



ARCTIC PORTAL.org
THE ARCTIC GATEWAY

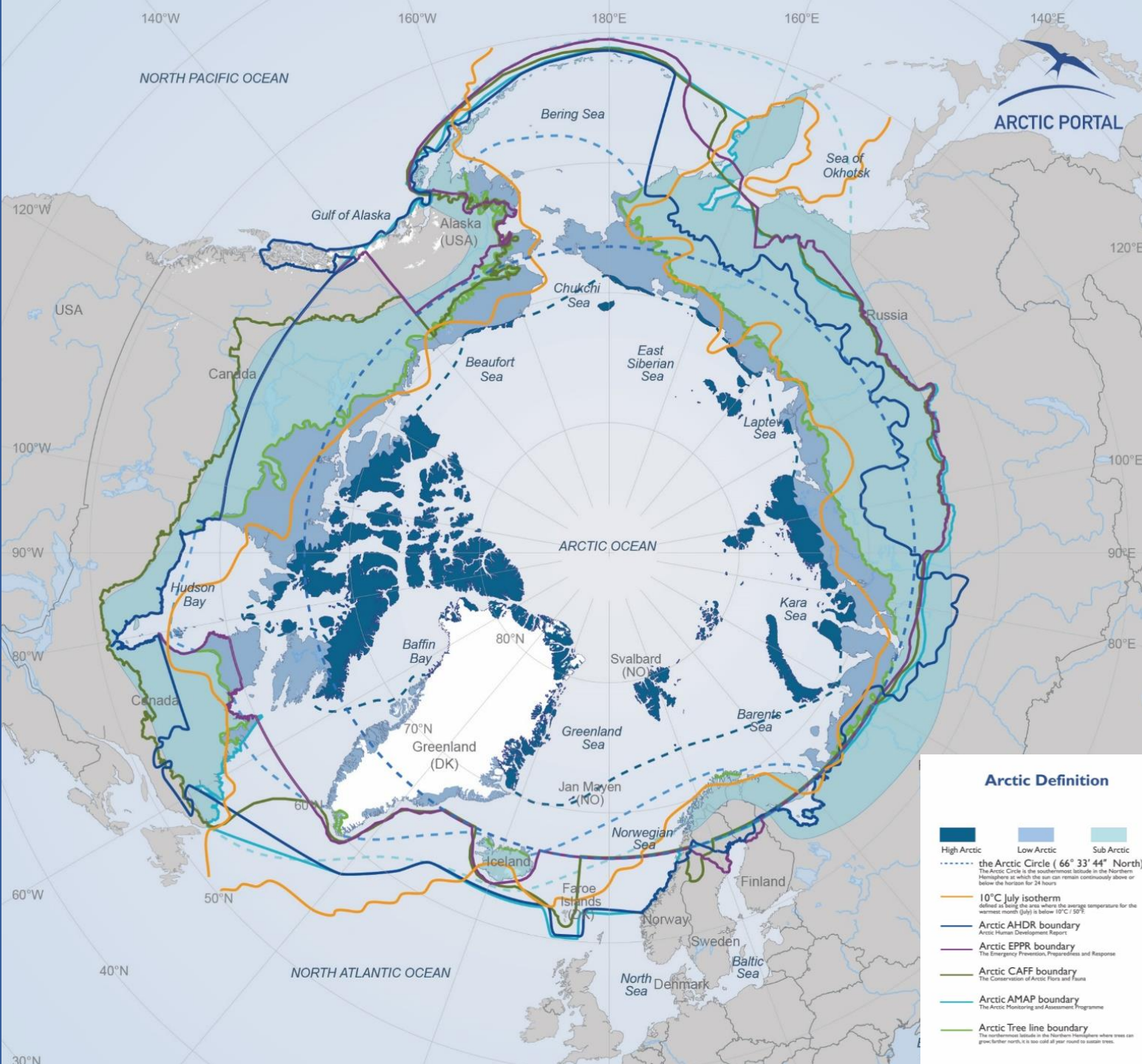


International cooperation for knowledge!

Introduction of the Arctic Portal



info@arcticportal.org

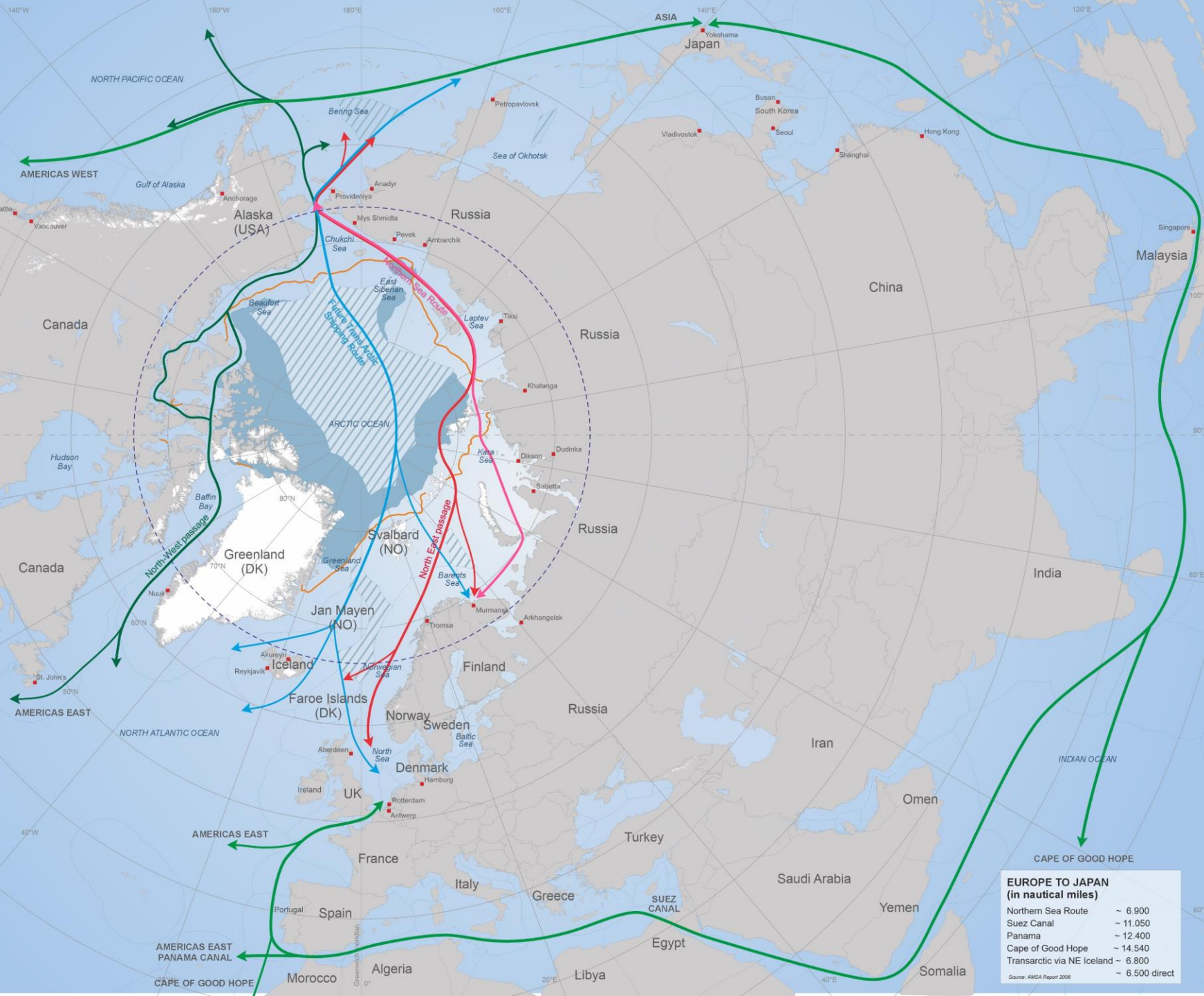


ARCTIC PORTAL

AREA OF OPPORTUNITIES AND THREATS!



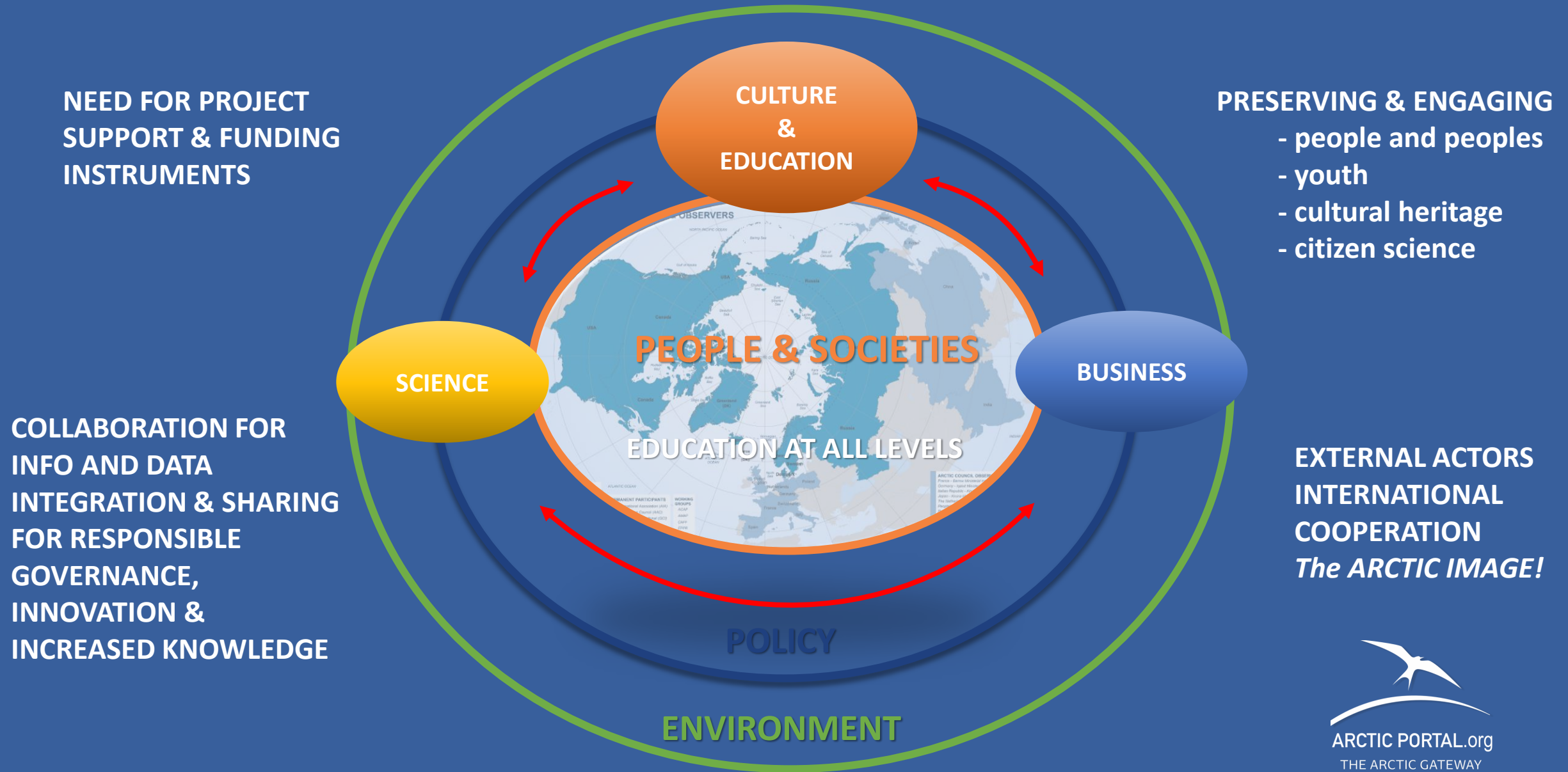
CLIMATE CHANGE AREA OF OPPORTUNITES AND THREATS!



