

Report on Activities of Arctic Data Committee

Peter L. Pulsifer (Presenter)

28 November 2018

5th Meeting of the Arctic Data Committee
Geneva, Switzerland



National Snow and Ice Data Center
Supporting Cryospheric Research Since 1976



Arctic Data Committee

- Formed Nov '14
- IASC-SAON partnership
- National and voluntary members + Indigenous (2017)
- Promote and enable:
 - **Understanding the system**
 - **Effective data policy**
 - **Infrastructure**
 - **Ethically open access**
 - **Attribution**
 - **Standards and interoperability**



<http://arcticdc.org>

Part of a System

Global



Selected 2017-2018 Activities

Arctic Data Committee (Sept 2017)

- Linking ADC / SCADM / SOOS and many other organizations (e.g. ASDI)
- Practical challenges in engaging Indigenous organizations
- Preparation for Polar Data Planning Summit

Photos: Marten Tacoma



September 2017 meetings of ADC, SCADM, SOOS and partners

“Polar Data Planning Summit”

22-24 May, 2018
Boulder, Colorado



Award 1749243



PDPS 2018

Details

■ Published: 23 August 2016

Page 3 of 6

Registered Participants

Name	Affiliation	Country
David Arthurs	Polar View	Denmark
Pip Bricher	Southern Ocean Observing System	Australia
Andreas Cziferszky	British Antarctic Survey / Polar View	United Kingdom
Taco de Bruin	NIOZ Royal Netherlands Institute for Sea Research	The Netherlands
Eric Coplin	Battelle-NEON	United States
Ruth Duerr	Ronin Institute for Independent Scholarship	United States
Florence Fetterer	NSIDC	United States
Daniel Gibson	Government of Northwest Territories	Canada
Oystein Goday	Norwegian Meteorological Institute	Norway
Sarah Inman	University of Washington	United States
Christopher Jones	National Center for Ecological Analysis and Synthesis, UC Santa Barbara	United States
Peter Kirsch	Polar Data Centre; British Antarctic Survey	United Kingdom
Christine Laney	Battelle-NEON	United States
Ellsworth LeDrew	University of Waterloo, Polar Data Catalogue	Canada
Corrado Leone	Italian National Research Council	Italy
Simona Longo	CNR	Italy
William Marley	University of Colorado, INSTAAR	United States
Heidi McCann	CIRES/NSIDC	United States
Maribeth Murray	Arctic Institute of North America, University of Calgary	Canada
Mark Parsons	Rensselaer Polytechnic Institute	United States
Peter L. Pulsifer	University of Colorado at Boulder	United States
Yubao QIU	Institute of Remote Sensing and Digital Earth	China
Simon Rielop	Canada Centre for Mapping and Earth Observation / Natural Resources Canada	Canada
Hannele Savola	Thule Institute, University of Oulu	Finland
Serge Scory	Royal Belgian Institute of Natural Sciences	Belgium
Donna Scott	National Snow and Ice Data Center	United States
Aleksandr Smirnov	Arctic Portal	Iceland
Sandy Starkweather	NOAA-ESRL/CIRES	United States
Don Stott	National Center for Atmospheric Research	United States
Colleen Strawhacker	National Snow and Ice Data Center	United States
Shane St. Savage	Axiom Data Science (Alaska Ocean Observing System)	United States
Marten Tacoma	NIOZ Royal Netherlands Institute for Sea Research	The Netherlands
Chris Torrence	NSIDC	United States
Taneil Uttal	NOAA	United States
Thomas Vandenberghe	Royal Belgian Institute of Natural Sciences	Belgium
Naomi Whitty	Polar Field Services	United States
Ann Windnagel	NOAA/NSIDC	United States
Lynn Yarmey	Research Data Alliance	United States

