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Finland's Antarctic Research Strategy 2014

Reports of the Ministry of Education and Culture, Finland 2014:20

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Abstract

On 2 March 2012 the Ministry of Education and Culture appointed a Coordination Committee for Antarctic Research for the period 2012-2014. The task of the Committee was to update the national Antarctic research strategy, strengthen national Arctic research co-operation, promote Finland's involvement in international Antarctic research co-operation, promote awareness and discussion on Antarctic research and monitor Finland's Antarctic research results and adherence to international obligations.

The Coordination Committee for Antarctic Research endorsed Finland's Antarctic Research Strategy 2014 at its meeting on 28 March 2014. The Committee consulted the science community and other Antarctic research stakeholders in the preparation of the strategy.

Antarctic research will produce high quality scientific data that concern Antarctica or for which information obtained from Antarctica is irreplaceable. Research may be either global, or limited to the two Polar Regions, but it would not be possible without data from Antarctica. Moreover, the research will generate information to support national and international decision-making. In Finnish Antarctic research the emphasis is especially on the areas of strength where Finland can conduct high-quality international scientific research. Antarctic research strengthens expertise on cold-climate conditions in Finland. The

Coordination Committee for Antarctic Research defined its vision for Finland's Antarctic research, according to which:

Finnish Antarctic research is of high international standard and open to new directions.

The vision of Finland's Antarctic research strategy is carried out through three focus areas:

1. Based on unique data, Antarctic research produces new scientific breakthroughs.
2. Antarctic research is internationally interactive.
3. Adequate prerequisites for Antarctic research are ensured and consistently developed.

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Abbreviations

COMNAP	Council of Managers of National Antarctic Programs
DROMLAN	Dronning Maud Land Air Network
EPB	European Polar Board
FINNARP	Finnish Antarctic Research Program
IASC	International Arctic Science Committee
IPCC	Intergovernmental Panel on Climate Change
SCAR	Scientific Committee on Antarctic Research
SopS	Finnish Treaty Series

1 Introduction

The Antarctic with its surrounding ocean is a unique entity, where phenomena affecting the entire globe are studied. Antarctic research will produce high quality scientific data that concern Antarctica or for which information obtained from Antarctica is irreplaceable. Research may be either global, or limited to the two Polar Regions, but it would not be possible without data from Antarctica. Moreover, the research will generate information to support national and international decision-making.

In Finnish Antarctic research the emphasis is especially on the areas of strength where Finland can conduct high-quality international scientific research. Antarctic research strengthens expertise on cold-climate conditions in Finland.

Finland signed the Antarctic Treaty (Finnish Treaty Series, 31/1984) in 1984 and was accepted as a Consultative Party in 1989, (i.e. voting member). The Finnish research station, Aboa, was established in Queen Maud Land over the period of 1988–1989. In 1996, Finland approved the Protocol on Environmental Protection (Finnish Treaty Series, 5/1998) related to the Antarctic Treaty. The first national Antarctic research strategy was developed in 1997.

The Antarctic Treaty's principle aims are the demilitarisation of Antarctica, safeguarding scientific research, and freezing territorial claims. The Protocol on Environmental Protection to the Antarctic Treaty provides for comprehensive protection of the Antarctic environment, as well as the associated ecosystems that depend on it. The environmental protocol forbids all activities focusing on mineral resources that do not involve scientific research. In addition to research activities also tourism has increased in Antarctica during the past few years.

The Antarctic region covers the areas south of 60° south latitude, which includes the Antarctica and the ocean surrounding it. In this strategy Antarctic research means research concerning the Antarctic region.

In Finland, Antarctic research has focused for example on the following research areas: Geodetic and glaciological research; bi-polar meteorological and space physics research; geological and geophysical research of bedrock, land and sea sediments and marine biology, ocean current and sea-ice research.

Research activities and associated administrative functions are coordinated by the Coordination Committee for Antarctic Research (Appendix 2), established by the

Ministry of Education and Culture to represent various branches of government and research communities. The committee examines regularly the Antarctic research strategy and updates it if needed.

