ARCTIC SDI
Arctic Spatial Data Infrastructure

Arctic Spatial Data Infrastructure

Enabling Access to Arctic Land and Marine Data Across Borders, Across Time

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Outline

- Introduction to the Arctic SDI
- Arctic Council as the primary client
- User needs assessments
- Arctic SDI Geoportal and the *embedded maps* functionality
- Arctic Spatial Data Pilot – A demonstration of the impacts of climate change in the economy of the North

Video:

Introduction to the Arctic Spatial Data Infrastructure

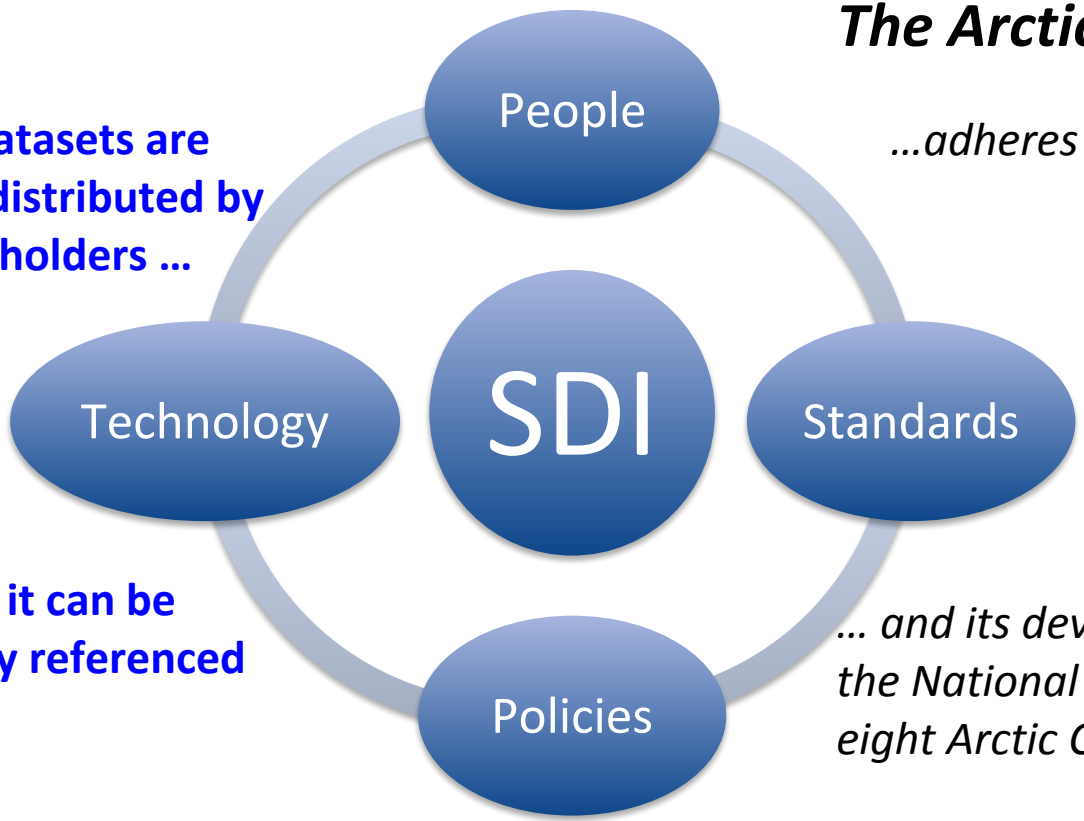
https://youtu.be/tGS1rcaJRug

ARCTIC SDI Arctic Spatial Data Infrastructure

A Spatial Data Infrastructure

Allows sharing geospatial data in an efficient and flexible way

Important datasets are produced and distributed by many stakeholders …



The Arctic SDI …

…adheres to Open Data Standards

… most of it can be geographically referenced

… and its development is facilitated by the National Mapping Agencies of the eight Arctic Countries.

