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# ARCTIC PASSION

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

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FMI

for WP6 (Clusters and international co-op)





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

- European Commission H2020 Program
- 4 years, 15 Mio Euro, 17 countries
- 35 partner organizations and 8 Indigenous Communities
- July 2021 June 2025

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- Website: <u>www.arcticpassion.eu</u>
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  NPI and Jeremy Wilkinson, BAS

Participant No.	Participant organisation name		Country
1 (Coordinator)	AWI	Alfred-Wegener-Institut Helmholtz-Zentrum für Polar- und Meeresforschung	DE
2	UKRI-BAS	United Kingdom Research and Innovation	UK
3	DMI	Danmarks Meteorologiske Institut	DK
4	NPI	Norsk Polarinstitutt	NO
5	UiT	Universitetet i Tromsoe – Norges Arktiske Universitet	NO
6	ULUND	Lunds Universitet	SE
7	MET	Meteorologisk Institutt	NO
8	OASYS	O.A.Sys - Ocean Amosphere Systems GmbH	DE
9	SNOW	Lumimuutos Osuuskunta - Snowchange	FI
10	GINR	Gronlands Naturinstitut	GL
11	JRC	JRC - Joint Research Centre - European Commission	BE
12	FMI	Ilmatieteen Laitos – FMI	FI
13	GRIDA	Stiftelsen Grid Arendal	NO
14	AMAP	Arctic Monitoring and Assessment Programme Secretariat	NO
15	CNR	Consiglio Nazionale delle Richerche	IT
16	DTU	Danmarks Tekniske Universitet	DK
17	EPB	European Polar Board	NL
18	ILAB	Kaminski Thomas Herbert – The Inversion Lab Thomas Kaminski Consulting	DE
19	INPO	INTERACT – International Network for Terrestrial Research and Monitoring in the Arctic - INPO	SE
20	SIOS	SIOS Svalbard AS	NO
21	CNRS	Centre Nationale de la Recherche Scientifique	FR
22	SPATINEO	Spatineo Oy	FI
23	SYKE	Suomen Ympariistokeskus- SYKE	FI
24	UBristol	University of Bristol	UK
25	UiB	Universitetet i Bergen	NO
26	WSL/SLF	Eidgenossischen Forschungsanstalt für Wald, Schnee und Landschaft – Organisationsverordnung WSL	СН
27	CAE	Cae	IT
28	WOA	Women of the Arctic ry	FI
29	ULAP	Lapin Yliopisto	FI
30	AINA	The Arctic Institute of North America	CA
31	UW	University of Washington	US
32	UMCES	University of Maryland Centre for Environmental Science	US
33	SIO	P.P. Shirshov Institute of Oceanology of Russian Academy of Sciences – SIO	RUS
34	TSU	Tomskij Gosudarstvennyj Universitet – Tomski State University	RUS
35	NCPOR	National Centre for Polar and Ocean Research - NCPOR	IN



- Co-create a **coherent, integrated pan-Arctic Observing System of Systems (pan-AOSS)** aiming to overcome fragmentation, and the lack of integration across essential Arctic observing system components;
- Build on existing EU and international work (such as INTAROS, KEPLER, RNA-CoObs, CCADI, etc) and collaborating with the Arctic Council and its working groups, SAON, GEO (as Arctic-GEOSS) and other international organisations;
- Understand and address the urgent needs of people living in the Arctic, and to have relevance to European and global society;
- Meaningful collaboration with Arctic communities, Indigenous Peoples (IP) and Indigenous organisations following the Arctic Council (AC) Ottawa Indigenous Knowledge Principles and expand monitoring capabilities through broad inclusion of Indigenous Knowledge and Local Knowledge;
- Coordinate and enhance Arctic-centred EO capacity and capability, by developing and co-creating
  - Shared Arctic Variables (SAVs/EAVs) for SAON
  - an "Arctic window of Copernicus"
  - user-driven **EuroGEO** services
- Improve **data interoperability** and simplify access to 'application-ready' environmental data for the benefit of all users;
- **Empower** the private sector, policymakers, and civil society with critical tools necessary to observe, understand and predict future change in the Arctic environment, over different spatial and time scales;
- Contribute to improved widespread monitoring of ongoing environmental change, to reduce uncertainty in predicting future system changes, support risk assessment, and inform and guide mitigation and adaptation measures, and sustainable development in the Arctic and elsewhere.



