Netherlands Organisation for Scientific Research

# Pole Position - NL 2.0

## Strategy for the
## Netherlands Polar Programme 2016-2020

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Netherlands Organisation for Scientific Research

## With contributions from

Albert Aalbers, MARIN
Rien Aerts, VU University of Amsterdam
Kees Bastmeijer, Tilburg University
Bram Bregman, Ministry of Infrastructure and the Environment
Nico van den Brink, Wageningen University & Research Centre
Michiel van den Broeke, Utrecht University
Corina Brussaard, NIOZ Royal Netherlands Institute for Sea Research
Anita Buma, University of Groningen
Herman Eijsackers, chairman of the Strategy Committee
Jan Andries van Franeker, IMARES
Loes Gerringa, NIOZ Royal Netherlands Institute for Sea Research
Louwrens Hacquebord, Arctic Centre (University of Groningen)
Dick van der Kroef, Netherlands Organisation for Scientific Research
Harro Meijer, University of Groningen
Liesbeth Noor, NWO (editorial board)
Alex Oude Elferink, Utrecht University
Annette Scheepstra, Arctic Centre (University of Groningen)
Sander Steenbrink, Boskalis
Frits Steenhuisen, Arctic Centre (University of Groningen)

## Cover photo

Collecting water samples in Marguerite Bay, Rothera Research Station. *D.*

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The Dirck Gerritsz Laboratory in Antarctica.

# Preface

In 2010, at the request of Ronald Plasterk, the Minister of Education, Culture and Science at that time, the Master Plan for Pole Position - NL was published, in which the plans were elaborated for the New Netherlands Polar Programme (NNPP) for the period 2010-2014. The 2016-2020 Scientific Strategy Plan in your hands is an updated continuation of the Master Plan and has been realised in collaboration with

partners, NWO is calling for an effective and ambitious growing polar research programme. In order to be able to achieve a proper first alignment with the economic priority areas, NWO considers budget growth to  10 million per year necessary.

> "The Polar Regions may seem remote but the rapid changes now affecting both these areas have resulted in significant consequences (……). Science is a vital tool in establishing what is driving this rapid change."

*European Polar Board in its challenges for Horizon2020 "Arctic and Antarctic Science for Europe", June 2014*

# 2 Social relevance and implications

The poles are extremely sensitive to changes in climate: they form the heartbeat of our climactic system. Climate change in the polar regions has huge physical, ecological, social and economic consequences far beyond those regions.

What is now becoming visible in the polar regions in an accelerated manner is generally seen to be a precursor to what the Netherlands is facing in a derivative form. Potential effects include changes in storm tracks, shifts in precipitation patterns, changes in the frequency and intensity of cold polar air flowing to lower latitudes, a rise in sea level, loss of biodiversity and the resulting degradation of fish populations, shifting vegetation boundaries and diminishment of the existing agricultural acreage.

These changes have economic consequences. However, these also create new opportunities for the Netherlands. The continuous retreat of Arctic sea ice gives room for shipping lanes from the Netherlands that may be 40% shorter than the routes now in use. Exploration into raw materials that are present in the North Pole region such as oil, gas and minerals will become technically and economically feasible. This also goes for new and shifting fishing grounds. The tourist sector can expand. As a consequence, the number of maritime operations will increase strongly through the years, along with the pressure to implement more permanent facilities (such as harbours, tourist facilities, etc.) in the polar regions.

All these new activities raise questions about the management of the polar regions, about international regulations and the maintainability of existing treaties and/or the need for new treaties.

Although attention to the Arctic area is increasing, the significant contribution made by the Antarctic ice cap to the global rise in sea level and the key role that Antarctic waters play in the food chain must not be underestimated. Commitment of a substantial portion of the NPP budget to Antarctica remains essential. Naturally, acquiring knowledge also plays an essential role in regulating human activities in Antarctica and in a strong position for the Netherlands in the Antarctic treaty system.

The Dutch government has drawn up the Policy Framework "The Netherlands and the Polar Regions 2011-2015" which elaborates its policy with respect to these areas. The NPP is an inextricable part of this and finances scientific research supporting this policy, along with performing a number of policy supporting tasks such as attending meetings of international organisations occupied with the polar regions (including workgroups of the Arctic Council and SCAR).

> "The rate of sea level rise since the mid-19$^{th}$ century has been larger than the mean rate during the previous two millennia (high confidence)."