A Model of Effective Collaboration

Arctic SDI is:

- a voluntary collaboration of the eight circumpolar National Mapping Agencies
- supported by a non-binding Memorandum of Understanding (MOU) in 3 languages
- based on foundations of solid governance and standards
- endorsed by the Arctic Council in 2009
- recognized by Senior Arctic Officials for improving data integration, sharing and analysis across the Arctic.
- Video https://youtu.be/tGS1rcaJRug

http://wallpaper.imcphoto.net/animals/polar-bear/polar-bear-on-ice.jpg

Arctic SDI Video – An Introduction

https://youtu.be/tGS1rcaJRug

A Cooperative Model in the Arctic

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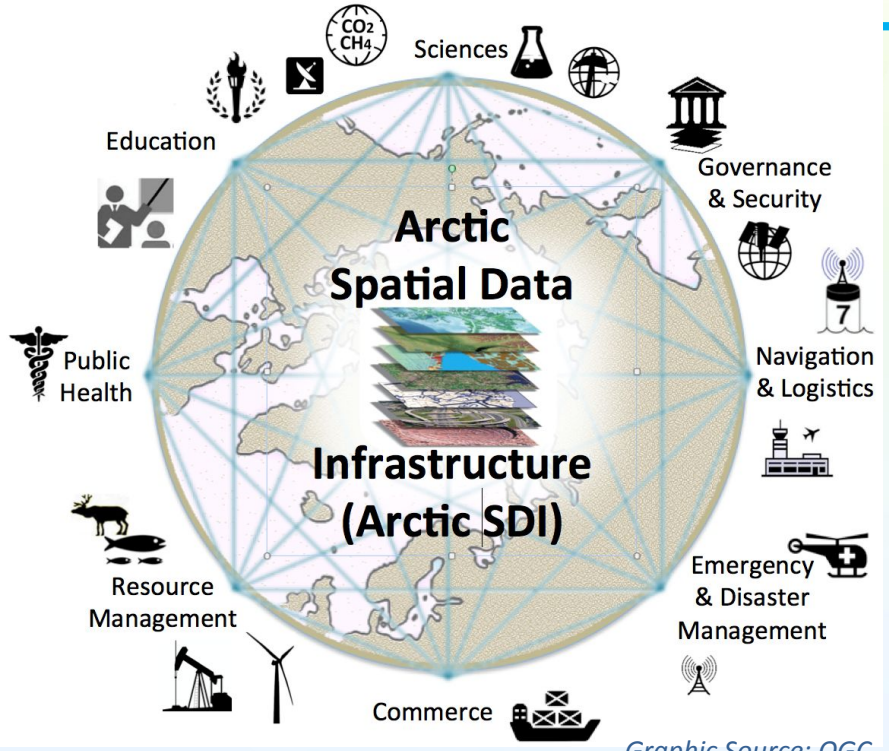


Graphic Source: OGC

The Arctic SDI is focused on:

- Working with organizations to make their data available,
- Understanding the needs and requirements of stakeholders - **Arctic Council as the primary client**,
- Information Management best practices (lifecycle of geospatial data),
- Open data standards and provision of authoritative data,
- Helping users and data contributors understand how to participate.

The Arctic SDI has been expanding its international cooperation

Conservation of Arctic Flora and Fauna's Arctic Biodiversity Data Service

International Hydrographic Organization's Arctic Regional Marine SDI Working Group (ARMSDIWG)

Sustaining Arctic Observing Networks

Arctic Data Committee

Open Geospatial Consortium

International Organization for Standardization

United Nations Committee of Experts on Global Geospatial Information Management (UN-GGIM)

University of Minnesota Polar Geospatial Center

Regular Dialogue with Arctic Council

Reporting on Arctic SDI activities through CAFF, SAOs

Dialogue and cooperation with the Arctic Council working groups

- to offer data and services

New pilot project with Arctic Council Secretariat
to modernize the map gallery at the Arctic Council Website

- including providing interactive maps that can exhibit statistical data within the administrative boundaries of the Arctic
- to serve as tools for communication of reports and scientific results

How Arctic Council Working Groups can benefit from the Arctic SDI?