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#### The Structure of Arctic PASSION as in Group on Earth Observations mission tasks





#### **Geographical regions of activity of Arctic PASSION**



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Pillar A Core observing system elements and services: Making the pan-AOSS science and knowledge driven

#### • WP1: Extend and Integrate Observations - NPI/LUND (A. Sundfjord/M. Johansson):

Establish an adaptive, comprehensive, needs-driven pan-AOSS to provide required observations for understanding the functioning, variability, trends and changes in the Arctic System on hourly to decadal time scales (including CBM, IK and LK)

-> i.e., building 'Environmental Observation Nodes – EON', extending the Pacific **Distributed Biological Observatory** concept across the Arctic basin to the Atlantic sector

-> i.e., with WP4.1, how can **Community Based Monitoring** networks expand observations, identify and monitor new indicators and local impacts; compatibility across the CBM, attribution of change through different indicators resulting from the large geographical region covered and different cultural perspectives



#### WP2: Bringing the Arctic Data System into Action - MET/AWI (O. Godoy/J. Felden):

Improve handling, archiving and interoperability of Arctic data, through a coherent data management structure, that provides accessible and analysis-ready data on demand.

-> i.e., 'Arctic window of Copernicus' (access to Arctic data connecting to the different Copernicus services)

#### • WP3: Supporting an intelligent AOSS through model-based impact assessments – OASys/MET (F. Kauker/H. Schyberg):

*Exploit statistical and numerical modelling to optimize in situ sampling strategies, and design of new satellite-based missions for improving monitoring and operational forecasting capabilities.* 



-> i.e. using Quantitative Network Design (QND) for more cost-efficient and secure navigation in ice infested waters and for monitoring potential risk on land (e.g. wildfires)



Pillar A Core observing system elements and services: Making the pan-AOSS science and knowledge driven

• WP4: Innovating User-driven Arctic EuroGEO Pilot Services - SNOW/GINR (T. Mustonen/M. Simons):

Co-create EuroGEO services to provide new information to support emergency preparedness, food security, responses to climate and socio-economic changes.

- PS1: Arctic Service 'Event Database of CBM Using Oral Histories, IK and LK' (T. Mustonen)
- PS2: Pan-Arctic requirements-driven Permafrost Service (G. Grosse)
- *PS3: 'State of the Arctic Environment' service (A. Sundfjord)*
- PS4: 'Integrated Fire Risk Management (INFRA)' Service (V. Vitale)
- *PS5: 'Local Atmospheric Pollutant Forecast' Service (S. Dobrcic)*
- PS6: 'Improving Safety for Shipping in the Polar Seas' Service (J. Wilkinson)
- PS7: 'CBM for Arctic marine climate change, noise pollution & impacts on marine living resources' (M. Simons/S. Olsen)
- PS8: Lake Ice Service for Arctic Climate and Safety (S. Koponen)





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#### **Pilot Services co-creation with**

PS1: Arctic Service 'Event Database of CBM Using Oral Histories, IK and LK' (and partially PS2, PS8) Indigenous Communities of

- Inupiaq and Yupiaq (Unalakleet, Alaska, USA) C1
- Tahltan Nation (Dease Lake, British Columbia, Canada) C2
- Gwich'in Nation (Tsiigehtchic, Northwest Territories, Canada) C2
- Inuit (Attu and Aasiaat, Greenland) C3
- Skolt Sámi (Näätämö River Basin, Finland and Norway) C4
- Skolt, Ter, Kildin Sámi (Ponoi River Basin, Murmansk, Russia) C5
- Khanty, Mansi (Khanty-Mansi Autonomous Okrug–Yugra, Russia) C6
- Chukchi, Even, Yukaghir, Dolgan (Lower Kolyma, Republic of Sakha-Yakutia, Russia) C7

