

AGRICULTURAL UNIVERSITY OF ICELAND: RESEARCH AND EDUCATIONAL ACTIVITIES HIGH LATITUDE DUST NETWORKING



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= ICEDUST MEMBERS >

THE PEEX SEMINAR THE 4TH ACCC IMPACT WEEK HELSINKI, FINLAND | 22 APRIL 2025





TALK OUTLINE

- A BRIEF OVERVIEW OF THE AUI
- HIGH LATITUDE DUST NETWORKS AND PROJECTS
- KEY FACTS ABOUT HIGH LATITUDE DUST

(BASED ON THE HLD OBSERVATIONS IN ICELAND, ANTARCTICA, SVALBARD, GREENLAND, CANADA + FINLAND, ICELAND – EXPERIMENTS + SAHARAN DUST + MOSS FIRES FROM ERUPTIONS)

WELCOME TO THE AGRICULTURAL UNIVERSITY OF ICELAND - AUI HVANNEYRI

600 students

GRICUL

100 staff

2 campuses

Landbúnaðarháskóli Íslands

and and and a

OUR PROGRAMMES





Nordic master programme – joint degree (Ice-Fi or Ice-Se): Environmental CHanges at high Latitudes (EnCHiL)















Landbúnaðarháskóli Íslands Agricultural University of Iceland

FOCUS AREAS

2024 - 2028

PROGRESSIVE AND CHALLENGING STUDIES

SOLID INFRASTRUCTURE, INSPIRING WORKING ENVIRONMENT, AND EQUALITY



RESEARCH,

INNOVATION

AND ECONOMIC

DEVELOPMENT



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- A BRIEF OVERVIEW OF THE AUI
- HIGH LATITUDE DUST NETWORKS AND PROJECTS FIRST ATTEMPTS IN 2013
- KEY FACTS ABOUT HIGH LATITUDE DUST

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- 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 MEMBER ASSOCIATION OF THE EAA
 - 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
- ➢ 10th HLD Workshop 11-12 Feb 2026





📣 News 🗮 Events 🛄 Library 🔚

IceDust

Copernicus 🛩 Projects 🛩 About Us 🛩

Operational forecasts of Icelandic dust

Þykkvibær and Þjórsá (credit: Kieran Baxter, 01/04/2024)

See more

Dust storms in Iceland

In Iceland, we have vast deserts covering over 44,000 km², leading to about **135 dust storm days annually**. Despite being known for some of the cleanest air in the world, placing air quality monitors near our frequent dust storms could reveal pollution issues. Understanding the link between dust storms and air quality is vital for our health and environment.





Home

Ice-dust.com

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University of the Arctic (UArctic)

WArctic

Activities

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





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

GIVE

- 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)

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



High Latitude Dust

Network

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

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Goals



ries Events Convention

Home / Land & life / Sand & dust storms

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

INTRODUCTION	MODULE 1	MODULE 2
Getting started	Mapping SDS	Observation,
_	sources	monitoring,
		early warning
TOOLBOX	AND GUIDANCE	AND GUIDANCE
MODULE 3	MODULE 4	MODULE 5
Risk and	Source control	Impact
vulnerability	and	mitigation
ssessment and	management	
mappind		

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

ICELAND INCLUDED IN THE UN SDS TOOLBOX

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/publicinformation?fbclid=IwY2xjawlgbltleHRuA2FlbQlxMAABHdcRWPIXM8imebhm48e9Dn & 2toLMzA311IF1pmWowj7We4K6tMePi-Q aem j1zy5ZwKv8oNdX1KBx7dUQ

https://www.unccd.int/land-and-life/sand-and-dust-storms/toolbox/research-informat sources?fbctd=lwY2xjawlabl5leHRuA2FlbQlx/MAABHdcRWPIX/X81mebhm48e9Dn_SSh LMzA31IF1pmWowj7We4K6tMePi-Q_genv_11zy5ZwKv8oNdX1KBx7dUQ

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

Meinander et al., 2025. Dust in the Arctic: a brief review of feedbacks and interactions between climate change, aeolian dust and ecosystems. Frontiers in Environmental Sciences 13, 1536395.

Key Focus Areas

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



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





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









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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.

