

## Integrating Activities for Advanced Communities



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## Executive summary

The Arctic is still an understudied part of the world, and restricted access or lack of infrastructure makes arctic research more complicated than elsewhere. Coordinating activities, implementing standards and data harmonization and sharing of data are therefore essential to make robust assessments and predictions for the Arctic and northern cold regions.

In this report, INTERACT stations provide information on research activities at their stations, i.e. what disciplines are studied at the station and what variables are monitored on a 'long-term' scale. Stations have also provided information about what scientific networks and organisations they contributes to and we describe some of these global intergovernmental organisations, central circumarctic coordinating organisations, important Arctic Council working groups and selected scientific networks with standard protocols or data harmonization.

The report can hence be a tool for station managers to identify networks that they could potentially contribute to, and for scientists and scientific networks to look for stations that could fill potential data gaps on their geographical coverage to improve robustness of their coordinated scientific efforts.

At the end of the report, we present two INTERACT tools that facilitate access to the Arctic.

1. The INTERACT GIS tool that allows scientists to explore station facilities and their surroundings when looking for ideal study locations.
2. The INTERACT Access programme consisting of Transnational Access (physical access) to research stations, Remote Access (samples/data collected by station staff) and Virtual Access (online access to data sets).

# INTERACT Research and Monitoring Report 2020

By Elmer Topp-Jørgensen, Marie Frost Arndal, Hannele Savela and Morten Rasch

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## 1. Introduction

This report is a guide for research stations and scientists working in the Arctic or boreal and alpine regions of the northern hemisphere. It provides an overview of the variety of networks and organisations that INTERACT stations (or associated scientists) contribute to alongside information about what scientific disciplines are studied and which variable groups are monitored at the individual stations. The report ends with a chapter presenting INTERACT tools for scientists to identify one or more research stations that suit their specific needs and guide scientists on how to access INTERACT stations and their data.

The Arctic is still an understudied part of the world, and restricted access or lack of infrastructure makes arctic research more complicated than elsewhere. The first scientific activities in the Arctic were conducted using mobile platforms like ships, dog sledges and more rarely air balloons, and later on aircrafts and vehicles brought scientists deeper into the Arctic. As activities increased, a demand for studying specific locations over time, to also understand variability and change, evolved, and the first research stations were established. In INTERACT, the earliest stations date back to 1906 in the Arctic (Arctic Station, Greenland) and 1886 in the Alpine area (Sonnblick Observatory, Austria). Over the past few centuries efforts to expand our knowledge of the Arctic has increased. Simultaneously, research stations have also grown in number, geographical distribution, size of operations and guest capacity. The 88 INTERACT stations currently host more than 15,000 scientists and students studying the physical environment, ecosystems, societies, etc.

Applied research and monitoring methods are either developed for specific arctic features or adapted from methodologies developed elsewhere. In order to easily compare and use data collected by others, scientists must follow the same protocols and use the same standard methods. Methods must be described in detail to allow others to understand how data was collected and to be able to replicate the study. Comparisons between different stations, locations, countries or regions also necessitates standard methodologies or data harmonization to an agreed format. Scientists have therefore developed different scientific networks and organisations to coordinate these efforts. Networks and organisations range from small initiatives looking at only one very specific feature to long-term intergovernmental organisations working at an arctic or global level and covering broader and sometimes interdisciplinary themes, e.g. Climate Change, biodiversity or pollution. INTERACT stations and/or associated scientists engage in these networks and organisations to 1) improve our scientific understanding, 2) to contribute to large-scale assessment and prediction efforts and 3) to support adaptation efforts at the policy maker level.

All stations in the INTERACT network are open to external scientists and networks. Most stations also run in-house research and monitoring programmes, and make the generated data available for external scientists working at the station. Today, many stations also offer free and open access to online data sets to be explored and used by anyone (see e.g. INTERACT Virtual Access - <https://eu-interact.org/accessing-the-arctic/virtual-access/> - also described in Chapter 6).

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INTERACT funds research activities at INTERACT stations through a Transnational Access programme, providing physical access for scientists to INTERACT Stations, and through a Remote Access programme, in which station staff collects data or samples on behalf of the scientist. INTERACT also operates a Virtual Access programme providing funding for research stations to develop online access to data for external scientists and others with an interest in these. These access modalities, described in more details in Chapter 6, also facilitate international cooperation, network development and comparisons across environmental and national boundaries.

This report may also be relevant to scientific networks and organisations who can explore stations, their surroundings and available data. This can be used to assess possibilities for closing potential data gaps by using INTERACT stations, thus strengthening their efforts to support robust assessments and predictions.

## 2. Arctic research and monitoring priorities

Arctic Council and international arctic science organisations put efforts into identifying research and monitoring priorities for the Arctic (see Box 2.1). The Arctic Council has established working groups to provide arctic governments with information on status, trends and recommendations within climate, ecosystem and social dimensions. These working groups consist of nationally appointed experts that, based on their political mandate, develop assessments and monitoring efforts that can inform decision makers in arctic governments. On a global scale, similar intergovernmental efforts takes place in the Intergovernmental Panel on Climate Change (IPCC) and Intergovernmental Panel on Biodiversity and Ecosystem Services (IPBES).

International arctic organisations also develop research priorities either in individual thematic scientific networks or as collaborative efforts across disciplines. The International Arctic Science Committee (IASC) plays a pivotal role in developing such circumarctic research priorities through the decadal ‘*International Conference on Arctic Research Planning*’ (ICARP) arranged by numerous arctic organisations. IASC and many other arctic organisations often align their research priorities with ICARP, but often adapt these regularly to remain relevant in light of the rapid climatic, environmental and societal changes that the Arctic is currently experiencing – see IASC State of the Arctic Science Report 2020<sup>1</sup>. The International Science Council (ISC) and Group on Earth Observations (GEO) are some of the central players when it comes to organisations working with priorities and programmes on a global scale.

### Box 2.1. Major organisations/initiatives identifying research priorities

Intergovernmental organisation	Arctic Council working groups <a href="https://arctic-council.org/en/about/working-groups/">https://arctic-council.org/en/about/working-groups/</a> Intergovernmental Panel on Climate Change – IPCC <a href="http://www.ipcc.ch/">www.ipcc.ch/</a> Intergovernmental Panel on Biodiversity and Ecosystem Services - IPBES <a href="https://ipbes.net/">https://ipbes.net/</a>
Non-governmental organisations	International Conference on Arctic research Planning III - ICARP III (2015) <a href="https://icarp.iasc.info/images/articles/downloads/ICARPIII_Final_Report.pdf">https://icarp.iasc.info/images/articles/downloads/ICARPIII_Final_Report.pdf</a> IASC State of the Arctic Science Report 2020 <a href="https://iasc.info/images/media/print/SAS2020_web.pdf">https://iasc.info/images/media/print/SAS2020_web.pdf</a> International Science Council (ISC) <a href="https://council.science/">https://council.science/</a> Group on Earth Observations (GEO) <a href="http://www.earthobservations.org/index.php">http://www.earthobservations.org/index.php</a>
INTERACT sources	INTERACT Research and Monitoring report 2015 – <a href="https://eu-interact.org/app/uploads/2017/11/INTERACT_ResearchMonitoring_web.pdf">https://eu-interact.org/app/uploads/2017/11/INTERACT_ResearchMonitoring_web.pdf</a>

<sup>11</sup> IASC State of the Arctic Science Report 2020  
[https://iasc.info/images/media/print/SAS2020\\_web.pdf](https://iasc.info/images/media/print/SAS2020_web.pdf)

Coordinated data collection (using standardised methodologies or data harmonization) is important to feed into international efforts to document change, and provide predictions based on modelling efforts. All needed to inform decision makers and the overall aim of adaptive management and sustainable development in the Arctic. Insight into processes and relations between and within the physical and environmental domains are needed to develop appropriate and realistic models<sup>2</sup>. Stronger ties between research, monitoring, and modelling has over the past decade gained increased attention, as needs of the modelling community should be addressed in the development of research and monitoring programmes, and that data should be used in predictive models in the analytical phase<sup>3</sup>. This cooperation between scientific and modelling communities needs to be strengthened to ensure a critical mass of data and adequate geographical coverage to allow robust assessments and predictions informing decision makers (Figure 2.1).



**Figure 2.1.** The 4M concept, monitoring, manipulation, modelling, management, developed by INTERACT Science Coordinator Terry V. Callaghan is crucial for better understanding ecological, climatic and social changes and making better prognosis of future changes.

Here a distributed network of research stations can play an important role in providing long time series of data from a diverse set of locations to scientific networks and modelling communities,

<sup>2</sup> Schmidt, N. M., Christensen, T. R. and Roslin, T. (2017). A high arctic experience of uniting research and monitoring. *Earth's Future* 5 650-4.

<https://doi:10.1002/2017EF000553>

<sup>3</sup> Ahlström, A., Schurgers, G., Arneeth, A. and Smith, B. (2012). Robustness and uncertainty in terrestrial ecosystem carbon response to CMIP5 Climate Change projections. *Environmental Research Letters* 7 044008.

<https://doi:10.1088/1748-9326/7/4/044008>

Ims, R. A. and Yoccoz, N. G. (2017). Ecosystem-based monitoring in the age of rapid Climate Change and new technologies. *Current Opinion in Environmental Sustainability* 2018, 29:170–176.

<https://doi.org/10.1016/j.cosust.2018.01.003>

Fisher J B, Hayes D J, Schwalm C R, Huntzinger D N, Stofferahn E, Schaefer K, Luo Y, Wullschlegler S D, Goetz S, Miller C E, Griffith P, Chadburn S, Chatterjee A, Ciais P, Douglas T A, Genet H, Ito A, Neigh C S R, Poulter B, Rogers B M, Sonnentag, O., Tian, H, Wang, W., Xue, Y., Yang, Z.-L., Zeng, N. and Zhang, Z. (2018). Missing pieces to modeling the Arctic-Boreal puzzle. *Environmental Research Letters* 13.2.

<https://10.1088/1748-9326/aa9d9a>

López-Blanco, E., Exbrayat, J. F., Lund, M., Christensen, T. R., Tamstorf, M. P., Slevin, D., Hugelius, G., Bloom, A. A. and Williams, M. (2019). Evaluation of terrestrial pan-Arctic carbon cycling using a data-assimilation system *Earth Syst. Dynam.* 10 pp. 233-55.

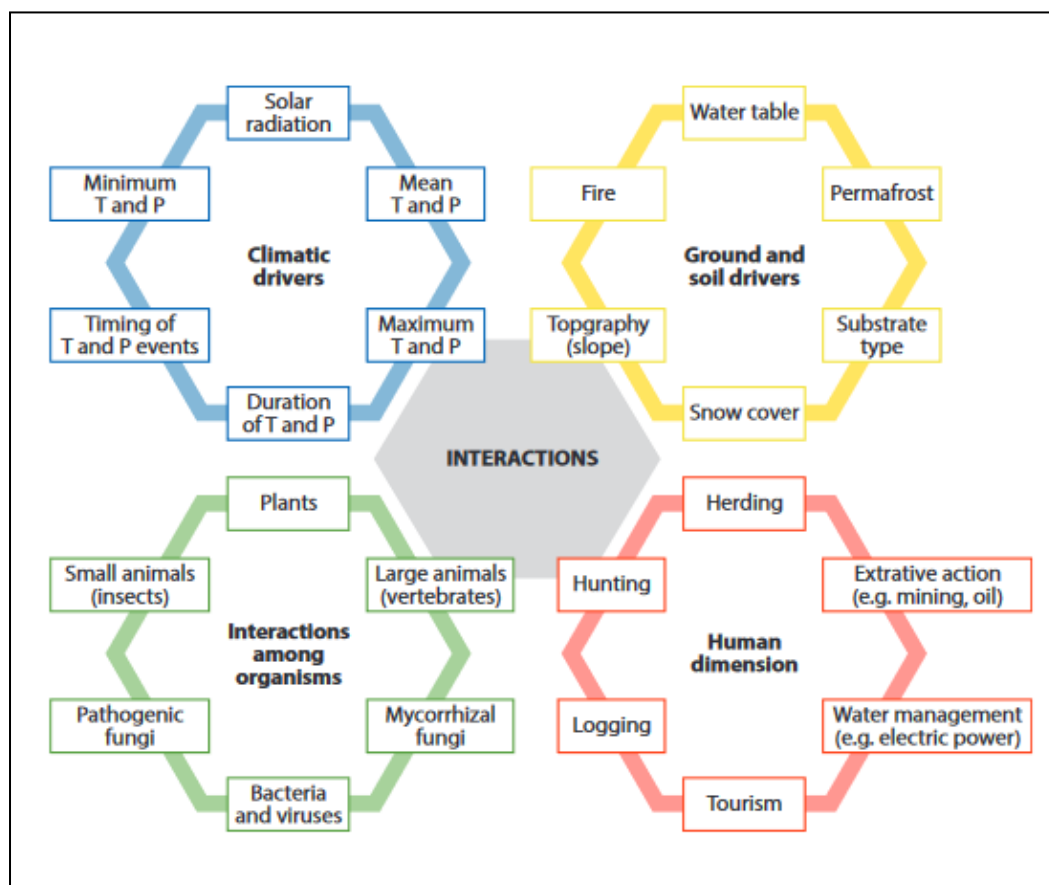
<https://doi.org/10.5194/esd-10-233-2019>



and providing background data necessary for external scientists working on short-term research projects. This requires that stations get involved in or host scientists from relevant scientific networks and organisations, adopt standard methodologies/data harmonisation, and share data in free and open access repositories.

In the INTERACT Research and Monitoring report from 2015<sup>4</sup>, a minimum monitoring programme, that builds on above research priorities identified by Arctic Council working groups and international organisations, is recommended for INTERACT stations (Figure 2.2). The 2015 report recommends and describes different scientific themes that stations should strive to address with linkages to related scientific networks and organisations. The following chapters in this report seek to provide an overview of relevant circumarctic scientific networks with standard methodologies or data harmonisation efforts, and provide an overview of the data gathered already by INTERACT stations.

INTERACT also facilitates online access to station data that could benefit scientific networks or modelling communities. Read more about this in Chapter 6.



**Figure 2.2.** Monitoring programmes at research stations should provide background information that can be used by external scientists to analyse other types of research and monitoring data. Here an example of variables influencing arctic wildlife, of which several could be covered by a monitoring programme<sup>4</sup>.

<sup>4</sup> INTERACT Research and Monitoring Report 2015, <https://eu-interact.org/publication/research-and-monitoring/>

### 3. Scientific networks and organisations

Scientific networks and organisations are instrumental for development of standard methodologies or data harmonization efforts important for larger-scale assessments and predictions. These networks depend on a relevant number of sampling sites and a relatively homogenous geographical coverage to make robust assessments. INTERACT stations offer a platform for scientific networks and organisations to ensure a relevant geographical coverage in line with their aims and objectives.

INTERACT stations are involved in more than 150 scientific networks and organisations, differing in a variety of aspects, e.g. disciplinary and geographical coverage, aims, activities and who that can become members (individual scientists, research stations, institutions, countries, etc.). To identify the networks and organisations that are most relevant to all INTERACT stations, we have identified a number of parameters that can be used to describe the different types of networks and organisations, e.g. geographical coverage, discipline, standard methodology, data repository, temporary or long-term, who can become a member, etc. (see Box 3.1).

A station is listed as being engaged in a network or an organisation if the station, or a scientist working long-term at the station, is involved or if data collected at the station is used by the network/organisation. The networks and organisations that a station contributes to are therefore dynamic in nature depending on the type of the network/organisation, and the scientists that are active at the station.

This section is intended for station managers, scientists and networks/organisations as an inspirational source for identifying gaps in the data collection that can be filled by using existing INTERACT stations to increase robustness of scientific assessments and predictions.

#### **Disclaimer – scientific network information**

There is no standard for presenting information about scientific networks and organisations. Gathering information about the characteristics of these networks and organisations to which INTERACT Stations contribute therefore proved to be difficult in many cases. The information presented here may therefore, in some cases, not precisely reflect the true characteristics of the individual networks and organisations.

If you discover unconcise information, please contact INTERACT, and we will correct the information in online documents and potential future publications.

Contact: <https://eu-interact.org/contact/>

### **Box 3.1. Descriptive parameters for scientific networks**

To assess the relevance of a scientific network or organisation, stations and scientists need to be able to easily find relevant information about the network/organisation. Looking through the websites of all networks and organisations that are active at INTERACT stations revealed that relevant information is not always available, and when available it is often spread across many different sub-pages on their websites. INTERACT recommends that scientific networks and organisations share their characteristics at easily accessible pages on their website. This could be:

- Name of network/organisation:
- Contact information: [e-mail/social media/phone/etc.]
- Geographical coverage: [Global, Arctic, European, Asian, American, Scandinavian, etc.]
- Disciplinary coverage: [list relevant disciplines]
- Standard methodology: [yes/no]
- Variables measured: [list variables, if relevant in different categories]
- Data repository: [yes/no, link to online repository, contact information to data manager, etc.]
- Membership: [what is the membership level: Intergovernmental/country representatives, NGO/country representatives, institution, station, scientist]
- Criteria for membership: [what criteria should a potential member comply with: e.g. annual obligations/contributions, payment of annual fee, specific geographical area, etc.]
- Contact for membership: [website/e-mail]
- Timeframe: [start date, open ended/end date]

## **Parameters used to describe networks and organisations**

To be able to assess the relevance of the networks and organisations for INTERACT stations we describe the individual networks and organisations using the following characteristics:

- Network type – Primary aim of the network/organisation
- Network organisational level – Who is the driver of the initiative?
- Standard methodology – Are there standard protocols to follow or harmonization of data?
- Data repository – Is there a common repository to which data are submitted?
- Membership level – Who can become members?
- Geographical coverage – Which geographical area is relevant for the network/organisation?

Appendix 1 shows the definition of these characteristics and their sub-categories.

## **Networks that INTERACT stations contribute to**

Based on the characteristics above, we here provide an overview of the different types of networks/organisations and their relevance to INTERACT stations. We focus primarily on networks/organisations that (i) are long-term, monitoring or assessment driven, (ii) use standard methodologies or data harmonization, (iii) are open for station (or associated scientist) membership or data contributions, and (iv) has a circumarctic or global coverage.

INTERACT stations or associated scientists participate in or contribute to 155 scientific initiatives. Of these 37 are circumarctic, one is Antarctic, four are Polar and 52 are Global in their geographical coverage, while the remaining initiatives are regional, multilateral, bilateral or national initiatives.

On an arctic scale INTERACT stations and associated scientists contributes to Arctic Council working groups AMAP and CAFF, and their related expert groups, monitoring programmes and assessments. INTERACT also links to larger coordinating organisations and institutions like IASC, SAON, UArctic and APECS. Seven arctic science driven networks have standard protocols or harmonise data sets for storage in data repositories and are thus open for station participation or contributions.

INTERACT stations contribute to intergovernmental organisations on climate (e.g. IPCC) and biodiversity and ecosystem services (e.g. IPBES). INTERACT also link to larger coordinating organisations like GEO/GEOSS, WMO, GTOS, GCOS, IUGG, etc. 31 global science driven networks have standard protocols or harmonise data sets for storage in data repositories and are thus open for station participation or contributions.

89 of the 155 initiatives have a data repository to store data (we have no information on the accessibility of these data). Of these 89 initiatives, nine are multidisciplinary data repositories or data journals that are open to a variety of data types.

