



ARCTIC
SDI Arctic Spatial
Data Infrastructure

Enabling Access to Arctic Location-Based Information

Eydís Líndal Finnbogadóttir

Chair of the Arctic SDI Board &

Director General, National Land Survey of Iceland

Working Group on Marine Geospatial Information

SIDE EVENT

Cooperation between Arctic SDI & ARMSDIWG

Access to Land and Marine Data to Face Challenges in the Arctic

UN-GGIM 9th Session

Working Group on Marine Geospatial Information Side Event

5 AUG 2019

Eydís Líndal Finnbogadóttir

Chair of the Arctic SDI Board & Director General, National Land Survey of Iceland

Sebastian Carisio

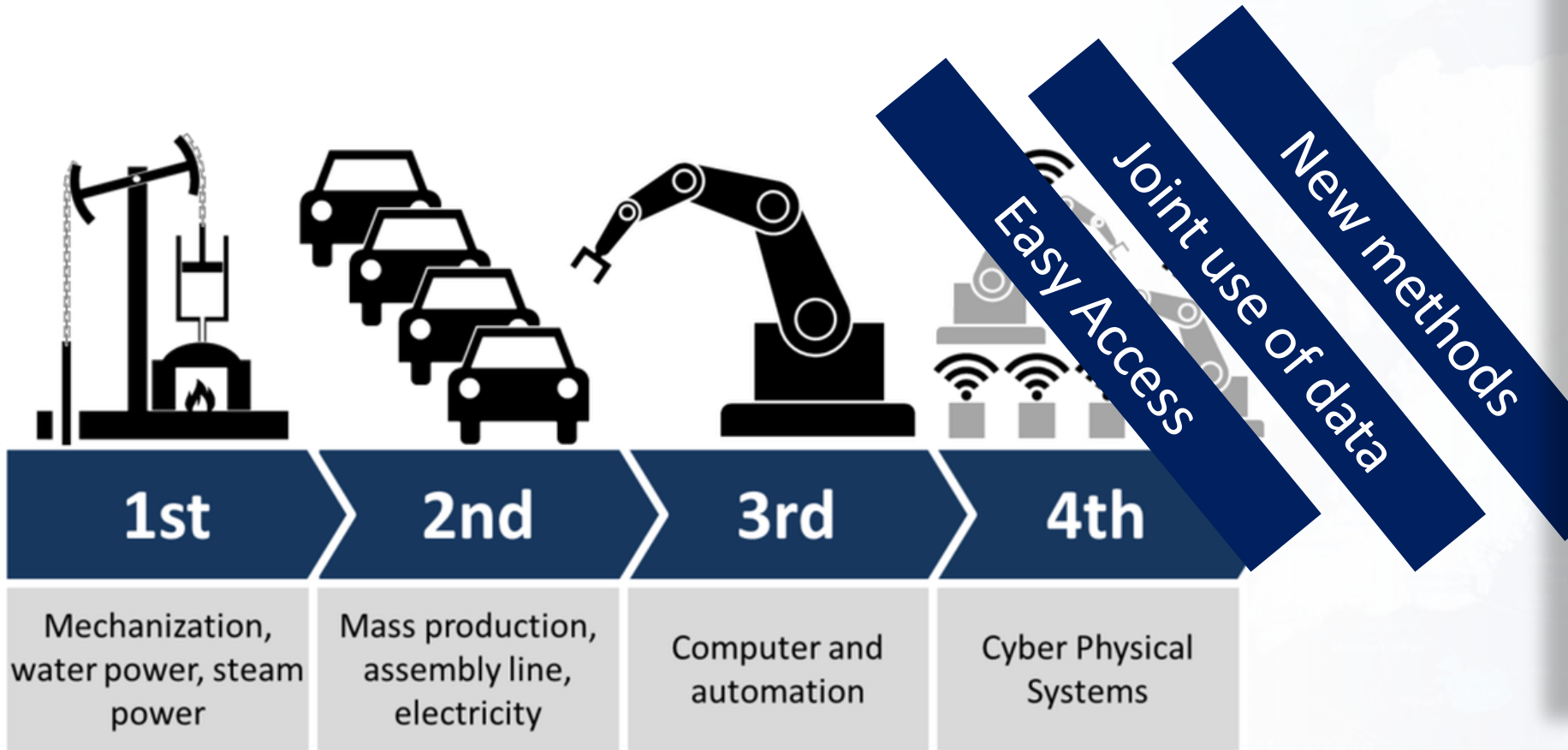
Chair, ARHC ARMSDIWG



**ARCTIC
SDI** Arctic Spatial
Data Infrastructure



**ARCTIC REGIONAL
HYDROGRAPHIC
COMMISSION**



In year 2016, for first time, more computers were searching the internet than humans.

In 2020, search by humans will only be negligible part of the search.

Arctic SDI provides an
Authoritative Reference Basemap
Provided Directly from the
8 Arctic National Mapping
Agencies



Arctic SDI

is based on cooperation between **the National Mapping Agencies (NMCA) from 8 countries** that border the Arctic Circle

Canada, Denmark, Finland, Iceland, Norway,
Russia, Sweden, USA

There is a signed Memorandum of Understanding towards cooperative development of an Arctic SDI.

Users, Stakeholders and Data Providers

- Arctic Council Working Groups (CAFF, AMAP, EPPR, PAME)
- Academic institutions in the Arctic
- Government and public sector
- Business, media, citizens, NGOs,....

Arctic SDI Strategic Vision

Facilitate **reliable and interoperable access** to geospatial information in support of social, economic and environmental monitoring and decision-making in the Arctic



SUSTAINABLE DEVELOPMENT GOALS

1 NO POVERTY

2 ZERO HUNGER

3 GOOD HEALTH AND WELL-BEING

4 QUALITY EDUCATION

5 GENDER EQUALITY

6 CLEAN WATER AND SANITATION

7 AFFORDABLE AND CLEAN ENERGY

8 DECENT WORK AND ECONOMIC GROWTH

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

10 REDUCED INEQUALITIES

11 SUSTAINABLE CITIES AND COMMUNITIES

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

13 CLIMATE ACTION

14 LIFE BELOW WATER

15 LIFE ON LAND

16 PEACE, JUSTICE AND STRONG INSTITUTIONS

17 PARTNERSHIPS FOR THE GOALS

SUSTAINABLE DEVELOPMENT GOALS

Arctic SDI Strategic Mission

To promote the cooperation and use of the Arctic Spatial Data Infrastructure, **enabling sharing** of Arctic location-based data, while pursuing data management best practices and value creation

Strategic Documents

Who and What is the Arctic SDI?