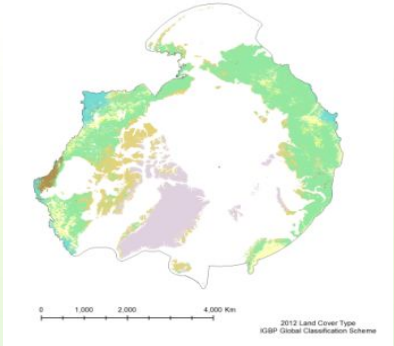
- Using the same basemap helps to combine research results
- Analysing and comparing the phenomenon at different times
- Publishing maps easily – interactive maps

→ Arctic SDI is available to help through technical assistance

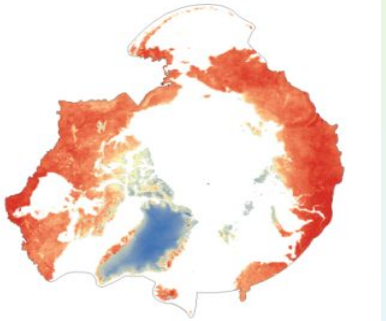
Technical Support

- Assisting CAFF with thematic data services
- Information exchange
- Reporting to Arctic Council
- Helping with mapping and providing data on wetlands across the Arctic
- Arctic SDI and CAFF are cooperating on CAFF's initiative to explore potential to harness remote sensing for Arctic flora and fauna monitoring and assessment.

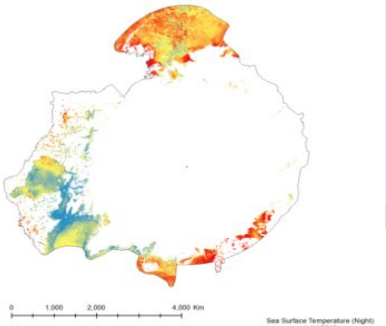
2012 Land Cover Type



Land Surface Temperature



Sea Surface Temperature



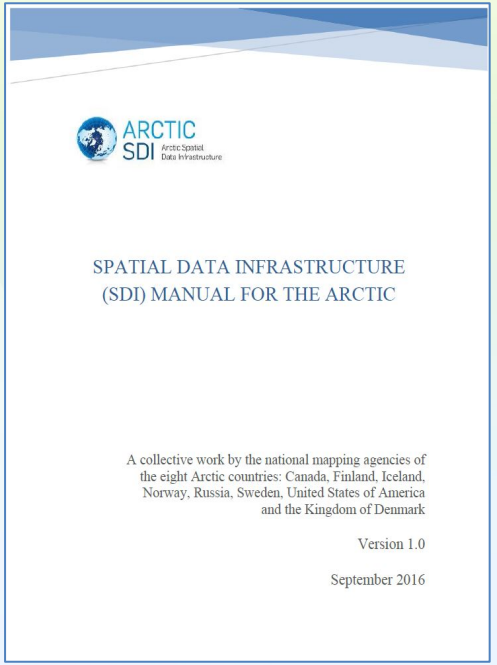
Arctic SDI Strategic Plan 2015-2020: 6 Objectives

Objective	Objective Description	Primary Arctic SDI Working Group
Objective 1	Address Needs of Arctic Council and Other Users	Strategy Working Group
Objective 2	Provide Reference Datasets	Data Working Group
Objective 3	Facilitate Access to Thematic Datasets	Data Working Group
Objective 4	Data and Technical Interoperability	Technical Working Group
Objective 5	Spatial Operational Policies	Operational Policies Working Group
Objective 6	Communications	Communication Working Group

Operational Policies

Geospatial **operational policies** are a broad range of practical instruments such as guidelines, best practices, directives, procedures and manuals that address topics related to the lifecycle of geospatial information and help facilitate access to and use of location-based information.

These policies apply to the day-to-day business of organizations and address legal and administrative requirements, and make issues such as data access, quality, ownership and integrity easier to manage.