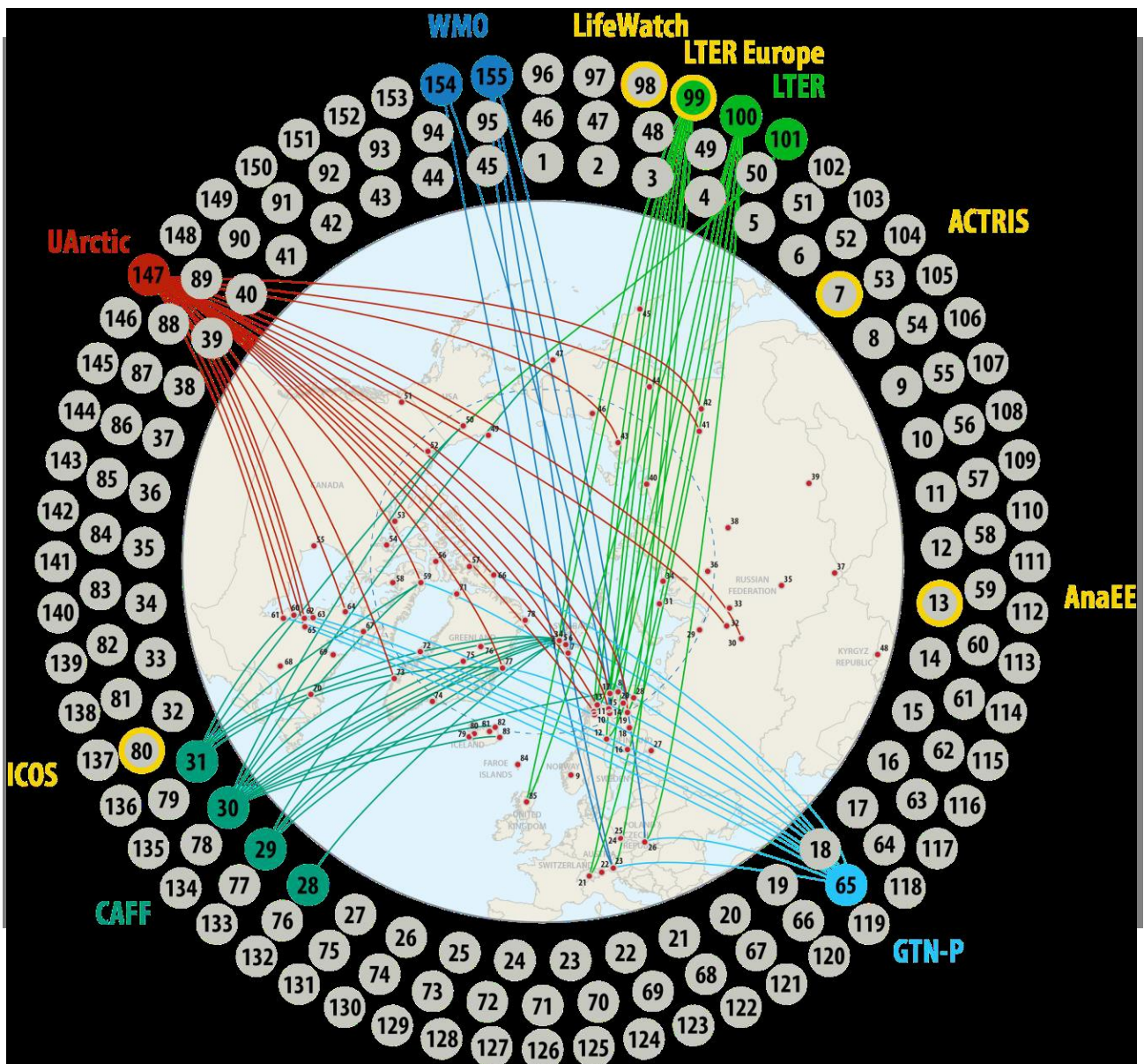
INTERACT, being an infrastructure platform, has linkages to 14 other research infrastructure communities.

Below are descriptions of long-term circumarctic or global scientific networks with standard methodologies that can be adopted by INTERACT stations to contribute to larger scale assessments and prediction efforts. The full overview of all networks and organisations that INTERACT stations (and associated scientists) contributes to, are given in Appendix 2.

### Network information to be integrated into INTERACT GIS

INTERACT plans to include information about what networks and organisations INTERACT stations contribute to in the INTERACT GIS system. This will allow stations, scientists and networks/organisations to identify potentially relevant stations for filling data gaps and hence lead to more robust scientific assessments and predictions.

See example of linkages between selected networks and INTERACT stations in Figure 3.1.



**Figure 3.1.** Contributions from INTERACT stations to selected networks and organisations. Yellow circles indicate other EU funded projects.

## Intergovernmental organisations - Global

### Intergovernmental Panel on Climate Change, IPCC



WEBSITE	<a href="http://www.ipcc.ch/">www.ipcc.ch/</a>
CONTACT ADDRESS	<a href="mailto:ipcc-sec@wmo.int">ipcc-sec@wmo.int</a>
KEYWORDS	Climate Change, impacts, adaptation, greenhouse gas, assessment reports, global warming.
DESCRIPTION	<p>IPCC was created in 1988 by the World Meteorological Organisation (WMO) and the United Nations Environment Programme (UNEP). The objective of the IPCC is to provide governments at all levels with scientific information that they can use to develop climate policies. IPCC reports are also a key input into international Climate Change negotiations.</p> <p>The IPCC is divided into three Working Groups and a Task Force. Working Group 1 deals with the physical science basis of Climate Change, Working Group 2 with Climate Change impacts, adaptation and vulnerability, and Working Group 3 with mitigation of Climate Change. The main objective of the Task Force on National Greenhouse Gas Inventories is to develop and refine a methodology for the calculation and reporting of national greenhouse gas emissions and removals.</p>
SUITABLE SITES	All ecosystems.
VARIABLES	Monitored variables depend on the working groups, but is centered around Climate Change.
METHODOLOGY	The IPCC produces special reports, which are an assessment on a specific issue and methodology reports, which provide practical guidelines for the preparation of greenhouse gas inventories. Several methodology reports are available online.
DATA REPOSITORY	Yes, Data Distribution Centre (DDC): <a href="http://www.ipcc-data.org/">www.ipcc-data.org/</a> . Emission Factor Database (EFDB): <a href="http://www.ipcc-nggip.iges.or.jp/EFDB/main.php">www.ipcc-nggip.iges.or.jp/EFDB/main.php</a> .
HOW TO GET INVOLVED	Look out for calls for nominations and contact the relevant IPCC government or Observer Organisation focal points for more information. You can also reach out to Bureau members. If you are interested in becoming an IPCC contributing author, contact the relevant IPCC Technical Support Unit (TSU) for more information.
GEOGRAPHICAL AREA	Global.

## Intergovernmental Panel on Biodiversity and Ecosystem Services, IPBES



WEBSITE	<a href="http://www.ipbes.net/">www.ipbes.net/</a>
CONTACT ADDRESS	<a href="mailto:secretariat@ipbes.net">secretariat@ipbes.net</a>
KEYWORDS	Biodiversity, nature, assessment, policy support, ecology, economy, sociology, indigenous people.
DESCRIPTION	The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) is an independent intergovernmental body established by governments to strengthen the science-policy interface for biodiversity and ecosystem services for the conservation and sustainable use of biodiversity, long-term human well-being and sustainable development. It was established in Panama City, on 21 April 2012 by 94 governments and currently has over 134 member states. It is not a United Nations body. It provides policymakers with objective scientific assessments about the state of knowledge regarding the planet's biodiversity, ecosystems and the benefits they provide to people, as well as the tools and methods to protect and sustainably use these vital natural assets.
SUITABLE SITES	All ecosystems.
VARIABLES	Biodiversity, ecosystem services and related variables.
METHODOLOGY	No standard methodologies, harmonisation of data.
DATA REPOSITORY	No.
HOW TO GET INVOLVED	All States Members of the United Nations are eligible for IPBES membership, with a nominated national focal point. A large number of NGOs, organisations, conventions and civil society groupings also participate in the formal IPBES process as observers, with several thousand individual stakeholders, ranging from scientific experts to representatives of academic and research institutions, local communities and the private sector, contributing to and benefiting from the work. It is possible to register as an IPBES Stakeholder on the website.
GEOGRAPHICAL AREA	Global.

## The Global Biodiversity Information Facility, GBIF

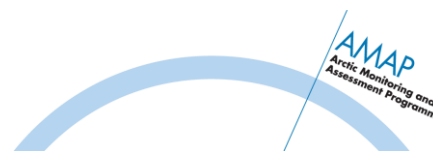


WEBSITE	<a href="http://www.gbif.org/">www.gbif.org/</a>
CONTACT ADDRESS	<a href="mailto:info@gbif.org">info@gbif.org</a>
KEYWORDS	Biodiversity, preserving data, data sharing, species.
DESCRIPTION	GBIF-the Global Biodiversity Information Facility is an international network and research infrastructure funded by the world's governments and aimed at providing anyone, anywhere open access to data about all types of life on Earth. Provides free and open access to biodiversity data.
SUITABLE SITES	All ecosystems.
VARIABLES	Biodiversity, ecosystems, species, taxonomy.
DATA REPOSITORY	Yes, <a href="http://www.gbif.org/">www.gbif.org/</a> .
HOW TO GET INVOLVED	The GBIF Memorandum of Understanding (MOU) defines members' formal relationships with the network. Under the terms of the MOU, participants can be a country, an economy, an intergovernmental or international organisation or an organisation with an international scope. Data holding institutions can share information about where and when species have been recorded.
GEOGRAFICAL AREA	Global.



## Intergovernmental organisations - Arctic Council Working Groups

### Arctic Monitoring and Assessment Programme, AMAP



WEBSITE	<a href="http://www.amap.no/">www.amap.no/</a>
CONTACT ADDRESS	<a href="mailto:amap@amap.no">amap@amap.no</a>
KEYWORDS	Climate Change, pollutants, monitoring, assessment, policy, outreach.
DESCRIPTION	<p>The Arctic Monitoring and Assessment Programme (AMAP) was established in 1991 and has produced a series of high quality reports and related communication products that detail the status of the Arctic with respect to climate and pollution issues and that include policy-relevant science-based advice to the Arctic Council and governments. AMAP is a programme designed to deliver sound science-based information for use in policy- and decision-making. Its assessment activities are internationally coordinated, subject to rigorous peer-review and make use of the most up-to-date results from both monitoring and research. The Arctic Monitoring and Assessment Programme is one of six Working Groups of the Arctic Council. AMAP is mandated:</p> <ul style="list-style-type: none"><li>- To monitor and assess the status of the arctic region with respect to pollution and Climate Change issues.</li><li>- To document levels and trends, pathways and processes, and effects on ecosystems and humans, and propose actions to reduce associated threats for consideration by governments.</li><li>- To produce sound science-based, policy-relevant assessments and public outreach products to inform policy and decision-making processes.</li></ul> <p>AMAP's work is directed by the Ministers of the Arctic Council and their Senior Arctic Officials, who have requested AMAP to also support international processes that work to reduce the global threats from contaminants and Climate Change.</p>
SUITABLE SITES	Arctic areas as defined by AMAP, <a href="http://www.amap.no/about/geographical-coverage">www.amap.no/about/geographical-coverage</a> .
VARIABLES	Related to pollution, environmental impact, human health, Climate Change.
METHODOLOGY	Efforts are made to harmonize existing and new programmes with respect to methodologies and quality assurance.
DATA REPOSITORY	Yes, for mercury see: <a href="http://www.amap.no/mercury-emissions/datasets">www.amap.no/mercury-emissions/datasets</a>

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	Thematic data centers: <a href="http://www.amap.no/about/data-compilation">www.amap.no/about/data-compilation</a>
HOW TO GET INVOLVED	The monitoring work within AMAP is based, as far as possible, on existing national and international monitoring and research programmes, aiming to harmonize these to the extent possible. Each country defines its own National Implementation Plan (NIP) to meet the AMAP monitoring objectives. Monitoring projects are carried out within each of the participating countries and across borders under bilateral and multilateral cooperations.
GEOGRAFICAL AREA	Arctic.

### Arctic Contaminants Action Program, ACAP




WEBSITE	<a href="https://arctic-council.org/en/about/working-groups/acap/home/">https://arctic-council.org/en/about/working-groups/acap/home/</a>
CONTACT ADDRESS	<a href="mailto:acap@arctic-council.org">acap@arctic-council.org</a>
KEYWORDS	Environmental risks, pollution, best practices, technologies, regulations.
DESCRIPTION	<p>The original Arctic Council Action Plan to Eliminate Pollution of the Arctic, now known as the Arctic Contaminants Action Program (ACAP), was adopted by the Senior Arctic Officials (SAO) in 2001 and provided the first mandate for work on hazardous substances. ACAP was established as a working group by the Arctic Ministers in Salekhard, Russia, in 2006 and gradually formed subsidiary Expert Groups (EGs) to tackle specific issues. The ACAP works to prevent and reduce pollution and environmental risks in the Arctic. ACAP carries out demonstration projects to raise awareness and show possibilities to cut pollution in the Arctic and clean up. ACAP encourages nations to strengthen policies and take actions to reduce pollutants and mitigate associated environmental, human health and socio-economic risks.</p> <p>The projects identified in ACAP's work plan 2019-2021 fall under four Expert Groups:</p> <ol style="list-style-type: none"><li>1. POPs and Mercury.</li><li>2. Waste.</li><li>3. Short Lived Climate Pollutants.</li><li>4. Indigenous Peoples Action Plan.</li></ol>
SUITABLE SITES	Arctic areas as defined by Arctic Council.
VARIABLES	ACAP's current work plan has a focus on pilot projects to reduce mercury, POPs and hazardous substances, and to reduce emissions of black carbon and other short-lived climate forcers. There is also an increased focus on waste management onshore to prevent plastic

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	marine litter and the release of micro-plastics into the arctic environment.
METHODOLOGY	ACAP, in cooperation with national authorities, develops pilot projects that build capacity and demonstrate emission reduction activities for contaminants. Exchange of information and knowledge on best practices, technologies, regulations, and other measures among Arctic States are key instruments in this work. ACAP contributes to the implementation by the Arctic States of international conventions and related protocols relevant to the Arctic.
DATA REPOSITORY	No.
HOW TO GET INVOLVED	The chair of the different expert groups can be found and contacted through the website.
GEOGRAFICAL AREA	Activities in all eight arctic countries.

## Conservation of Arctic Flora and Fauna, CAFF

WEBSITE	<a href="http://www.caff.is/">www.caff.is/</a>	 The logo for CAFF (Conservation of Arctic Flora and Fauna), featuring a stylized white globe icon to the left of the letters "CAFF" in a large, white, sans-serif font. Below "CAFF" is the text "Conservation of Arctic Flora and Fauna" in a smaller, white, sans-serif font. The entire logo is set against a dark grey rectangular background.
CONTACT ADDRESS	<a href="mailto:caff@caff.is">caff@caff.is</a>	
KEYWORDS	Biodiversity, monitoring.	
DESCRIPTION	<p>CAFF is the biodiversity working group of the Arctic Council. CAFF's mandate is to address the conservation of arctic biodiversity, and to communicate its findings to the governments and residents of the Arctic, and helping to promote practices, which ensure the sustainability of the Arctic's living resources. It does so through various monitoring, assessment and expert group activities. CAFF operates at the interface between science and policy and as such, provides a mechanism to develop common responses on issues of importance.</p> <p>CAFF's projects provide data for informed decision making to resolve challenges arising from trying to conserve the natural environment and permit regional growth. This work is based on cooperation between all arctic countries, indigenous organisations, international conventions and organisations, and is guided by the CAFF Strategic Plan for the Conservation of Arctic Biological Diversity and biennial Work Plans. CAFF consists of National Representatives assigned by each of the eight Arctic Council Member States, representatives of Indigenous Peoples' organisations that are Permanent Participants to the Council, and Arctic Council observer countries and organisations. The CAFF Working Group operates by the Arctic Council Rules of Procedures.</p>	

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SUITABLE SITES	Terrestrial, freshwater and marine sites in the Arctic within the CAFF boundary, <a href="https://www.caff.is/about-caff">https://www.caff.is/about-caff</a> .
VARIABLES	Developed under CAFFs Circumpolar Biodiversity Monitoring Program (described below).
METHODOLOGY	Depending on project/assessment. Monitoring methodologies developed under CAFFs Circumpolar Biodiversity Monitoring Program (described below).
DATA REPOSITORY	Yes, <a href="https://www.abds.is/">https://www.abds.is/</a> is an online, interoperable data management system, which serves as a focal point and common platform for all CAFF programmes and projects as well as a dynamic source for up-to-date circumpolar arctic biodiversity information and emerging trends.
HOW TO GET INVOLVED	The Conservation of Arctic Flora and Fauna (CAFF) is open to external parties that wish to make their data available via the Arctic Biodiversity Data Service (ABDS). If you wish to contribute data to CAFF, you need to fill in a form online.
GEOGRAFICAL AREA	Arctic.

## CAFF's Circumpolar Biodiversity Monitoring Program, CBMP



WEBSITE	<a href="http://www.caff.is/monitoring">www.caff.is/monitoring</a>
CONTACT ADDRESS	<a href="mailto:caff@caff.is">caff@caff.is</a>
KEYWORDS	Biodiversity, Climate Change, anthropogenic stressors, conservation, management.
DESCRIPTION	<p>The Circumpolar Biodiversity Monitoring Program (CBMP) is the cornerstone programme of the Conservation of Arctic Flora and Fauna (CAFF), the Arctic Council's biodiversity working group. The CBMP is an international network of scientists, government agencies, Indigenous organisations and conservation groups working together to harmonize and integrate efforts to monitor arctic biodiversity and ecosystems.</p> <p>The CBMP focuses its efforts on five key programme areas:</p> <ul style="list-style-type: none"><li>- Data management (the Arctic Biodiversity Data Service).</li><li>- Capacity building.</li><li>- Reporting.</li><li>- Coordination and integration of arctic monitoring.</li><li>- Communication, education and outreach.</li></ul> <p>CBMP experts are developing four coordinated and integrated Arctic Biodiversity Monitoring Plans to help guide circumpolar monitoring efforts. Results will be channelled into effective conservation, mitigation and adaptation policies supporting the Arctic. These plans represent the Arctic's major ecosystems: 1. Marine, 2. Freshwater, 3. Terrestrial,</p>

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	<p>4. Coastal. The CBMP operates under an ecosystem-based approach. The ecosystem-based approach to monitoring considers the integrity of entire ecosystems and their interaction with other ecosystems. It provides a bridge between ecosystems, habitats, species, and the impacts of stressors on ecological functions. Results contribute to adaptive management, allowing for effective conservation, mitigation, and adaptation actions appropriate to the Arctic. The CBMP is coordinating the wide range of arctic biodiversity monitoring activities spanning biological, geographical, and climatic disciplines. This includes standardizing practices, coordinating and integrating information, and providing services in data management (through the Arctic Biodiversity Data Service), communications, reporting and decision-making.</p>
SUITABLE SITES	Sites within the CBMP arctic boundary, <a href="http://www.caff.is/about-caff">www.caff.is/about-caff</a> .
VARIABLES	Ecosystems, habitats, species.
METHODOLOGY	CBMP is working with partners, including existing terrestrial monitoring networks, across the Arctic to harmonize and enhance long-term monitoring efforts within terrestrial, coastal, marine and fresh water ecosystems.
DATA REPOSITORY	Yes, <a href="http://www.abds.is/">www.abds.is/</a> .
HOW TO GET INVOLVED	CAFF Member Country Partners can be found online, or the CAFF secretariat can help answer any questions and identify relevant national points of contact.
GEOGRAFICAL AREA	Arctic.

## Circumarctic coordinating organisations

### International Arctic Science Committee, IASC



WEBSITE	<a href="https://iasc.info/">https://iasc.info/</a>
CONTACT ADDRESS	<a href="mailto:info@iasc.info">info@iasc.info</a>
KEYWORDS	Multidisciplinary, arctic, science, facilitating coordination, science development, data exchange.
DESCRIPTION	<p>The International Arctic Science Committee (IASC) is a non-governmental, international scientific organisation. Overall, IASC promotes and supports leading-edge interdisciplinary research in order to foster a greater scientific understanding of the arctic region and its role in the Earth system.</p> <p>IASC is also committed to recognizing that Traditional Knowledge, Indigenous Knowledge, and “Western” scientific knowledge are coequal and complementary knowledge systems, all of which can and should inform the work of IASC.</p> <p>The scientific core elements of IASC are its five Working Groups (WGs):</p> <ul style="list-style-type: none"><li>- Atmosphere WG.</li><li>- Cryosphere WG.</li><li>- Marine WG.</li><li>- Social &amp; Human WG.</li><li>- Terrestrial WG.</li></ul> <p>The main function of the WGs is to encourage and support science-led international programmes by offering opportunities for planning and coordination, and by facilitating communication and access to facilities. Each WG is composed of up to two scientists from each IASC member country, appointed by the national adhering bodies. The members are experts in their field, with an international reputation, and from different scientific disciplines so that the full range of arctic research is represented in the WGs.</p> <p>IASC Actions Groups are established by the IASC Council to provide strategic advice concerning both long-term activities and urgent needs. They are expert groups typically with a one or two year mandate and conclude their task with a report to the Council. The present ‘IASC Action Group on Carbon Footprint’ will start work in the fall 2020.</p>
DATA REPOSITORY	No.
HOW TO GET INVOLVED	Contact one of the national delegates (see the member section under each Working Group), or contact the IASC Secretariat directly.
GEOGRAFICAL AREA	Arctic.

