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Arctic PASSION: A new EU-funded project of relevance to the Arctic Council and its Working Groups

The Arctic Council and IASC have jointly co-sponsored the Sustaining Arctic Observing Networks (SAON) for a number of years. Recently, to enhance integration of international environmental observing systems for the Arctic and to enable greater European support of SAON, the EU has granted 15 million EURO in funding for a new Horizon 2020 project: Arctic PASSION. The project includes 35 partners from 17 countries and is led by Germany´s Alfred Wegener Institute (www.arcticpassion.eu).

As the AMAP Secretariat serves as the Secretariat for SAON, the AMAP Secretariat has joined the Arctic PASSION project as a partner with the goal of further developing and enhancing SAON. In this role, the AMAP Secretariat has also offered to establish a dialogue among the Arctic Council to provide information on Arctic PASSION activities of relevance to the AC and its WGs, as well as to receive feedback and suggestions for further work in the project. This presentation is intended to serve as the initiation of this dialogue.

Objectives of Arctic PASSION

The overall objective of Arctic PASSION, which started on 1 July 2021, is similar to that of SAON: the co-creation and implementation of a coherent, integrated Arctic observing system: the 'Pan-Arctic Observing System of Systems - pan-AOSS'. It aims to enhance the present observing system by 1) refining its operability; 2) improving and extending pan-Arctic scientific and community-based monitoring and the integration with Indigenous and Local knowledge; 3) streamlining access to and interoperability of Arctic data systems and services; and 4) ensuring the economic viability and sustainability of the observing system for years to come.

This will include coordinating contributions to a key element in SAON's Roadmap for Arctic Observing and Data Systems (ROADS), namely, the identification, definition and implementation of the most impactful variables to observe in order to meet Arctic societal benefits. Arctic PASSION will develop a series of so-called Shared Arctic Variables (SAVs) in an open, consultative process, as a contribution to and support of the ROADS process. SAVs are defined both as being relevant to Arctic communities, driven by scientific understanding of the Arctic system, and linked to the global observing systems and interests. The ROADS guiding principles 1) of ensuring Indigenous Peoples' equitable partnership, 2) that the process should complement and integrate current planning approaches of existing activities and projects and that 3) the process should support stepwise development through a flexible and evolving structure, are all well-aligned with the priorities of Arctic PASSION.

Arctic PASSION aims to improve current Arctic observation systems by co-creating an integrated pan-AOSS via international collaboration, including Indigenous and local communities, that can continuously provide unrestricted, high quality, science-based Earth observation information tuned to address the urgent needs of people living in the Arctic and have relevance to European and global society.

Structure of the project and main relevance to the AC and its WGs

A brief overview of the main Work Packages (WP) and Pilot Services of this project is given below.

WP1: Establishing an adaptive and more complete Arctic observing system: The objective is to establish the foundation for a comprehensive Arctic observing system of systems (pan-AOSS) that builds on, coordinates and enhances existing observing infrastructures and networks to provide the most vital observations for understanding how the Arctic system is functioning, and the variability, trends and changes in the system, over time horizons from short-term extreme events (e.g., storms) to long-term change (e.g., climate).

WP1 will work with **CAFF** on improving and harmonizing biodiversity monitoring through **CBMP** and INTERACT collaboration at the terrestrial sites. WP1 partner, the **AMAP Secretariat**, is directly involved in the development of Shared Arctic Variables and will thus be able to draw on the groups' expertise. WP1 will invite **PAME** and **AMAP** representatives to contribute to the establishment of Marine Environmental Observational Nodes in the Eurasian Arctic, including prioritizing which indicators to collect routinely in the enhanced new marine observational system.

WP2: Bringing the Arctic Data System to action: The overall objective is to enhance data availability, long-term data preservation, and interoperability of data through collaboration and coordination with ongoing activities at the Arctic and European level (e.g., the interoperability activities of CCADI in Canada).

WP3: Supporting a smart Arctic Observing System by model-based impact assessments: The overall objective is to support the cost-efficient extension of Arctic monitoring and forecasting capabilities, with special consideration of the Pilot Services of WP4, through dedicated modelling activities.

WP4: Innovating user-driven Arctic EuroGEO Pilot Services: The objective is to establish user-demanded Pilot Services that have high societal and economic benefit. Co-design and co-production of these services with end-users will ensure their relevance, and open and free access to the PS will empower users to make knowledge-based decisions in support of a prosperous, sustainable, and environmentally secure Arctic.

WP4 Pilot Services will interact with **CAFF** in several ways through collaboration with the focus on fires in the Arctic and through the Event Database, which documents and interprets Indigenous knowledge of past and present environmental change in eight Arctic locations jointly with local Indigenous communities. Additionally, WP4 will interact with **EPPR**, **SDWG** and the **PPs** seeking collaboration on strengthening the ways the Pilot Services can contribute to the overall Arctic Council activities.

The Pilot Services (PS) are listed below together with their relevance to various AC WGs.