ARCTIC SHIPPING IN A GLOBAL CONTEXT

Is there a business case?

WHY DO WE ALL NEED TO COOPERATE TOGETHER?



ARCTIC FOUNDATION - ARCTIC PORTAL

Who are we ?

Some examples of our experience and expertise!

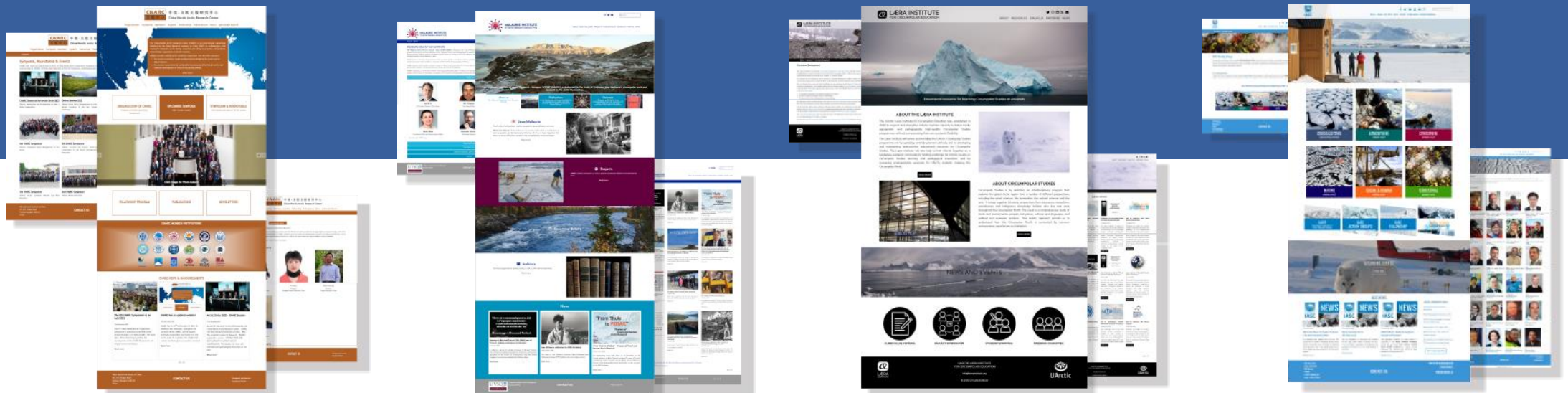


ARCTIC PORTAL.org
THE ARCTIC GATEWAY

CONSULTING AND OUTREACH - THE GATEWAY TO ARCTIC INFORMATION AND DATA

www.arcticportal.org

- ✓ AP is one of the most-established organizations in Arctic-related outreach, communication, cooperation, consulting, mapping and data systems in a Global context. Officially registered media in Iceland.
- ✓ AP is actively involved in consulting, stakeholder engagement, policy making, planning and advising at local, regional and international levels with over 35 years of experience.
- ✓ AP provides IT services, design, hosting and long-term support to multiple international organizations, institutions, networks and participates in projects of Arctic and Global relevance.



Expert IT Development, Outreach Data Management & Systems

Registered LTD company in good standing in Iceland



- IT System design and consulting services
- Mapping and Data Management Systems
- Consulting, Hosting and Outreach Services
- Backend and Frontend specialists
- Data Presentation
- Data Analysis

Arctic Portals technical division. Provider of expert IT development, data management and consulting services focusing on specialized collection, processing, evaluation, interpretation and presentation of information and data through specialized communication products and tools with related consulting services for business, governments, policymakers, educators and organizations. Highly experienced, professional and scalable team.

Participating in international cooperation on data systems, management, metadata, and standards and actively developing systems, tools and service protocols, providing data, data presentation and data interpretation services.



ARCTIC PORTAL.org
THE ARCTIC GATEWAY



The leadership of the Arctic Foundation – Arctic Portal.org & ArcData Ltd.

Halldór Jóhannsson, the executive director of the Arctic Portal.org and Chairman of the Arctic Foundation and ArcData Ltd.

He has long and vast Arctic and International experience in consulting, cooperation, communication, IT system development, data interpretation and management, outreach, policy, planning, tourism and project management.

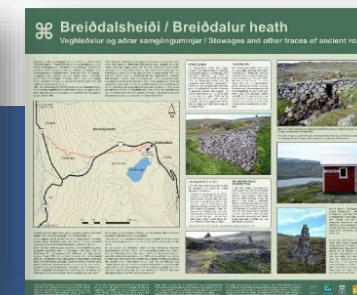
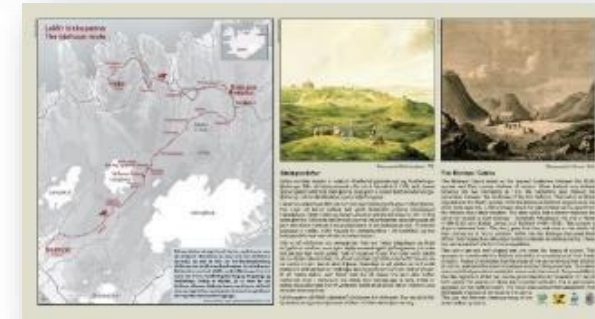
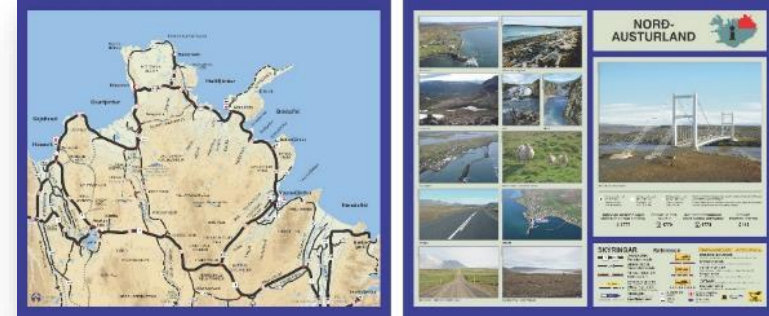
Member of and leading participant in multiple Icelandic and international committees, projects and initiatives of highest relevance.

Attended, presented and chaired at numerous local and international meetings, seminars and conferences of relevance.

VAST EXPERIENCE IN PLANNING, DESIGN, CONSULTING AND OUTREACH

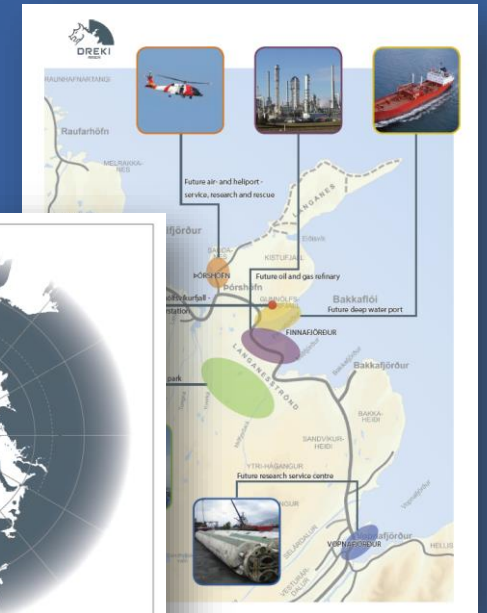
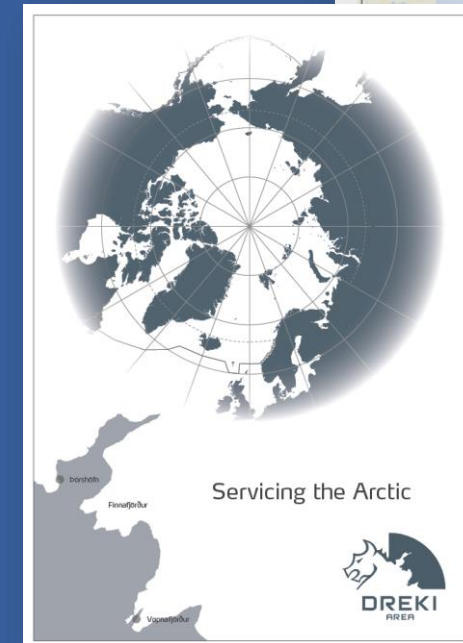
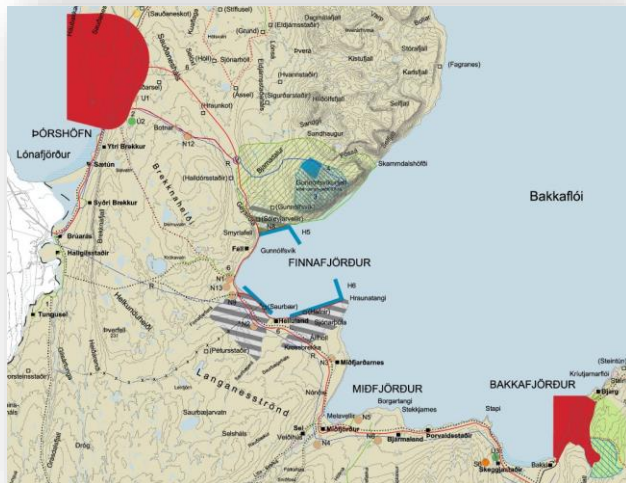
Decades of experience in urban and regional planning, tourism, cultural planning and design in Iceland.

Consultants to the Road & Coastal Adm, the Tourism Board, the National Museum and more in planning and designing for tourism, including a complete network of rest areas, informational signs, online information and approach to tourism, all over Iceland and abroad!



