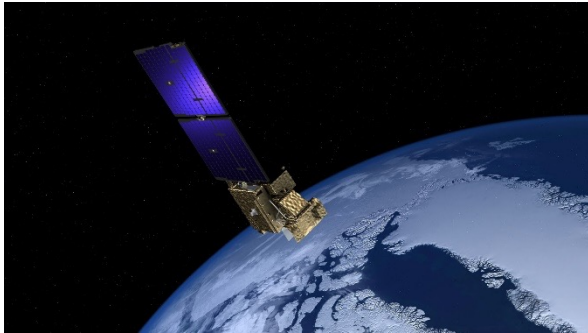
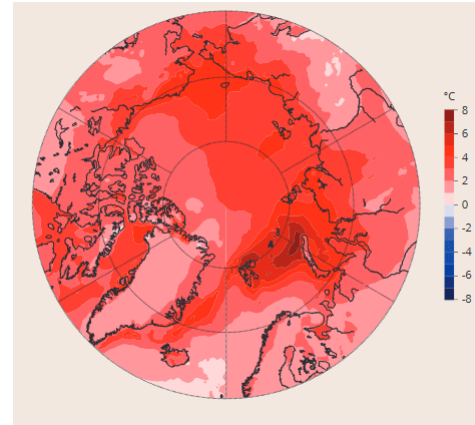


Collaborating towards an Observing System that serves society's needs in a future Arctic