*IPCC Working Group I, Summary for Policy Makers, 2013*

The tip of the iceberg, Antarctica. *D. /*

The four themes for the strategy period 2016-2020 are described below. The description of each theme is determinant for what is categorised within a theme. This concerns global strategy description: the research topics listed serve as examples for the type of research that may fall within a given theme and the summation is not exhaustive.

Financing from Cluster I

Financing from Cluster II

## 4.2 Polar ecosystems

Important topics for **science-driven research** within this theme include:

- The cumulative impact of natural and anthropogenic stress factors on polar ecosystems;
- The effect of changing physical/chemical factors resulting from climate change on the diversity and share of key organisms in the polar food web;
- The consequences of changes in sea ice to polar ecosystems.

In this theme, the focus of **policy-driven research** includes:

- Protecting biodiversity;
- The impact of changes in polar regions on migratory birds;
- Research into the provenance and behaviour of contaminating substances such as persistent organic pollutants (POPs) and heavy metals that end up in the polar region via air and sea flows.

## 4.3 Sustainable exploitation

Important subjects for **science-driven research** regarding the exploitation of natural resources, maritime operations and infrastructural development include:

- Acquiring information about the capacity and resilience of ecosystems with respect to emissions and burdens (e.g. research into the effects of underwater noise or turbidity on the environment);
- Research that contributes to better insight into the social, legal, economic and political consequences of mining and new transportation routes.

**Policy-driven research** within this theme should provide information about the capacity of and environmental effects on the polar regions when using natural resources, conducting maritime operations and using the area for transport. Important topics within this theme include:

- Research that contributes to proper management of fish and marine krill populations;
- Mining in cold regions and the associated environmental problems;
-

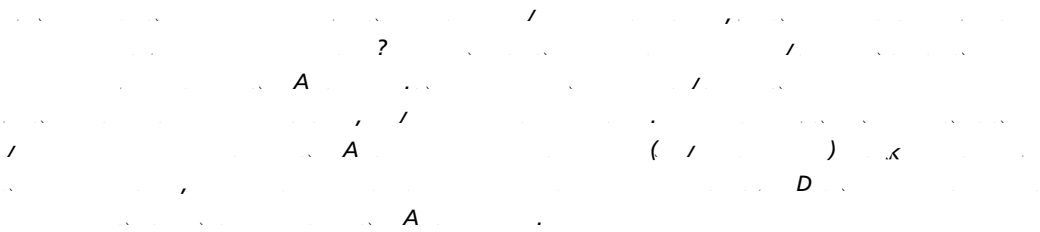
The Netherlands has a strong maritime and offshore services sector specialised in complex, specific systems and operations. Economic activities in polar regions offer opportunities for Dutch companies and research institutes. These activities must be structured and performed within the preconditions of safety and sustainability. The expected increase in maritime operations in the Arctic (coastal) areas and of tourist activities in both polar regions demands research into methods and technologies for managing the risk and safety of such operations. This can be further subdivided into:

Financing
Public-private
partnership

- Risk management for ecosystems and species;
- Risk management, safety and social impact for local communities;
- Risk management and safety for the companies and their employees themselves.

> "Developing the Arctic could be essential to securing energy supplies for the future, but it will mean balancing economic, environmental and social challenges."
>
> *Shell (www.shell.com/global/future-energy/arctic.html)*

## 4.4 Social, legal and economic landscape



Financing
from
Cluster I

**Science-driven research** is, among others, related to the following:

- The effectiveness of existing law – e.g., by a study of the way in which existing international treaties are implemented and enforced in practice in national law and enforcement;
- Global economic consequences from thawing in the polar regions;
- The effect of (climate) change on local inhabitants in the Arctic region.

Financing
from
Cluster II

**Policy-driven research** within this theme focuses, among others, on the following subjects:

- The implementation of protection of biodiversity and wilderness values in the polar regions in treaties and permit systems;
- The improvement of regulation of human activity in Antarctica in order to be able to manage the cumulative effects of these activities on the Antarctic environment and other values (e.g. replacement of the current system of issuing permits for separate activities, which provides no oversight of the final cumulative result);
- What are the existing and possible future values of polar ecosystem services?

> "Answering these many questions [selected in the SCAR Horizon Scan] will require sustained and stable funding (...). Postponed projects and lost field seasons leave gaps."