## University of the Arctic, UArctic



WEBSITE	<a href="http://www.uarctic.org/">www.uarctic.org/</a>
CONTACT ADDRESS	<a href="mailto:secretariat@uarctic.org">secretariat@uarctic.org</a>
KEYWORDS	Education, research, graduate programmes, students.
DESCRIPTION	The University of the Arctic (UArctic) is a cooperative network of universities, colleges, research institutes and other organisations concerned with education and research in and about the North. UArctic builds and strengthens collective resources and collaborative infrastructure that enables member institutions to better serve their constituents and their regions. Through cooperation in education, research and outreach UArctic enhances human capacity in the North, promotes viable communities and sustainable economies, and forges global partnerships. UArctic is an official observer to the Arctic Council. The University of the Arctic was officially registered as a non-profit association under the Finnish law "UArctic ry" in November 2019.
SUITABLE SITES	Arctic focus. Institutions or organisations with an interest in and commitment to higher education and research in the Circumpolar North (the eight arctic countries of Canada, Denmark/Greenland, Finland, Iceland, Sweden, Norway, Russia, and the USA). Non-arctic members of UArctic are institutions or organisations, with an interest in and commitment to higher education and research in the Circumpolar North, located outside the eight arctic countries.
DATA REPOSITORY	No.
HOW TO GET INVOLVED	If an institution/organisation is interested in becoming a member of UArctic, a membership application needs to be filled out online. The next application round is for 2021, with an application deadline of February 28, 2021.
GEOGRAPHICAL AREA	Arctic focused activities, member institutions from all over the world.

## Association of Polar Early Career Scientists, APECS



WEBSITE	<a href="http://www.apecs.is/">www.apecs.is/</a>
CONTACT ADDRESS	<a href="mailto:info@apecs.is">info@apecs.is</a>
KEYWORDS	Polar science, career development, young researchers, education.
DESCRIPTION	<p>The Association of Polar Early Career Scientists (APECS) is an international and interdisciplinary organisation for undergraduate and graduate students, postdoctoral researchers, early career faculty members, early career professionals, educators and others with interests in polar and alpine regions and the wider cryosphere. APECS' goals include creating opportunities for the development of innovative, international, and interdisciplinary collaborations among current early career polar researchers as well as recruiting, retaining and promoting the next generation of polar enthusiasts.</p> <p>APECS celebrated its 10<sup>th</sup> anniversary in 2017 with more than 7,500 early career researchers (ECRs) joining the network during the early stages of their careers.</p>
DATA REPOSITORY	No.
HOW TO GET INVOLVED	You can register for APECS membership online.
GEOGRAPHICAL AREA	Polar and alpine regions and the wider cryosphere.



## Global/circumarctic scientific networks and organisations

### Atmospheric Sciences

#### World Meteorological Organisation, WMO

WEBSITE

<https://public.wmo.int/en>

CONTACT ADDRESS

[wmo@wmo.int](mailto:wmo@wmo.int)

KEYWORDS

Weather, Climate Change, atmosphere, Meteorology, Hydrology.

DESCRIPTION

The World Meteorological Organisation (WMO) is a specialized agency of the United Nations. It is the UN system's authoritative voice on the state and behaviour of the Earth's atmosphere, its interaction with the oceans, the climate it produces and the resulting distribution of water resources. WMO has a number of observing programmes centered around weather, climate and hydrology:

- The World Weather Watch (WWW) - the core of the WMO Programmes - combines observing systems, telecommunication facilities, and data processing and forecasting centers to make meteorological and related environmental information available and provide efficient forecasting services in all countries. See: [www.wmo.int/pages/prog/www/index\\_en.html](http://www.wmo.int/pages/prog/www/index_en.html).
- The Hydrology and Water Resources Programme (HWRP) is concerned with the assessment of the quantity and quality of water resources, both surface and groundwater, in order to meet the needs of society, to permit mitigation of water-related hazards, and to maintain or enhance the condition of the global environment. See: [www.wmo.int/pages/prog/hwrp/index\\_en.php](http://www.wmo.int/pages/prog/hwrp/index_en.php).
- World Climate Programme (WCP) – the scope of WCP is to determine the physical basis of the climate system that would allow increasingly skillful climate predictions and projections, develop operational structures to provide climate services and to develop and maintain an essential global observing system fully capable of meeting the climate information needs. See: [www.wmo.int/pages/prog/wcp/index\\_en.html](http://www.wmo.int/pages/prog/wcp/index_en.html).
- Global Atmosphere Watch (GAW) studies the variability and trends in atmospheric composition and related physical variables, and assesses the consequences thereof. Global Atmosphere Watch also focuses on service delivery in a number of application areas where its data brings added value. One major aspect of the Global Atmosphere Watch mission is to organize, participate in and coordinate



WORLD  
METEOROLOGICAL  
ORGANIZATION

assessments of the chemical composition of the atmosphere on a global scale.

See: <https://public.wmo.int/en/programmes/global-atmosphere-watch-programme>.

- Global Climate Observing System (GCOS) regularly assesses the status of global climate observations of the atmosphere, land and ocean and produces guidance for its improvement. GCOS expert panels maintain definitions of Essential Climate Variables (ECVs), which are required to systematically observe Earth`s changing climate. The observations supported by GCOS contribute to solving challenges in climate research and also underpin climate services and adaptation measures. See: <https://gcos.wmo.int/en/home>.
- The Global Cryosphere Watch (GCW) is an international mechanism for supporting all key cryospheric *in-situ* and remote sensing observations. GCW provides authoritative, clear, and useable data, information, and analyses on the past, current and future state of the cryosphere. GCW includes observation, monitoring, assessment, product development, prediction, and research. The GCW surface observation network is comprised of a core component, called CryoNet, and contributing stations that are not part of CryoNet. The GCW network builds on existing cryosphere observing programmes and promotes the addition of standardized cryospheric observations to existing facilities in order to create more robust environmental observatories.

See: <https://globalcryospherewatch.org/> and <http://globalcryospherewatch.org/cryonet/>.

SUITABLE SITES	All ecosystems.
VARIABLES	Monitored variables depend on programme, but they are mostly centered around weather, climate and hydrology, see links above.
METHODOLOGY	Instrumentation and methodologies can be found under the individual programmes, see links above.
HOW TO GET INVOLVED	Identify relevant contact persons of the individual programmes, see links above.
GEOGRAPHICAL AREA	Global, see individual programmes.

## International Arctic Systems for Observing the Atmosphere, IASOA



WEBSITE	<a href="http://www.esrl.noaa.gov/psd/iasoa/home2">www.esrl.noaa.gov/psd/iasoa/home2</a>
CONTACT ADDRESS	<a href="mailto:taneil.uttal@noaa.gov">taneil.uttal@noaa.gov</a> or <a href="mailto:sara.morris@noaa.gov">sara.morris@noaa.gov</a> .
KEYWORDS	Atmosphere, atmospheric chemistry, climate, climatology.
DESCRIPTION	<p>The International Arctic Systems for Observing the Atmosphere (IASOA) activities and partnerships were initiated as a part of the 2007-09 International Polar Year (IPY). The IASOA focus is on coordinating intensive measurements of the arctic atmosphere collected in the United States, Canada, Russia, Norway, Finland, and Greenland to create synthesis science that leads to an understanding of why and not just how the arctic atmosphere is evolving. The IASOA premise is that there are limitations with arctic modeling and satellite observations that can only be addressed with boots-on-the-ground, in situ observations, and that the potential of combining individual station and network measurements into an integrated observing system is tremendous. IASOA coordinates the activities of individual arctic observatories to provide a collaborative international network for arctic atmospheric research and operations. Much of the arctic data collection is done by individual observatories, scattered across the Arctic, which are sponsored by arctic nations. These nations include Norway, Russia, Greenland, Canada, U.S., and Finland.</p> <p>The data collected is used for monitoring and fundamental arctic climate analysis by the international research community. Participating agencies submit their data findings to IASOA and it is posted to a data portal available to the public.</p>
SUITABLE SITES	Arctic sites with observatories.
VARIABLES	Collects basic meteorological data as well as atmospheric data. Basic weather data from different observatories includes: temperature, wind, precipitation, and pressure. Atmospheric data includes information about clouds, composition of liquid in the atmosphere, amount of sunlight, and the amount and type of greenhouse gases in the arctic air. Greenhouse gas measurements as well as black carbon are essential parts of arctic data collection because of their effect on the atmosphere. Measured quantities can include (but are not limited to) solar radiation, aerosol physical and chemical properties, air chemistry, trace gases, cloud properties, water vapor, ozone, temperatures, winds, surface albedo and stratospheric properties.
METHODOLOGY	In situ observations. The IASOA Data Portal targets continuous atmospheric data collected at IASOA Observatories. It does not address data from campaigns, satellites or model output.

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DATA REPOSITORY	Yes, <a href="https://psl.noaa.gov/iasoa/dataataglance">https://psl.noaa.gov/iasoa/dataataglance</a> (but currently not maintained – August 2020).
HOW TO GET INVOLVED	IASOA includes six different countries as well as government agencies, private science institutions, and academic institutions from the different nations. Observatories can request to join the consortium.
GEOGRAFICAL AREA	Arctic, see website.

## Geo Sciences

### Global Runoff Data Centre, GRDC



WEBSITE	<a href="http://www.bafg.de/GRDC/EN/Home/homepage_node.html">www.bafg.de/GRDC/EN/Home/homepage_node.html</a>
CONTACT ADDRESS	<a href="mailto:grdc@bafg.de">grdc@bafg.de</a>
KEYWORDS	River discharge, basins, runoff, watershed.
DESCRIPTION	<p>The GRDC is an international archive of data up to 200 years old, and fosters multinational and global long-term hydrological studies. Originally established three decades ago, the aim of the GRDC is to help earth scientists analyse global climate trends and assess environmental impacts and risks. Operating under the auspices of WMO, the database of quality controlled “historical” mean daily and monthly discharge data grows steadily. Since 1988 the GRDC database has grown continuously and now encompasses discharge data from more than 9900 stations in 159 countries. GRDC currently holds river discharge time series from 2625 gauging stations in the arctic region with earliest records from 1877 and an average time series length of 41 years, with a range from 1 to 138 years. Initially compiled for the ACSYS and CliC projects, now the Arctic Region Dataset forms an integral part of the Global Runoff Database and is continually updated. Especially in the context of the Arctic-HYCOS project, the Arctic Region Dataset is being expanded and updated to support the Arctic-HYCOS basic network.</p>
SUITABLE SITES	All stations that fulfil a few numbers of criteria
VARIABLES	River discharge.
METHODOLOGY	Daily discharge data from gauging stations. A minimum requirement is daily streamflow and lake level data.
DATA REPOSITORY	Yes <a href="http://www.bafg.de/GRDC/EN/02_srvcs/services_node.html">www.bafg.de/GRDC/EN/02_srvcs/services_node.html</a> .
HOW TO GET INVOLVED	Everyone is welcome to send data.
GEOGRAFICAL AREA	Global, see website.

## The Global Terrestrial Network for Glaciers, GTN-G

# GTN-G

WEBSITE	<a href="http://www.gtn-g.org">www.gtn-g.org</a>
CONTACT ADDRESS	<a href="mailto:mail@gtn-g.org">mail@gtn-g.org</a> or <a href="http://www.gtn-g.org/contact.html">www.gtn-g.org/contact.html</a>
DISCIPLINES	Glaciology, Climatology.
KEYWORDS	Glacier, Climate Change, mass balance, energy balance.
DESCRIPTION	<p>The Global Terrestrial Network for Glaciers (GTN-G) is the framework for the internationally coordinated monitoring of glaciers and ice caps in support of the United Nations Framework Convention on Climate Change (UNFCCC). The network, authorized under the Global Climate/Terrestrial Observing System (GCOS, GTOS), is jointly run by the World Glacier Monitoring Service (WGMS), the U.S. National Snow and Ice Data Center (NSIDC), and the Global Land Ice Measurements from Space initiative (GLIMS). Amongst these three bodies, key expertise for in-situ measurements has traditionally been located at WGMS, whereas GLIMS and NSIDC have mainly focused on remote sensing and data management in relation to glaciers. WGMS is therefore the most relevant starting point for stations seeking information on standard field methodologies.</p> <p>The World Glacier Monitoring Service (WGMS) collects standardized observations on changes in mass, volume, area and length of glaciers with time (glacier fluctuations), as well as statistical information on the distribution of perennial surface ice in space (glacier inventories). Such glacier fluctuation and inventory data are high priority key variables in climate system monitoring; they form a basis for hydrological modelling with respect to possible effects of atmospheric warming, and provide fundamental information in glaciology, glacial geomorphology and quaternary geology.</p>
SUITABLE SITES:	Stations with access to glaciated environments.
VARIABLES:	Energy balance, mass balance, flow dynamics and extent.
METHODOLOGY:	Within the Global Terrestrial Network for Glaciers (GTN-G), the following guidelines and standards have been established regarding glacier fluctuations, <a href="http://www.gtn-g.org/literature">www.gtn-g.org/literature</a> .
HOW TO GET INVOLVED	See website, <a href="http://www.gtn-g.org/contact.html">www.gtn-g.org/contact.html</a> or enquire via e-mail ( <a href="mailto:mail@gtn-g.org">mail@gtn-g.org</a> ).
GEOGRAPHICAL AREA	Glaciated areas of the World. Currently active in more than 30 countries, <a href="https://gtnp.arcticportal.org/resources/maps">https://gtnp.arcticportal.org/resources/maps</a> . The highest information density is found for the Alps and Scandinavia, where long and uninterrupted records are available.

## Global Terrestrial Network for Permafrost, GTN-P



WEBSITE	<a href="https://gtnp.arcticportal.org/">https://gtnp.arcticportal.org/</a>
CONTACT ADDRESS	<a href="mailto:gtnp-secretariat@awi.de">gtnp-secretariat@awi.de</a>
KEYWORDS	Geocryology, methane, ice-sheet, glacier.
DESCRIPTION	<p>The Global Terrestrial Network for Permafrost (GTN-P) is the primary international programme concerned with monitoring permafrost variables. GTN-P was developed by the International Permafrost Association (IPA) under the Global Climate Observing System (GCOS) and the Global Terrestrial Observing Network (GTOS) in 1999, with the long-term goal of obtaining a comprehensive view of the spatial structure, trends, and variability of changes in the active layer thickness and permafrost temperature. GCOS and GTOS established 50 Essential Climate Variables (ECVs), of which one is permafrost. Within the GTN-P, involving the senior and young permafrost scientific community, two permafrost key variables have been identified as ECV's:</p> <ul style="list-style-type: none"><li>- The Thermal State of Permafrost (TSP, see below), which is permafrost temperature, long-term monitored by an extensive borehole network.</li><li>- The Active Layer Thickness (ALT), which is the annual thaw depth of permafrost, mostly referring to the monitoring network of Circumpolar Active Layer Monitoring (CALM, see below).</li></ul>
SUITABLE SITES	Station with access to areas with permafrost soils.
VARIABLES	Permafrost temperature and active layer thicknesses.
METHODOLOGY	Permafrost temperatures are usually monitored by lowering a calibrated thermistor into a borehole (varying from less than 10 m to more than 100 m depth) or recording the temperature from multi-sensor cables that are permanently or temporarily installed in a borehole. The traditional methods to determine the seasonal and long-term changes in thickness of the active layer are 1) mechanical probing by pushing a metal rod into the ground up to the point of resistance, 2) using frost/thaw tubes for measuring heave or subsidence, and 3) interpolation of soil temperatures obtained by data loggers.
DATA REPOSITORY	Yes, <a href="https://gtnp.arcticportal.org/data/data-download">https://gtnp.arcticportal.org/data/data-download</a> .
HOW TO GET INVOLVED	National Correspondents can be found on the website.
GEOGRAPHICAL AREA	Global, in permafrost areas, <a href="https://gtnp.arcticportal.org/resources/maps">https://gtnp.arcticportal.org/resources/maps</a> .

## Circumpolar Active Layer Monitoring, CALM



WEBSITE	<a href="http://www.gwu.edu/~calm">www.gwu.edu/~calm</a>
CONTACT ADDRESS	<a href="http://www.gwu.edu/~calm/about/admins.html">www.gwu.edu/~calm/about/admins.html</a>
DISCIPLINE	Geocryology.
KEYWORDS	Permafrost, active layer, thaw depth.
DESCRIPTION	<p>The primary goal of the Circumpolar Active Layer Monitoring (CALM) programme is to observe the response of the active layer and near-surface permafrost to Climate Change over long (multi-decadal) time scales. The CALM observational network, established in the 1990s, observes the long-term response of the active layer and near-surface permafrost to changes and variations in climate at more than 125 sites in both hemispheres. CALM currently has participants from 15 countries. Approximately 60 sites measure active-layer thickness on grids ranging from 1 ha to 1 km<sup>2</sup>, and 100 sites observe soil temperatures, including permafrost temperatures from boreholes. Most sites in the CALM network are located in arctic and subarctic lowlands, although 20 boreholes affiliated with CALM are in mountainous regions of the Northern Hemisphere above 1,300 m elevation.</p> <p>Together with its sister programme, the International Permafrost Association's Thermal State of Permafrost programme, CALM comprises the Global Terrestrial Network for Permafrost (GTN-P), itself a component of the Global Terrestrial Observation System and the Global Climate Observation System (GTOS/GCOS).</p>
SUITABLE SITES	Stations with access to areas with permafrost soils.
VARIABLES	<p>CALM investigators measure the seasonal depth of thaw at plots of various dimensions. Soil and air temperature, soil moisture content, and vertical movement are also measured at many sites. These measurements, combined with site-specific information about soils, landscape and vegetation, can be used to "scale up" assessments of the stability and projected changes to regional and circumpolar scales.</p>
METHODOLOGY	<p>CALM investigators measure the seasonal depth of thaw at plots of various dimensions using a standard protocol. CALM data are made freely available.</p> <p>Measurement protocols: <a href="http://www.gwu.edu/~calm/research/measurements.html">www.gwu.edu/~calm/research/measurements.html</a></p> <p>Methods for measuring active layer thickness: <a href="http://www.unis.no/35_staff/staff_webpages/geology/ole_humlum/PeriglacialHandbook/ActiveLayerThicknessMethods.htm">www.unis.no/35_staff/staff_webpages/geology/ole_humlum/PeriglacialHandbook/ActiveLayerThicknessMethods.htm</a>.</p>
DATA REPOSITORY	Yes, <a href="http://gtnpdatabase.org/">http://gtnpdatabase.org/</a> and <a href="https://www2.gwu.edu/~calm/data/data-links.html">https://www2.gwu.edu/~calm/data/data-links.html</a> .
HOW TO GET INVOLVED:	Contact CALM programme administrators, <a href="http://www.gwu.edu/~calm/about/admins.html">www.gwu.edu/~calm/about/admins.html</a> .



**GEOGRAFICAL AREA** Global permafrost areas, currently more than 200 sites in both hemispheres, <https://gtnp.arcticportal.org/resources/maps/12-resources/38-maps-active-layer-grids>.

## **Thermal State of permafrost, TSP**

**WEBSITE** <http://ipa.arcticportal.org/activities?catid=0&id=15>

**CONTACT ADDRESS** [contact@ipa-permafrost.org](mailto:contact@ipa-permafrost.org)

**DISCIPLINE** Geocryology.

**KEYWORDS** Permafrost temperature, Climate Change, thaw, climate feedbacks.

**DESCRIPTION** The Thermal State of Permafrost programme measures permafrost temperatures to address questions related to climate warming and the attendant environmental and societal issues in the cold regions of Planet Earth. The TSP data set will serve as a baseline for the assessment of the rate of change of permafrost temperatures and permafrost distribution, to validate climate model scenarios, and to support process research in order to improve our understanding of permafrost dynamics.

Together with its sister programme, the International Permafrost Association's Circumpolar Active Layer Monitoring programme, TSP comprises GTN-P, the Global Terrestrial Network for Permafrost, itself a component of the Global Terrestrial Observation System and the Global Climate Observation System (GTOS/GCOS).

Suitable sites: Stations located in areas with permafrost. TSP welcomes:

- Boreholes with long-term records of prior observations in order to establish recent trends.
- New boreholes in undisturbed areas that can be protected and can be available for continuing observations.

