THE ARCTIC OBSERVING SUMMIT

Background and Synthesis of Outcomes 2013-2016

International Study of Arctic Change

SAON
SUSTAINING ARCTIC OBSERVING NETWORKS

IASC

Citation

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The Arctic Observing Summit

The Arctic Observing Summit (AOS) is a biennial summit that aims to provide community-driven, science-based guidance for the design, implementation, coordination, and operation of a sustained long-term (decades) international network of arctic observing systems. The AOS provides a platform to address urgent and broadly recognized needs of Arctic observing across all components of the arctic system, including the human component. The AOS fosters communication and international collaboration and coordination of long-term observations aimed at improving understanding of and response to system-scale arctic change. The AOS is an international forum for optimizing resource allocation, and minimizing gaps and duplication, through coordination of and exchange among researchers, federal/government agencies, Indigenous and northern peoples, non-governmental organizations, the private sector and others involved or interested in long-term observing activities.

Background and Motivation

The circumpolar North is experiencing some of the highest rates of environmental change on the planet. Distant and local drivers of change (Figure 1) including the expansion of industrial activities are generating unprecedented and accelerated system-wide transformations with impacts, feedbacks and global teleconnections still not clearly understood or even well-described. Among the many challenges are accelerated environmental changes that may impact the long-term sustainability of natural resources and traditional economies, food security, health and safety, and natural resource management practices. Shifting environmental conditions have cascading effects that extend beyond the north to the global system, and may result in accelerated, unpredictable, and in some cases unmanageable responses to change.

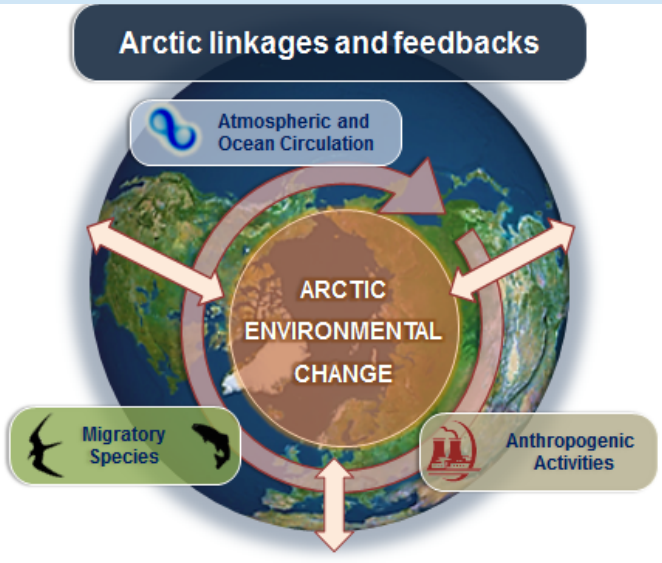

FIGURE 1. The Arctic is connected to global marine and atmospheric circulation systems, climate, hydrology, geochemical processes, and nutrient cycling. Species migrate into and out of Arctic regions to complete reproduction and life cycles, linking marine, terrestrial and freshwater ecosystems and their components across latitudes. Human activities can impact Arctic ecosystems, exacerbate climate change and pollution, facilitate greater access to Arctic resources, all with unintended or unknown feedbacks to the Arctic System.

Understanding current Arctic system interactions, projecting future conditions, identifying emerging issues, and responding to change requires timely and reliable observational information from within and beyond the Arctic. Advances in technology, computation power, communications and cyber-

infrastructure, and growing international, collaborative activities ushered in a new age of near-real-time information capture, modeling and forecasting. Earth observing systems, from satellite imagery and remote sensing, to ground-based autonomous data loggers and sensors, contribute to long-term tracking of the physical, chemical, and living world. Harnessing the combined observing power from a coordinated network of platforms, systems and site-based efforts, including community-based efforts requires international coordination and cooperation beyond Arctic borders, and multi-directional dialogue among system designers, researchers, and communities of rights-holders and stakeholders who require data products for planning, mitigation, and management in a changing world. Sustained observing networks also require commitment and dialogue with international partners, funders, communicators, and community leaders.

The AOS initiative originated from widespread agreement on the need to improve the coverage and coordination of pan-Arctic observing activities, and the communication and utilization of observational information to and by the widest possible audience for the purposes of basic research, problem solving, and decision-making. There is an ongoing demand to facilitate dialogue that will enable responding and adapting to Arctic environmental change and this includes the iterative development of recommendations to foster the coordination of observing activities and to improve existing Arctic observing systems.