*SCAR. Polar research: Six priorities for Antarctic science. Nature, vol 512, pp23-25 (2014)*

## 4.5 Transcending the themes

Connections between fields of research occur in various areas. These so-called cross-cutting issues connect the four themes. For example: how will the carbon cycle in the North polar region change due to changes in ice coverage? What will the effects of climate change be on the Gulf Stream in Western Europe? What are the consequences for local communities if a northern passage for shipping comes about? This interdisciplinarity within the Dutch polar research community can be strengthened by formulating research questions that either fall within various themes or that connect the themes.

Two important basic threads run among the themes:

1. Acquiring fundamental knowledge of the polar regions and insight into the various interactions, so that the effects of human activity and climate change can be measured well. This is important for projecting future scenarios and for managing these areas effectively;
2. Monitoring and/or long-term research is important in order to maintain the picture arising from the aforementioned fundamental knowledge with information about the status of a changing system over time. This allows changes that are occurring now to be detected. This information is essential in order to be able to draw up reliable models, which themselves are essential for reliable predictions. Research groups have difficulty with the continued financing of their own longer-term monitoring programmes. The same problem arises at the NPP: it gets financing every 5 years and is therefore unable to finance any monitoring projects that last longer than 5 years. Only by financing individual projects in an overlapping manner can NPP contribute to this, as long as the NWO criterion of a research proposal's originality is still in effect.

The European Polar Board has also designated these two basic threads as being hugely important for the European research agenda Horizon 2020.

# 5 Two connecting lines

In addition to the four themes, two points of commonality run through the Netherlands Polar Programme:

## 5.1 International collaboration and coordination

Polar research is expensive. This is due to extreme climatological and geographic conditions and the high logistical and infrastructural costs associated with the collection of the required research data. . Polar research in the Netherlands has long-term collaborative partnerships in place with the British Antarctic Survey (BAS) and the German Alfred-Wegener-Institut für Polar- und Meeresforschung (AWI). These collaborative partnerships are established in a Memorandum of Understanding (MoU). The scientific ties with other countries that are important to Dutch polar research will be tightened during this strategy period wherever possible. One can consider Russia in connection with that country's large territorial presence in the North Polar region and the Dutch research efforts already present in Northern Russia. One can also consider whether further collaboration with Belgian scientists might be important for the Netherlands. The Belgian Princess Elizabeth Base may be an interesting terrestrial fieldwork location for Dutch scientists. Opportunities for financing research projects based on collaboration with Belgian scientists also exist in Belgium. Chile, an important access route to Antarctica, is also looking to collaborate with Dutch polar scientists. In 2016, it will be 400 years ago that Willem Schouten rounded Cape Horn. This will be celebrated during the Antarctic Treaty Consultative Meeting (ATCM), the annual meeting of all the member states to the Antarctic Treaty; in 2016 this meeting will take place in Chile. This may lead to a national impulse for Chilean polar research. Dutch scientists from the NPP will be actively involved in this. Norway is also an important partner for Arctic research considering its coordinating role in research on Spitsbergen (Ny-Ålesund) and considering the financial resources that Norway makes available for scientific studies in relation to themes 2 and 3.
However, every expansion in the geographic focus of NPP research is linked to expansion of the existing financing.

Extra financing required

The Netherlands will have to contribute proportionally to the maintenance/construction/rental of our international partners' Arctic and Antarctic logistical and infrastructural facilities, if we want to be able to maintain our privileged collaboration with them. The Netherlands is and remains an attractive partner for collaboration and Dutch scientists will continue to have access to other countries' polar facilities as long as Dutch scientists produce important research contributions and data sets in return. The Netherlands is a "niche operator" in polar research. Compared to the efforts of such countries as the UK and Germany, our total efforts are relatively limited, but these efforts involve a number of very specific scientific fields, including glaciology and oceanography, with groundbreaking, high-level research in areas where other countries lack expertise. For example, in the NPP there is considerable expertise in the area of (automatic) in-situ monitoring and modelling of the polar climate. Being able to share scientific infrastructure and data with foreign partners provides excellent compensation for the lack of our own polar infrastructure. NPP continues to invest in this area.