**VARIABLES** Permafrost borehole temperatures and associated abiotic variables.

**METHODOLOGY** Two measurement strategies are proposed:

- Type 1: Long-term, high frequency (minimum three times/day, four recommended) continuous observations in a limited number of key boreholes, which are representative of a given region. Borehole depth should be at least 15-20 meters.
- Type 2: Occasional or periodical measurements (at least annually or more frequently) in deeper boreholes.

Observations require data-loggers. A variety of data logging systems is available, and the choice depends on available funding. See manual for methodologies and required equipment or contact TSP to enquire about

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	newest recommendations, <a href="http://ipa.arcticportal.org/images/stories/tsp_manual.pdf">http://ipa.arcticportal.org/images/stories/tsp_manual.pdf</a> .
DATA REPOSITORY	Yes, <a href="http://gtnpdatabase.org/">http://gtnpdatabase.org/</a> .
HOW TO GET INVOLVED	See list of national/regional coordinators in the manual or contact IPA ( <a href="mailto:contact@ipa-permafrost.org">contact@ipa-permafrost.org</a> ).
GEOGRAPHICAL AREA	Global, permafrost regions, <a href="https://gtnp.arcticportal.org/resources/maps/12-resources/37-maps-boreholes">https://gtnp.arcticportal.org/resources/maps/12-resources/37-maps-boreholes</a> .

## Arctic Coastal Dynamics, ACD




WEBSITE	<a href="https://arcticcoast.info/">https://arcticcoast.info/</a>
CONTACT ADDRESS	<a href="mailto:acd@awi.de">acd@awi.de</a>
KEYWORDS	Permafrost, ground ice, sediments, erosion.
DESCRIPTION	The Arctic Coastal Dynamics (ACD) project started in 1999 as an initiative of the International Permafrost Association (IPA) and the International Arctic Science Committee (IASC). The Arctic Coastal Dynamics (ACD) programme is a multi-disciplinary, multi-national forum to exchange ideas and information. Since its inception, the ACD group produced significant contributions to International Conferences on Arctic Research Planning (ICARPs), to the International Polar Year (IPY) and to other arctic observing organisations (e.g. SAON, AOS). The overall objective of ACD is to improve our understanding of circumarctic coastal dynamics as a function of environmental forcing, coastal geology and cryology, and morphodynamic behavior.
SUITABLE SITES	Circumarctic coastal stations.
VARIABLES	Permafrost, sea ice, ground ice, sediments, erosion.
METHODOLOGY	Variables included in the ACD Coastal Classification can be found in the science and implementation plan: <a href="https://arcticcoast.info/images/resources/docs/pdfs/SciencePlans/ACD-II-SIP.pdf">https://arcticcoast.info/images/resources/docs/pdfs/SciencePlans/ACD-II-SIP.pdf</a>
DATA REPOSITORY	Yes, ACD GIS Database <a href="https://arcticcoast.info/resources/acd-gis">https://arcticcoast.info/resources/acd-gis</a>
HOW TO GET INVOLVED	ACD welcomes the participation of new researchers and groups in the project, and for new key sites. Contact the ACD by email.
GEOGRAPHICAL AREA	Arctic, <a href="https://maps.awi.de/awimaps/projects/public/?cu=Arctic%20Coastal%20Dynamics#home">https://maps.awi.de/awimaps/projects/public/?cu=Arctic Coastal Dynamics#home</a> .

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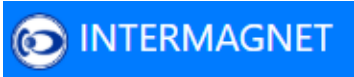
## Baseline Surface Radiation Network, BSRN

WEBSITE	<a href="http://bsrn.awi.de/">http://bsrn.awi.de/</a>
CONTACT ADDRESS	<a href="mailto:christian.LANCONELLI@ec.europa.eu">christian.LANCONELLI@ec.europa.eu</a>
KEYWORDS	Radiation, long term monitoring, climate system, ground truthing.
DESCRIPTION	<p>The goal of BSRN is to provide continuous, long-term, frequently sampled, state-of-the-art measurements of surface radiation fluxes adhering to the highest achievable standards of measurement procedures, calibration and accuracy. The uniform and consistent measurements throughout the BSRN network are used to:</p> <ul style="list-style-type: none"><li>- Monitor the background (least influenced by immediate human activities which are regionally concentrated) short-wave and long-wave radiative components and their changes with the best methods currently available.</li><li>- Provide data for the validation and evaluation of satellite-based estimates of the surface radiative fluxes.</li><li>- Produce high-quality observational data for comparison to climate model (GCM) calculations and for the development of local regionally representative radiation scenarios.</li></ul>
SUITABLE SITES	The readings are taken from a small number of selected stations, in contrasting climatic zones, together with collocated surface and upper air meteorological data and other supporting observations.
VARIABLES	Direct radiation, diffuse radiation, global radiation, air temperature at 2 m height, relative humidity, atmospheric pressure, etc.
METHODOLOGY	See Baseline Surface Radiation Network Operations Manual (Version 2.1): <a href="https://bsrn.awi.de/fileadmin/user_upload/bsrn.awi.de/Publications/McArthur.pdf">https://bsrn.awi.de/fileadmin/user_upload/bsrn.awi.de/Publications/McArthur.pdf</a> .
DATA REPOSITORY	Yes, <a href="https://dataportals.pangaea.de/bsrn/">https://dataportals.pangaea.de/bsrn/</a> or see: <a href="https://bsrn.awi.de/?id=387">https://bsrn.awi.de/?id=387</a> .
HOW TO GET INVOLVED	Participation in the BSRN is best accomplished through the WMO representative of your home country. You should contact the BSRN project manager for additional information. Participation is strictly voluntary and no funds are available from the BSRN or other associated organisations for establishing or maintaining the BSRN measurement activity. Many existing sites are funded through the participating country's space or climate research programmes. Other programmes are part of national radiation programmes. Sites are especially needed in oceanic environments, deserts, high altitudes, or climatic zones not covered by existing operational sites, <a href="https://bsrn.awi.de/nc/stations/maps/">https://bsrn.awi.de/nc/stations/maps/</a> .
GEOGRAFICAL AREA	Global

## Terrestrial Carbon Flux Network, FLUXNET

WEBSITE	<a href="http://fluxnet.fluxdata.org/about/">http://fluxnet.fluxdata.org/about/</a>	 The logo for FLUXNET, a circular emblem with a blue border. Inside, there's a green landscape with a white tower and a blue sky. The text "FLUXNET" is at the top and "A Global Network" is at the bottom.
CONTACT ADDRESS	<a href="mailto:fluxdata-support@fluxdata.org">fluxdata-support@fluxdata.org</a>	
KEYWORDS	Temperature, humidity, wind speed, rainfall, atmospheric carbon dioxide, atmosphere, eddy covariance.	
DESCRIPTION	Eddy covariance measurements of carbon dioxide and water vapor exchange are being made routinely on all continents. The flux measurement sites are linked across a confederation of regional networks in North, Central and South America, Europe, Asia, Africa, and Australia, in the global network FLUXNET. This global network includes more than eight hundred active and historic flux measurement sites, dispersed across most of the world's climate space and representative biomes.	
SUITABLE SITES	All sites that collect carbon, GHGs and energy flux measurements using the eddy covariance methods are eligible and welcome.	
VARIABLES	CO <sub>2</sub> , CH <sub>4</sub> , water vapor, sensible, latent heat, air temperature, precipitation, radiation.	
METHODOLOGY	At each tower site, the eddy covariance method is applied to quantify the fluxes of scalars (e.g., CO <sub>2</sub> , CH <sub>4</sub> , water vapor) and energy between the biosphere and atmosphere. In addition, continuous measurements of ancillary physical variables are acquired from a large number of sensors at high temporal resolution. The half-hourly or hourly fluxes are calculated and quality-controlled by the local tower teams. The data is then transferred to the Regional Networks and the FLUXNET Data Portal - Fluxdata.	
DATA REPOSITORY	Yes, <a href="https://fluxnet.org/data/">https://fluxnet.org/data/</a> .	
HOW TO GET INVOLVED	The best way to get actively involved in FLUXNET is by using a regional network as the primary affiliation. The regional networks are connected to the FLUXNET system and the information and data uploaded are also shared through this channel. Otherwise contact: <a href="mailto:fluxdata-support@fluxdata.org">fluxdata-support@fluxdata.org</a> .	
GEOGRAFICAL AREA	Global, <a href="https://fluxnet.org/custom-map/cartographer.html">https://fluxnet.org/custom-map/cartographer.html</a> .	

## International Real-time Magnetic Observatory Network, INTERMAGNET

WEBSITE	<a href="https://intermagnet.github.io">https://intermagnet.github.io</a>	
CONTACT ADDRESS	E-mail addresses for the members of the Executive Council and the Operations Committee can be found on the website.	
KEYWORDS	Magnetic observatories, geomagnetic field.	
DESCRIPTION	INTERMAGNET is a global network of observatories, monitoring the Earth's magnetic field. The INTERMAGNET programme exists to establish a global network of cooperating digital magnetic observatories, adopting modern standard specifications for measuring and recording equipment, in order to facilitate data exchanges and the production of geomagnetic products in close to real time. Where local support is lacking it is a further goal of INTERMAGNET to aid in the establishment of new observatories or to provide assistance with the upgrade and maintenance of existing facilities. Supplemental to this aim is the promotion of modern standards for measuring and recording the Earth's magnetic field. INTERMAGNET is constituted from existing groups whose primary task is one of geomagnetic measurement.	
SUITABLE SITES	Stations with magnetic observatories.	
VARIABLES	Magnetic field values.	
METHODOLOGY	See the technical manual, which contains details of all specifications that have to be met by observatories wishing to join INTERMAGNET. <a href="https://www.intermagnet.org/publication-software/technicalsoft-eng.php">https://www.intermagnet.org/publication-software/technicalsoft-eng.php</a> .	
DATA REPOSITORY	Yes, <a href="https://intermagnet.github.io/data_conditions.html">https://intermagnet.github.io/data_conditions.html</a> .	
HOW TO GET INVOLVED	INTERMAGNET membership is available to institutions who wish to operate one or more INTERMAGNET Magnetic Observatories. An Institution must apply for membership in INTERMAGNET by emailing a completed application form, available on the website. Application for membership implies that the institution will agree to abide by the INTERMAGNET Principles, Conditions and Standards as set out in the Technical Manual.	
GEOGRAPHICAL AREA	Global, <a href="https://www.intermagnet.org/imos/imomap-eng.php">https://www.intermagnet.org/imos/imomap-eng.php</a> .	

## Life Sciences

### International Long Term Ecological Research, iLTER



WEBSITE	<a href="http://www.ilter.network/">www.ilter.network/</a>
CONTACT ADDRESS	<a href="mailto:herbert.haubold@umweltbundesamt.at">herbert.haubold@umweltbundesamt.at</a>
KEYWORDS	Ecology, ecosystem, Climate Change.
DESCRIPTION	<p>The International Long Term Ecological Research Network, ILTER, is a network of networks, encompassing hundreds of research sites located in a wide array of ecosystems that can help understand environmental change across the Globe. ILTER's focus is on long-term, site-based research and monitoring.</p> <p>ILTER's vision is a world in which science helps prevent and solve environmental and socio-ecological problems. ILTER contributes to solving international ecological and socio-economic problems through question and problem-driven research, with a unique ability to design collaborative, site-based projects, compare data from a global network of sites and detect global trends.</p> <p>ILTER members are mostly national networks of scientists engaged in long-term, site-based ecological and socio-economic research (known as LTER or LTSER). They have expertise in the collection, management and analysis of long-term environmental data. Together they are responsible for creating and maintaining a large number of unique long-term datasets.</p>
SUITABLE SITES	Terrestrial, freshwater and marine ecosystems.
VARIABLES	Ecological and socio-ecological variables.
METHODOLOGY	ILTER supports globally comparative and synthetic analyses over time and space in search of general ecological principles prevailing across biomes, environmental zones, ecosystem types and scales. It thereby enables the expansion of scientific opportunities and knowledge, and delivering reliable information for evidence-based policy.
DATA REPOSITORY	Yes, <a href="https://deims.org/">https://deims.org/</a> .
HOW TO GET INVOLVED	The ILTER member networks are structured into the four ILTER Regional Groups: Americas (including US LTER), East-Asia-Pacific (EAP), Africa and Europe (LTER Europe). The regional networks are open to science communities, including institutions, research groups, and individual scientists, contact info available online.
GEOGRAFICAL AREA	Global, <a href="https://deims.org/network/1aa7ccb2-a14b-43d6-90ac-5e0a6bc1d65b">https://deims.org/network/1aa7ccb2-a14b-43d6-90ac-5e0a6bc1d65b</a> .

## International Tundra Experiment, ITEX




WEBSITE	<a href="http://www.gvsu.edu/itex/">www.gvsu.edu/itex/</a>
CONTACT	Contact a member of the ITEX Steering Committee listed online.
KEYWORDS	Ecosystem, Climate Change, tundra, manipulation, open-top chambers.
DESCRIPTION	<p>The International Tundra Experiment (ITEX) is a collaborative effort involving scientists from more than 11 countries, including all the arctic nations. ITEX seeks to examine the response of circumpolar cold adapted plant species and tundra ecosystems to environmental change, specifically to an increase in summer temperature. Empirical knowledge based on experiments coupled with available evolutionary history, ecology, and genetics was chosen as the best way to predict species response to Climate Change.</p> <p>The ITEX research model combines long-term and short-term experimentation with monitoring and has the elegance and simplicity called for to understand ecosystem response and vulnerability to change. The experiment is designed to examine the effects of temperature change by (i) maximizing geographic representation, (ii) minimizing technical and equipment requirements, (iii) being long-term, (iv) focusing primarily on species and, if resources permit, (v) allowing for genetic and system level studies. Collectively the ITEX network is able to pool its data sets to examine vegetation response at varying levels, for example genetics (from ecotype to functional type), across space (from habitats to ecosystems) and over time. The power of ITEX is the ability to perform quantitative synthesis of observations across many sites. Due to the long-term nature of the ITEX network, many of the sites serve as a platform for monitoring and cross-site comparisons.</p>
SUITABLE SITES	Sites with tundra ecosystems where tree growth is hindered by low temperatures and short growing seasons.
VARIABLES	Participation may be at several levels of complexity and sophistication depending on interests and available funding support. Plant growth, species composition, experiments, physical variables, etc.
METHODOLOGY	Common protocols are outlined in the ITEX Manual. Every ITEX site operates some form of warming experiment. Most sites use open-top chambers to warm the tundra. These passive chambers affect plant growth and phenological development in a variety of ways. It is possible to become an ITEX site without necessarily including a warming experiment. The critical factor is that the site measures vegetation using standardized protocols so that results can be quantitatively compared across sites.

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DATA REPOSITORY	Yes, contact the database managers, contact info on the website.
HOW TO GET INVOLVED	Join the listserv by sending an e-mail to <a href="mailto:ITEX-LIST-request@LISTS.UBC.CA">ITEX-LIST-request@LISTS.UBC.CA</a> and attend an ITEX meeting. Membership in the network is voluntary.
GEOGRAFICAL AREA	Global, tundra and tundra-like ecosystems, <a href="http://www.gvsu.edu/itex/sites-people-14.htm">www.gvsu.edu/itex/sites-people-14.htm</a> .

## Global Observation Research Initiative In Alpine Environments, GLORIA

WEBSITE	<a href="http://www.gloria.ac.at/">www.gloria.ac.at/</a>	 The logo for the GLORIA program, featuring a blue globe with a grid pattern and the word "GLORIA" in white capital letters across the center.
CONTACT ADDRESS	<a href="mailto:gloria.office@boku.ac.at">gloria.office@boku.ac.at</a>	
KEYWORDS	Ecosystems, terrestrial biology, species diversity, vegetation, temperature, Climate Change.	
DESCRIPTION	The GLORIA programme operates a world-wide long-term observation network with permanent plot sites in alpine environments. Vegetation and temperature data collected at the GLORIA sites will be used to discern trends in species diversity, composition, abundance, and temperature, and to assess and predict losses in biodiversity in these fragile alpine ecosystems that are under accelerating Climate Change pressures. The GLORIA programme aims at building globally applicable indicators for comparing magnitudes and velocities of changes of different biodiversity components across the major terrestrial biomes and climate zones on Earth. The basic focus is on vegetation and vascular plants, but where experts and funding are available, other organism groups such as bryophytes, lichens, and different vertebrate and arthropod groups are included.	
SUITABLE SITES	Sites should be in alpine environments with multiple summits. Summits need not be more than 20 elevation meters from surrounding landscape. Very steep summits and plateau-like mountains are not applicable.	
VARIABLES	Species diversity, composition, abundance and temperature.	
METHODOLOGY	A detailed description of the GLORIA Multi-summit approach can be found in the Field Manual v5 <a href="https://gloria.ac.at/downloads/manual">https://gloria.ac.at/downloads/manual</a> . It is recommended that you contact the Gloria Coordination Office to ensure proper site selection and methodologies.	
HOW TO GET INVOLVED	The implementation process from study design to data management is described on the website. New sites should be registered before starting fieldwork. The Gloria Coordination Office can be contacted at any time and asked for advice.	
GEOGRAPHICAL AREA	Global mountain areas, <a href="https://gloria.ac.at/network/global-distribution">https://gloria.ac.at/network/global-distribution</a> .	



## The Herbivory Network

WEBSITE	<a href="https://herbivory.lbhi.is/">https://herbivory.lbhi.is/</a>
CONTACT ADDRESS	<a href="mailto:herbivory.network@gmail.com">herbivory.network@gmail.com</a>
KEYWORDS	Plant-animal interactions, herbivory, ecosystems.
DESCRIPTION	<p>The Herbivory Network is a UArctic Thematic Network, established in 2014, studying herbivory in arctic and alpine ecosystems. The network currently involves more than 200 scientists from more than 20 countries. It is a group of researchers investigating plant-animal interactions in tundra environments. The goal is to form collaborative partnerships and design standardized protocols for measuring herbivory across alpine and arctic ecosystems. Ongoing changes in the composition of plant and herbivore communities are likely to have a large impact on the dynamics of arctic and alpine ecosystems and their ability to respond to changes. Beyond its ecological relevance, herbivory is an important topic for many northern communities, as the main arctic herbivores are herded (e.g. reindeer), tended as livestock (e.g. sheep) or hunted (e.g. caribou, geese and ptarmigan). The knowledge gained and methods developed in the Herbivory Network will ultimately benefit land use management and conservation around the Arctic.</p>
SUITABLE SITES	Arctic and alpine regions.
VARIABLES	Plant-animal interactions in tundra environments.
METHODOLOGY	The network has developed protocols for different groups of herbivores (vertebrates, invertebrates), focusing on the impacts of herbivores on specific parts of the ecosystem (soils), or targeted to specific experimental designs (International Tundra Experiment ITEX protocol).
DATA REPOSITORY	No.
HOW TO GET INVOLVED	If you are interested in herbivory in arctic or alpine regions and you want to join the group, just send an email to <a href="mailto:herbivory.network@gmail.com">herbivory.network@gmail.com</a>
GEOGRAFICAL AREA	Arctic and alpine ecosystems.



## Network for Arthropods of the Tundra, NeAT



WEBSITE	<a href="https://tundraarthropods.wordpress.com/">https://tundraarthropods.wordpress.com/</a>
CONTACT ADDRESS	See website for contact form.
KEYWORDS	Tundra, arthropods, protocols, population, taxonomy.
DESCRIPTION	This academic network on terrestrial and freshwater arthropods of arctic, antarctic and alpine regions brings together entomologists from research institutions around the World. The goal of NeAT is to advance communication, collaboration and knowledge about tundra arthropods.
SUITABLE SITES	Terrestrial and freshwater sites in arctic, antarctic and alpine regions.
VARIABLES	Will be decided when standard protocols are developed.
METHODOLOGY	The networks aims for developing a standardized protocol to measure invertebrate herbivory in the tundra.
DATA REPOSITORY	No.
HOW TO GET INVOLVED	Join the network by filling in an online questionnaire on the website. Information on member's areas of expertise and their email address can also be found online.
GEOGRAFICAL AREA	Arctic, antarctic and alpine regions.