- [2017-2019 Biennial Report](#): Highlights from the Finnish Chairmanship
- [2015-2017 Biennial Report](#): Highlights from the US Chairmanship
- [Arctic SDI factsheet](#) September 2018
- [Arctic SDI Geoportals Factsheet](#) September 2018

Governing Documents

- [Signed Memorandum of Understanding](#)
– English, French, and Russian version
- [Arctic SDI-Governance_v3.0](#)
- [Working Groups – 2019 country membership](#)
- [Arctic SDI Organization May 2019](#)

Arctic SDI Strategic Plan Documents

- [Strategic Plan 2015-2020](#)
- [Implementation Plan](#)
- [Roadmap](#)

Arctic Spatial Data Pilot

- [Open Geospatial Consortium Spatial Data Pilot](#) with data intensive scenario based videos and a Final Engineering Report

Arctic SDI Historical Framework

- [Arctic-SDI-Framework-Document_V2.0](#)
 - Provides historical framework and technical vision for the Arctic SDI

Pan-Arctic Digital Elevation Model

- [ArcticDEM – Arctic SDI Board Position Statement](#)
 - [Polar Geospatial Center ArcticDEM Documentation](#)

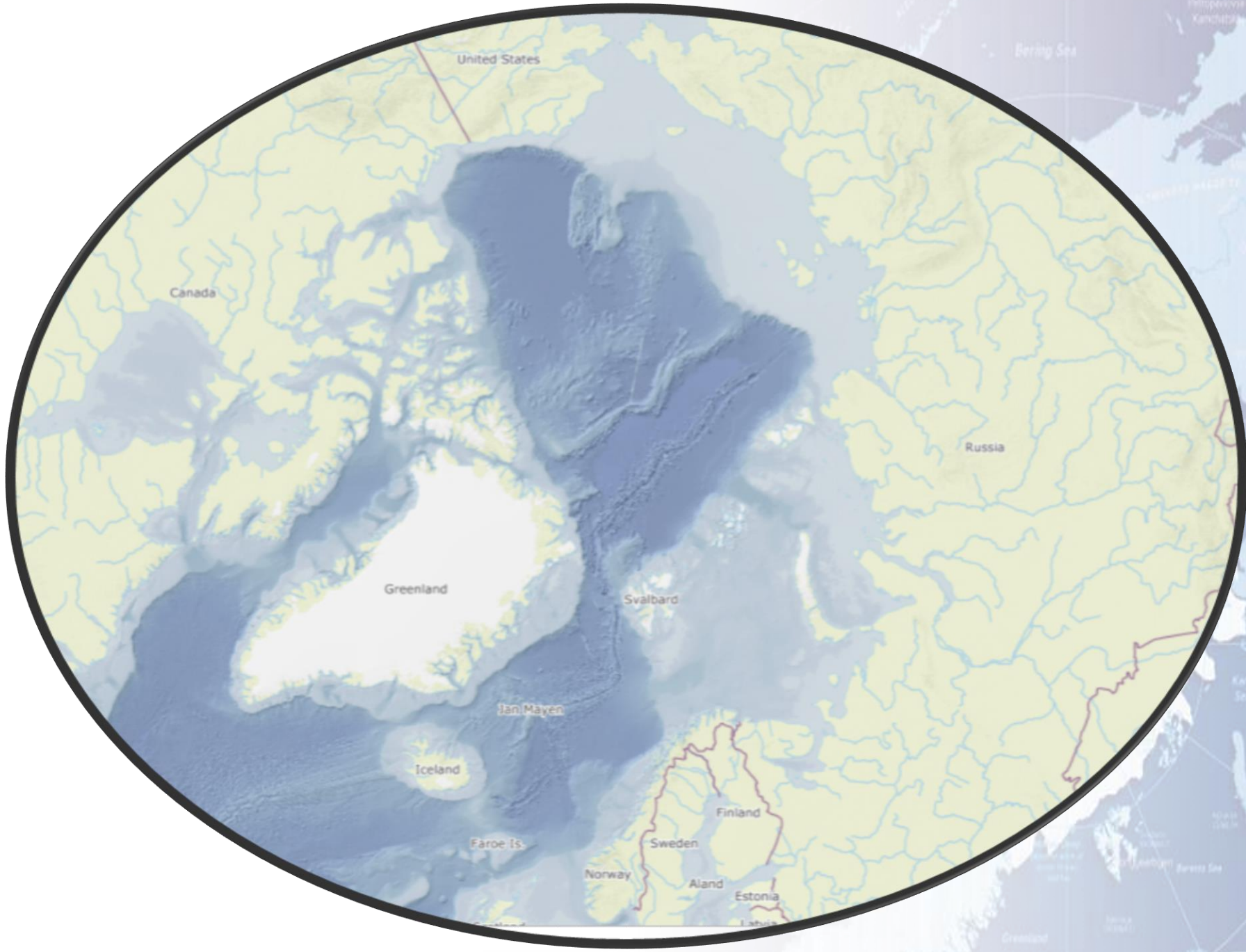
User Needs Assessments

- [User Survey Report – Marine and Oceans](#)

Arctic SDI Documentation

- [SDI Manual for the Arctic with Glossary of Terms](#)
 - Guidance and information management good practices on commonly accepted SDI operational policies and standards.
 - Audiences: strategic decision makers, data providers, distributors and end users of Arctic data
- [Arctic SDI Glossary of Terms](#)
 - A living glossary providing terms, acronyms, definitions and sources
- [Arctic SDI Evaluation](#)
 - [Arctic SDI Evaluation Report](#)
 - [Arctic SDI Evaluation Framework](#)
 - [Arctic SDI Evaluation and Benchmarking presentation](#)







Access to data



Arctic Spatial Data Infrastructure

SEARCH

MAP LAYERS

SELECTED LAYERS 1

MY DATA

MAP PUBLISHING

MAP LEGENDS

USER GUIDE



[Register](#)