LOCAL & REGIONAL PLANNING AND DEVELOPMENT IN ICELAND

PROJECT EXAMPLES

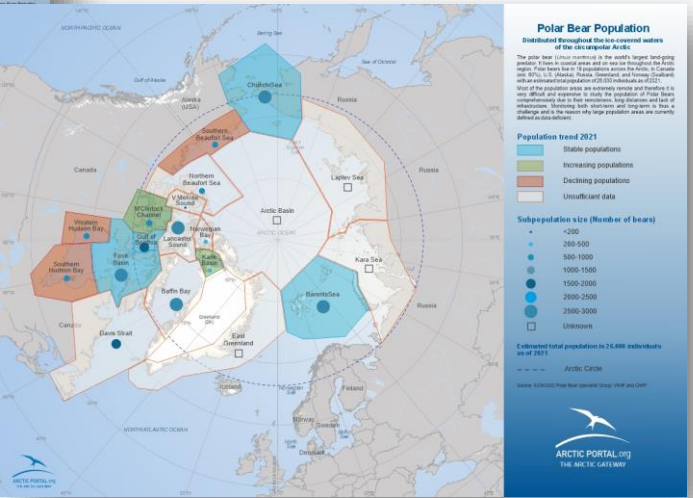
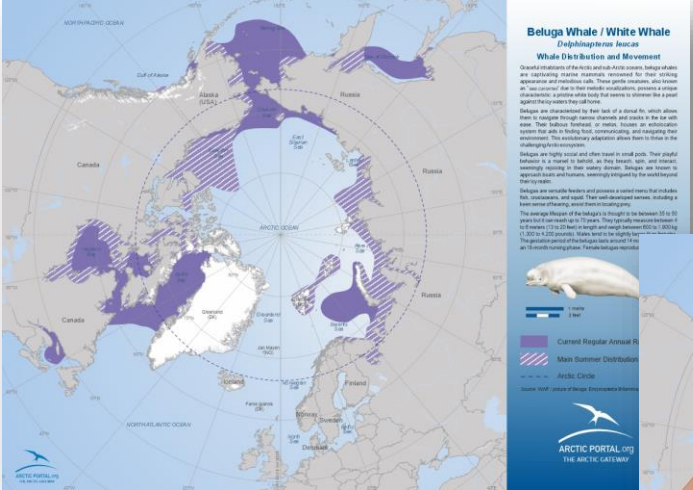
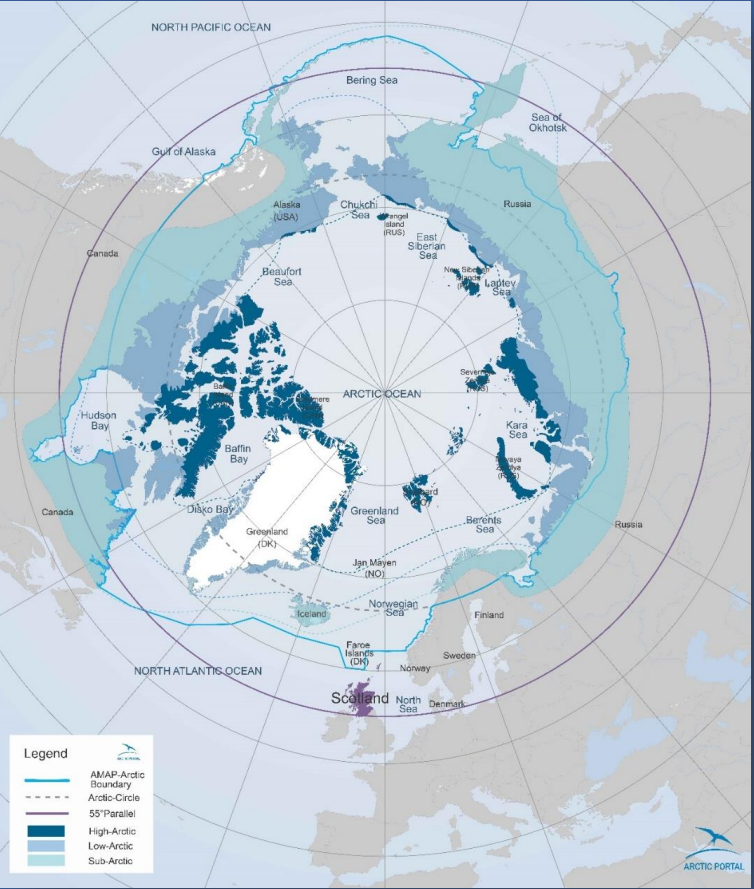


Thinking ahead – planning and consulting, locally and internationally

PROJECT EXAMPLE - NETWORK OF INFORMATIONAL SIGNS ALL OVER ICELAND

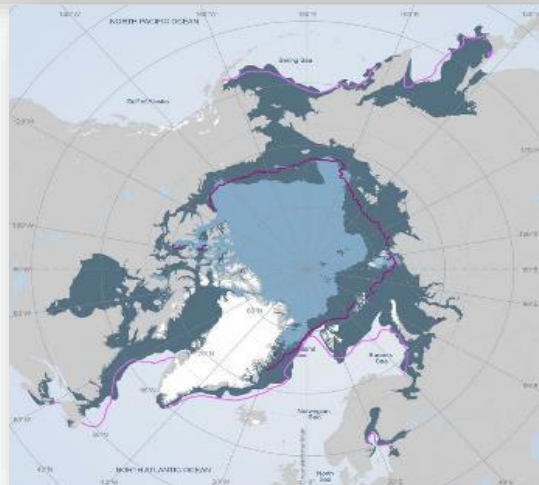
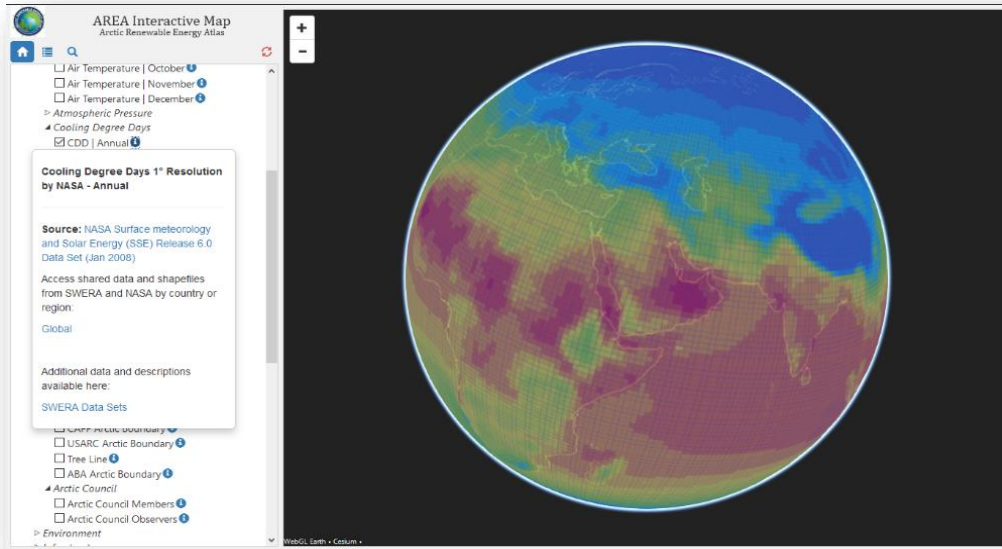


MAPS AND DATA ON REQUEST

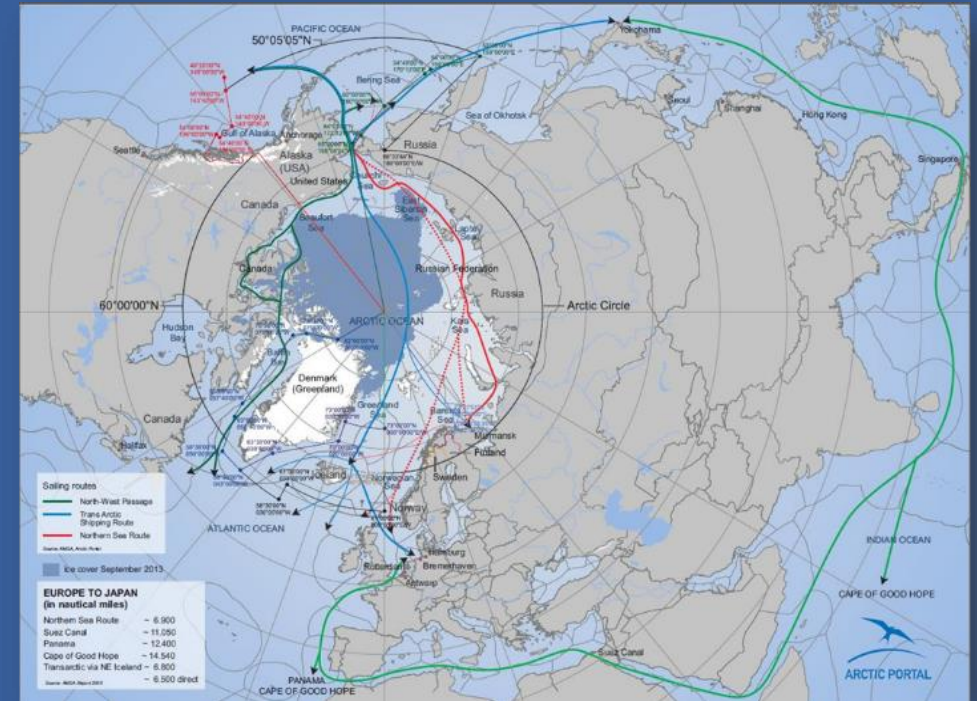


Examples of recent mapping and outreach services: Scotland and the Arctic and Arctic Fauna; Beluga Whale & Polar Bear

STATE OF THE ART MAPPING SYSTEMS & DATA TOOLS



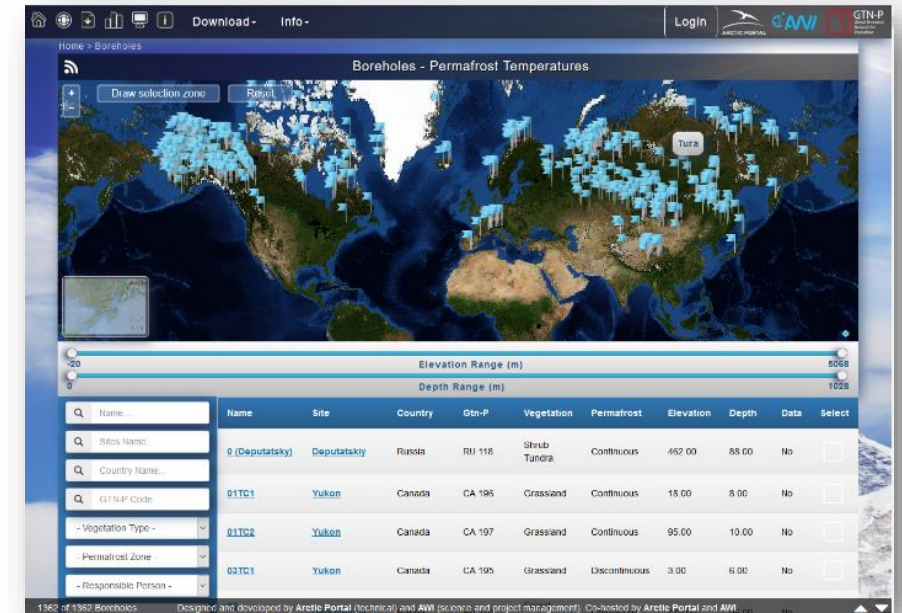
DECADES OF EXPERIENCE



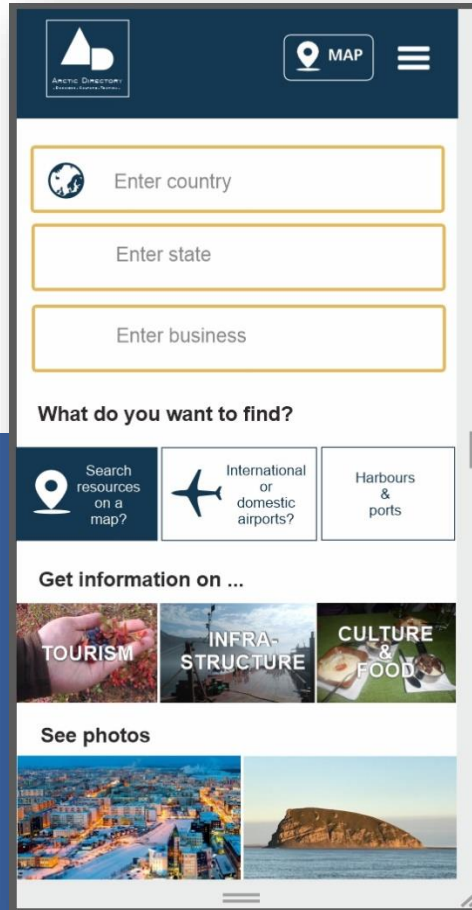
Developer of complex web based interactive GIS mapping systems and data presentation applications - applicable and scalable worldwide!

