wind fields in the atmospheric boundary layer. The UAS data provide a crucial link between ground-based and remote sensing observations as well as aerosol and meteorological properties between different research sites like Gruvebadet, CCT, Zeppelin observatory and EC stations. Data from more than 50 measurements flights are available.

Measured parameters were: aerosol particle number concentration with different lower cut-offs, aerosol number size distribution >350 nm, BC mass concentration, temperature, relative humidity, 3D-windvector, solar radiation, reflex radiation, and surface temperature. In the current version of available data, the 3D-windvector is not available, all other parameters are submitted to the data base.

Figure 1. The unmanned aerial system ALADINA on the airfield in Ny-Ålesund.

Reference

Altstädter, B., A. Platis, B. Wehner, A. Scholtz, N. Wildmann, M. Hermann, R. Käthner, H. Baars, J. Bange and A. Lampert, ALADINA – an unmanned research aircraft for observing vertical and horizontal distributions of ultrafine particles within the atmospheric boundary layer, Atmos. Measurement Techn., 8, 1627-1639, 2015.

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