Arctic-SDI.org:

- SDI Manual for the Arctic , Glossary of Terms, Data Sharing Agreements,
- Guidelines for Data Providers (under creation), Geoportal Disclaimer,
- **User Needs Assessments** , **Evaluation**, **Key Performance Indicators** ,…

Key Policy Instrument and Methodology: User Needs Assessments

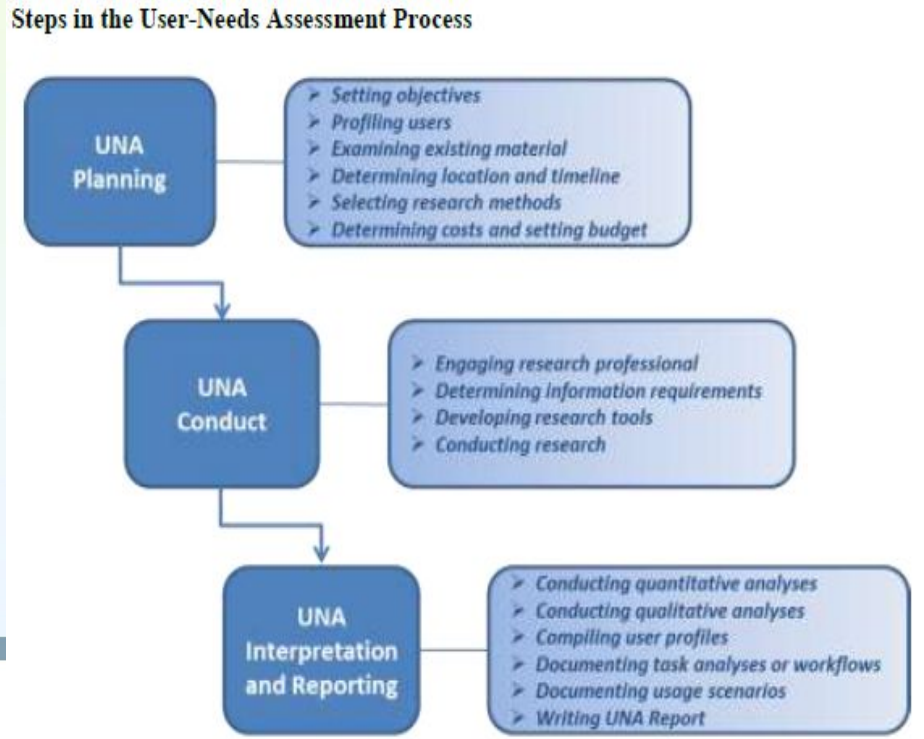
- A **user needs assessment (UNA)** is a process of discovering and assessing the needs of users by taking into account their ideas, attitudes, wants and preferences on a particular issue.

- A UNA will help organisations set priorities and make decisions about a program, application or system, or the allocation of resources.

- The research methods used, either qualitative or quantitative, will depend on the type of information required, attitude information or behavioral information.

- Two Arctic SDI UNAs were contracted to gather the needs of users and data providers. This resulted in two reports:
  - *Environmental Scan on User Needs Assessments for the Arctic SDI* with a focus on Indigenous communities,
  - *Better Access to Geospatial Marine Data*.

The UNA process is typically carried out in three phases:



Policy Instruments and Methodology: Evaluation Framework and KPIs

A SDI evaluation is used to assess if the SDI realizes the intended objectives and benefits by providing a snapshot of its current state.

A SDI evaluation (a detailed " **audit** ") is performed to:
- Obtain more knowledge about SDI functioning (performance),
- Determine if the SDI is on the intended track of development,
- Assist SDI development, and
- Determine accountability.

A KPI is "a measurable objective which provides a clear indication of service centre capability, quality, customer satisfaction, etc."

In the Arctic SDI context, nine KPIs were developed to gauge the effectiveness of the implementation of the Arctic SDI Strategic Plan 2015-2020, as well as the effectiveness of the Arctic SDI itself.

KPIs are providing on a yearly basis a regular and accessible reporting tool - a short **KPI Report Card** - to the Arctic SDI Board

Table 1: KPIs by Board Reporting Themes with linkages to the Strategic Plan and Evaluation Framework.

