

Sustained Arctic Observing Networks

SAON - Phase II

Danish Agency for Science, Technology and Innovation
Ministry of Science, Technology and Innovation

April 2010

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2. Introduction

The Arctic Council has agreed to establish a formal body, in partnership with IASC and WMO, to continue the development of Sustained Arctic Observing Networks (SAON). This body – the SAON Steering Group (SAON SG) – was formed in May 2009 and consists of national coordinators representing the eight Arctic countries, permanent participants in the Arctic Council, and representatives of the Arctic Council working groups. With the inclusion of representatives from IASC and WMO, the SAON SG is also connected to the Arctic science, observing and data management activities and interests of the non-Arctic countries, as well as to global observing systems.

The SAON SG is the successor to the SAON IG (Initiating Group), which organized a consultative process during International Polar Year 2007-2009 that culminated in a set of recommendations for the development of Sustained Arctic Observing Networks. This survey continues the process of gathering information that will assist the SAON SG as it strives to facilitate the development of SAON and the realisation of Arctic and global value-added services and benefits. The SAON SG relies on information and advice from those who operate observing sites, systems and networks, provide data and information management services, and use the observing data and information.

The survey consists of two questions and an inventory form requesting some basic information about Arctic observing sites, systems or networks, or data and information management activity. These questions and the inventory form were sent to Danish research institutions. All received answers are gathered in this report. The report will be updated whenever necessary by the Danish SAON representative.

Best regards

Anne B. Klitgaard

Danish Agency for Science, Technology and Innovation
Ministry of Science, Technology and Innovation

3. Institutions and projects

3.1 Danish Meteorological Institute (DMI)

Question 1. a. How can the SAON SG best assist you?
b. What do you see as the role of the SAON SG?

a) SAON can facilitate information on existing observation networks, harmonisation of dataformats and quality assurance procedures and exchange of data between partners

b) Secure activities in a) and secure contacts relations to other international bodies focussing on observations in the arctic f.ex. Arctic GOOS, IICWG etc. as well as the many research projects that collects data in the Arctic.

Question 2. What are the critical issues facing your observing program or data and information management program?

- Continuous funding
- Ground Truth data/ quality control

Inventory of Observing Sites, Systems & Networks

This form is intended to register basic information about observing sites, systems and networks, and data and information management archives/centres, that are interested in contributing to the development of Sustained Arctic Observing Networks (SAON). The information will later become available at the SAON Web site - www.arcticobserving.org The inventory focusses on existing and planned observing sites and networks that are, or have the potential to become, pan-Arctic in scope.

Name and acronym: Claus Kern-Hansen

Contact person (e-mail): CKH@dmi.dk

Web site (if any): www.dmi.dk.

Main objective of the network

DMI operates general weather observation for meteorological and climatological services.

DMI operates geomagnetic observatories in Greenland

DMI monitors stratospheric ozone and UV radiation

DMI operates ocean monitoring and operational icecharting

Member of or connected to a global network; if yes, which

The general weather observations are part of WMO/GTS and GCOS

The geomagnetic observatories are part of the IAGA network of geomagnetic observatories

The ozone and UV monitoring are part of Global Atmospheric Watch under WMO and Network for the Detection of Atmospheric Composition Change (NDACC)..

Type of activity:

- Theme:

- Atmosphere.....X
- Terrestrial ecosystem, including freshwater
- Marine ecosystem.... X
- Coastal ...X...
- OceanX
- CryosphereX
- Human & socio-economic
- Space physics
- Earth science (geomagnetic field)

- Location(s):

- Upernavik, Nuuk, Danmarkshavn, Tasiilaq, Prins Christiansund (general weather observations)
- Qaanaq and Narsarsuaq (geomagnetism)
- Thule Air Base, Sondre Stromfjord, Scoresbysund (Ozone and UV)
- Arctic Ocean with focus on Greenland waters (ocean monitoring and icecharting)

- Community-based:

- Coordination, e.g. not directly involved in observations, but coordinating data and information (e.g., AMAP):.....

Main variables:

Standard meteorological SYNOP parameters

Geomagnetic field, measurement of field strength, direction, and variability

Total ozone, vertical ozone profiles, surface UV radiation
Temperature, salinity, ocean colour, SST, sea ice, icebergs

When operational (year): more than 50 year

Geographical coverage (countries): Greenland

Data archive/centre, including Web site: Data archive at DMI , World Ozone and UV Data Center,
Canada, Network for the Detection of atmospheric Composition Change

Data availability:

- Metadata only: ...
- All data: X Some data are free for download at dmi.dk, others are free
for R&D-projects and others are subject to charge.
- Charge or no charge for data:

Main gaps, e.g., geographic coverage, variables:

3.2 Geological Survey of Denmark and Greenland (GEUS)

Question 1. a. How can the SAON SG best assist you?
b. What do you see as the role of the SAON SG?

a) By providing a one-stop, updated and reliable database tracking ongoing monitoring efforts

b) Assisting in coordinating the monitoring efforts
lobbying for continued support of long term monitoring efforts

Question 2. What are the critical issues facing your observing program or data and information management program?

The most critical issues we are facing are:

- 1 – keeping the instruments located at remote locations fully operational
- 2 – enforcing a controlled protocol for sensors calibration and data validation
- 3 – managing the data flow from satellite telemetry and manual downloads

3.2.1 Programme for Monitoring of the Greenland Ice Sheet (PROMICE)

Name and acronym: Programme for Monitoring of the Greenland Ice Sheet (PROMICE)

Contact person (e-mail): Andreas P. Ahlstrøm, apa@geus.dk

Web site (if any): www.promice.dk, www.geus.dk

Main objective of the network: to monitor the mass budget of the Greenland ice sheet, track changes in the extent of local glaciers and ice caps, and track changes in the position of the ice-sheet margin using in-situ, airborne, and satellite data, combined with ice-dynamical and surface mass balance modelling.

