

Science Plan

Kongsfjorden International Research Base (KIRB), Svalbard

Priorities for the period 2010-2013

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Introduction

The Ny-Ålesund mission statement¹ declares overall goals for the entire Kongsfjorden area. The goal of this Science Plan is to continue developing Ny-Ålesund as a premier international Arctic research and monitoring facility. Ny-Ålesund shall cement its role as an outstanding observatory, laboratory, field base and training site for Arctic research. Ny-Ålesund strives for acting as **one** well coordinated international research facility, while at the same time maintaining the scientific quality and integrity of individual stations and research groups. The Ny-Ålesund research community promotes a policy of open and free exchange of scientific data, based on mutual trust and respect for the intellectual property rights.

The Ny-Ålesund Science Plan applies to the entire research area including Kongsfjorden, and the land areas owned by Kings Bay AS (KB) including the entire Brøgger peninsula. The plan also applies to research outside the area emanating from or through Ny-Ålesund.

Svalbard Science Forum (SSF) has the overall responsibility for the coordination and implementation of the science plan.

The unified scientific stations under this science plan will be known as members of the **Kongsfjorden International Research Base (KIRB)**.

¹ Appendix 1

1. Overall vision for the plan period

- KIRB will be a primary observational base in the Arctic for environmental research and monitoring.
- KIRB will be a unified research facility where all nations, stations and projects work as one entity with common goals without compromising their identities and intellectual property rights.
- KIRB will host research in scientific areas that have clear benefits from performing the research in the pristine environment that this natural laboratory provides.
- KIRB will secure, maintain and proliferate long-term time series of environmental parameters.
- KIRB will as a coordinated science and educational platform be a primary showcase of international achievements in the Arctic.
- Flagship programs define core scientific foci for KIRB.
- KIRB will coordinate its research and cooperate with all other research bases in Svalbard.

KIRB promotes:

- New complementary research activities that do not duplicate existing research
- High ethical standards with respect to experiments involving animals and humans
- A research environment with open and free exchange of scientific data
- A research environment based on trust and respect for the intellectual property rights
- Joint research activities involving new trans-national collaboration
- The continued emphasis on monitoring and the protection of long term data series
- Research and operational activities utilizing green technologies

KIRB does not support:

- Research activities that pollute or permanently disturb the local environment
- Activities that have negative impact on, and reduce the quality of existing research and the locations potential for future environmental research areas

2. Scientific focus

KIRB is ideal for research and monitoring of contemporary environmental changes related to climate change issues, long range transport of pollutants, UV-radiation and related biological effects, physiology, eco-toxicology, Arctic marine and terrestrial ecosystems, as well as research from other disciplines. With its multidisciplinary research environment, KIRB provides unique opportunities for scientific synergies. Maintaining long-term time series of environmental parameters shall remain a scientific foundation. KIRB science and institutions shall contribute **essentially** to climate research programs and international networks; notably the development of SAON, GAW, GCW and SIOS². Ny-Ålesund has a great potential for comparative bi-polar studies based on its broad measurement programs.

² SAON: Sustained Arctic Observing Network (Arctic Concil); GAW: Global Atmospheric Watch (World Meteorological Organization); GCW: Global Cryosphere Watch (World Meteorological Organization); SIOS: Svalbard Integrated Earth Observing System (European Strategy Forum for Infrastructure)

Research within KIRB is comprised of activities at all the stations. Substantial portions of these activities are related and complementary. To release the full potential of these complementarities and simultaneously increase the influence of KIRB in the scientific debate, the stations have agreed to build and implement flagship programs during the plan period. Each flagship program will be guided by a science group. The science groups will nominate a leader that will be responsible for calling meetings for defining yearly milestones and goals to achieve the long term visions for the programs. The science groups have a standing task of making yearly revisions of gaps in knowledge and measurement programs.

Three flagship programs have been agreed on and all scientists active within KIRB are encouraged to focus on developing the science and outcome of the flagships. *Activities that are endorsed flagship activities will be prioritized when infrastructure or human resources limit activities.*

Detailed information about the flagships can be found in the flagship documents³ which also list several project proposals for integrated research approaches. During the present science plan period these flagship programs will seek to integrated institutional contributions into scientific challenges that no single institution or group could tackle in solitude.

