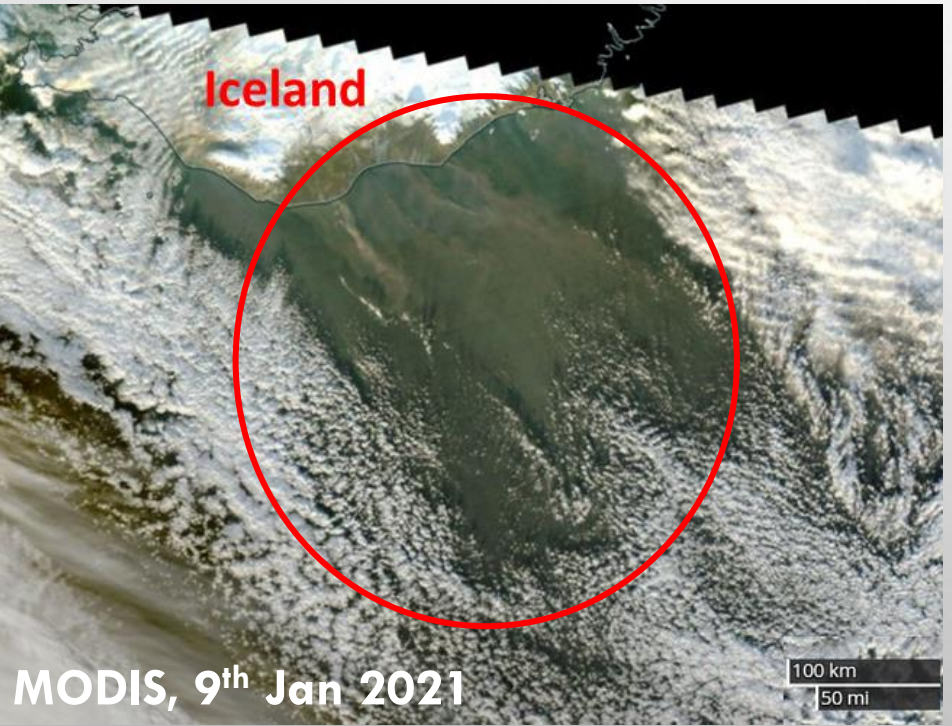
HIGH LATITUDE DUST RESEARCH IN ICELAND AND GLOBALLY



PAVLA DAGSSON-WALDHAUSEROVA

O. ARNALDS, O. MEINANDER, A. VUKOVIC, S. NICKOVIC, J. KAVAN, B. CVETKOVIC, J-B. RENARD, B. MORONI, D., M. HRABALIKOVA, P. FOSTER, B. PICKERING, A. BAKLANOV, AND MORE..

= ICEDUST MEMBERS >

ÞORRAÞING VEÐURFRÆÐIFÉLAGSINS

REYKJAVIK, ICELAND | 18 FEBRUARY 2025

TALK OUTLINE

- **HIGH LATITUDE DUST NETWORKS (UPDATE 2025)**
- HLD- AND ICELANDIC DUST FORECASTING
- HIGH LATITUDE DUST PROJECTS IN 2025
- CHALLENGES IN HLD MEASUREMENTS (ICELAND, ANTARCTICA AND SVALBARD IN 2025)
- IF TIME ALLOWS: IMPACTS OF ICELANDIC DUST ON ATMOSPHERE (CLOUDS, ATM. CHEMISTRY AND RADIATION)

NORTHERN AFRICA-MIDDLE EAST-EUROPE (NA-ME-E) REGIONAL CENTER

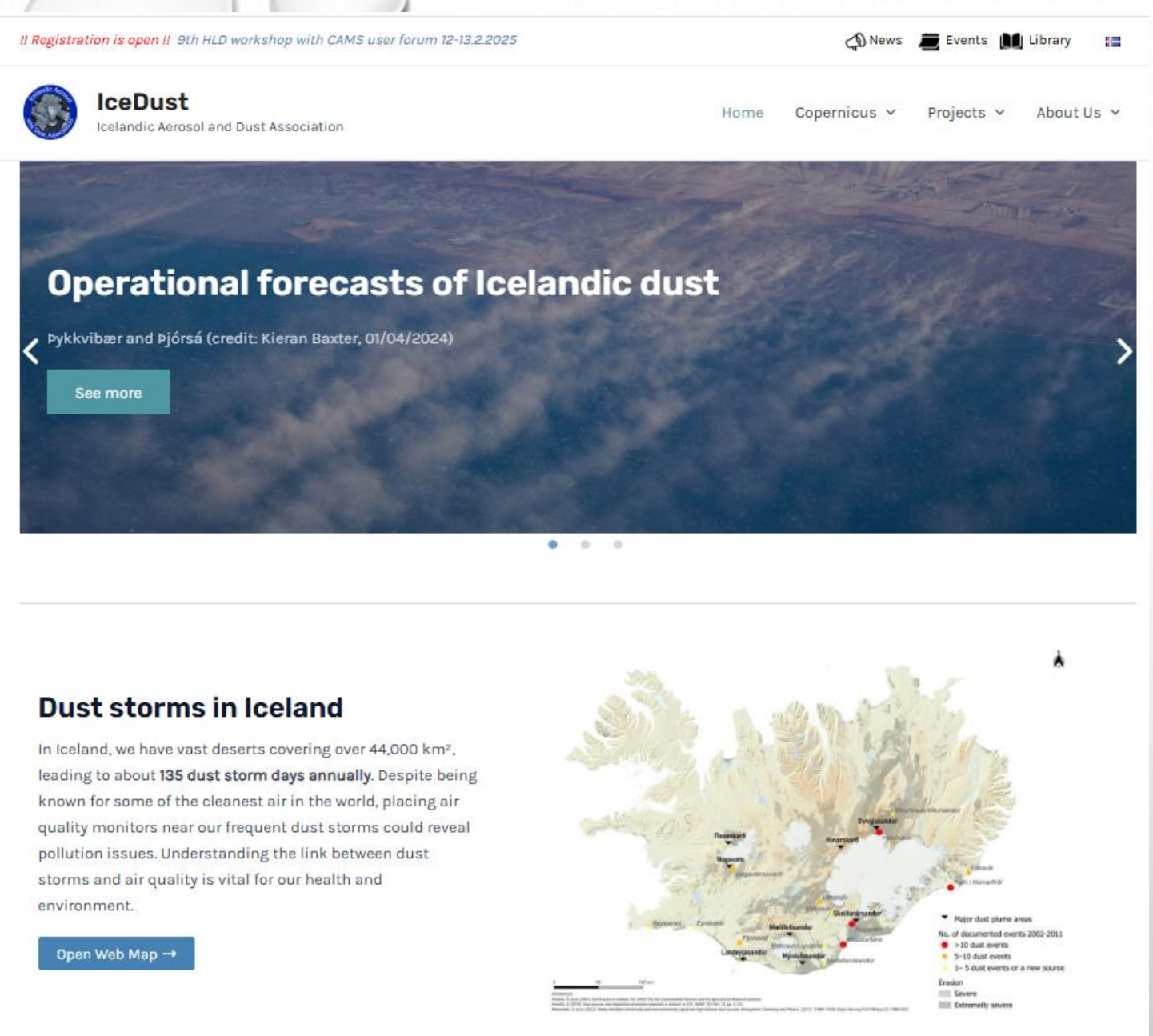
WMO Sand and Dust Storm Warning Advisory and Assessment System (SDS-WAS)

WMO SDS WAS || Asia Regional Center || America Regional Center

- **WMO** IS ONE OF 19 MEMBERS OF THE UN COALITION COMBATING SDS (UN SDS COALITION)
- **ICELAND** IS PART OF THE NORTHERN AFRICA, MIDDLE EAST AND EUROPE NODE OF THE **WMO SDS WAS**
- **ICELAND** IS THE LARGEST DESERT IN EUROPE OUTSIDE THE CASPIAN SEA AREA
- **HIGH LATITUDE DUST NETWORKS (ACTIVE TODAY):**
  - ICEDUST – ICELANDIC AEROSOL AND DUST ASSOCIATION
  - UARCTIC THEMATIC NETWORK ON HLD
  - CAMS NATIONAL COLLABORATION PROGRAMME ICELAND
  - NORDDUST - COUNCIL OF MINISTERS - NORDIC WORKING GROUP FOR CLIMATE AND AIR (NKL) - MINISTRY OF ENVIRONMENT, DENMARK

ICEDUST ASSOCIATION

- 57 research institutions from 22 countries
- >110 members
- > 60 scientific papers published
- Member of the **European Aerosol Assembly** since 2022
- 9th HLD Workshop 12-13 Feb 2025



Ice-dust.com

- 57 research institutions from 22 countries
- >110 members
- > 60 scientific papers published
- Member of the European Aerosol Assembly since 2022

AEROSOL ASSOCIATIONS OF THE EUROPEAN AEROSOL ASSEMBLY

Czech Aerosol Society
AT

The Finish Association for Aerosol Research
FAAR

Association Francaise d'Etudes et Recherches sur les Aérosoles
ASFERA

Israeli Association for Aerosol Research
IAAR

Italian Aerosol Society
IAS

Nordic Society for Aeosol Research
NOSA

Gesellschaft für Aerosolforschung
GAeF

Hellenic Association for Aerosol Research
HAAR

Hungarian Aerosol Society
HAeS

Asosiación Espanola de Ciencia y Tecnología de Aerosoles
AECyTA

The Aerosol Society
AS

Icelandic Aerosol and Dust Association (IceDust)

University of the Arctic (UArctic)

UArctic

GIVE

Activities

- Thematic Networks and Institutes
- north2north
- Chairs
- Research
- Education Opportunities
- Seminars
- Tipping Point Actions
- Awards & Grants

Home > Activities > High Latitude Dust

Thematic Network on High Latitude Dust

Related news

- 9th High Latitude Dust Workshop 2025
- Polar Winter School on snow measurements and arctic air pollution
- How dust from Europe's largest desert is impacting the climate
- UArctic at the 2024 Arctic Circle Assembly

See All News

Related articles

- Information and past activities

Related files

- Thematic Network on High Latitude Dust presentation

Contacts

- Pavla Dagsson-Waldhauserova (Lead)
- Outi Meinander (Vice-Lead)

Goals

UArctic Thematic Network on High Latitude Dust (HLD) is an international scientific network committed to the support of research in the field of aerosol science focused on dust at high latitudes, with a main focus on Polar Regions. We are researchers, educators and innovators

Icelandic Aerosol and Dust Association

High Latitude Dust Network

https://www.uarctic.org/activities/thematic-networks/high-latitude-dust/

HIGH LATITUDE DUST AS A DRIVER FOR CLIMATE CHANGE AND AIR POLLUTION IN THE ARCTIC

NORDDUST

to provide information and advice on high latitude dust issues in the Nordic Region.

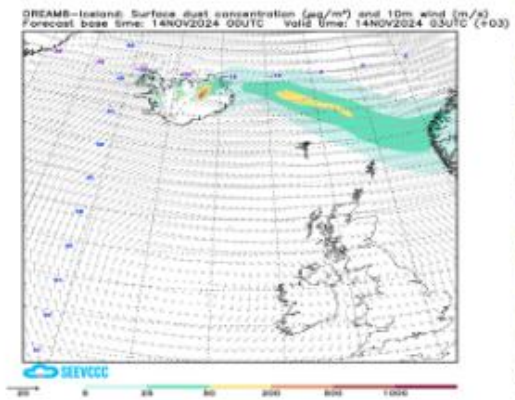
NORDDUST consortium is the Nordic network of experts on high latitude dust (HLD) and its climate impacts to monitor, advise, and provide knowledge and monitoring tools on dust storms and dust-related particulate matter air pollution in the Nordic region. This advisory group consists of partners from Iceland, Finland, Denmark, Sweden, and Norway, and it is funded by the Nordic Council on Ministers, Nordic Working Group for Climate and Air (NKL) by the Ministry of Environment, Denmark. It was established in 2024.

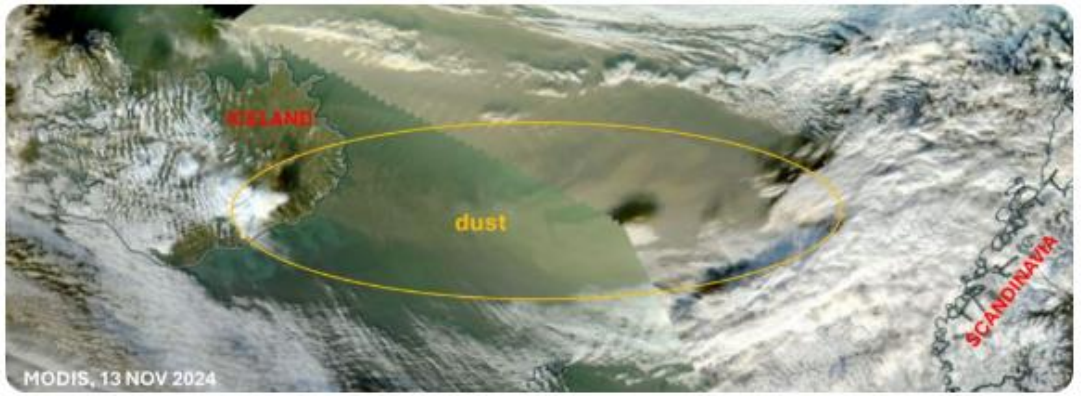
- HLD Assessment
- HLD EU COST Action proposal
- (HLD minireview)

Key Focus Areas

NORDDUST provides knowledge and recommendations on HLD impacts on...

- **Air pollution and health**
- **Climate impacts (cryosphere, radiation, and clouds)**
- **Ecosystems and marine environments**
- **Socio-economic risks (road safety, energy, soil erosion)**
- **Dust protection measures**





.... as the main topics for the Nordic and international negotiations.

ICELAND INCLUDED IN THE UN SDS TOOLBOX

United Nations
Convention to Combat Desertification

Land & life | Our work & impact | Science | News & stories | Events | Convention

Home / Land & life / Sand & dust storms

Sand and Dust Storms Toolbox

Overview | Coalition | News & stories | Toolbox | Resources

- Getting started
- Mapping SDS sources
- Observation, monitoring, forecasting & early warning
- Risk and vulnerability assessment
- Source control and management
- Impact mitigation
- About the toolbox

Sand and Dust Storms Toolbox

The SDS Toolbox provides tools, guidance and information which can be used to identify the sources of sand and dust storms, develop and implement management policy, plans and strategies, assess risks and vulnerabilities to SDS, understand how to observe, monitor, forecast and provide warnings of SDS and develop and implement ways to mitigate the impacts of sand and dust storms.

INTRODUCTION
Getting started
EXPLORE THE TOOLBOX

MODULE 1
Mapping SDS sources
EXPLORE TOOLS AND GUIDANCE

MODULE 2
Observation, monitoring, forecasting & early warning
EXPLORE TOOLS AND GUIDANCE

MODULE 3
Risk and vulnerability assessment and mapping

MODULE 4
Source control and management

MODULE 5
Impact mitigation

Dust storms and health

Find out more about health risks of windblown dust, particularly its impact on respiratory health and what to do during a dust storm.

Source: *Windblown Dust and Dust storms & your health - Department of Ecology, Washington State, ecology.wa.gov.*

WMO Airborne Dust Bulletins

The World Meteorological Organization publishes anually a report on the incidence and hazards of sand and dust storms, which have a major impact on air quality, health, the environment, agriculture and economies.

The latest Airborne Dust Bulletin can be found here: WMO Airborne Dust Bulletin No. 8 – July 2024.

Operational forecasts of Icelandic dust

Iceland has several SDS source locations with dust storms occurring across all months of the year. Operational forecasts of near surface dust for Iceland are available for a 72 hr. period at three hour increments from dustforecast.lbhi.is. The forecasts can be useful in avoiding dust events while traveling by road and planning visits within the country.

Icelandic Aerosol and Dust Association (IceDust)

Iceland has the largest desert in Europe and experiences an average of 135 dust days per year. The Icelandic Aerosol and Dust Association (IceDust) provides (1) a venue for collaboration on aerosol research in Iceland, (2) a mechanism for communication between researchers focusing on dust events in Iceland and (3) a source of information for the general public on aerosol processes linked to air pollution, atmosphere-cryosphere interactions, volcanic ash resuspension, health and environmental effects of particulate matter.