Type of activity: research project including in-situ monitoring, remote sensing and modelling

Theme: Cryosphere

Location(s): Automatic weather stations (AWS) are setup along the margin of the Greenland ice sheet at seven transects composed of an upper and a lower station. Six out of the planned seven transects have been setup, with the last planned for starting in 2010

Main variables: ice ablation, air temperature, relative humidity, barometric pressure, wind speed, wind direction, incoming shortwave radiation, reflected shortwave radiation, incoming longwave radiation, emitted longwave radiation, snow depth, ice temperature profile, GPS position.

When operational (year): project started in 2007 and is planned to be fully operative by 2010. Currently 6 of the 7 transects (corresponding to 12 out of 14 AWS) have been deployed.

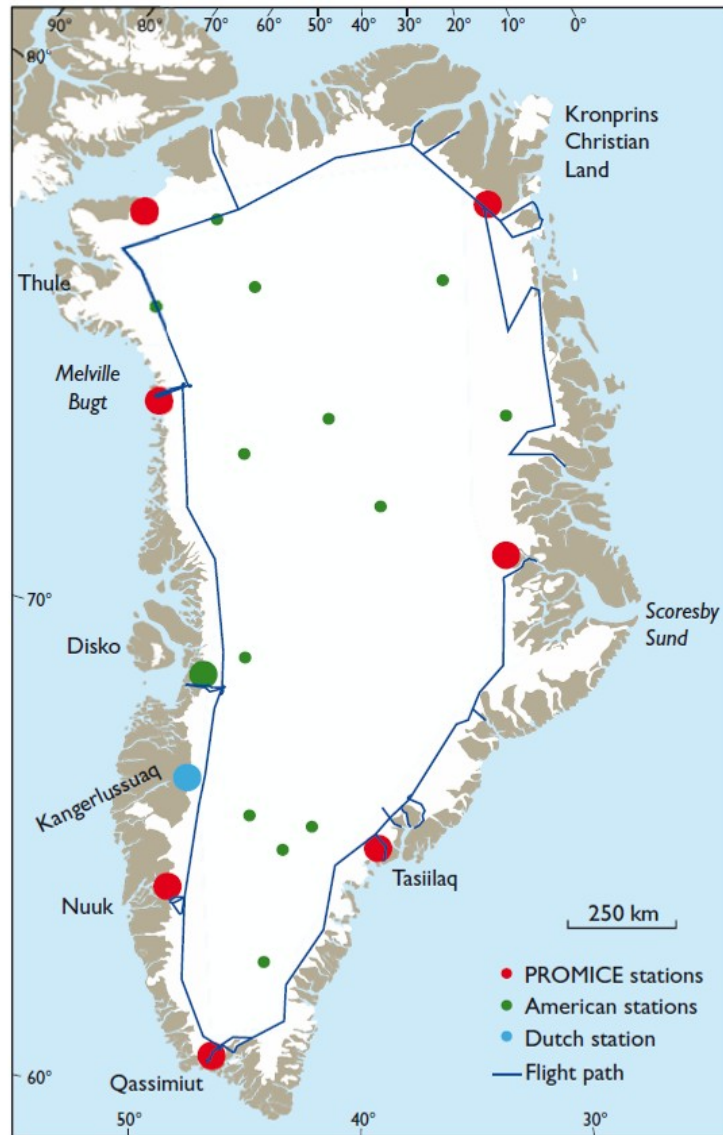
Geographical coverage (countries): Greenland

Data archive/centre, including Web site: GEUS – Geological Survey of Denmark and Greenland. www.promice.dk, www.geus.dk

Data availability: after validation, all PROMICE weather station data is available at no charge.

Main gaps, e.g., geographic coverage, variables: The following table gives the location and start date of all AWS stations.

Station name	Latitude (N)	Longitude (W)	Elevation (m)	Date of start
KPC_L	79° 55'	24° 5'	380	17. jul 08
KPC_U	79° 50'	25° 10'	870	17. jul 08
SCO_L	72° 14'	26° 49'	470	21. jul 08
SCO_U	72° 24'	27° 16'	1000	21. jul 08
TAS_L	65° 38'	38° 54'	270	23. aug 07
TAS_U	65° 42'	38° 52'	580	15. aug 07
QAS_L	61° 1'	46° 52'	280	24. aug 07
QAS_U	61° 11'	46° 49'	910	7. aug 08
NUK_L	64° 29'	49° 31'	580	20. aug 07
NUK_U	64° 30'	49° 16'	1140	20. aug 07
UPE_L	73°	54°		aug 2009
UPE_U	73°	54°		aug 2009
THU_L	79°	65°	?	planned 2010
THU_U	79°	65°	?	planned 2010



Overview map showing PROMICE activities. Large red dots signify several PROMICE stations along transects in the ablation zone of the ice sheet (near Tasiilaq, Nuuk, Melville Bugt, Qassimiut, Thule, Kronprins Christian Land and inner Scoresby Sund). The flight lines show the PROMICE flight in August 2007, covering the entire margin apart from a short high elevation segment in East Greenland. Note that the flight paths also pass down 20 of the most significant outlet glaciers from the Greenland ice sheet

3.2.2. GlacioBasis Monitoring Programme

Name and acronym: GlacioBasis Monitoring Programme

Contact person (e-mail): Michele Citterio, mcit@geus.dk

Web site (if any): www.zackenberg.dk/Monitoring/

Main objective of the network: to monitor the mass balance of A. P. Olsen Ice Cap (74.6° N, 21.5° W) and its outlet glacier discharging into the Zackenberg River drainage basin using in-situ observations with automatic weather stations (AWS), ablation stakes, ground penetrating radar (GPR) and satellite remote sensing data, combined with surface mass balance modelling.