The KIRB flagship programs:

The Kongsfjorden System

The Kongsfjorden System is an established reference site for Arctic marine studies and represents a natural laboratory in close proximity to Kings Bay Marine Laboratory. Kongsfjorden is directly influenced by variable climate signals in the Arctic and represents, together with the Zeppelin Station probably the most comprehensive environmental monitoring location in the Arctic. Thus, Ny-Ålesund is an ideal site for studies of environmental contaminants in the marine system.

The flagship states the following future research priorities:

- A combination of atmospheric measurements of long-range pollutants with measurements of contaminant levels in the biota
- Studies of feedback mechanisms from the biosphere to the atmosphere
- Investigation of interactive effects of rising temperatures and enhanced UV- radiation
- Studies of changes in the pelagic fish community of Kongsfjorden
- Studies of organic carbon mineralization
- Studies of water exchange processes in the fjord and small scale turbulences
- The use of clams as environmental indicators
- A monitoring programme for phytoplankton

Two major infrastructure innovations are planned. First, a cabled oceanographic monitoring platform that will allow real-time data retrieval and second, an integrated comprehensive monitoring station on the central islands within Kongsfjorden to monitor and study the processes on the atmosphere/ocean surface interface. It is also emphasized that a database for long-term data series from the Kongsfjorden System needs to be established and made available for the research community, as well as coordinating and furthering the already established metadatabases.

³ www.svalbardscienceforum.no/pages/baseNyAa.htm#SciencePlan

The terrestrial ecosystem

The great heterogeneity of the area, the coastal terrestrial environment by which enables studies of interactions between the marine and environmental environments and the long record of research combine to make Ny-Ålesund a key location for terrestrial research in the High-Arctic.

The flagship states the following future research priorities:

- Detailed records of physical parameters influencing the terrestrial system
- Establishment of a reference bar code library of terrestrial biota in the Kongsfjorden area and a log of the appearance of new arrivals
- Studies of overwintering ecology and integrative studies of freshwater systems.
- Studies of the palaeoenvironmental history to understand the history of the current flora and fauna communities.
- Studies of soil geochemistry, microbiology and methane production, especially in newly deglaciated regions
- Studies of groundwater and permafrost interactions
- Studies of periglacial landform activity occurring around Ny-Ålesund
- A watershed approach to enable inputs and outputs to be quantified and enhance the predictive value of numerical modeling projects

A prime requirement is for a Terrestrial Laboratory Facility. The laboratory should be operated by a permanent staff that can map scientific activity. Moreover, the need for a mobile field laboratory is recognised. The establishment of a High-Arctic Land Observatory (HALO) as part of SIOS is proposed to further integrate and coordinate terrestrial research within Ny-Ålesund, Svalbard and with other polar research bases. Under the auspices of HALO, long-term data series will be maintained providing open access long-term baseline data. Reference sites will be designated for monitoring natural changes and will be intensively instrumented to record relevant parameters.

The atmospheric research

In Ny-Ålesund, several long term measurements of key climate parameters from the surface up to the ozone layer have been performed for decades already. Their data is continuously fed into global networks and such comprehensive data sets are available from very few sites in the Arctic. The location under the magnetospheric cusp furthermore makes it a unique place for observing the solar wind and magnetosphere interaction on the dayside.

The flagship states following future research priorities:

- Long term observations of key parameters concerning climate change
- Planetary boundary layer (PBL) research
- Studies and monitoring of long range transport of pollutants
- Arctic ozone layer and UV research
- Ionospheric / magnetospheric research
- Validation and synergistic analyses of satellite data

The flagship aims to establish a unique international long-term atmospheric monitoring and observation platform supported by all research institutions represented in Ny-Ålesund and thus to realize a supersite allowing investigating the complex Arctic System with a multidisciplinary approach. Interdisciplinary observations will be performed elucidating interaction processes on sea-, snow-, ice surfaces and the atmosphere. Special emphasis will be laid upon the impact of climate change on the Arctic environment.

3. Educational focus

KIRB will provide a venue to tie higher education directly to cutting edge research.