PDPS 2018

Agenda

Participants

Use Cases

Resources

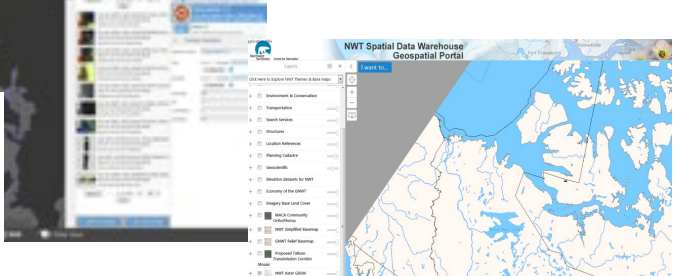
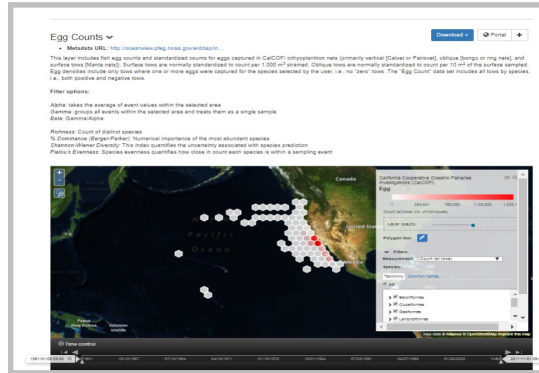
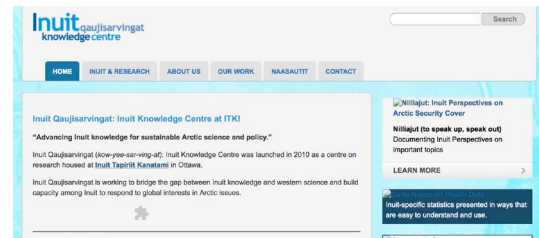
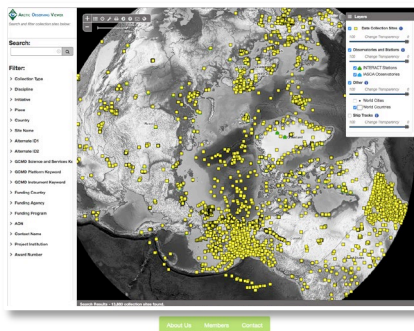
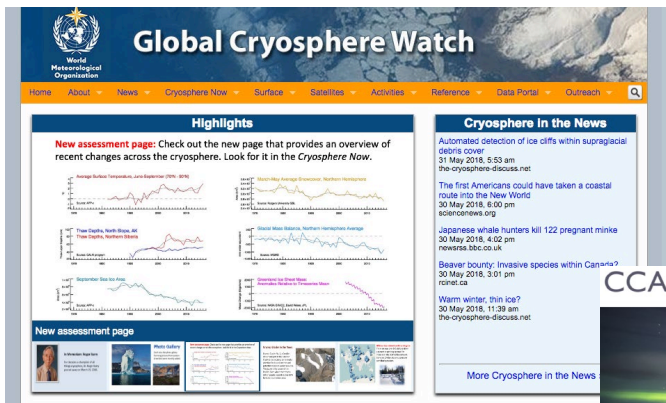
Registration, Transportation, Weather, Contacts