2015-2020 Arctic SDI Strategic Plan Objectives		Board Reporting Themes	KPIs	Evaluation Framework Components
Address Needs of Arctic Council and other data users and providers	Communications	Outreach and Communication	• 1. Number of accesses to the Arctic SDI Website • 2. Number of outreach and capacity building activities • 3. Number of times the Arctic SDI is mentioned externally	• Organizational readiness • Capacity Building
	Provide Reference Datasets	NMA Services	• 4. Number of relevant and validated NMA reference datasets that are available through the Geoportal	• Data and Information Environment
	Provide Thematic Datasets Provide Reference Datasets	External Data	• 5. Number of relevant and validated external datasets that are available through the Geoportal	• Data and Information Environment
	Data and Technical Interoperability	Geoportal	• 6. Number of applications using the Arctic SDI and its Geoportal tools • 7. Number of accesses to Arctic SDI central services • 8. Number of data providers publishing metadata in the Arctic SDI Metadata Catalogue	• Arctic SDI Geoportal • Standards • Information Infrastructure
	Spatial Operational Policies	Business Processes	• 9. Number of times that Arctic SDI guidelines are used	• Organizational readiness

SDI User Needs Assessments

ARCTIC SDI Arctic Spatial Data Infrastructure

The objective of this project is to conceptualise, document, frame and develop detailed user needs assessments (UNAs) that will gather the requirements of Canadian stakeholders and the international Arctic community in terms of:

- data and services (land and marine),
- standards
- technologies (e.g. applications)
- operational policies
- collaboration, and
- leadership & governance.

Specifically, this project will consist of researching and detailing the SDI requirements of different communities:

- Canadian stakeholders (CGDI),
- International Arctic Community, and
- Indigenous Communities (First Nations, Inuit, Métis).

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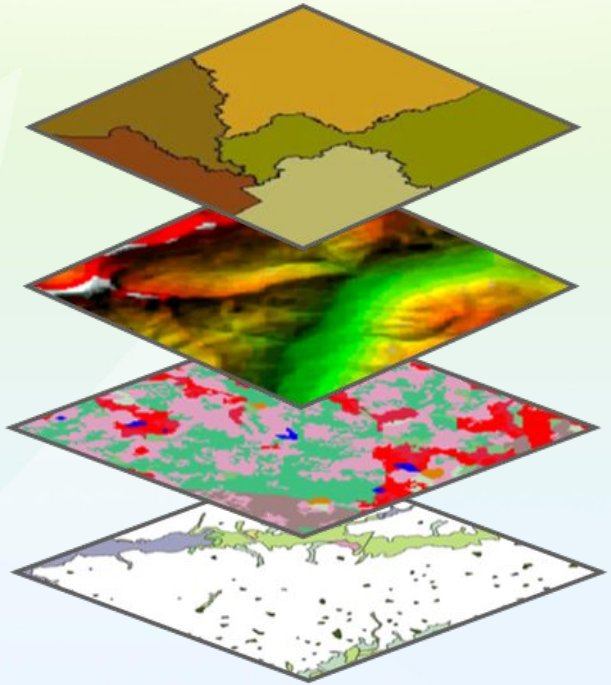
The Arctic SDI provides, via a Web portal, easy access to:

- A searchable metadata catalogue
- Authoritative Arctic topographic Basemap Service (scale 1:250,000)
- Thematic data (birds, ice cover, ship routes, land cover change, flora etc.)
- Gazetteer Database and Search (3 million place names)
- A geoportal for geospatial data viewing and discovery



Authoritative Topographic Basemap

Provided Directly from the **8 Arctic National Mapping Agencies**

- **Common Cartographic Specification**
- **A Trusted Source of Detailed Information**

