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Dataset name: **iCUPE Dataset (DS) from Deliverable 1.4.2 (Task 1.4):**

Dataset on organic aerosols in the Arctic

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The produced dataset (in MS Excel format) contains mass concentrations of water-soluble organic source-components in aerosol samples collected on quartz fiber filters around the Arctic. Total suspended particulate matter or particulate matter with aerodynamic diameter less than 10 µm (PM_{10}) was collected. The concentrations are in ng m^{-3} of sampled air. The Arctic sampling sites are shown in Figure 1. Samplings were performed from 2014 to 2019, leading to a total of 348 composite filter samples, encompassing annual cycles with an approximatively (bi-)weekly resolution. The dataset was derived based on Positive Matrix Factorization (PMF) applied on mass spectra of water-extracted organic aerosol matter (OA), measured using offline Aerosol Mass Spectrometry (AMS). The results do not include PMF output factors related to potential contamination, field blank and carbonate contributions. In the latter case, the data have been corrected for the relative ionization efficiency in the AMS of organics vs carbonate.

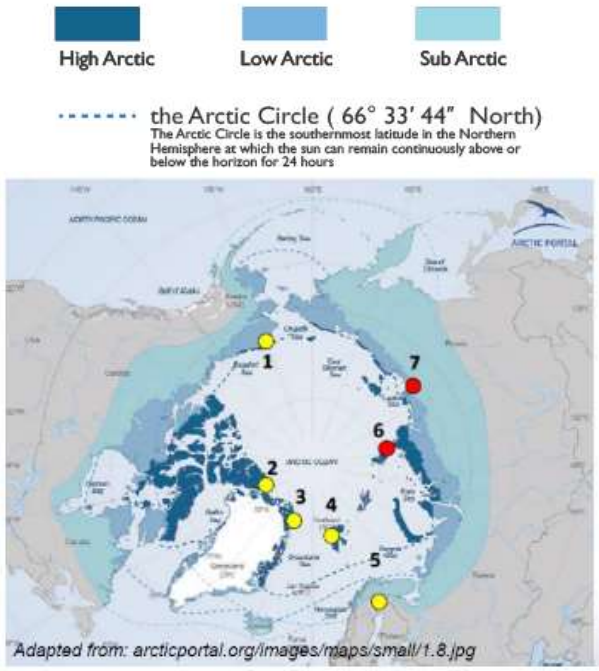

Figure 1*. Filter sampling stations around the Arctic. Russian stations are indicated with red colour. The numbers are explained in the attached "read me" file together with station abbreviations.*

Offline aerosol mass spectrometry (AMS) campaign with quartz fiber filter samples collected at multiple Arctic stations from 2014-2019

Project on "Yearly cycles of natural and anthropogenic organic aerosol sources across the Arctic land surface", task on sources and sinks of atmospheric pollution in the polar areas

Instrumentation:

Offline AMS first setup see Daellenbach, AMT, 2016
L-ToF-AMS and N2 were used here:
https://www.aerodyne.com/wp-content/uploads/2019/09/L-ToF_AMS.pdf

Data analysis:

Positive matrix factorization (PMF), using SoFi within Igor Pro (Canonaco, AMT, 2013) on mass spectra of (lab) water-extracted organic aerosol matter (WSOA).
The median and IQR values in the Excel file are based on a bootstrap analysis approach on the resulting source component (factor) mass spectra (profiles).

Station abbreviations:

BRW: Barrow (1);
ALT: Alert (2);
VIL: Villum (3);
GRU: Gruvebadet (4);
ZEP: Zeppelin (4);
PAL: Pallas (5);
TIK: Tiksi (6);
BAR: Baranova (7)

WSOA factor interpretations:

PA-OA: primary anthropogenic OA. Interpreted as originating probably from oil combustion, or flaring.
AHOA: Arctic Haze OA. Interpreted to be related to highly aged OA from transported anthropogenic emissions.
MSA-OA: methane sulfonic acid-related OA. Related to secondary organic aerosol of marine origin, including methane sulfonic acid from the oxidation of dimethyl-sulfide.
Biogenic: Interpreted to be related to fresh biogenic secondary organic aerosols, e.g., from monoterpenes and isoprene.
PBOA: primary biological OA. Interpreted to originate from biological material, e.g., fungal spores, vegetative detritus.
CHN-rich: a factor rich in proteinaceous matter, which can be related to biological/marine biogenic matter and/or to primary combustion emissions.
OOA: undefined oxygenated OA. Correlates with highly oxidized AMS fragments.

Content of the Excel dataset file:

Column A: Sample ID (StationAbbreviation_YearMonthDay); the dates indicate the sampling start (exception: sampling end date shown for PAL); two dates are included for composite samples

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Column B:	Sample date (median of start and end sampling dates)
Columns E to K:	Median factor mass concentrations
Columns N to T:	1st quartile (Q1) of factor mass concentrations
Columns W to AC:	3rd quartile (Q3) of factor mass concentrations