Type of activity: research project including in-situ monitoring, ground penetrating radar, remote sensing and modelling

Theme: Cryosphere

Coordination: GlacioBasis is a sub-programme within the ZackenbergBasis long-term monitoring programme.

Location(s): Three automatic weather stations (AWS) have been setup at the summit area of AP Olsen ice cap and at lower elevations along its outlet glacier discharging into the Zackenberg River drainage basin. GPR survey of snow depth, 14 ablation stakes and snow pit locations cover the entire outlet glacier.

Main variables: mass balance, ice ablation, air temperature, relative humidity, barometric pressure, wind speed, wind direction, incoming shortwave radiation, reflected shortwave radiation, incoming longwave radiation, emitted longwave radiation, snow depth, ice temperature profile, GPS position.

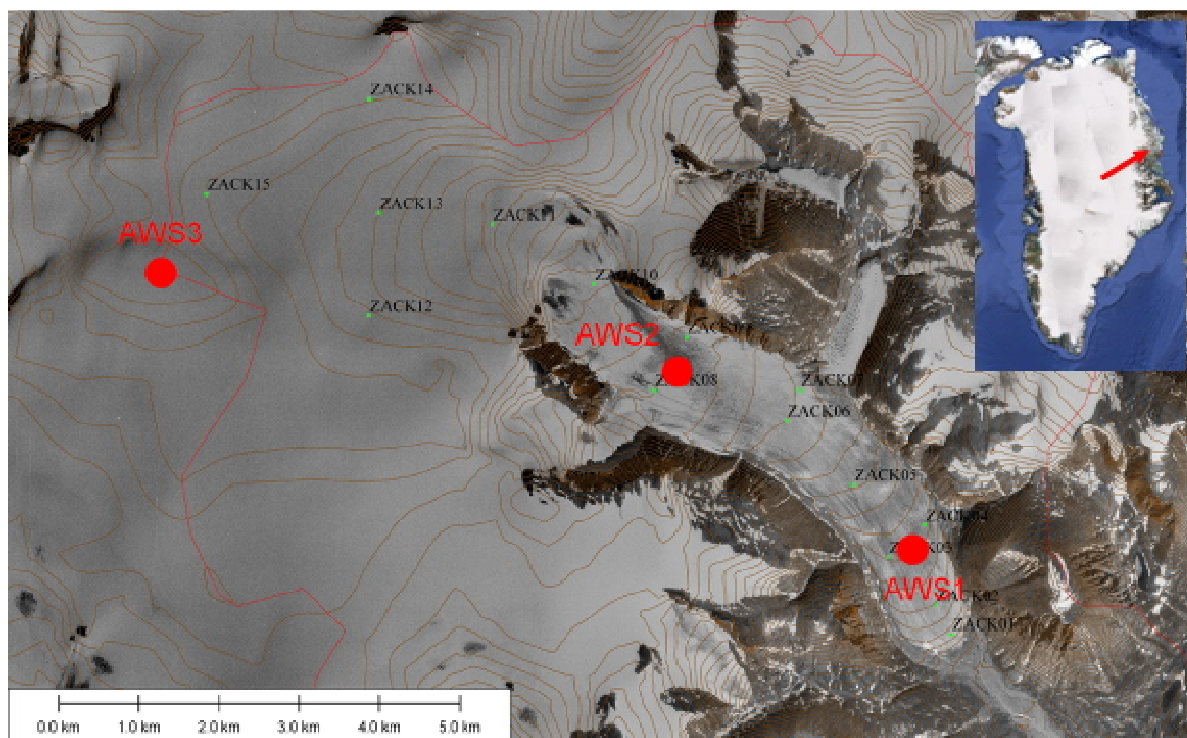
When operational (year): project started in 2008 and the three AWS are currently operative.

Geographical coverage (countries): A.P. Olsen Ice Cap (74.6° N, 21.5° W), NE Greenland.

Data archive/centre, including Web site: GEUS – Geological Survey of Denmark and Greenland, www.geus.dk

Data availability: after validation, all GlacioBasis weather station data is available at no charge.

Main gaps, e.g., geographic coverage, variables: The following image shows the location of the ablation stakes and of the three AWS stations on the outlet glacier of A.P. Olsen ice cap.



3.2.3 Monitoring of the glaciers surrounding Malmbjerg

Name and acronym: Monitoring of the glaciers surrounding Malmbjerg

Contact person (e-mail): Michele Citterio, mcit@geus.dk

Web site (if any): none

Main objective of the network: to monitor the mass balance and glacier flow of Arcturus Glacier and of Schuchert Glacier adjacent to Malmbjerg (Stauning Alps, E Greenland)

Type of activity: commercial consultancy including in-situ monitoring, ablation stakes, ground penetrating radar, modelling

Theme: Cryosphere

Location(s): Arcturus Glacier and of Schuchert Glacier adjacent to Malmbjerg (Stauning Alps, E Greenland).

Main variables: ice ablation, air temperature, relative humidity, barometric pressure, wind speed, wind direction, incoming shortwave radiation, reflected shortwave radiation, incoming longwave radiation, emitted longwave radiation, snow depth, ice temperature profile, GPS position.