# 6 Policy support

A third component of the NPP, set up at the recommendation of the Terlouw Commission, concerns expenditures for purposes of proper management of polar regions, international coordination of research and implementation of knowledge, and expanding the international image and visibility of the Netherlands and of Dutch polar research. To achieve this, good national representation in international bodies that are important to polar research (boards, (programme) committees, workgroups, etc.) is important. Cluster III absorbs expenditures for contributions, attending meetings by Dutch representatives, etc. Partly thanks to this effort via Cluster III in 2014, the Netherlands was able to gain the secretariat of the European Polar Board for the period 2015-2019. The important activities and organisations for the polar region are:

Extra financing required

- Contract with the University of Groningen's Arctic Centre concerning management of the Dutch Polar Station on Spitsbergen
- Contract with Tilburg University for advisory work concerning membership in the Antarctic Treaty
- Secretariat for the Antarctic Treaty
  - The Antarctic Treaty Consultative Meetings (ATCM & CEP)
- Workgroups/Committee of the Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR)
- Scientific Committee for Antarctic Research (SCAR)
- Council of Managers of National Antarctic Programmes (COMNAP)
- Participation in inspections in the context of the Antarctic Treaty
- European Polar Board
- International Arctic Scientific Council (IASC)
- Workgroups in the Arctic Council (AC)
- European Framework programmes

In the 2010-2014 NNPP, not all of the aforementioned organisations and work activities were funded. Attending the ATCM, the meeting of the CEP and work activities for the Commission on the Conservation of Antarctic Marine Living Resources (CCAMLR), are now mentioned because of the importance of these organisations to the polar regions. NPP research can contribute to the work activities of and the results achieved by these organisations. However, Cluster III funding will have to be expanded in comparison with the period 2010-2014.

### Education, Outreach and Communication

The NPP must be supported by an adequate communication strategy and sufficient budget must be appropriated for executing the "3x3" communication strategy developed in the IPY. This strategy links each of the three components of Education, Communication and Outreach to the three important target audiences for polar research: the public, policymakers and scientists. Parts of this communication strategy include the annual NPP symposium, publishing brochures and an annual report, giving lectures or having outsiders provide these, and having videos produced about the NPP's work.

In Cluster III, no (research) requests may be submitted.

### Costs transcending the clusters

Outside the three clusters, funding is also required for central activities including the coordination, logistics and support of scientific research. Among other things, this includes contributions to international partners (MoUs), financing Dutch infrastructure, data management and meeting costs for the Netherlands Polar Committee. These activities contribute to all clusters and, therefore, receive contributions from all three clusters.

# 7 Infrastructure

Access to adequate infrastructure is essential for the visibility and continuity of the NPP.

## Antarctic infrastructure

Access to Antarctic infrastructure is coordinated centrally by NWO. For this, NWO takes care of the necessary MoUs and for national representation of the Netherlands in the Council of Managers of National Antarctic Programmes (COMNAP).

### Dirck Gerritsz Laboratory – Rothera Research Station, Antarctica

One of the focal points in the Pole Position NL Master Plan (for the period 2011-2015), inspired by Ronald Plasterk, the Minister of Education, Culture and Science at that time, was the construction of a laboratory at the British research station Rothera in Antarctica. This lab was officially opened in January 2013. The entire construction of this laboratory was completed in collaboration with the British Antarctic Survey (BAS). NWO manages the lab with the help of a Scientific Steering Committee, with representatives from both the Dutch and the British side. Effective use of this investment requires a call for proposals once every 2-3 years, (partially) focused on the Dirck Gerritsz Laboratory.

### Collaboration with the British Antarctic Survey (BAS)

For the Netherlands, the British are a natural and very reliable partner in a relatively accessible part

## Arctic infrastructure

### Dutch Polar Station – Ny-Ålesund, Spitsbergen

Since 1995, the Netherlands has rented a modest research facility in Ny-Ålesund. This research facility enables Dutch scientists to participate in international research activities and to use other research facilities present at Ny-Ålesund. This fixed, permanent infrastructure contributes to improve continuity, recognisability and integration of the Dutch research. In this context, the situation in Ny-Ålesund is a beautiful example of collaboration in which a small investment in a useful and recognisable Dutch polar station as part of an international research facility results in significant recognisability in international polar research. However, the existing polar station is very outdated and the primitive facilities there no longer meet current needs for the accommodation of scientists. Furthermore, there is a need for special laboratory facilities that are not provided in the current Kings Bay Marine Laboratory. There is now an excellent opportunity for building a new accommodation in Ny-Ålesund in collaboration with AWI and IPEV (AWIPEV). This win-win approach aligns well with the European Polar Board's proposal concerning improved coordination and joint financing of polar infrastructure. NWO is also reviewing possibilities for a mobile addition to the Kings Bay Marine Laboratory, comparable with the mobile laboratories at the Dirck Gerritsz Laboratory. Naturally, this concerns lab facilities not already provided by the Kings Bay Marine Laboratory.
At some point, NPP also wants to provide transnational access to the Dutch facilities.