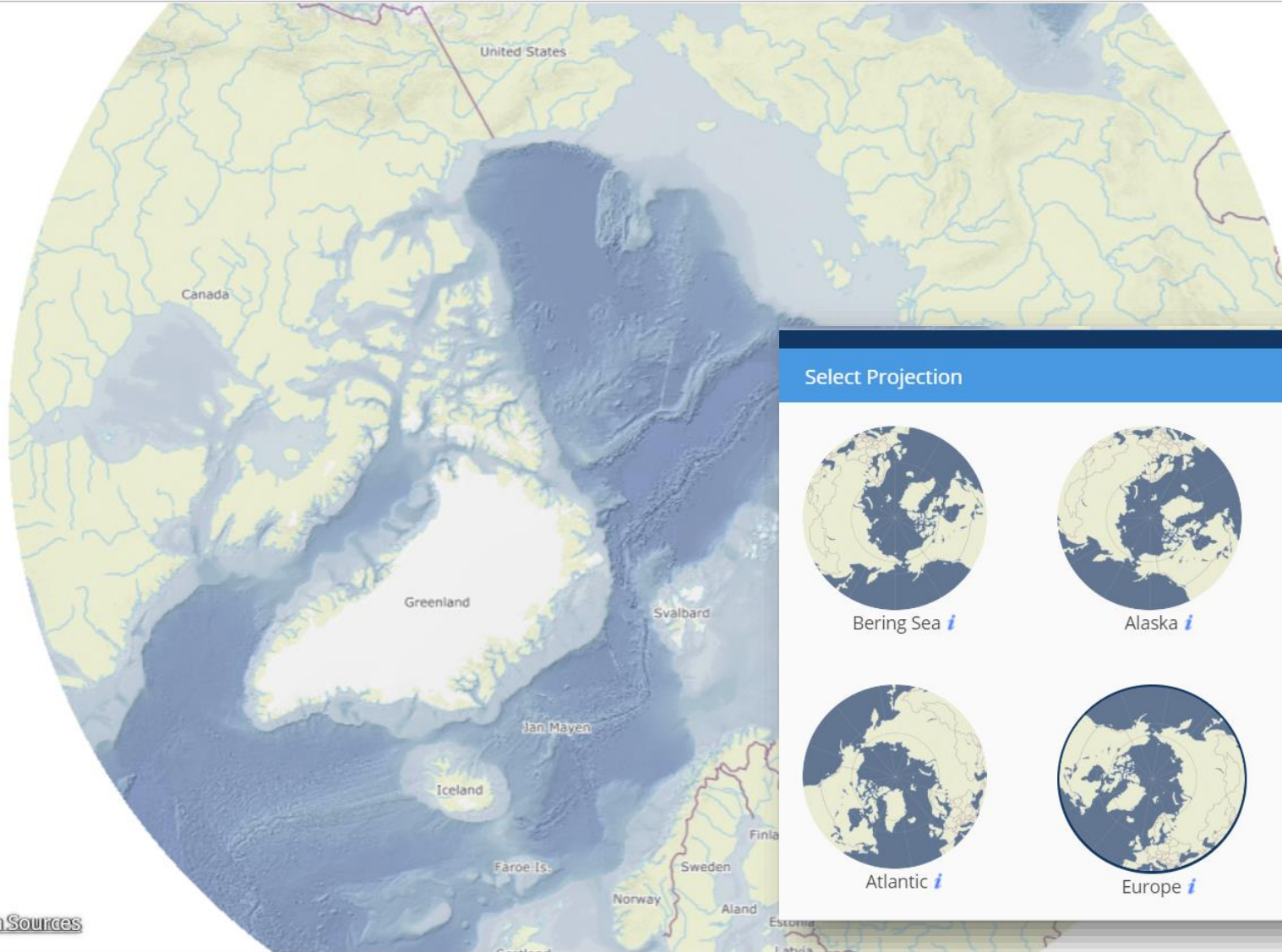
Login

1000 km



[Terms of Use](#)

[Data Sources](#)



Select Projection



Bering Sea *i*



Alaska *i*



Canada *i*



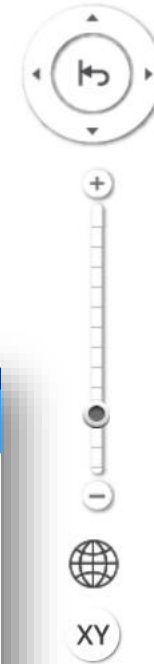
Atlantic *i*

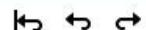


Europe *i*



Russia *i*





Map Layers

By Theme

By Data Provider

Newest

Time series

Search map layers by map layer name, data producer name or keyword. [i](#)

- ▶ **Biota** 8
- ▶ **Boundaries** 8
- ▶ **Climatology / Meteorology / Atmosphere** 30
- ▶ **Economy** 3
- ▶ **Elevation** 20
- ▶ **Environment** 27
- ▶ **Farming** 1
- ▶ **Geoscientific Information** 10
- ▶ **Health** 3
- ▶ **Imagery / Base Maps / Earth Cover** 4
- ▶ **Location** 5

▼ **Oceans** 30

Arctic Ecologically and Biologically Significant Areas

Arctic Marine Areas (AMAs)