## Arctic birds

WEBSITE	<a href="http://www.arcticbirds.net/">www.arcticbirds.net/</a>
CONTACT ADDRESS	<a href="mailto:mikhail-soloviev@yandex.ru">mikhail-soloviev@yandex.ru</a> or <a href="mailto:pst@zmmu.msu.ru">pst@zmmu.msu.ru</a>
KEYWORDS	Ecology, birds, breeding biology, weather, climate.
DESCRIPTION	The International Breeding Conditions Survey on Arctic Birds (ABBCS) is a joint venture of International Wader Study Group and Wetlands International's Goose and Swan Specialist Groups. This project aims at collating information on environmental conditions on breeding grounds of arctic nesting birds in a persistently updated database. The database of International Wader Study Group and Wetlands International's Goose and Swan Specialist Groups accumulates simple and most up-to-date environmental information, obtained from many arctic localities, primarily by means of distributing questionnaires among arctic field workers. Although being initially focused on waders and waterfowl, and still making main emphasis on these groups due to their dominant role in most arctic bird communities, the database now provides also for accumulation of data on other groups of arctic terrestrial birds, as their responses to changing environment have often much in common.
SUITABLE SITES	All arctic and scandinavian bird communities.
VARIABLES	Abundance, breeding performance, predators.

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METHODOLOGY	Observations on bird numbers and breeding performance during arctic summer in relation to climatic, predatory and other relevant factors.
DATA REPOSITORY	Yes, see website. Currently information is available online on bird breeding success, rodent abundance and certain weather characteristics in the Arctic in the last season 2019, and summers 1988 to 2018.
HOW TO GET INVOLVED	Download, fill in and submit the questionnaire of the International Breeding Conditions Survey on Arctic Birds from the website.
GEOGRAFICAL AREA	Arctic, Scandinavia.

### **Circumarctic Rangifer Monitoring and Assessment Network, CARMA**

WEBSITE	<a href="https://carma.caff.is/">https://carma.caff.is/</a>	
CONTACT ADDRESS	<a href="mailto:askcarma@gmail.com">askcarma@gmail.com</a>	
KEYWORDS	Ecology, Arctic, biology, zoology, botany, caribou, reindeer, monitoring.	
DESCRIPTION	CARMA is a network of researchers, managers and community people who share information on the status of the World's wild rangifer (reindeer and caribou) populations, and how they are affected by global changes, such as Climate Change and industrial development. CARMA has seen that, since the 1990s, most herds have declined, some herds almost disappearing, others experiencing up to 80% declines and, a few are stable or increasing.	
SUITABLE SITES	CARMA is primarily focused on the status of most of the large migratory rangifer herds and thus, currently, does not deal with Woodland caribou and Peary caribou in North America or forest and marine reindeer in Fennoscandia and Russia. As well, CARMA do not deal with domestic reindeer or the herding economy.	
VARIABLES	Reindeer/caribou population characteristics and related variables (e.g. climate, illness and vegetation).	
METHODOLOGY	CARMA is developing protocols so that researchers and managers across the North can adopt standardized methods to monitor the abundance and health of their rangifer herds. Data contributed to and collected under the CARMA programme will be made available to other researchers through metadata contributions and through data sharing agreements.	
DATA REPOSITORY	Yes, <a href="http://www.polardata.ca/">www.polardata.ca/</a> , use of and access to the data is outlined in a data submission form, and access is provided via a data request form.	
HOW TO GET INVOLVED	Contact <a href="mailto:askcarma@gmail.com">askcarma@gmail.com</a> .	
GEOGRAFICAL AREA	Circumarctic regions with reindeer/caribou populations, <a href="https://carma.caff.is/index.php/carma-interactive-map">https://carma.caff.is/index.php/carma-interactive-map</a> .	

## Social Sciences

### International Arctic Social Science Association, IASSA



WEBSITE	<a href="https://iassa.org/">https://iassa.org/</a>
CONTACT ADDRESS	<a href="mailto:ann.crawford@uni.edu">ann.crawford@uni.edu</a>
KEYWORDS	Sociology, social and health science, ethical principles.
DESCRIPTION	<p>IASSA was founded in 1990 in Fairbanks to establish an international association to represent arctic social scientists. The objectives are:</p> <ul style="list-style-type: none"><li>- To promote and stimulate international cooperation and to increase the participation of social scientists in national and international arctic research.</li><li>- To promote communication and coordination with other research organisations.</li><li>- To promote the active collection, exchange, dissemination, and archiving of scientific information in the arctic social sciences.</li><li>- To promote mutual respect, communication, and collaboration between social scientists and northern peoples.</li><li>- To facilitate culturally, developmentally, and linguistically appropriate education in the North.</li><li>- To follow the IASSA statement of ethical principles for the conduct of research in the Arctic.</li></ul> <p>IASSA provides guidelines for all researchers working in the North in the social, natural and health sciences, and in the humanities.</p>
SUITABLE SITES	Stations with interactions with local communities.
VARIABLES	Depends on project.
METHODOLOGY	No standard methodology, but provide guidelines for ethical science.
DATA REPOSITORY	No.
HOW TO GET INVOLVED	Membership is open to anyone interested in arctic social sciences. Membership fee required. Membership fees cover secretariat costs and assist towards organizing the ICASS and other activities further the objectives of IASSA, such as representation at Arctic Council.
GEOGRAFICAL AREA	Arctic and subarctic areas.

## 4. Disciplines studied at INTERACT stations

INTERACT stations have been established for different purposes. Some are focusing on one or a few disciplines, tightly coupled to a specific location (e.g. mountains or glaciers), while others host projects within a multitude of disciplines. Scientific activities can be divided into short-term research projects, long-term experimental projects, long-term monitoring activities etc. Many long-term monitoring efforts and experimental projects at INTERACT stations are conducted by the stations themselves or by associated scientists and thus data are often accessible, if not online, then through direct contact with the station or the relevant scientist. Short-term research projects are often conducted by external scientists, and hence data sharing is often entirely up to the scientist(s) collecting the data.

The disciplines covered by short-term research projects may be different from the disciplines covered by the long-term monitoring efforts (see Chapter 4 on monitored variable groups). This section on disciplines studied at INTERACT stations may therefore inform scientists of potentially available data from disciplines that are not monitored at the station.

In this section, we present information on which general science disciplines that are studied at the individual INTERACT stations. Descriptions of general science disciplines (Table 4.1) are followed by a table (Table 4.2) showing field stations that have hosted or are hosting research and/or monitoring projects within each discipline since the year 2000.

### Information on disciplines studied is available on INTERACT GIS

The information can also be explored in INTERACT GIS – an online GIS platform with information on station facilities, climate, surrounding environment, as well as research and monitoring information - <https://www.interact-gis.org/> - see Chapter 6.

**Table 4.1. List of disciplines used in the survey** (descriptions modified from Encyclopaedia Britannica, <https://www.britannica.com/> unless marked by \* that are modified from Wikipedia, [www.wikipedia.org](http://www.wikipedia.org)).

Physical sciences	
Astronomy	Astronomy, science that encompasses the study of all extraterrestrial objects and phenomena.
Atmospheric sciences	Atmospheric science, interdisciplinary field of study that combines the components of physics and chemistry that focus on the structure and dynamics of Earth's atmosphere.
Cryology	Cryology encompass all portions of Earth's surface, where water is in solid form, including sea ice, lake ice, river ice, snow cover, glaciers, ice caps, ice sheets, and frozen ground (which includes permafrost).*
Geology	Geology, the fields of study concerned with the solid Earth. Included are sciences such as mineralogy, geodesy, and stratigraphy.
Hydrology	Hydrology, scientific discipline concerned with the waters of the Earth, including their occurrence, distribution, and circulation via the hydrologic cycle and interactions with living things. It also deals with the chemical and physical properties of water in all its phases.

### Life Sciences

Limnic Biology	Limnic Biology is the natural science that studies life and living organisms in freshwater habitats, including natural history, taxonomy, their physical structure, chemical processes, molecular interactions, genetics, physiological mechanisms, development and evolution, ecology, etc.*
Marine Biology	Marine Biology is the natural science that studies life and living organisms in marine habitats, including natural history, taxonomy, their physical structure, chemical processes, molecular interactions, genetics, physiological mechanisms, development and evolution, ecology, etc.*
Terrestrial Biology	Terrestrial Biology is the natural science that studies life and living organisms in terrestrial habitats, including natural history, taxonomy, their physical structure, chemical processes, molecular interactions, genetics, physiological mechanisms, development and evolution, ecology, etc.*
Human biology	Human biology is an interdisciplinary area of study that examines humans through the influences and interplay of many diverse fields such as genetics, evolution, physiology, anatomy, epidemiology, anthropology, ecology, nutrition, population genetics, and sociocultural influences.*

### Social sciences

Anthropology	Anthropology, “the science of humanity,” which studies human beings in aspects ranging from the biology and evolutionary history of <i>Homo sapiens</i> to the features of society and culture that decisively distinguish humans from other animal species.
Archaeology	Archaeology is the scientific study of the material remains of past human life and activities.
Sociology	Sociology, a social science that studies human societies, their interactions, and the processes that preserve and change them.

### Interdisciplinary sciences

Climate Change	The study of changes in climate and its implications for the Earth's system including chemical, physical and biological properties.
Environmental science (incl. pollution)	Interdisciplinary academic field that draws on ecology, geology, meteorology, biology, chemistry, engineering, and physics to study environmental problems and human impacts on the environment.
Oceanography	Scientific discipline concerned with all aspects of the World’s oceans and seas, including their physical and chemical properties, their origin and geologic framework, and the life forms that inhabit the marine environment.

## Ecosystem service sciences

Agriculture	Sciences dealing with food and fibre production and processing. They include the technologies of soil cultivation, crop cultivation and harvesting, animal production, and the processing of plant and animal products for human consumption and use.
Animal husbandry	The study of animal husbandry refers to the studies of controlled cultivation, management and production of domestic animals. Animal husbandry is a sub-category of agricultural science. Here treated separately as it includes traditional reindeer herding.*
Fisheries	The study of the effects of fisheries is part of fisheries management that attempts to balance the need of fish populations with the needs of people. Fisheries science includes the studies of managed populations and draws on disciplines such as mathematics, chemistry, biology, ecology, climatology and geography.*
Forestry	Forestry is the science and craft of creating, managing, using, conserving, and repairing forests, woodlands, and associated resources for human and environmental benefits.
Hunting	The study of the effects of hunting is part of wildlife management that attempts to balance the needs of wildlife with the needs of people. Wildlife management includes the study of hunted populations and draws on disciplines such as mathematics, chemistry, biology, ecology, climatology and geography.*
Tourism	The study of the effects of tourism relates to effects on the environment and on destination communities, and its economic contributions.*

**Table 4.2.** Disciplines studies at INTERACT stations.

**Overview of disciplinary coverage**

● Yes ● No Blank: N/A

Station name	Physical sciences					Life sciences				Social sciences			Inter-disciplinary sciences			Ecosystem service sciences					
	Astronomy	Atmospheric sciences	Cryology	Geology	Hydrology	Limnic Biology	Marine Biology	Terrestrial Biology	Human biology	Anthropology	Archaeology	Sociology	Climate Change	Environmental science (incl. pollution)	Oceanography	Agriculture	Animal husbandry	Fisheries	Forestry	Hunting	Tourism
1 AWIPEV Arctic Research Base	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
2 CNR Arctic Station "Dirigibile Italia"	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
3 Ny-Ålesund Research Station – NPI Sverdrup	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
4 UK Arctic Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
5 Netherlands' Arctic Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
6 Nicolaus Copernicus University Polar Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
7 Adam Mickiewicz University Polar Station "Petuniabukta"	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
8 Czech Arctic Research Station of Josef Svoboda	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
9 Polish Polar Station Hornsund	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
10 Finse Alpine Research Centre	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
11 Nibio Svanhovd Research Station																					
12 Svartberget Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
13 Tarfala Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
14 Abisko Scientific Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
15 Kilpisjärvi Biological Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
16 Pallas-Sodankylä Stations	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
17 Kolarí Research Unit																					
18 Hyytiälä Forest Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
19 Kainuu Fisheries Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
20 Oulanka Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
21 Värriö Subarctic Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
22 Kevo Subarctic Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
23 Alpine Research and Education Station Furka																					
24 Station Hintereis	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
25 Sonnblick Observatory	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
26 Krkonoše Mountains National Park	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
27 Karkonosze Mountains National Park	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
28 M&M Kłapa Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
29 Lammin-Suo Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
30 Khibiny Educational and Scientific Station																					
31 The Arctic Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
32 Mukhrino Field Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
33 Numto Park Station																					



### Overview of disciplinary coverage

● Yes ● No Blank: N/A

Station name	Physical sciences					Life sciences				Social sciences			Inter-disciplinary sciences			Ecosystem service sciences					
	Astronomy	Atmospheric sciences	Cryology	Geology	Hydrology	Limnic Biology	Marine Biology	Terrestrial Biology	Human biology	Anthropology	Archaeology	Sociology	Climate Change	Environmental science (incl. pollution)	Oceanography	Agriculture	Animal husbandry	Fisheries	Forestry	Hunting	Tourism
34 Khanymey Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
35 Belyi Island Research Station																					
36 Willem Barentsz Biological Station																					
37 Igarka Geocryology Laboratory																					
38 Kajbasovo Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
39 Aktru Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
40 Evenkian Field Station																					
41 International Ecological Educational Center "Istomino"	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
42 Research Station Samoylov Island	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
43 Spasskaya Pad Scientific Forest Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
44 Elgeei Scientific Forest Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
45 Chokurdakh Scientific Tundra Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
46 Orotuk Field Station																					
47 Avachinsky Volcano Field Station																					
48 North-East Science Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
49 Meinyipil'gyno Community Based Biological Station																					
50 Adygine Research Station																					
51 Barrow Arctic Research Center/ Barrow Environmental Observatory	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
52 Toolik Field Station																					
53 Kluane Lake Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
54 Western Arctic Research Centre	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
55 Canadian High Arctic Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
56 M'Clintock Channel Polar Research Cabins																					
57 Churchill Northern Studies Centre																					
58 Flashline Mars Arctic Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
59 Polar Environment Atmospheric Research Laboratory	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
60 CEN Ward Hunt Island Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
61 CEN Bylot Island Field Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
62 Igloodik Research Center																					
63 CEN Salluit Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

### Overview of disciplinary coverage

● Yes ● No Blank: N/A

Station name	Physical sciences					Life sciences				Social sciences			Inter-disciplinary sciences			Ecosystem service sciences					
	Astronomy	Atmospheric sciences	Cryology	Geology	Hydrology	Limnic Biology	Marine Biology	Terrestrial Biology	Human biology	Anthropology	Archaeology	Sociology	Climate Change	Environmental science (incl. pollution)	Oceanography	Agriculture	Animal husbandry	Fisheries	Forestry	Hunting	Tourism
64 CEN Boniface River Field Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
65 CEN Umiujaq Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
66 CEN Whapmagoostui-Kuujuarapik Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
67 CEN Radisson Ecological Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
68 CEN Clearwater Lake Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
69 Nunavut Research Institute	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
70 CEN Kangiqsualujjuaq Sukuijarvik Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
71 Uapishka Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
72 Labrador Institute Research Station																					
73 DMI Geophysical Observatory – Qaanaaq																					
74 Arctic Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
75 Arctic DTU Research Station Sisimiut																					
76 Greenland Institute of Natural Resources	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
77 Sermilik Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
78 Summit Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
79 EGRIP Field Station																					
80 Zackenberg Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
81 Villum Research Station		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
82 Sudurnes Science and Learning Center	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
83 Litla-Skard	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
84 China-Iceland Arctic Observatory																					
85 RIF Field Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
86 Skálanes Nature and Heritage Center	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
87 Faroe Islands Nature Investigation																					
88 ECN Cairngorms	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

## 5. Monitored variable groups

Monitoring data is required to understand variability and change in studied variables over time and to improve our understanding of physical relationships and ecosystem processes. All stations in INTERACT monitor a set of variables (a condition for membership). Some stations monitor a limited number of predominantly climate variables, others monitor more than 1,000 different variables within a broad range of disciplines.

INTERACT stations engage in international scientific networks where possible to ensure that applied monitoring methodologies adhere to relevant standards and/or data formats. While some monitoring efforts are conducted by the station themselves, many stations also engage with external scientists to monitor a broader set of variables.

In this section, we show what variables are being monitored at INTERACT stations. The thousands of variables that are monitored across all INTERACT stations have been divided into variable groups for simplicity. The section thus provides an overview of where data within a specific group of variables should be available, if not online then through the station or associated scientists. Grouped variables monitored by INTERACT stations are listed in Table 5.1.

### **Information on monitored variable groups is available in INTERACT GIS**

Variables groups monitored at the individual INTERACT stations can also be explored in INTERACT GIS – an online GIS platform with information on station facilities, climate, surrounding environment, as well as research and monitoring information - <https://www.interact-gis.org/> - see [Chapter 6](#).

**Table 5.1.** Overview of monitored variable groups at INTERACT stations.

**Overview of monitored variables**

● Yes ● No Blank: N/A

Station name	CLIMATE														
	Meteorology						Energy balance and radiation								
	Air temperature	Air humidity	Air pressure	Wind velocity	Wind direction	Precipitation	Energy balance	Short wave incoming	Short wave outgoing	Long wave incoming	Long wave outgoing	Net radiation	UV-B	Multi-spectral	Cloud cover/hours of sunshine
1 AWIPEV Arctic Research Base	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
2 CNR Arctic Station "Dirigibile Italia"	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
3 Ny-Ålesund Research Station – NPI Sverdrup	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
4 UK Arctic Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
5 Netherlands' Arctic Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
6 Nicolaus Copernicus University Polar Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
7 Adam Mickiewicz University Polar Station "Petuniabukta"	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
8 Czech Arctic Research Station of Josef Svoboda	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
9 Polish Polar Station Hornsund	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
10 Finse Alpine Research Centre	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
11 Nibio Svanhovd Research Station															
12 Svartberget Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
13 Tarfala Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
14 Abisko Scientific Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
15 Kilpisjärvi Biological Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
16 Pallas-Sodankylä Stations	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
17 Kolari Research Unit															
18 Hyttiälä Forest Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
19 Kainuu Fisheries Research Station															
20 Oulanka Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
21 Värriö Subarctic Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
22 Kevo Subarctic Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
23 Alpine Research and Education Station Furka															
24 Station Hintereis	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
25 Sonnblick Observatory	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
26 Krkonoše Mountains National Park	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
27 Karkonosze Mountains National Park	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
28 M&M Kłapa Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
29 Lammin-Suo Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
30 Khibiny Educational and Scientific Station															
31 The Arctic Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
32 Mukhrino Field Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
33 Numto Park Station															

### Overview of monitored variables

● Yes ● No Blank: N/A

Station name	CLIMATE														
	Meteorology						Energy balance and radiation								
	Air temperature	Air humidity	Air pressure	Wind velocity	Wind direction	Precipitation	Energy balance	Short wave incoming	Short wave outgoing	Long wave incoming	Long wave outgoing	Net radiation	UV-B	Multi-spectral	Cloud cover/hours of sunshine
34 Khanymey Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
35 Belyi Island Research Station															
36 Willem Barentsz Biological Station															
37 Igarka Geocryology Laboratory															
38 Kajbasovo Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
39 Aktru Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
40 Evenkian Field Station															
41 International Ecological Educational Center "Istomino"	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
42 Research Station Samoylov Island	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
43 Spasskaya Pad Scientific Forest Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
44 Elgeei Scientific Forest Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
45 Chokurdakh Scientific Tundra Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
46 Orotuk Field Station															
47 Avachinsky Volcano Field Station															
48 North-East Science Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
49 Meinyil'gyno Community Based Biological Station															
50 Adygine Research Station															
51 Barrow Arctic Research Center/Barrow Environmental Observatory	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
52 Toolik Field Station															
53 Kluane Lake Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
54 Western Arctic Research Centre	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
55 Canadian High Arctic Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
56 M'Clintock Channel Polar Research Cabins															
57 Churchill Northern Studies Centre															
58 Flashline Mars Arctic Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
59 Polar Environment Atmospheric Research Laboratory	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
60 CEN Ward Hunt Island Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
61 CEN Bylot Island Field Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
62 Igloodik Research Center															
63 CEN Salluit Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