### PS4: 'Integrated Fire Risk Management (INFRA)' Service.

Indigenous Communities of

- Gwich'in Nation (Tsiigehtchic, Northwest Territories, Canada)
- Khanty (Khanty-Mansi Autonomous Okrug–Yugra, Russia)

#### PS7: 'CBM for Arctic marine climate change, noise pollution & impacts on marine living resources'

• Greenland Inuit community members of the Qaanaaq region.



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Pillar B Societal, science, policy and decision-making support: Making the pan-AOSS society driven



<u>WP5: Assessing Societal Benefits and Economic Impacts – JRC/FMI (S. Dobrcic/A. Perrels):</u>

Provide estimates of societal and economic benefits of AOSS elements and Pilot Services for Arctic communities and for European and global society

-> i.e., Using 'Value Tree Analysis (VTA)' to create the representation of benefit generation pathways

• WP6: International Cooperation and Clustering for essential Arctic Integration – FMI/BAS (M. Strahlendorff/E. Ford):

Improve international and European collaboration on the integration of Arctic observations, operate a framework for SAVs, and lift Arctic-GEOSS from a community activity to GEO-Initiative.

-> i.e., identify SAV in diverse Expert Panels in collaboration with SAON (jointly with WP1)

<u>WP7: Supporting coherent Policy and decision-making – AWI/AMAP (V. Rachold/J. Pawlak):</u>

Establish platforms and fora for two-way dialogues with policy and decision-makers on international, European, national, and regional levels; provide support for decision-making by receiving and acting on policy and information needs, as well as to communicate policy recommendations from Arctic PASSION.

-> i.e., Two-way dialogues, consultation meetings, policy briefs and online surveys, and face-to-face briefings with relevant policy and decision-makers





Figure 1. Full Value Tree Framework.



• WP8: Co-developing an integrated pan-AOSS – AWI/BAS (M. Karcher/J. Wilkinson):

Synthesize outputs of all Arctic PASSION activities, to ensure the legacy of our actions and services. Overall enhancement, integration and strengthening of pan-Arctic observations for the Arctic and European societies.

-> i.e., continuous integration of project results and synthesis of the output, experiences, and recommendations

• WP 9: Connecting with Society: Communication, Dissemination and Engagement – GRIDA/APECS (A. Sinisalo/J. Lenz):

Increase the visibility of Arctic PASSION's actions, provide information flow within, to rights- and stakeholders, and society; enhance the visibility of contributions to Arctic observations, and improve accessibility and user uptake through our 'Windows to the Arctic' platform, and through bi-directional learning and capacity building.

-> i.e., adopting bi-directional, bottom-up approaches, such as using pro-active dialogue and participatory tools and dissemination information in the major local and/or Indigenous languages





Anu Fredrikson (Arctic Frontiers) Craig Donlon (ESA) Craig Lee (UW, IOP) Eva Krümmel (ICC) Eun-Jin Yang (KOPRI) Henrik Steen Andersen (EEA, Copernicus In Situ Component) Michael Cherlet (JRC, Copernicus Land Management Service) Otto Habeck (University of Hamburg) Rodica Nitu (WMO, Global Cryosphere Watch) Vyacheslav Shadrin (RAIPON)





- Demonstrate current Arctic Observing System fitness for purpose
  - Highlight needs to sustain and extend the system
  - Support new SAON process for defining Essential/Shared Arctic Variables to answer to the need to sustain and extend
- Co-create services from observing system and research results
  - Estimate value (economic, scientific and social) of Arctic observing value trees
  - Extend use of Copernicus data
  - Could your data be used by Arctic local communities and businesses?
- Indigenous People involved in all activities
- Advocate, Engage and Deliver for EuroGEO and SAON as the Arctic GEOSS initiative