Michael Karcher & Jeremy Wilkinson for the Arctic PASSION team



© ESA



© AMAP



© Snowchange

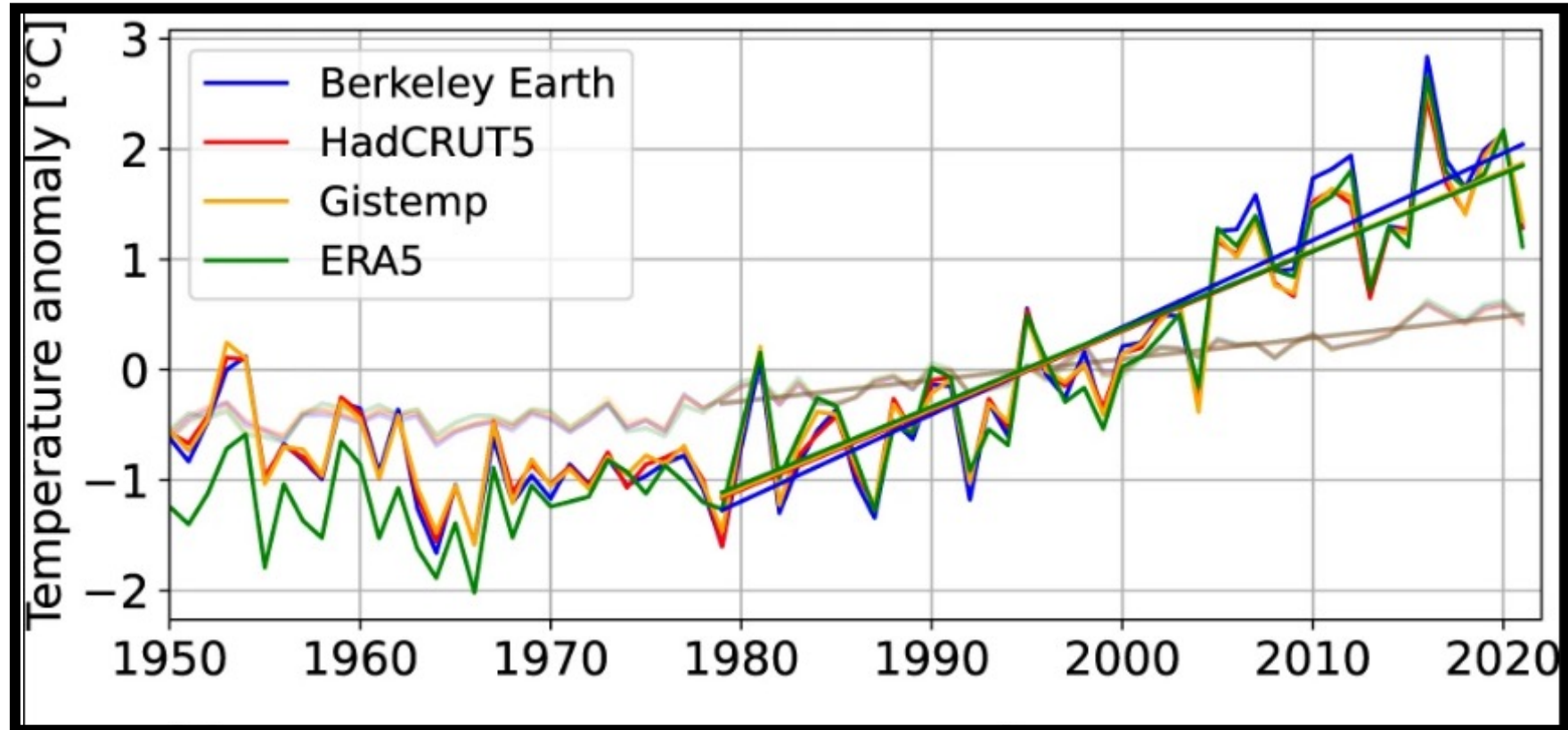


© J. Bamber



© L. Hislop

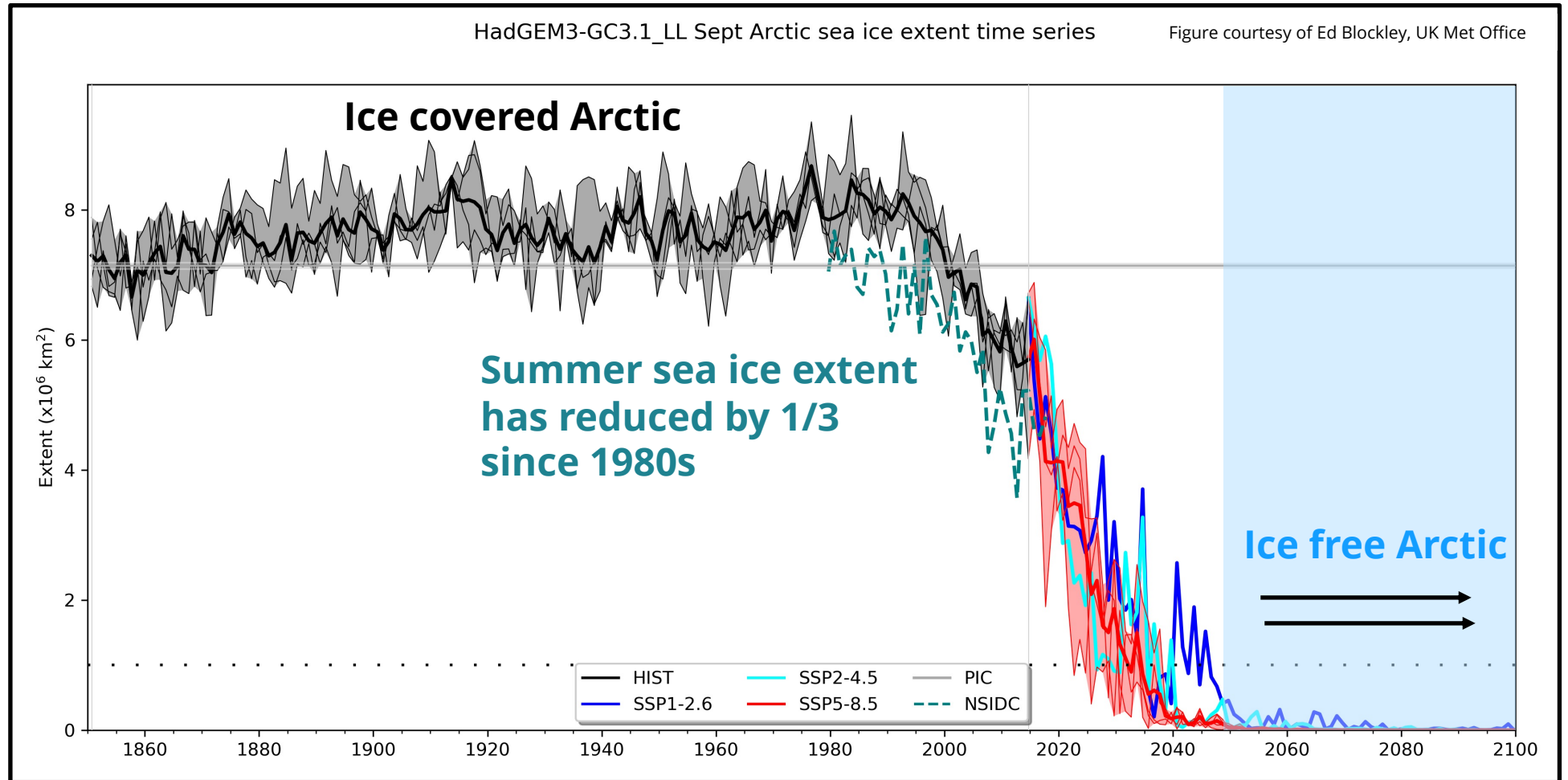
The Arctic warms 4 times faster than the global mean



Rantanen et al, 2022

The consequences for the environmental system are massive

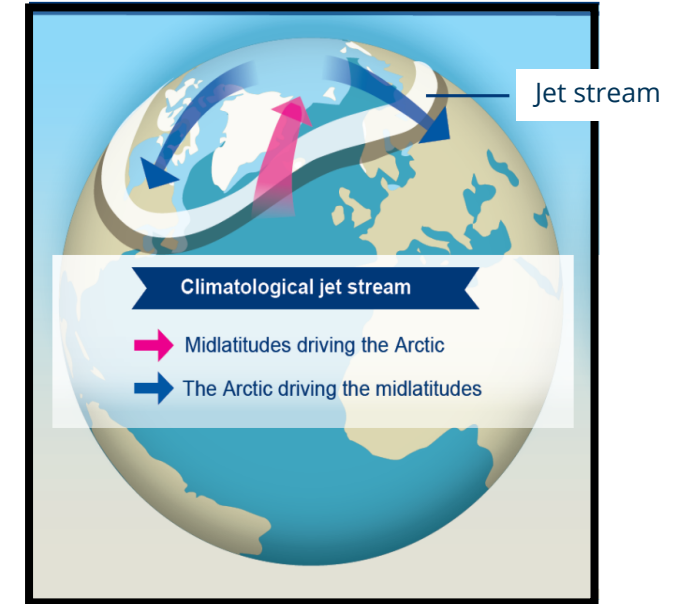
The most visible effect is the disappearance of summer sea ice



Summers are expected to be ice-free after 2050s in any of the emission scenarios

The Arctic is not isolated.

Europe, North America and Asia will be impacted.



➔ **Mitigation and adaptation to the consequences demand decision-making**

that is based on the best available information:

- knowledge on the state and recent development of the Arctic environment
- systemic knowledge on how the environmental system works (including the people)
- sound forecasts and projections (all of which depend on observations!)

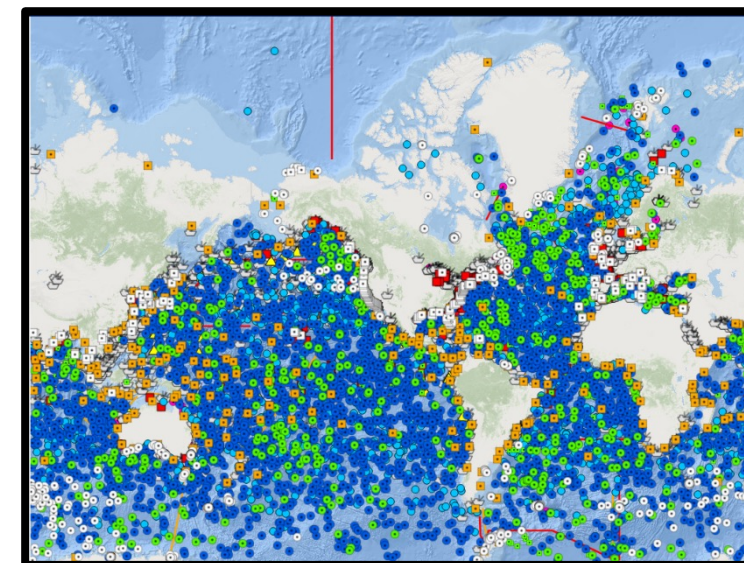
The Arctic is undersampled, data coverage is sparse