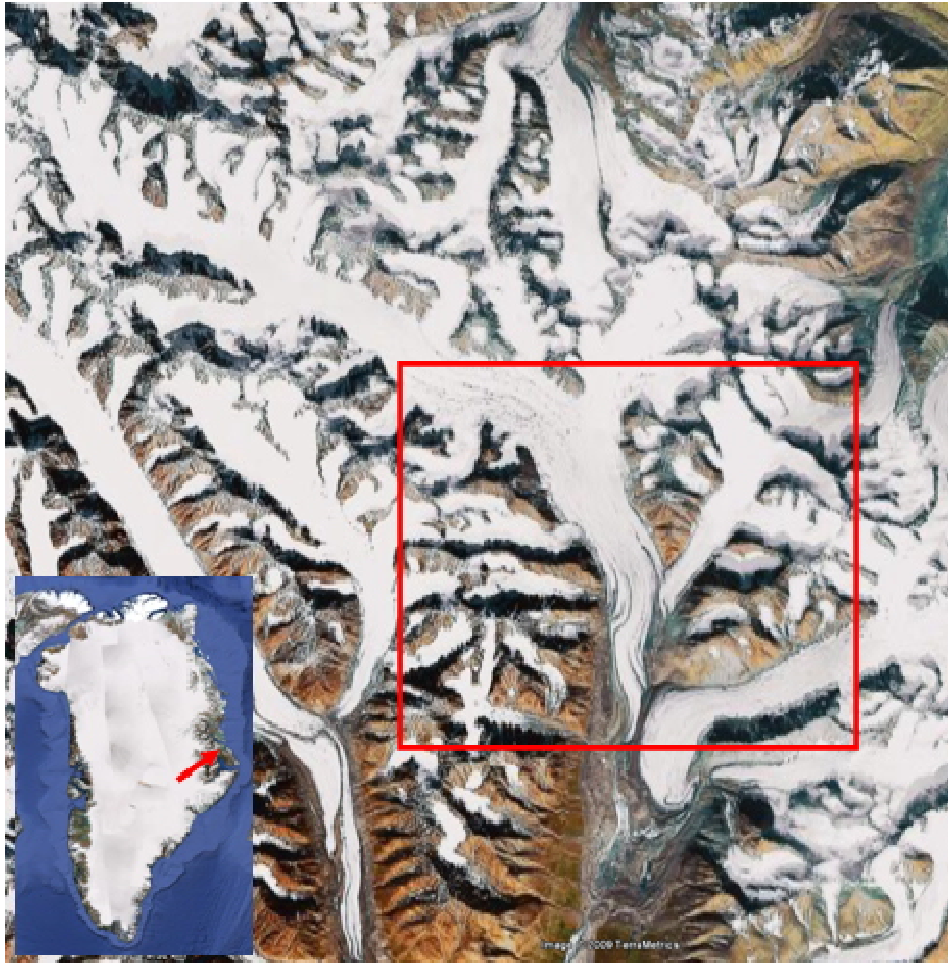
When operational (year): project started in 2008 with one AWS, geophysical surveys and modeling.

Geographical coverage (countries): Arcturus Glacier and of Schuchert Glacier adjacent to Malmbjerg (Stauning Alps, E Greenland).

Data archive/centre, including Web site: GEUS – Geological Survey of Denmark and Greenland, www.geus.dk

Data availability: data produced within the commercial consultancy is confidential and not available.

Main gaps, e.g., geographic coverage, variables: AWS data series started in April 2008. The following picture shows the study area



3.3 National Environmental Research Institute

- Question 1.** a. How can the SAON SG best assist you?
b. What do you see as the role of the SAON SG?

Concerning both a and b. I am not quite certain. It still seems a bit unclear to me, how SAON will emerge. However, I do see a need for an organisation to coordinate data collection on Arctic Climate Change issues, to act as a central data center, to facilitate new monitoring initiatives, to synthesise data and to produce relevant assessments.

b) It is my hope, that SAON SG – the sooner, the better - will be able to establish a SAON Secretariat with a proper staff being able to accomplish the above mentioned items.

- Question 2.** What are the critical issues facing your observing program or data and information management program?
- please limit your response to a brief description of no more than 3 critical issues.

1. We need funding for winter measurements allowing us to study ecosystem dynamics outside the growing season. Recent research has demonstrated that important components of ecosystem dynamics occur after the growing season (e.g. Post et al. 2009: Science 325, 1355-1358; Mastepanov et al. 2008: Nature 456, 628-630.).
2. We need funding for increased circum-arctic cooperation between monitoring sites to facilitate comparative studies of ecosystem dynamics in different compartments of the Arctic.

3.3.1 Zackenberg Ecological Research Operations (ZERO) and Zackenberg Basic

Name and acronym: Zackenberg Ecological Research Operations (ZERO) and Zackenberg Basic

Contact person (e-mail): Morten Rasch (mras@dmu.dk)

Web site (if any): www.zackenberg.dk

Main objective of the network: To provide the data necessary for quantifying the dynamics of a high arctic ecosystem

Member of or connected to a global network; if yes, which: Many, including ICOS, ITEX, CALM, ACD, GLORIA, FLUXNET, SCANNET, CEON etc.

Type of activity:

- Theme:
 - Atmosphere.....
 - Terrestrial ecosystem, including freshwaterX
 - Marine ecosystemX
 - CoastalX
 - Ocean
 - Cryosphere
 - Human & socio-economic
 - Space physics
- Location(s): Zackenberg, High Arctic, Northeast Greenland, 74°30'N 21° 00'W
- Community-based: ?
- Coordination, e.g. not directly involved in observations, but coordinating data and information (e.g., AMAP): ?

Main variables: c. 3.500 physical and biotic parameters are measured each year in marine and terrestrial (including glacial) parts of the ecosystem. The programme is cross-disciplinary and aims on providing data to allow for quantifying the dynamics of a high arctic ecosystem

When operational (year): Started in 1995, still in operation

Geographical coverage (countries): Greenland

Data archive/centre, including Web site: Data available on <http://www.zackenberg.dk/Data/>

Data availability:

- Metadata only: ...
- All data:X
- Charge or no charge for data: No charge

Main gaps, e.g., geographic coverage, variables: Winter dynamics

3.3.2 Nuuk Ecological Research Operations (NERO) and Nuuk Basic

Name and acronym: Nuuk Ecological Research Operations (NERO) and Nuuk Basic

Contact person (e-mail): Morten Rasch (mras@dmu.dk)

Web site (if any): www.nuuk-basic.dk

Main objective of the network: To provide the data necessary for quantifying the dynamics of a low arctic ecosystem

Member of or connected to a global network; if yes, which: Many, including ICOS, ITEX, CALM, ACD, GLORIA, FLUXNET, SCANNET, CEON etc.

