

Review of the Polar Data Planning Summit

Presented at the SAON Board Meeting
22 June 2018

Peter L. Pulsifer (Presenter)

Research Scientist, National Snow and Ice Data Center, University of Colorado Boulder

Chair, IASC-SAON Arctic Data Committee

Co-Lead, IARPC Arctic Data Sub-Team

Co-Lead GEO Cold Regions Initiative



National Snow and Ice Data Center
Supporting Cryospheric Research Since 1976



Collaborative Effort

A. Van de Putte (2), P. Bricher (3), C. Strawhacker (1), M. Murray (4), D. Arthurs (5), T. Barnes (6), O. Bermúdez Molina (7), T. de Bruin (8), K. Buckland (6), J. Collins (1), R. Duerr (9), J. Friddell (10) , Ø. Godøy (11), T. Hamre (12), H. Jóhannsson (13), U. Jonsell (14), S.J.S. Khalsa (1), E. Kruemmel (15), J. Larsen (16), C. Leone (17), S. Longo (17), M. Maloley (18), R. Nitu (19), A. Olivieri (17), M. Parsons (20), J. Parrott (21), H. Savela (22), S. Schumacher (23), S. Scory (2), D. Scott (1), M. Tacoma (8), S. Tronstad (24), A. Vitikka (25), S. Vossepoel (4) Thomas Vandenberghe and Hsun-Yi Hsieh (2)

(1) University of Colorado, Boulder CO, United States; (2) Royal Belgian Institute of Natural Sciences, Brussels, Belgium; (3) Southern Ocean Observing System, Hobart, Tasmania, Australia; (4) University of Calgary, Calgary AB, Canada; (5) Polar View, Oxfordshire, United Kingdom; (6) British Antarctic Survey, Cambridge, United Kingdom; (7) IGME, Madrid, Spain; (8) NIOZ Royal Netherlands Institute for Sea Research and Utrecht University, Texel, Netherlands; (9) Ronin Institute for Independent Scholarship; (10) Canadian Cryospheric Information Network/Polar Data Catalogue, University of Waterloo, Waterloo ON, Canada; (11) The Norwegian Meteorological Institute, Oslo, Norway; (12) Nansen Environmental and Remote Sensing Center, Bergen, Norway; (13) Arctic Portal, Akureyri, Iceland; (14) Swedish Polar Research Secretariat, Stockholm, Sweden; (15) Inuit Circumpolar Council, Ottawa ON, Canada; (16) Sustaining Arctic Observing Networks, Oslo, Norway; (17) Consiglio Nazionale delle Ricerche, Rome, Italy; (18) Arctic Spatial Data Infrastructure, Ottawa ON, Canada; (19) World Meteorological Institute, Geneva, Switzerland; (20) Rensselaer Polytechnic Institute, Troy NY, United States; (21) Inuvialuit Regional Corporation, Inuvik NWT, Canada; (22) University of Oulu, Oulu, Finland; (23) Alfred Wegener Institute, Bremerhaven, Germany; (24) Norwegian Polar Institute, Tromsø, Norway; (25) University of Lapland, Rovaniemi, Finland

Overview

- Many initiatives have resources available or pending and progress is being made
- Still some work to do in connecting these systems and realizing interoperability
- The Summit brought together organizations, projects, programs that have available data resources and services
- Priority was on establishing practical, achievable connections between systems
- Used use case(s) as a guide

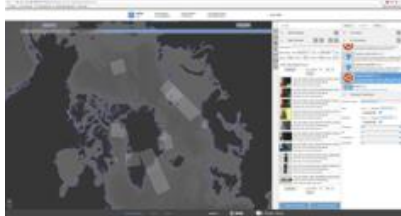
Planning Process

- Many events have preceded the Summit... and many will follow
- SAON Retreat in June 2017 resulted in workshop resources
- Consultation and discussion at ADC / SCADM meetings September
- Practical challenges in engaging Indigenous organizations
- Continued planning through Fall of 2017 and beyond