Requirements for knowledge-based decision-making:

- Better data coverage
- Less fragmentation of observing activities
- Data that are accessible and interoperable
- A systemic (holistic) and more equitable approach
- Information products tailored to societal needs

➔ The EU has realized these problems and invested in:
Arctic research, Arctic observing system projects, and services

Ocean drifters (April 2022)



GOOS

Radiosondes (22.1.2024)



Met.no



ARCTIC PASSION

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

**Collaborating towards a better
coordinated and integrated, more useful
and more equitable Arctic Observing
System**

Funded by the European Commission H2020 Program 2021 – 2025
with 15 Mio Euro

**More than 40 partner institutions and Indigenous Communities
from 18 countries
plus numerous international collaborating programmes**

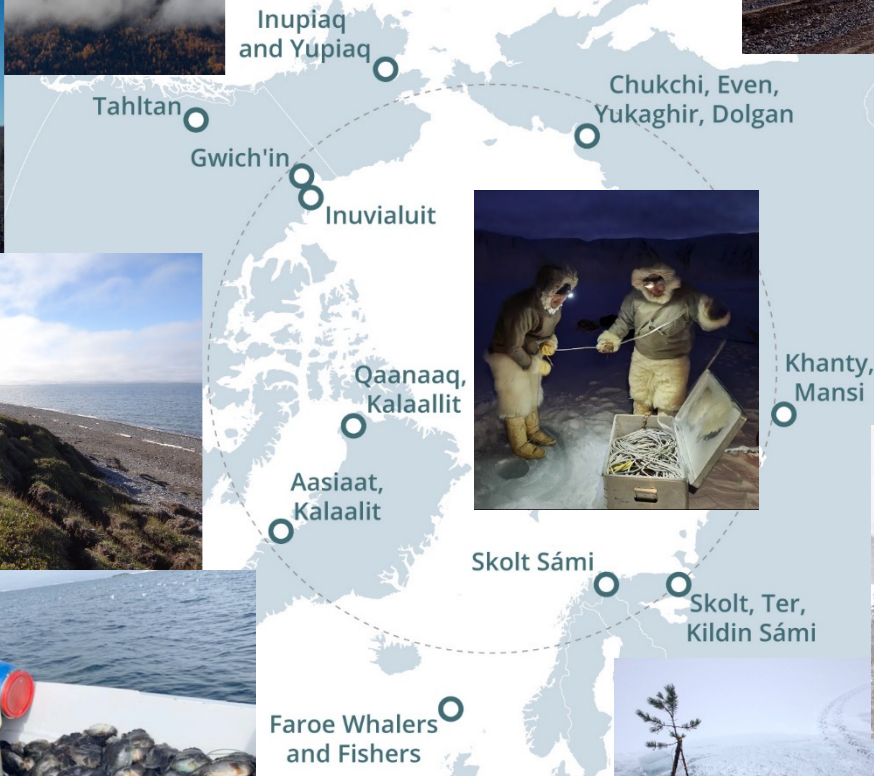
Coordination: 