More information on IceDust can be found at https://ice-dust.com and https://icedustblog.wordpress.com

Thematic Network on High Latitude Dust

The Thematic Network on High Latitude Dust, an activity of the University of the Arctic (UArctic), provides a mechanism for sharing research and networking on dust at high latitudes. Thematic Network encompasses more than 110 scientists working in 53 institutions across 21 countries, holds periodic meetings and, through a link with IceDust, provides access to publications on dust and Iceland.

https://www.unccd.int/land-and-life/sand-and-dust-storms/toolbox/public-information?fbclid=IwY2xjawIgbltleHRuA2FlbQIxMAABHdcRWPIXM8imebhm48e9Dn_SSh2toLMzA31llF1pmWowj7We4K6tMePi-Q_aem_j1zy5ZwKv8oNdX1KBx7dUQ

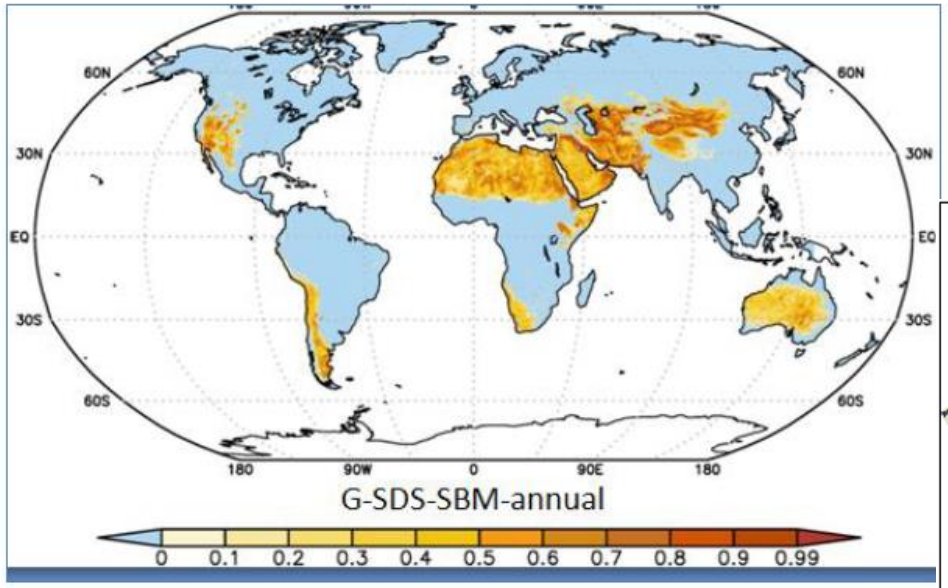
https://www.unccd.int/land-and-life/sand-and-dust-storms/toolbox/research-information-sources?fbclid=IwY2xjawIgbl5leHRuA2FlbQIxMAABHdcRWPIXM8imebhm48e9Dn_SSh2toLMzA31llF1pmWowj7We4K6tMePi-Q_aem_j1zy5ZwKv8oNdX1KBx7dUQ

TALK OUTLINE

- HIGH LATITUDE DUST NETWORKS (UPDATE 2025)
- **HLD- AND ICELANDIC DUST FORECASTING**
- HIGH LATITUDE DUST PROJECTS IN 2024-2025
    - CAMS NCP ICELAND
    - POLAR WINTER SCHOOL SVALBARD WITH NORDSNOWNET
    - DUSTDRONE
- CHALLENGES IN HLD MEASUREMENTS (ICELAND, ANTARCTICA AND SVALBARD IN 2025)

HIGH LATITUDE DUST AREAS IDENTIFICATION

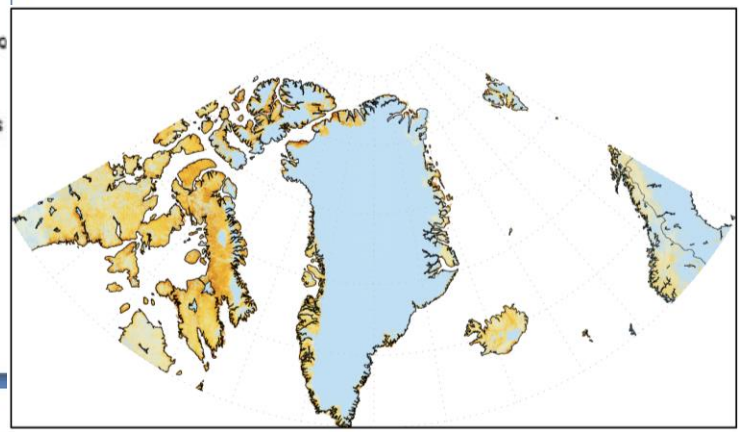
Vukovic, 2019. Sand and Dust Storms Source Base-map

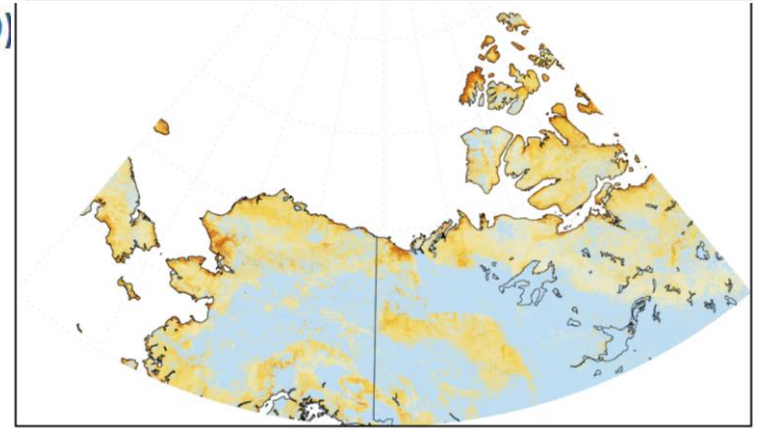


UNCCD 1km global dust mask (Ana Vukovic, 2019)

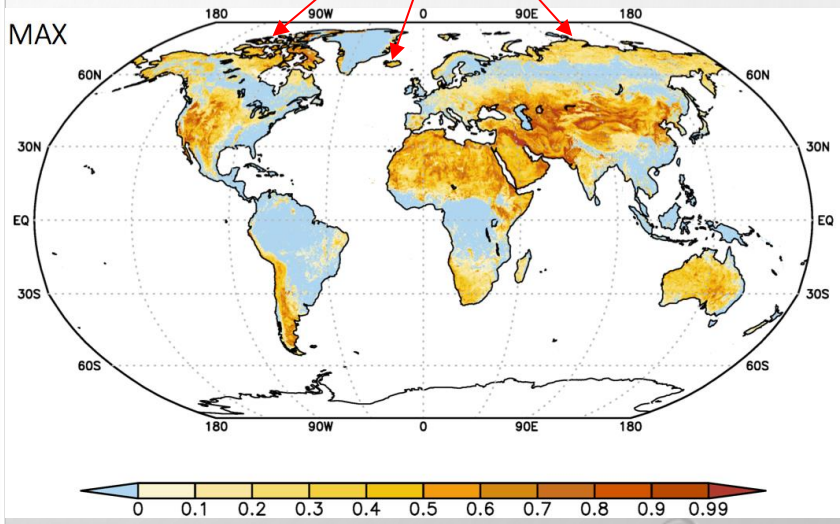
https://maps.unccd.int/sds/

Ana Vukovic (2019)





Northern dust belt



SDS index

WMO

United Nations
Convention to Combat
Desertification

GLOBAL DUST IN THE ARCTIC

NORTHERN HLD SOURCES AND THEIR CONTRIBUTION IN THE ARCTIC

AGU PUBLICATIONS
JGR
Journal of Geophysical Research: Atmospheres
RESEARCH ARTICLE
10.1002/2016JD025482

Substantial contribution of northern high-latitude sources to mineral dust in the Arctic

C. D. Groot Zwaaftink[1], H. Grythe[1,2,3], H. Skov[4], and A. Stohl[1]

Key Points:
• High-latitude dust sources in the

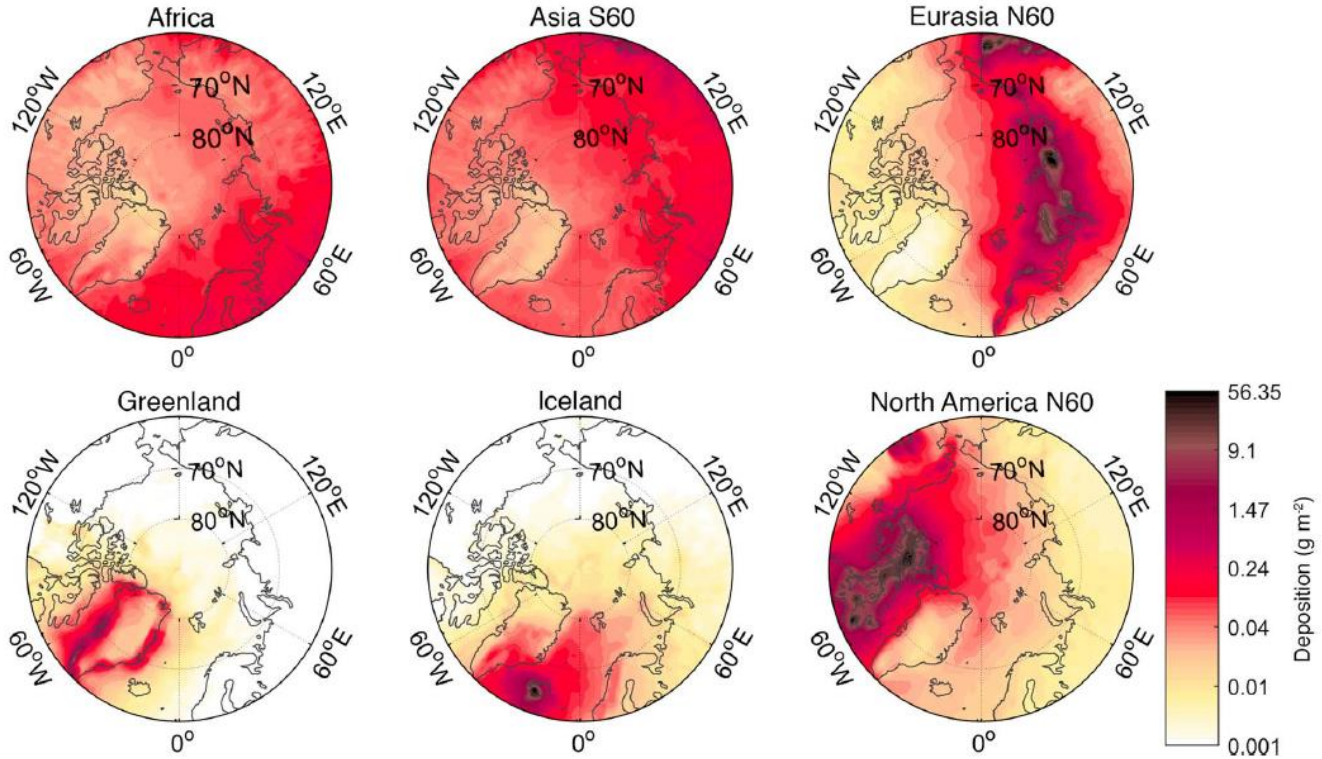


Figure 11. Simulated annual mean deposition of dust (g m^{-2}) in the near Arctic originating from different source regions averaged for years 2010–2012. Deposition is here given as the sum of dry and wet deposition.

~ 3% of global dust emission from the northern HLD sources

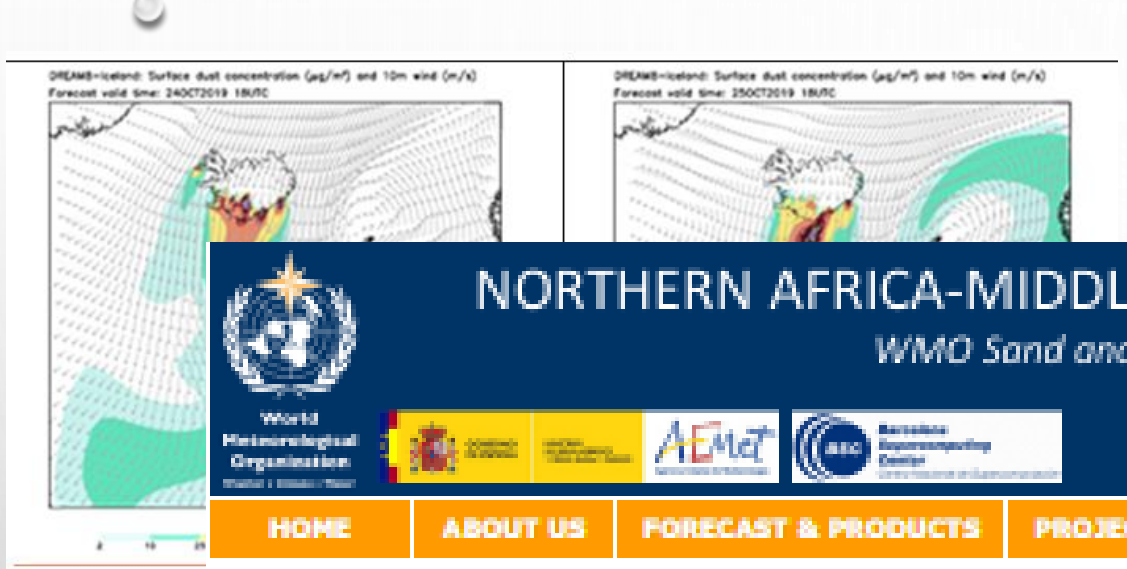
Total atmospheric dust loads in the Arctic:

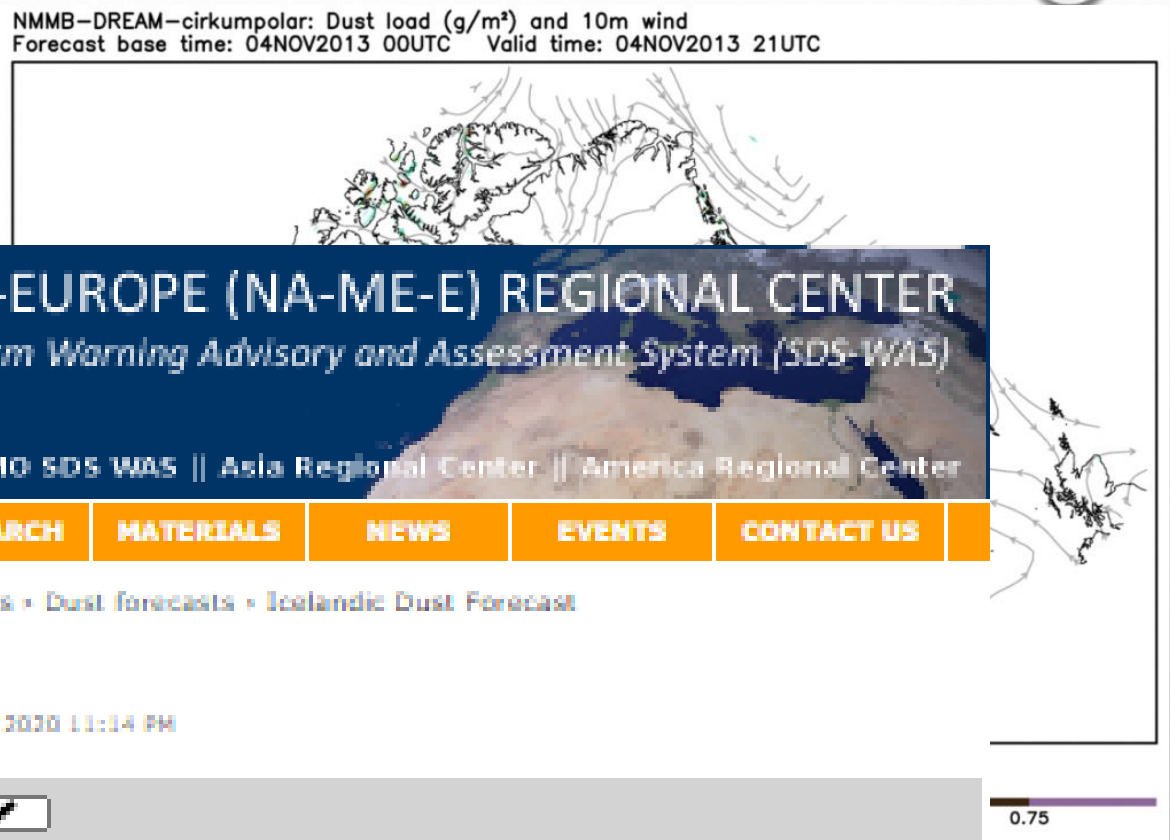
Asia (~38%)

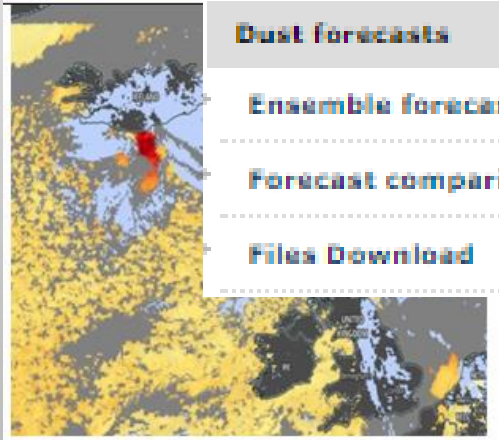
Africa (~32%)

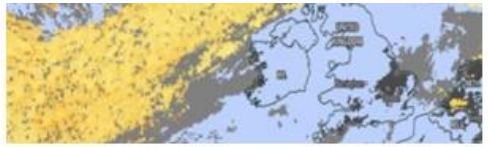
HLD (27%)

CIRCUMPOLAR DUST ATMOSPHERIC MODELS









atmosphere

Article

Fully Dynamic High–Resolution Model for Dispersion of Icelandic Airborne Mineral Dust