The Academy of Finland is the main financier of Finnish Antarctic research projects. Since 1998 the Academy of Finland has organised regular calls for Antarctic research. Presently the call for applications is issued every fourth year. The most recent application round was organized in 2012, when a total of 2.5 million euros was granted to research projects (Appendix 1). Higher education institutes and research institutes promote also Antarctic research with their own funding. There are also many other sources of funding that can be utilised in Antarctic research, such as the Academy of Finland's other forms of financing and international sources (such as Horizon 2020, the EU Framework Programme for Research and Innovation).

The Finnish Antarctic Research Programme, FINNARP, is responsible of the logistics and maintenance of Aboa research station. FINNARP operates in connection with the Finnish Meteorological Institute under the Ministry of Transport and Communications, with an annual budget of about 850 000 euros,.

The Finnish Antarctic research strategy for 2014 was prepared by the Coordination Committee for Antarctic research. The science community and other Antarctic research stakeholders were consulted when the strategy was being formulated. In the early stages of the strategy process, on 24 October 2013, the Committee organized an Antarctic research seminar. The seminar was attended by approximately 50 representatives from the government sector, higher education institutes, scientific institutions and other stakeholders. In addition, the scientific community and other stakeholders commented on the Antarctic Research Strategy while being drafted.

1.1 Assessment of the previous strategy period

According to the international Antarctic research evaluation carried out in 2006 (Publication of the Academy of Finland 13/06, www.aka.fi/publications/) Finnish Antarctic research was partly successful in the period 1998–2005, but on average research results remained below both national and international standards. Finnish research was weakly integrated to the international community and collaboration among national research groups was modest.

Based on the strategy adopted in 2008, the project funding granted by the Academy of Finland has placed greater emphasis on national and international co-operation than before. International co-operation has become a precondition for funding. The projects funded by the Academy of Finland during the periods of 2009–2012 and 2013–2016 are listed in Appendix 1. Full estimation of the influence and impact of the 2008 strategy is difficult due to a lack of systematic monitoring data. Currently estimation is mainly based on research projects financed through Academy of Finland's Antarctic research calls.

International interaction has increased in many ways. In recent years, international co-operation and operational efficiency have been successfully emphasized in logistics. International co-operation is executed directly with the national Antarctic programmes and research institutes and in the framework of the COMNAP and DROMLAN systems. Co-operation with research stations and vessels belonging to other countries has grown. Approximately 60 researcher visits to stations of other countries have taken place over the past decade. At the same time, waste management has improved and transport co-operation has increased with other countries, such as Sweden.

Moreover, the media coverage on Antarctic research has increased, and expeditions to the Antarctic, in particular, are actively covered by the Finnish media.

1.2 Operational environment of Antarctic research

Globally, interest in the Polar Regions has increased significantly in recent years. Polar Regions are central to research on climate change and on the consequences of climate change. Antarctica and the Arctic region have their own special characteristics and challenges that need to be taken into account in research activities.

Interest in the Arctic region has grown especially as a result of the opening of new sea transport routes and the growing opportunities to use the region's natural resources. At the same time concern about the fragility of the Arctic environment has increased. Antarctic research has an ever greater role in science and in the way it impacts society. For example, the ongoing melting of glaciers in Antarctica, which may possibly be progressive, is expected to significantly affect the conditions in the northern hemisphere, in particular as a result of rising sea levels.

Finland's expertise in the Arctic region is broad-based, and can in many cases be applied to the Antarctic region too. Many areas of research have connections to cold climate expertise. There is a demand for Finnish expertise on cold-climate conditions also outside the Arctic region. The technology used in the research does not depend on geographic location.

Antarctic research is international in nature. International actors such as the Scientific Committee on Antarctic Research (SCAR), European Polar Board (EPB) and the Intergovernmental Panel on Climate Change (IPCC) have a key role in defining priority areas in Antarctic research also from a Finnish perspective. SCAR's Horizon Scan project is the first large-scale foresight exercise in the framework of SCAR. Its purpose is to map out the main Antarctic research themes for the next two decades. The IPCC is preparing the fifth assessment report of the scientific, technical and social information on climate change. The fifth report will be completed in phases during 2013-2014. Specifically cross-sectional themes in the fifth assessment report include ice sheet melting, sea-ice and sea level rises.