DATA SYSTEMS AND PROJECTS, SOME EXAMPLES:

- ✓ **GTN-P**: Global Terrestrial Network of Permafrost – 2011 + <http://gtnpdatabase.org>
 - ✓ Development, Hosting and Maintaining - EU Funded
- ✓ **AMATII** Arctic Marine and Aviation Transportation Infrastructure Initiative - Arctic Council <http://arcticinfrastructure.org> - 2014 +
 - ✓ Development, Hosting and Maintaining
- ✓ **Arctic Renewable Energy Atlas (AREA)** - best practices and local adaptation actions in the Arctic – Arctic Council SDWG project 2015+ <http://arcticrenewableenergy.org> Leading Outreach, Data management and Data visualization - Hosting and Maintaining
- ✓ PPR – Arctic Council EPPR project
- ✓ Arctic Languages and Cultures - Arctic Council - 2021 +
- ✓ Northern Forum - Arctic Business Directory
- ✓ Icelandic Graveyard database - all deceased Icelanders ! - 2001+
- ✓ Tourism in Iceland - Public Roads Administration - 1998 -
- ✓ and many more.....

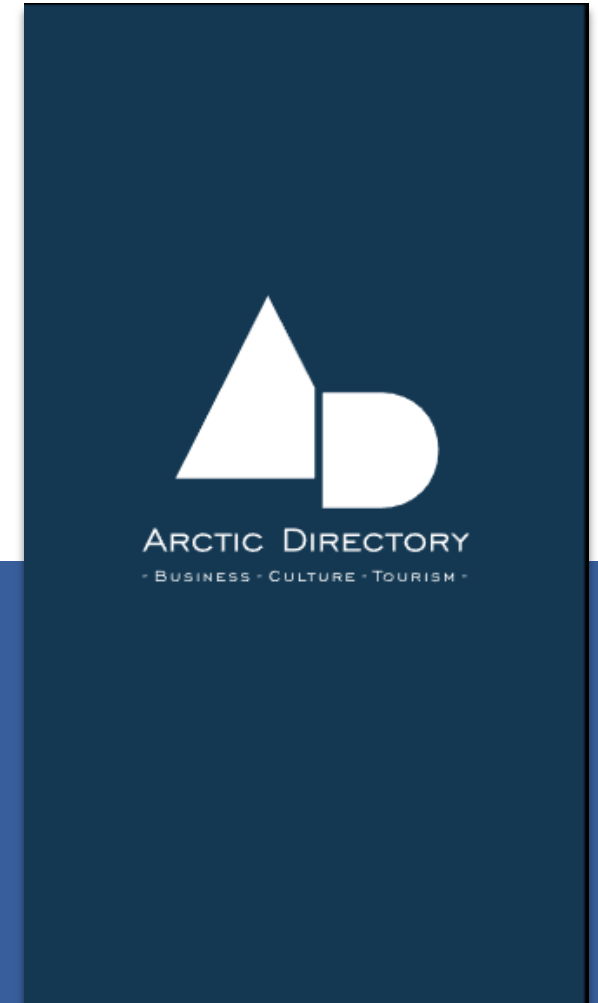
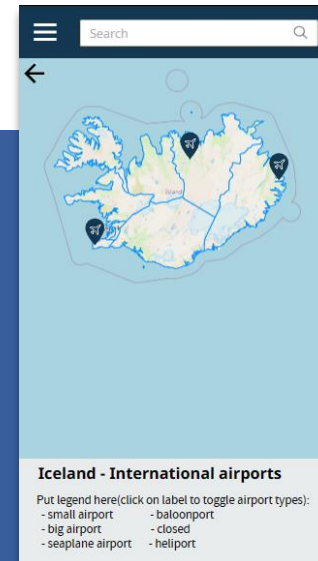
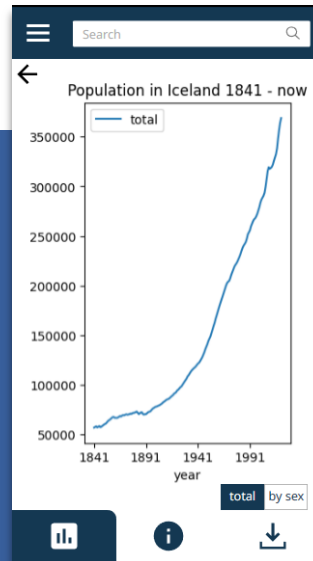
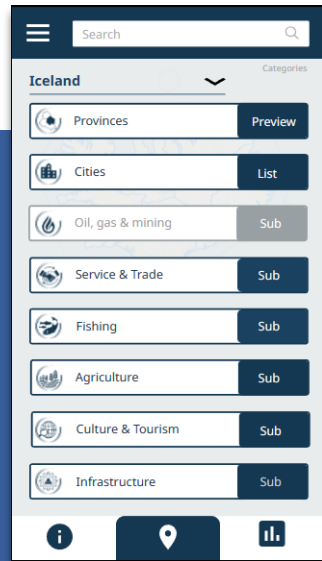


COMMUNICATION AND EXCHANGE PLATFORM AND TOOLS SUPPORTING BUSINESS, CULTURE AND TOURISM IN THE ARCTIC AND THE NORTH WITH INCREASED KNOWLEDGE FOR SUSTAINABLE DEVELOPMENT



HIGHLIGHTED PROJECT OF RELEVANCE: ARCTIC BUSINESS DIRECTORY (WORK IN PROGRESS)

A complex application programming interface developed in mobile and desktop format for the exchange of business and culturally related information and data. Developed in cooperation with the Northern Forum - www.northernforum.org



Systems and related organizations that coordinate or track observing activities & infrastructure in the polar regions.

i This registry has been released as a phase 1 version for demonstration purposes. Plans are underway as funding allows for improvements in scope, functionality, and interoperability. For further information, visit the [About](#) section. Feedback is appreciated.

Filter ×

- Region ▶
- Subregion ▶
- Domain ▶
- Discipline ▶
- Asset Type ▶
- Asset Catalog? ▶

Search ... × 🔍

AMAP Project Directory

Region Arctic Subregion multiple

Domain **Ocean** **Atmosphere** **Land**

Disciplines **Biology** **Meteorology and Climate** **Oceanography** **Data Management** **Cryosphere** **Geological Sciences**

Asset Types **projects**

Website amap.no

Arctic Observing Viewer

Region Arctic Subregion multiple

Domain **Ocean** **Atmosphere** **Land**

Disciplines **Biology** **Meteorology and Climate** **Oceanography** **Space Physics** **Data Management** **Education and Outreach**
Cryosphere **Social and Human Sciences** **Geological Sciences** **Instrument Development**

Asset Types **sites**

Website arcticobservingviewer.org

Arctic Research Mapping Application

Region Arctic Subregion multiple

Domain **Atmosphere** **Ocean** **Land**

Disciplines **Oceanography** **Cryosphere** **Meteorology and Climate** **Data Management** **Instrument Development**
Social and Human Sciences **Space Physics** **Geological Sciences** **Biology** **Education and Outreach**

Asset Types **projects**

Website armap.org

ABS The ASM3 Project Database

Region Global Subregion multiple

Domain **Land** **Ocean** **Atmosphere**

INTERNATIONAL PROJECT DATABASE ON POLAR OBSERVING NETWORKS

RoPON

<https://polarobservingregistry.org/>

EDUCATION AND DISTANCE LEARNING SYSTEMS AND TOOLS

- A member of the University of the Arctic.
- A consortium member in the [Edu-Arctic](#) project that encourages and supports teachers and students in engaging in **STEM** education through Arctic research.
- Experienced in distance learning activities and on-line courses and educational activities - Edu-Arctic, UArctic, APECS, International Centre for Reindeer Husbandry, Mentoring in the Korean Arctic School and more.

PARTNERS

- EUROPEAN COMMISSION
- ARCTIC PORTAL
- NIBID
- UNIVERSITY OF THE ARCTIC

EDU ARCTIC

ENGAGING STUDENTS IN STEM EDUCATION THROUGH ARCTIC RESEARCH PROGRAM FOR SECONDARY SCHOOLS

TRANSFORMING ARCTIC KNOWLEDGE INTO SKILLS

www.edu-arctic.eu

ABOUT EDU-ARCTIC

EDU-ARCTIC is a 7-year project based on a long-term partnership between the University of the Arctic and the European Commission. The project is aimed at providing secondary school students with an opportunity to engage in Arctic research through a series of online lessons, competitions, and training sessions.

PROGRAMME COMPONENTS

- ONLINE LESSONS**: Virtual classes from Arctic research institutions.
- ARCTIC COMPETITIONS**: A chance for students to test their knowledge and skills in Arctic research.
- EDUCATOR TRAINING SESSIONS**: A chance for teachers to gain knowledge and skills in Arctic research.
- MONITORING SYSTEM**: A system for monitoring the progress of the project.
- POLARPEDIA**: A digital encyclopedia of Arctic knowledge.

MAIN OBJECTIVES

The primary goal of EDU-ARCTIC is to raise awareness of Arctic research, engage secondary school students in Arctic research, and provide them with an opportunity to engage in Arctic research through a series of online lessons, competitions, and training sessions.

THE PROJECT WILL

- Develop a series of online lessons on Arctic research.
- Develop a series of online competitions on Arctic research.
- Develop a series of online training sessions on Arctic research.
- Develop a monitoring system for the project.
- Develop a digital encyclopedia of Arctic knowledge.



EDU ARCTIC

Engaging students in STEM education through Arctic research

CONGRATULATION TO THE WINNERS OF THE 3RD ARCTIC COMPETITION

The winners will be heading for an Arctic expedition to the Faroe Islands or Svanhøvd in Northern Norway!

PROGRAM

- ONLINE LESSONS
- POLARPEDIA
- MONITORING SYSTEM
- ARCTIC COMPETITIONS
- EDUCATOR TRAINING SESSIONS

FACEBOOK

Edu-Arctic

Like Page 1,600 likes

Look up and learn how to identify cloud types with our new app! [https://youtu.be/EST4BQJ2p](#)

Ready for some unsolved mysteries? Maybe you have the answer to latest questions that scientists are struggling with? See you tomorrow at 11:00 AM! [https://program.edu-arctic.eu/lessons/588](#)

UPCOMING EVENTS

No events

LATEST NEWS

- Mobile app Arctic Explorer Game - smart entertainment for everyone
- FINAL CONFERENCE OF EDU-ARCTIC PROJECT: FRUITFUL MEETING IN PARIS
- Engaging students in STEM education and raising awareness about climate change through Arctic research

PROMOTING SCIENCE COMMUNICATION AND OUTREACH TOOLS FOR EDUCATION, SUPPORTING TOURISM AND INCREASING PUBLIC KNOWLEDGE

BIOLOGY

Biology is the natural science that studies life and living organisms, including their physical structure, chemical processes, molecular interactions, physiological mechanisms, development and evolution.

Biology recognizes the cell as the basic unit of life, genes as the basic unit of heredity, and evolution as the engine that propels the creation and extinction of species.

Biology has more than 40 branches:

- » Anatomy
- » Botany
- » Cell biology
- » Biochemistry
- » Biological engineering
- » Biogeography
- » Bioinformatics
- » Biomechanics
- » Biomedical research
- » Biophysics
- » Biotechnology
- » Evolutionary biology
- » Genetics
- » Genomics
- » Immunology
- » Microbiology
- » Mycology
- » Parasitology
- » Ecology
- » Evolutionary biology
- » Neuroscience
- » Paleontology
- » Pathology
- » Physiology
- » Plant physiology
- » Plant pathology
- » Marine biology
- » Microbiology
- » Bacteriology
- » Mycology
- » Structural biology
- » Theoretical biology
- » Zoology
- » Nanobiology

Botany



Around 600 moss species, 700 lichen species and 2,000 species of fungi have been found in Iceland. Iceland has just a few vascular (higher) plant species grow wild – a total of around 490.