2022



Summary of the main dust sources:

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

Southern Hemisphere (Antarctica, New

Zealand, and Patagonia)

Atmos. Chem. Phys., 22, 11889–11930, 2022 https://doi.org/10.5194/acp-22-11889-2022 @ Author(s) 2022. This work is distributed under the Creative Commons Attribution 4.0 License. Atmospheric Chemistry and Physics

EGI

Newly identified climatically and environmentally significant high-latitude dust sources

Outi Meinander¹, Pavla Dagsson-Waldhauserova^{2,3}, Pavel Amosov⁴, Elena Aseyeva⁵, Cliff Atkins⁶,

Location of 60 new HLD sources

HIGH LATITUDE DUST AREAS IDENTIFICATION

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



HIGH LATITUDE DUST AREAS – UPDATED COLLECTION

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

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	817

and health impacts from short-lived...

Download

Abstract

Discussion

Metrics

17 Dec 2021

Preprint (3081 KB)

Metadata XML

Supplement (798 KB)

BibTeX

EndNote

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

Share

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 Amosov⁴, Elena Aseyeva⁵, Cliff Atkins⁶, Alexander Baklanov⁷, Clarissa Baldo⁽⁸⁾, Sarah Barr⁹, Barbara Barzycka¹⁰, Liane Benning⁽⁶⁾¹¹, Bojan Cvetkovic¹², Polina Enchilik⁵, Denis Frolov⁽⁵⁾, Santiago Gassó⁽⁶⁾¹³, Konrad Kandler¹⁴, Nikolay Kasimov⁽⁵⁾, Jan Kavan¹⁵, James King¹⁶, Tatyana Koroleva⁵, Viktoria Krupskaya⁵, Monika Kusiak¹⁷, Michał Laska¹⁰, Jerome Lasne⁽⁶⁾¹⁸, Marek Lewandowski¹⁷, Bartłomiej Luks⁽⁶⁾¹⁷, James McQuaid⁽⁶⁾⁹, Beatrice Moroni¹⁹, Benjamin Murray⁽⁶⁾⁹, Ottmar Möhler⁽⁶⁾²⁰, Adam Nawrot¹⁷, Slobodan Nickovic⁽⁶⁾¹², Norman O'Neill²¹, Goran Pejanovic¹², Olga Popovicheva⁵, Keyvan Ranjbar⁽⁶⁾²¹, Manolis Romanias⁽⁶⁾¹⁸, Olga Samonova⁵, Alberto Sanchez-Marroquin⁹, Kerstin Schepanski²², Ivan Semenkov⁽⁶⁾⁵, Anna Sharapova⁵, Elena Shevnina⁶⁾¹, Zongbo Shi⁽⁶⁾⁸, Mikhail Sofiev¹, Frédéric Thevenet¹⁸, Throstur Thorsteinsson⁽⁶⁾²³, Mikhail Timofeev⁵, Nsikanabasi Silas Umo⁽²⁰⁾, Andreas Uppstu¹, Darya Urupina¹⁸, György Varga²⁴, Tomasz Werner¹⁷, Olafur Arnalds², and Ana Vukovic Vimic²⁵

 Active HLD sources cover > 1,670, 000 km² (excluding Antarctica)

1-5% of the global dust budget

(~100 Tg yr⁻¹ of global dust budget)

Summary of HLD climate impacts

Key facts about HLD:

- 1. HLD contributes to the Arctic amplification dust-albedo feedback (Boy et al., 2019, Meinander et al., 2022)
- 2. HLD was recognized as an important climate driver in Polar Regions in the IPCC report (SROCC, 2019) + AMAP (2022)
- 3. Dust hot spots in the Arctic are often located in ice-proximal areas with frequent floods bringing fine sediments from beneath the glaciers
- 4. HLD storms cause severe air pollution (even 1000x higher concentrations than health limits)
- There are 135 dust days reported annually in Iceland and dust travels thousands of km inside the Arctic and >3,500 km towards Europe
- 6. HLD has impacts on atmosphere, cryosphere, marine and terrestrial environments, causing severe erosion and land degradation
- 7. HLD has impacts on socio-economic sectors (health, road safety, energy production, aviation, land degradation etc.)



Mikið moldrok í nótt og sundlaugin svört í morgun

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

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



Swimming pool after dust storm



Damaged cars after dust storm



Snow-dust storms and dirty glaciers Waiting for the HLD

Dyngjusandur, NE Iceland

= Bodele of the North

Thank you for your attention pavla@lbhi.is

Feel free to send me an email for questions and recommendations