Bojan Cvetkovic [1,*], Pavla Dagsson-Waldhauserová [2,3], Slavko Petkovic [1], Ólafur Arnalds [2], Fabio Madonna [4], Emmanouil Proestakis [5], Antonis Gkikas [5], Ana Vukovic Vimic [6], Goran Pejanovic, Marco Rosoldi [4], Darius Ceburnis [7], Vassilis Amiridis [5], Lenka Lisá [8,9], Slobodan Nickovic [1,10] and Jugoslav Nikolic [1]

https://www.mdpi.com/2073-4433/13/9/1345

Detailed forecast for Icelanders:

http://dustforecast.lbhi.is/desktop.html

http://www.seevccc.rs/?p=8

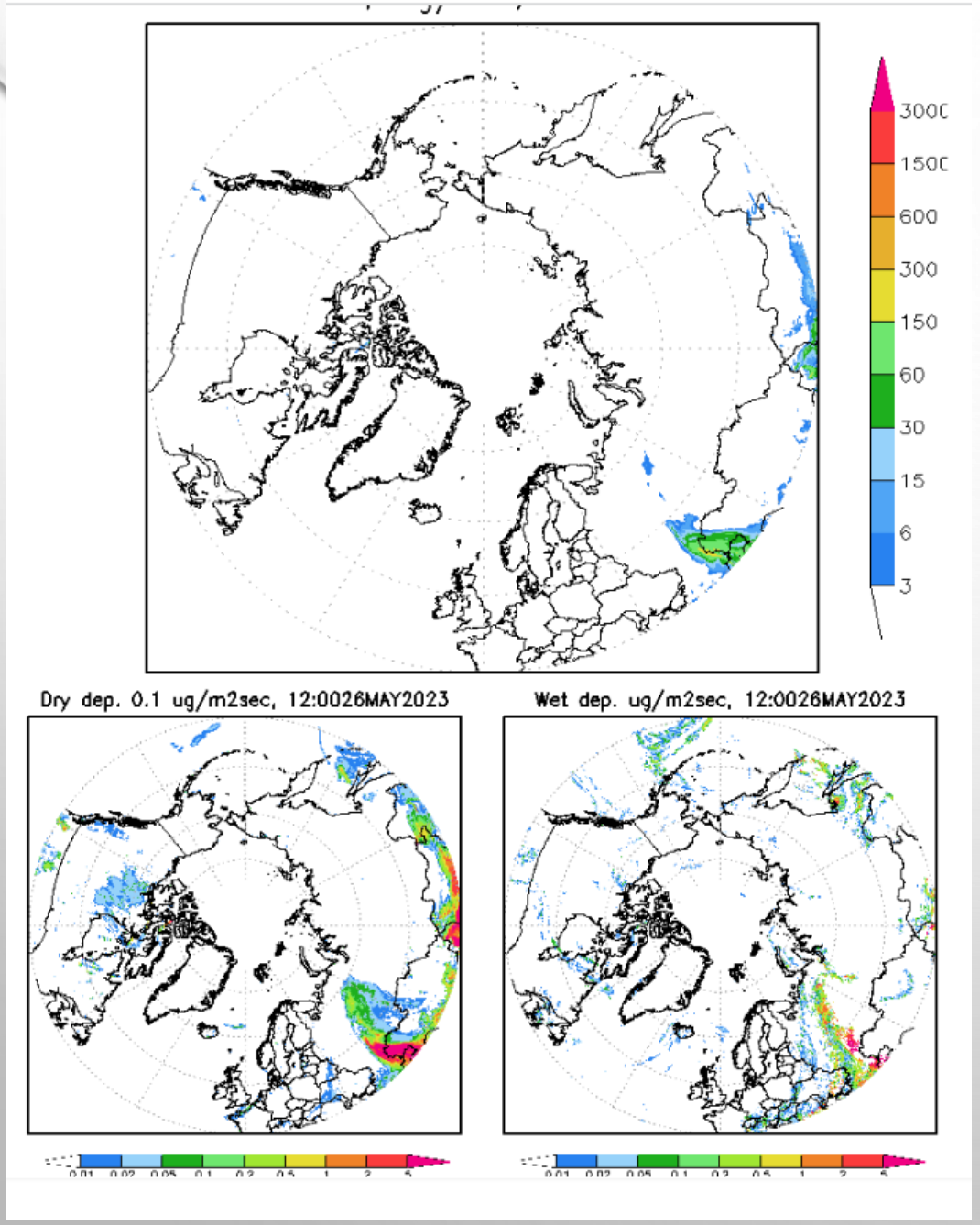
Serbian Weather Service

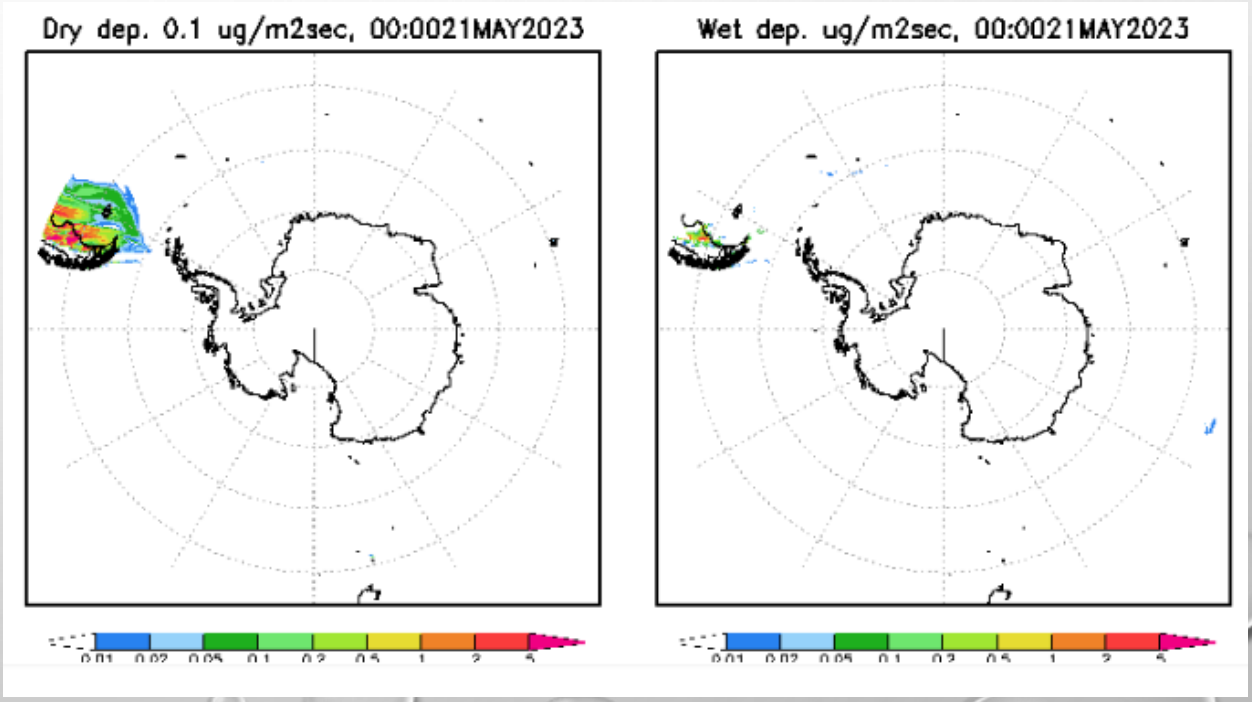
SEEVCCC

TALK OUTLINE

- HIGH LATITUDE DUST NETWORKS (UPDATE 2025)
- HLD- AND ICELANDIC DUST FORECASTING
- **HIGH LATITUDE DUST PROJECTS IN 2024-2025**
  - **CAMS NCP ICELAND**
  - **POLAR WINTER SCHOOL SVALBARD WITH NORDSNOWNET**
  - **DUSTDRONE**
- CHALLENGES IN HLD MEASUREMENTS (ICELAND, ANTARCTICA AND SVALBARD IN 2025)

SILAM FMI DUST MODEL





CAMS NCP ICELAND - ADDED THREE AIR QUALITY MONITORING STATIONS IN ICELAND

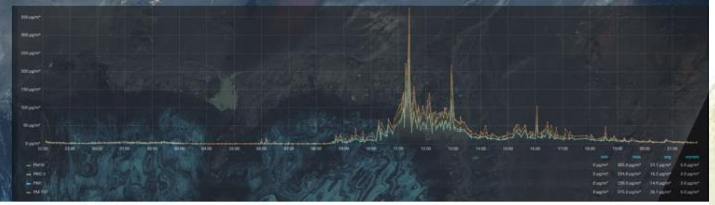
S2, Sept 5, 2024, 13:03

Activities on aerosol and dust

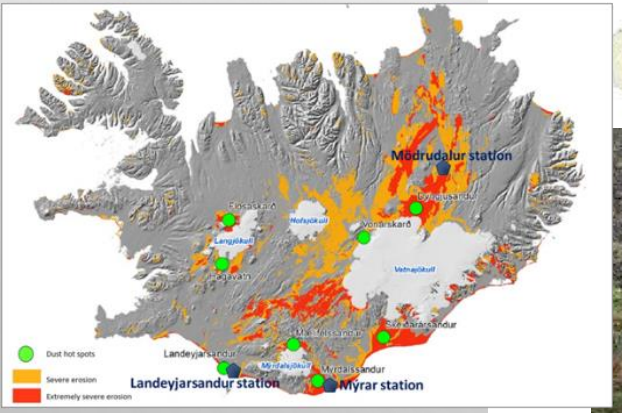
National Collaboration Programme – Iceland

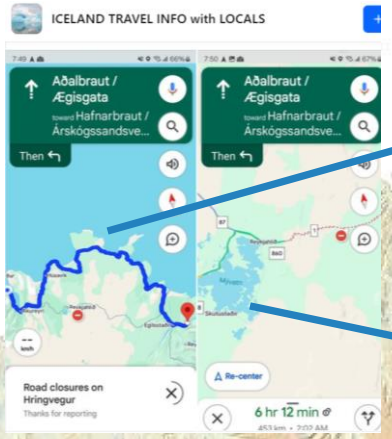
Pavla Dagsson-Waldhauserová[1], Michaela Hrabalíková[2], Hlynur Árnason[3], Slobodan Nickovic[1,4], Bojan Cvetkovic[4], Ana Vukovic[5]

[1] Agricultural University of Iceland
[2] Natural Science Institute of Iceland
[3] Icelandic Environment and Energy Agency
[4] Republic Hydrometeorological Service of Serbia – SEEVCCC
[5] Faculty of Agriculture, University of Belgrade, Serbia

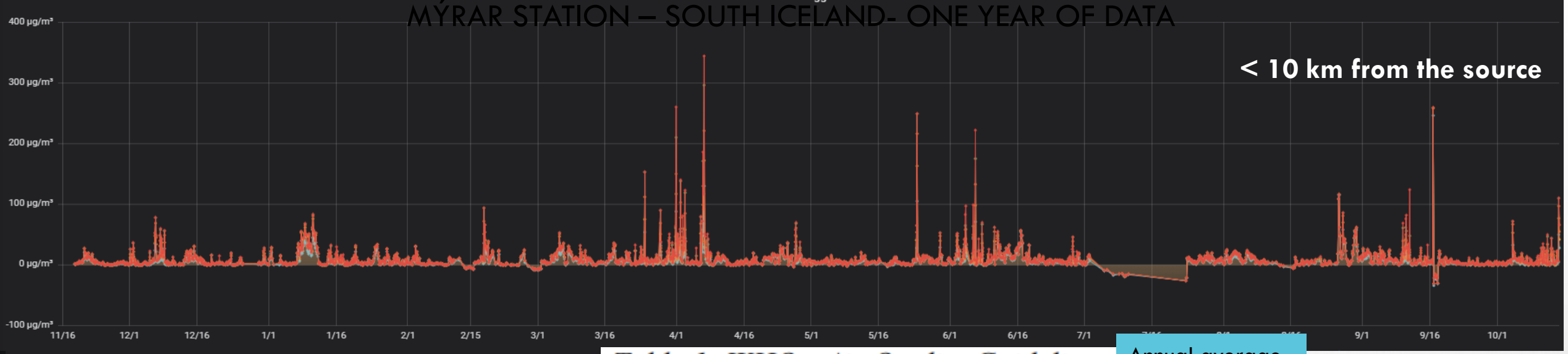


PROGRAMME OF THE EUROPEAN UNION | Copernicus | ON BEHALF OF ECMWF | Landbúnaðarháskóli Íslands Agricultural University of Iceland | Natural Science Institute of Iceland

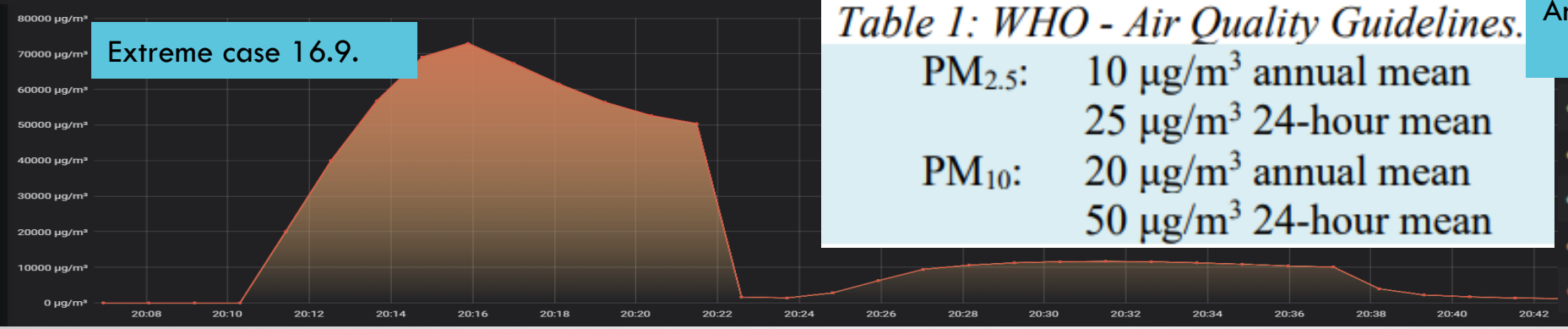




MÝRAR STATION – SOUTH ICELAND- ONE YEAR OF DATA



< 10 km from the source



Extreme case 16.9.

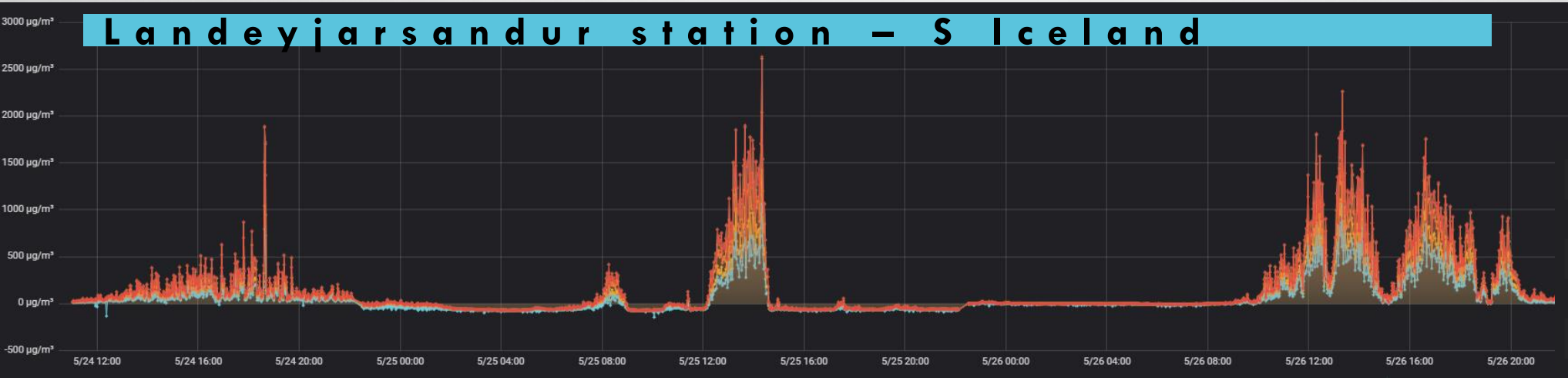
Table 1: WHO - Air Quality Guidelines.

$PM_{2.5}$:	10 µg/m³ annual mean
	25 µg/m³ 24-hour mean
PM_{10}:	20 µg/m³ annual mean
	50 µg/m³ 24-hour mean

Annual average

	max	avg	current
PM10	296.0 µg/m³	9.8 µg/m³	66.0 µg/m³
PM2.5	258.0 µg/m³	8.1 µg/m³	42.0 µg/m³
PM1	246.0 µg/m³	6.4 µg/m³	28.0 µg/m³
PM 4	259.0 µg/m³	9.0 µg/m³	55.0 µg/m³
PM TOT	344.0 µg/m³	10.3 µg/m³	66.0 µg/m³

Landeyjarsandur station – S Iceland



	max	avg
PM10	2610.0 µg/m³	166.8 µg/m³
PM2.5	1420.0 µg/m³	89.6 µg/m³
PM1	1060.0 µg/m³	58.3 µg/m³
PM 4	2040.0 µg/m³	133.4 µg/m³
PM TOT	2630.0 µg/m³	168.3 µg/m³

Air Quality - Dust Storms

Basemap Data

Search Data

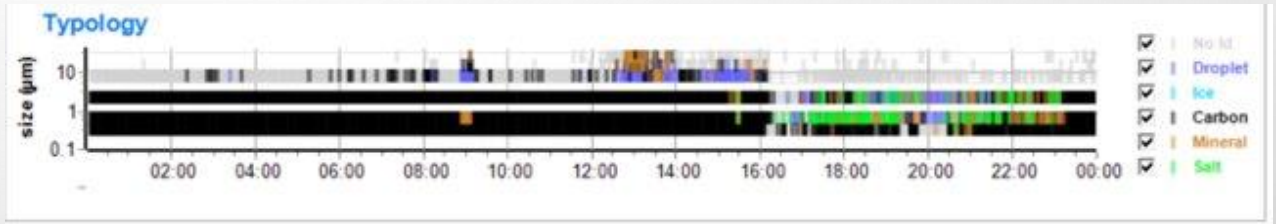
- Forecast Models
  - CAMS global forecast
  - CAMS EU forecast
- Real-Time Monitoring
  - Road Condition Data
  - Meteorological Data
  - Cameras Data
  - Air Quality & Pollutants
    - Air Quality Stations
- Land & Soil Data
  - Soil Map
  - Soil erosion, 1:850k
  - Major dust hotspot
- Background Data

