



# ARCTIC PASSION

Pan-Arctic Observing  
System of Systems:  
Implementing Observations  
for Societal Needs

## Arctic PASSION – a brief Summary

Project Number: 101003472



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# ARCTIC PASSION

## **Arctic PASSION – a brief Summary**

The Arctic is undergoing unprecedented environmental transformation. The dramatic changes, such as melting ice, extensive wildfires, and shifting ecosystems, demand a coordinated, adaptive, and inclusive approach to environmental monitoring. This requires a shift away from fragmented and siloed efforts and towards a more cohesive network that is inclusive of scientific knowledge, Indigenous Knowledge, and local knowledge, while delivering actionable knowledge for decision-makers, businesses, researchers, and local people alike.

Arctic PASSION has worked in international collaboration towards this vision by strengthening the components and connection of the many observing system components to come closer to an integrated Arctic Observing System of Systems (AOSS). At its core, such an AOSS needs to address a fundamental challenge: no single organisation or technology can comprehensively monitor the vast, complex Arctic environment. Instead, the system connects diverse observing efforts, from satellite networks to community-based monitoring, into an interconnected framework that produces reliable, accessible information for climate adaptation, sustainable resource management, and emergency response. Arctic PASSION has significantly advanced this system also by fostering inclusive governance structures that empower Indigenous Peoples and Arctic residents as equal partners in observation design and implementation.

Looking ahead, the AOSS must build on such foundations while addressing persistent challenges, such as sustainable, long-term funding. This remains critical to maintain an equitable observing networks that can detect and respond to Arctic changes over decades rather than project cycles. Holistic approaches including different Knowledge Systems are needed and require open minds and capacity building on all sides. Science-policy/decision-making communication channels need strengthening to ensure that research informs action and that societal needs guide observing priorities. Advances in autonomous technologies, the further use of AI, and extending community-based monitoring will reshape the AOSS. These and other developments must be carefully balanced with ethical considerations and Indigenous data sovereignty principles. Building a truly effective observing system requires more than technical solutions, it demands trust, meaningful engagement, and a commitment to equity at every level. Our project's most relevant legacy lies not just in the tools and services it has



developed, but in the collaborative relationships it has fostered between scientists, Indigenous communities, and decision-makers and policymakers.

## Examples of results of Arctic PASSION



- Enhancement of observations, new instrumentation, calibration and processing schemes and steps to unify measurement protocols in the marine and terrestrial domains (see [D1.8](#) 'Recent progress and ways forward for Arctic observing capacities')
- Creation of a set of ground reference measurement [datasets](#) and satellite observations of key cryospheric components
- Development of glacier calving front and runoff datasets from [Arctic Land Ice](#)
- Establishment of the Atlantic-Arctic Distributed Biological Observatory ([A-DBO](#)) and the pan-Arctic DBO network, dedicated to harmonizing and coordinating observations in key regions
- Initiation of the Arctic Ocean Regional Alliance [ArORA](#), jointly with international partners as an organisation to connect existing marine observation activities across the Arctic
- Identification of Shared Arctic Variables for 'wildfire', 'permafrost', and 'sea ice', with expert panels including Indigenous and local knowledge holders in the context of [SAON](#).
- Establishment of a [unified data catalogue](#) supporting SAON. [Long-term data storage](#) for Arctic data and metadata.
- Co-creation of [eight Arctic services](#) delivering important information to end-users and rights holders and assessments of their societal benefits
- Creation of [policy and decision-making support](#) for local and regional policy makers, the European Parliament, the Senior Arctic Officials and the Arctic Council WGs
- Securing the 'GEO Convener' status for Arctic GEOSS, elevating the Arctic's presence in global observing systems.
- A "[Sharing Circle for Early Career Professionals and Arctic Youth](#)", the concept of which now serves as an inspiration for youth activities in the new EU project „Youth Together for Arctic Futures”
- Co-creation of a [project synthesis and roadmap](#) for further evolution of the Arctic Observing System of System - AOSS



## Progress beyond the State of the Art



In creating those actions and results, Arctic PASSION has been able to progress beyond the state of the art on several levels:

**By enhancing observations**, we moved Arctic observations from fragmented and static datasets into better integrated and user-centered knowledge systems. **By modernising instrumentation**, enhancing data infrastructure, and fostering interdisciplinary collaboration, the project strengthened the capacity to monitor and respond to rapid Arctic changes. **In pushing the Arctic data system towards FAIR and CARE**, we advanced the Arctic data ecosystem by moving beyond technical compliance to meaningful interoperability and usability. **By centering diverse voices and building meaning**, we contributed to advance equity and inclusivity in Arctic observing systems through the approach that Indigenous Peoples, local communities, and marginalised groups are not merely consulted, but empowered as co-leaders in the design and implementation of observing activities. We did succeed with this ambition in many, but not all cases. The project stressed that meaningful participation, rooted in human rights, decolonial approaches, and gender equality, is essential for creating observing systems that are relevant, effective, gender-responsive, and just. **By transforming observations into societal impact**, we demonstrated that Arctic observations are not just about collecting data - they are about empowering people, informing decisions, and fostering resilience. Our work focused on tailoring data, services, and knowledge to meet the diverse needs of end users, from Indigenous communities and local decision-makers to scientists, policymakers, and industries. By co-designing solutions with those who rely on Arctic observations, we transformed raw data into actionable knowledge, ensuring that the AOSS delivers tangible societal benefits. **Building resilience and sustainability**, we strengthened the governance and coordination of the AOSS, ensuring that it is responsive to local priorities while aligned with global frameworks. **By fostering collaboration, co-creation and trust**, we contributed to transforming the AOSS from a collection of siloed efforts into a more dynamic, interconnected system. The project built a network of networks that spans scientists, Indigenous Peoples and other Arctic residents, communities, policy, and industry stakeholders.



## Spin-offs



Arctic PASSION has both been successful in accomplishing its assigned mission and a fruitful ground for members of the team to create **numerous spin-off actions and projects**, such as: **‘SustainME’**, funded by Nordforsk (<https://www.nordforsk.org/projects/sustainable-human-use-marine-environment-sustainme>), aiming to co-produce knowledge that supports **adaptation solutions** to mitigate the impacts of sea ice loss and human pressures on the Arctic marine environment; and the **‘Satellites to Sleds (S2S)’**, currently in submission to the Canadian research funding scheme NFRFT. It is meant to build, implement and utilize a coastal, marine and sea ice focused Arctic Observing System for Canada and its allies that supports security, sovereignty, sustainability and science. Important aspects of Arctic PASSION live on in the HE-funded project **‘Beyond Arctic PASSION’** (to start in September 2026) which will accelerate the implementation of a sustainable, integrated, advanced and inclusive AOSS for which the predecessor projects INTAROS, KEPLER and Arctic PASSION have laid the ground. The enhanced system will be able to better deliver accessible and interoperable observations, co-develop products and services needed for adapting to the changing Arctic, combining cutting-edge science, Indigenous Knowledge, local knowledge, advanced technologies, and transparent governance.

## The Power of Connection.



The Arctic is a region of high complexity, where environmental, social, economic, and cultural dynamics intersect in ways that demand holistic, collaborative solutions. The success of Arctic

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PASSION hinged on its ability to foster an interdisciplinary, intersectoral, and intercultural network - a living ecosystem of expertise, trust, and shared purpose. This network did not merely facilitate cooperation; it transformed the project's ambitions into tangible impacts, bridging gaps between science, Indigenous Knowledge, policy and society. By integrating diverse perspectives, infrastructures, and methodologies, Arctic PASSION created a model for Arctic research and observing systems that extends beyond the sum of its parts:

**Breaking Silos** – The strength of interdisciplinary collaboration: The Arctic's challenges are numerous and broad, from melting sea ice to increased frequency of wildfires, through to shipping risks and community resilience. These cannot be addressed within the confines of a single discipline or sector. Arctic PASSION's network dissolved traditional silos, enabling environmental scientists, technologists, economists, social scientists, Indigenous Peoples communities, Arctic residents and policymakers to work in concert. This cross-disciplinary synergy was not just beneficial; it was essential for innovation.