### Overview of monitored variables

● Yes ● No Blank: N/A

Station name	CLIMATE														
	Meteorology						Energy balance and radiation								
	Air temperature	Air humidity	Air pressure	Wind velocity	Wind direction	Precipitation	Energy balance	Short wave incoming	Short wave outgoing	Long wave incoming	Long wave outgoing	Net radiation	UV-B	Multi-spectral	Cloud cover/hours of sunshine
64 CEN Boniface River Field Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
65 CEN Umiujaq Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
66 CEN Whapmagoostui-Kuujuarapik Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
67 CEN Radisson Ecological Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
68 CEN Clearwater Lake Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
69 Nunavut Research Institute	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
70 CEN Kangiqsualujuaq Sukujjarvik Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
71 Uapishka Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
72 Labrador Institute Research Station															
73 DMI Geophysical Observatory – Qaanaaq															
74 Arctic Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
75 Arctic DTU Research Station Sisimiut															
76 Greenland Institute of Natural Resources	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
77 Sermilik Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
78 Summit Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
79 EGRIP Field Station															
80 Zackenberg Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
81 Villum Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
82 Sudurnes Science and Learning Center	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
83 Litla-Skard	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
84 China-Iceland Arctic Observatory															
85 RIF Field Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
86 Skálanes Nature and Heritage Center	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
87 Faroe Islands Nature Investigation															
88 ECN Cairngorms	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

### Overview of monitored variables

● Yes ● No Blank: N/A

Station name	GEO (part 1)																			
	Geology, geomorphology				Geophysics and Geodesy				Sub-surface characteristics							Snow				
	Quaternary geology	Sedimentology	Bedrock geology	Erosion	Gravity	Magnetic field	Aurora	Seismic activity	Ground surface temperature	Soil temperature	Soil moisture	Ground water table	Soil water chemistry	Active layer depth	Permafrost distribution	Permafrost thickness	Permafrost temperature	Snow depth	Snow cover	Snow density
1 AWIPEV Arctic Research Base	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
2 CNR Arctic Station "Dirigibile Italia"	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
3 Ny-Ålesund Research Station – NPI Sverdrup	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
4 UK Arctic Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
5 Netherlands' Arctic Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
6 Nicolaus Copernicus University Polar Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
7 Adam Mickiewicz University Polar Station "Petuniabukta"	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
8 Czech Arctic Research Station of Josef Svoboda	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
9 Polish Polar Station Hornsund	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
10 Finse Alpine Research Centre	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
11 Nibio Svanhovd Research Station																				
12 Svartberget Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
13 Tarfala Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
14 Abisko Scientific Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
15 Kilpisjärvi Biological Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
16 Pallas-Sodankylä Stations	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
17 Kolari Research Unit																				
18 Hyytiälä Forest Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
19 Kainuu Fisheries Research Station																				
20 Oulanka Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
21 Värriö Subarctic Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
22 Kevo Subarctic Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
23 Alpine Research and Education Station Furka																				
24 Station Hintereis	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
25 Sonnblick Observatory	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
26 Krkonosze Mountains National Park	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
27 Karkonosze Mountains National Park	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
28 M&M Klapa Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
29 Lammin-Suo Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
30 Khibiny Educational and Scientific Station																				
31 The Arctic Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
32 Mukhrino Field Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
33 Numto Park Station																				

### Overview of monitored variables

● Yes ● No Blank: N/A

Station name	GEO (part 2)																						
	Atmos. comp.		Greenhouse gas xchange			Energy budget				Hydrology/Limnology								Pollution					
	CO <sub>2</sub> concentration	CH <sub>4</sub> concentration	CO <sub>2</sub> exchange	CH <sub>4</sub> exchange	N <sub>2</sub> O exchange	Net radiation	Sensible heat flux	Latent heat flux	Soil heat flux	Precipitation	River water discharge/ water level	Lake water level	Water balance	Water temperature	Lake ice cover (formation/ breakup/thickness)	Suspended sediment discharge	Organic matter discharge	PAR (Photosynthetically Active Radiation)/secchi depth	Water chemistry	In air	In water	In soil	In snow (ice)
1 AWIPEV Arctic Research Base	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
2 CNR Arctic Station "Dirigibile Italia"	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
3 Ny-Ålesund Research Station – NPI Sverdrup	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
4 UK Arctic Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
5 Netherlands' Arctic Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
6 Nicolaus Copernicus University Polar Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
7 Adam Mickiewicz University Polar Station "Petuniabukta"	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
8 Czech Arctic Research Station of Josef Svoboda	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
9 Polish Polar Station Hornsund	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
10 Finse Alpine Research Centre	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
11 Nibio Svanhovd Research Station																							
12 Svartberget Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
13 Tarfala Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
14 Abisko Scientific Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
15 Kilpisjärvi Biological Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
16 Pallas-Sodankylä Stations	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
17 Kolari Research Unit																							
18 Hyytiälä Forest Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
19 Kainuu Fisheries Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
20 Oulanka Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
21 Värriö Subarctic Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
22 Kevo Subarctic Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
23 Alpine Research and Education Station Furka																							
24 Station Hintereis	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
25 Sonnblick Observatory	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
26 Krkonoše Mountains National Park	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
27 Karkonosze Mountains National Park	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
28 M&M Klapa Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
29 Lammin-Suo Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
30 Khibiny Educational and Scientific Station																							
31 The Arctic Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
32 Mukhrino Field Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
33 Numto Park Station																							



**Overview of monitored variables**

● Yes ● No Blank: N/A

Station name	GEO (part 1)																			
	Geology, geomorphology				Geophysics and Geodesy				Sub-surface characteristics							Snow				
	Quaternary geology	Sedimentology	Bedrock geology	Erosion	Gravity	Magnetic field	Aurora	Seismic activity	Ground surface temperature	Soil temperature	Soil moisture	Ground water table	Soil water chemistry	Active layer depth	Permafrost distribution	Permafrost thickness	Permafrost temperature	Snow depth	Snow cover	Snow density
34 Khanymey Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
35 Belyi Island Research Station																				
36 Willem Barentsz Biological Station																				
37 Igarka Geocryology Laboratory																				
38 Kajbasovo Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
39 Aktru Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
40 Evenkian Field Station																				
41 International Ecological Educational Center "Istomino"	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
42 Research Station Samoylov Island	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
43 Spasskaya Pad Scientific Forest Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
44 Elgeei Scientific Forest Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
45 Chokurdakh Scientific Tundra Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
46 Orotuk Field Station																				
47 Avachinsky Volcano Field Station																				
48 North-East Science Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
49 Meinyopil'gyno Community Based Biological Station																				
50 Adygine Research Station																				
51 Barrow Arctic Research Center/Barrow Environmental Observatory	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
52 Toolik Field Station																				
53 Kluane Lake Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
54 Western Arctic Research Centre	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
55 Canadian High Arctic Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
56 M'Clintock Channel Polar Research Cabins																				
57 Churchill Northern Studies Centre																				
58 Flashline Mars Arctic Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
59 Polar Environment Atmospheric Research Laboratory	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
60 CEN Ward Hunt Island Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
61 CEN Bylot Island Field Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
62 Igloodik Research Center																				
63 CEN Salluit Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

**Overview of monitored variables**

● Yes ● No Blank: N/A

Station name	GEO (part 2)																							
	Atmos. comp.		Greenhouse gas xchange			Energy budget				Hydrology/Limnology							Pollution							
	CO <sub>2</sub> concentration	CH <sub>4</sub> concentration	CO <sub>2</sub> exchange	CH <sub>4</sub> exchange	N <sub>2</sub> O exchange	Net radiation	Sensible heat flux	Latent heat flux	Soil heat flux	Precipitation	River water discharge/water level	Lake water level	Water balance	Water temperature	Lake ice cover (formation/breakup/thickness)	Suspended sediment discharge	Organic matter discharge	PAR (Photosynthetically Active Radiation)/secchi depth	Water chemistry	In air	In water	In soil	In snow (ice)	Other
34 Khanymey Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
35 Belyi Island Research Station																								
36 Willem Barentsz Biological Station																								
37 Igarka Geocryology Laboratory																								
38 Kajbasovo Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
39 Aktru Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
40 Evenkian Field Station																								
41 International Ecological Educational Center "Istomino"	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
42 Research Station Samoylov Island	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
43 Spasskaya Pad Scientific Forest Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
44 Elgeei Scientific Forest Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
45 Chokurdakh Scientific Tundra Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
46 Orotuk Field Station																								
47 Avachinsky Volcano Field Station																								
48 North-East Science Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
49 Meinypil'gyno Community Based Biological Station																								
50 Adygine Research Station																								
51 Barrow Arctic Research Center/Barrow Environmental Observatory	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
52 Toolik Field Station																								
53 Kluane Lake Research Station																								
54 Western Arctic Research Centre	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
55 Canadian High Arctic Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
56 M'Clintock Channel Polar Research Cabins																								
57 Churchill Northern Studies Centre																								
58 Flashline Mars Arctic Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
59 Polar Environment Atmospheric Research Laboratory	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
60 CEN Ward Hunt Island Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
61 CEN Bylot Island Field Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
62 Igloolik Research Center																								
63 CEN Salluit Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

### Overview of monitored variables

● Yes ● No Blank: N/A

Station name	GEO (part 1)																				
	Geology, geomorphology				Geophysics and Geodesy				Sub-surface characteristics						Snow						
	Quaternary geology	Sedimentology	Bedrock geology	Erosion	Gravity	Magnetic field	Aurora	Seismic activity	Ground surface temperature	Soil temperature	Soil moisture	Ground water table	Soil water chemistry	Active layer depth	Permafrost distribution	Permafrost thickness	Permafrost temperature	Snow depth	Snow cover	Snow density	Snow temperature
64 CEN Boniface River Field Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
65 CEN Umiujaq Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
66 CEN Whapmagoostui-Kuujuarapik Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
67 CEN Radisson Ecological Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
68 CEN Clearwater Lake Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
69 Nunavut Research Institute	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
70 CEN Kangiqsualujuaq Sukuijarvik Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
71 Uapishka Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
72 Labrador Institute Research Station																					
73 DMI Geophysical Observatory – Qaanaaq																					
74 Arctic Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
75 Arctic DTU Research Station Sisimiut																					
76 Greenland Institute of Natural Resources	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
77 Sermilik Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
78 Summit Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
79 EGRIP Field Station																					
80 Zackenberg Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
81 Villum Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
82 Sudurnes Science and Learning Center	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
83 Litla-Skard	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
84 China-Iceland Arctic Observatory																					
85 RIF Field Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
86 Skálanes Nature and Heritage Center	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
87 Faroe Islands Nature Investigation																					
88 ECN Cairngorms	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

### Overview of monitored variables

● Yes ● No Blank: N/A

Station name	GEO (part 2)																						
	Atmos. comp.		Greenhouse gas xchange			Energy budget				Hydrology/Limnology										Pollution			
	CO <sub>2</sub> concentration	CH <sub>4</sub> concentration	CO <sub>2</sub> exchange	CH <sub>4</sub> exchange	N <sub>2</sub> O exchange	Net radiation	Sensible heat flux	Latent heat flux	Soil heat flux	Precipitation	River water discharge/ water level	Lake water level	Water balance	Water temperature	Lake ice cover (formation/ breakup/thickness)	Suspended sediment discharge	Organic matter discharge	PAR (Photosynthetically Active Radiation)/secchi depth	Water chemistry	In air	In water	In soil	In snow (ice)
64 CEN Boniface River Field Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
65 CEN Umiujaq Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
66 CEN Whapmagoostui-Kuujuarapik Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
67 CEN Radisson Ecological Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
68 CEN Clearwater Lake Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
69 Nunavut Research Institute	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
70 CEN Kangiqsualujuaq Sukuijark Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
71 Uapishka Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
72 Labrador Institute Research Station																							
73 DMI Geophysical Observatory – Qaanaaq																							
74 Arctic Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
75 Arctic DTU Research Station Sisimiut																							
76 Greenland Institute of Natural Resources	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
77 Sermilik Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
78 Summit Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
79 EGRIP Field Station																							
80 Zackenberg Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
81 Villum Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
82 Sudurnes Science and Learning Center	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
83 Litla-Skard	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
84 China-Iceland Arctic Observatory																							
85 RIF Field Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
86 Skálanes Nature and Heritage Center	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
87 Faroe Islands Nature Investigation																							
88 ECN Cairngorms	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

### Overview of monitored variables

● Yes ● No Blank: N/A

Station name	GLACIER																									
	Glacier characteristics								Mass balance					Climate		Glacier hydrology				Biogeochemistry	Microbiology	Particles, aerosols	Pollutants	Isotope chemistry		
	Glacier area	Topography	Elevation change	Terminus position	Ice velocity	Ice thickness	Debris cover	Surface albedo	Mass balance	Snow water equivalent	Snowcover stratigraphy	Equilibrium Line Altitude	Duration of snow cover	Calving flux	Climate measurements	Energy balance	Run-off	Drainage system	Meltwater retention						Glacial lake outburst floods	
1 AWIPEV Arctic Research Base	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
2 CNR Arctic Station "Dirigibile Italia"	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
3 Ny-Ålesund Research Station – NPI Sverdrup	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
4 UK Arctic Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
5 Netherlands' Arctic Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
6 Nicolaus Copernicus University Polar Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
7 Adam Mickiewicz University Polar Station "Petuniabukta"	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
8 Czech Arctic Research Station of Josef Svoboda	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
9 Polish Polar Station Hornsund	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
10 Finse Alpine Research Centre	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
11 Nibio Svanhovd Research Station																										
12 Svartberget Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
13 Tarfala Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
14 Abisko Scientific Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
15 Kilpisjärvi Biological Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
16 Pallas-Sodankylä Stations	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
17 Kolari Research Unit																										
18 Hyttiälä Forest Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
19 Kainuu Fisheries Research Station																										
20 Oulanka Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
21 Värriö Subarctic Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
22 Kevo Subarctic Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
23 Alpine Research and Education Station Furka																										
24 Station Hintereis	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
25 Sonnblick Observatory	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
26 Krkonoše Mountains National Park	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
27 Karkonosze Mountains National Park	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
28 M&M Klapa Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
29 Lammin-Suo Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
30 Khibiny Educational and Scientific Station																										
31 The Arctic Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
32 Mukhrino Field Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
33 Numto Park Station																										

### Overview of monitored variables

● Yes ● No Blank: N/A

Station name	GLACIER																						
	Glacier characteristics							Mass balance					Climate		Glacier hydrology				Biogeochemistry	Microbiology	Particles, aerosols	Pollutants	Isotope chemistry
	Glacier area	Topography	Elevation change	Terminus position	Ice velocity	Ice thickness	Debris cover	Surface albedo	Mass balance	Snow water equivalent	Snowcover stratigraphy	Equilibrium Line Altitude	Duration of snow cover	Calving flux	Climate measurements	Energy balance	Run-off	Drainage system					
34 Khanymey Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
35 Belyi Island Research Station																							
36 Willem Barentsz Biological Station																							
37 Igarka Geocryology Laboratory																							
38 Kajbasovo Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
39 Aktru Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
40 Evenkian Field Station																							
41 International Ecological Educational Center "Istomino"	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
42 Research Station Samoylov Island	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
43 Spasskaya Pad Scientific Forest Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
44 Elgeii Scientific Forest Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
45 Chokurdakh Scientific Tundra Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
46 Orotuk Field Station																							
47 Avachinsky Volcano Field Station																							
48 North-East Science Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
49 Meinypl'gyno Community Based Biological Station																							
50 Adygine Research Station																							
51 Barrow Arctic Research Center/Barrow Environmental Observatory	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
52 Toolik Field Station																							
53 Kluane Lake Research Station																							
54 Western Arctic Research Centre																							
55 Canadian High Arctic Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
56 M'Clintock Channel Polar Research Cabins																							
57 Churchill Northern Studies Centre																							
58 Flashline Mars Arctic Research Station																							
59 Polar Environment Atmospheric Research Laboratory	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
60 CEN Ward Hunt Island Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
61 CEN Bylot Island Field Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
62 Igloolik Research Center																							
63 CEN Salluit Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	

### Overview of monitored variables

● Yes ● No Blank: N/A

Station name	GLACIER																						
	Glacier characteristics							Mass balance					Climate		Glacier hydrology				Biogeochemistry	Microbiology	Particles, aerosols	Pollutants	Isotope chemistry
	Glacier area	Topography	Elevation change	Terminus position	Ice velocity	Ice thickness	Debris cover	Surface albedo	Mass balance	Snow water equivalent	Snowcover stratigraphy	Equilibrium Line Altitude	Duration of snow cover	Calving flux	Climate measurements	Energy balance	Run-off	Drainage system					
64 CEN Boniface River Field Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●			
65 CEN Umiujaq Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●			
66 CEN Whapmagoostui-Kuujuarapik Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●			
67 CEN Radisson Ecological Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●			
68 CEN Clearwater Lake Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●			
69 Nunavut Research Institute	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●			
70 CEN Kangiqsualujuaq Sukuijarvik Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●			
71 Uapishka Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●			
72 Labrador Institute Research Station																							
73 DMI Geophysical Observatory – Qaanaaq																							
74 Arctic Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●			
75 Arctic DTU Research Station Sisimiut																							
76 Greenland Institute of Natural Resources	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●			
77 Sermilik Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●			
78 Summit Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●			
79 EGRIP Field Station																							
80 Zackenberg Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●			
81 Villum Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●			
82 Sudurnes Science and Learning Center	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●			
83 Litla-Skard	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●			
84 China-Iceland Arctic Observatory																							
85 RIF Field Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●			
86 Skálanes Nature and Heritage Center	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●			
87 Faroe Islands Nature Investigation																							
88 ECN Cairngorms	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●			

### Overview of monitored variables

● Yes ● No Blank: N/A

Station name	BIO (part 1)																					
	Vegetation										Arthropods					Birds						
	Flowering phenology	Amount of flowering	NDVI (plot/transect)	Landscape NDVI (from satellite images)	Vascular plant (community composition)	Bryophyte (community composition)	Lichen (community composition)	Fungi (community composition)	Berry production	Aerobiological monitoring	Species list (community composition)	Abundance	Emergence phenology	Insect herbivory	Species list (community composition)	Abundance	Distribution	Phenology	Breeding birds	Nest initiation phenology	Nest predation rates	Species list (community composition)
1 AWIPEV Arctic Research Base	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
2 CNR Arctic Station "Dirigibile Italia"	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
3 Ny-Ålesund Research Station - NPI Sverdrup	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
4 UK Arctic Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
5 Netherlands' Arctic Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
6 Nicolaus Copernicus University Polar Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
7 Adam Mickiewicz University Polar Station "Petuniabukta"	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
8 Czech Arctic Research Station of Josef Svoboda	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
9 Polish Polar Station Hornsund	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
10 Finse Alpine Research Centre	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
11 Nibio Svanhovd Research Station																						
12 Svartberget Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
13 Tarfala Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
14 Abisko Scientific Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
15 Kilpisjärvi Biological Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
16 Pallas-Sodankylä Stations	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
17 Kolarí Research Unit																						
18 Hyttiälä Forest Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
19 Kainuu Fisheries Research Station																						
20 Oulanka Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
21 Värriö Subarctic Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
22 Kevo Subarctic Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
23 Alpine Research and Education Station Furka																						
24 Station Hintereis	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
25 Sonnblick Observatory	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
26 Krkonoše Mountains National Park	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
27 Karkonosze Mountains National Park	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
28 M&M Klapa Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
29 Lammin-Suo Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
30 Khibiny Educational and Scientific Station																						
31 The Arctic Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
32 Mukhrino Field Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
33 Numto Park Station																						



### Overview of monitored variables

● Yes ● No Blank: N/A

Station name	BIO (part 2)																								
	Mammals						Lake ecology						Microbiology			Pollution				Disturbances					
	Mammal abundance	Mammal distribution	Mammal reproduction	Mortality	Predation	Physiology	Species list (community composition)	Phytoplankton (chlorophyll?)	Zooplankton	Vegetation	Fish Invertebrates	Species list (community composition)	Interstitial fauna	Species list (community composition)	Collection of tissue	Vegetation	Water	Mammals	Birds	Diseases in flora and fauna	Parasites in flora and fauna	Number of visitors	Sampling, manipulation, traffic etc.	Aircraft activities	Emissions, discharge and garbage
1 AWIPEV Arctic Research Base	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
2 CNR Arctic Station "Dirigibile Italia"																									
3 Ny-Ålesund Research Station – NPI Sverdrup	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
4 UK Arctic Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
5 Netherlands' Arctic Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
6 Nicolaus Copernicus University Polar Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
7 Adam Mickiewicz University Polar Station "Petuniabukta"	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
8 Czech Arctic Research Station of Josef Svoboda	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
9 Polish Polar Station Hornsund	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
10 Finse Alpine Research Centre	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
11 Nibio Svanhovd Research Station																									
12 Svartberget Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
13 Tarfala Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
14 Abisko Scientific Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
15 Kilpisjärvi Biological Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
16 Pallas-Sodankylä Stations	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
17 Kolarí Research Unit																									
18 Hyttiälä Forest Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
19 Kainuu Fisheries Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
20 Oulanka Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
21 Värriö Subarctic Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
22 Kevo Subarctic Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
23 Alpine Research and Education Station Furka																									
24 Station Hintereis	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
25 Sonnblick Observatory	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
26 Krkonoše Mountains National Park	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
27 Karkonosze Mountains National Park	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
28 M&M Klapa Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
29 Lammin-Suo Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
30 Khibiny Educational and Scientific Station																									
31 The Arctic Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
32 Mukhrino Field Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
33 Numto Park Station																									