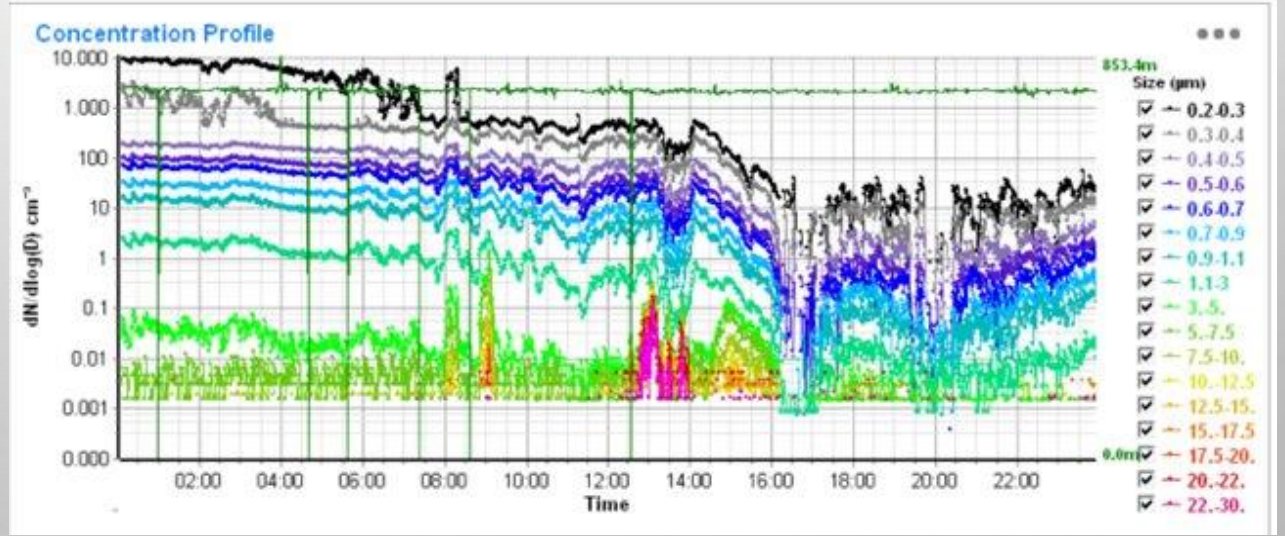
https://loftgaedasja.gis.is/ - details can be shown at the end of the presentation

PM10:

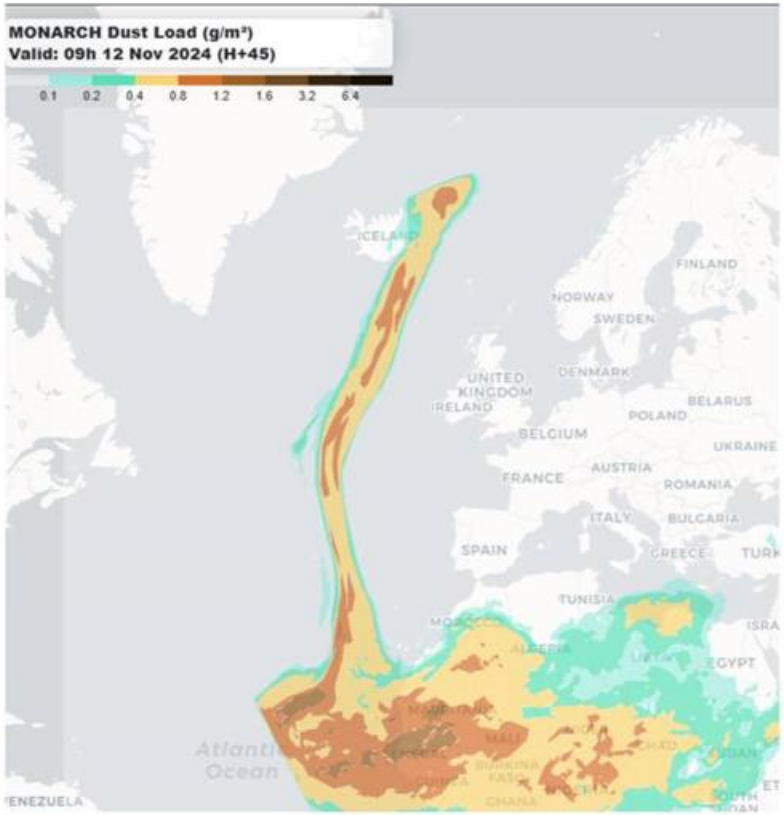
28-30.8.2024: BLACK CARBON SMOKE PLUME

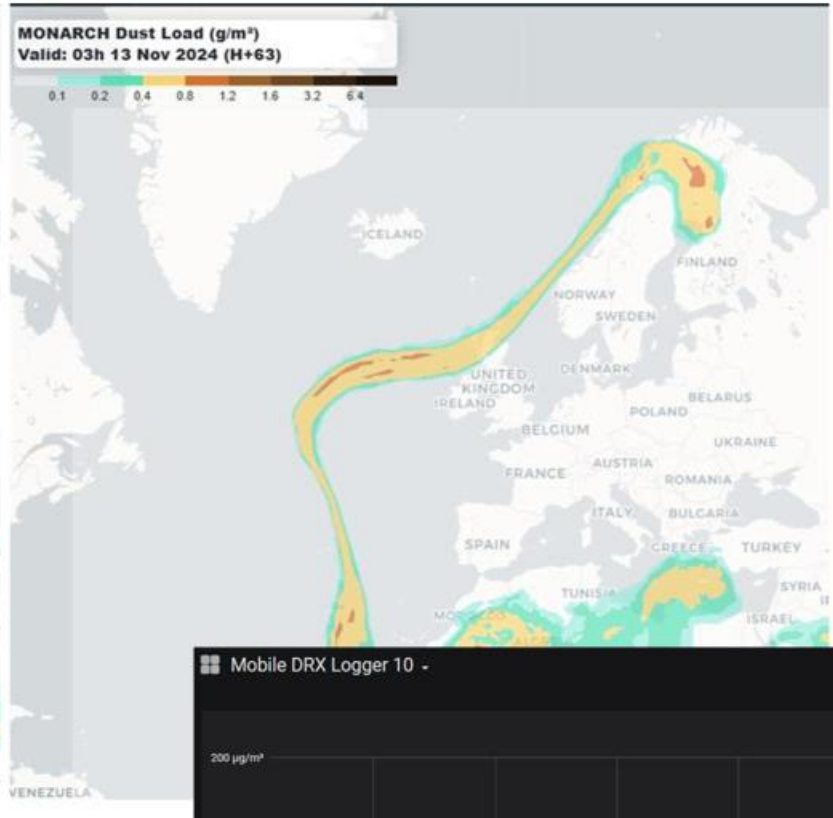
- LOAC PARTICLE NUMBER CONCENTRATIONS FROM NE ICELAND
- BLACK CARBON INCREASED FROM BACKGROUND OF MAX 10 PARTICLES PER CM^3 TO 10 000 PARTICLES PER CM^3
- SOME EXCEEDING THE SIZES > 1 UM

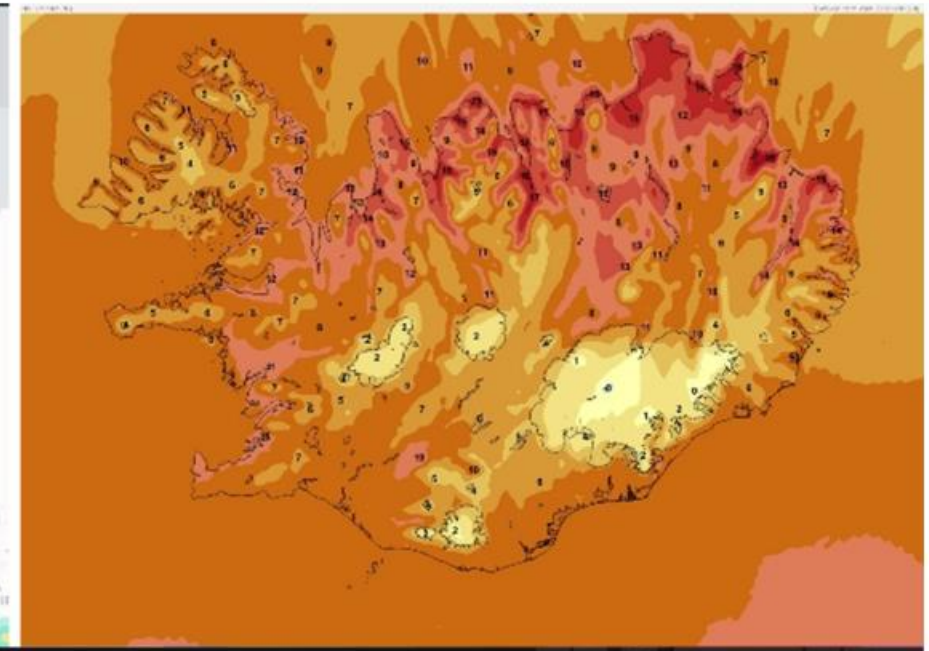


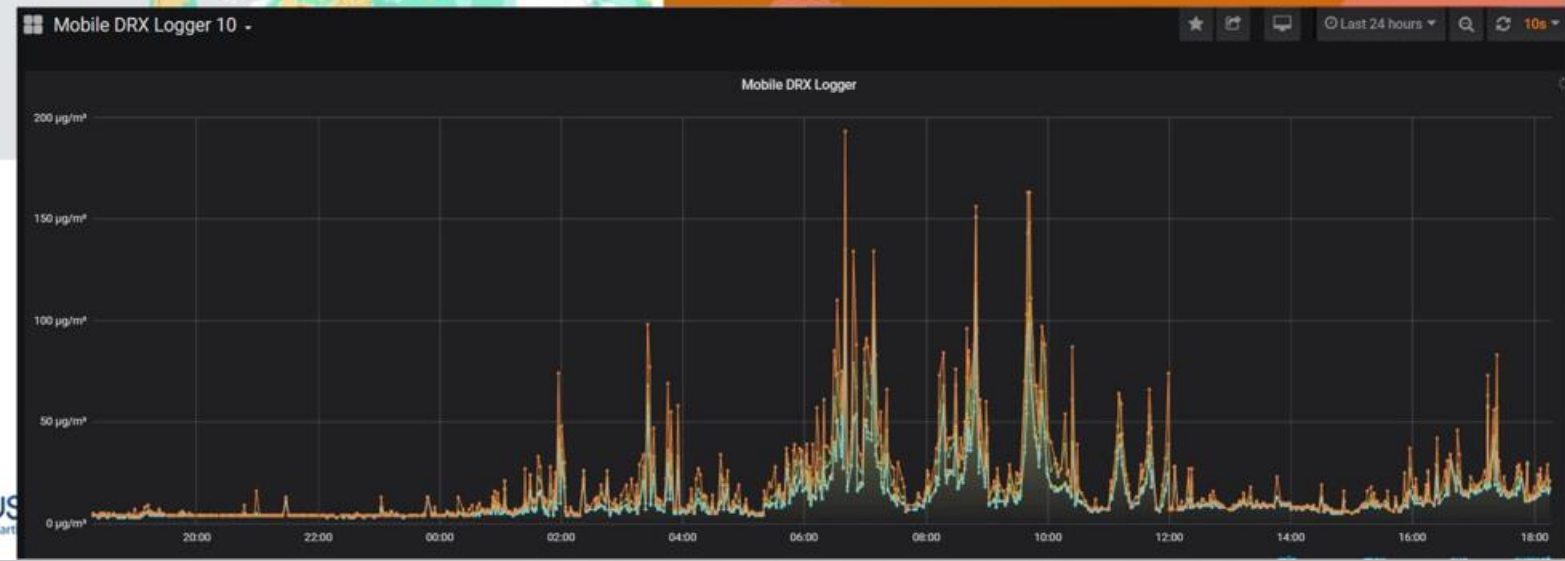


12.-13.11.2024: Sahara and Icelandic Dust







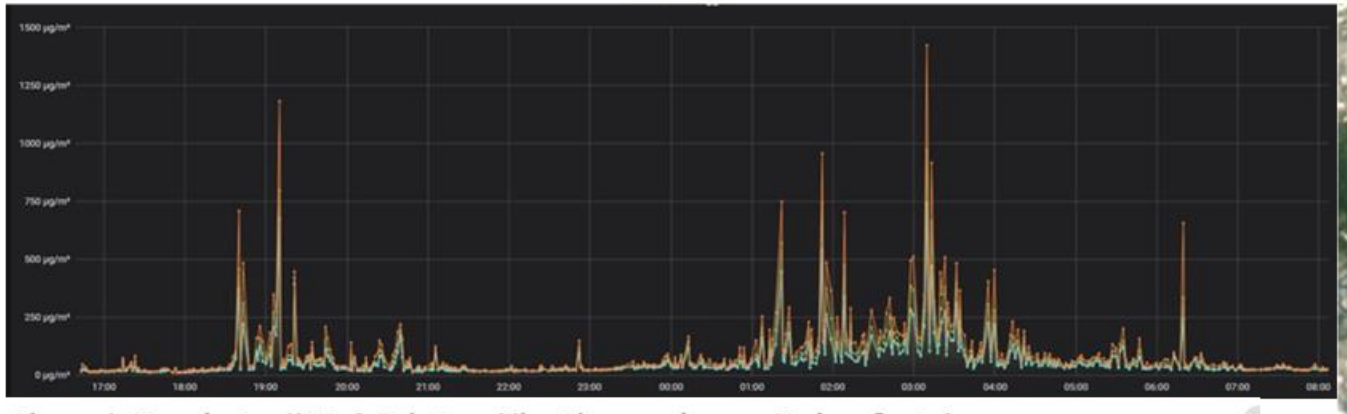


- Saharan dust and unusual summer temperatures in Iceland in November 2024
- Dust measurements, some exceeding 100 ug/m3, all around the country including CAMS NCP station in NE Iceland Möðrudalur

PROGRAMME OF THE EUROPEAN UNION

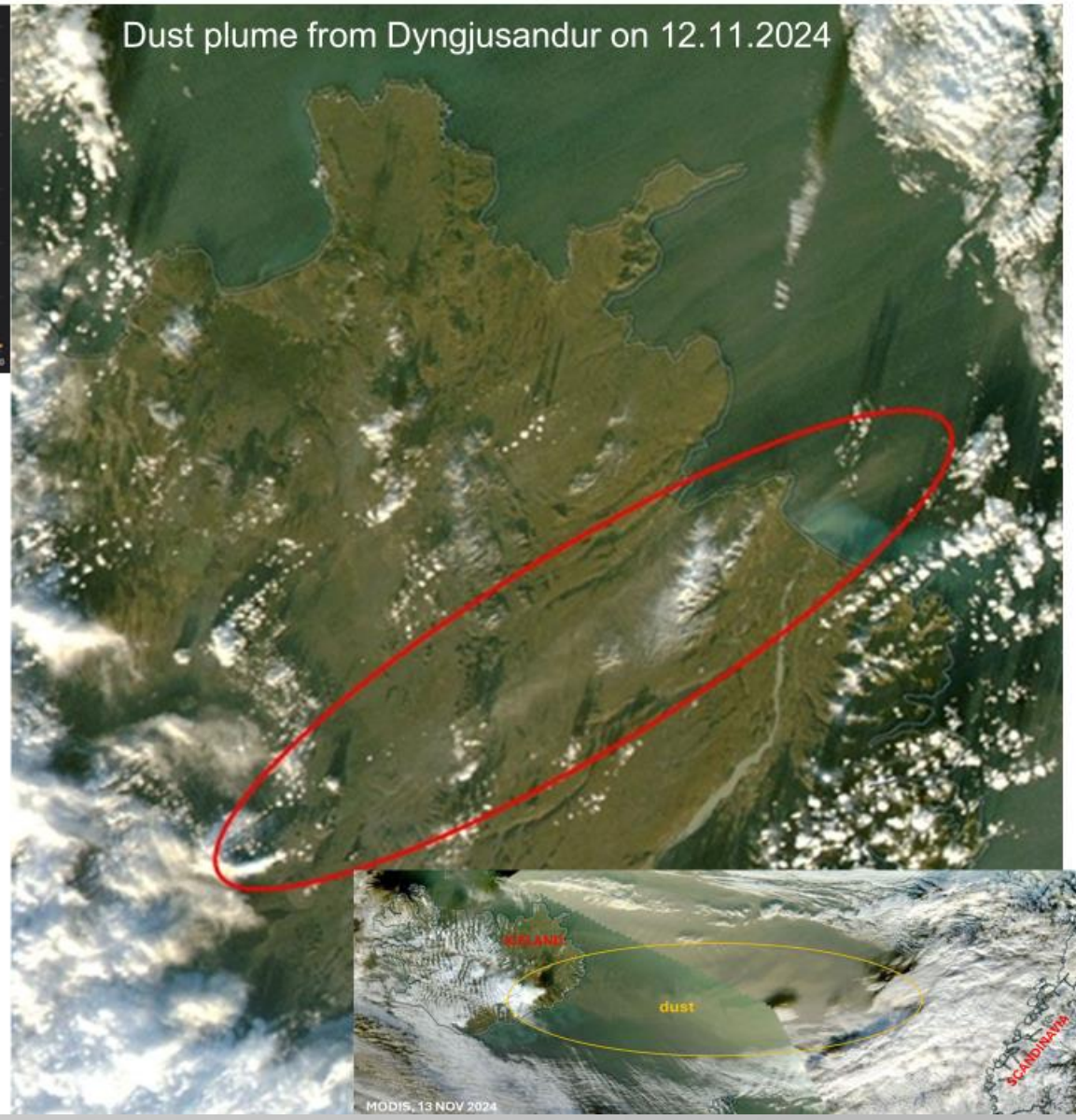
opernicus
Europe's eyes on Earth

12-13.11.2024: Sahara and Icelandic Dust



Akureyri, Strandgata við Hof. Rekstraraðilar Akureyrarbær og Umhverfisstofnun.