**Bridging Sectors** - From local communities to global policy: Arctic PASSION's network extended beyond academia, creating vital linkages between scientific research, Indigenous communities, governance bodies, and industry. This intersectoral connectivity ensured that the project's outputs were not only scientifically sound but also socially relevant and policy influential.

**Cultural Exchange** - The heart of co-design and trust: At its core, Arctic PASSION's network was intercultural, built on mutual respect, shared goals, and a commitment to equitable partnership. The project's success in co-designing several of our services and monitoring programs with Indigenous communities was not accidental—it was the result of deliberate, long-term relationship-building.

## What Comes Next?



The true measure of Arctic PASSION's network lies not just in what it achieved during the project but in its potential to endure. The trust, collaborations, and shared knowledge cultivated



within Arctic PASSION have laid the groundwork for future initiatives. Partners are already planning to maintain and expand these relationships, whether through European or bilateral projects, continued CBM programs, or new policy engagements.

The project's interdisciplinary, intersectoral, and intercultural network has proven that Arctic challenges demand collective action. By breaking down silos, bridging sectors, and centring diverse knowledge systems, Arctic PASSION has contributed to a new standard for how Arctic research can and should be conducted. Its legacy shall be a testament to the power of connection: a reminder that the most resilient solutions emerge when we work together. The project has shown that success is not just about data or technology, it is about people, trust, and the relationships that turn ambition into impact. In this way, Arctic PASSION's greatest achievement may well be the network itself. Our goal is to make it a living, evolving ecosystem that will continue to shape the future of Arctic observing beyond the project's lifetime.

## **Lessons Learned from Arctic PASSION**



Arctic PASSION, with its aim to contribute to an improved, better coordinated, more useful and more equitable observing system, had been confronted not only with a complex environmental situation, a fragmented observing system and a large variety of actors. It also faced fundamental challenges for overall collaboration such as the COVID-19 pandemic, the full-scale invasion of Ukraine by Russia and the following political, scientific and personal ruptures and threats to data security and availability. The fact that as a large team, together with other collaborators outside of the project, we were able to create major contributions, was largely due to the willingness of all partners to collaborate, adapt and be solution focused.





## Recommendations for Policymakers: Building a Resilient, Inclusive, and Actionable Arctic Observing System



The change happening in the Arctic demands urgent, informed, and inclusive action from policymakers. The AOSS must evolve to meet these challenges by founding on Indigenous Knowledge, traditional knowledge, local knowledge, and scientific expertise while ensuring long-term sustainability, equitable governance, and actionable outcomes.

The **following recommendations** build on the lessons and achievements of Arctic PASSION, to guide policymakers in designing a resilient, user-centred, and policy-relevant AOSS:

- **Prioritise inclusive, holistic initiatives that create meaningful impact**
- **Sustain long-term observations with dedicated, cross-disciplinary funding**
- **Develop tailored remote sensing products for local and indigenous needs**
- **Improve data interoperability and accessibility across the full data lifecycle**
- **Invest in innovation with ethical safeguards and a focus on connections**
- **Enhance coordination and governance with diverse, equitable approaches**
- **Secure sustainable coordination structures for long-term impact**
- **Facilitate structured science-policy dialogues for evidence-based decision-making**
- **Link Arctic observing investments to global policy frameworks**

The recommendations above outline a comprehensive, actionable roadmap for policymakers to strengthen the AOSS. More details on the recommendations can be found [here](#).

By prioritising inclusivity, sustainability, and innovation, while fostering Indigenous and local leadership, policymakers can ensure that the Arctic observing system is resilient, equitable, and responsive to the rapid changes shaping the region.



The legacy of Arctic PASSION proves that collaboration across disciplines, sectors, and cultures is not just beneficial, it is essential. Policymakers now have the opportunity and responsibility to build on this foundation, creating an AOSS that serves science, society, and the planet for generations to come. In the current difficult geopolitical situation this requires an intensified coalition of the willing.

