

## Plans for an Arctic Global Earth Observation System of Systems - Arctic GEOSS

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### **Abstract:**

The rapid on-going changes in the Arctic present an urgent need to better observe, characterize and quantify processes and properties of the Arctic system. A full integration of ground-based and satellite segments of observing systems is fundamental to achieve this overarching target. A collaboration between Sustaining Arctic Observing Networks (SAON) – a joint initiative of the Arctic Council and the International Arctic Science Committee (IASC) – and the Group of Earth Observations (GEO) - an intergovernmental organization working to improve the availability, access and use of Earth observations - will address this need. The proposed Arctic GEOSS (Global Earth Observation System of Systems) under the direction of both SAON and GEO will bring together two organizations with influence and reach that can advance SAON's Vision of a connected, collaborative and comprehensive long-term pan-Arctic Observing System that serves societal needs and will enable GEO to tie into a new international policy framework to drive its mission of Earth observations for societal benefit. This Statement highlights the activities proposed under this collaborative effort.

### **Background:**

The Arctic GEOSS is an undertaking of two organizations – GEO and SAON. Firstly, GEO works to actively improve and coordinate global EO systems and promote broad, open data sharing. A central part of GEO's Mission is to build the GEOSS which is a set of coordinated, independent Earth observation, information and processing systems that interact and provide access to diverse information for a broad range of users in both public and private sectors. GEOSS links these systems to strengthen the monitoring of the state of the Earth. It facilitates the sharing of environmental data and information collected from the large array of observing systems contributed by countries and organizations within GEO. The collaborative partner is SAON, a joint initiative of the Arctic Council and the International Arctic Science Committee (IASC), whose Vision is a connected, collaborative and comprehensive long-term pan-Arctic Observing System that serves societal needs.

### **Planned Activities:**

The Arctic GEOSS activities will be implemented within the framework of SAON as described below.

#### ***1. Create a roadmap to a well-integrated Arctic Observing System***

SAON is engaged in and facilitates connections among the producers and end-users of Arctic observations in order to create and sustain an Arctic Observing System. In order to achieve this

goal, SAON has adopted a community-endorsed framework, the International Arctic Observations Assessment Framework. As a follow-up to this, SAON will develop Guidelines for contributing to SAON's Roadmap for Arctic Observing and Data Systems (ROADS) to be organized around Essential Arctic Variables (EAVs).

In addition, Arctic GEOSS plans to implement a mechanism for essential variable development. It will evolve step- wise through a series of pilot efforts to develop EAV documentation that is consistent with SAON's guiding principles, while complementary to other efforts.

Arctic GEOSS also plans to develop a series of pilot services based on identified EAVs. The number and nature of these is still to be defined. This will address and is expected to be supported by the European Commission Work Programme 2018-2020, that contains a call for *Supporting the implementation of GEOSS in the Arctic in collaboration with Copernicus*. The aim of the project is to advance "the operationalisation of an integrated pan-Arctic Observing System in preparation for a possible future Arctic GEOSS initiative".

As the first pilot, the project *Research Networking Activities in Support of Sustained Coordinated Observations of Arctic Change* has defined a case study that will focus on food security in coastal and marine environments in the Pacific Arctic sector. The project will link societal benefits to specific essential variables and observing system technical design and reporting requirements. The project will then develop or adapt information infrastructure around these activities to demonstrate how an internationally coordinated roadmap for Arctic observing can be designed and developed, in service to operators, the research community and decision-makers. The project was submitted as an application to the US National Science Foundation in May 2019.

## ***2. Promote free and ethically open access to all Arctic observational data.***

A review of relevant Arctic data management efforts and results has guided the SAON Vision for an open, interconnected, international system for sharing data across disciplines, domains, and cultures. In recognizing the elements of the envisioned system and the key challenges identified by the community, SAON focuses on improving connections, and cooperation between actors.

The *SAON Polar Connections Interoperability Workshop and Assessment Process* agreed that the key current challenges impeding the development of a globally connected, interoperable system are social and organizational rather than technical: supporting human networks, promoting standards, and aligning policy with implementation.

The recent *Polar Data Planning Summit* and the *Polar Data and Systems Architecture*

*Workshop* developed a common understanding of how to develop interoperability amongst a number of existing Arctic data systems. The plan is to apply this understanding to the food security case study in the Pacific Arctic sector described above.

The technical solutions developed within Arctic GEOSS may well be of relevance to global needs. The Arctic Council Member countries are global technological leaders in many domains and their solutions are often adopted worldwide.

### **References:**

The Vision, Mission, Guiding Principles and Goals of SAON are described in the document Sustaining Arctic Observing Networks Strategy: 2018-2028:

[https://www.arcticobserving.org/images/pdf/Strategy\\_and\\_Implementation/SAON\\_Strategy\\_2018-2028\\_version\\_16MAY2018.pdf](https://www.arcticobserving.org/images/pdf/Strategy_and_Implementation/SAON_Strategy_2018-2028_version_16MAY2018.pdf)

SAON Implementation Plan:

[https://www.arcticobserving.org/images/pdf/Strategy\\_and\\_Implementation/SAON\\_Implementation\\_Plan\\_version\\_17JUL2018\\_Status\\_approved.pdf](https://www.arcticobserving.org/images/pdf/Strategy_and_Implementation/SAON_Implementation_Plan_version_17JUL2018_Status_approved.pdf)

GEO Workplan 2020-2022:

[https://www.earthobservations.org/documents/gwp20\\_22/gwp2020\\_summary\\_document.pdf](https://www.earthobservations.org/documents/gwp20_22/gwp2020_summary_document.pdf)

The IDA Science and Technology Policy Institute (STPI) and SAON (2017): *The International Arctic Observations Assessment Framework*: <https://www.arcticobserving.org/news/268-international-arctic-observations-assessment-framework-released>