Marine biology

The ocean surrounding Iceland is full of life:

- » Big animals like 23 different species of whale, dolphin, orcas and seals.
- » Middle sizes fish like Cod, Haddock, Pollack, Flatfish, Wolffish.
- » Macro species like shrimps and nudibranchs.



Zoology

There are 28 mammal species in Iceland, of which:

- » Critically endangered – 0
- » Endangered – 4
- » Vulnerable – 4
- » Near-threatened – 0

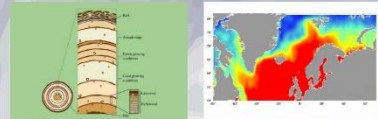


Arctic Fox is only one land mammal native to Iceland.

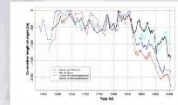
CLIMATOLOGY

Climatology is the scientific study of climate, defined as weather conditions averaged over a period of time. It studies both the nature of climates – local, regional or global – and the natural or human-induced factors that cause climates to change.

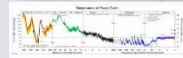
Climatology consists of the following branches:



Dendroclimatology – the study of tree rings and how they relate to the climate.



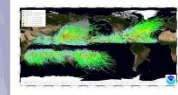
Dynamic Climatology – the study of large-scale patterns and how they can be used to understand global weather.



Paleoclimatology – reconstruction of past climates using fossil evidence, ice cores, and tree rings



Physical Climatology – the study of physical processes such as evaporation, cloud formation, aerosol dispersal, and more.



Tornado Climatology – The study of how long-term trends in climate change can affect the strength, location, and frequency of tornados and thunderstorms.

Tropical Cyclone Climatology – The study of how climate change affects the strength, locations, and frequency of tropical storms.

Climatology considers the past and can help predict future climate change.

ECOLOGY

Ecology is the branch of biology which studies the interactions among organisms and their environment.

Ecology addresses the full scale of life, from tiny bacteria to processes that span the entire planet.

Ecology studies biodiversity, distribution, biomass, and populations of organisms, as well as cooperation and competition within and between species.



Ecology has the following branches:

- » Chemical ecology;
- » Circles of Sustainability;
- » Cultural ecology;
- » Dialectical naturalism;
- » Ecological death;
- » Ecological psychology;
- » Ecology movement;
- » Ecosophy;
- » Ecosophology;
- » Industrial ecology;
- » Information ecology;
- » Landscape ecology;
- » Natural resource;
- » Normative science;
- » Political ecology;
- » Sensory ecology;
- » Spiritual ecology;
- » Sustainable development

Ecology has practical applications in:

- » Conservation biology
- » Wetland management
- » Natural resource management
- » City planning
- » Community health
- » Economics
- » Basic and applied science
- » Human social interaction

Ecosystems are dynamically interacting systems of organisms, the communities they make up, and the non-living components of their environment. Ecosystem processes, such as primary production, pedogenesis, nutrient cycling, and niche construction, regulate the flux of energy and matter through an environment.



Iceland has a mostly tundra ecosystem with some coniferous forest. Iceland is limited to these colder ecosystems due to its high latitude which provides difficult conditions for plant growth.

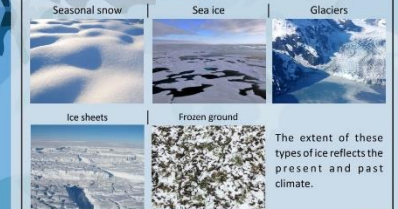


Iceland is able to obtain most of its energy from renewable sources and has no national grid.

GLACIOLOGY

Glaciology is the scientific study of glaciers, or more generally ice and natural phenomena that involve ice.

Important components of glaciology are:



The extent of these types of ice reflects the present and past climate.

Large areas covered by snow and sea ice reflect solar radiation away from the Earth's surface and thereby influence the heat balance of the Earth. Because these components are only decimeters to meters thick, they can change on time scales as short as seasons.

A glacier is an extended mass of ice formed from snow falling and accumulating over a long period of time. There are two types of glaciation:

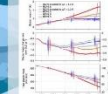
Alpine glaciation



Continental glaciation



Glaciers and ice sheets are hundreds to more than one thousand meters thick and change significantly only on decadal or much longer time scale. On these longer time scales they can influence atmospheric circulation and global sea level.



Glacier mass balance is the difference between accumulation and ablation (sublimation and melting).

Glacier	Area (km²)	Glacier	Avg. loss (mm/yr)
Vanngjöfurlá	8,800	Eggsbakkajökull	78
Langjökull	653	Tunguðalsjökull	48
Þrengingur	925	Þerjafjallajökull	32
Myrdalsjökull	596	Einöfjallajökull	22
Dröngfjallajökull	160	Þrengingur	22



Largest glaciers in Iceland

The glaciers and ice caps of Iceland cover 11.1% of the land area of the country (about 11,400 km² out of the total area of 103,125 km²) and have a considerable impact on its landscape and meteorology.

OCEANOGRAPHY

Oceanography is the study of the physical and biological aspects of the ocean.

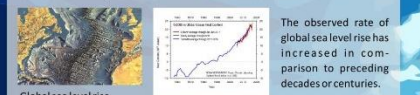
Oceanography includes the following branches:

- » Biological oceanography - the ecology of marine organisms in the context of the physical, chemical and geological characteristics of their ocean environment and the biology of individual marine organisms.
- » Chemical oceanography - chemistry of the ocean.
- » Geological oceanography - geology of the ocean floor including plate tectonics and paleoceanography.
- » Physical oceanography - ocean's physical attributes including temperature-salinity structure, mixing, surface waves, internal waves, surface tides, internal tides, and currents.

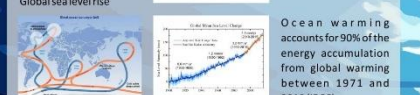


Great ocean conveyor belt

Global heat content



The observed rate of global sea level rise has increased in comparison to preceding decades or centuries.

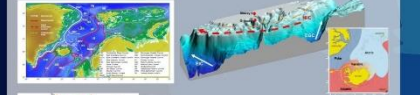


Ocean warming accounts for 90% of the energy accumulation from global warming between 1971 and 2010 (IPCC).

Gets its "start" in the Nordic Seas. Plays a crucial role in climate changes.

Thermohaline circulation (Great ocean conveyor belt is a part of the large-scale ocean circulation that is driven by global density gradients created by surface heat and freshwater fluxes.

The thermohaline circulation plays an important role in supplying heat to the polar regions, and thus in regulating the amount of sea ice in these regions.



It is important to keep both East Greenland Current (EGC) and East Icelandic Current (EIC) under constant observation in order to monitor changes in the properties of water overflowing back to the Atlantic ocean.

PROMOTING SCIENCE COMMUNICATION AND OUTREACH TOOLS FOR EDUCATION, SUPPORTING TOURISM AND INCREASING PUBLIC KNOWLEDGE

VOLCANOLOGY

Volcanology is the study of volcanoes, lava, magma, and related geological, geophysical and geochemical phenomena.



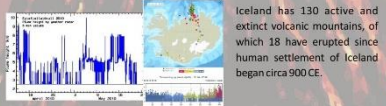
Volcanology deals with:

- » Eruptive activity
- » Current and historic eruptions
- » Formation of volcanoes
- » Prediction of eruptions



Volcanology utilizes the following observations:

- » Seismic monitoring in order to determine magma movement through volcanic conduits;
- » Surface deformation on monitoring as indicator of magma upwelling;
- » Gas emissions which may signal an impending volcanic eruption;
- » Temperature changes which may indicate upcoming activity;
- » Satellite measurements to show the spread of an ash plume as well as SO2 emissions.



Iceland has 130 active and extinct volcanic mountains, of which 18 have erupted since human settlement of Iceland began circa 900 CE.

Iceland has four volcanic zones: Reykjanes (Reykjanes Ridge, the Mid-Atlantic Ridge South of Iceland), West and North Volcanic Zones (RVZ, WVZ, NVZ) and the East Volcanic Zone (EVZ), (Westman Islands).

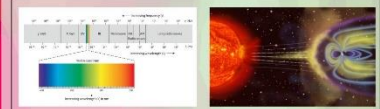
Volcano	Height in m
Öraefajökull	2119
Bárðarbunga	2005
Kverfjall	1920
Hofsjökull	1782
Esjufjöll	1780
Grímsvötn	1725
Laki	1725
Herðubreið	1682
Lyngjallajökull	1666
Leiknargjafjöll	1570
Tungufellajökull	1535
Askja	1516

AURORA

Aurora is an extraordinarily dynamic light display seen in the high latitudes sky, and it is a visual manifestation of the solar wind-magnetosphere-ionosphere interaction chain. It is caused by precipitating energetic particle beams colliding with atoms and molecules in the upper atmosphere.



Aurora at Kárhöll, October 2018.



There are three main emission lines of the aurora within the visible part of the spectrum.

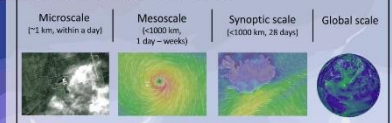
- » The Oxygen 6300 Å emission (1 Å=0.1 nm), the 'red line', is emitted by the transition from O(¹D) to O(³P₂), has a peak altitude of 230 km. The low atmospheric density at high altitudes and the low sensitivity of eyes at this wavelength make it often hard to be seen.
- » The Oxygen 5577 Å emission, the 'green line', has a peak altitude of 110 km, is the brightest emission results from the transition from O(¹S) to O(¹D).
- » The molecular Nitrogen 4278 Å emission, the 'blue line', has a peak altitude of about 90 km, is emitted by the transition from N₂(¹Π_g⁻) to N₂(¹Π_g⁺).



METEOROLOGY

Meteorology is a branch of the atmospheric sciences which includes atmospheric chemistry and atmospheric physics, with a major focus on weather forecasting.

Meteorology consists of the following areas:



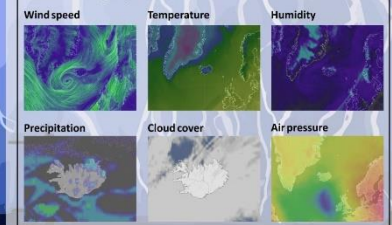
Meteorology has application in:

- » Weather forecasting
- » Maritime meteorology
- » Aviation meteorology
- » Military meteorology
- » Agricultural meteorology
- » Environmental meteorology
- » Hydrometeorology
- » Renewable energy
- » Nuclear meteorology

General circulation of the Earth's atmosphere:



Main meteorological parameters are:



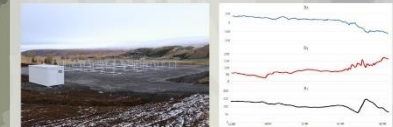
Meteorology plays an important role in climatic research as a part of a coupled ocean-atmosphere system.

SPACE WEATHER

Space weather is a branch of space physics and aeronomy concerned with the time varying conditions within the Solar System, including the solar wind, emphasizing the space surrounding the Earth, including conditions in the magnetosphere, ionosphere, thermosphere, and exosphere. It refers to the time-variable conditions in the space environment that may effect space-borne or ground based technological systems.