Alfred Wegener Institute for Polar and Marine Research



© M. Karcher





Arctic partner communities

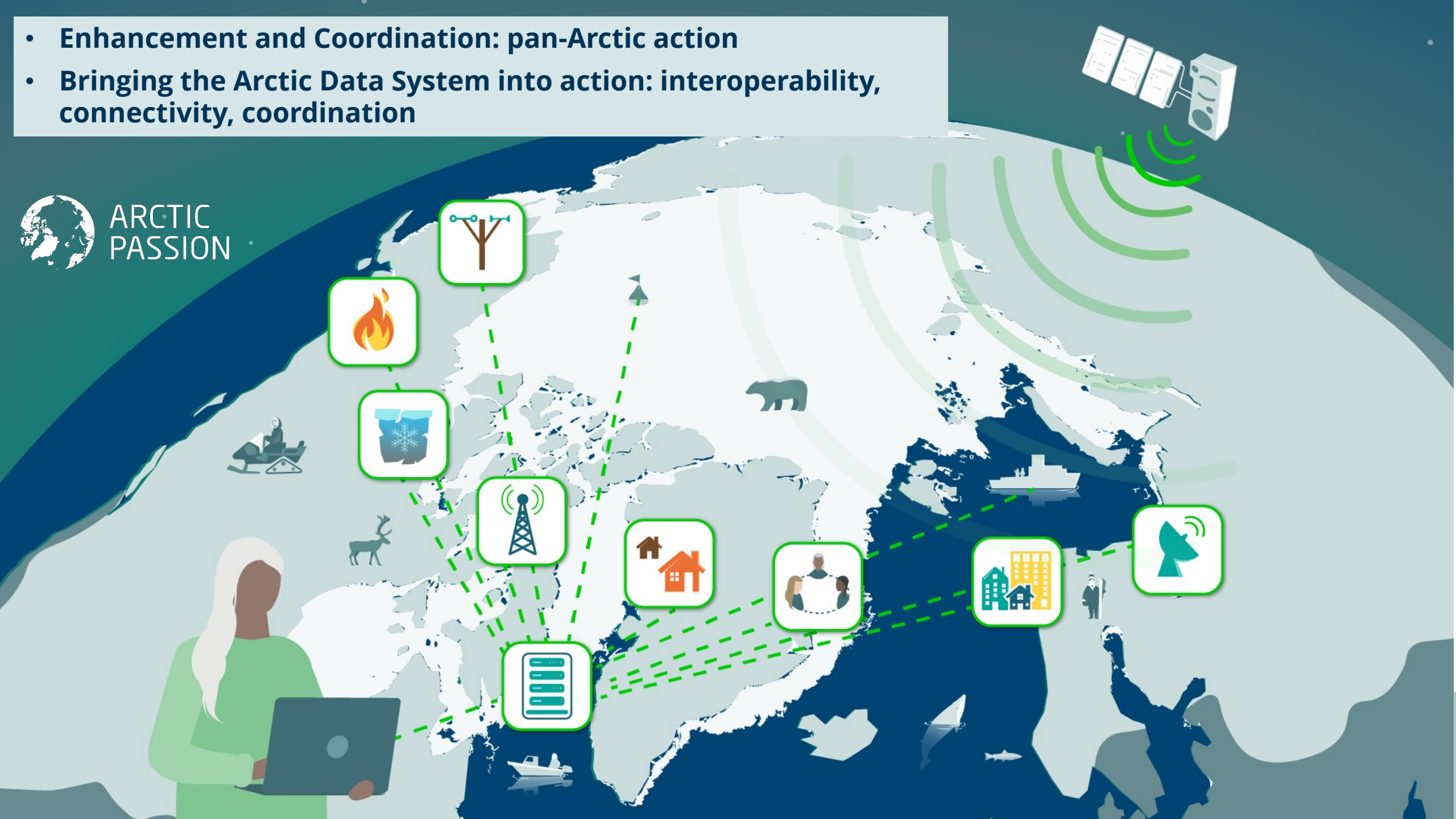


- Enhancing instrumentation and coordination
- Inclusion of different knowledge systems
- Enhancing the functionality of the Arctic Data System
- Developing new services
- Piloting the ‚Shared Arctic Variables‘ concept of SAON
- Developing societal benefit assessments
- Enhancing international collaboration
- Providing policy and decision-making support
- Contributing to developing a clearer and more equitable international Structure for Arctic observing



➔ founding on and collaborating with previous and ongoing international efforts

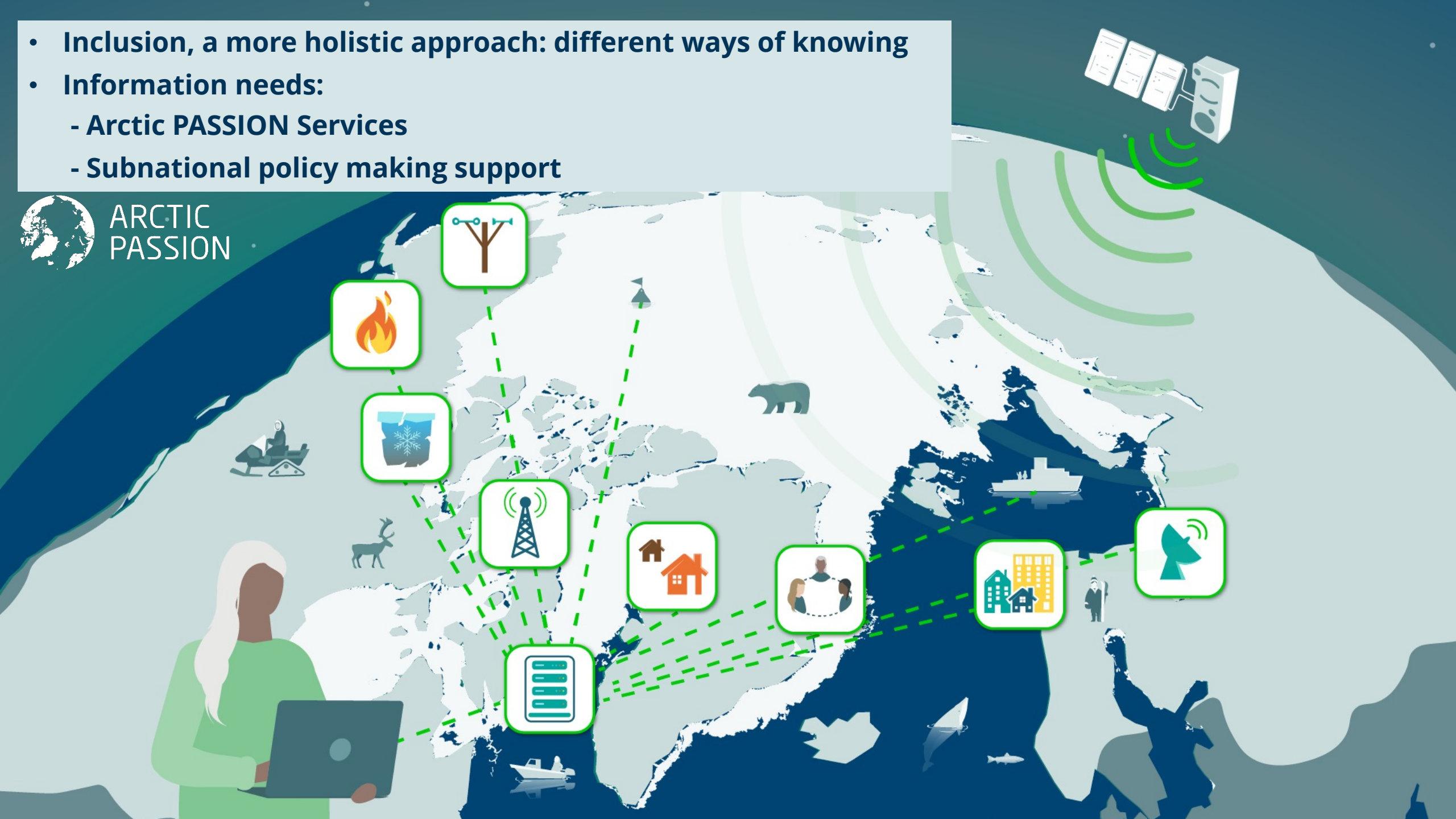
- Enhancement and Coordination: pan-Arctic action
- Bringing the Arctic Data System into action: interoperability, connectivity, coordination