The AOS is a Sustaining Arctic Observing Networks (SAON) task. Together with the International Study of Arctic Change (ISAC), and the International Arctic Science Committee (IASC), SAON coordinates the Arctic Observing Summit (AOS). The AOS is an integral part of the implementation of the 'observing change' component of the ISAC Science Plan (www.arcticchange.org) and is an iterative international scientific program. The AOS, from 2014 on, is planned as a biennial event with subsequent summits occurring in conjunction with the Arctic Science Summit Week (ASSW). SAON is led jointly by the Arctic Council and IASC with the purpose of broadening and facilitating international cooperation and dialogue for sustained and coordinated pan-Arctic observing and data-sharing from environmental, biological, physical, social, cultural, and economic perspectives. The AOS contributes to the SAON process through the synthesis of Arctic knowledge, development of the vision for an international, integrated Arctic observing system design, engagement in dialogue and solutions discovery of scientific, logistic and implementation challenges, and the identification of gaps and priorities.

Figure 2. ISAC Program Goals.

SUMMIT EVENTS – 2013, 2014, 2016

The AOS is structured thematically to building on the outcomes of previous Summits and to ensure focus on specific observing needs. White papers, short statements and posters addressing Summit themes were prepared for discussion in 2013, 2014 and 2016. Input is also elicited through Town Hall meetings, workshops, and online interactions (i.e., surveys, teleconferences, webinars, etc.). Plenary presentations, panel discussions, and working groups guide activities at the Summits, and in 2016, working groups prepared Theme Synthesis papers. Summit participants work to develop recommendations, concrete actions and strategies to advance the continued development and implementation of a pan-Arctic Observing System of Systems. The Summit is an iterative activity, evolving as the System develops and with changing priorities and emerging needs.

Figure 3. Summit Events and Organizing Partners

AOS 2013 established a process for organization and structure of future Summits. Themes centered on building a foundation for observing: status of the current observing system and system design; and coordinating system implementation and operation. AOS 2014 facilitated broader interaction of the Arctic Community and focused on effective and efficient observing, the perspective, roles and needs of stakeholders, observing technologies, data management and access. More than fifty recommendations emerged, with six general suggestions overlapping in both years (Figure 4). These six were used to guide thematic organization and the activities leading up to and during AOS 2016.

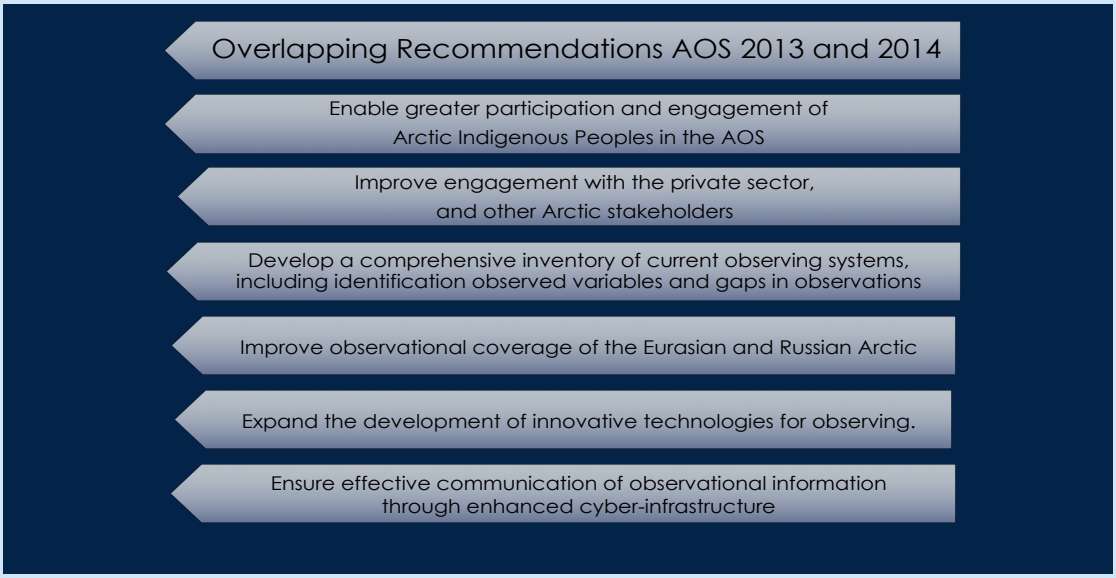

Figure 4. Recommendations from 2013-2014 used to guide development of AOS 2016.