Arctic Marine Areas of Heightened Ecological and Cultural Significance

Average September sea ice extent 1979

Average September sea ice extent 1981-2010

Search

Location search

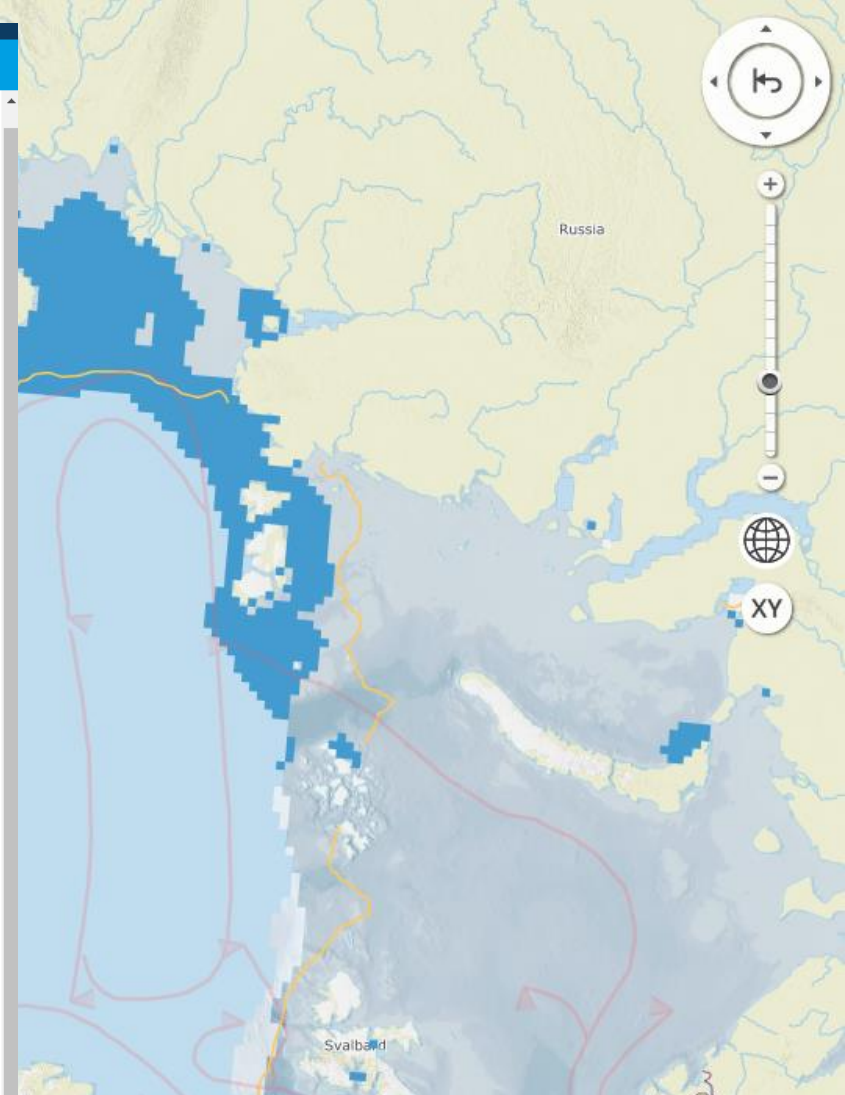
Metadata Search

Search locations by typing a name of a place

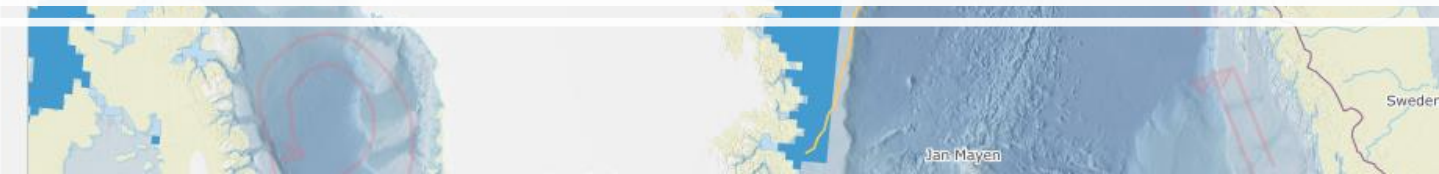
You search returned 50 results.
Sort search results by clicking a column heading in the table below.

Search result 50 results by search term john

Placename	Region	Type
John Island	Canada	Island
Johnson	Canada	Populated places
Johnson	Canada	Populated places
John Point	Canada	Coastal and shore relieves
John Point	Canada	Coastal and shore relieves
John Point	Canada	Coastal and shore relieves
John Rock	Canada	Coastal and shore relieves
Cape St. John	Canada	Coastal and shore relieves
John Lake	Canada	Standing water features
John Brook	Canada	Flowing water features
John Creek	Canada	Flowing water features
John Lake	Canada	Standing water features
John Creek	Canada	Flowing water features
John Lake	Canada	Standing water features
John Lake	Canada	Standing water features
John-John Creek	Canada	Flowing water features
Lac John	Canada	Standing water features
Johnson	United States	Miscellaneous
Long John	United States	Miscellaneous
Johno	Finland	Terrain features
Johnsbu	Norway	Non-residential structures and buildings
Johnshaj	Denmark	Terrain features
Johnsli	Norway	Non-residential structures and buildings
Johnsrud	Norway	Non-residential structures and buildings
Johnsrud	Norway	Non-residential structures and buildings



Arctic SDI Geoportal – viewpoint to arctic geodata



ARCTIC SDI Arctic Spatial Data Infrastructure

SEARCH

MAP LAYERS




SELECTED LAYERS 2





MY DATA



MAP PUBLISHING



MAP LEGENDS

USER GUIDE

[Register](#)

Login

Change language ▾

Map Layers

By Theme | By Data Provider

Newest | Time series

Search map layers. ✕

Search map layers by map layer name, data producer name or keyword. [i](#)

- ▶ **Biota** 8
- ▶ **Boundaries** 8
- ▶ **Climatology / Meteorology / Atmosphere** 30
- ▶ **Economy** 3
- ▶ **Elevation** 13
- ▶ **Environment** 26
- ▶ **Farming** 1
- ▶ **Geoscientific Information** 10

Arctic Shipping, 1995-2004

Quality | Actions

ARCTIC SHIPPING 1995-2004

2004 (source: Arctic Marine Shipping Assessment 2009).





Metadata

▼ The Arctic SDI Topographic Basemap

- Basic information
- ISO 19115 metadata
- Inspire metadata**
- Data quality
- Actions



THE ARCTIC SDI TOPOGRAPHIC BASEMAP

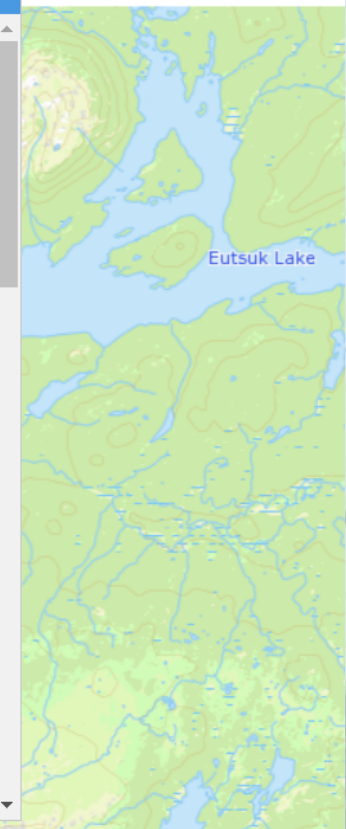
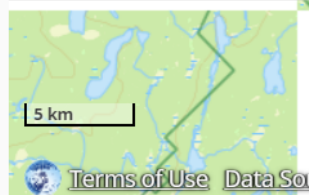
ABSTRACT TEXT (SERVICE)

The Arctic SDI Topographic Basemap is a WMTS service provided by Arctic SDI - a cooperation between the national mapping agencies in Canada, Denmark, Finland, Iceland, Norway, Russia, Sweden and US. It contains basic topographic information coming from these authoritative data sources:: Canada Centre for Mapping and Earth Observation - National Resources Canada, Danish Agency for Data Supply and Efficiency, National Land Survey of Finland, National Land Survey of Iceland, Norwegian Mapping Authority, Norwegian Polar Institute, Russian Federal Service for State Registration, Cadastre and Mapping, Swedish Mapping, Cadastre and Land Registration Authority and United States Geological Survey.