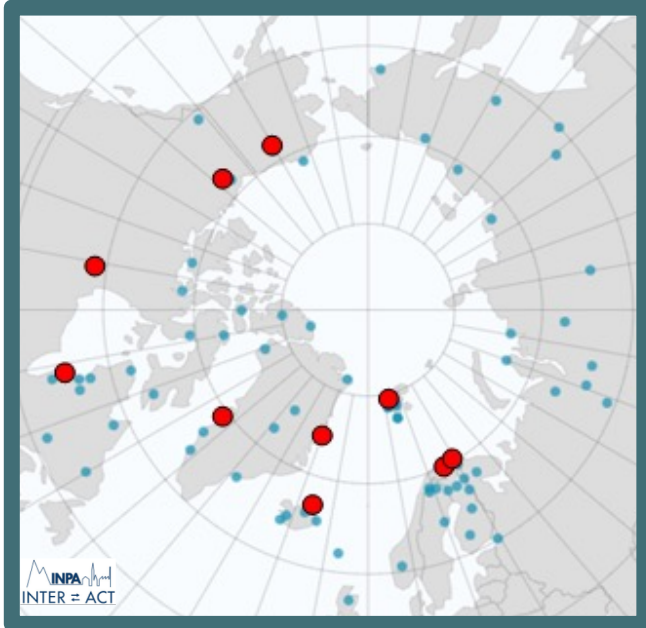
- Inclusion, a more holistic approach: different ways of knowing
- Information needs:
 - Arctic PASSION Services
 - Subnational policy making support



ARCTIC
PASSION

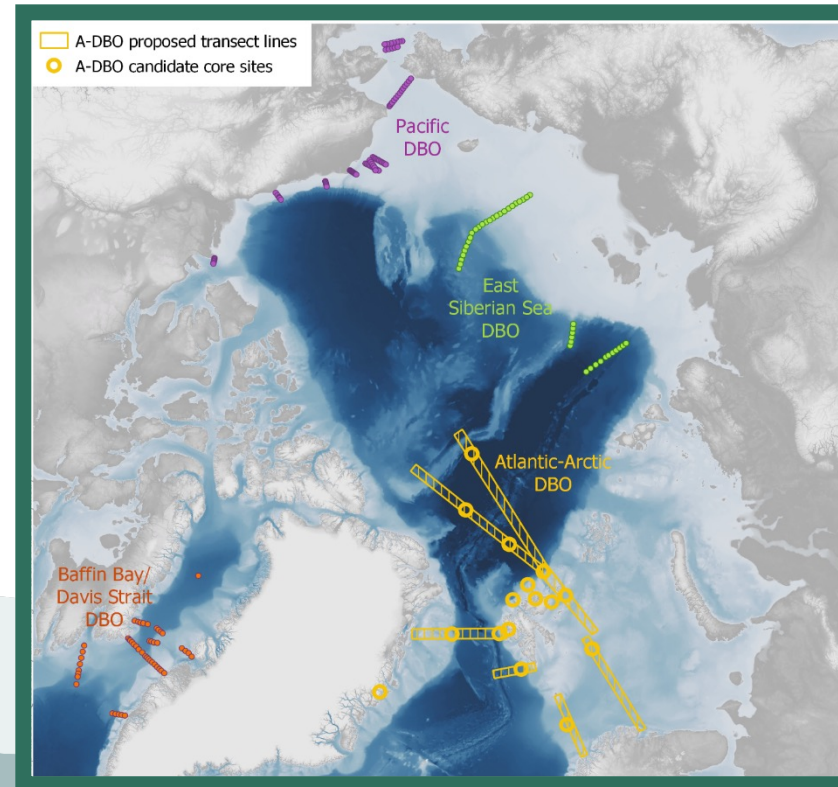


Enhancing instrumentation and coordination

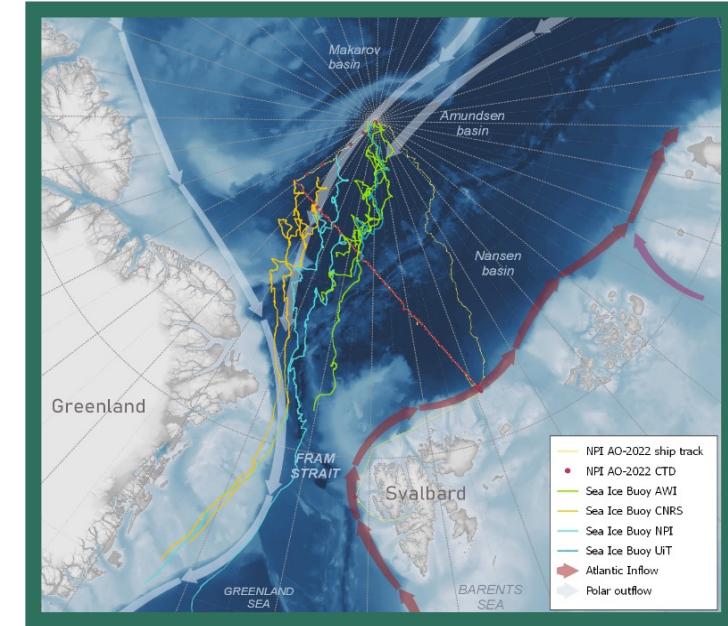


Uni Lund

- New multi-disciplinary deployments
- New sensor, instrumentation and analysis development