Photos: Marten Tacoma



September 2017 meetings of ADC, SCADM, SOOS and partners



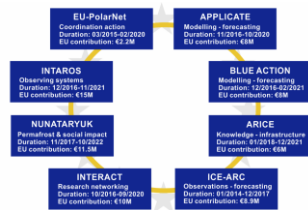
Polar TEP / Polar View



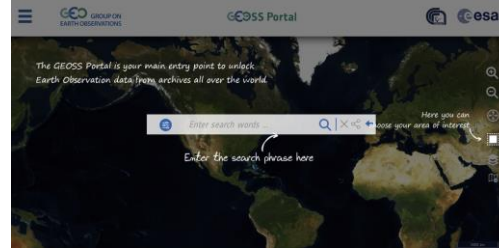
U of the Arctic



CCADI



EU Arctic Cluster



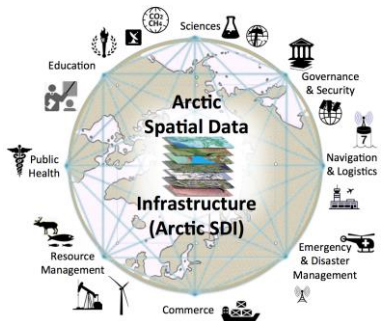
GEO(CRI)



Arctic Portal



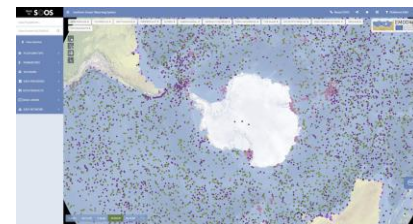
SCADM



ASDI



GCW



SOOS

Initial Partner Organizations

Mapping and Understanding the Data Ecosystem

Title: Postdoctoral Fellow (Arctic Data e-Cosystem Scientist)
 Reports To: Professor Paul Arthur Berkman and Dr. Peter Pulsifer
 Location: Fletcher School of Law and Diplomacy, Tufts University
 FTE: 24 Months (with possible extension)

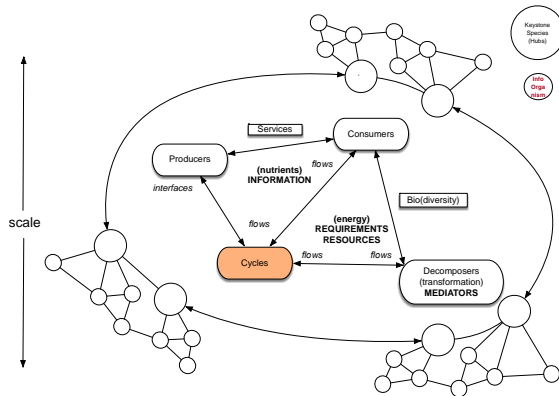
POSTDOCTORAL FELLOW
 Arctic Data e-Cosystem Scientist

BACKGROUND OF FLETCHER SCHOOL OF LAW AND DIPLOMACY AT TUFTS UNIVERSITY

The Fletcher School is committed to educating in an inclusive and supportive environment that welcomes students regardless of national origin, religion or citizenship status. At the Fletcher School, for more than 80 years, we have tried to "know the world." Our job is to prepare our graduates to be practitioners in every dimension of international relations: economics, finance, diplomatic history, politics, culture, security and many other disciplines. The challenges we face in this turbulent 21st century date literally thousands of miles away from our campus.



