

## *Statement for the 2022 Arctic Observing Summit*

### **Sea ice as a proposed theme to define a Shared Arctic Variable based on as part of Arctic PASSION**

Ilkka Matero<sup>a</sup>, Jan Rene Larsen<sup>b</sup>, Heïdi Sevestre<sup>b</sup>, Mikko Strahlendorff<sup>c</sup>, Michael Karcher<sup>d</sup>, Maribeth Murray<sup>e</sup>, Thomas Lavergne<sup>f</sup>, Tero Mustonen<sup>h</sup>, Heikki Lihavainen<sup>a</sup>

- a) SIOS Knowledge Centre, Longyearbyen, Norway
- b) AMAP Arctic Monitoring and Assessment Programme
- c) Finnish Meteorological Institute, Helsinki, Finland
- d) Alfred-Wegener-Institut, Hemholtz-Zentrum für Polar- und Meeresforschung, Bremerhaven, Germany
- e) University of Calgary, Calgary, Canada
- f) Norwegian Meteorological Institute, Oslo, Norway
- g) Snowchange, Selkie, Finland

Contact: Ilkka Matero ([ilkka.matero@sios-svalbard.org](mailto:ilkka.matero@sios-svalbard.org))

Sea ice is a key feature of the Arctic environment and has been an integral part of the living environment for many indigenous communities for millennia. It is also a key indicator and a driver of climatic changes in our planet<sup>1</sup>. Defining sea ice as a Shared Arctic Variable (SAV) as part of the Arctic PASSION ('Pan-Arctic Observing System of Systems: Implementing Observations for societal Needs') combines scientific observations with novel approaches to bettering our understanding from the point of view of Arctic communities. Arctic PASSION therefore proposes using 'Sea Ice' as a starting point for one Expert Panel to start developing a proposal for a SAV to the ROADS Advisory Panel. This would allow for addressing the information needs of everyone involved with life or study of sea ice including indigenous and other Arctic communities.

Arctic PASSION is a Horizon 2020 -funded project that aims to co-create a coherent, integrated pan-Arctic Observing System of Systems<sup>2</sup>. The project aims to improve on the current limitations of Arctic observing systems by expanding monitoring capabilities through broad inclusion of Indigenous Knowledge and Local Knowledge, as well as coordinating and enhancing Earth Observation capacity and capability through refinements based on the needs of diverse user groups including local communities, academics, policymakers and industry. The plan also aims to provide much-needed improvements in Arctic data management and data interoperability, which contributes to helping address the needs for acute and relevant information of people living in the Arctic and provide value to the European and the global society. The project work was initiated in July 2021, with a consortium of 43 partners, including 8 Indigenous Communities, led by the Alfred Wegener Institute.

The identification and implementation process of SAVs are a key element in Arctic PASSION and the objective is to define 2-4 SAVs. This work will be done in support and guided by the ROADS (Roadmap for Arctic Observing and Data Systems) process of the Sustaining Arctic Observing Networks (SAON)<sup>3</sup>. The SAVs will likely share some similarities with the Essential Climate Variables of The Global Climate

Observing System (GCOS) of the World Meteorological Organization, but are expected to address a multitude of needs.

By definition the term shared comes from the understanding that the interest in a variable can come from three levels:

1. Meeting community-identified benefits in Indigenous or local communities
2. Support fundamental understanding of Arctic systems and regional decision-making needs
3. Inform science and decision-making needs at the global scale and integrate with operational global networks

Our process will include Expert Panels, from the Arctic PASSION project together with external representatives to make sure the interests and needs from all three levels are met. Inclusivity and collaboration with communities outside the Arctic PASSION project will be crucial for achieving our goals, with the inclusion of a wide range of expertise and views into the composition of the Expert Panels being a prime example of this. An important aspect will be aligning our efforts with the ROADS<sup>3</sup> process through dialogue with SAON, and following the guiding principles set out as part of ROADS. Collaboration and learning from experiences in the SAV definition process carried out elsewhere such as in the CoObs RNA project (<https://sites.google.com/alaska.edu/rna-observations/>) will be invaluable.

Sea ice in the Arctic is changing, with some of the changes having direct consequences for the ways of life at the shores of ice-infested waters. These include e.g. endangerment of ice-related livelihoods and shortening season for safe passage on ice through later freeze-up and earlier thaw as well as a general trend in the reduction in ice thickness. Indigenous communities have a highly sophisticated understanding of sea ice, and information of changes in sea ice conditions have been passed down from generation to generation. It cannot be stressed enough how important it is to include the views and needs of indigenous and local communities into the process if the Expert Panels decide to pursue defining a Shared Arctic Variable based on sea ice.

#### **References:**

<sup>1</sup> Notz, D., Jahn, A., Holland, M., Hunke, E., Massonnet, F., Stroeve, J., Tremblay, B., and Vancoppenolle, M.: Sea Ice Model Intercomparison Project (SIMIP): Understanding sea ice through climate-model simulations, *Geosci. Model Dev. Discuss.*, doi:10.5194/gmd-2016-67, in review, 2016.

<sup>2</sup> <https://arcticpassion.eu/>

<sup>3</sup> Starkweather, S., J. R. Larsen, E. Kruemmel, H. Eicken, D. Arthurs, A. C. Bradley, N. Carlo, T. Christensen, R. Daniel, F. Danielsen, S. Kalhok, M. Karcher, M. Johansson, H. Jóhannsson, Y. Kodama, S. Lund, M. S. Murray, T. Petäjä, P. L. Pulsifer, S. Sandven, R. D. Sankar, M. Strahlendorff, J. Wilkinson: *Sustaining Arctic Observing Networks' (SAON) Roadmap for Arctic Observing and Data Systems (ROADS)*. Arctic (in print)