Finnish Arctic Strategy (2013) and the National Strategy for Marine Research (2013) are among the recent national strategies closely related to the Finnish Antarctic research strategy 2014. The basic premise in the Arctic strategy is that Finland is an active Arctic actor with ability to reconcile the limitations imposed and business opportunities provided by the Arctic environment in a sustainable manner while drawing upon international co-operation. The strategy builds on the fact that Finland has Arctic expertise and the Arctic is relevant to the whole of Finland. The National Strategy for Marine Research emphasizes the importance of multidisciplinary Arctic marine research.

The Finnish research and innovation system is undergoing numerous reforms. A Government resolution was introduced in 2013 for reforming government research institutes and research funding. A new funding instrument for strategically oriented research is being established for allocating funding for research aiming to find solutions to major societal challenges. The updated Finland's research infrastructure roadmap of was published in March 2014. The Academy of Finland funds research infrastructure projects annually through separate funding.

2 Vision, focus areas and measures

Vision

Finnish Antarctic research is of high international standard, and open to new directions.

The focus areas

This vision is carried out through three focus areas:

1. Based on unique data, Antarctic research produces new scientific breakthroughs.
2. Antarctic research is internationally interactive.
3. Adequate prerequisites for Antarctic research are ensured and consistently developed.

Focus area 1. Antarctic research produces new scientific breakthroughs using unique data

Antarctic research will produce high quality scientific data that concern Antarctica or for which information obtained from Antarctica is irreplaceable. Research may be either global, or limited to the two Polar Regions, but it would not be possible without data from Antarctica.

Reports, analyses and evaluations by key international actors, which identify future research priorities and needs, will be taken into account in the prioritisation of research areas and planning of Finland's targeted Antarctic research. These include SCAR Horizon Scan (Future Directions in Antarctic and Southern Ocean Science) -project, the IPCC's fifth Assessment Report (2014) and the European Union's Horizon 2020 programme.

Researchers are encouraged to consider new directions that offer promise for scientific breakthroughs in Antarctic research. This can happen by participating in SCAR's activities, for example, or by strengthening co-operation between SCAR and the International Arctic Science Committee (IASC).

Successful research requires the combining of expertise from different Finnish research groups and more effective use of existing data. Polar researchers should also work closely in co-operation with researchers from other fields, and in advancing of researcher education. The harsh conditions require extraordinary durability of structures, energy sources and measuring instruments, as well as their continuous development. Finland will pursue with her strong and wide-ranging expertise on cold-climate conditions and further develop it to reach the international forefront.

Informing of the public and the cooperation of researchers will be encouraged for example by organising periodically research seminars. Antarctic research media coverage and communication to the public will be promoted as well as the use of research findings in public decision-making, science education and in the business sector. In order to achieve this, input is needed from all stakeholders (higher education institutions, research institutions, the Academy of Finland, Finnish Antarctic Research Program and the Antarctic Research Coordination Committee as well as the Finnish National Committee on Arctic and Antarctic Research).

Measures

- Researchers and research groups are involved in both national and international multi-disciplinary co-operation, also with actors in the field of technology.
- Research is interactive and multidisciplinary. Co-operation with Arctic research and oceanographic research is strengthened.
- Research results are published in international peer-reviewed publications and communicated to the public.
- Research results are in wide use, including national and international decision-making.
- The Antarctic Research website (www.antarctica.fi) is enhanced and used for disseminating information about research activities.
- Research seminars are organised regularly in co-operation by different actors.

Focus area 2. Greater international interaction

By utilising and emphasising key international programmes, Finland strengthens Antarctic research. Finnish researchers participate in the working groups of SCAR. Bipolar research also requires close co-operation with IASC. To this end, international actors will be made better known in Finland. Finnish researchers will make full use of the possibilities provided by other countries' research stations and vessels, and vice versa. Finland's research station Aboa's activities will support the research of other parties of the Antarctic Treaty. Indicators of international co-operation include high-quality international collaborative publications, researcher exchange, international funding and the use of data in international research and monitoring.