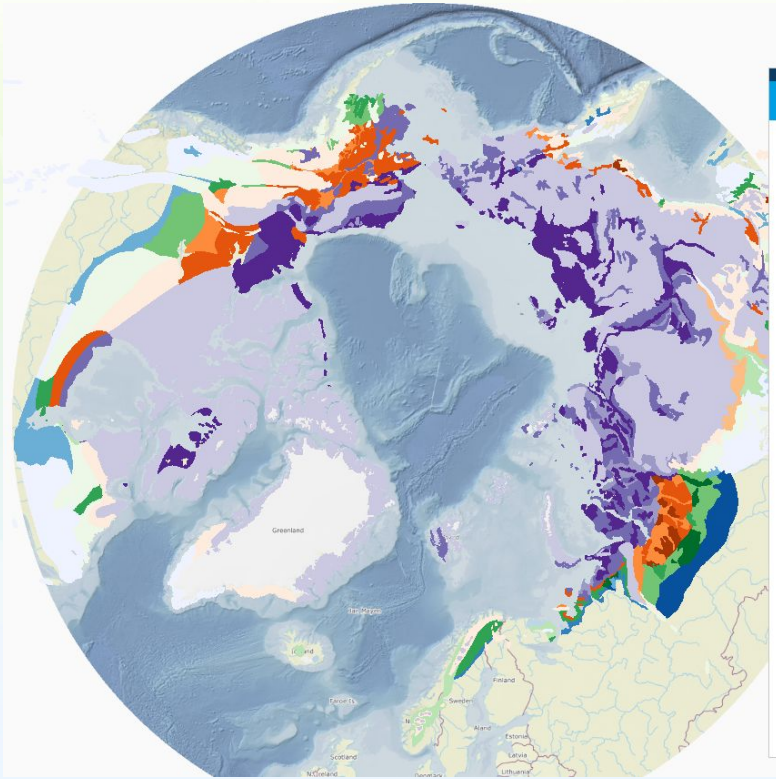
Southern Svalbard: Arctic SDI Basemap vs. Google Maps

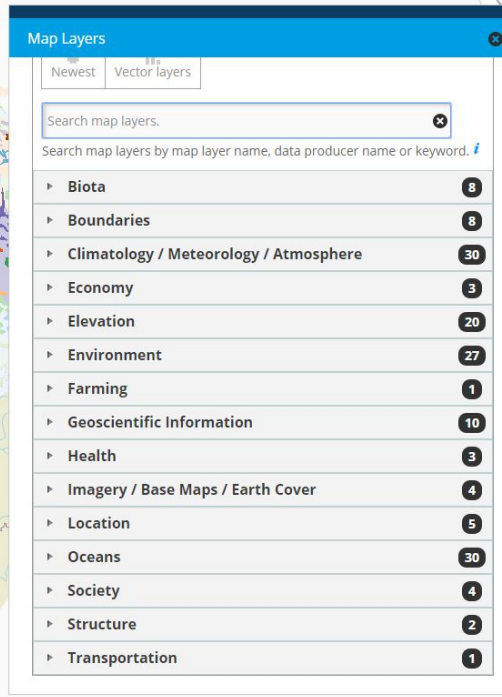
Arctic SDI Geoportal / Arctic-SDI.org

ARCTIC SDI Arctic Spatial Data Infrastructure

Functionalities

- Location Search
- Metadata Search
- Map Layers & Coordinate Tool
- Time Series (WMS-T)
- Embedded Maps Wizard
- Your Own Maps
- Geoportal Administration





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Embedded Maps

CAFF Conservation of Arctic Flora and Fauna

About Monitoring Assessments Strategies Policy Expert Groups Data Publications Press

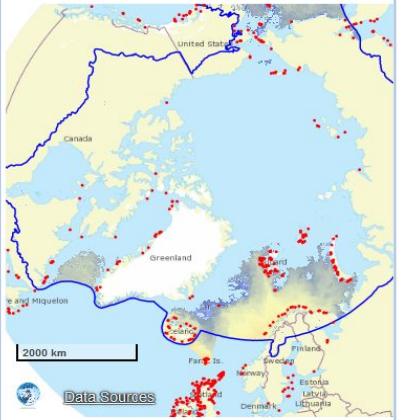
ARCTIC COUNCIL

Home / CAFF_Webb / caff.is / Press Centre / Press Releases_New / 2012 Arctic Report Cards describe dramatic changes in the Arctic (December 4, 2012)

Search CAFF

Search .... Go

Search location



2012 Arctic Report Cards describe dramatic changes in the Arctic (December 4, 2012)

December 4, 2013, U.S.A.- The Arctic Council, through the Arctic Monitoring and Assessment Programme (AMAP) and the Conservation of Arctic Flora and Fauna's (CAFF) Circumpolar Biodiversity Monitoring Programme (CBMP), has contributed to the Arctic Report Card, an annual report released today by the National Oceanic and Atmospheric Administration (NOAA) that monitors the often-quickly changing conditions in the Arctic.