ONLINE RESOURCES

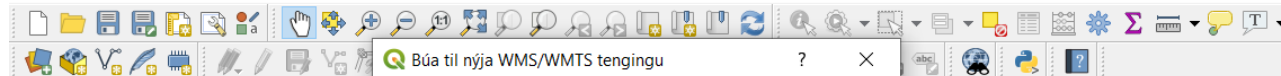
- <http://basemap.arctic-sdi.org/mapcache/wmts/?service=wmts&version=1.1.0&request=getcapabilities>

LINEAGE STATEMENT



*sumarganga 2019 - QGIS

Verkefni Breyta Skoða Lag Stillingar Viðbætur Vektor Rasti Gagnagrunnur Vefur Vinnsla Hjálp



- Vafri
- D:\
 - GeoPackage
 - SpatialLite
 - PostGIS
 - MSSQL
 - Oracle
 - DB2
 - WMS/WMTS
 - Basemap
 - Arctic cascading
 - DM Solutions GMap
 - erm prufa
 - Ferðamálastofa áhugaverðri staðir
 - INSPIRE WMS
 - Lizardtech server
 - LMÍ WMS Geoserver
 - LMÍ WMTS þjónusta
 - malta test

- Lag
- gönguleið sumar 2019
 - Örnefni
 - atlas
 - LMI_kort
 - group1
 - Arctic cascading

Búa til nýja WMS/WMTS tengingu

Nánar um tengingu

Heiti Base Map Arctic SDI

URL che/wmts/?service=wmts&version=1.1.0&request=getcapabilities

Uppsetningar Einfalt

Choose or create an authentication configuration

Engin auðkenning

Configurations store encrypted credentials in the QGIS authentication database.

WMS/WMTS Options

Referer

DPI-Mode allt

Húsa URI-slóð GetMap/GetTile sem tiltekin er í getuupplýsingum

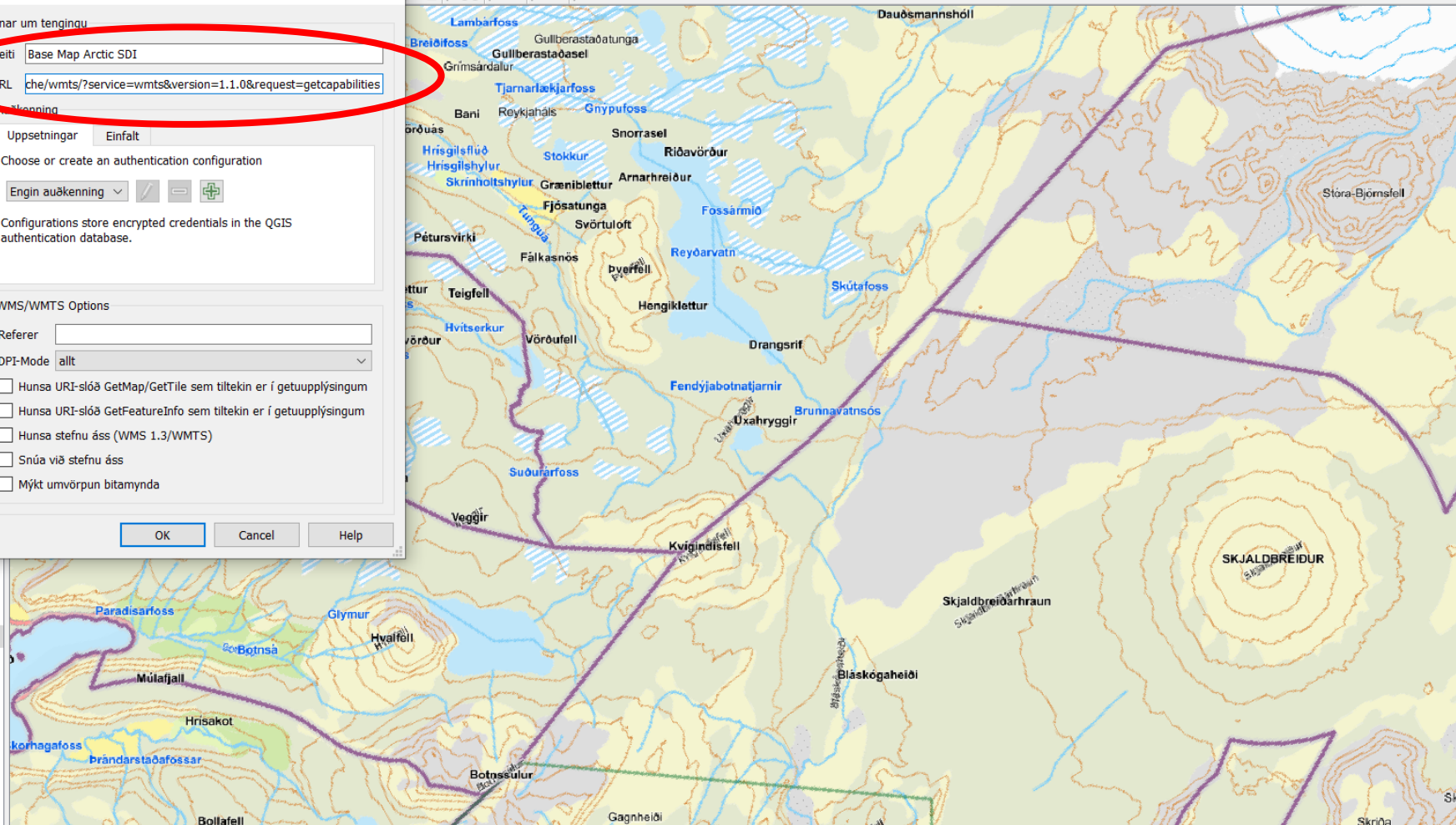
Húsa URI-slóð GetFeatureInfo sem tiltekin er í getuupplýsingum

Húsa stefnu áss (WMS 1.3/WMTS)

Snúa við stefnu áss

Mýkt umvörpun bitamynda

OK Cancel Help



Skrifa til að finna (Ctrl+K)

6 skýringafærslur fjarlægðar.

Hnit 2583402,235951

Kvarði 1:114735

Stækkun 100%

Snúningur 0,0°

Myndgera EPSG:8088

ABA *aðgengi að þjónustum - QGIS

What? Verkefni Breyta Skoða Lag Stillingar Viðbætur Vektor Rasti Gagnagrunnur Vefur Vinnsla Hjálp



Vafri

Keyw

Contact for resou

Categories

- ABA 2013 Arctic Ocean
- Completed
- XY
- WC
- Wf



Auðkenna niðurstöður

Fitja Gildi

▼ 0 accidents_incidentspt

Snið HTML

▼ accident...

accidents_incidentspt															
fid	source	type	date_	latitude	longitude	lives_lost	fuel_spill	total_loss	ice_damage	primary_re	descriptio	year	owner	source_pro	contact
accidents_incidentspt.61	LMIU	FISHING VESSEL	7/25/96 12:00 AM	65.766667	-23.833056	NO	NO	YES	NO	SUNK/SUBMERGED	LISTED AND SANK IN 65 46.41 N 23 49.78 W 25 JUL 1996.	1996	PAME (pame.is)	Arctic Marine Shipping Assessment (amsa.is)	pame@pame.is

> (Afle...