Type of activity:

- Theme:
 - Atmosphere.....
 - Terrestrial ecosystem, including freshwaterX
 - Marine ecosystemX
 - CoastalX
 - Ocean
 - Cryosphere
 - Human & socio-economic
 - Space physics
- Location(s): Kobbefjord near Nuuk, Low Arctic, West Greenland, 64°00'N 51°30'
- Community-based: ?
- Coordination, e.g. not directly involved in observations, but coordinating data and information (e.g., AMAP): ?

Main variables: c. 3.500 physical and biotic parameters are measured each year in marine and terrestrial (including glacial) parts of the ecosystem. The programme is cross-disciplinary and aims on providing data to allow for quantifying the dynamics of a low arctic ecosystem

When operational (year): Started in 2007, still in operation

Geographical coverage (countries): Greenland

Data archive/centre, including Web site: Data available on <http://www.nuuk-basic.dk/Data/>

Data availability:

- Metadata only: ...
- All data:X
- Charge or no charge for data: No charge

Main gaps, e.g., geographic coverage, variables: Winter dynamics

3.3.3 Greenland Ecosystem Monitoring (GEM)

Name and acronym: Greenland Ecosystem Monitoring (GEM)

Contact person (e-mail): Morten Rasch (mras@dmu.dk)

Web site (if any): www.g-e-m.dk

Main objective of the network: To provide the data necessary for quantifying the dynamics of arctic ecosystems, i.e. at the two field sites at respectively Zackenberg (Northeast Greenland) and Nuuk (West Greenland)

Member of or connected to a global network; if yes, which: Many, including ICOS, ITEX, CALM, ACD, GLORIA, FLUXNET, SCANNET, CEON etc.

Type of activity:

- Theme:

- Atmosphere.....
- Terrestrial ecosystem, including freshwaterX
- Marine ecosystemX
- CoastalX
- Ocean
- Cryosphere
- Human & socio-economic
- Space physics

- Location(s): Kobbefjord near Nuuk, Low Arctic, West Greenland, 64°00'N 51°30'W and Zackenberg, High Arctic, Northeast Greenland, 74°30'N 21° 00'W

- Community-based: ?

- Coordination, e.g. not directly involved in observations, but coordinating data and information (e.g., AMAP): ?

Main variables: c. 3.500 physical and biotic parameters are measured each year in marine and terrestrial (including glacial) parts of the ecosystem at a low arctic and a high arctic site. The programme is cross-disciplinary and aims on providing data to allow for quantifying the dynamics of a low arctic ecosystem

When operational (year): Started in 2007 as an umbrella encompassing Zackenberg Ecological Research Operations, Zackenberg Basic, Nuuk Ecological Research Operations and Nuuk Basic, still in operation

Geographical coverage (countries): Greenland

Data archive/centre, including Web site: Data available on <http://www.nuuk-basic.dk/Data/> and <http://www.zackenberg.dk/Data/>

Data availability:

- Metadata only: ...
- All data:X
- Charge or no charge for data: No charge

Main gaps, e.g., geographic coverage, variables: Winter dynamics

3.3.4 Monitoring of contaminants in atmosphere and biota in Greenland

Name and acronym: Monitoring of contaminants in atmosphere and biota in Greenland

Contact person (e-mail): Frank Rigét ffr@dmu.dk (biological part) Henrik Skov hsk@dmu.dk (atmospheric part)

Web site (if any): link to the programmes biological tissue bank on the NERI website
<http://www.dmu.dk/International/Arctic/Pollutants/Databank>

Main objective of the network: Temporal trend monitoring of contaminants in atmosphere and biota in Greenland. Modelling the atmospheric transport pathways and deposition of contaminants in the Arctic as well as determination of climate related parameters.

Member of or connected to a global network; if yes, which: Connected to the Arctic Monitoring and Assessment Programme (AMAP) – a working group under the Arctic Council

Type of activity:

- Theme:

- AtmosphereX
- Terrestrial ecosystem, including freshwater(X)
- Marine ecosystemX
- Coastal
- Ocean
- Cryosphere
- Human & socio-economic
- Space physics

- Location(s): Atmosphere – Station Nord in North East Greenland (81° 36' N, 16° 40' W, 25 m ASL). Biological sampling locations at Qeqertarsuaq (68° 39' N, 53° 18' W), Qaanaaq (77° 29' N, 66° 75' W), Ittoqqortoormiit (70° 28' N, 21° 95' W) and Isortoq (60° 59' N, 47° 31' W)

- Community-based:

- Coordination, e.g. not directly involved in observations, but coordinating data and information (e.g., AMAP): AMAP

Main variables: Heavy metals and persistent organic pollutants (POPs) in the atmosphere and biota and short lived Climate Forcers in the atmosphere as well as biological samples

When operational (year): Started in 1990 for the atmospheric part and 1994 for

Geographical coverage (countries): AMAP are circumpolar, our programme covers Greenland and for the atmospheric part the Arctic

Data archive/centre, including Web site:

<http://www.dmu.dk/International/Arctic/Pollutants/Databank>

Data availability:

- Metadata only:(X)
- All data:(X)
- Charge or no charge for data: no charge

Main gaps, e.g., geographic coverage, variables:

3.4 National Space Institute, Technical University of Denmark (DTU Space)

3.4.1 DTU Space Tide gauges in Greenland

Name and acronym: DTU Space Tide gauges in Greenland

Contact person (e-mail): Per Knudsen (pk@space.dtu.dk)