[RUV News: Black sand in swimming pools, Egilsstaðir]



PROGRAMME OF THE EUROPEAN UNION

Copernicus Europe's eyes on Earth

ON BEHALF OF ECMWF FOR THE EUROPEAN COMMISSION

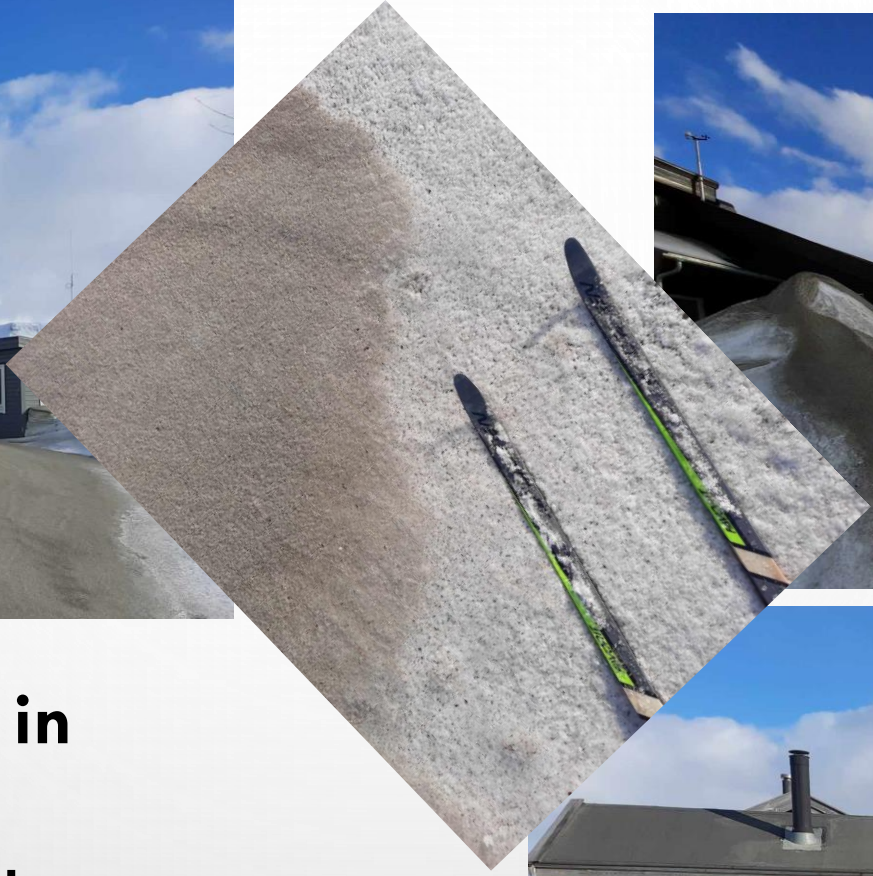
Mikið moldrok í nótt og sundlaugin svört í morgun

Starfsmenn sundlaugarinn á Egilsstöðum standa í ströngu í dag við að hreinsa mikla leirdrullu af botni laugarinnar. Leirkenndur sandurinn kom ofan af hálendi.

Rúnar Snær Reynisson
13. nóvember 2024 kl. 10:52, uppfært kl. 11:47

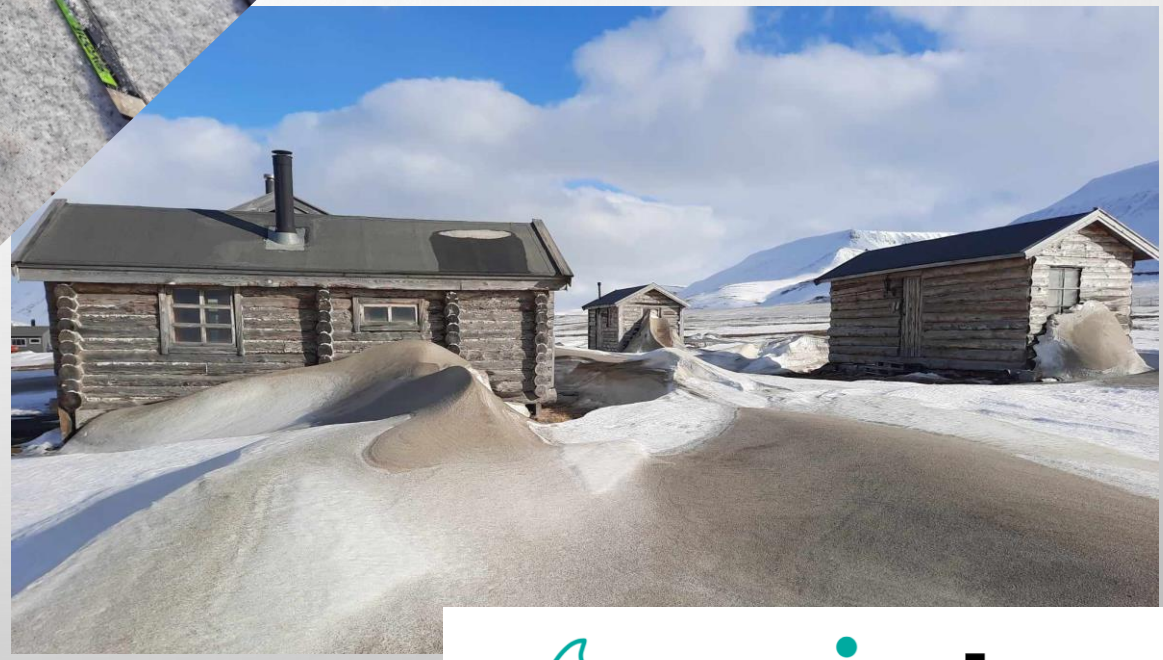
A A A

13/11/2024: East Iceland. Jan Kavan



POLAR WINTER SCHOOL in SVALBARD

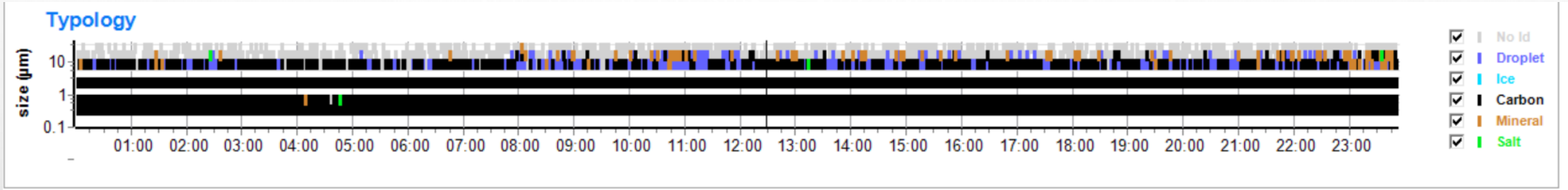
NORDSNOWNET -> UARCTIC TN

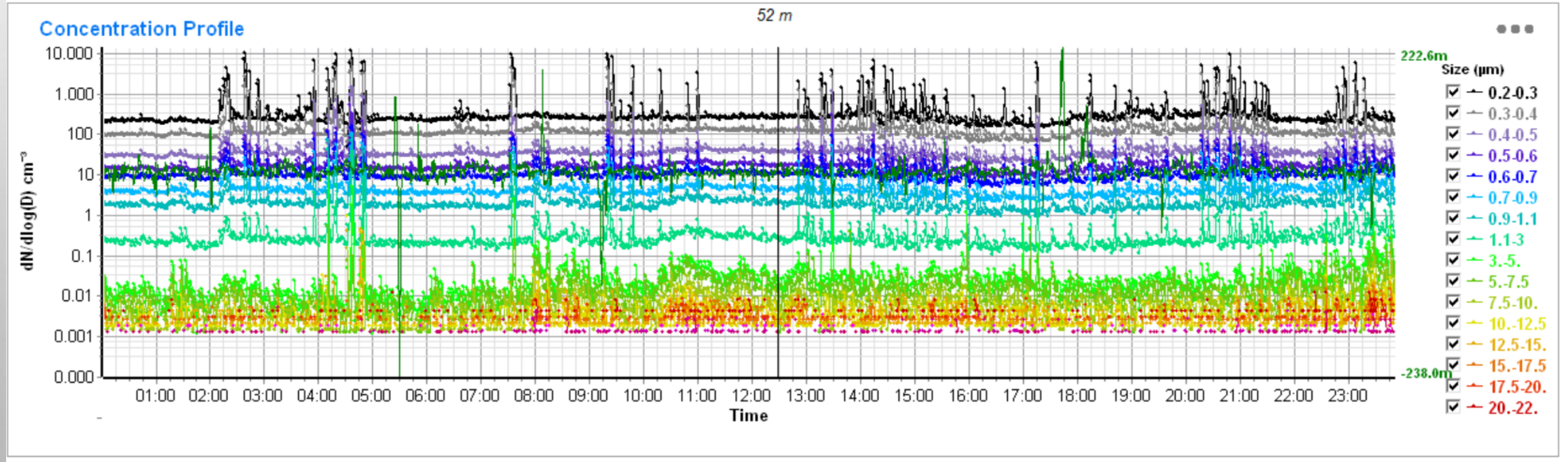


SNOW-DUST STORMS LONGYEARBYEN, APRIL 2024

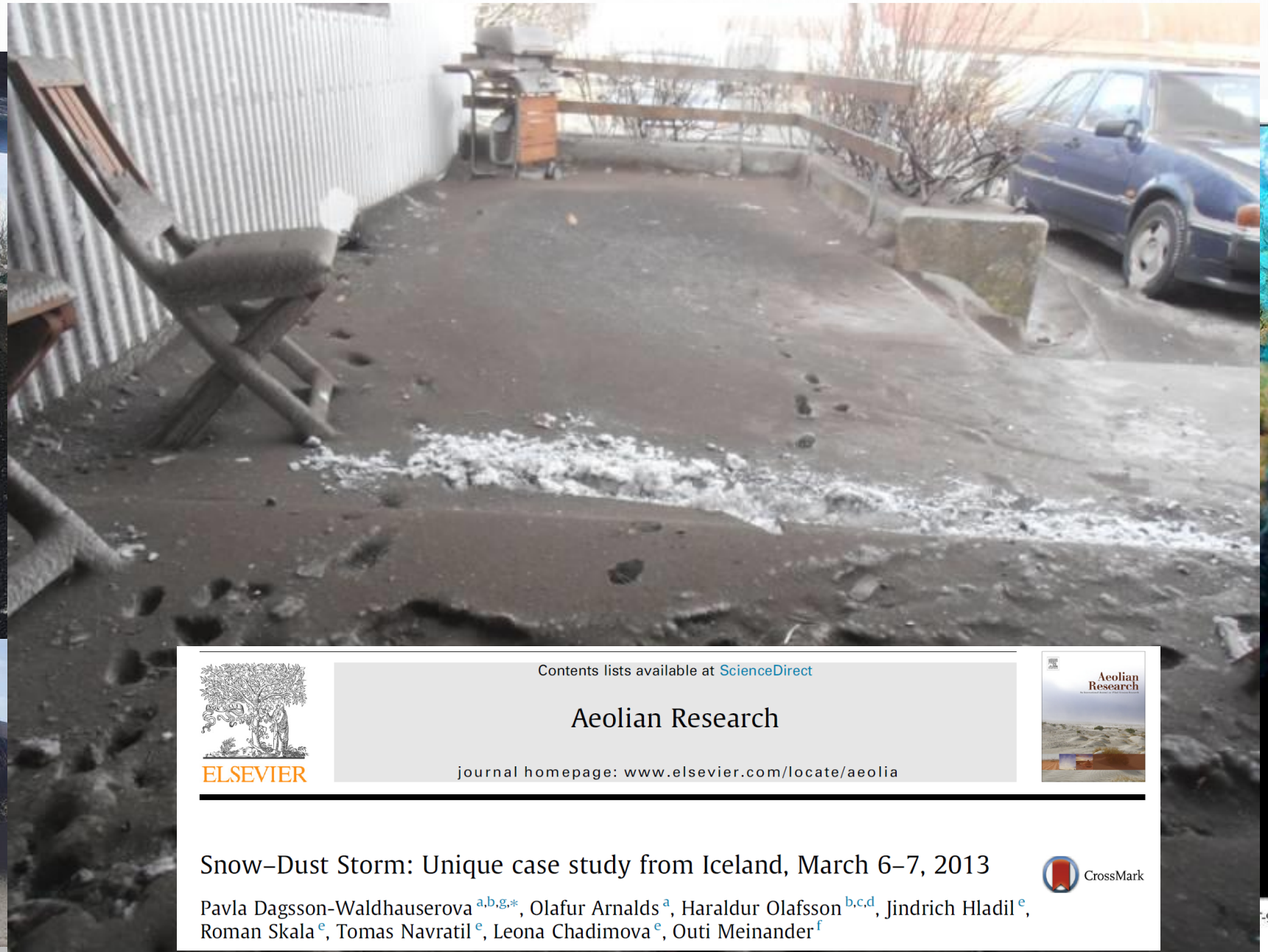
winter POLAR SCHO*L

LONGYEARBYEN 24.4.2024





SNOW-DUST STORMS KNOWN FROM ICELAND – E.G.13.3.2023



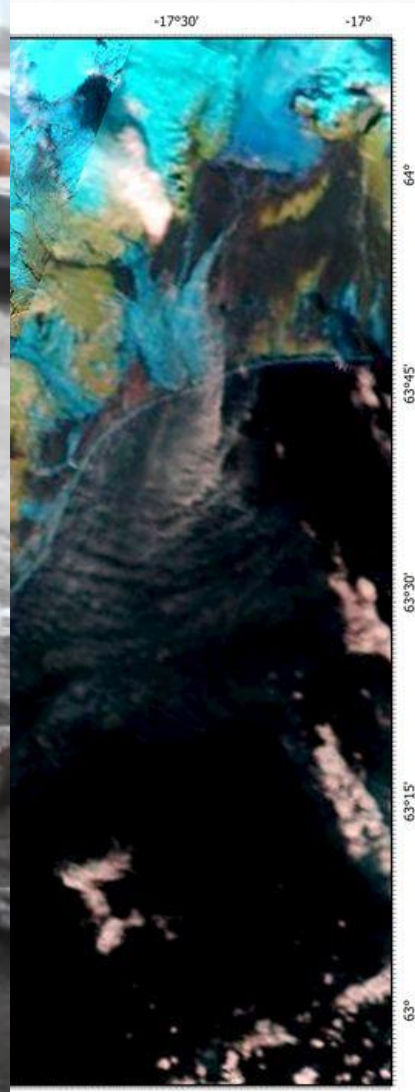
Contents lists available at ScienceDirect

Aeolian Research

journal homepage: www.elsevier.com/locate/aeolia

Snow–Dust Storm: Unique case study from Iceland, March 6–7, 2013

Pavla Dagsson-Waldhauserova [a,b,g,*], Olafur Arnalds [a], Haraldur Olafsson [b,c,d], Jindrich Hladil [e], Roman Skala [e], Tomas Navratil [e], Leona Chadimova [e], Outi Meinander [f]



euronews.

Latest Europe World EU Policy Business Travel Euroviews Next Green Heal

Black sand storms: An Icelandic climate mystery scientists are hoping to crack

With EGU Science Journalist awardee Daniela de Lorenzo

https://www.euronews.com/green/2024/11/17/black-sand-storms-an-icelandic-climate-mystery-scientists-are-hoping-to-crack

DUSTDRONE PROJECT

UK–ICELAND ARCTIC SCIENCE PARTNERSHIP SCHEME

VERTICAL PROFILES SOUTH OF MYRDALSSANDUR UP TO 2 KM

Polly Foster, Ben Pickering, Ólafur Rögnvaldsson, et al. **DustDrone: Aerial Sampling of dust plumes over Iceland**

TALK OUTLINE

- HIGH LATITUDE DUST NETWORKS (UPDATE 2025)
- HLD- AND ICELANDIC DUST FORECASTING
- HIGH LATITUDE DUST PROJECTS IN 2025
    - CAMS NCP ICELAND
    - POLAR WINTER SCHOOL SVALBARD WITH NORDSNOWNET
    - DUSTDRONE
- **CHALLENGES IN HLD MEASUREMENTS (ICELAND, ANTARCTICA AND SVALBARD IN 2025)**

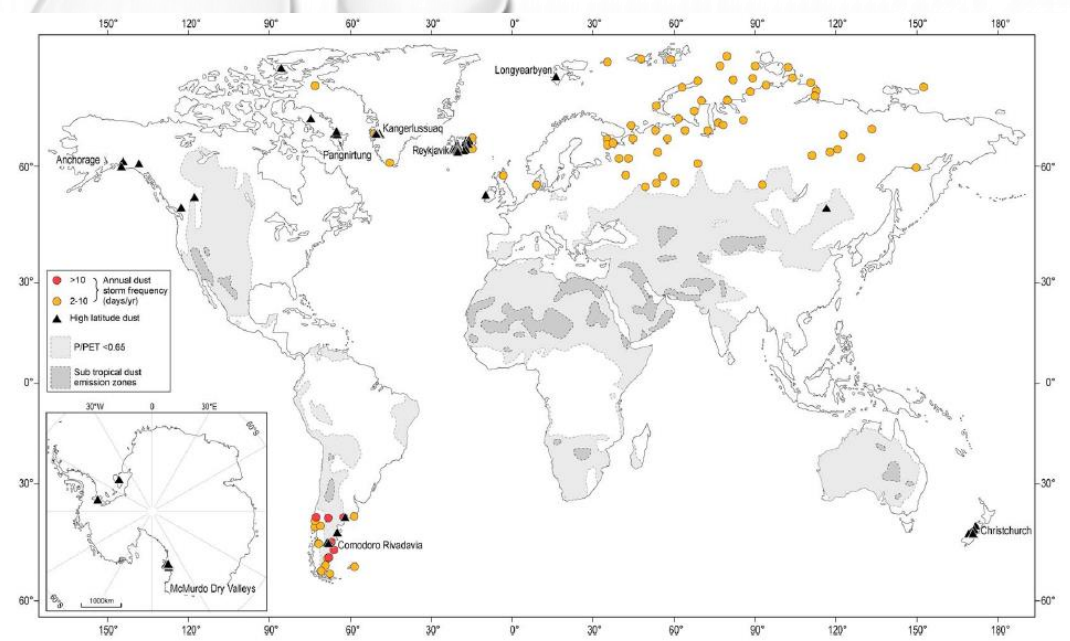


Figure 3. Global observations of high-latitude dust where filled circles indicate dust storm frequency based on visibility data, and black triangles indicate georeferenced published observations of dust storms (see text for details). Areas where the precipitation: potential evapotranspiration ratio <0.65 (aridity index) [*United Nations Environment Programme*, 1997] and subtropical dust emission zones are included for reference.