NPI

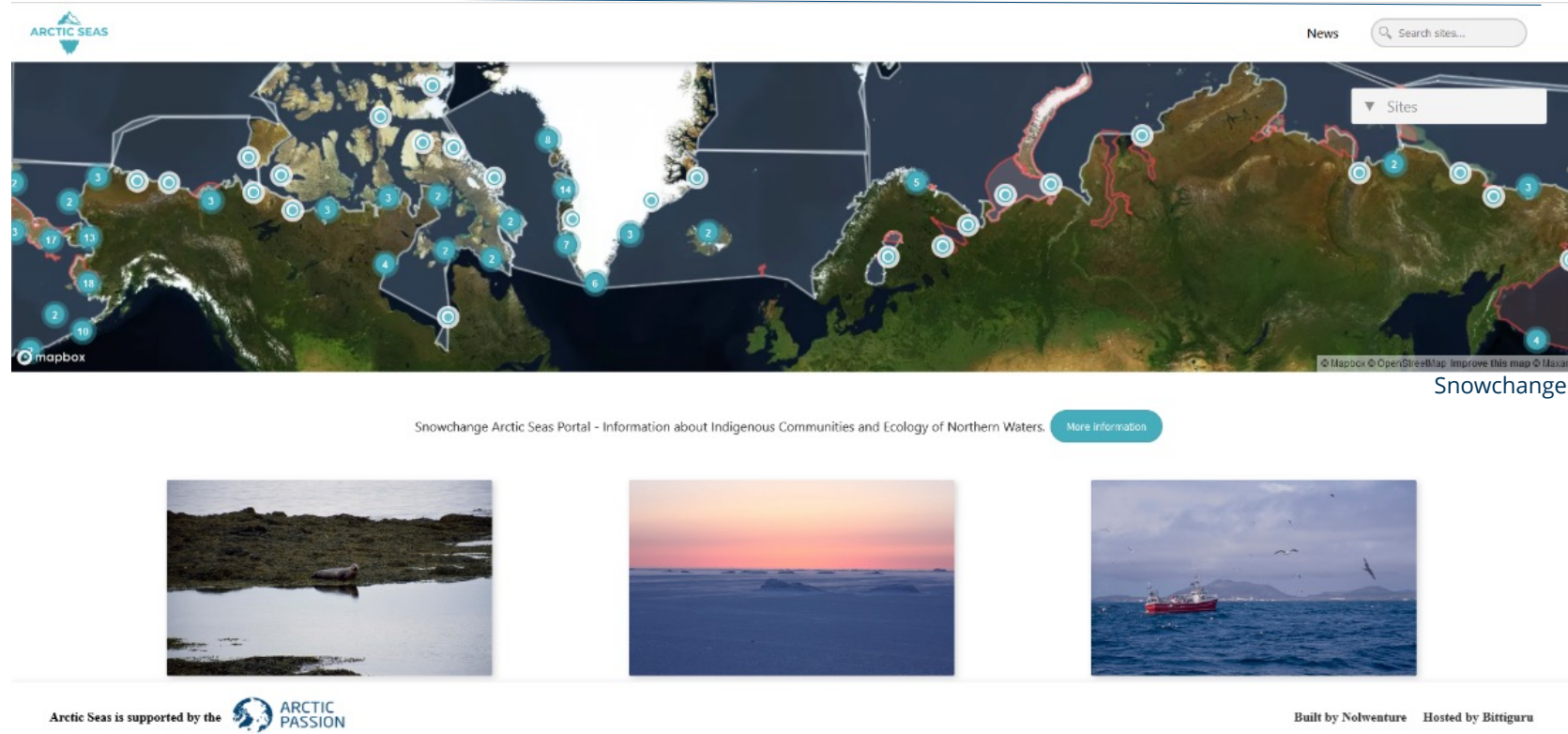


Sundfjord, NPI

- A-DBO, an Atlantic-Arctic environmental observatory
- Formation of an Arctic Ocean coordination alliance (GRA)

Enhancing inclusion of different knowledge systems

- Advancing the visibility of Indigenous marine knowledge: ***arcticseas.org***



ARCTIC SEAS


News

Sites

mapbox

Snowchange

Snowchange Arctic Seas Portal - Information about Indigenous Communities and Ecology of Northern Waters. [More Information](#)

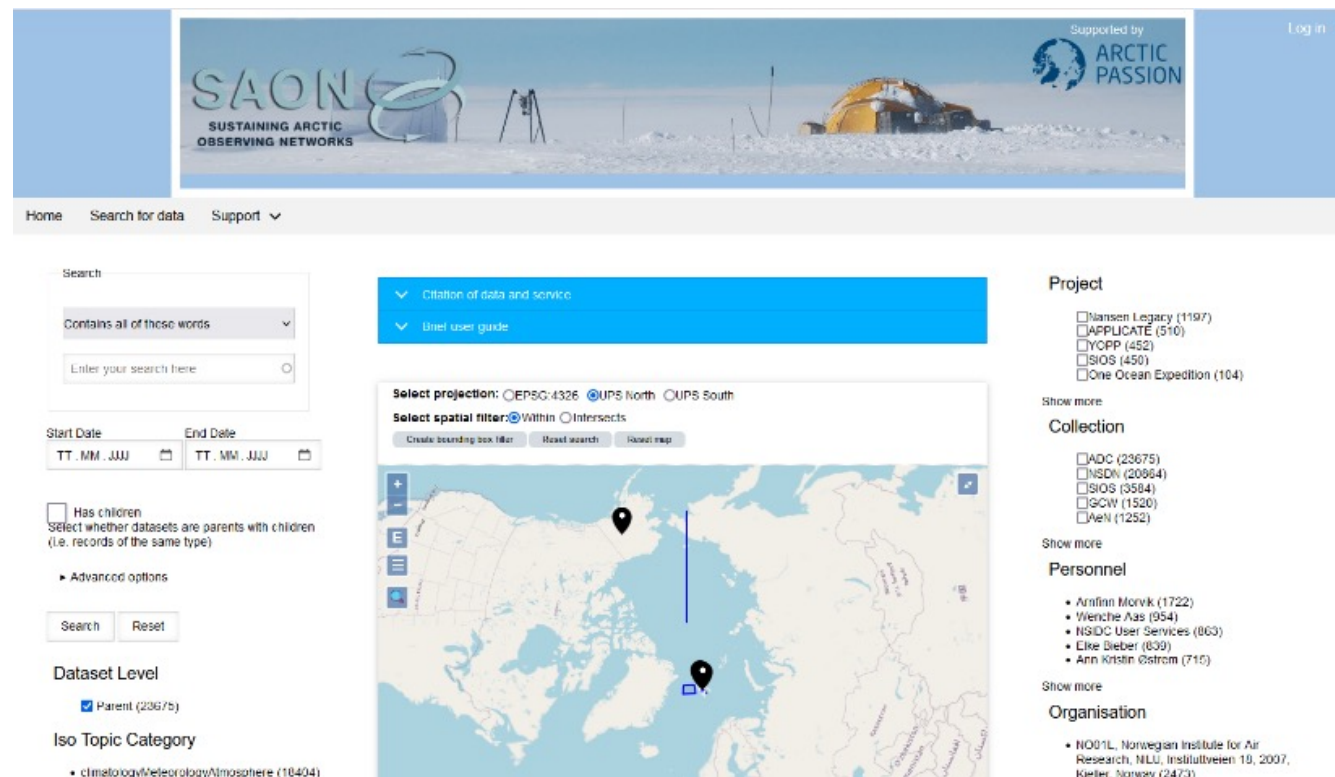
Arctic Seas is supported by the 

Built by Nolventure Hosted by Bitiguru

- Piloting the development of SAON's **Shared Arctic Variables**
- Empowerment to identify observational needs of local and Indigenous communities: **wildfire, permafrost and sea ice**