Outcomes from 2016

AOS themes for 2016 (Figure 5) highlighted sustained support for long-term observing, technology and innovation with a focus on unmanned vehicles and sensors, contributions from the private sector and industry to observing initiatives; actor and stakeholder engagement; Arctic observing in the context of Global Observing; and the interfaces among Indigenous Knowledge, community-based monitoring and scientific methods. These themes expanded on discussions from prior Summits, including promoting dialogue among Indigenous Peoples and other members of the Arctic Community, an area where progress continues but remains challenging.

AOS 2016	AOS 2014	AOS 2013
International and national strategies for sustained support of long-term Arctic observing	International collaboration and accessibility	Mechanisms for coordination of support, implementation and operation of a sustained Arctic observing system
Technology and innovation with a special focus on unmanned vehicles	Technology and innovation including coverage and design	Observing system design and coordination including inter-operability
Contributions of the Private Sector and Industry to sustained Arctic observations	Data management, accessibility, and interoperability	Status of the current observing system (incl. goals, capabilities, gaps, and sustainability
Actor and Stakeholder engagement and needs	Stakeholder engagement	Stakeholder perspectives on observing system design and integration
Arctic Observations in the context of global observing initiatives	Remote sensing solutions	
Interfacing Indigenous Knowledge, Community-based Monitoring and Scientific Methods		

Figure 5. Themes from AOS 2013-2016.

At the 2016 Summit, over 450 delegates from 30 countries, representing a broad spectrum of the scientific community, Indigenous Peoples from Alaska, Northern Canada, Greenland, Arctic Scandinavia and Arctic Russia, representatives of the private sector, governmental and non-governmental agencies, non-profit organizations, and Arctic Council observers, Permanent Participants, and working group representatives came together to discuss and develop recommendations and a pathway toward the implementation of an internationally supported, pan-Arctic observing system that is considerate of and responsive to both local and global needs. Over 100 specific recommendations came out of the AOS 2016, many of which built on the outcomes of 2013 and 2014. These are enumerated on the AOS website. Key recommendations are highlighted below.:

Key Recommendations

1. Develop a well-supported impact assessment and cost-direct/indirect benefit business case for investing in an integrated Arctic Observing System of Systems including the value added of such a system, and options for investment, cooperation, governance and long-term sustainability.

2. Assess needs for observing system data to develop solutions to environmental and societal problems stemming from a rapidly changing Arctic. Building out the system must involve co-design and co-production, particularly with respect to community-based programs, initiatives and infrastructures.

3. Perform a gap analysis and assessment to explore how existing and new platforms and technologies can be implemented to mitigate science gaps, to evaluate the status and capacity of the current technology, and readiness level and future expected capacities.

4. Develop best practices for engagement of the Private Sector and share broadly. Agreements that identify rights, responsibilities and roles of different collaborating entities need to be developed and shared among the observational community so that they may be employed to achieve the overall objective of sustained observing system support.

5. Promote open data policies, provide credits for data sharing through bodies that can facilitate coordination, such as the Arctic Data Committee and coordinate data formats, data access, storage, common policies and standards.

6. Encourage private sector engagement in discussions with funders, regulatory agencies, research and other data-holding organizations and data communities. This engagement needs to transcend project level discussions that typically characterize cooperation among the different Arctic communities to a more coordinated effort that considers how a pan-Arctic observing system can be implemented and maintained through public-private partnerships, international funding models, entrepreneurship and in-kind support.

7. Empower rights-holders and stakeholders to address their own observational needs and their own observational goals. This includes having decision-making authority with respect to the implementation of external observation programs, where feasible.

In addition to these seven, was the recommendation that the international Arctic Community:

Propose to the highest levels of government, the business case for a comprehensive pan-Arctic observing system. *" (AOS Conference Statement 2016)*

This recommendation elaborated that: ***"This proposal should assess the costs and demonstrate the benefits for society at various levels, including an Implementation Plan that builds upon the present system and past planning, and that identifies needed resources including infrastructure, instrumentation, human capacity, the pathways to financing, and a strategy for sustained financing".***

It is this recommendation, challenging the international Arctic community to present a "business case" for a comprehensive pan-Arctic observing system that was the focus of AOS 2018. That effort, reported elsewhere, (AOS 2018 report) evaluated societal benefits and costs, considered financing options, and placed investments in observing activities and infrastructure into a broader context.

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