Lag

- Örn
- ac
- CO
- DA
- FIR
- GR
- MA
- MIS
- SU
- LM
- Ar

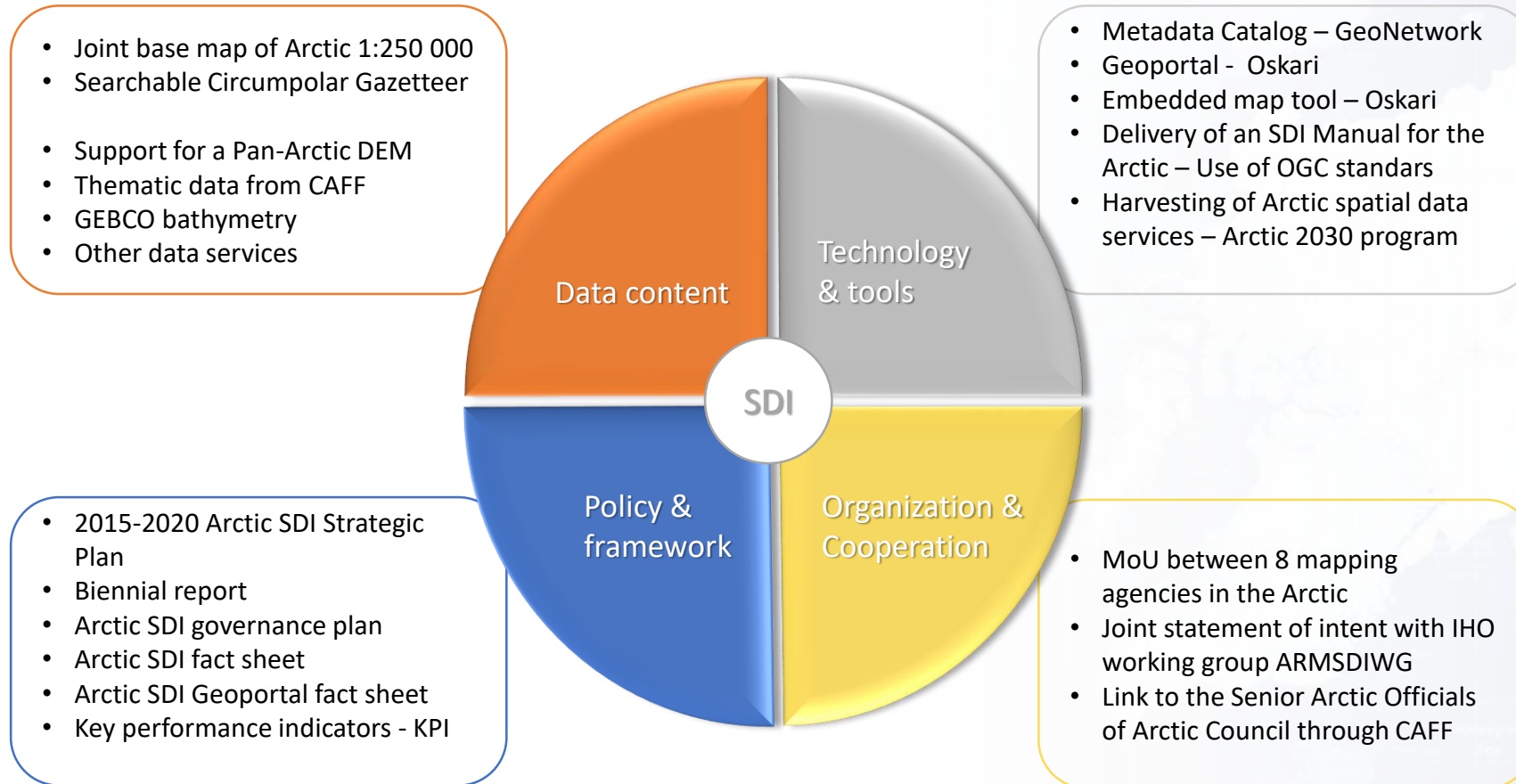
Hamur Valið lag

Skoða Tré

Auto open form

Hjálp

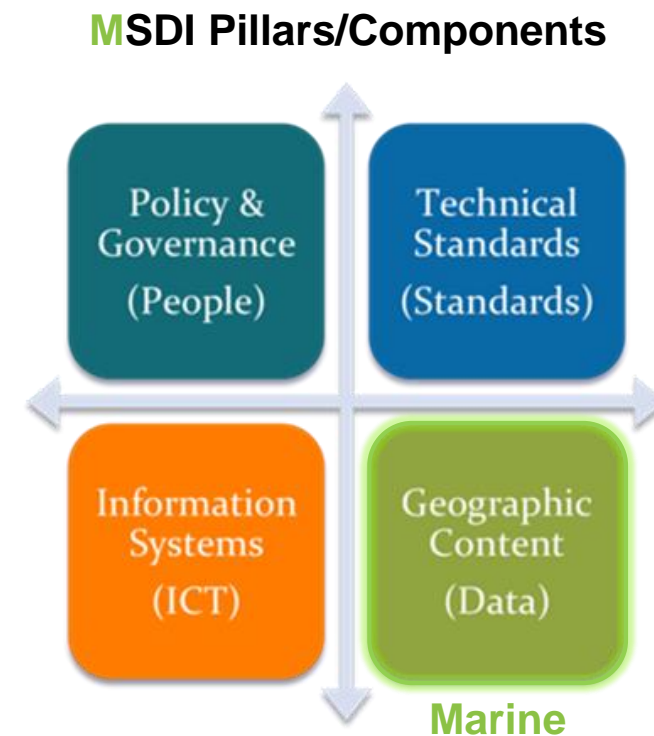
Status of Arctic SDI



Marine Spatial Data Infrastructure (MSDI)

- MSDI

- Element of SDI focused on the marine input.
- A MSDI is not a collection of hydrographic products, but an infrastructure that promotes interoperability of data at all levels (e.g., national, regional, international).
 - Discoverability
 - Accessibility
 - Interoperability
 - Data-centricity (Hydrographic Offices)
- Supports wider, non-traditional user-base of marine data typically used for navigation.
- MSDI Working Group (MSDIWG)
 - International Hydrographic Organization (IHO) working group to deliver IHO MSDI-related policy objectives.¹



ARCTIC REGIONAL
HYDROGRAPHIC
COMMISSION



**ARCTIC
SDI** Arctic Spatial
Data Infrastructure

Arctic Regional Hydrographic Commission (ARHC)

The International Hydrographic Organization (IHO) has encouraged the establishment of **Regional Hydrographic Commissions (RHCs)** to coordinate hydrographic activity and cooperation at the regional level. RHCs are made up of IHO Member States together with other regional States that wish to participate. RHCs work in close harmony with IHO to help further its ideals and program.