Space weather real time monitoring at the Arctic Observatory.



Riometer field and the control room at the Arctic Observatory. Magnetometer - Data from 1. October 2018 at the Arctic Observatory.



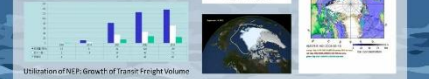
All Sky Camera at the Arctic Observatory.



Seaworthiness Evaluation of the Arctic Passage and development and demonstration for the Passage forecasting system

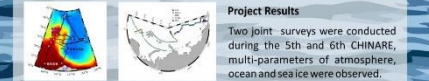
Background:

Arctic sea ice has been under-going a significant and rapid decline in recent decades, especially in the Arctic North-east Passage (NEP).



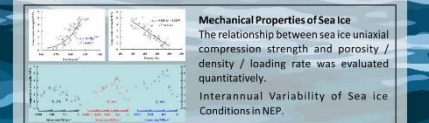
Project Overview

- » Investigations and Observations of Marine Environment in the Arctic Passage.
- » Assessment of Sea Ice Conditions and Shipping Environment in the Arctic Ocean.
- » Development of ocean-ice coupled models in the Arctic Passage.
- » Development for the Arctic Passage Forecasting System.
- » Demonstration of the Arctic Passage Forecasting System.
- » Economic, Law and International Issues Related to the Arctic Passage Utilization.



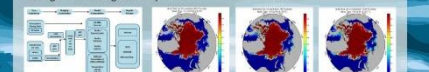
Observation of Ice Mass-Balance Buoy (IMB)

Based on the IMB data, sea ice thermodynamics process and the output of transpolar flow were characterized.



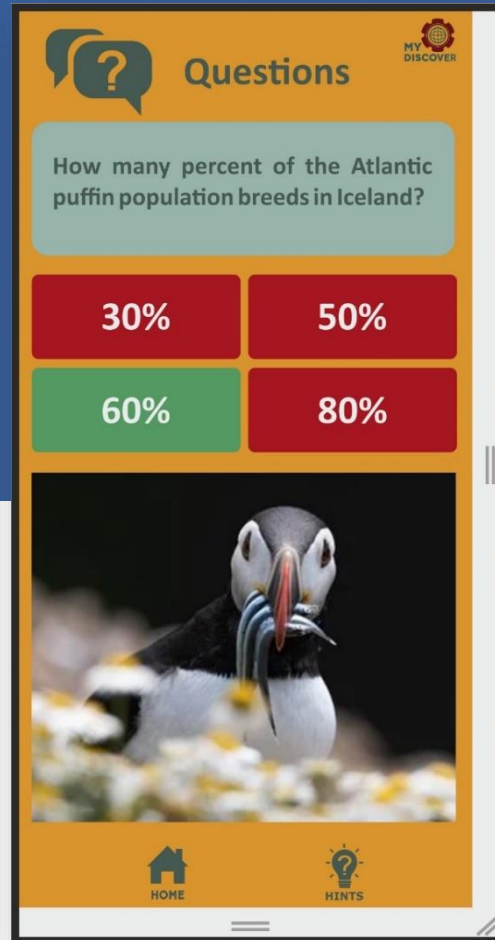
Development and Demonstration for the Passage Forecasting System

Northeast Passage High Latitude Passage
The nudging and optimal interpolation algorithms were combined in the sea ice concentration assimilation module. The stability and forecasting timeliness for the Passage Forecasting were improved.



The Passage Forecasting System was demonstrated during the 5th, 6th CHINARE and the "Yongsheng" navigation through the Arctic Passage. Product Samples of the Passage Forecasting system.

COOPERATION AND TOOLS DEVELOPMENT FOR EDUCATION AND CITIZEN ENGAGEMENT





The Northern Forum Foundation

www.nffoundation.is



- The Northern Forum Foundation operates according to Icelandic Act no. 119/2019 on non-profit organizations, registered in Akureyri, Iceland, operating across borders.
- The purpose and objectives of Northern Forum Foundation is to raise funding, fund and support activities and projects that benefit sustainable development and better living for the people and peoples of the North and their societies, including in: education; culture; innovation; responsible business development; empowering the youth; health; science and for the environment; as per the objectives and strategy and as agreed by its members.
- The Northern Forum Foundation intends to achieve its purpose and objectives by raising funds based on its merits from the Global international community, private and public, including: individuals; organizations; associations; companies and governments; through funding applications, fundraising campaigns, sponsoring agreements and partnerships based on active communication, outreach activities and events.
- Governor of Lapland, Finland, Mr. Mika Riipi, is the CURRENT Chair of the Northern Forum Foundation.
- The Northern Forum Foundation is hosted by the Arctic Portal.org at Radhustorg 7, Akureyri, Iceland, and managed by directors Mr. Halldor Johannsson.

EXPERT-TO-EXPERT

**Circumpolar
scientific
people-to-people
cooperation in
the Arctic!**



**THE MAIN PURPOSE OF THE ARCTIC
EXPERT-TO-EXPERT INITIATIVE IS
CONTINUED DIALOGUE AND
EXCHANGE OF KNOWLEDGE BETWEEN
TRANSDISCIPLINARY ARCTIC EXPERTS
OF ALL NATIONS AT THE TIME OF VERY
COMPLEX GEOPOLITICS.**

- This dialogue should proceed in People-to-People format (in compliance with and bearing in mind the current regulations), be cross-disciplinary and focus on topics of mutual importance, such as problems associated with climate change and sustainability of the Arctic regions and communities.
- The Arctic Expert-to-Expert initiative is supported by COLLEQUES in view of Open Science with global inclusion to address global challenges, involving people, each acting in their own capacity.

Expert-to-Expert@arcticportal.org



EXPERT-TO-EXPERT

Circumpolar scientific people-to-people cooperation in the Arctic!

The International Arctic expert-to-expert initiative is cross-disciplinary and focuses on topics of mutual importance such as problems associated with climate change and sustainability of the Arctic regions and communities.

Read more



News

Arctic Council Ministerial Statement!

11.05.2023



ARCTIC COUNCIL

Arctic States and Indigenous Permanent Participants convened today May 11th for the 13th Arctic Council meeting and issued a statement.

Russia hands over their chairmanship in the Arctic Council t...

11.05.2023



Russia has handed over their chairmanship in the Arctic Council to Norway.

President Grímsson Symposium on the occasion of his 80th bir...

11.05.2023



President of Iceland 1996-2016 Mr. Ólafur Ragnar Grímsson celebrates his 80th birthday this coming Sunday, 14 May 2023.

Latest News

European Polar Board: Synthesis Report o...

Arctic Multilingual Portal now open!

The Intelligence Community Must Evolve T...

UN- Launch of Group of Friends for a Gre...

Statement From The Chair to Preserve The...

Re-experience High North Dialogue

Exhibition: Arctic twilight, at the Univ...

The White-Wiphala Paper on Indigenous Pe...

Priorities of the Norwegian chairmanship...

A Global Resource: The Whale Watching Ha...

Growing immigration to Iceland creates c...

US Navy nuclear powered submarines get p...



ARCTIC MAPS



GOVERNANCE



LIBRARY



EXPERT-TO-EXPERT

COMMUNICATION PLATFORM
PUBLICATIONS
EVENTS
DATA
AND MORE.....

www.arcticportal.org

CHINA-NORDIC ARCTIC RESEARCH CENTRE

CNARC 中国-北欧北极研究中心
北极中心 China-Nordic Arctic Research Center

Organization Symposia Fellowship News Publications Members Experts Advanced Search

The China-Nordic Arctic Research Center (CNARC) is an international consortium initiated by the Polar Research Institute of China (PRIC) in collaboration with respective institutes in the Nordic countries and China to promote and facilitate China-Nordic cooperation for Arctic research.

CNARC provides a platform for academic cooperation with the following aims:

- To increase awareness, understanding and knowledge of the Arctic and its global impacts.
- To promote cooperation for sustainable development of the Nordic Arctic and coherent development of China in the global context.

Read more

ORGANIZATION OF CNARC

Purpose, activities, personnel, background

UPCOMING SYMPOSIA

2023

SYMPOSIUM & ROUNDTABLE

Information and data on former events



FELLOWSHIP PROGRAM

PUBLICATIONS

NEWSLETTERS

CNARC MEMBER INSTITUTIONS

Symposia, Roundtable & Events

CNARC shall meet on a yearly basis in form of China-Nordic Arctic Cooperation Symposia on a predetermined topic with regards to the Arctic social science research. Member Institutes shall take turns to host the Symposia, rotating biannually between Chinese and Nordic member institutes.

CNARC Session at the Arctic Circle 2022

Theme: Interactions and Development in China's Arctic Cooperation

Online Seminar 2022

Theme: Arctic Policy Development of China and Nordic Countries in the New Geopolitical Landscape

7th CNARC Symposium 2019

Theme: Arctic Fisheries, Polar Silk Road, and Sustainable Development Practices

6th CNARC Symposium 2018

Theme: Integrated Ocean Management in the Arctic

5th CNARC Symposium 2017

Theme: Towards the Future: Trans-regional Cooperation in the Arctic Development and Protection

4th CNARC Symposium 2016

Theme: The Sustainable Arctic – Opportunities and Challenges of Globalization

Publications

Search by

- Type
- All (194)
- Article (142)
- Book (10)
- Other (15)

Subject

- All (194)
- Astronomy (27)
- Arctic (142)
- Biology (3)
- Climate and Climate Change (11)
- Climatology (13)
- Culture and Heritage (1)
- Energy (1)
- Fisheries (2)
- Flora and Fauna (3)
- Geology (2)
- Geography (1)
- Governance (22)
- Indigenous Peoples (1)
- Land and Regional Communities and Networks (1)
- Mapping (1)
- Anthropology (1)

Organization

Directors

Wang Jun
Chairman

Wang Yong
Vice-Chairman

Wang Yong
Secretary

Secretariat

Liu Han
Executive Secretary of CNARC / Assistant Researcher / Division of Strategic Studies, PRIC

The China-Nordic Arctic Research Centre - CNARC was established in Shanghai 2013 by 10 member institutes, four Chinese and six Nordic. Led by PRIC.

Today the member institutes are 18 – eight Chinese and ten Nordic.

Arctic Portal has from the very beginning consulted on the establishment and the ongoing development of the CNARC, manages, designed and hosts the CNARC webpage.

www.cnarc.info

CHINA-NORDIC ARCTIC RESEARCH CENTRE

CNARC MEMBER INSTITUTIONS





ARCTIC EDUCATIONAL CHINA PROGRAM – ARC-CHINA

**STEM COURSES, EDUCATIONAL
RESOURCES, and
DISCOVER-THE-ARCTIC FIELD SCHOOL**

**DESIGNED AND MANAGED FOR
CHINESE STUDENTS**

The program is being structured as STEM (science, technology, engineering, mathematics) course and Discover-the-Arctic Field School with educational support material including virtual lessons, an Arctic knowledge database and mapping system as a learning aid system, exercises, experiments and games, designed to be included in and supporting STEM educational criteria and courses guidelines in the Chinese educational system.

Can be adapted to support education at various levels and different focuses!

The educational packages being developed are with emphasis on the Arctic (mostly STEM, but also STEAM), distinguishing between lower and upper secondary level, with are on for instance:

- Arctic environment/geography
- Arctic societies
- Arctic history and polar exploration
- Arctic governance and law
- Arctic natural resources
- Arctic science: oceanography, marine biology, ecology, cryosphere studies, atmosphere physics (including meteorology), glaciology and hydrology, permafrost studies, pollution etc.