Financing from all Clusters

For the purpose of observational polar research, the Netherlands must have infrastructure that can be used on NPP research projects. With this scientific infrastructure in both the north and south pole regions, scientists from the Netherlands obtain easier access to foreign partners' logistical facilities. During this strategy period, the need for infrastructure/equipment for Dutch polar research is met by the possibility of requesting infrastructure and expensive equipment via a call for proposals.

Extra financing required

"Abrupt changes have been observed in the environment across the Arctic. Such changes risk crossing environmental thresholds, which can have long-term consequences that affect options for future development."

*The Arctic Council in its Arctic Resilience Interim Report 2013*

# 8 Programme execution

The 2014 NPP evaluation showed that the various stakeholders considered NPP's execution in the period from 2009-2014 to be very much professionalised[4]. This provides encouragement for continuing the existing way of working, in which the necessary adjustments will be made to certain components. The various financing instruments consist of:

## Open competition

Open rounds of competition will be held for the entire area of polar research, with a call amount of approximately 2 million, for which interested polar scientists may submit proposals. This concerns a programme for promising, but relatively small-scale, top research (one Ph.D. or postdoc scientist). For the purpose of guiding these proposals, the themes defined in this plan (see Chapter 4) and the policy principles of the Policy Framework (if it involves research funded by Cluster II) take precedence. So researchers are invited to submit theme or policy-driven proposals.

## Core programme grants

With this strategy plan, NWO wants to continue the policy of awarding a number of science-driven polar core programme grants on the basis of scientific, internationally recognised top quality. There is a provision to award a number of new core programmes (each a total of 1-3 million for 5 years). The research proposals must fit within the four indicated themes.

With this plan, NWO also wants to award a number of policy-driven core programme grants (each

When selecting the core programme grants, primary considerations concerning the applicants are;

1. demonstrated consistency in excellent polar scientific research by means of peer-reviewed publications and international evaluations;
2.

Table 1 shows the estimates of the NPP expenses **annually** for the period 2016-2020:

Table 1 | Estimates of annual NPP expenses 2016-2020 (MEuro /year)

| | |
|---|---|
| **Cluster 1. Science-driven:** | **3,0** |
| Open competition | |
| Core programme grant + investments | |
| International programming and transnational calls | |
| **Cluster 2. Policy-driven + Private:** | **3,0** |
| A. | |
| Open competition | |
| Core programme grant + investments | |
| International programming and transnational calls | |
| B. | |
| Public-private partnership | |
| **Cluster 3. Policy-supporting** | **1,0** |
| International activities | |
| Contracts with third parties | |
| Education, communication and outreach | |
| **Coordination, logistics and international collaboration** | **3,0** |
| **Total** | **10,0** |

Table 2 shows the estimates of the necessary NPP income for the period 2016-2020:

Table 2 | Estimate of NPP income for the period 2016-2020 (MEuro)

| | 2016 | 2017 | 2018 | 2019 | 2020 |
|---|---|---|---|---|---|
| NWO | 1,0 | 1,0 | 1,0 | 1,0 | 1,0 |
| OCW | 2,0 | 2,0 | 2,0 | 2,0 | 2,0 |
| I&M | 2,0* | 2,0* | 2,0* | 2,0* | 2,0* |
| EZ | 2,0* | 2,0* | 2,0* | 2,0* | 2,0* |
| BZ | 1,0 | 1,0 | 1,0 | 1,0 | 1,0 |
| PPS | 2,0 | 2,0 | 2,0 | 2,0 | 2,0 |
| **Totaal** | **10,0** | **10,0** | **10,0** | **10,0** | **10,0** |

*= 1.0 MEuro available for matching PPP collaboration

## Private parties and the NPP

By means of a public-private partnership structure, such as already has been used in the economic priority areas, the business community can make a financial contribution. For this, co-funding is required from the users of the research, in addition to NWO's contribution to the research project. This co-funding may consist partly of an in-cash contribution and partly of an in-kind contribution. Examples of in-kind contributions include providing access to facilities, data and research locations, and the use of personnel for specific tasks within a project.

The exact definition of this connection is partly a task for the financing ministries. The size of the budget available for polar research related to economic priority areas depends primarily on the Ministry of Economic Affairs, which has the economic priority areas' policy in its portfolio.