Web site (if any): <http://www.vliz.be/gauges/map.php>

Main objective of the network: Monitoring of the sea-level

Member of or connected to a global network: UNESCO/IOC

Type of activity:

- Theme:

Ocean

- Location(s):

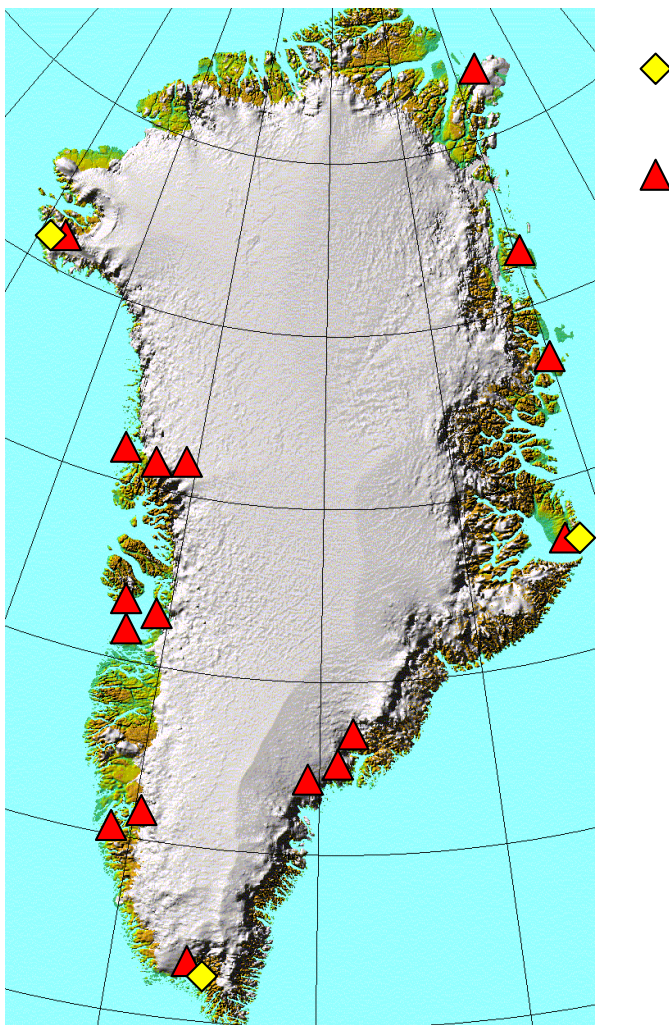
DTU Space is running the tide gauges at:

Pituffik / Thule

Ittoqqortoormiit / Scoresbysund

Qaqortoq / Julianehåb

See map below: The yellow diamonds marks the position of the tide gauges.



Main variables: Sea-level

When operational (year): 2005

Geographical coverage (countries): Greenland

Data archive/centre, including Web site: <http://www.vliz.be/gauges/map.php>

Data availability:

- All data, free of charge

3.4.2 DTU Space Permanent GNSS stations in Greenland

Name and acronym: DTU Space Permanent GNSS stations in Greenland

Contact person (e-mail): Per Knudsen (pk@space.dtu.dk)

Web site (if any): <http://igsjb.jpl.nasa.gov/>

Main objective of the network:

Dual purpose:

Supporting geographical infrastructure in and around Greenland

Monitoring changes in Greenland ice sheet as part of GNET

Member of or connected to a global network: The International GNSS Service (IGS)

Type of activity:

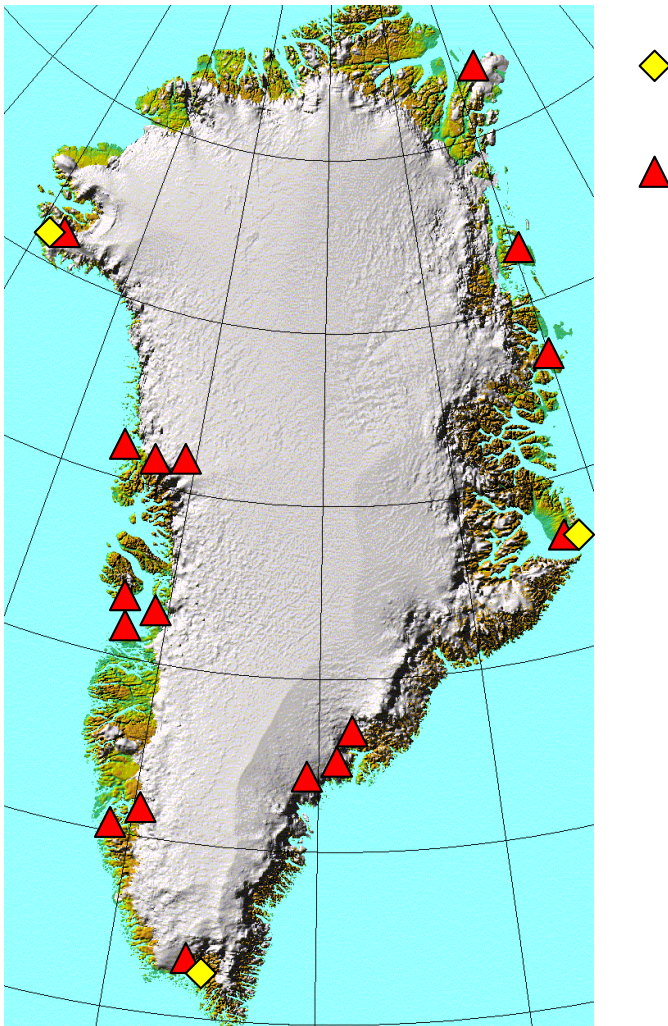
- Theme:

Geographical infrastructure

Cryosphere

- Location(s):

See map below: The red triangles mark the position of the GNSS stations.