2016


AGU PUBLICATIONS

Reviews of Geophysics

REVIEW ARTICLE

10.1002/2016RG000518

High-latitude dust in the Earth system

Joanna E. Bullard[1], Matthew Baddock[1], Tom Bradwell[2], John Crusius[3], Eleanor Darlington[1], Diego Gaiero[4], Santiago Gassó[5], Gudrun Gisladottir[6], Richard Hodgkins[1], Robert McCulloch[2], Cheryl McKenna-Neuman[7], Tom Mockford[1], Helena Stewart[2], and Throstur Thorsteinsson[8]

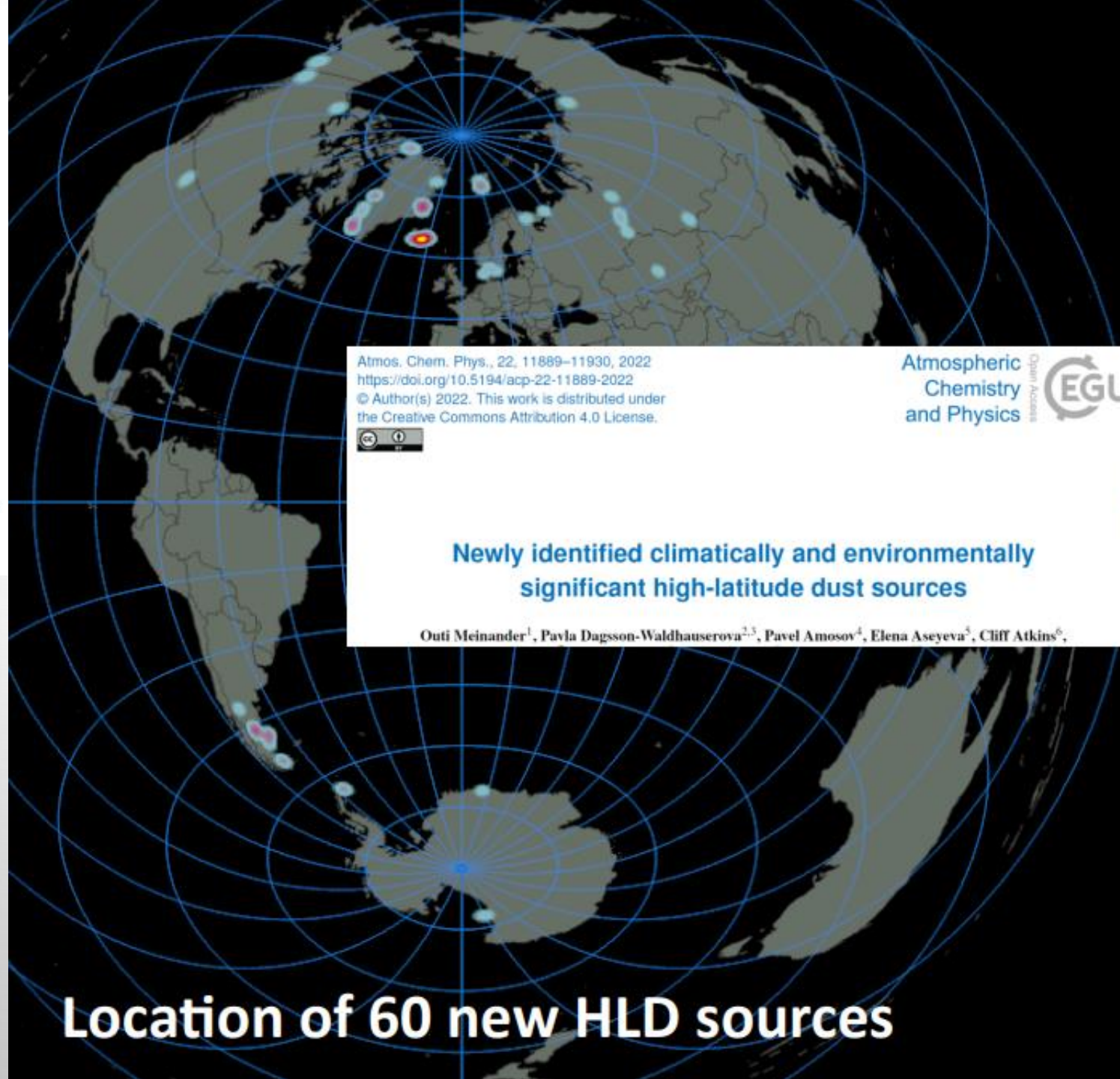
Key Points:
- High-latitude dust sources are located in paraglacial regions ≥50°N and ≥40°S

Summary of the main dust sources:

Northern Hemisphere (Alaska, Canada, Greenland, Iceland, Svalbard, Siberia, Scandinavia)

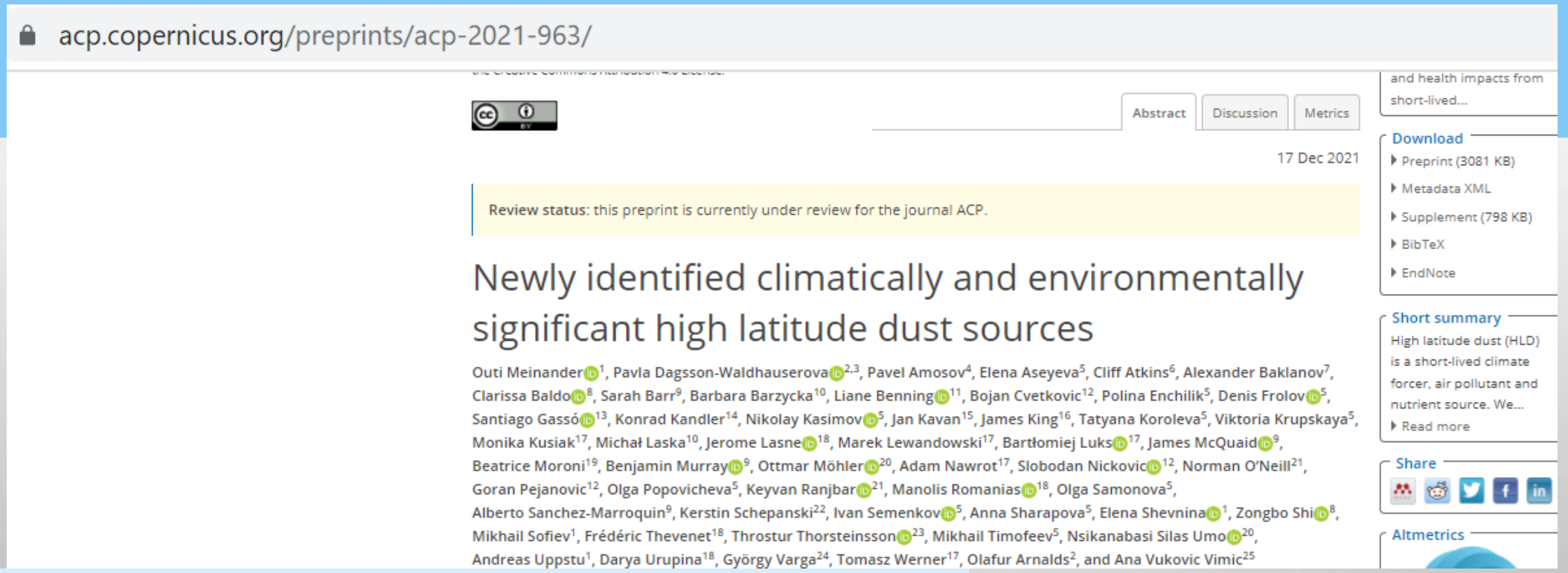
Southern Hemisphere (Antarctica, New Zealand, and Patagonia)

2022



HIGH LATITUDE DUST AREAS – UPDATED COLLECTION

Meinander et al. on Merging > 60 new HLD sources



acp.copernicus.org/preprints/acp-2021-963/

Abstract | Discussion | Metrics

17 Dec 2021

Review status: this preprint is currently under review for the journal ACP.

Newly identified climatically and environmentally significant high latitude dust sources

Outi Meinander[1], Pavla Dagsson-Waldhauserova[2,3], Pavel Amosov[4], Elena Aseyeva[5], Cliff Atkins[6], Alexander Baklanov[7], Clarissa Baldo[8], Sarah Barr[9], Barbara Barzycka[10], Liane Benning[11], Bojan Cvetkovic[12], Polina Enchilik[5], Denis Frolov[5], Santiago Gassó[13], Konrad Kandler[14], Nikolay Kasimov[5], Jan Kavan[15], James King[16], Tatyana Koroleva[5], Viktoria Krupskaya[5], Monika Kusiak[17], Michał Laska[10], Jerome Lasne[18], Marek Lewandowski[17], Bartłomiej Luks[17], James McQuaid[9], Beatrice Moroni[19], Benjamin Murray[9], Ottmar Möhler[20], Adam Nawrot[17], Slobodan Nickovic[12], Norman O'Neill[21], Goran Pejanovic[12], Olga Popovicheva[5], Keyvan Ranjbar[21], Manolis Romanias[18], Olga Samonova[5], Alberto Sanchez-Marroquin[9], Kerstin Schepanski[22], Ivan Semenkov[5], Anna Sharapova[5], Elena Shevnina[1], Zongbo Shi[8], Mikhail Sofiev[1], Frédéric Thevenet[18], Throstur Thorsteinsson[23], Mikhail Timofeev[5], Nsikanabasi Silas Umo[20], Andreas Uppstu[1], Darya Urupina[18], György Varga[24], Tomasz Werner[17], Olafur Arnalds[2], and Ana Vukovic Vimic[25]

and health impacts from short-lived...

Download
- Preprint (3081 KB)
- Metadata XML
- Supplement (798 KB)
- BibTeX
- EndNote

Short summary

High latitude dust (HLD) is a short-lived climate forcer, air pollutant and nutrient source. We...

Read more

Share

Altmetrics

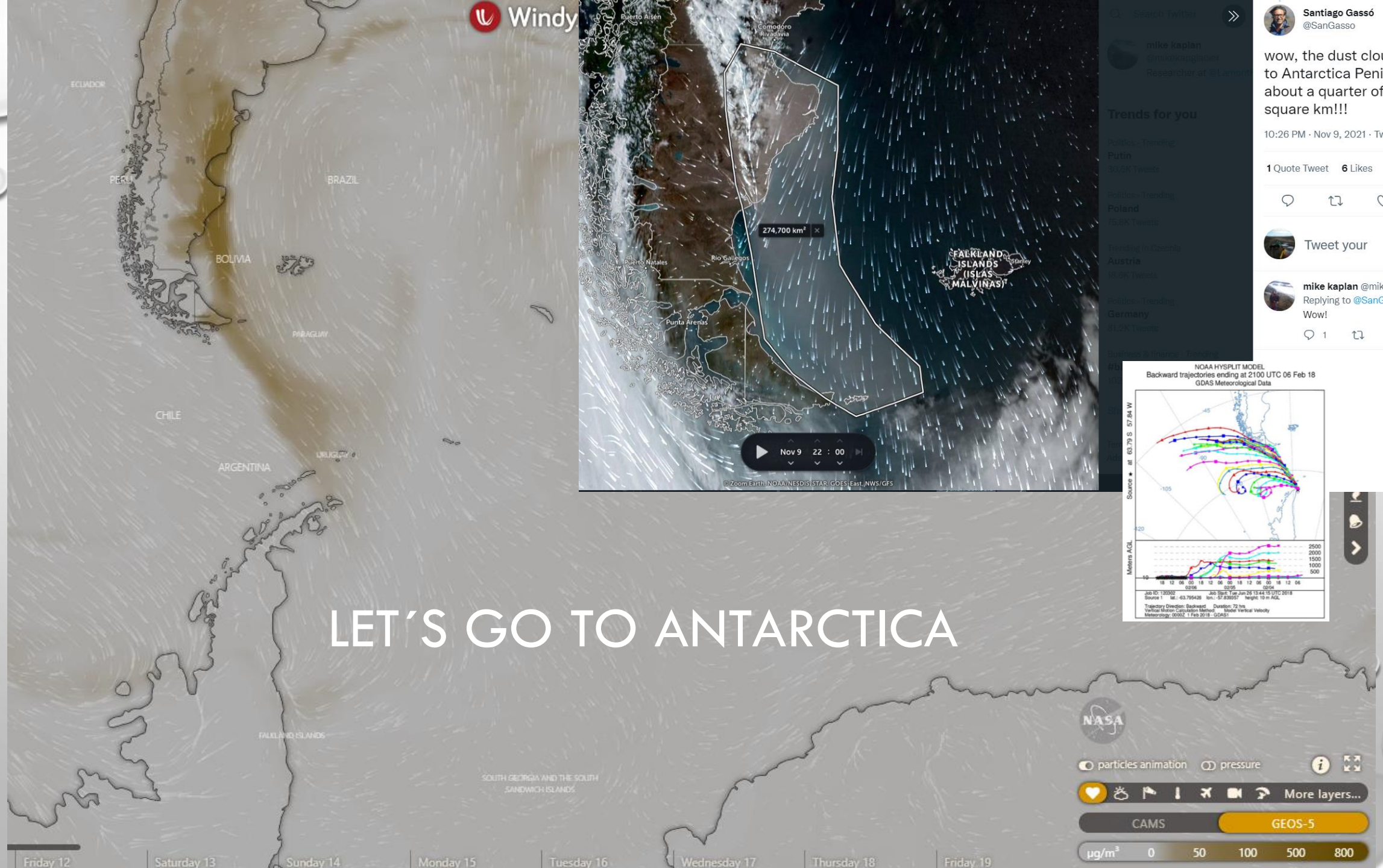
- **Active HLD sources cover > 1,670, 000 km^2**

(excluding Antarctica)

- **1-5% of the global dust budget**

(~100 Tg yr^{-1} of global dust budget)

Summary of HLD climate impacts



LET´S GO TO ANTARCTICA

ANTARCTICA 2018-2025
Extreme summer 2021/22

James Ross Isle

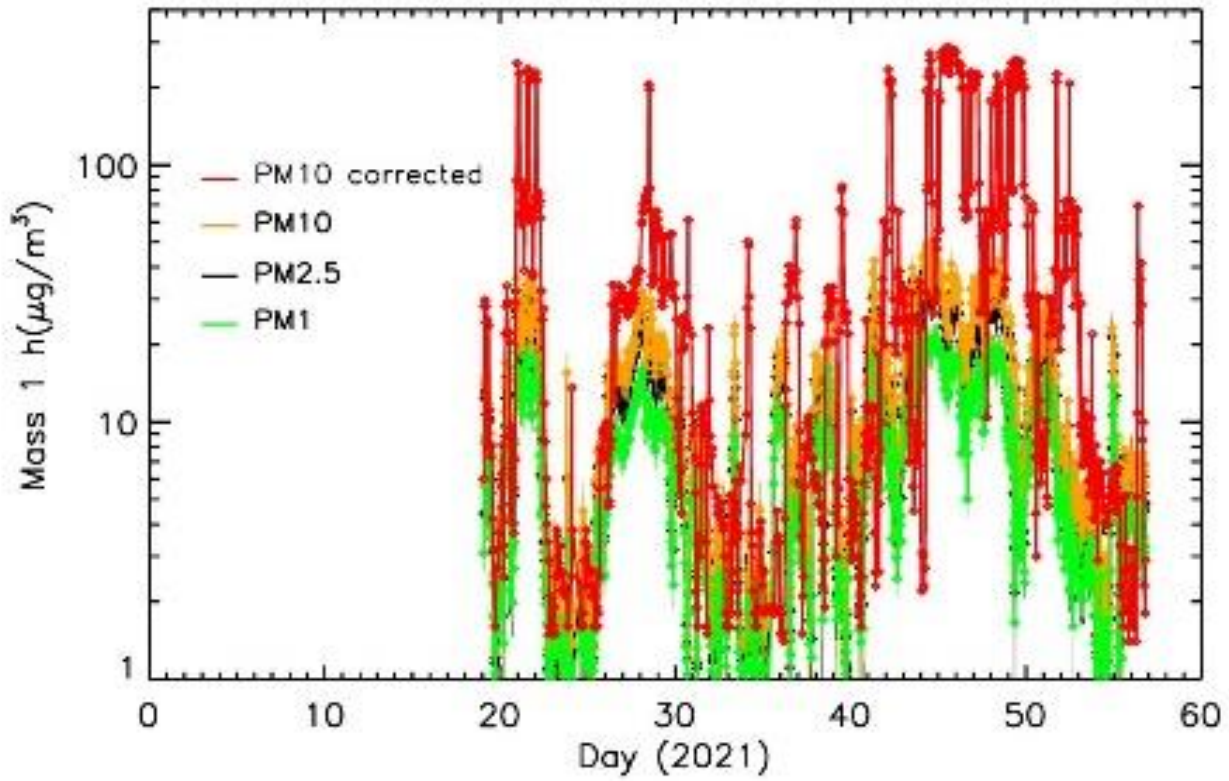
- the most active/productive dust source in Antarctica