ARHC Members

- Canada
- Denmark
- Norway
- Russian Federation
- United States

ARHC Associate Members

- Finland
- Iceland
- Italy



ARCTIC REGIONAL
HYDROGRAPHIC
COMMISSION

Arctic Regional Marine Spatial Data Infrastructures Working Group (ARMSDIWG) established at 6th ARHC Meeting (2016)



ARCTIC REGIONAL
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ARCTIC
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ARMSDIWG

(armz - dē - wig)

- Identify and assess the statuses of individual MS MSDI implementation.
- Consider MSDI policies in related international projects and **cooperate specifically with the Arctic SDI.**
- Analyze how maritime authorities can contribute their spatial information and the necessary updates, so information can easily be collated with other information to a current overall picture for the region.
- Focus on how ARHC in the future can benefit from a regional approach.
- Monitor the development of SDI (**specifically the Arctic SDI**) that could be relevant for the region.
- Monitor the development of relevant and applicable OGC standards and activities through association with the **OGC Marine DWG.**
- To present a yearly report to the ARHC.



ARMSDIWG 3rd meeting in Reykjavík, Iceland - April 2019

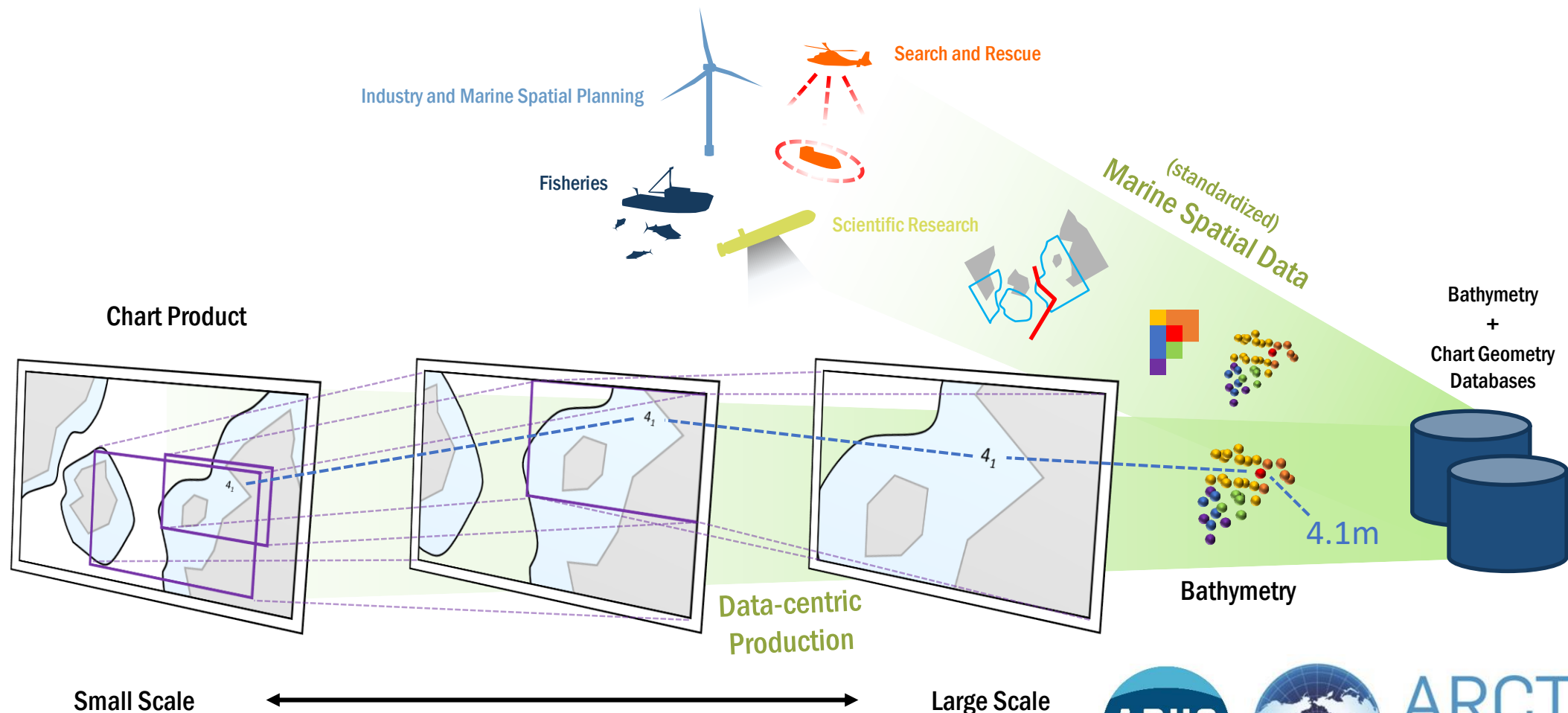


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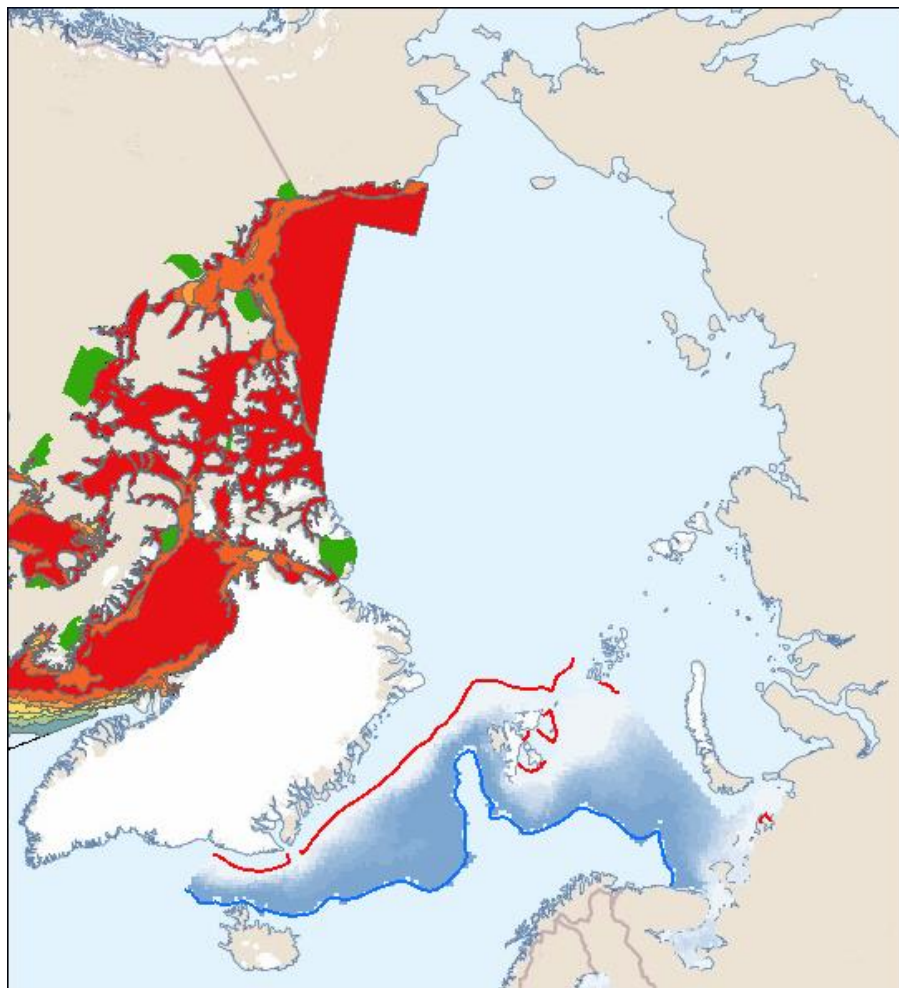
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Data-Centric Production and MSDI



ARCTIC SDI Arctic Spatial Data Infrastructure

Hydrographic Office Data Reuse



Canadian Arctic Voyage Planning Guide (AVPG) web service displaying in Norway Marine Spatial Management Tool made possible by OGC WMX standards.