THE CHINA-ICELAND ARCTIC OBSERVATORY - CIAO



THE CHINA-ICELAND ARCTIC OBSERVATORY - CIAO



THE CIAO

The CIAO is established under an agreement between the Icelandic Centre for Research (Rannis) and the Polar Research Institute of China (PRIC) as a platform for Arctic research cooperation between Icelandic and Chinese research institutions. Rannis coordinates and promotes Icelandic participation in collaborative international projects in science and technology. PRIC conducts comprehensive studies and outreach, operates scientific and logistical infrastructures and promotes international cooperation in the polar regions.



At the Opening of the China-Iceland Arctic Observatory - CIAO in October 2018.

The cooperation
The aim of this cooperation is to further scientific cooperation between Icelandic and Chinese scientists and to advance knowledge in multiple fields of Arctic science. Participation by scientists from other nations is encouraged.

The Arctic Observatory is governed by a joint organizational and management committee, the CIAO board, with the support of an International Science and Outreach committee. The scientific emphasis will be on, but not limited to: the understanding on solar-terrestrial interaction and space weather by conducting polar upper atmosphere observations such as auroras and geomagnetic field variations; climatology; glaciology, oceanography; biology; ecology; and other related fields of science.

Special emphasis will be on outreach to the public. Within the CIAO will be a Guest centre dedicated to Science Communication based on activities conducted in and around the Arctic Observatory. Special emphasis will be on the Aurora Borealis, the magnetic fields and upper atmosphere. Iceland is very well located for this kind of research as the aurora belt lies over the country. The Guest centre will be a very welcome addition to education, tourism, service, and recreation in the region.

Research partners
Iceland: The Icelandic Centre for Research, Science Institute of the University of Iceland, the Icelandic Meteorological Office, The University of Akureyri, the Icelandic Arctic Cooperation Network, Hovork-Academic Centre, Arctic Portal.
China: Polar Research Institute of China, National Space Science Center, Chinese Academy of Sciences (CAS), Institute of Geology and Geophysics, CAS; China Research Institute of Radio Wave Propagation, National Center for Space Weather Information Service, Institute of Space and Earth Information Technology, Peking University, School of Electronic Information, Wuhan University, School of Earth and Space Science, University of Science and Technology of China, School of Space Science and Technology, Shandong University.

International cooperation, including:



China-Iceland Arctic Observatory - www.CIAO.is



OBSERVATORY

The land and facilities at Kárhóll is owned by a local non-for-profit foundation Aurora Observatory (AO). PRIC leases the facilities and land from the AO for the operations of the CIAO observatory. The land of the CIAO is 156 ha and the new Arctic Observatory building is 760 m² on three levels, built out of concrete and steel. The first floor is dedicated to science outreach, the second is for laboratories and management, and the third is for scientific equipment.



The China-Iceland Arctic Observatory building in the land of Kárhóll, Northern Iceland.



There are three main emission lines of the aurora within the visible part of the spectrum

- █ The Oxygen 6300 Å emission (L Å=3.1 km), the 'red line', is emitted by the transition from O(1D) to O(3P), has a peak altitude of 230 km. The low atmospheric density at high altitudes and the low sensitivity of eyes at this wavelength make it often hard to be seen.
- █ The Oxygen 5577 Å emission, the 'green line', has a peak altitude of 110 km, is the brightest emission results from the transition from O(1S) to O(1D).
- █ The molecular Nitrogen 4278 Å emission, the 'blue line', has a peak altitude of about 90 km, is emitted by the transition from N₂(A²Σ⁺) to N₂(B²Σ⁺).




Photos from the inside the Observatory

China-Iceland Arctic Observatory - www.CIAO.is



Co-leading the founding of the China-Iceland Arctic Observatory (CIAO) in cooperation with the Icelandic Centre for Research (RANNIS) - from 2011 to date, including the initial introduction, project and site planning, negotiations and agreements, design, project execution and outreach.

Close partnerships have developed with China through the CIAO - www.ciao.is and the China-Nordic Arctic Research Centre - www.cnarc.info to develop the Arc-China Educational Program.

THE FIELDS OF SCIENCE AT CIAO



The partnership with Chinese and international scientists through the Icelandic framework opens for cooperation in multiple fields of Arctic science, for Icelandic and Chinese professionals.

The scientific emphasis will be on, but not limited to:

- solar-terrestrial interaction
- space weather
- upper atmosphere observations
- auroras and geomagnetic field variations
- climatology
- glaciology
- meteorology
- oceanography
- biology
- ecology
- volcanology

All observation data will be made available and open to the Icelandic scientific community

AURORA

Aurora is an extraordinarily dynamic light display seen in the high latitudes sky, and it is a visual manifestation of the solar wind-magnetosphere-ionosphere interaction chain. It is caused by precipitating energetic particle beams colliding with atoms and molecules in the upper atmosphere.

Aurora at Kárhóll, October 2018.

There are three main emission lines of the aurora within the visible part of the spectrum.

- The Oxygen 6300 Å emission (1 Å=0.1 nm), the 'red line', is emitted by the transition from $O(^1D)$ to $O(^3P_2)$, has a peak altitude of 230 km. The low atmospheric density at high altitudes and the low sensitivity of eyes at this wavelength make it often hard to be seen.
- The Oxygen 5577 Å emission, the 'green line', has a peak altitude of 110 km, is the brightest emission results from the transition from $O(^1S)$ to $O(^1D)$.
- The molecular Nitrogen 4278 Å emission, the 'blue line', has a peak altitude of about 90 km, is emitted by the transition from $N_2^+(A^2\Sigma_u^+)$ to $N_2^+(B^2\Sigma_u^+)$.

KÁRHÓLL ARCTIC OBSERVATORY, CIAO - PARTNERSHIPS



Research partners:

Iceland: The Icelandic Centre for Research, Science Institute of the University of Iceland, Arctic Portal - ArcData, the Icelandic Meteorological Office, The University of Akureyri, the Icelandic Arctic Cooperation Network, Húsavík Academic Center.

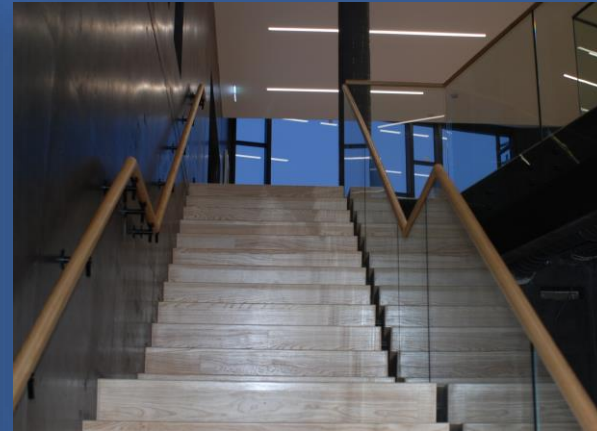
China: Polar Research Institute of China (PRIC) - lead partner, National Space Science Center, Chinese Academy of Sciences (CAS); Institute of Geology and Geophysics, CAS; China Research Institute of Radio Wave Propagation; National Center for Space Weather; Institute of Space Physics and Applied Technology, Peking University; School of Electronic Information, Wuhan University; School of Earth and Space Science, University of Science and Technology of China; School of Space Science and Physics, Shandong University.

Shanghai Science Museum will be a partner in Outreach and Tongji University in the development of educational material and student visits to Iceland.

SCBC could become a key partner, in development, research, multimedia applications, operation, education and outreach!

International: INTERACT, SAON, Lancaster University, European Space Agency – ESA, Japan Polar Institute, more expected to be added at a later stage.

THE INTERIOR OF THE CIAO



AURORA EXHIBITION CENTRE – BUSINESS CONCEPT



- The Arctic Observatory, CIAO, is a state-of-the-art research station and the first of its kind with dedicated outreach facilities to the public. The investment in building and land is financed by PRIC.
- Provides exceptional opportunity to connect science, scientists and the public / tourists and business through its on side Exhibition Centre and conference facilities.
- Exhibition and outreach material produced can be duplicated or projected for outreach in distant Science Centres and tourism establishments through on-side fiber connections and partnerships.
- The Exhibition Centre, AEC, will be operated on a long term facility lease and science communication agreement with PRIC as per appointment by RANNIS.
- Great business opportunity due to tourism in Iceland and steady increase in interest in the Northern Lights / Aurora Borealis and environmental science in a Global context.
- AEC to become leader in international Science Communication and educational material production in cooperation with PRIC, local and international educational and Science Centre partners.

RELEVANT PROJECT PORTFOLIO



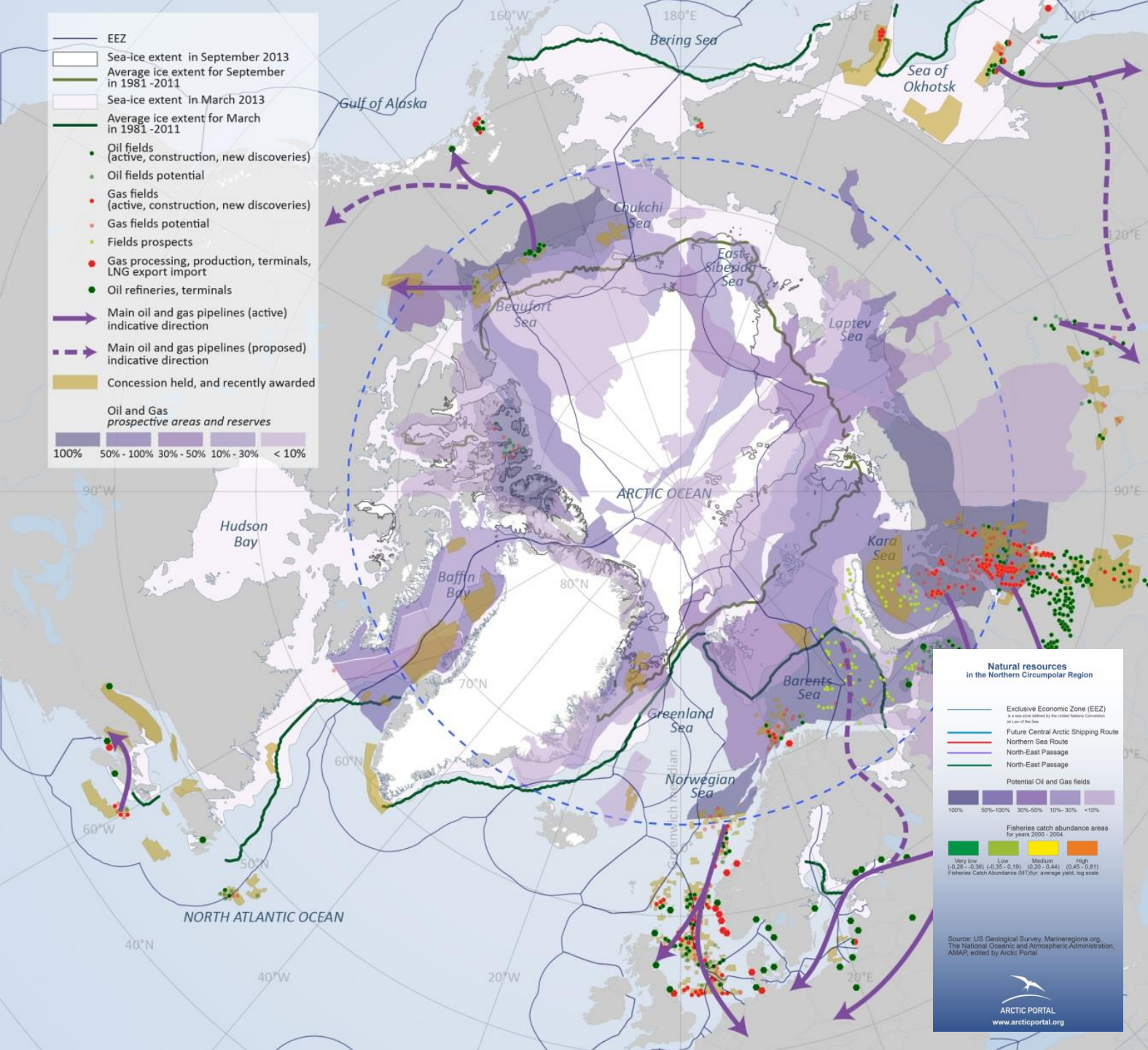
- ✓ **Edu-Arctic** – Innovative educational program attracting young people to natural sciences and polar research – STEM – EU Horizon 2020
- ✓ **Education** – EEA STEM project with Norway and Poland.
- ✓ **Education** - Joint venture with Chinese universities to develop STEM material and host summer schools.
- ✓ **APPLICATE** - Advanced Prediction in Polar Regions and Beyond: Modelling, observing system design and linkages associated with a Changing Arctic Climate – EU Horizon 2020
- ✓ **ARICE** - An international collaboration strategy for meeting the needs of marine based research in the Arctic – EU Horizon 2020.
- ✓ **ADMS** – Arctic Data Management System development – EU Horizon 2020 INNOSUP.
- ✓ **NUNATARYUK** - Permafrost thaw in the coastal areas of the Arctic – EU Horizon 2020.
- ✓ **Arctic Energy Summit** – Arctic Council SDWG – co organizer of the next conference to be in Iceland 2020.
- ✓ **China-Iceland Arctic Observatory - CIAO** - Science Communication and Outreach – Icelandic Centre for Research (RANNIS) and the Polar Research Institute of China (PRIC).
- ✓ **Northern Forum** - Arctic Business Directory and Information Systems.
- ✓ **Pro-Active Diving** – Diving with a purpose – Citizen Science.
- ✓ **EEAS - EU Policy Assessment** – Associated partner with ULapland and the AWI.
- ✓ **Arctic Statistics** – Korea Maritime Institute, (KMI) Korea.
- ✓ **AREA** - Arctic Renewable Energy Atlas – SDWG Arctic Council project, lead by USA and Canada.
- ✓ **INTERACT** - International Network for Terrestrial Research and Monitoring in the Arctic – EU Horizon 2020
- ✓ **ARCTIC RISK PLATFORM** – Arctic Basecamp – Climate Change – www.arcticrisk.org