The peer-reviewed report contains contributions from 141 authors from 15 countries. For this year's issue CAFF's CBMP developed and edited the terrestrial and marine ecosystem chapters in cooperation with others, while AMAP organized an independent peer-review process involving international experts.

The Arctic region continued to break records in 2012—among them the loss of summer sea ice, spring snow cover, and melting of the Greenland ice sheet. This was true even though air temperatures in the Arctic were unremarkable relative to the last decade, according to the report.

Major findings include:

- ***Snow cover***: A new record low snow extent for the Northern Hemisphere was set in June 2012, and a new record low was reached in May over Eurasia.
- ***Sea ice***: Minimum Arctic sea ice extent in September 2012 set a new all-time record low, as measured by satellite since 1979.
- ***Greenland ice sheet***: There was a rare, nearly ice sheet-wide melt event on the Greenland ice sheet in July, covering about 97 percent of the ice sheet on a single day.
- ***Vegetation***: The tundra is getting greener and there's more above-ground growth. During the period of 2003-2010, the length of the growing season increased through much of the Arctic.
- ***Wildlife and food chain***: In northernmost Europe, the Arctic fox is close to extinction and vulnerable to the encroaching Red fox. Additionally, massive phytoplankton blooms below the summer sea ice suggest estimates of biological production at the bottom of the marine food chain may be ten times too low.
- ***Ocean***: Sea surface temperatures in summer continue to be warmer than the long-term average at the growing ice-free margins, while upper ocean temperature and salinity show significant interannual variability with no clear trends.
- ***Weather***: Most of the notable weather activity in fall and winter occurred in the sub-Arctic due to a strong positive North Atlantic Oscillation. There were three extreme weather events including an unusual cold spell in late January to early February 2012 across Eurasia, and two record storms characterized by very low central pressures and

Login

Geoportal

- The **Geoportal** is an access point to the Arctic SDI, brings all the services and maps together and enables you to very easily reuse them in your daily work.
- Openly accessible.
- The Geoportal features for example a **Time Series tool**, which can be used to visualize various phenomena
 for example sea surface temperature change over time in the Arctic

- **Dynamic interactive maps**, known as embedded maps, can be created for delivery via any website
 without any coding, with just a few quick steps
 if any data source gets updated, the latest data is readily shown on in the embedded map without user intervention

Arctic SDI Geoportal Video

https://youtu.be/K8xRbNiGgRs

Operational Policies

CGDI Resource Centre

Operational Policy Documents:

Protected Information

- Confidential information
- Sensitive Information
- Private information
- Intellectual Property

Access, Management and Dissemination

- Archiving and Preservation
- Data Integration
- Data Sharing
- Licensing
- Volunteered Geographic Information (VGI)
- Cloud Computing
- Free and Open Source Software (FOSS)
- Licensing

Arctic Spatial Data Pilot - Climate Change Scenarios

- Sponsored by NRCan and USGS, in collaboration with the Arctic SDI participants, this Open Geospatial Consortium Arctic Spatial Data Pilot:
  - Defined land and sea climate change scenarios to break down *information management silos* with technical piloting activities:
    - Improved access to reliable data for monitoring, management, emergency preparedness and decision making in the Arctic,
    - Produced videos to showcase how standards and common approaches to data management are deployed.
  - Addressed technology issues to meet the realities of Arctic frontier economies, such as in zero/low bandwidth Internet.

  http://www.opengeospatial.org/projects/initiatives/arcticsdp

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USGS
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Arctic Spatial Data Pilot - Videos

VIDEOS

Case Studies by Pilot Participants

OGC / 7:46 MIN

The Arctic Spatial Data Pilot Summary

This video highlights essential elements that have been addressed by the Arctic Spatial Data Pilot, an initiative of the OGC Innovation Program

LUCIAD / 2:56 MIN

New Shipping Routes in the Arctic

The Arctic encompasses a number of shipping routes, grouped into a Northwest Passage and a Northeast Passage. Each passage crosses a ...