All Pages

Building on Existing Work

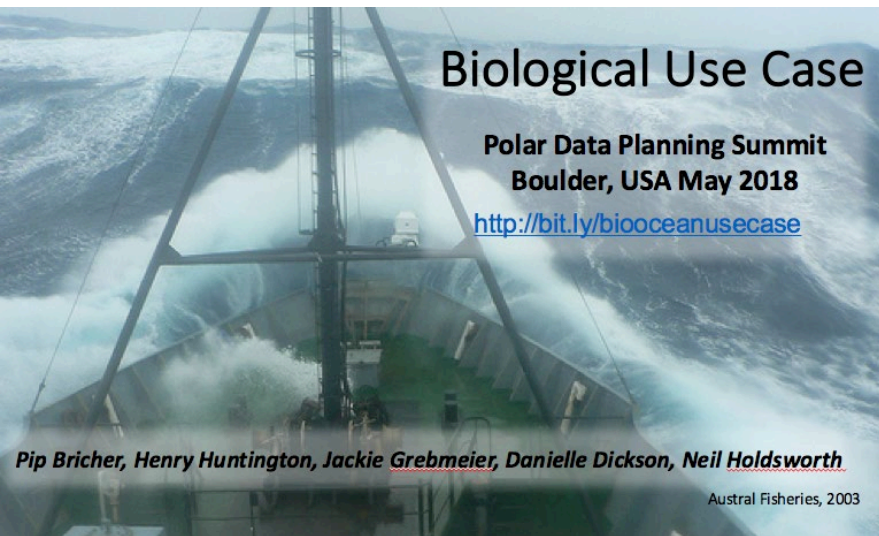


PDPS: Review of Selected Existing Resources



Working Session

Use Cases



Scenario for data discovery/federation and access through standardised web services
discussion on cryospheric extremes



The following questions might be asked

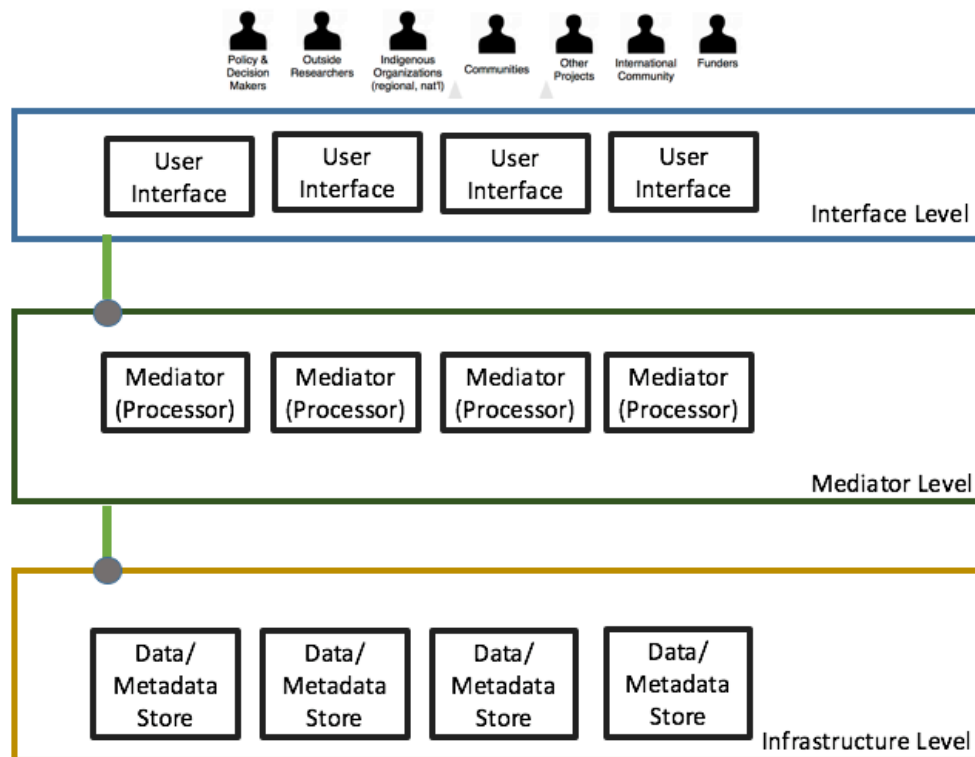
- Has the risk for avalanches in Longyearbyen increased the last 30 years?
- Is the permafrost changing and will this affect the local infrastructure in Longyearbyen?
- Can changes be attributed to changes in the atmospheric circulation and are these changes related to the diminishing sea ice?
- Are local and regional observations sufficient?
- Are they sustainable?
- How will they evolve?
- What oceanographic, biological, and other environmental (i.e. sea ice) marine observations and research are currently underway in the Bering Strait region?
- What are the objectives, timelines of these initiatives?
- What outreach protocols/opportunities are currently in place for coastal stakeholders in western and northern Alaska to learn about the ongoing work and/or past results that might be relevant?



