

The Sixth International Symposium on Arctic Research (ISAR-6)

Summary Statement from the ASM3 Special Session*¹

The Arctic is experiencing rapid environmental changes, creating far-reaching environmental, societal, and economic challenges for people living in the region. The consequences of these changes are global, influencing the weather, ecosystems, and human societies well beyond the region. Despite our increased knowledge of the underlying physics that drives these changes, many atmospheric, marine, and terrestrial processes are not fully understood; especially the roles of clouds, aerosols, sea ice, greenhouse gases, land processes, ozone depletion, solar activity, and other factors involved in Arctic change.

The International Symposium on Arctic Research (ISAR), a quasi-biannual interdisciplinary symposium on a wide range of topics in Arctic research, recently held its sixth meeting (ISAR-6). It was originally scheduled to commence in March 2020 in Tokyo, but the symposium urgently moved online due to the start of the COVID-19 pandemic. Despite the limitation of not meeting in person, the interactive discussion between participants was made available through an online presentation system.

ISAR has been a forum where international researchers from various disciplines can bring their latest findings to a cross-disciplinary discussion on the ongoing changes in the Arctic, and their far-reaching effects. It has proved to be an indispensable setting for furthering our understanding of the complexities of the climate, environment, and social systems of the Arctic. ISAR-6 included a special session to present and discuss scientific contributions to the Third Arctic Science Ministerial (ASM3), aimed to provide an opportunity to inform policymakers of essential issues.

Recommended Actions or the research topics to be focused

We focused on the activities where an improved and better-coordinated international scientific effort can provide opportunities to advance understanding, and increase the ability to meet societal challenges and opportunities. The actions and topics are grouped by four themes defined for this special session.

1. Strengthening, Integrating and Sustaining Arctic Observations, Facilitating Access to Arctic Data

- It is necessary to support the Sustaining Arctic Observing Networks (SAON) and its roadmap if we are to improve international efforts for coordinating observations and data management. Setting up an expert panel to determine the essential observation elements for each region will be the next step.
- The Svalbard Integrated Arctic Earth Observing System (SIOS), an international consortium to

*¹ This document is not a comprehensive summary of the whole symposium, but summarizes the contributions in the special session S20, titled "Scientific Contributions to the Third Arctic Science Ministerial", with a focus on specific action items. The summary is based on the presentations and exchanges on the ISAR online platform and a virtual meeting discussion, as well as the survey form inputs from the presenters and ISAR participants.

develop and maintain a regional observing system, is a successful example of coordinating observation and research.

- The amount of data in the Arctic is growing, and many observing systems have been established. However, the funding is mainly dependent on time-limited projects, thus impacting its sustainability. Arctic observing systems should be advanced under the sustainable funded programs and better coordinated with the operational monitoring systems.
- Adequate funding mechanisms should be established to support a data management system for multidisciplinary Arctic data, through which the Arctic data must be available openly.
- The COVID-19 pandemic has shed light on the vulnerability of the Arctic observations. Stronger cooperation between the scientists and more involvement of the Indigenous and local communities are needed, to avoid the loss of long-term observation and important data.
- The research infrastructures of countries should be easily accessed and open for collaborations. It is important to maintain such schemes to access and share the facilities, not only to provide opportunities for the research community, but also as a potential solution for human resources. Such communications will be necessary for future planning of large international projects like MOSAiC.
- Hi-speed internet connection is one of the infrastructures now of high demand for the Arctic. It is crucial to have a stable and fast connection for observing, education, and many other activities.

2. Understanding Regional and Global Dynamics of Arctic Change

- Current research priorities based on IASC Working Groups reporting are: The role of the Arctic in the global system, observing and predicting future climate dynamics and ecosystem responses, understanding the vulnerability and resilience of Arctic environments and societies, and supporting sustainable development.
- It is necessary to revisit the value of basic natural sciences, even though some of them are seemingly not directly connected to societal problems. They are often indispensable to fill the knowledge gap in order to understand the Arctic system.
- Prediction capability has room for improvements, and continuous improvements of numerical models are necessary, as well as the full use of computational engineering. After the YOPP ends in 2022, a post-YOPP program would be needed to make further advances.

3. Assessing Vulnerability and Building Resilience of Arctic Environments and Societies

- The dataset on fish/food resources, contaminants/pollutants in the Arctic ecosystem, and Indigenous Knowledge are important for the evaluation of vulnerability and resiliency. Successful approaches to interact with the indigenous knowledge are the inclusion of Indigenous communities in observation and outreaches.
- An accurate understanding of the pros and cons of ongoing changes is important in responding to changes. Wildfire, permafrost thawing, glacial river flood, loss of sea ice, and landslide were examples of serious impacts of changing climate and environments on human society, whilst the sustainable exploitation of the abundant natural resources within the Arctic, and shorter global trade routes (e.g. Northern Sea Routes), are examples of positive influence.
- We need to improve decision-making by cross-weaving knowledge systems, co-management, and community-driven environmental monitoring to increase the number of Arctic resource managers and scientists who can facilitate, implement and operationalize participatory

approaches to natural resource management and monitoring in practice.

4. Capacity Building in the Arctic. Contribution of Science and Engineering, Private Sector and the Local Communities

- The importance of education for younger generations living in the Arctic should be stressed. There were also good lessons from the COVID-19 pandemic, which showed the potential of online education.
- Useful Arctic Knowledge (UAK) is an example of projects to advance capacity building aiming to contribute to building cross-disciplinary competence and use of modern data collection and dissemination methods. It expects to have a positive impact on cooperation among the science, business, and public sectors.
- It is essential to develop human resources in the Arctic through the co-production of knowledge with Indigenous communities. It can positively impact the future capacity of observations and research, and the mitigation and adaptation to the changes.
- Language is one of the obstacles, especially for collaboration with indigenous people. Their original languages should be respected, but communication is more difficult without an international language.

Conclusion

As shown in the discussion throughout the symposium, interdisciplinary gathering connects researchers, knowledge, data, and projects, which is a key to study the Arctic on large spatial and long temporal scales. It is expected to enhance the communication with the Arctic local communities and policymakers so that the collaboration and co-production of the knowledge will be accelerated, and scientific findings can be conveyed more smoothly.

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S20 Session Conveners

Main convener: Volker Rachold

Co-conveners: Nicole Biebow, Hiroyuki Enomoto,
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ISAR-6 Symposium Organizing Committee

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