### Overview of monitored variables

● Yes ● No Blank: N/A

Station name	BIO (part 1)																					
	Vegetation										Arthropods					Birds						
	Flowering phenology	Amount of flowering	NDVI (plot/transect)	Landscape NDVI (from satellite images)	Vascular plant (community composition)	Bryophyte (community composition)	Lichen (community composition)	Fungi (community composition)	Berry production	Aerobiological monitoring	Species list (community composition)	Abundance	Emergence phenology	Insect herbivory	Species list (community composition)	Abundance	Distribution	Phenology	Breeding birds	Nest initiation phenology	Nest predation rates	Species list (community composition)
34 Khanymey Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
35 Belyi Island Research Station																						
36 Willem Barentsz Biological Station																						
37 Igarka Geocryology Laboratory																						
38 Kajbasovo Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
39 Aktru Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
40 Evenkian Field Station																						
41 International Ecological Educational Center "Istomino"	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
42 Research Station Samoylov Island	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
43 Spasskaya Pad Scientific Forest Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
44 Elgeei Scientific Forest Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
45 Chokurdakh Scientific Tundra Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
46 Orotuk Field Station																						
47 Avachinsky Volcano Field Station																						
48 North-East Science Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
49 Meinyipil'gyno Community Based Biological Station																						
50 Adygine Research Station																						
51 Barrow Arctic Research Center/Barrow Environmental Observatory	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
52 Toolik Field Station																						
53 Kluane Lake Research Station																						
54 Western Arctic Research Centre	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
55 Canadian High Arctic Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
56 M'Clintock Channel Polar Research Cabins																						
57 Churchill Northern Studies Centre																						
58 Flashline Mars Arctic Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
59 Polar Environment Atmospheric Research Laboratory	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
60 CEN Ward Hunt Island Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
61 CEN Bylot Island Field Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
62 Igloolik Research Center																						
63 CEN Salluit Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

### Overview of monitored variables

● Yes ● No Blank: N/A

Station name	BIO (part 2)																								
	Mammals						Lake ecology						Micro-biology			Pollution				Disturbances					
	Mammal abundance	Mammal distribution	Mammal reproduction	Mortality	Predation	Physiology	Species list (community composition)	Phytoplankton (chlorophyll?)	Zooplankton	Vegetation	Fish Invertebrates	Species list (community composition)	Interstitial fauna	Species list (community composition)	Collection of tissue	Vegetation	Water	Mammals	Birds	Diseases in flora and fauna	Parasites in flora and fauna	Number of visitors	Sampling, manipulation, traffic etc.	Aircraft activities	Emissions, discharge and garbage
34 Khanymey Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
35 Belyi Island Research Station																									
36 Willem Barentsz Biological Station																									
37 Igarka Geocryology Laboratory																									
38 Kajbasovo Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
39 Aktru Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
40 Evenkian Field Station																									
41 International Ecological Educational Center "Istomino"	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
42 Research Station Samoylov Island	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
43 Spasskaya Pad Scientific Forest Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
44 Elgeei Scientific Forest Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
45 Chokurdakh Scientific Tundra Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
46 Orotuk Field Station																									
47 Avachinsky Volcano Field Station																									
48 North-East Science Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
49 Meinyipil'gyno Community Based Biological Station																									
50 Adygine Research Station																									
51 Barrow Arctic Research Center/Barrow Environmental Observatory	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
52 Toolik Field Station																									
53 Kluane Lake Research Station																									
54 Western Arctic Research Centre																									
55 Canadian High Arctic Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
56 M'Clintock Channel Polar Research Cabins																									
57 Churchill Northern Studies Centre																									
58 Flashline Mars Arctic Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
59 Polar Environment Atmospheric Research Laboratory	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
60 CEN Ward Hunt Island Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
61 CEN Bylot Island Field Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
62 Igloodik Research Center																									
63 CEN Salluit Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

### Overview of monitored variables

● Yes ● No Blank: N/A

Station name	BIO (part 1)																					
	Vegetation										Arthropods					Birds						
	Flowering phenology	Amount of flowering	NDVI (plot/transect)	Landscape NDVI (from satellite images)	Vascular plant (community composition)	Bryophyte (community composition)	Lichen (community composition)	Fungi (community composition)	Berry production	Aerobiological monitoring	Species list (community composition)	Abundance	Emergence phenology	Insect herbivory	Species list (community composition)	Abundance	Distribution	Phenology	Breeding birds	Nest initiation phenology	Nest predation rates	Species list (community composition)
64 CEN Boniface River Field Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
65 CEN Umiujaq Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
66 CEN Whapmagoostui-Kuujuarapik Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
67 CEN Radisson Ecological Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
68 CEN Clearwater Lake Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
69 Nunavut Research Institute	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
70 CEN Kangiqsualujuaq Sukuijarvik Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
71 Uapishka Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
72 Labrador Institute Research Station																						
73 DMI Geophysical Observatory – Qaanaaq																						
74 Arctic Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
75 Arctic DTU Research Station Sisimiut																						
76 Greenland Institute of Natural Resources	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
77 Sermilik Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
78 Summit Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
79 EGRIP Field Station																						
80 Zackenberg Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
81 Villum Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
82 Sudurnes Science and Learning Center	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
83 Litla-Skard	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
84 China-Iceland Arctic Observatory																						
85 RIF Field Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
86 Skálanes Nature and Heritage Center	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
87 Faroe Islands Nature Investigation																						
88 ECN Cairngorms	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

### Overview of monitored variables

● Yes ● No Blank: N/A

Station name	BIO (part 2)																								
	Mammals					Lake ecology					Micro-biology			Pollution				Disturbances							
	Mammal abundance	Mammal distribution	Mammal reproduction	Mortality	Predation	Physiology	Species list (community composition)	Phytoplankton (chlorophyll?)	Zooplankton	Vegetation	Fish Invertebrates	Species list (community composition)	Interstitial fauna	Species list (community composition)	Collection of tissue	Vegetation	Water	Mammals	Birds	Diseases in flora and fauna	Parasites in flora and fauna	Number of visitors	Sampling, manipulation, traffic etc.	Aircraft activities	Emissions, discharge and garbage
64 CEN Boniface River Field Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
65 CEN Umiujaq Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
66 CEN Whapmagoostui-Kuujuarapik Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
67 CEN Radisson Ecological Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
68 CEN Clearwater Lake Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
69 Nunavut Research Institute	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
70 CEN Kangiqsualujjuaq Sukuijarvik Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
71 Uapishka Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
72 Labrador Institute Research Station																									
73 DMI Geophysical Observatory – Qaanaaq																									
74 Arctic Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
75 Arctic DTU Research Station Sisimiut																									
76 Greenland Institute of Natural Resources	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
77 Sermilik Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
78 Summit Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
79 EGRIP Field Station																									
80 Zackenberg Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
81 Villum Research Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
82 Sudurnes Science and Learning Center	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
83 Litla-Skard	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
84 China-Iceland Arctic Observatory																									
85 RIF Field Station	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
86 Skálanes Nature and Heritage Center	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
87 Faroe Islands Nature Investigation																									
88 ECN Cairngorms	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

## 6. INTERACT Tools for accessing the Arctic

### 6.1 INTERACT GIS – an online INTERACT tool to identify relevant research stations

Selecting an appropriate field site for obtaining the data needed for a specific study is an important aspect of many research and monitoring projects. Searching for relevant study sites in the Arctic can, however, be difficult, and often requires local knowledge or good contacts. INTERACT has therefore developed an online tool with filtering options and a search function that allows you to explore stations and identify those that suits your needs – this system is called INTERACT GIS and is described below.

Note that there are other research stations that are not part of INTERACT and that it is also possible to conduct your study outside of research stations. It is, however, beyond the scope of this report to include information on this.

#### **INTERACT GIS - [www.interact-gis.org](http://www.interact-gis.org)**

INTERACT GIS is a tool for INTERACT research stations to share information about their station. It can thus be used by scientists to explore the different stations in INTERACT and to search for a station with specific facilities, environmental features, monitored variables, etc.

INTERACT GIS lets you explore:

- Contact information
- Detailed text descriptions of stations
- Location, natural environment and climate
- Facilities and services offered
- Scientific disciplines being studied
- Variable groups being monitored
- Project metadata for projects conducted since Year 2000 (note that some stations do not offer this information while others share project metadata from before Year 2000).

#### **Other INTERACT sources worth exploring**

As a supplement to INTERACT GIS, the INTERACT website may also hold additional information giving potential visitors a visual impression of the station and its surroundings, i.e.:

- The INTERACT Station Catalogue
- INTERACT station webpages
  - o INTERACT Street View – where you can explore station facilities and their surroundings through a series of 360-degree photos.
  - o Video presentations of the stations made by the stations themselves.

Furthermore, over 30 stations offer online access to data, which may be of relevance to new visitors (read more about INTERACT Virtual Access below).

## How to use INTERACT GIS

### Exploring stations and the science conducted here

Anyone can explore INTERACT stations in INTERACT GIS. It is possible to search for stations in specific climate zones or with a certain cryospheric elements (permafrost, glacier, etc.) or stations offering access to a specific natural feature. Clicking on specific stations allows you to see facts about the station, its facilities and surroundings, as well as which scientific disciplines are studied and what variable groups are being monitored.

### Applying for access

Most research stations require that scientists submit an application for access to the station. The information needed to apply for access to INTERACT stations varies significantly, depending on their remoteness, the complexity of their logistics, etc. Many stations therefore have developed their own application system to ensure that they receive relevant information needed to assess both science quality, safety issues, permit requirements and logistical needs.

INTERACT GIS also includes links to where you can apply for access to specific INTERACT stations; either through INTERACT GIS or through a link to the station's own application system or website with further information about how to apply for access.

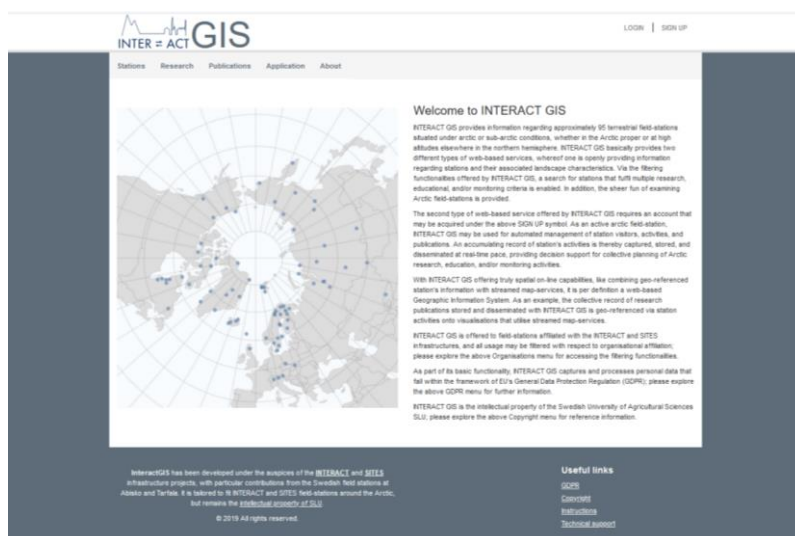
### INTERACT GIS application module

INTERACT GIS includes a general application module that stations can use (currently only a few stations offer access application through INTERACT GIS). In order to apply for access through INTERACT GIS, you need to register in INTERACT GIS. Once registered, you can log into the system and apply for access to the stations that use the INTERACT GIS application module. Once logged in, create a project under 'My items', then go to the 'Application form' and follow the guidelines.

### As a station manager

Station managers register in INTERACT GIS and the system operator assign them the role as station manager of their station. This allow station managers to enter and update all information in INTERACT GIS (text descriptions, photos, facilities information, natural features and science). If the station uses the application module, the system also allows handling of applications with review and approval functions.

The INTERACT GIS website – [www.interact-gis.org](http://www.interact-gis.org)



## Explore station websites and contact station manager if needed

You can find additional information on the station's own websites, where they may give more details on facilities and practical information related to application procedures, logistics, permit issues, accommodation, safety, etc.

Station managers can be contacted to help ensure that your research can be accomplished at the station, and they can inform you about existing knowledge/data or knowledge gaps of relevance to your study. Before you contact the station manager, please take a closer look at INTERACT GIS and the website of the station. Should you have questions for the station manager, pool as many questions together when you contact them, to minimise the number of e-mails, phone calls, etc. Contact details for station managers can be found on the INTERACT website, in INTERACT GIS and normally also on the website for the relevant station (links available on the INTERACT website and in INTERACT GIS).

INTERACT website - <https://eu-interact.org/field-sites/>

INTERACT GIS - [www.interact-gis.org](http://www.interact-gis.org)

INTERACT Access Infrastructure contacts - <https://eu-interact.org/accessing-the-arctic/infrastructures/>

## 6.2 Accessing INTERACT stations and their data – the three access modalities of INTERACT

Once you have identified the data needed to conduct your research and found one or more INTERACT stations, from where you need data, it is time to decide on the right way (or combination of ways) to obtain these data. Funding to go to INTERACT stations are often obtained from research institution budgets, or government or private donor grants. INTERACT, however, also provide opportunities for access to INTERACT stations and their data.

INTERACT offers three modes of 'access' (described in detail below):

- Virtual Access - Online access to existing data sets.
- Remote Access - Station staff collect data/samples for you.
- Transnational Access - Physical access to research station.



## INTERACT Access Programmes

### Virtual Access in INTERACT

Virtual Access means free access to data and databases of INTERACT stations. More than 25 stations offer free online access to data generated at the stations.

Check out the INTERACT website to learn which stations offer Virtual Access  
<https://eu-interact.org/accessing-the-arctic/virtual-access/>

#### Virtual Access data are ideal for:

Retrospective/historical data
Time series (monitoring data)
Data from larger areas/many sites
Obtaining comparable data from other areas than your own study area
Obtaining background data or complimentary data from the location, where you are obtaining new data
Minimising CO <sub>2</sub> emissions from travels to field sites

### Remote Access

Remote Access is a form of access in which the user(s) do not visit the infrastructure physically themselves. Instead, the staff of the infrastructure is collecting data or samples for the user(s) in accordance with a manual produced by the user(s).

Check out the INTERACT website to learn which stations offer Remote Access  
<https://eu-interact.org/accessing-the-arctic/infrastructures/>

Calls for Remote Access are advertised on the INTRACT website  
<https://eu-interact.org/accessing-the-arctic/tacall/>

#### Remote Access is ideal for:

Various field data that do not depend on very specialised skills during collection
Doing a very simple sampling/experiments at several sites
Data from one or several sites
Filling a data gap
Obtaining comparable data from other areas than your own study area
Obtaining background data or complimentary data from the location, where you obtain new data
Minimising CO <sub>2</sub> emissions from travels to field sites
Developing longer term cooperation with station(s), e.g. implementation of scientific network standards for contribution to regional/global assessments (requires agreement by station)

#### Requirements for Remote Access studies

Simple experimental setup and instructions
You are able to provide necessary equipment, if the station does not have it available
Staff with required skills available at the station (no expert knowledge or special training required)
Staff available at the required time of data collection

## Transnational Access

Transnational Access means free of charge, transnational physical access to research infrastructures for selected user groups. INTERACT Transnational Access calls will be open annually in the autumn for the summer and winter seasons of the following year. In addition, 1-2 additional calls may be arranged with focus on specific themes or stations.

Check out the INTERACT website to learn which stations offer Transnational Access

<https://eu-interact.org/accessing-the-arctic/infrastructures/>

Calls for Remote Access are advertised on the INTERACT website

<https://eu-interact.org/accessing-the-arctic/tacall/>.

### Transnational Access is ideal for:

Collecting your own research and monitoring data and samples

Complex studies requiring specific skills

Data from one or a few sites

Filling a data gap

Developing longer term cooperation with station(s), e.g. implementation of scientific network standards for contribution to regional/global assessments (requires agreement by station)

### Requirements for Transnational Access studies

Eligible applicants – see <https://eu-interact.org/accessing-the-arctic/tacall/>

Station open and space available in required period

Acceptance by the station upon evaluation by INTERACT Transnational Advisory Board

See Box 6.1 below for a stepwise approach to selecting appropriate success modality.

**Box 6.1. Stepwise approach to selecting appropriate access mechanism**

1. Are required data available from the station or data repository?

Conduct a data search through international repositories, explore INTERACT Virtual ACCESS or contact station manager to identify potential data sources you can use.

- a. Yes, data exist and are available – choose **Virtual Access**
- b. No, not all required data exists or can be obtained – go to 2

2. Is the station offering Remote Access?

Check out the INTERACT website for which stations offer Remote Access

- a. Yes – go to 3
- b. No – go to 5

3. Can the methodology be carried out by a field assistant with only general science skills?

Consider if it is possible to make a simple description of the methodology and provide required (and easily operated) sampling equipment that allow non-experts to collect the data/samples.

- a. Yes – go to 4
- b. No - go to 5

4. Does the station have staff available for collecting the data/samples at the required location/time, and can they accept the task?

Contact the station to ensure that they have the required time, resources and skills to accomplish the required data/sample collection.

- a. Yes – choose **Remote Access**(if you apply for Transnational Access, but it is not granted – go to 6)
- b. No – go to 5

5. Is the station offering Transnational Access (physical access)?

Physical access to the infrastructure is the only mean to acquire the data/samples you need. Check out the INTERACT website for which stations offer Transnational Access or if you need to find alternative funding sources.

- a. Yes – choose **Transnational Access** (if you apply for Transnational Access, but it is not granted – go to 6)
- b. No – go to 6

6. Can the study be conducted at the station?

Contact station to enquire about possibilities for conducting your proposed study at their station.

## Appendix 1. Variables used to describe organisations and networks that INTERACT stations or associated scientists contributes to.

Name of organisation, network, programme, project, etc.	Definition
<b>Acronym</b>	
<b>Website</b>	
<b>Network type</b>	
Scientific – monitoring	Scientific network/organisation doing continuous collection of standardised data within one or more disciplines
Scientific – assessment	Scientific network/organisations doing periodical gathering of historic data to make assessments within one or more disciplines
Scientific – research project	Scientific network/organisation doing short term research projects, often with changing topics and or geographical coverage within one or more disciplines
Database/data journal	Institution/organisation managing and operating online data repositories or data journals
Advisory organisation	Organisation established to provide advice to government agencies (e.g. on Climate Change adaptation, sustainable development, etc.)
Infrastructure network/organisation	Network/organisation of research infrastructures established to improve services offered to the scientific community
Others	
<b>Network level</b>	
Science driven	Driven by scientists
Intergovernmental – Global	Driven by countries, often with nationally appointed representatives - Global
Intergovernmental – Arctic	Driven by countries, often with nationally appointed representatives – Circumarctic
Intergovernmental – Regional/Multilateral	Driven by countries, often with nationally appointed representatives - geographic region, more than two countries
Intergovernmental – Bilateral	Driven by countries, often with nationally appointed representatives - two countries
National governmental	Driven by authorities
<b>Standard methodology</b>	
Standard monitoring protocols	Network/organisation have developed standard sampling protocols to be followed by members
Harmonisation of data sets	Network/organisation harmonise data sets gathered from different members using different methodologies



None	Network/organisation use whatever methodology is relevant for their specific purpose
<b>Database</b>	
Yes	The network has a data repository/database, being publically available or not.
No	The network does not have a data repository/database
<b>Membership (person, station, institution, country?)</b>	
Person	Person/scientist associated with station
Research station	Research station located in arctic, boreal or alpine areas, long-term, open for external visitors and conducting some level of monitoring
Institution	Institutions operating the research station
Country	National appointed representative (often by government), coordinating national input
<b>Geographical coverage</b>	
Global	
Arctic	
North American	
European	
Asian (including Russia)	
Atlantic	
Pacific	
Multilateral	Network between several countries, crossing regions
Bilateral	Network between two countries
National	Network within one country

## Appendix 2. List of intergovernmental organisations and scientific networks INTERACT stations or associated scientists contributes to.