Technical Track



Template



Polar Data Planning
Summit 2018

Architecture Template

Notes:

- For system elements provide function description and if possible, an instance
- Describe service interfaces and flows
- If possible, provide format information in flow description
- Describe user "personas" wherever possible

● Service interface

■ Data/metadata flow

Results – focus on discovery



Context and Organizational Challenges Track

Summary of Topics

- Complex “ecosystem” that goes beyond technology and data to includes organizational relationships, standards, policy, international relations, local to global scales – how to influence this in a purposeful way?
- Need to “interweave” activities and planning related to observing system with data system
- Will require a balance of top-down structure and bottom-up activities (structure, agency) – coordination, “soft governance”
- Unpacking “governance”, “organization”, “coordination” - IMP: Who?

Arctic Observing Summit – Davos, June 2018

Sub-Theme 2: Implementing and Optimizing a Pan- Arctic Observing System



Arctic Observing Summit (AOS) 2018 Statement and Call to Action August 24, 2018

Working Group 4: Participants of this group will focus on the role of **data management** in observing system implementation.

Co-chairs: Dr. Peter Pulsifer (National Snow and Ice Data Center); Dr. Oystein Godoy (Norwegian Meteorological Institute)

Rapporteur: Dr. Anja Rosel (Norwegian Polar Institute); Ms. Shannon Christoffersen (University of Calgary).

Thematic Working Group members: Dr. Paul Berkman (Tufts University); Dr. Maribeth Murray (University of Calgary); Dr. Roberta Pirazzini (Finnish Meteorological Institute); Ms. Sarah Marie Strand (The University Centre in Svalbard); Mr. Mikko Strahlendorff (Finnish Meteorological Institute); Dr. Taneil Uttal (National Oceanic and Atmospheric Administration).

The final statement summarizes the main conclusions and call to action from the Arctic Observing Summit 2018 held in Davos, Switzerland, between June 24 and 26, 2018. The Conference Statement is based on the summaries of the working group deliberations and was reviewed during the final plenary session of the summit.

We are living in the Anthropocene – a new era with human activities altering the planet in ways never before. One of the fastest changing regions on the Earth is the Arctic where impacts of major changes are felt both early and more strongly than elsewhere in the world. As an integral part of the system, the Arctic is shaped by global processes, and in turn, Arctic processes influence living conditions for millions of people at lower latitudes. Through the efforts of governments, international organizations, Indigenous Peoples, academicians, and others, there is real progress in observing a rapidly changing Arctic. Numerous examples illustrate that progress from such observations enables, informs, and enhances decision-making at local to pan-Arctic scales, however, much more must be done, particularly with respect to the range, distribution and continuity of observing.

https://arcticdc.org/images/download/ASM2_Deliverable_Statement_Data.pdf

Second Arctic Science Ministerial Deliverable



Minimum of 3 events from
November 2018 – March 2020

Title: Developing an architecture for an international, interconnected arctic data system

Funding Programme and/or Organisation

Sustaining Arctic Observing Networks (SAON)

Coordinating organisations and main contact person

- The Arctic Data Committee
- Standing Committee on Antarctic Data Management
- Southern Ocean Observing System

Main contact person: Peter L. Pulsifer, National Snow and Ice Data Center, University of Colorado, Boulder, USA; e-mail: peter.pulsifer@colorado.edu

Description of the deliverable

Arctic societies, science and services are entering a new era that increasingly require cross-cultural, interdisciplinary integration of data to provide critical understanding and products. These needs require an integrated Arctic data system that is not only part of the global system, but which also allows exchange and usage of data between disparate data systems. Such a data system will allow enhanced understanding that is critical for mitigating risk to humans and infrastructure, reducing costs of adaptation and development, and supporting much needed research that spans disciplines and knowledge systems, including science and Indigenous Knowledge.