- Mapping the **Polar Data System**
- Transformation of data to **standardized form**
- **FAIR** Data and Service provision
- Long term **data preservation**
- **Data center harvesting** for the unified **SAON Data Portal/Catalogue**



The screenshot displays the SAON Data Portal/Catalogue interface. At the top, there is a banner for SAON (Sustaining Arctic Observing Networks) with the Arctic Passion logo. Below the banner is a navigation bar with links for Home, Search for data, and Support. The main content area is divided into several sections:

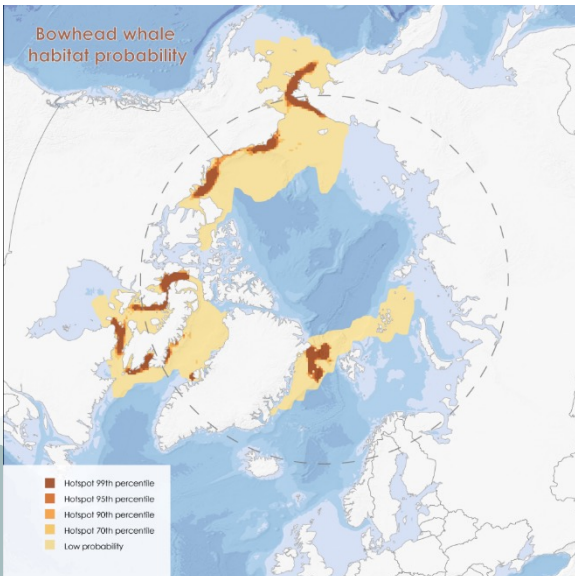
- Search:** A search box with a dropdown menu for "Contains all of these words" and a text input field for "Enter your search here".
- Start Date / End Date:** Two date pickers with the format "TT . MM . JJJJ".
- Has children:** A checkbox labeled "Has children" with the text "Select whether datasets are parents with children (i.e. records of the same type)".
- Advanced options:** A section with a "Search" button and a "Reset" button.
- Dataset Level:** A checkbox labeled "Parent" with the count "(236/75)".
- Iso Topic Category:** A list of categories, including "climatology/Meteorology/Atmosphere (18404)".
- Map:** A map of the Arctic region with a blue bounding box and a vertical line. Above the map, there are options for "Select projection" (EPSG:4326, UTM North, UTM South) and "Select spatial filter" (Within, Intersects). Below the map are buttons for "Create bounding box filter", "Reset search", and "Reset map".
- Project:** A list of projects with checkboxes, including "Nansen Legacy (1197)", "APPLICATE (510)", "YOPP (452)", "SIOS (450)", and "One Ocean Expedition (104)".
- Collection:** A list of collections with checkboxes, including "ADC (23675)", "NSDN (20864)", "SIOS (3584)", "SGW (1520)", and "AeN (1252)".
- Personnel:** A list of personnel with names and counts, including "Arnfinn Morvik (1722)", "Wenche Aas (954)", "NSIDC User Services (863)", "Eike Bieber (639)", and "Ann Kristin Østrom (710)".
- Organisation:** A list of organizations, including "NOU1L, Norwegian Institute for Air Research, NILU, Instituttveien 19, 2007, Kjeller, Norway (2473)".



Snowchange

Self-governed database of CBM and oral histories, Indigenous Knowledge and local knowledge

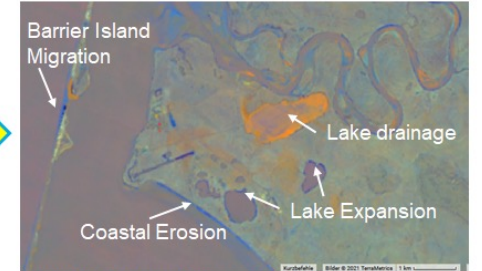
Pan-Arctic requirements-driven **Permafrost** service



Village of Point Lay, Northern Alaska

Impacts on Northern Communities

Google Earth Engine App with Remotely Sensed Trends in 30m resolution from 2001-2020