**SOME EXAMPLES OF MAPS AND DATA RESOURCES AT
THE ARCTIC PORTAL**



ARCTIC PORTAL.org

THE ARCTIC GATEWAY



OIL & GAS IN THE ARCTIC

ARCTIC COUNCIL MEMBERS & OBSERVERS



ARCTIC COUNCIL MEMBER STATES

- Canada
- The Kingdom of Denmark
- Finland
- Iceland
- Norway
- Russian Federation
- Sweden
- United States of America

PERMANENT PARTICIPANTS

- Aleut International Association (AIA)
- Arctic Athabaskan Council (AAC)
- Gwich'in Council International (GCI)
- Inuit Circumpolar Council (ICC)
- Russian Association of Indigenous Peoples of the North (RAIPON)
- Saami Council (SC)

WORKING GROUPS

- ACAP
- AMAP
- CAFF
- EPPR
- PAME
- SDWG

ARCTIC COUNCIL OBSERVERS STATES

- France - Barrow Ministerial meeting, 2000
- Germany - Iqaluit Ministerial meeting, 1998
- Italian Republic - Kiruna Ministerial meeting, 2013
- Japan - Kiruna Ministerial meeting, 2013
- The Netherlands - Iqaluit Ministerial meeting, 1998
- People's Republic of China - Kiruna Ministerial meeting, 2013
- Poland - Iqaluit Ministerial meeting, 1998
- Republic of India - Kiruna Ministerial meeting, 2013
- Republic of Korea - Kiruna Ministerial meeting, 2013
- Republic of Singapore - Kiruna Ministerial meeting, 2013
- Spain - Salekhard Ministerial meeting, 2006
- Switzerland - Fairbanks Ministerial meeting, 2017
- United Kingdom - Iqaluit Ministerial meeting, 1998



Based on information from the Arctic Council, September 2022 / © Arctic Portal

INTERNATIONAL COLLABORATION & GOVERNANCE ARCTIC COUNCIL

THIRTEEN INTERGOVERNMENTAL AND INTER-PARLIAMENTARY ORGANIZATIONS HAVE AN APPROVED OBSERVER STATUS:

- International Council for the Exploration of the Sea (ICES) - Fairbanks Ministerial meeting, 2017
- International Federation of Red Cross & Red Crescent Societies (IFRC) - Barrow Ministerial meeting, 2000
- International Maritime Organization (IMO) - Rovaniemi Ministerial meeting, 2019
- International Union for the Conservation of Nature (IUCN) - Barrow Ministerial meeting, 2000*
- Nordic Council of Ministers (NCM) - Barrow Ministerial meeting, 2000*
- Nordic Environment Finance Corporation (NEFCO) - Reykjavik Ministerial meeting, 2004
- North Atlantic Marine Mammal Commission (NAMMCO) - Barrow Ministerial meeting, 2000
- OSPAR Commission - Fairbanks Ministerial, 2017
- Standing Committee of the Parliamentarians of the Arctic Region (SCPAR) - Iqaluit Ministerial meeting, 1998*
- United Nations Development Programme (UNDP) - Inari Ministerial meeting 2002
- United Nations Environment Programme (UNEP) - Iqaluit Ministerial meeting, 1998*
- World Meteorological Organization (WMO) - Fairbanks Ministerial meeting, 2017
- West Nordic Council (WNC) - Fairbanks Ministerial meeting, 2017

*At the Kiruna Ministerial Meeting in 2013, the Arctic Council "receive[d] the application of the EU for Observer status affirmatively", but deferred a final decision. Until such time as Ministers of the Arctic States may reach a final decision, the EU may observe Council proceedings.
**Also present at the signing ceremony* in Ottawa 19 September, 1996.

TWELVE NON-GOVERNMENTAL ORGANIZATIONS ARE APPROVED OBSERVERS IN THE ARCTIC COUNCIL:

- Advisory Committee on Protection of the Sea (ACOPS) - Barrow Ministerial meeting, 2000*
- Arctic Institute of North America (AINA) (Formerly Arctic Cultural Gateway (ACG)) - Reykjavik Ministerial meeting, 2004
- Association of World Reindeer Herders (AWRH) - Barrow Ministerial meeting, 2000
- Circumpolar Conservation Union (CCU) - Barrow Ministerial meeting, 2000
- International Arctic Science Committee (IASC) - Iqaluit Ministerial meeting, 1998*
- International Arctic Social Sciences Association (IASSA) - Barrow Ministerial meeting, 2000
- International Union for Circumpolar Health (IUCH) - Iqaluit Ministerial meeting, 1998*
- International Work Group for Indigenous Affairs (IWGIA) - Inari Ministerial meeting, 2002
- Northern Forum (NF) - Iqaluit Ministerial meeting, 1998
- Oceana - Fairbanks Ministerial meeting, 2017
- University of the Arctic (UArctic) - Inari Ministerial meeting, 2002
- World Wide Fund for Nature-Global Arctic Program (WWF) - Iqaluit Ministerial meeting, 1998*

Also present at the signing ceremony in Ottawa 19 September, 1996.
Based on information from the Arctic Council, September 2022 / © Arctic Portal





THE ARCTIC - AREA OF GOOD GOVERNANCE

THE IMO POLAR CODE

Definition of legal issues
Codes of conduct.





SEARCH AND RESCUE IN THE ARCTIC

Search and Rescue in the Arctic

The Agreement on Cooperation on Aeronautical and Maritime Search and Rescue in the Arctic is an international treaty concluded among the member states of the Arctic Council – Canada, Denmark, Finland, Iceland, Norway, Russia, Sweden and the United States
 — on 12 May 2011 in Nuuk, Greenland

- Search and Rescue Delimitation**
- Canada - Denmark
 - Canada - United States
 - Denmark - Iceland
 - Denmark - Norway
 - Finland - Norway
 - Finland - Sweden
 - Finland - Russian Federation
 - Iceland - Norway
 - Norway - Sweden
 - Norway - Russian Federation
 - Russian Federation - United States
 - Southern Extend

Source: Arctic Council



ADMS – Arctic Data Management System

The screenshot displays the ADMS Arctic Data Management System interface. The central focus is a 3D globe showing the Arctic region, with various data layers overlaid. The interface includes a left-hand layer list, a top navigation bar, and a right-hand metadata panel.

ADMS GeoServer Layer List:

- ADMS GeoServer
 - amati
 - airport_annual_data
 - airport_full_view
 - Arctic Airports
 - arctic_infrastructure
 - Arctic Ports
 - domestic_airport_view
 - international_airport_view
 - large_medium_port_view
 - port_annual_data
 - Port_full_view
 - small_very_small_port_view
 - arctic_coastal_dynamics
 - arctic_shipping_routes
 - area
 - boundaries
 - climate_models
 - glims
 - global_solar_atlas
 - global_wind_atlas
 - gshhg
 - iceland
 - nasa
 - natural_earth
 - nscsd_v2
 - nsdc
 - oil_gas
 - Pipelines
 - Potential oil and gas in Arctic
 - osm
 - permafrost
 - GTN-P Permafrost temperature
 - Permafrost zones
 - protected_areas
 - randolph_glacier
 - seaiceage_v4
 - search_rescue
 - swera
 - usgs
 - vegetation
 - vito_solar_data
- Flatey GeoServer
 - Kortakerfi
 - admin
 - amati
 - arctic_coastal_dynamic
 - arctic_soil_carbon_content
 - area
 - basemap
 - climate_models
 - iceland
 - infrastructure
 - interact
 - northforum
 - page21
 - permafrost
 - ppr
 - vegagerdin
 - vegetation

Metadata Panel (Arctic Airports):

- Layer Name:** Arctic Airports
- Abstract:** Source: AMATII Database
- Keywords:** features, airport_kml
- SRS:** EPSG:4326
- Bounding Box:**
 - Xmin: -179.3737
 - Ymin: 51.881447
 - Xmax: 179.293
 - Ymax: 82.517778
- ID:** airport_kml
- Capability:** ADMS GeoServer
- Workspace:** amati
- Raw Data:** CSV, JSON (human-readable)

Navigation and UI Elements:

- Top Bar: Projection: 3d, Basemap: World Satellite Image
- Left Panel: Search, Home, Layers, Full Screen, Print, Help
- Bottom Left: 500 km scale bar, Cesium Ion logo, v0131
- Bottom Right: Hint! Click the name to see the layer info on the right pane; click the checkbox (☐) to see the layer on the map.



For further information please contact

Halldor Johannsson – halldor@arcticportal.org



ARCTIC FOUNDATION - Arctic Portal.org

ArcData ltd

Northern Forum Foundation



Radhustorg 7,
600 Akureyri, Iceland,
+354 461 2800 / + 354 899 2828,
halldor@arcticportal.org