The role of the National Committee on Arctic and Antarctic Research as a national link in coordinating research will be strengthened. Stakeholders involved in Antarctic research are represented in the committee. The committee is responsible for the official representation in SCAR and appoints national representatives to SCAR's Standing Scientific Groups. The representatives must act as operative links between SCAR organs and national activities. The committee also promotes co-operation with IASC.

Finnish Antarctic research abides by Finnish national Antarctic legislation and international regulations binding Finland. The special requirements of the sensitive environment in the Antarctic region are taken into account also in relation to environmental protection. Finland will participate actively in the debate and decisions-making concerning the Antarctic Treaty, its status and its future. Finnish research and expertise will be presented in an expedient manner in the annual Consultative Meetings of the Antarctic Treaty System.

Measures

- Finnish researchers participate actively in the operations of the Scientific Committee on Antarctic Research (SCAR) and take an active role in the planning and realisation of research projects concerning the Antarctic.
- The National Committee of Polar Research promotes national and international co-operation.
- Finnish researchers' participation in international research collaboration is supported by consistently funding large-scale multidisciplinary research projects.
- Finland takes part in decision making in the Antarctic Treaty System and supports and actively develops comprehensive protection of the Antarctic region's environment.

Focus Area 3. Ensuring adequate prerequisites for research

The Academy of Finland regularly finances multi-annual research projects, which are selected on the basis of evaluation by international experts. The Call for Antarctic Research of the Academy of Finland has been a prerequisite for implementing the obligations of the Antarctic Treaty, and also for coordinating the logistical support for the research activities. The Finnish Antarctic Research Strategy 2014 and its focus areas will be taken into account in the Academy of Finland's call for Antarctic research. The aim is to identify the most high-quality and multidisciplinary research projects and the most promising researchers.

The Academy of Finland will continue to finance the Antarctic Research Call for applications at the same level of funding as before. The Coordination Committee for Antarctic Research will prepare as necessary recommendations concerning the appropriate magnitude of funding by the Academy of Finland for Antarctic research.

In addition to the financing through the Academy of Finland's call for Antarctic Research applications, it is important to make use of other national and international funding resources. With funding for Arctic research having increased, there are good opportunities to develop expertise on cold-climate conditions, which also supports Antarctic research. The Academy's different financing opportunities must be utilised. EU's programmes provide financial resources for research and mobility. Effective use of Nordic financing sources would guarantee closer Nordic research co-operation. Universities and research institutions invest financial resources of their own for Antarctic research. The aim is to keep the resources at least at the current level. Some of the resources and infrastructures used in research is such that own funding is the only possible way to maintain them.

Efficiency of the archiving of and access to research data will be further strengthened. Finnish scientists have gathered significant sample series and long-term observation series, which should be archived in open databases allowing more effective use of them. The gathering of measurements on a year-round basis is essential for many research projects, requiring the Aboa research station's instruments to operate automatically and to tolerate the harsh conditions.

Further development of the Finnish Aboa research station and strengthening its use also in international cooperation is important. Generating long-term observation series also requires adequate maintaining of the Aboa station. When needed, FINNARP's equipment and networks can be used also in Arctic research (for example, in expedition operations and measurement campaigns), but Finnish Antarctic research must be prioritised first.

It is important to ensure that there are sufficient financial resources to safeguard the operating conditions for Antarctic logistics. Effective logistical support is required to ensure safe research operations in the Finnish Aboa research station and to enable Finnish researchers and projects to operate at the stations of other countries. Regardless of the funding source, all research projects belonging to measurement campaigns in Antarctica should be in contact with FINNARP. The requirements of multi-annual research projects form a framework in which it is possible to plan expeditions logically and in an economically expedient manner.

The Coordination Committee for Antarctic Research is responsible for organising the monitoring of the Antarctic research strategy. The committee will prepare a plan for consistent monitoring of the measures outlined in the new strategy and identifies responsible actors. Different sources of data, such as the Academy of Finland's, FINNARP's and the Finnish National Committee on Arctic and Antarctic Research's sources and different publication databases will be utilised in monitoring.

Measures

- The Academy of Finland funds high-quality research projects with emphasis on a multidisciplinary and international approach.
- Boosting the monitoring of research projects.
- FINNARP is responsible for ensuring safe technical conditions for research and their development in Antarctica.
- Ensuring the continuity of long-term observations and measurements.
- The national funding for research and associated logistics will be at a level suitable for high-quality research.