- **National educational initiatives:**
The educational use of KIRB will be promoted further. Coordination of national programs to stimulate students through direct student contacts on site will be pursued.
- **European Union educational programs:**
The EU transnational access project ARCFAC V will terminate 2010. This will be furthered with initiatives for additional EU educational programs (e.g. Marie Curie and other programs).
- **UNIS courses in Ny-Ålesund:**
The University Centre in Svalbard (UNIS) currently offers courses with field activities in Ny-Ålesund. Their activity will be increased by implementing more research projects and staging field courses well suited to KIRB.
- **KB funding policy for young researchers:**
KB will continue to make KIRB attractive to bachelor and master students by offering educational facilities and favourable prices.
- **KIRB scientists as lecturers at UNIS**
A strong link between research and education will be established by a frequent use of KIRB scientists as guest lecturers at UNIS.

4. Coordination activities within KIRB

Information tools

- **Information Service / Web-portal**
SSF maintains a central web-portal for all research on Svalbard. This portal will also contain links to the KIRB web-sites, the project databases and the individual stations.
- **Project database**
The Research in Svalbard Database (RiS) is a tool administered by SSF for information about research projects where all KIRB research activities are registered.
- **Bibliographies**
The stations are responsible for providing SSF with (and updating) short field reports, lists of planned and finished publications, documentations of experiences and preliminary results.
- **Scientific data**
IPY data policies will be implemented within KIRB securing open access to data. A GIS-based online and searchable metadata module of the RiS will identify data sets, samples, geographical sites and measurements.

Logistical services

Logistics shall be organized to prioritize the scientific efficiency of KIRB. The Kings Bay Marine Laboratory will serve as role model for future logistic investments and coordination with resources guided towards common logistic solutions for **scientific** needs at the stations. Stations will, when practical and useful, turn towards station specific specializing in scientific services offered to the entire KIRB community.

- **Equal access to shared resources**
KB and its research partners/stations shall together seek to implement the best joint system for provision of accommodation, offices, and meeting rooms, so as to give all users equal access to such shared resources irrespective of nationality.

- **Joint logistical services:**
Logistics shall be centralized and coordinated to the largest degree feasible. A complete list of logistical services and providers shall be accessible through the SSF web portal.
- **Scientific instruments and installations:**
All stations shall maintain complete lists of scientific instruments and installations which will be accessible through the SSF web portal.
- **Hazardous waste disposal**
Kings Bay will organize a central disposal system for handling hazardous materials and chemicals.

Organizational measures

- **KIRB-LIB**
The Norwegian Polar Institute (NPI) will in collaboration with UNIS revitalize its onsite library, consisting of contemporary Ny-Ålesund papers, field reports and other scientific reference material.
- **KIRB-SVC (Science Visitor Centre)**
NySMAC in collaboration with KB shall have the responsibility for the Science Visitor Centre. KIRB-SVC shall be an exceptional Arctic science education and outreach facility for visitors.
- **KIRB-SAFE (Safety service)**
A common security procedure agreement will be established to ensure a common standard and understanding.
- **KIRB-MAF (Ny-Ålesund Station Managers Forum)**
KIRB-MAF should serve as an information board among all research stations present in Ny-Ålesund at all times, and weekly meetings will be held. All day-to-day problems should be addressed through this board.
- **KIRB-TALK**
Every effort should be made to encourage the scientists to communicate their work and results into the village through popular science seminars and other means.
- **KIRB-ENV**
The environmental impact assessment (EIA) for Ny-Ålesund is an **important background** document for the Science Plan. All stations are expected to contribute to the establishment of an EIA monitoring program documenting the development of key environmental effect parameters at the site.

Networking

- **Ny-Ålesund Scientific seminars**
The Ny-Ålesund Scientific seminars, initiated by NySMAC are organized every 2 years for scientific exchange and communication both within the KIRB research community and with the outside world.
- **The Ny-Ålesund Symposium**
KB will organize the high-level event, The Ny-Ålesund Symposium on a regular basis on polar topics of choice to promote KIRB as a premier international Arctic research and monitoring facility.
- **SSF seminars**
SSF organizes and finances scientific seminars bringing together international scientists to discuss topics of particular scientific interest to facilitate thematic development of KIRB.
- **Outreach and policy maker enlightenment**
The use of Ny-Ålesund for seminars, training course, conferences and meetings will be promoted but restricted to such that address issues of relevance to the scientific development and promotion of scientific results from KIRB.