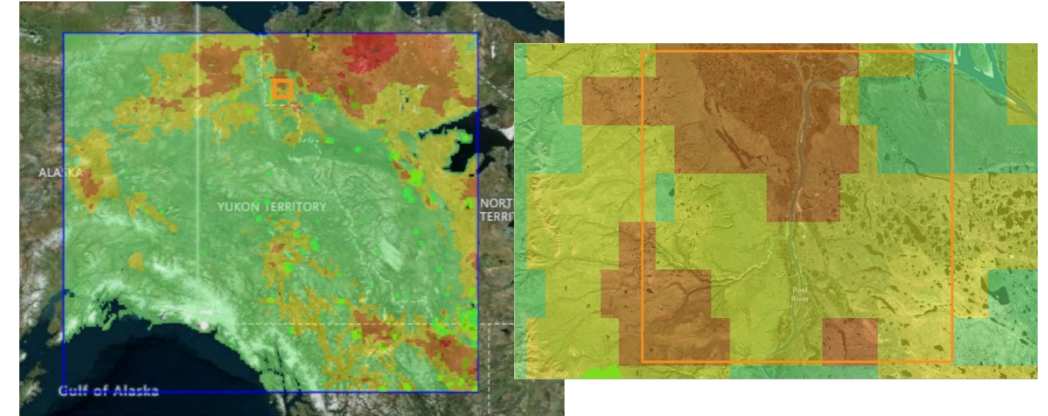


ESA GlobPermafrost + ESA CCI+ Permafrost

G. Grosse, AWI

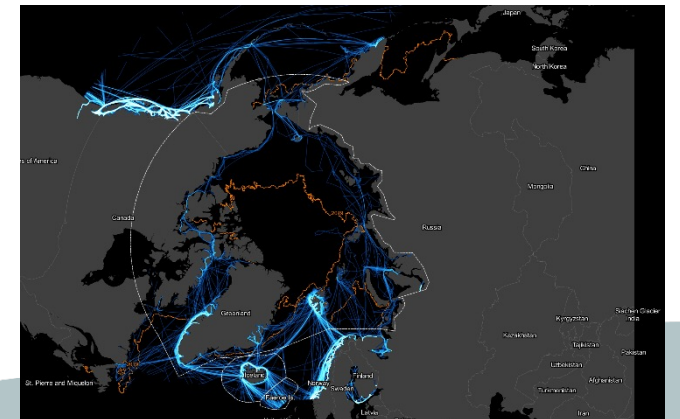
Web-platform 'State of the Arctic Environment'

Integrated **Fire Risk Management** Service

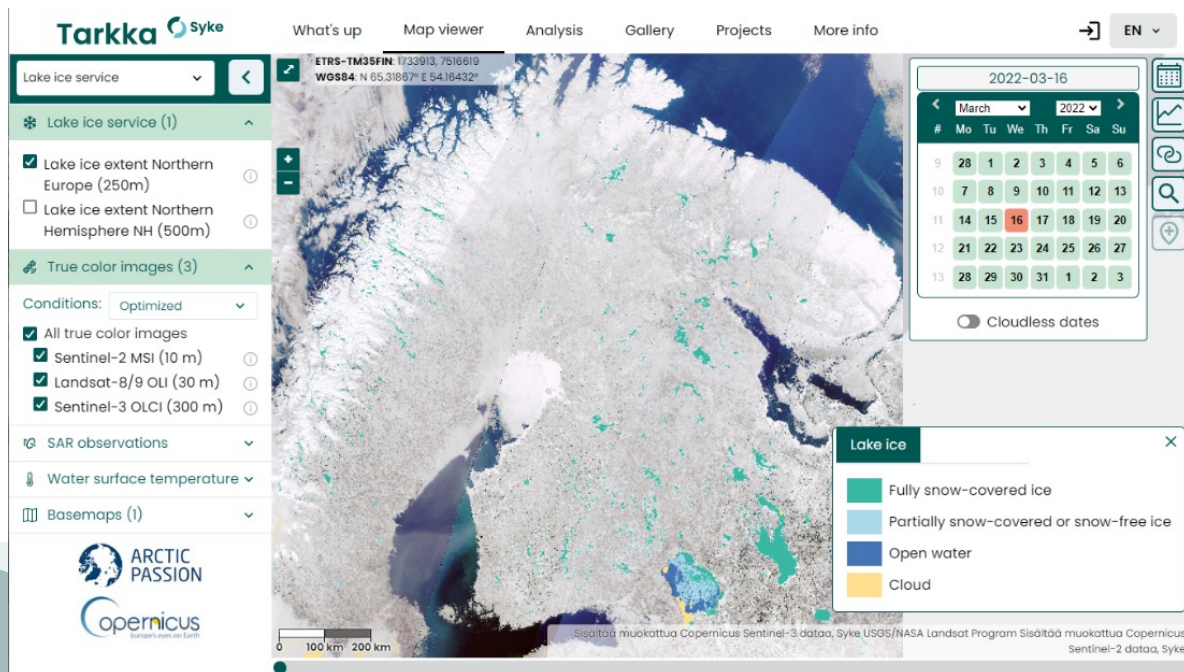


Local Atmospheric **Pollutant Forecast** Service

Improving **Safety for Shipping** in the Polar Seas



Community Based Monitoring: marine climate change, **noise pollution & impacts on marine living resources**



Soelbaeck, GINR

Lake Ice Service for Arctic Climate and Safety



Consultations with decision-makers at the sub-national level



Alaska Centre for Climate Assessment and Policy;
City & Borough of Juneau;
Municipality of Anchorage



Environment and Climate Change Canada;
The Government of Yukon;
The Government of Northwest Territories;
The Government of Nunavut;
The Government of Newfoundland and Labrador;
Municipality of Yellowknife, NWT



Ministry for Agriculture, Self-Sufficiency,
Energy and Environment;
Avannaata Municipality



Ministry for the Environment and Natural Resources;
The Environment Agency of Iceland;
Westfjords Regional Development Office;
Municipality of Akureyri;
Municipality of Dalvik;
Municipality of Siglufjordur,
Municipality of Reykjavik (Greater Reykjavik Area)



Ministry of Local Government and Regional Development
Norwegian Centre for Climate Services
Troms and Finnmark County;
Tromsø Municipality;
Harstad Municipality;
Tana Municipality;
Vardø Municipality



County Administrative Board of Norrbotten;
Lulea Municipality



Regional Council of Lapland;
Lapland Centre for Economic Development,
Transport and the Environment;
Kuusamo Municipality
Kemi Municipality



P. Tkach/A.Stepien
Uni Lapland

- Organizing joint workshops
- Creating Policy Briefs
- Collaborating with the “Arctic Mayors Forum”



Arctic Change and Arctic Observing

What are the needs?

- The rapidly changing Arctic environment impacts the livelihood of people living in the Arctic and societies outside the Arctic
- This requires access to the most recent and most relevant environmental data and knowledge:
 - Sustained long-term observations and information services based on the needs and requirements of inhabitants, stakeholders, and scientists by support actions from the EP and the EC.
 - Sustained funding and political support by the EU for better coordination of pan-Arctic Ocean observations and the dissemination of relevant data.
 - Changes in the funding and decision-making structure for a more equitable and inclusive Arctic observing system.
 - An agreed (and enforced) framework for harmonised data and the enhancement of data-interoperability and accessibility.



ARCTIC PASSION

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

Website:

www.arcticpassion.eu