PS1: Arctic Service Event Database of CBM Using Oral Histories, IK and LK: PS1 will develop a living Event Database that will contain community-embedded Indigenous and local knowledge (IK-LK) observations that can be expanded on and build trust between local and scientific communities. Pilot Service 1 will work with AC thematic actions (mercury work under **AMAP**) and **CAFF** and **EPPR** on questions of ecological baselines of change, safety and questions of sea ice, mercury leaching and permafrost melt events. Additionally. PS1 we will participate in **CAFF** events on fires in the Arctic, and welcome discussions with the **IPS** and the actions under the Russian Chairmanship of the Arctic Council, especially on questions of nomadic reindeer herding events slated for Spring 2021.

PS2: Pan-Arctic requirements-driven Permafrost Service: PS2 is actively supporting the Global Terrestrial Network for Permafrost, funding the development of best practices for permafrost monitoring and developing remote-sensing based products for rapid thaw detection. These products will be made publicly available so that **AC WGs** can increasingly include permafrost thaw as a factor for change in the Arctic region.

PS3: State of the Arctic Environment: PS3 will invite **CAFF**, **AMAP** and **PAME** to provide input both on which indicators to show in the State of the Arctic Pilot Service and how to visualize the current status as well as historical context (trends and variability), in order to reach a broad audience in a meaningful manner

PS4: Integrated Fire Risk Management (INFRA): The PS4 INFRA Service aims to develop an integrated web-based system that will collect data and make available a set of tools and information to support: (i) prevention and forecasting of forest fires; (ii) sighting and monitoring of forest fires; (iii) emergency management of shutdown operations; (iv) post-event management and damage assessment. Interactions with ongoing activities on this topic in the AC WGs started since the beginning (INFRA development team includes an Italian expert involved in the **EPPR** wildfire project). This interaction will be of relevance to identify stakeholders needs and develop an effective modular approach to facilitate the implementation in different conditions.

PS5: Local Atmospheric Pollution Forecast: PS5 may provide useful information to the **AMAP** Expert Group on Short-Lived Climate Forcers later in the project.

PS6: Improving Safety for Shipping in the Polar Seas: PS6 aims to reduce the risk of a shipping incident by improved access to the International Maritime Organization's (IMO) POLARIS risk assessment system and developing a new POLARIS forecast. PS6 will work closely with **PAME** as they have agreed to be a member of the Pilot Service Advisory Group. **PAME** has highlighted that the project has synergies with their work on the Arctic Shipping Traffic Database and has links to PAME's Arctic Shipping Best Practice Information Forum.

PS7: CBM for Arctic Marine Climate Change, Noise Pollution and Impacts on Marine Living Resources: PS7 is a community-led Pilot Service. It will engage a local, traditional Greenlandic community in monitoring marine climate change, noise polution and impacts on marine living resources. This is in part a response to the identified gaps in knowlege and data coverage by **PAME** (State of Knowledge report on Underwater Noise 2019), and can be linked with one of the ongoing projects on marine noise polution. Key results will be communicated to AC WGs as well as information on upcoming workshops. PS7 will also engage with **AMAP** to support implementation of the sustainable pan-AOOS and the SAON roadmap.

PS8: Lake Ice Service for Arctic Climate and Safety: PS8 work on lake Ice monitoring will involve collaboration mainly with **AMAP** to help define user requirements for the first version of the data service and provide comments for its further development.

WP5: Assessing Societal Benefits and Economic Impacts: The evaluation of societal benefits of Arctic observing systems and Pilot Services in WP5 will be provided to Arctic Council by communicating the results of the studies to SAON. The studies in WP5 might also contribute to the work of the **SDWG** and in this case communication with SDWG should be established.

WP6: International Cooperation and Clustering for essential Arctic Integration: WP6 will support SAON by strengthening the European efforts in SAON. Through the SAON Roadmap for Arctic Observing and Data Systems (ROADS), SAON will provide the most comprehensive international

framework to set a course for developing a pan-Arctic Observing System and for specifying how partners will collectively work to achieve this, including engagement of, and partnership with, Arctic Indigenous People.

WP7: Supporting coherent Policy and decision-making: The objective of this WP is to provide decision-making and policy support by establishing meaningful dialogues with local to international policy makers. The goal is to understand policy needs and bring them into the project so that they can be integrated into project actions, and to communicate the work of all Arctic PASSION WPs, their outcomes and their recommendations widely. WP7 will also further the outcome of the Arctic Science Ministerial regarding sustained Arctic observations and establish a dialogue with Working Groups and Permanent Participants of the Arctic Council. This presentation is part of the work of WP7.

WP8: Co-developing an integrated and sustainable pan-AOSS: WP8 will synthesize outputs of all Arctic PASSION activities. It will ensure the legacy of the actions and services in collaboration with Copernicus, and the overall integration and strengthening of pan-Arctic observations from science and other forms of knowledge for the benefit of Arctic People, the European community and the wider world.