5. Implementation of the Science Plan

All institutions are committed to promoting and creating incentives for their scientists to adhere to the goals of the science plan.

- ***Role and responsibilities of Svalbard Science Forum (SSF)***
SSF is the central information and coordination unit for research on Svalbard under the auspices of the Research Council of Norway. SSF will also be responsible for overseeing the implementation of the Ny-Ålesund Science Plan. The SSF board approves the science plan.
- ***Role and responsibility of the research partners and stations in Ny-Ålesund***
Each station is responsible for making the content and intention of the Science Plan known to the station personnel and its users. All active groups are responsible for reporting identified gaps in knowledge and observational programs into the database.
- ***Role and responsibility of the Norwegian Polar Institute (NPI)***
NPI has a role to oversee the scientific implementation of the science plan. NPI is also a logistics provider on Svalbard and has specific responsibilities with respect to facilitate Norwegian and international research activities on Svalbard, providing research results for the Norwegian authorities, and documenting ongoing research.
- ***Role and responsibility of the University centre in Svalbard (UNIS)***
UNIS should promote and maintain educational activities in Ny-Ålesund. UNIS will facilitate stronger exchange of science between scientists in Ny-Ålesund and its own research activities through educational programs and pursuit of joint research projects.
- ***Role and responsibilities of Kings Bay AS (KB)***
KB is the owner and operator of Ny-Ålesund providing general infrastructure, transport and accommodation services for the research activities. KB maintains and manages the Marine Laboratory. KB will encourage all visitors to contribute to databases and adhere to the science plan.
- ***Role of the research Council of Norway (RCN)***
RCN will through international collaboration work for bilateral and multinational joint calls for proposals to further develop collaboration in Ny-Ålesund. RCN will work for providing the resources needed to provide the positive incentives necessary to fully implement the science plan.
- ***Role and responsibilities of Ny-Ålesund Science Managers Committee (NySMAC)***
NySMAC provides recommendations and advice to KB with respect to all matters of interest to the research. NySMAC is responsible for implementing the science plan.
- ***Role and responsibility of Ny-Ålesund Station Managers Forum (KIRB-MAF)***
KIRB-MAF is the local station managers forum in Ny-Ålesund that meets regularly with KB to ensure the smooth operation of research stations, projects and the provision of technical and logistical support.

Mission Statement for Ny-Ålesund

Adopted by NySMAC 24 Aug. 1997

Background

The Norwegian government has formulated as a goal that Ny-Ålesund is to be developed into a leading international Arctic environmental research and monitoring station.

The Norwegian Ministry of Environment White Paper #42 "Norwegian Polar Research", 1992-93, states that:

- A prerequisite for Ny-Ålesund continuing to attract Norwegian as well as foreign scientific activities is that the local human impacts on the environment are kept at a very low level.
- Other activities in the area must adapt to the conditions set by scientific research and monitoring

The following Mission Statement was adopted by the Ny-Ålesund Managers Committee at the 7th NySMAC meeting 24 August 1997:

The mission of Ny-Ålesund, Svalbard, is to

1. serve as an international station for scientific research and monitoring;
2. encourage international scientific cooperation;
3. give priority to scientific research and monitoring that is dependent on the near pristine environment or unique qualities of the Ny-Ålesund area, in particular research related to long range pollution, climate change and polar ecology;
4. preserve the near pristine environment of the Brøgger Peninsula and the Kongsfjorden area, as well as the cultural heritage of Ny-Ålesund;
5. keep local human environmental impacts at the lowest possible level so as not to jeopardise scientific research and monitoring;
6. give scientific research and monitoring priority over other local human activities, such as tourism and commercial fishing;
7. be a prime example of the sustainable operation and development of a research station in the Polar Regions.

The success of the station will be judged on its scientific merits and achievements.