

Title: Developing an architecture for an international, interconnected arctic data system

Funding Programme and/or Organisation

Sustaining Arctic Observing Networks (SAON)

Coordinating organisations and main contact person

- The Arctic Data Committee
- Standing Committee on Antarctic Data Management
- Southern Ocean Observing System

Main contact person: Peter L. Pulsifer, National Snow and Ice Data Center, University of Colorado, Boulder, USA; e-mail: peter.pulsifer@colorado.edu

Description of the deliverable

Arctic societies, science and services are entering a new era that increasingly require cross-cultural, interdisciplinary integration of data to provide critical understanding and products. These needs require an integrated Arctic data system that is not only part of the global system, but which also allows exchange and usage of data between disparate data systems. Such a data system will allow enhanced understanding that is critical for mitigating risk to humans and infrastructure, reducing costs of adaptation and development, and supporting much needed research that spans disciplines and knowledge systems, including science and Indigenous Knowledge.

Data are an integral element in the observing system value chain. Without a data system that makes well documented data accessible, many kinds of observations are ephemeral and their value is limited. As such, we must ensure that the overarching observing framework will emphasize data integrity throughout the entire process from data collection and management over time to different data uses including but not limited to science, policy development, and decision-making at all scales.

A fully developed Arctic data system will use open data policy and standards to network people to people and machines to machines, allowing users to find, access, integrate and reuse data. Following user-centered design, and coordinated international collaboration, the Arctic data community will deliver a carefully designed blueprint for a structure or “architecture” that will enhance and better connect existing data resources to build a system supporting knowledge integration and analysis appropriate for a wide range of different users. This includes improving the mechanisms and resources needed to ensure

that Indigenous perspectives are included and Indigenous Knowledge is ethically and appropriately utilized.

Based on prior research and collaboration, a global group of experts will develop a detailed architecture for an international, interconnected Arctic data system, that leverages substantial existing resources and infrastructure and seamlessly contributes to and integrates with the broader global data system. This deliverable will be developed through a series of international working design and development meetings that build on a series of recent, successful workshops. The process will commence in Geneva, in November of 2018, continue at the Third *Polar Data Forum* to be held mid-2019, and culminate with the publication and launch of the architecture prior to the Arctic Observing Summit being held in Iceland in 2020. The result will be a detailed technical and institutional architecture that ensures that Arctic data are findable, accessible, interoperable, and reusable. The architecture will be co-designed with all interested actors ranging from local community members to researchers to policy makers, and novice to professional users.

Starting with the results of previous activities, the specific focus of the work will be on: i) clear identification and documentation of all actors and stakeholders; ii) an analysis of user needs; iii) enabling the ability to search across data catalogues; iv) identifying standards and protocols to improve data access; v) enhancing the ability for system--system integration (interoperability); vi) enabling data reuse for multiple audiences; vii) ethical utilization of Indigenous knowledge and community based monitoring; viii) inclusion of advanced, networked analytical capabilities.

Websites

- Arctic Data Committee (ADC): <https://arcticdc.org>
- International Arctic Science Committee (IASC): <https://iasc.info/>
- Standing Committee on Antarctic Data Management (SCADM): <https://scar.org/data-products/scadm/overview/>
- Southern Ocean Observing System (SOOS): www.soos.aq
- Sustaining Arctic Observing Networks (SAON): www.arcticobserving.org

International scientific cooperation dimension

The architecture will be developed by a number of partners who are currently working together to realize an integrated system, including members of the Arctic Data Committee of the Sustaining Arctic Observing Networks (SAON) and International Arctic Science Committee (IASC), the Global Cryosphere Watch, the Group on Earth Observations (GEO) including the GEO Cold Regions Initiative and ArcticGEOSS proposed as an Arctic Science Ministerial deliverable, Permanent Participants of the Arctic Council, International Arctic

Systems for Observing the Atmosphere, the Arctic Spatial Data Infrastructure and many other committed national, regional and local initiatives.

The relation with the Themes of the ASM1 and the connection with the themes of the ASM2

Theme from ASM1: Strengthening and Integrating Arctic Observations and Data-Sharing.

Theme from ASM2: Strengthening, Integrating and Sustaining Arctic Observations, Facilitating Access to Arctic Data, and Sharing Arctic Research Infrastructure

This Statement builds on deliberations at the *Polar Data Planning Summit*, May 2018. It also builds on deliberations at the international 2018 Arctic Observing Summit (AOS), June 2018. As a task of SAON, AOS helped inform the discourse that led to ASM1, with a strong observing theme.