

Sustained Arctic Observing Networks – Initiating Group (SAON-IG)

1. Purpose of the SAON-IG

The purpose of the SAON-IG is to develop a set of recommendations on how to achieve long-term Arctic-wide observing activities that provide free, open and timely access to high quality data (obtained at the Earth's surface and from space) that will realise pan-Arctic and global value-added services and provide societal benefits (Figure 1). The SAON IG promotes coordination, collaboration and communication among all parties (Figure 1) to develop the recommendations and achieve a lasting legacy of International Polar Year 2007-2009.

2. Background

The Arctic is the home of almost 4 million people from more than 30 different societies with different traditions and cultures. It is rich in natural resources and is a natural laboratory for understanding Global Change and the Earth System. Stimulated by the recognition of its global scientific, socio-economic and political importance, there is strong and growing national and international interest in the circumpolar Arctic.

Nowhere is national and international interest in the Arctic more apparent than the rapid environmental changes that are being observed throughout the Arctic System and their regional and global connections and consequences. The Arctic environment is sensitive to global influences, and the resultant changes in the Arctic are amplified by regional interactions and feedback processes, e.g. the ice/snow albedo feedback. Arctic environmental changes, in turn, have significant global consequences, e.g. sea level rise due to melting glaciers and ice sheets.

Notwithstanding the many and frequent reports of Arctic Change, our knowledge of the Arctic System is limited in many respects; for example, there are temporal, spatial and disciplinary gaps in observing records, and data are often difficult to obtain or even unavailable. While current observing systems have been adequate to detect a variety of physical, biological and socio-economic changes in the Arctic, observing capabilities are less than adequate to document either the full suite of changes that are underway, or any changes that will occur in the future.

Sub-optimal observing and data management hamper our ability to monitor and study (by assessment, synthesis and modelling) Arctic environmental and socio-economic change and their regional and global consequences. Understanding the causes of Arctic Change, and the development of adaptive responses to change require increased national and international commitment to sustained, coordinated and improved observing sites, systems and networks in the circumpolar Arctic.

3. The Need for Coordinated Arctic Observing

The need for a well coordinated and sustained Arctic Observing Network that meets scientific and societal needs has been identified in numerous high profile reports and at a variety of workshops and conferences (e.g., ARCUS, 2005; ICARP-II, 2005; NRC, 2006). In November 2006, the Arctic Council (AC) urged all member nations to maintain and extend long-term

monitoring of change in the Arctic, with a view to building a lasting legacy of the International Polar Year (IPY). Further, the AC requested that the Arctic Monitoring and Assessment Programme (AMAP, an AC Working Group) work with other AC working groups, the International Arctic Science Committee (IASC) and other partners in efforts to create a coordinated Arctic Observing Network that meets identified societal needs (Arctic Council, 2006). The goal of developing an Arctic Observing Network as a legacy of IPY (WMO/ICSU, 2007) was endorsed by the WMO XV Congress in May 2007.

There is a strong consensus that scientific understanding of the changing Arctic system and its global connections and consequences requires improved Arctic observing capabilities that are linked to global observing activities. Numerous observing sites, systems and networks already exist in the Arctic, and more are being initiated during IPY. In order to maximize the likelihood that these disparate activities can be integrated into a sustained network for long-term observation that will support the scientific study of Arctic system change in a global context, there is, among other things, a vital need to:

- improve *coordination* to avoid repetition, duplication and overlap, and promote synergies;
- assess user needs, and identify and fill *gaps in spatial, temporal and disciplinary coverage* to achieve a circum-Arctic observing network;
- guarantee *access to data and information* in an easy, free, open and timely fashion, and in standard, internationally accepted formats, to the broadest possible community of users;
- ensure *sustainability* through long-term funding and commitments;
- establish *links to global observing* activities, networks and systems.

4. SAON-IG: Founding Members and Broadening Participation

In order to achieve the needs described above it is important to engage all individuals and organizations involved in Arctic observing activities. Broadly speaking, Arctic observing falls into three categories: research observing by the scientific community; operational observing by government agencies; and local observing by northern residents and communities (Figure 1). The SAON-IG, composed of representatives from each of the three groups described above, was formed in January 2007 to initiate a process of soliciting information and advice that will contribute to the development of the recommendations described in Section 1. The founding members of the SAON-IG are:

- Arctic Council (represented by AMAP)
- Arctic Ocean Sciences Board (AOSB)
- Climate and Cryosphere (World Climate Research Programme/WMO)
- Forum of Arctic Research Operators (FARO)
- Indigenous Peoples Secretariat (IPS)
- International Arctic Science Committee (IASC)
- International Arctic Social Science Association (IASSA)
- International Polar Year (represented by the International Programme Office)
- International Study of Arctic Change (ISAC)
- National Science Foundation (NSF, USA)
- European Polar Board
- Global Ocean Observing System (GOOS)
- International Permafrost Association (IPA)

Participation in SAON-IG activities is not limited to the founding members. It is recognized that the broad, tri-partite (Figure 1) Arctic observing community includes not only those in the eight Arctic countries, but also those in the many non-Arctic countries that have a strong Arctic research tradition and which have a vital role to play in Arctic observing. The participation of Arctic and non-Arctic countries is essential to the development of a roadmap and vision that will guide the creation of a sustained observing network that, in addition to serving researchers and scientists, will also meet the societal needs of stakeholders such as northern residents and communities, educators, business/industry, decision- and policy-makers, non-governmental organizations, and governments.

5. SAON-IG: Guiding Principles

The Arctic system and global connections

The SAON-IG recognizes that the Arctic system is integral to the global environmental and socio-economic systems, that Global Change affects the Arctic, and Arctic Change has global consequences. Consequently, the SAON-IG aims to identify what will be required to sustain coordinated Arctic observing activities that will contribute to global observing activities (Figure 1) and support the system-wide studies that are necessary for (1) scientific understanding of Arctic processes, interactions and feedbacks and their global connections, and (2) meeting societal needs in the changing Arctic and beyond (Figure 1).