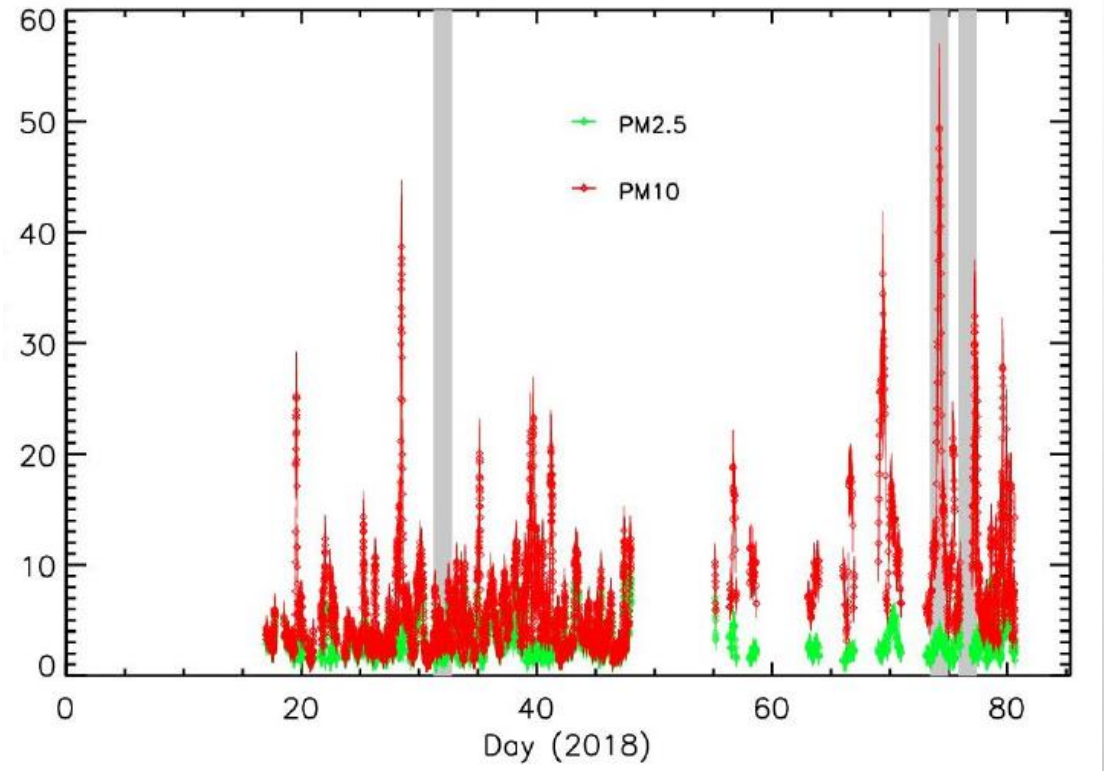
ANTARCTICA 2021 – preliminary results

ORIGINAL RESEARCH ARTICLE
Front. Earth Sci., 03 December 2018 | https://doi.org/10.3389/feart.2018.00207

Aerosol Concentrations in Relationship to Local Atmospheric Conditions on James Ross Island, Antarctica

Jan Kavan[1*], Pavla Dagsson-Waldhauserova[2,3], Jean Baptiste Renard[4], Kamil Láska[1] and Klára Ambrožová[1]

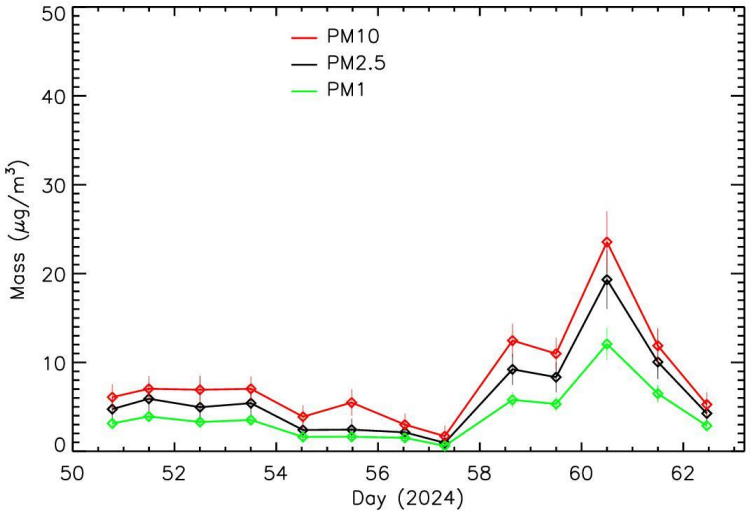


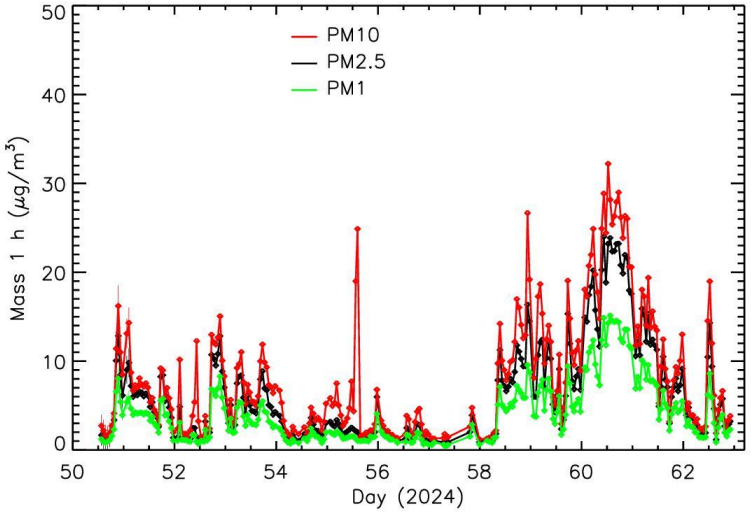


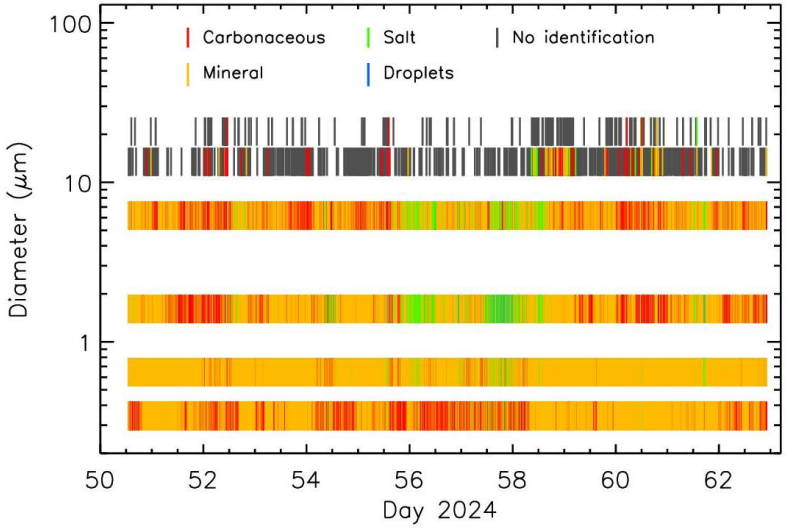
PM_{10} were 13.5 ± 2.3 (10.4 ± 1.7) μgm^{-3} – recalculated **45.1** (19.3) μgm^{-3}
$PM_{2,5}$ were 11.5 ± 2.2 (8.7± 1.6) μgm^{-3}
PM_1 were 7.3 ± 1.1 (5.8 ± 0.9) μgm^{-3}

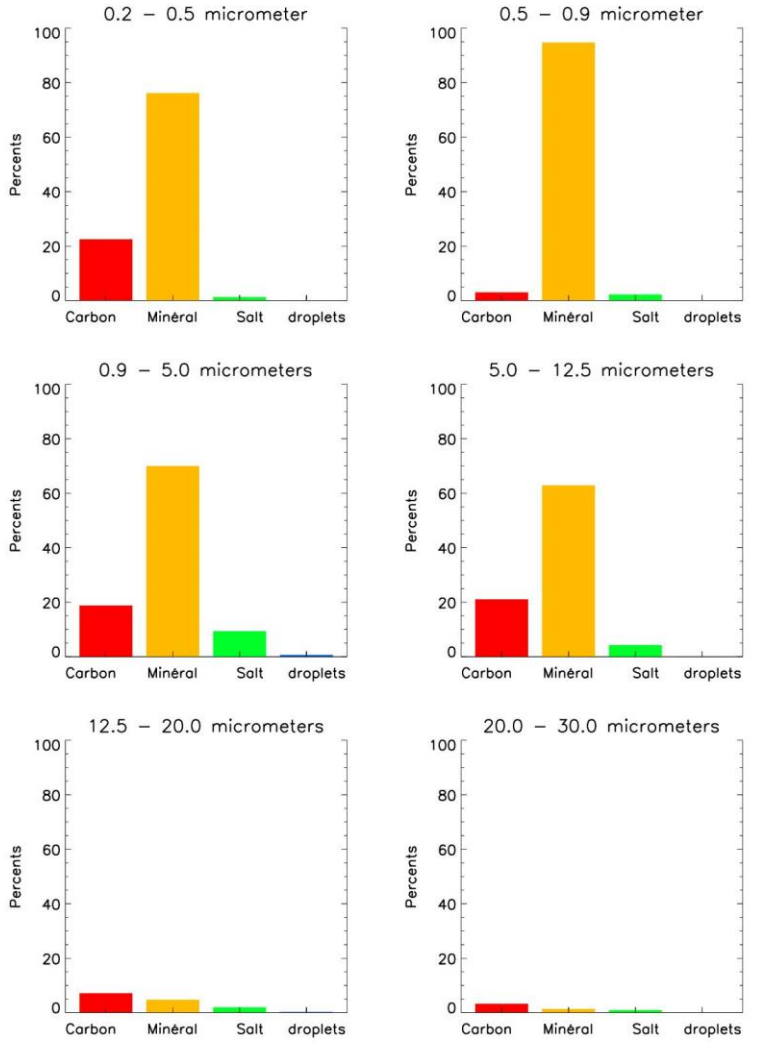
Similar to air quality as in some of the most polluted EU cities – Madrid, Barcelona, London (Putaud et al., 2010)

JAMES ROSS ISLE ANTARCTICA 2025









DUST-CRYOSPHERE SESSION + MELTING GLACIERS

EGU General Assembly 2025

Vienna, Austria & Online | 27 April–2 May 2025

PROGRAMME ATTEND EXHIBITION GUIDELINES MEDIA ABOUT LOGINS

My profile My network

Session ITS2.12/CR7.6

Home / Programme / ITS / ITS2.12/CR7.6

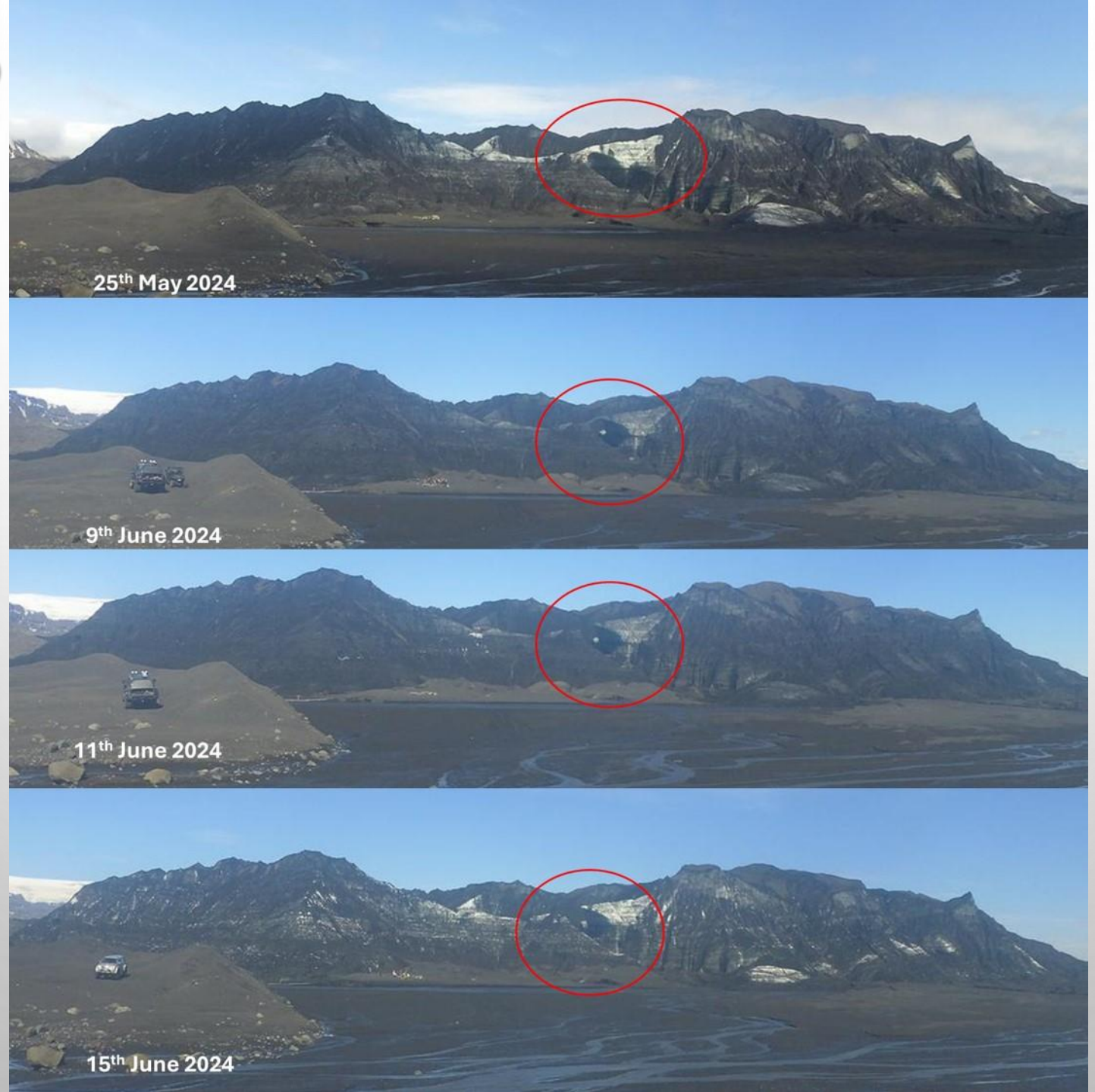
Search

EDI PICO

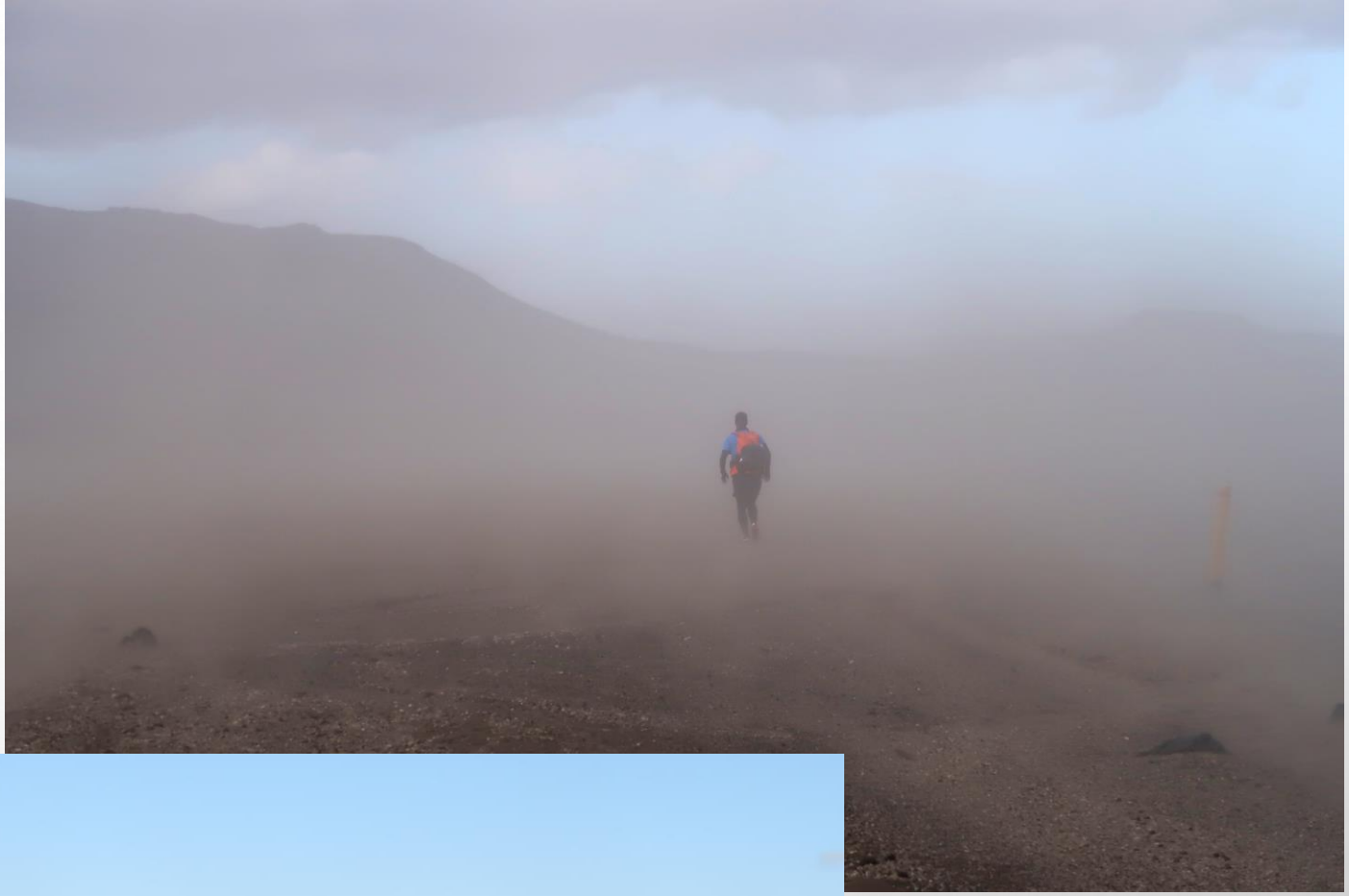
Atmosphere-Cryosphere Interactions in Mountain and High-Latitude Environments

Convener: Pavla Dagsson Waldhauserova[ECS] | Co-conveners: Thomas Shaw, Outi Meinander, Ivana Stiperski, Christina Draeger[ECS], Marie Dumont, Arindan Mandal[ECS]

Collapse of ice cave in Kötlujökull on 10th June 2024



SOME PEOPLE LIKE DUST



UPCOMING EVENTS

- 10TH HLD WORKSHOP 11-12 FEB 2026 + DUST-ART EXHIBITION
- NOSA MEETING 2027 – ICELAND – 10-11 FEB 2027
- EUROPEAN AEROSOL CONFERENCE IN ICELAND - ?