Geneva Workshop – 28 – 30 November, 2018

Polar Data and Systems Architecture Workshop

- Extension of Polar Data Planning Summit and Arctic Observing Summit
- First meeting in series outlined in ASM II Deliverable
- Continue federated search activity
- Expand activity to include data interoperability
- Primary goal: develop collaborative “structure” and model for development of architecture. Includes presentation of existing models.

Polar Data Architecture Workshop

Details

■ Published: 24 August 2018

Page 1 of 5

Dates and Location

28 - 30 November 2018

WMO Headquarters, Geneva, Switzerland

7bis, avenue de la Paix,
Case postale 2300
CH-1211 Geneva 2
Switzerland



In the coming period this page will be expanded, important updates will also be sent to the [polardata mailing list](#). If you aren't on that list yet we strongly encourage you to sign up.

Background

A consortium of polar data coordinating bodies have recently hosted a number of useful workshops and events to foster collaboration between individuals, institutions, projects and organisations. These events have built on polar data coordination efforts including progress made during the International Polar Year, and two Polar Data Forum meetings.

More recently, the focus has been on identifying and understanding the specifics of polar data sharing and interoperability through workshops such as the Polar Connections Interoperability Workshop and Assessment Process hosted by the European Space Agency in 2016, and the Arctic Spatial Data Pilot implemented by the Open Geospatial Consortium. In May of 2018, the Polar Data Planning Summit (PDPS) hosted by the University of Colorado focused on specific interoperability priorities and the organizational and community-building aspects of data sharing and interoperability.

[Polar Data Architecture Workshop](#)[Draft Agenda](#)[Registration / Transportation / Weather](#)[Remote participation](#)[Contact](#)[All Pages](#)

System Dimensions/Components

Federated Search



- About Portals
- GCMD Portal Listings
- Add to AMD
- View Writer's Guide
- AMD Data Sets
- Astrophysics Data Sets
- Online Data Sets
- SCADM Website

Find Data Sets by Topic:



Enter term(s)

N: 90

S: 45

E: 180

W: -180

Data Set Text S
Search tips

Send feedback

Diverse Arctic Research Data

Search multiple repositories in one convenient place. Search results will direct you towards free

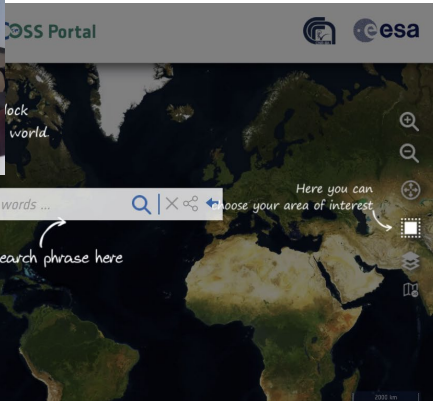
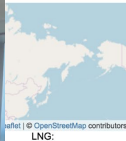
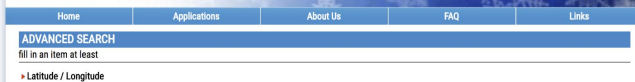
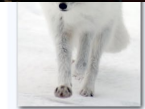
Examples of Available Data

- Sea ice
- Biology
- Permafrost
- Mineralogy
- Economics
- Hydrography
- Oceanography
- Ecology
- Terrestrial ecology
- Chemistry
- Local and Traditional Knowledge

Earthquake and IEEE video on how the Arctic Data Explorer works.