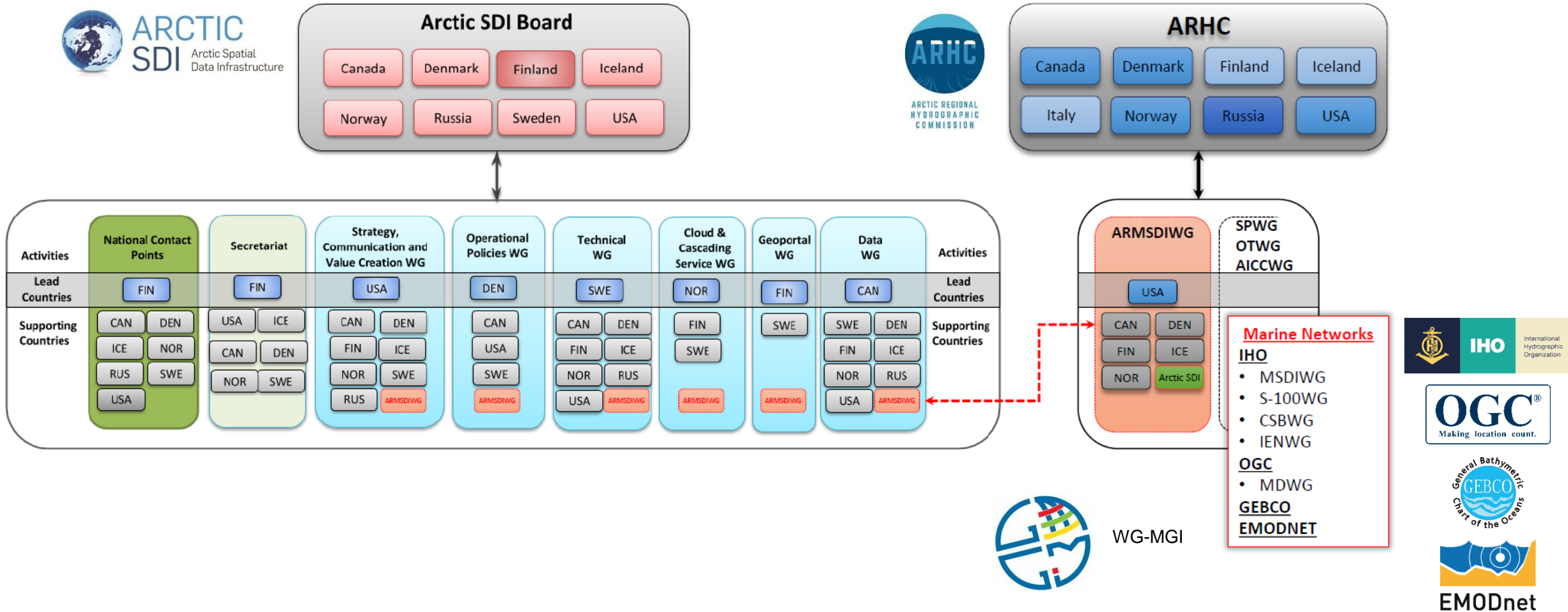


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**ARCTIC
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Data Infrastructure

Proposed Arctic SDI & ARHC ARMSDIWG Cooperation Structure



Arctic SDI & ARMSDIWG: Marine Networks Data Reuse

Arctic SDI
Arctic Spatial
Data Infrastructure

SEARCH

MAP LAYERS

SELECTED LAYERS 1

MY DATA

MAP PUBLISHING

MAP LEGENDS

USER GUIDE

Register

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Change language

Search

Location Search Metadata Search

Search locations by typing a name of a place.

Northwind Ridge Search

Your search returned 2 results.
You can sort search results by clicking the headers of the table below.

Place name	Region	Type
Northwind Ridge	Canada	Other hydrographic and underwater features
Northwind Ridge	GEBCO	Other hydrographic and underwater features

Search Results

Northwind Ridge

GEBCO
Other hydrographic and underwater features
[Close](#)

200 km

[Terms of Use](#) [Data Sources](#)

Arctic SDI Geoportal displaying Arctic SDI Basemap, utilizing International Bathymetric Chart of the Arctic Ocean (IBCAO), and the GEBCO Sub-Committee on Undersea Feature Names (SCUFN) digital gazetteer service of the names, generic feature type and geographic position of features on the seafloor.



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Challenges

- Lack of know how by data owners – regarding data distribution
- Terms of reference
- Lack of data stewardship
- Lack of data strategies – e.g. Universities, government parties
- „My data are so special“, „I haven't finished yet“, „I'm going to written an article“, „It's my data“, „I'm so busy“
- Connecting to other cooperation – ARMSDIWG





Future