Thank you for your attention!

pavla@lbhi.is

Feel free to send me an email for questions and recommendations

IF TIME ALLOWS: **IMPACTS OF ICELANDIC DUST ON ATMOSPHERE (CLOUDS, ATM. CHEMISTRY AND RADIATION)**

ICELANDIC DUST MAKES ICE IN CLOUDS

- Icelandic volcanic dust is an active Ice-Nucleating Particle (INP) similarly to Low Latitude Dust (LLD)

- Airborne Icelandic dust sampled from the aircraft is more active INP than LLD at temperatures above −17°C

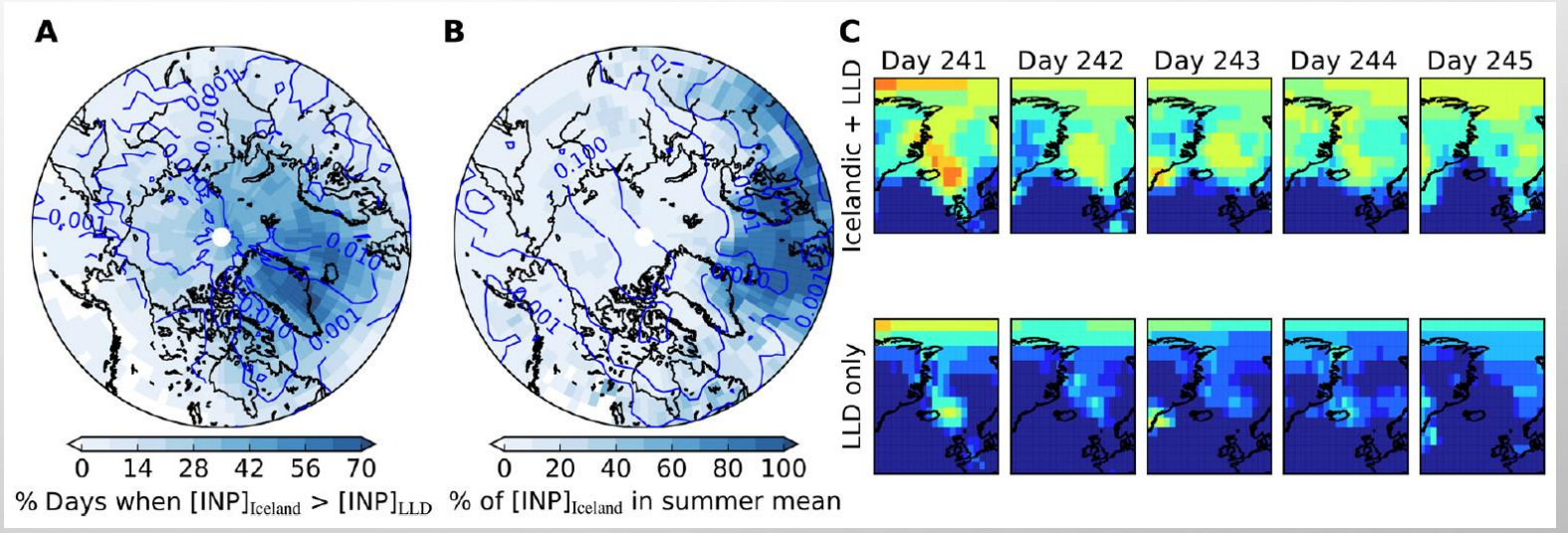
- The greatest contribution of Icelandic dust to the INP population occurs during the summer over large areas of the North Atlantic and the Arctic at altitudes between 3-5.5 km, where mixed-phased clouds are known to occur.
- In future, increased INP concentrations would lead to **a reduction in supercooled water** and a **decrease in shortwave reflectivity** of clouds to produce a positive climate feedback, which has not yet been considered in climate simulations

SCIENCE ADVANCES | RESEARCH ARTICLE

ATMOSPHERIC SCIENCE

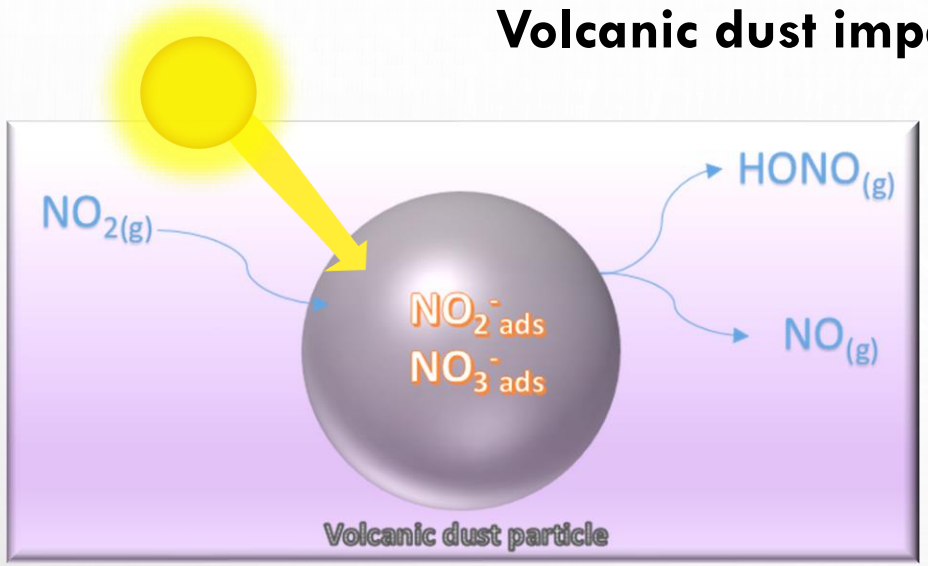
Iceland is an episodic source of atmospheric ice-nucleating particles relevant for mixed-phase clouds

A. Sanchez-Marroquin[1]*, O. Arnalds[2], K. J. Baustian-Dorsi[1,3], J. Browse[1,4], P. Dagsson-Waldhauserova[2,5], A. D. Harrison[1], E. C. Maters[1,6], K. J. Pringle[1], J. Vergara-Temprado[7], I. T. Burke[1], J. B. McQuaid[1], K. S. Carslaw[1], B. J. Murray[1]



- ice crystals in a mixed-phase cloud makes the cloud instable
- ice phase will grow at expenses of the liquid one, removing the liquid content
- clouds optically thinner, and therefore they have less albedo (less bright).

Volcanic dust impacts on atmospheric chemistry

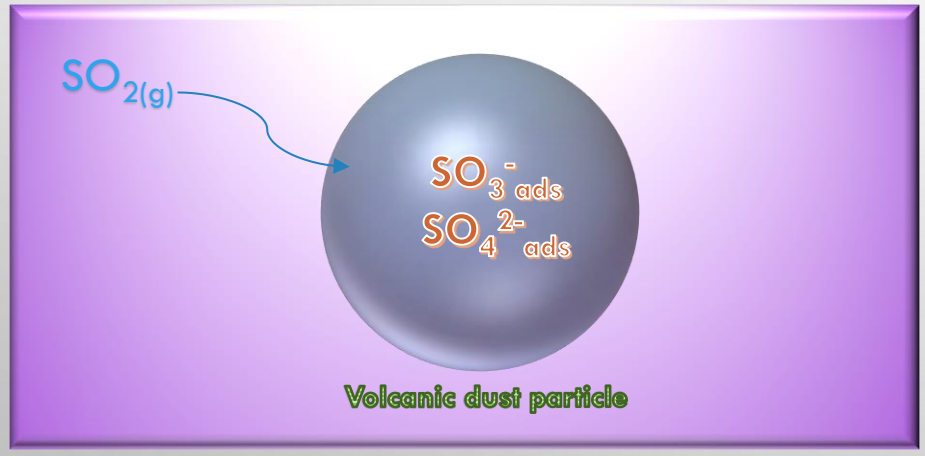


Dust particles scavenge efficiently **NO_2** acting as transported media of surface nitrites and nitrates.
Dust particles convert NO_2 to HONO (nitrous acid), a very important precursor of OH radicals (HONO is photolysed during day time producing OH and NO)

Journal of Environmental Sciences
Volume 95, September 2020, Pages 155-164

Reactive uptake of NO_2 on volcanic particles: A possible source of HONO in the atmosphere

Manolis N. Romanias [1], Yangang Ren [2], Benoit Grosselin [2], Véronique Daële [2], Abdelwahid Mellouki [2], Pavla Dagsson-Waldhauserova [3, 4], Frederic Thevenet [1]



SO_2 is scavenged very efficiently on dust particles to form sulfites and sulfates. Therefore, the acidity of the particles can change as well as the hygroscopic and optical properties.

Urupina et al. (2019)

Contents lists available at ScienceDirect
Atmospheric Environment
journal homepage: www.elsevier.com/locate/atmosenv

Uptake and surface chemistry of SO_2 on natural volcanic dusts

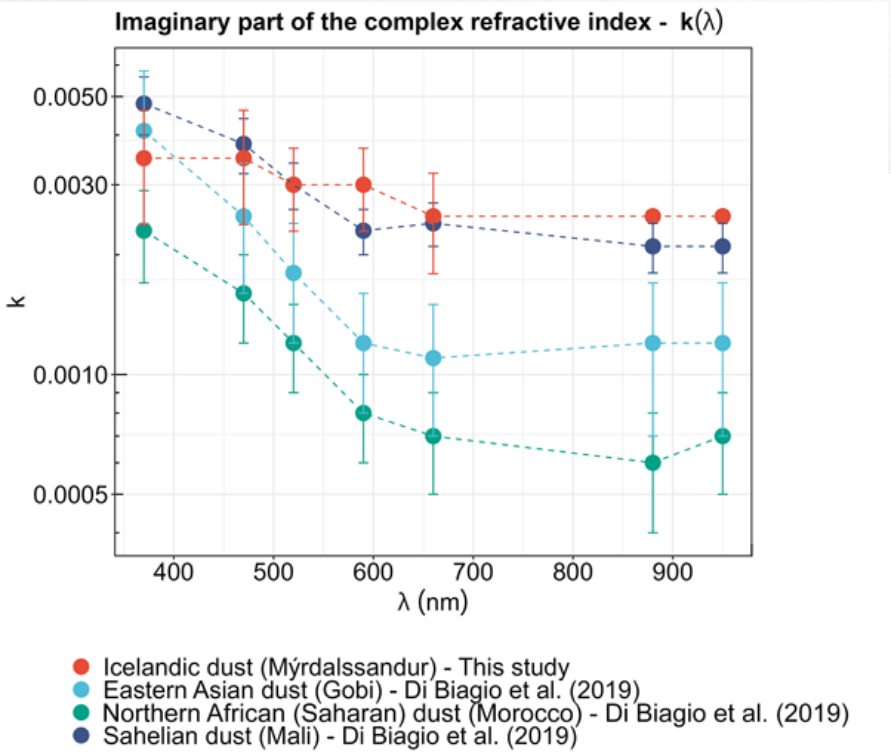
D. Urupina[a,*], J. Lasne[a], M.N. Romanias[a], V. Thiery[b], P. Dagsson-Waldhauserova[c,d], F. Thevenet[a]

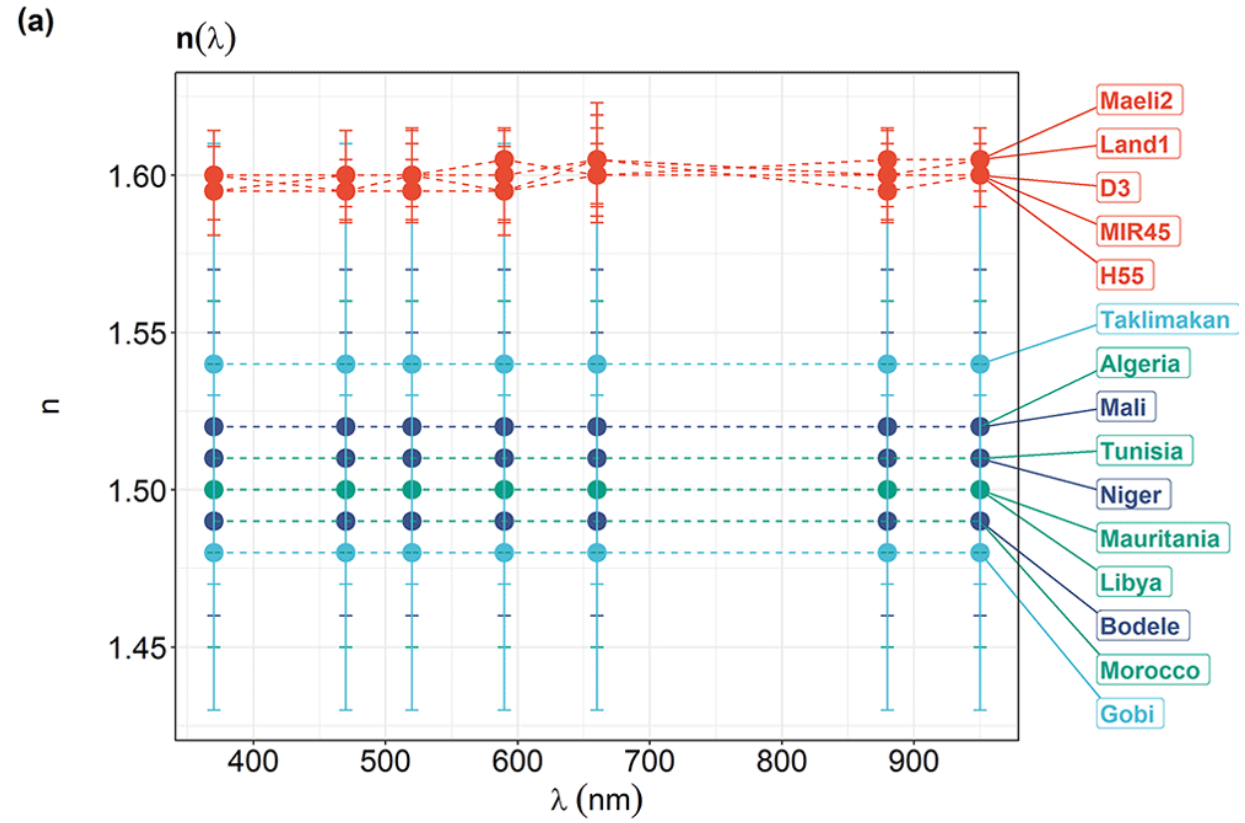
Atmos. Chem. Phys., 23, 7975–8000, 2023
https://doi.org/10.5194/acp-23-7975-2023

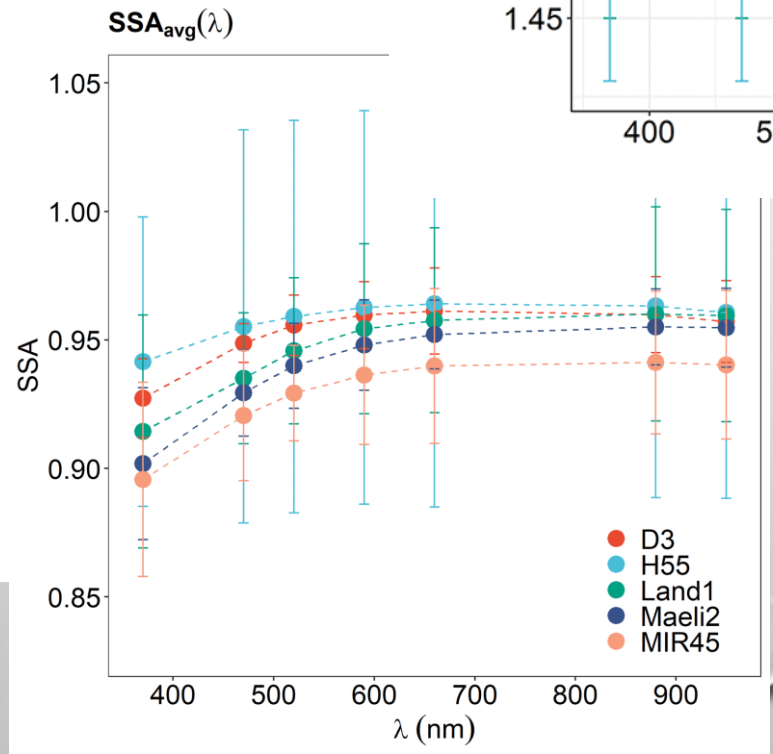
Atmospheric Chemistry and Physics
Open Access
EGU

Complex refractive index and single scattering albedo of Icelandic dust in the shortwave part of the spectrum

Clarissa Baldo[1,a], Paola Formenti[2], Claudia Di Biagio[2], Gongda Lu[1,b], Congbo Song[1,c], Mathieu Cazaunau[3], Edouard Pangui[3], Jean-Francois Doussin[2], Pavla Dagsson-Waldhauserova[4,5], Olafur Arnalds[4], David Beddows[1], A. Robert MacKenzie[1], and Zongbo Shi[1]







- Icelandic dust tends to be more absorbing towards the near-infrared.
- In Icelandic dust, $k(\lambda)$ between 660–950 nm was **2–8 times higher** than most of the dust samples sourced in northern Africa and eastern Asia.