# 10 Management and organisation structure

## Financiers

The working method created by the NPP in the period 2010-2014 will be continued for the assessment of research proposals within the policy-driven framework. The value of this working method has been acknowledged by the co-financing ministries and it makes use of two assessment committees:

- one that works as the assessment committee for science-driven proposals, and that must be redesignated with international experts for each call for proposals, and that assesses the scientific quality;
- an assessment committee consisting of researchers selected by the IPO, who have policy expertise in the areas of the ministerial policy fields and who assess the relevance of the proposals for Dutch policy.

The ranking of proposals within this framework is based on two sets of criteria (scientific versus policy) with a 50-50 weighting formula for scientific excellence versus importance for policy. If a decision must be made about awarding policy-driven research proposals, then the members of the IPO issue a proposal for a decision, after which the NWO-ALW's divisional board makes the formal decision.

"The Council therefore supports an enhanced contribution by the EU to Arctic research, including monitoring and observation efforts, and to the sharing and dissemination of information about the Arctic."

*Council conclusions of the Council of the European Union, 12 May 2014*

| | |
|---|---|
| **Dick van der Kroef** | Acting director at NWO Earth and Life Sciences Division and manager of NPP |
| **Harro Meijer** | Professor of Atmospheric Chemistry at University of Groningen and member of the Netherlands Polar Committee |
| **Liesbeth Noor** | Policy Officer at NWO Earth and Life Sciences Division and coordinator of NPP |
| **Alex Oude Elferink** | Senior researcher in International law, the law of the sea and maritime demarcation at Utrecht University and member of the Netherlands Polar Committee |
| **Sander Steenbrink** | Head of R&D at Royal Boskalis Westminster and participant in the economic priority area Water |

This committee was then asked to provide input to the substantive chapters concerning the research themes. For this, in early May 2014, they were given the first version of the Strategy Plan. On 26 June 2014, part of the Dutch field of polar research and policy makers (a total of 50 people) were invited for a workshop in parliamentary style in the conference hall ´Jaarbeurs´ in Utrecht. Here, they could state their opinions about a second version of the Strategy Plan. Herman Eijsackers chaired this workshop. NWO wanted to use this occasion to clarify whether any important topics were missing. The Netherlands Polar Committee met in July 2014 to discuss the second version and the workshop of 26 June. In August, the third version of the Strategy Plan was once again sent to all members of the strategy committee. All could then provide input about the entire document one more time. In September 2014, the Advisory Council on International Affairs (AIV) released an important recommendation for the Arctic region: "The Future of the Arctic Region: Collaboration or Confrontation?". This emphasises the importance of Arctic research. Naturally, this is hugely important for the NPP and this recommendation was subsequently included in this Strategy Plan. The final Strategy Plan for the NPP is a document published by NWO's Earth and Life Sciences Division and under the responsibility of the NWO-ALW divisional board. This was completed at the end of November 2014 and presented to the NPC, the Strategy Committee and to participants in the seminar organised on 28 November 2014 in response to the AIV recommendation.

# Annex 2 List of abbreviations used

| | |
|---|---|
| AIV | Advisory Council on International Affairs (Adviesraad Internationale Vraagstukken - AIV) |
| ALW | (NWO Division) Earth and Life Sciences (Aard en Levenswetenschappen) |
| ATCM | Antarctic Treaty Consultative Meeting |
| AWI | Alfred Wegener Institut für Polar- und Meeresforschung |
| BAS | British Antarctic Survey |
| CCAMLR | Commission for the Conservation of Antarctic Marine Living Resources |
| COMNAP | Council of Managers of National Antarctic Programmes |
| IASC | International Arctic Science Committee |
| IPO | Interdepartmental Polar Consultation (Interdepartementaal Polair Overleg) |
| NIOZ | Royal Netherlands Institute for Sea Research (Koninklijk Nederlands Instituut voor Zeeonderzoek) |
| NPC | Netherlands Polar Committee (Nederlandse Poolcommissie) |
| NPP | Netehrlands Polar Programme (Nederlands Polair Programma) |
| NWO | Netherlands Organisation for Scientific Research (Nederlandse Organisatie voor Wetenschappelijk Onderzoek) |
| PPP | Public-private partnership (Publiek-Private Samenwerking) |
| SCAR | Scientific Committee on Antarctic Research |
| SRON | Netherlands Institute for Space Research |