Pan-Arctic view and comprehensive Arctic coverage

The SAON-IG has a pan-Arctic view and aims to identify what will be required to achieve comprehensive Arctic observing coverage. There are many current and planned observing sites, systems and networks in the Arctic. However, there are also significant spatial, temporal and disciplinary gaps, and/or they lack sustained (long-term) funding. Some gaps could be filled, and valuable synergies and cost-savings realized, by adding observing capabilities at key multidisciplinary intensive sites and other observing locations. The SAON-IG will facilitate the identification of user needs, key gaps that need to be filled, and the resources necessary to sustain more comprehensive and coordinated Arctic observing over the long-term.

Coordination, collaboration and communication

The SAON-IG is dedicated to promoting coordination, collaboration and communication to realise the goal of sustained and integrated observing in the Arctic. A ‘Sustained’ network is one that enables long-term observing. In most countries, the resources and responsibility for long-term observing are typically in the hands of government agencies, while researchers and scientists make significant contributions on a short to medium term basis. Some local residents and communities also make their own observations. Coordination, collaboration and communication among the observing activities of government agencies, research communities and local residents/communities, and inviting others to participate as appropriate, will contribute to the development of a robust, lasting and coordinated system of systems.

Data and information standards and management

The SAON-IG promotes easy, free, open and timely access to data and information that meet international standards, and which are available in a variety of formats. Only data and information that meet these criteria can contribute to the full range of value-added services and societal benefits of Arctic observing (Figure 1).

Inclusiveness

The SAON-IG operates on the basis of inclusiveness. That is, its activities will be open to all users and disciplines, and to the full range of observing activities and groups, including scientists and researchers, operational-/mission-oriented agencies, and northern residents and communities (Figure 1).

6. SAON-IG and the Development of Recommendations for Sustained, Integrated Arctic Observing Activities

The SAON-IG aims to have developed a set of recommendations by spring 2009. At that time, the recommendations will be presented to the Arctic Council, the International Arctic Science Committee and the WMO/ICSU IPY Joint Committee, and distributed to all those who contributed to their development.

To develop the recommendations, the SAON-IG suggests that five key questions need to be addressed:

1. What Arctic observing sites, systems and networks (activities) currently exist?
2. What spatial, temporal and disciplinary gaps exist?
3. How will gaps be filled and the entire effort sustained?
4. How are these activities to be coordinated and integrated?
5. How are free, open and timely access to data to be achieved?

The process for addressing these questions and developing the recommendations will primarily involve a series of three workshops. The workshops will provide the opportunity for the broader Arctic observing community (research, operational, northern residents) to meet and contribute their experience and expertise to the process.

The first workshop, to be held in Stockholm, Sweden, in autumn 2007, will be hosted by the Swedish IPY Secretariat. The workshop will address the question: **Are current Arctic observing and data and information management activities sufficient to meet users' needs?** Plenary sessions and break-out groups will be the primary means of exchanging ideas and sharing information. Plenary sessions will focus on the following cross-cutting themes: Weather and Climate; Human Health and Well—Being; Biodiversity and Ecosystems; Social and Economic development; and Data and Information Management; Break-out groups will focus on the following disciplinary topics: Atmosphere; Ocean and Sea Ice; Hydrology/Cryosphere; Terrestrial Ecosystems; and Human Dimensions.

The second workshop, to be held in Alberta, Canada, in spring 2008, will be hosted by the Canadian IPY Secretariat. This workshop will address the question: **How will Arctic observing and data and information management activities be coordinated and**

sustained over the long-term? The precise format of the workshop remains to be decided, but will probably also use a combination of plenary sessions and break-out groups.

The third workshop, to be held in Finland in autumn 2008, will be hosted by the Finnish Meteorological Institute. The format and scope of this workshop remains to be determined, but an important element will be a synthesis of the advice and information gathered at the previous workshops into the final set of recommendations for the coordination and promotion of sustained, integrated Arctic observing activities.

SAON-IG Point of Contact

For the moment, Odd Rogne (AMAP& IPY International Programme Office) will serve as the point of contact for the SAON-IG. Please address all inquiries to him at Odd.Rogne@AMAP.no.

References

- Arctic Council. 2006. *Salekhard Declaration*, Salekhard, Russia.
- ARCUS. 2006. *Study of Environmental Arctic Change: Plans for Implementation During International Polar Year and Beyond*, Report of the SEARCH Implementation Workshop, 23-25 May 2005, Arctic Research Consortium of the United States (ARCUS), Fairbanks, Alaska, USA.
- ICARP-II. 2005. *Proceedings of the Second International Conference on Arctic Research Planning (ICARP-II): The Arctic System in a Changing World*, 10-12 November 2005, Copenhagen, Denmark. Available online at <http://www.icarp.dk/Proceedings.pdf>
- National Research Council. 2006. *Toward an Integrated Arctic Observing Network*. National Academy of Sciences, Washington, DC, USA.
- WMO/ICSU. 2007. *The Scope of Science for the International Polar Year 2007-2008*. World Meteorological Organization/International Council for Science (WMO/ICSU), WMO/TD-No. 1364, Geneva, Switzerland.

Figure caption

Conceptual diagram showing the three Arctic observing categories and data and information management collectively contributing to value-added services and societal benefits, and to global observing. The SAON IG promotes coordination, collaboration and communication among all the parties in order to achieve a lasting legacy of the International Polar Year, i.e, long-term Arctic observing activities and data and information management that contribute to circum-Arctic and global services and benefits.