Main variables: Position in 3-d

When operational (year): 1995

Geographical coverage (countries): Greenland

Data archive/centre, including Web site: <http://igscb.jpl.nasa.gov/>

Data availability:

- All data, free of charge

**3.5 National Institute of Aquatic Resources, Technical University of Denmark
(DTU – AQUA)**

Question 1. a. How can the SAON SG best assist you?
b. What do you see as the role of the SAON SG?

a) Provide visibility and coordination of data and activities and facilitate access to network in the Arctic-region

b) To coordinate the collection of data and contribute to increased collaboration and transparency

Question 2. What are the critical issues facing your observing program or data and information management program?

Continuous financial support - funding

3.5.1 Fish stock assessment and fisheries management

Name and acronym: National Institute of Aquatic Resources, Technical University of Denmark, DTU-AQUA

Contact person (e-mail): Fritz Köster, fwk@aqua.dtu.dk

Web site (if any): www.aqua.dtu.dk

Main objective of the network:

Fish stock assessment and fisheries management

Cooperation with Greenland Institute of Natural Resources (GNI) on: i) stock assessment and fisheries management, survey planning and evaluation, ii) stock and fish community dynamics under climate change, iii) fish species interactions, iii) Education of young scientist at GNI.

Oceanography and climate change impact on marine ecosystems. Cooperation with GNI, Danish Meteorological Institute (DMI) and Natural Environmental Research Institute (DMU) on: i) physical oceanography and climate forcing, ii) biological oceanography, iii) population genetics.

The International Polar Year IPY) project ECOGREEN under leadership of DMU. Contribution to biological oceanography, e.g. survey of RV Dana (the research vessel of DTU-AQUA) to West Greenland in 2008

Member of or connected to a global network; if yes, which:

Type of activity:

- Theme:
 - Marine ecosystem
 - Coastal
 - Ocean
- Location(s): Greenland waters
- Community-based:
 - Coordination, e.g. not directly involved in observations, but coordinating data and information (e.g., AMAP: N/A
 - International Council for the Exploration of the Sea (ICES) for East Greenland
 - Northwest Atlantic Fisheries Organisation (NAFO) for West Greenland

Main variables: Fish stock abundance and fisheries data and from certain periods plankton and physical oceanography

When operational (year): early 1980's

Geographical coverage (countries): Greenland

Data archive/centre, including Web site:

Data availability:

- Metadata only:
- All data: Fish and fisheries data available through ICES and NAFO, rest at DTU

Aqua

- Charge or no charge for data: no charge

Main gaps, e.g., geographic coverage, variables:

3.6 Natural History Museum of Denmark, Zoological Museum, University of Copenhagen

- Question 1.** a. How can the SAON SG best assist you?
b. What do you see as the role of the SAON SG?
- a) Probably exactly by making information about this kind of activities online-accessible so that coordination with similar projects becomes possible.
- b) I actually never heard of SAON before (shame on me) and can not give an immediate answer.

- Question 2.** What are the critical issues facing your observing program or data and information management program?
- please limit your response to a brief description of no more than 3 critical issues.
 - Lack of recent field monitoring programmes.

3.6.1 Greenland Marine Benthos Survey

Name and acronym: Greenland Marine Benthos Survey

Contact person (e-mail) Tom Schiøtte, TSchioette@SNM.KU.DK

Web site (if any):

Main objective of the network: To establish a modern, comprehensive checklist and database of the marine, benthic macrofauna in Greenland territorial waters from the shore to 1000 m depth

Member of or connected to a global network; if yes, which: GBIF (but not yet implemented)

Type of activity:

- Theme:
 - Marine ecosystem, species composition, geographical distribution and variation, depth zonation and, in future, variation over time.

- Coordination, e.g. not directly involved in observations, but coordinating data and information (e.g., AMAP): This is expected at some point in the future to be placed with DanBIF and GBIF.

Main variables: The survey uses literature data as its primary source, supplemented with unpublished data from members of the network. By continuing to monitor new data as they become available the database will reflect changes in the fauna.

When operational (year): Has been operational since 2003 on a personal request base. Intended to be accessible online later, pending solution of problems of technical nature and concerning rights to unpublished data.

Geographical coverage (countries): The complete Greenland Marine territory down to 1000 m depth.

Data archive/centre, including Web site: State Natural History Museum, Denmark

Data availability:

- All data: But until a more permanent solution is found it is necessary to evaluate information requests from case to case (protection of unpublished information).

- Charge or no charge for data: No charge for public institutions and for pure research purpose. A charge may be decided individually for commercial use of the database.

Main gaps, e.g., geographic coverage, variables: Missing data from the northernmost and very few data from south-eastern coastal stretches and adjoining marine territory. Too few recent fauna monitoring programs in the whole area.

3.7 Department of Geography and Geology, University of Copenhagen

Question 1. a. How can the SAON SG best assist you?
b. What do you see as the role of the SAON SG?

- a) Provide updated information about network and facilitate access to data.
- b) Secure adequate coverage and representativity of network and provide necessary funding.

Question 2. What are the critical issues facing your observing program or data and information management program?
- please limit your response to a brief description of no more than 3 critical issues.

Very few stations measure runoff from GrIS (Greenland Ice Sheet). Only four stations monitor sediment transport from the entire Greenland (pt. 4 stations), this station is the only station that monitor transport to the sea from GrIS. When the project ends (2010) only three stations are left and transport from GrIS is again unknown.