Name of organisation, network, programme or project.	Acronym	Geographical coverage	Advisory organisations	Monitoring organisations	Assessment organisations	Research organisations	Infrastructure network	Data repository/data journal	Other (Network of networks, education, etc)	Network initiator	Standard methodology/ harmonisation of data	Database	Membership (person, Research station, institution, network, country)	Discipline
A Long-Term Biodiversity, Ecosystem and Awareness Research Network	ALTER-Net	European				1				Science driven	None	No	Institution	Biology
ABOVE project from NASA	ABOVE	North American				1				Intergovernmental	Standard protocols	No	Country, person	Terrestrial Biology
Aerosol Robotic Network	AERONET	Global		1		1				Science driven	Standard protocols	Yes	Institution, person	Atmospheric sciences
Aerosols, Clouds, and Trace gases Research Infrastructure Network	ACTRIS	European					1			Science driven	None	Yes	Country	Atmospheric chemistry
AMAP - Adaptation Actions for a Changing Climate	AMAP/ AACA	Arctic	1	1	1					Intergovernmental	Harmonisation	No	Country	Climate Change
AMAP - Arctic Contaminants Action Programme	ACAP	Arctic	1	1		1				Intergovernmental	Harmonisation	No	Country	Environmental science
AMAP - Snow, Water Ice and Permafrost Assessment	SWIPA	Arctic	1		1					Intergovernmental	Harmonisation	Yes	Country, persons	Multidisciplinary
Analysis of aerosol transport patterns from Northern Europe	ANNA	European				1				Intergovernmental	Standard protocols	No	Person	Atmospheric chemistry
Aquaculture infrastructures for Excellence in European fish research towards 2020	AQUAEXCEL2020	European				1				Intergovernmental	None	No	Research station, Institution	Fishing
Arctic Birds Breeding Condition Survey	Arctic Birds	Arctic		1						Science driven	Harmonisation	Yes	Person	Terrestrial Biology
Arctic Coastal Dynamics	ACD	Arctic				1				Science driven	Standard protocols	Yes	Institution, Person	Geology



Arctic Great Rivers Observatory	Arctic GRO	Arctic				1				Science driven	Standard protocols	Yes	Person	Limnic Biology, Hydrology
Arctic Monitoring and Assessment Programme	AMAP	Arctic	1	1	1					Intergovernmental	Harmonisation	No	Country	Climate Change
Arctic Observatory Network	AON	Bilateral		1						Science driven	Standard protocols	Yes	Institution	Multidisciplinary
Arctic Research Consortium of the United States	Arcus	Arctic				1	1			National governmental	None	No	Institution	Multidisciplinary
Arctic Science Partnership	ASP	Arctic				1				Science driven	None	No	Person, Institution	Multidisciplinary
ArcticWEB	ArcticWEB	Arctic					1			Intergovernmental	None	No	Institution	Infrastructure network
Association of Canadian Universities for Northern Studies	ACUNS	Canadian					1			Science driven	None	No	Institution	Multidisciplinary
Association of Polar Early Career Scientists	APECS	Polar				1	1			Science driven	None	No	Person	Multidisciplinary
Austrian Radiation Network	ARAD	Austrian	1							Science driven	Standard protocols	No	Institution	Geology
AUTUMNX Magnetometer Network	AUTUMNX	Canadian						1		Science driven	Standard protocols	Yes	Research station, Institution	Geology
Bartol Research Institute Neutron Monitor Program	BRINMP	Global		1						Science driven	Standard protocols	Yes	Institution	Astrophysics
Baseline Surface Radiation Network	BSRN	Global		1						Science driven	Standard protocols	Yes	Research station, Institution, Person	Geology
Beaufort Sea Partnership	BSP	Canadian	1							Science driven	None	Yes	Institution	Marine Biology
CAFF - Arctic Biodiversity Data Service	ABDS	Arctic						1		Science driven	Harmonisation	Yes	Institution, person	Biology
CAFF - Arctic Migratory Bird Initiative	CAFF/AMBI	Arctic				1				Intergovernmental	None	No	Country	Terrestrial Biology
CAFF - Circum Arctic Rangifer Monitoring and Assessment Network	CARMA	Arctic	1	1	1					Science driven	Standard protocols	Yes	Institution, person	Terrestrial Biology
CAFF - Circumpolar Biodiversity Monitoring Program	CAFF/CBMP	Arctic	1				1			Intergovernmental	Standard protocols	Yes	Country	Terrestrial biology
CAFF - Circumpolar Flora Group	CAFF/Flora	Arctic	1							Intergovernmental	Harmonisation	Yes	Country	Terrestrial Biology
CAFF - Seabirds	CAFF/C-Bird	Arctic	1	1	1					Intergovernmental	Harmonisation	Yes	Country	Marine Biology, Hunting
Canada and Greenland Joint Commission on Polar Bear	SWG	Atlantic				1				Intergovernmental	Harmonisation	No	Country, Institution	Marine biology
Canada and Greenland Joint commission on narwhal and beluga	JCNB	Bilateral	1							Intergovernmental	None	No	Appointed members	Marine Biology, Hunting
Canadian Network of Norther Research Operators	CNNRO	Canadian					1			Science driven	None	No	Institution	Infrastructure network
Circumarctic Active Layer Monitoring	CALM	Arctic		1						Science driven	Standard protocols	Yes	Institution	Geology
Circum-Arctic Lakes Observation Network	CALON	Arctic		1						Science driven	None	No	Person	Limnic Biology



Climate and Cryosphere	ClIC	Global				1									Intergovernmental	None	Yes	Country	Cryology, Atmospheric Science
Common Operations of Environmental Research Infrastructures	ENVRI	European		1		1									Science driven	None	No	Institution	Infrastructure network
Community Collaborative Rain, Hail, and Snow Network	CCRHSN	USA		1											Science driven	Standard protocols	Yes	Person	Climatology
Cumulative Impacts Monitoring Program	CIMP	Canadian		1											Science driven	Standard protocols	Yes	Institution	Environmental science
Data Publisher for Earth & Environmental Science	PANGEA	Global							1						Science driven	Harmonisation	Yes	Institution, person	Environmental science, Geology
Emodnet - Bathymetry (Mapping European bathymetry)	Emodnet - HRSM	European				1									Science driven	Standard protocols	Yes	Institution	Geology
Emodnet - Geology (Mapping European seas)	Emodnet - Geo	European				1									Science driven	Standard protocols	Yes	Institution	Geology
eScience Tools for Investigating Climate Change at High Northern Latitudes	eSTICC	European								1					Science driven	Harmonisation	Yes	Institution	Climate Change
European Aerosol Research Lidar Network to Establish an Aerosol Climatology	EARLINET	European		1											Science driven	None	Yes	Institution	Atmospheric sciences
European e-Science Infrastructure for Biodiversity and Ecosystem Research	LifeWatch	European							1						Science driven	Standard protocols	Yes	Institution, Person	Database/data journal
European Fluxes Database Cluster	EFD	European								1					Science driven	Harmonisation	Yes	Institution, person	Geology
Experimentation in Ecosystem Research	ExpeER	European		1		1									Science driven	Standard protocols	Yes	Country	Terrestrial biology
FitFish	FITFISH	European				1									Science driven	None	No	Person	Biology, Fishing
Forum of Arctic Research Operators	None	Arctic							1						Intergovernmental	None	No	Country, Institution	Infrastructure network
Global Biodiversity Information Facility	GBIF	Global								1					Science driven	Standard protocols	Yes	Institution	Biology
Global Climate Observing System	GCOS	Global										1			Science driven	None	Yes	Institution	Climatology
Global Cryosphere Watch	GCW	Global		1											Science driven	Standard protocols	Yes	Country, Institution	Geology
Global Earth Observation System of Systems	GEO/GEOSS	Global										1			Science driven	Standard protocols	Yes	Country	Multidisciplinary
Global Land Ice Measurements from Space	GLIMS	Global		1		1									Science driven	Standard protocols	Yes	Institution	Geology
Global Mountain Biodiversity Assessment (Future Earth)	GMBA	Global								1					Science driven	Harmonisation	Yes	Person	Terrestrial Biology
Global Observation Research Initiative in Alpine Environments	GLORIA	Global								1					Science driven	Standard protocols	Yes	Person, Institution	Terrestrial Biology
Global Runoff Data Centre	GRDC	Global		1											Science driven	Standard protocols	Yes	Country, Institution	Geology
Global Terrestrial Network Glaciers	GTN-G	Global		1											Science driven	Standard protocols	Yes	Institutions	Cryology



Global Terrestrial Network on Permafrost	GTN-P	Global		1		1				Science driven	Standard protocols	Yes	Country, Institution	Geology
Global Terrestrial Observing System	GTOS	Global		1						Science driven	Standard protocols	Yes	Networks	Multidisciplinary
Greenland Ecosystem Monitoring	GEM	Greenlandic		1						Science driven	Standard protocols	Yes	Research station, Institution	Multidisciplinary
Greenland Ice Sheet Monitoring Network	GLISN	Greenland		1						Science driven	Standard protocols	Yes	Institution	Cryology
Herbivory network	Herbivory Network	Global				1				Science driven	Standard protocols	Yes	Person	Terrestrial Biology
IASC - Atmosphere Working Group	IASC - Atmosphere WG	Arctic				1				Intergovernmental	None	No	Country	Atmospheric Sciences, Climate Change
IASC - Cryosphere Working Group	IASC - Cryosphere WG	Arctic				1				Intergovernmental	None	No	Country	Cryology
IASC - Marine Working Group	IASC - Marine WG	Arctic				1				Intergovernmental	None	No	Country	Marine Biology
IASC - Social and Human Working Group	IASC - Social and Human WG	Arctic				1				Intergovernmental	None	No	Country	Sociology
IASC - Terrestrial Working Group	IASC - Terrestrial WG	Arctic	1			1				Intergovernmental	None	No	Country	Multidisciplinary
Icelandic Arctic Cooperation Network	IACN	Icelandic				1				Science driven	None	No	Institution	Multidisciplinary
IMMATSIAK Groundwater monitoring water	IMMATSIAK	Canadian		1						National governmental	Standard protocols	Yes	Person, Institution	Hydrology
Infrastructure for Analysis and Experimentation on Ecosystems	AnaEE	European						1		Intergovernmental	Standard protocols	Yes	Country	Terrestrial Biology
Integrated Arctic Observing System	INTAROS (EU)	Arctic		1						Science driven	Harmonisation	No	Person, Institution	Multidisciplinary
Integrated Carbon Observation System	ICOS	Global		1		1				Science driven	Standard protocols	Yes	Country	Geology
Integrated non CO2 Greenhouse gas Observing System	InGOS	Global		1						Science driven	Standard protocols	Yes	Institution	Geology
Intergovernmental Panel of Biodiversity and Ecosystem Services	IPBES	Global	1							Intergovernmental	None	No	Country	Ecosystem service sciences
Intergovernmental Panel on Climate Change	IPCC	Global				1				Intergovernmental	None	No	Country	Climate Change
International Arctic Science Committee	IASC	Arctic	1							Intergovernmental	None	No	Country	Multidisciplinary
International Arctic Social Science Association	IASSA	Arctic				1				Science driven	None	No	Institution, Person	Sociology
International Arctic Systems for Observing the Atmosphere	IASOA	Arctic		1		1				Science driven	Standard protocols	Yes	Institution, Station	Multidisciplinary
International Association of Classification Societies	IACS	Global						1		Intergovernmental	None	No	Institution	Sociology
International Association of Cryospheric Sciences	IACS	Global				1				Science driven	None	No	Person	Cryology



International Association of Geomagnetism and Aeronomy	IAGA	Global		1		1				Science driven	Standard protocols	Yes	Country	Multidisciplinary
International Council for the Exploration of the Sea	ICES	Global	1							Intergovernmental	None	Yes	Country	Marine Biology
International Glaciological Society	IGS	Global			1					Science driven	None	No	Person	Cryology
International Long Term Ecological Research	ILTER	Global		1						Science driven	Standard protocols	Yes	Institution	Terrestrial biology
International Monitoring for Auroral Geomagnetic Effects	IMAGE	Polar		1						Science driven	Standard protocols	Yes	Institution	Geology
International partnership in ice core sciences	IPICS	Global				1				Science driven	None	No	Institution, Person	Cryology, Atmospheric Science
International Permafrost Association	IPA	Global		1		1				Science driven	Standard protocols	Yes	Country, institution, person	Cryology
International Real-time Magnetic Observatory Network	INTERMAGNET	Global		1						Science driven	Standard protocols	Yes	Station, Institution	Geology
International Science Council	ICSU	Global	1							Intergovernmental	None	No	Country, Institution	Multidisciplinary
International Study of Arctic Change	ISAC	Arctic		1	1	1				Intergovernmental	None	No	Country	Multidisciplinary
International Tundra Experiment	ITEX	Global				1				Science driven	Standard protocols	Yes	Institution, person	Terrestrial Biology
International Whaling Commission	IWC	Global	1							Intergovernmental	None	No	Country	Marine Biology, Hunting
IPCC - Arctic Climate Impact Assessment	ACIA	Arctic	1		1					Intergovernmental	None	No	Country	Climate Change
IUCN Polar Bear Specialist Group	IUCN/SSC-PBSG	Arctic	1							Intergovernmental	None	Yes	Country, Institution	Marine biology
IWRB Goose Specialist Group	GSG	Global				1				Science driven	None	No	Person	Terrestrial Biology, Hunting
Laboratoire d'Excellence	OHMI Nunavik	Global				1	1			Science driven	Harmonisation	Yes	Institution, Person	Multidisciplinary
Landscape Conservation Cooperative	LCC	USA				1				Science driven	None	No	Person	Biology, Fisheries. Hunting
Long Term Ecological Research	LTER Europe	Global		1						Science driven	Standard protocols	Yes	Institution	Biology, Environmental science
Long Term Ecological Research	LTER US	USA		1						Science driven	Standard protocols	Yes	Person	Terrestrial Biology
Long Term Research in Environmental Biology	LTREB	USA		1						Science driven	Standard protocols	No	Institution, Person	Terrestrial Biology
Monitoring of Atmospheric Composition and Climate	MACC	European		1						Science driven	Standard protocols	Yes	Institution	Multidisciplinary
Mountain Research Initiative	MRI	Global				1				Science driven	Harmonisation	Yes	Institution, Person	Geology
National Air Pollution Surveillance Program	NAPS	Canadian		1						National governmental	Standard protocols	Yes	Institution, Person	Environmental science
National Science Foundation, office of polar programs	NSF-OPP	USA					1			National governmental	None	Yes	Research station, Institution, Person	Multidisciplinary

Network for Arthropods of the Tundra	NeAT	Global				1			Science driven	Harmonisation	No	Institution, Person	Terrestrial Biology
Network for the Detection of Atmospheric Composition Change	NDACC	Global		1		1			Science driven	Standard protocols	Yes	Station, Institution	Geology
Next Generation Ecosystem Experiment	NGEE	Arctic				1			Science driven	Harmonisation	Yes	Person	Terrestrial Biology
Nordicana D	Nordicana D	Arctic						1	Science driven	Harmonisation	Yes	Person, Institution	Multidisciplinary
North Atlantic Marine Mammal Commission	NAMMCO	Atlantic	1						Intergovernmental	None	No	Country	Marine biology
North East Atlantic Fisheries Commission	NEAFC	Atlantic	1						Intergovernmental	None	No	Country, Institution	Fishing
North Slope Science Initiative	NNSI	USA		1		1			Science driven	None	No	Institution, Person	Multidisciplinary
Northern Contaminants Program	NCP	Canadian		1		1			National governmental	Standard protocols	No	Institution, Person	Environmental science
Northwest Atlantic Fisheries Organisation	NAFO	Atlantic	1						Intergovernmental	None	Yes	Country, Institution	Fishing
Ny-Ålesund Science Managers Committee	NySMAC	Svalbard						1	Science driven	None	No	Research station, Institution, Person	Multidisciplinary, Infrastructure
Organisation of Biological Field Stations	OBFS	USA						1	Science driven	None	No	Research station, Person	Infrastructure network
Pacific Arctic Group	PAG	Pacific				1			Science driven	None	No	Institution, person	Multidisciplinary
Pan European Phenology network	PEP	European				1			Science driven	Harmonisation	Yes	Institution	Terrestrial Biology
Past Global Changes	PAGES	Global				1			Science driven	Harmonisation	Yes	Institution, Person	Environmental science
Permafrost Carbon Network	PCN	Global				1			Science driven	None	No	Person, Institution	Cryology
Polar Archaeology Network	PAN	Polar						1	Science driven	None	No	Person	Archaeology
Polar Bear Technical Committee	PBTC	Canadian	1						National governmental	None	No	Appointed members	Marine biology
Polar Data Catalogue	PDC	Polar						1	Science driven	Harmonisation	Yes	Institution, person	Multidisciplinary
Program for Regional Climate Assessment	PARCA	Greenlandic				1			Science driven	None	No	Institution, Person	Cryology
Programme for Monitoring the Greenland Ice Sheet	Promice	Greenlandic				1			Science driven	Standard protocols	Yes	Person	Cryology
RESTAT.FI	RESTAT.FI	Finnish		1			1		Science driven	None	No	Institution, Research station	Multidisciplinary, Infrastructure
Rothamsted Insect Survey	RIS	UK		1		1			Science driven	Standard protocols	Yes	Institution	Terrestrial Biology
Science for the Carpathians and Mountains Research Network	S4C	European						1	Intergovernmental	None	No	Person	Multidisciplinary
Scientific Committee on Antarctic Research	SCAR	Antarctic	1						Intergovernmental	Standard protocols	Yes	Country	Multidisciplinary

Scientific experts on fish stocks in the Central Arctic Ocean	FISCAO	Arctic		1									Intergovernmental	None	No	Country	Marine biology
Sediment Budgets in Cold Environments	SEDIBUD	Global		1		1							Science driven	Standard protocols	No	Country	Geology
Siberian Environmental Change Network	SecNet	Russian					1						Science driven	None	No	Institution, person	Multidisciplinary
Station for Measuring Ecosystem- Atmosphere Relations	SMEAR	Finnish					1						Science driven	Standard protocols	Yes	Institution	Atmospheric Sciences, Environmental science
Super Dual Auroral Radar Network	SuperDARN	Global		1			1						Science driven	Standard protocols	Yes	Institution	Atmospheric science
Sustaining Arctic Observing Networks	SAON	Arctic									1		Science driven	Standard protocols	Yes	Country, Institutions	Multidisciplinary
Svalbard Integrated Arctic Earth Observing System	SIOS	Svalbard		1									Science driven	Standard protocols	Yes	Institution	Multidisciplinary
Swedish Infrastructure of Ecosystem Science	SITES	Swedish		1									Science driven	None	No	Institution	Multidisciplinary
Swedish National Phenology Network	SNPN	Swedish						1					Science driven	Harmonisation	Yes	Institution	Terrestrial Biology
Terrestrial Carbon Flux Network	FLUXNET	Global						1					Science driven	Standard protocols	Yes	Institution, person	Geology
The International GNSS Service	IGS	Global		1				1					Science driven	Standard protocols	Yes	Institution	Geology
The National Ecological Observatory Network	NEON	USA		1									Science driven	Standard protocols	Yes	Research station, Institution	Terrestrial Biology
The Pan Eurasian Experiment	PEEX	Regional							1				Science driven	Standard protocols	Yes	Country, Institution	Multidisciplinary
Time History of Events and Macroscale During Substorms	THEMIS	USA							1				Science driven	Harmonisation	Yes	Institution	Astrophysics
Total Carbon Column Observing Network	TCCON	Global		1									Science driven	Standard protocols	Yes	Institution, Station	Multidisciplinary
UK Environmental Change Network	ECN	UK		1				1					Science driven	Harmonisation	Yes	Institution, Network	Environmental science
UK Eutrophying and acidifying atmospheric pollutants	UKEAP	UK		1									National governmental	Standard protocols	Yes	Institution	Atmospheric sciences
UNEP - Global Environmental Outlook	UNEP - GEO	Global	1										Intergovernmental	None	No	Person	Biology, Environmental science
UNESCO - International Hydrological Programme	IHP- UNESCO	Global								1			Intergovernmental	None	No	Country	Hydrology
University of the Arctic	Uarctic	Arctic										1	Science driven	None	No	Institution	Multidisciplinary
Upland Waters Monitoring Network	UWMN	UK		1									National governmental	Standard protocols	Yes	Institution	Environmental science
Virtual Alpine Observatory	VAO	European										1	Science driven	Harmonisation	No	Institution	Multidisciplinary
WinterNet	WinterNet	Global										1	Science driven	None	No	Person	Climate Change
WMO - Global Atmosphere Watch	WMO-GAW	Global		1									Science driven	Standard protocols	Yes	Country	Geology



World Glacier Monitoring Service	WGMS	Global		1					Science driven	Standard protocols	Yes	Institution	Geology
World Hydrological Cycle Observing System	WHYCOS	Global		1					Science driven	Standard protocols	Yes	Country	Geology