Repository Name

NSF Arctic Data Center (NSF ADC)	6352
National Snow and Ice Data Center (NSIDC)	201
UCAR NCAR - Earth Observing Laboratory (UCAR NCAR EOL)	14300
UCAR NCAR Research Data Archive (UCAR NCAR RDA)	470
NOAA National Oceanographic Data Center (NOAA NODC)	499
Norwegian Meteorological Institute (Met.no)	1522
NASA Earth Observing System (EOS) Clearing House (ECHO) (NASA ECHO)	2550
International Council for the Exploration of the Sea (ICES)	84
U.S. Geological Survey ScienceBase (USGS ScienceBase)	913
Biological and Chemical Oceanography Data Management Office (BCO-DMO)	2203
Polar Data Catalogue (PDC)	1404
IdAR: The Digital Archaeological Record (dAR)	
Rolling Deck to Repository (R2R)	
NOAA's National Centers for Environmental Information, World Data Service for Paleoclimatology (NOAA WDS Paleo)	
Global Terrestrial Network for Permafrost (GTN-P)	





Data Interoperability, Standards and Services

- Standards are the foundation of interoperability
- Discovery standards
- Data standards
- Services use standards to make the data widely available



OAI-PMH



Semantics

ADC-IARPC-SCADM Vocabularies and Semantics Working Group

Details

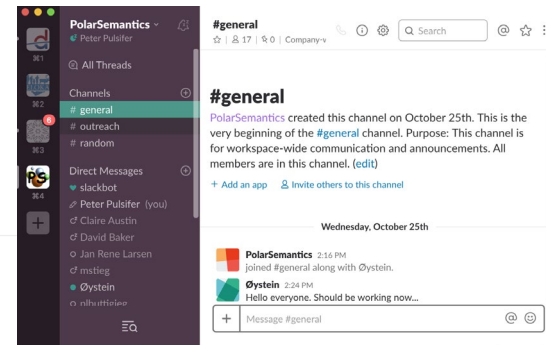
 Published: 31 July 2017

Group Summary

The Vocabularies and Semantics Working Group brings together people who are interested in semantics and vocabularies relevant to the polar regions. Originally established as a joint effort between the Arctic Data Committee and the [Arctic Data Sub Team of the Interagency Arctic Research Policy Committee](#), the group is open to all individuals and organizations with an interest in this topic.

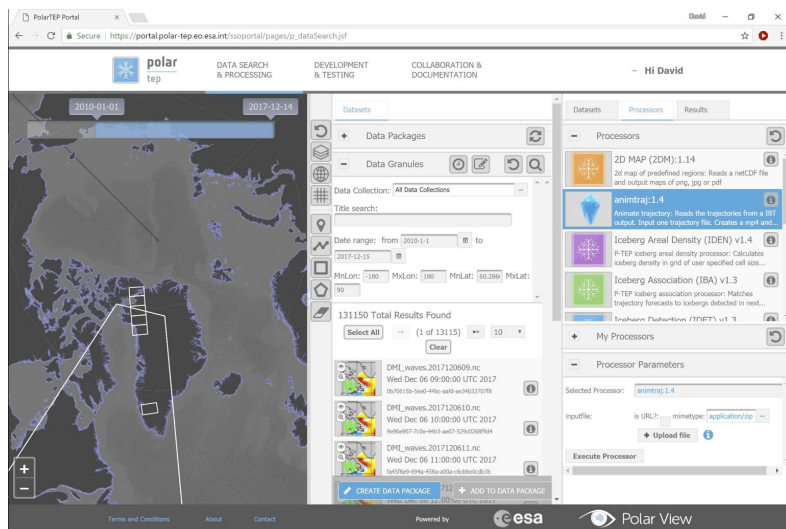
Group activities include:

- Promote awareness of existing vocabularies and semantics initiatives to increase effectiveness and reduce or eliminate redundancy
- Coordinate vocabularies and semantics development activities across the polar information community
- Enable and organize regular communication within the community
- Help members of the community connect to useful and interoperable vocabularies
- Inform the polar community about broader activities (e.g. ESIP, RDA), and act as ambassadors from the polar community to other initiatives