COMPUSULT / 4:50 MIN

Search & Rescue in the Hudson Strait

The Canadian Coast Guard receives a distress message from an oil tanker in the Hudson Strait. Coast Guard initiates a search and ...

PYXIS / 7:03 MIN

Modeling, Forecasting & Complex Data Analysis

Analysis of scientific data to project thawing of permafrost Modeling Land Susceptibility to Failure due to Permafrost Loss.

ECERE / 9:18 MIN

3D Data Visualization & Temporal Patterns

The Porcupine caribou herd's migration patterns have been overlaid with topographic and climatic information in a 3D environment.

ESRI CANADA / 6:56 MIN

Food Security in the Arctic

Building a Web Platform on Food Security: Governments and NGOs are continually assessing and monitoring the situation to ensure ...

ARCTIC SDI / 5:32 MIN

ArcticSDI: Functionality & Sustainability

Demonstration of the Arctic SDI Geoportal, a cooperative effort between the National Mapping Agencies of the eight Arctic Council Member countries.

PYXIS / 5:56 MIN

Landslide Susceptibility Mapping

NRCan completed a pilot study on a region within the Mackenzie Valley to test a method of mapping slope stability in a permafrost environment.

LUCIAD / 3:11 MIN

Sea Ice Age Evolution: Beaufort Gyre

Arctic Sea Ice Age measurements show that the sea ice is becoming younger. Since the 1980s, the amount of multiyear ice has declined ...

In Summary

We Are All Stakeholders

- Ecosystem-based analysis requires seamless sharing of data across jurisdictions and organizations.

- Arctic SDI is providing shared tools and information management practices to Arctic Council WGs to break down silos.
- Arctic SDI brings together the National Mapping Agencies, trusted map data and geospatial data expertise.

Source: blogs.vmware.com

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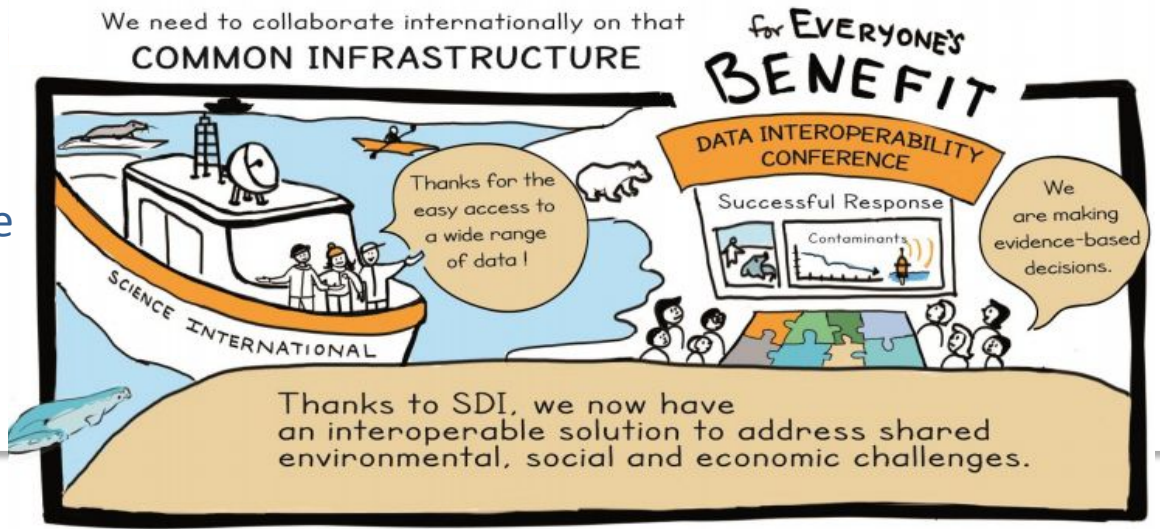
In Summary

- Improved access to geospatial data can help us better to predict, understand and react to changes in the Arctic.
- Capacity building materials on how to integrate your own data.
- Geoportal:
  - Embedded maps
  - Time Series visualization and other tools to help Arctic stakeholders analyse and deliver their data to decision makers and other audiences



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Arctic-SDI.org