3.7.1 Monitoring of discharge and sediment transport at the outlet of Watson River, Kangerlussuaq, Greenland

Name and acronym: Bent Hasholt, IGG (Institut for Geografi og Geologi, KU)

Contact person (e-mail): bh@geo.ku.dk

Web site (if any): www.geo.ku.dk

Main objective of the network: Monitoring of discharge and sediment transport at the outlet of Watson River, Kangerlussuaq, Greenland

Member of or connected to a global network; if yes, which: IPY, Arctic Hydra, SEDIBUD

Type of activity:

- Theme:

- Atmosphere
- x - Terrestrial ecosystem, including freshwater
- x - Marine ecosystem
- x - Coastal
- x - Ocean
- x - Cryosphere
- Human & socio-economic
- Space physics

- Location(s): Watson River, Kangerlussuaq

- Community-based:

- Coordination, e.g. not directly involved in observations, but coordinating data and information (e.g., AMAP): Arctic Hydra, SEDIBUD, ASIAQ

Main variables: Stage, discharge, temperature, Conductivity, sediment concentration, sediment transport

When operational (year): 2007-

Geographical coverage (countries): Sector of Greenland Ice Sheet

Data archive/centre, including Web site: IGG (Institute of Geography and Geology, Univ. CPH)

Data availability:

- Metadata only: ...
- All data: when quality controlled and published
- Charge or no charge for data: Procession costs

Main gaps, e.g., geographic coverage, variables:

3.8 The Arctic Station, Qeqertarsuaq, Greenland, University of Copenhagen

Question 1. a. How can the SAON SG best assist you?
b. What do you see as the role of the SAON SG?

a) By being a significant coordinator and track-keeper of data, infrastructures and network for scientist working in the Arctic

b) As above

Question 2. What are the critical issues facing your observing program or data and information management program?
- please limit your response to a brief description of no more than 3 critical issues.

Mainly funding but also to some extent infra-structures

Name and acronym: The Arctic Station, Qeqertarsuaq, Greenland (AS-Q)

Contact person (e-mail): Kirsten Christoffersen (kchristoffersen@bio.ku.dk) and Bo Elberling (be@geo.ku.dk)

Web site (if any): <http://arktiskstation.ku.dk/english>

Main objective of the network:

The Arctic Station is located on the south coast of the Disko Island in central west Greenland. It is thus facing the Disko Bay and is characterized by an arctic, marine climate. There are 3 buildings comprising guest facilities, staff accommodation, laboratory and library that are located in a nature sanctuary, approximately 1 km west of a small town, Qeqertarsuaq (formerly Godhavn), with ca. 1100 inhabitants. Within the town community is located all necessary service facilities, incl. several shops, bank, postoffice, church and a hospital.

The station offers a 'state of the art' platform for year-round environmental research.

The Arctic Station maintains an automatic climate station located in the immediate vicinity of the Arctic Station.

Member of or connected to a global network; if yes, which:

Type of activity:

The datalogging at Arctic Station (every half hour) comprises: air temperature, humidity, incoming and outgoing radiation, wind speed and direction, rainfall, ground temperatures (5, 60 and 150 cm below surface) and temperature in solid rock 2 metre below surface.

Main variables: see above

When operational (year): see above

Geographical coverage (countries): Disko, Western Greenland. (69°15'N, 53°34'W)

Data archive/centre, including Web site: <http://arktiskstation.ku.dk/english>

Data availability:

- Metadata only:X
- All data:
- Charge or no charge for data:

Main gaps, e.g., geographic coverage, variables: NA

3.9 Sermilik Station, East Greenland, University of Copenhagen

Question 1. a. How can the SAON SG best assist you?
b. What do you see as the role of the SAON SG?

a) By providing updated information on ecosystem observations and monitoring in the Arctic, and facilitating data access

b) Supporting the national and international efforts to maintain and extend an adequate network of sustained ecosystem monitoring sites in the Arctic.

Question 2. What are the critical issues facing your observing program or data and information management program?

- Basic funding for long-term monitoring
- Basic funding for data and data base handling

3.9.1 Monitoring and modelling of a glaciated terrestrial ecosystem and land ocean fluxes to the adjacent fjord system

Name and acronym: Sermilik Station, East Greenland.

Contact person (e-mail): Bjarne Holm Jakobsen, Institute of Geography & Geology, University of Copenhagen (bhj@geo.ku.dk)

Web site (if any) : www.geo.ku.dk

Main objective of the network: Monitoring and modelling of a glaciated terrestrial ecosystem and land ocean fluxes to the adjacent fjord system.

Member of or connected to a global network; if yes, which: SCANNET, Arctic Hydra and SediBud

Type of activity:

- Theme:
 - Atmosphere: Climate stations
 - Terrestrial ecosystem, including freshwater: River stations
 - Marine ecosystem: Fjord surveys
 - Coastal: Delta surveys
 - Ocean:....
 - Cryosphere: Glacier mass balance and glacier surveys (Mittivakkat Glacier)
 - Human & socio-economic:....
 - Space physics:....
- Location(s): Mittivakkat Glacier catchment in Sermilik Fjord, East Greenland (65° 42'N; 37° 48'W)
- Community-based:....
- Coordination, e.g. not directly involved in observations, but coordinating data and information (e.g., AMAP):

Main variables: Basic climate data from coastal station and station at glacier equilibrium line: Si, Temp., RH, Wind (direction and speed) and precipitation. Basic river data: Stage, discharge, Temp., conductivity, sediment concentration and transport. Basic data on changing delta and coastal geomorphology. Basic data on glacier mass balance and glacier dynamics.

When operational (year): 1995 (1998) -

Geographical coverage (countries): Low Arctic south east sector of Greenland

Data archive/centre, including Web site: Institute of geography and Geology, University of Copenhagen (www.geo.ku.dk)

Data availability:

- Metadata only: ...
- All data: Climate data are available on request. Most other data have been published.
- Charge or no charge for data: Processing costs

Main gaps, e.g., geographic coverage, variables: A few short gaps due to sensor failures.