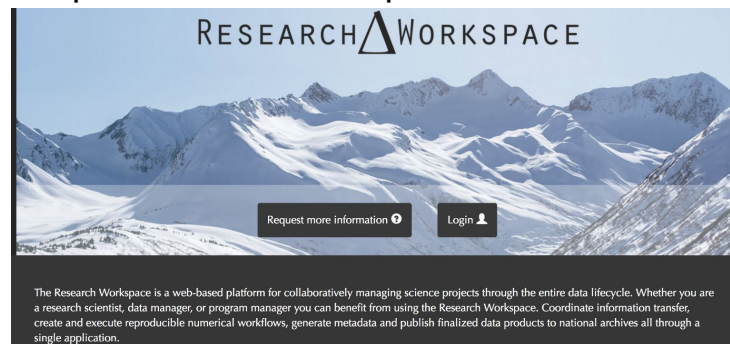
Cloud Platforms/Virtual Research Environments

<https://portal.polar-tep.eo.esa.int>

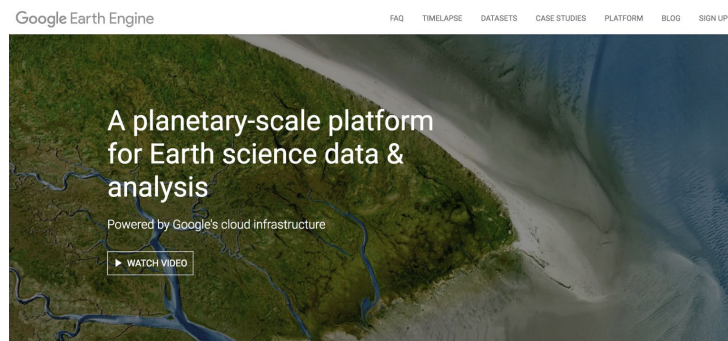


Polar Thematic Exploration Platform

<https://researchworkspace.com>



<https://earthengine.google.com>



Google Earth Engine

Moving Forward

Agenda

Wednesday, November 28th, 2018

08:30 - Arctic Data Committee Business Meeting ADC members, open to all

12:00

Agenda for the ADC meeting will be available [here](#) on or before September 30 2018

Time	Topic/Item	Lead, Participants
13:00	Arrival, Refreshments	
13:30	Welcome, logistics	Meeting organizers
13:45	Introductions	All participants
14:00	Review of recent activities and outcomes	Peter Pulsifer, Øystein Godøy, Pip Bricher, others
14:30	Detailed presentations on existing polar data and system architectures, including (additional presentations will be added): Global Cryosphere Watch Polar Thematic Exploration Platform Arctic Spatial Data Infrastructure INTAROS NSF Arctic Data Center / DataONE Arctic Portal	
15:30	Break	All
15:45	Detailed presentation on architectures continued GEOS platform Canadian Consortium for Arctic Data Interoperability Alaska Ocean Observing System Southern Ocean Observing System Standing Committee on Antarctic Data Management	

<https://arcticdc.org/meetings/conferences/polar-data-architecture-workshop>

Thursday, November 29th, 2018

08:00 Arrival, Refreshments

08:30 Review of Day 1 and Overview of Working Sessions (All)

09:00 **Work Session 1:** Comprehensive architecture design
(all elements of architecture)

A broad review of all aspects of architecture. Including but not limited to discussion of:

- Community building, coordination and governance,
- Physical infrastructure,
- Discovery and federated search
- Implementation software
- Standards and specifications
- Exchange protocols for data
- Semantic annotation and modeling for data

Working Session 2: Architecture design with a focus on Federated Search

Building on work carried out before and during Polar Data Planning Summit, Arctic Observing Summit and virtual meetings that have followed. Led by POLDER group (Federated Search for Polar Regions). Including but not limited to discussion of:

- Metadata structures/elements
- Discovery metadata
- Use metadata
- Discovery metadata granularity
- Exchange protocols for discovery metadata
- Semantic annotation in discovery and use metadata
- Finalising survey of polar metadata catalogues
- Finalising draft of Practical Advice for Polar Data Centres