Appendix 1.

Research projects funded by the Academy of Finland through the call for Antarctic research project proposals between 2009–2012 and 2013–2016

The names of the directors of consortiums are underlined wherever there is a consortium project in the below list.

Researchers	Organisation	Research project	Period
Kerminen, Veli-Matti Virkkula, Aki	University of Helsinki Finnish Meteorological Institute	Atmospheric Composition and Processes relevant to climate change in ANTarctica (ACPANT)	2013–2016
Lensu, Mikko Kujala, Pentti	Finnish Meteorological Institute Aalto University	Variation of Antarctic sea ice thickness and its effect on the load level of ice navigating	2013–2016
Usoskin, Ilya	University of Oulu	Cosmic Rays in Polar Atmosphere (CRIPA)	2013–2016
Vihma, Timo	Finnish Meteorological Institute	Antarctic Meteorology and its Interaction with the Cryosphere and Ocean (AMICO)	2013–2016
Hillamo, Risto Kulmala, Markku T Leppäranta, Matti J	Finnish Meteorological Institute University of Helsinki University of Helsinki	Antarctic Coastal and High Plateau Aerosols and Snow (ANTAS)	2009–2012
Kyrö, Esko	Finnish Meteorological Institute	Studies of the Changing Antarctic Atmosphere using Soundings, Remote Sensing and Modelling: A Bi-polar Approach. (SAARA)	2009–2012
Moore, John	University of Lapland	Dynamical evolution of Scharffenbergbotnen blue ice area since the Late Glacial Maximum	2009–2012
Savijärvi, Hannu I Vihma, Timo	University of Helsinki Finnish Meteorological Institute	Antarctic Meteorology and its Interactions with the Cryosphere and the Ocean	2009–2012
Strand, Kari	University of Oulu	Cenozoic East Antarctic Ice Sheet History from Wilkes Land Sediments, IODP Expedition 323	2009–2012

Appendix 2.

Coordination Committee for Antarctic Research 2012–2014

Chairman

Petteri Kauppinen, Counsellor of Education, Ministry of Education and Culture

Members

Liisa Valjento, Counsellor, Ministry for Foreign Affairs

Martti Mäkelä, Counsellor, Ministry of Transport and Communications
(until 19 Sep 2012 and 29 Jun 2013–7 Jan 2014)

Johanna Särkijärvi, Project Director, Ministry of Transport and Communications
(19 Sep 2012–28 Jun 2013)

Johanna Ikävalko, Ministerial Adviser, Ministry of Transport and Communications (from 8 Jan 2014)

Outi Mähönen, Ministerial Adviser, Ministry of the Environment

Jenni Virtanen, Science Adviser, Academy of Finland (until 19 Sep 2012)

Tommi Laitinen, Science Adviser, Academy of Finland (19 Sep 2012–31 Dec 2012)

Hanna Katriina Pikkarainen, Science Adviser, Academy of Finland (7 Jan 2013–26 Apr 2014)

Anna Kalliomäki, Science Adviser, Academy of Finland (from 21 May 2014)

Annakaisa Korja, Research Director, University of Helsinki

Kari Laine, Director, University of Oulu

Paula Kankaanpää, Director, University of Lapland

Mikko Alestalo, Director, Finnish Meteorological Institute

Mari Walls, Director, Finnish Environment Institute

Petri Lintinen, Manager, Geological Survey of Finland

Markku Poutanen, Professor, Finnish National Committee on Arctic and Antarctic Research

Standing experts

Mika Kalakoski, Manager, Finnish Antarctic Research Programme (FINNARP)

Secretary

Henni Axelin, Senior Adviser, Ministry of Education and Culture (until 18.1.2013)

Riina Vuorento, Senior Adviser, Ministry of Education and Culture (from 19.1.2013)

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12 Varhaiskasvatuksen historia, nykytila ja kehittämisen suuntalinjat. Tausta-aineisto varhaiskasvatusta koskevaa lainsäädäntöä valmistelevan työryhmän tueksi
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