Dr. Katia Kontar



Information Ecology to Map the Arctic Information Landscape

Peter L. Pulsifer, Yekaterina Kontar, Paul Arthur Berkman, D.R. Fraser Taylor

12.1 Introduction

Governance involves processes of interaction, dialogue, negotiation and decision-making among many actors involved in the development of social norms and institutions. Understanding and addressing the values, key priorities, and common interests of actors is critical to effective governance that balances societal well-being, environmental protection and economic prosperity across generations. This is particularly challenging in the Arctic region due to the complexity of the region in the face of significant environmental, economic

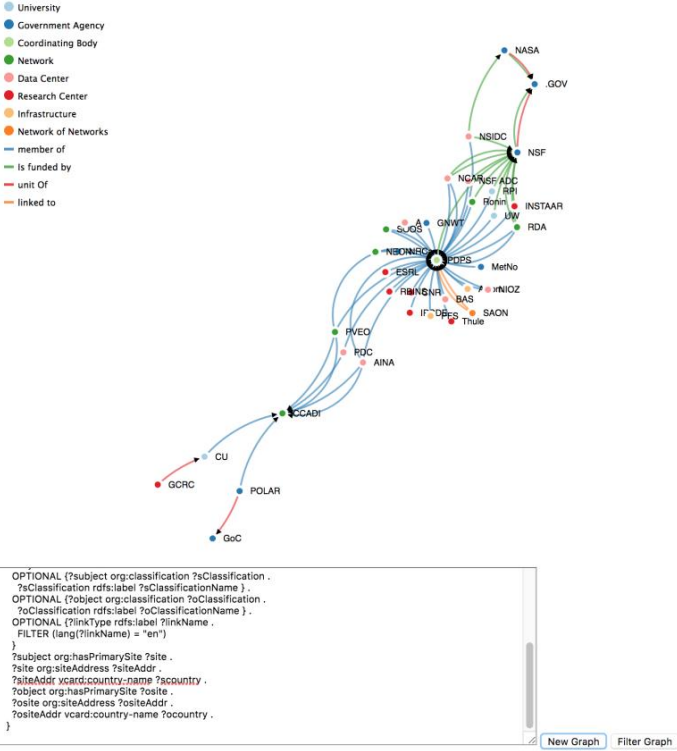


Arctic Data Ecosystem Map (DRAFT)

The objective of this activity is to establish a map of the arctic data management "ecosystem" or "universe". This is both a concept map indicating projects, services and relationships as well as a geographic map indicating location. The effort was started during the first meeting of the ACC in Potsdam, Germany, November 2014 and is an ongoing activity. The roadmap for this project includes establishing a linked open data endpoint that will allow people to query the database (i.e. using SPARQL).

In June of 2016, the concept of mapping the Arctic data ecosystem were presented by task lead, Peter Pulsifer, the second meeting of the Belmont Forum Funded Pan-Arctic Options Project, led by Professor Paul Berkman. Similar concepts were being discussed by the Pan-Arctic Options team and other initiatives under organizations such as the Research Data Alliance have recently emerged. Starting in early 2017, this activity is now being carried out using resources from and under a broader initiative led by the Pan-Arctic Options project in collaboration with a number of other open and digital infrastructure initiatives. Results will be posted here and elsewhere.

From Map to Model



Polar Data Planning Summit

PDPS 2018

Details

Published: 23 August 2016

Page 1 of 6

Polar Data Planning Summit



Dates and Location

22 - 24 May 2018

UMC 415-417, University Memorial Center
1669 Euclid Ave, Boulder, Colorado, 80309 (corner of Broadway and Euclid)

University of Colorado Boulder
Boulder, Colorado USA

Map of Campus

Connection to Guest wireless Internet during the meeting

Connection to Zoom Conference for Virtual Participants

| |
|---|
| PDPS 2018 |
| Agenda |
| Participants |
| Use Cases |
| Resources |
| Registration, Transportation, Weather, Contacts |
| All Pages |

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 Godoy | 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 Lancy | Battelle-NEON | United States |

| |
|---|
| PDPS 2018 |
| Agenda |
| Participants |
| Use Cases |
| Resources |
| Registration, Transportation, Weather, Contacts |
| All Pages |





Technical Track



Building on Existing Work

Sustaining Arctic Observing Network (SAON)

SAON Data Management Workshop Report

Developing a Strategic Approach

Prepared By:
Göran B. Lückert, NOAA Arctic Research Program
Klausen Wilson, ANAP

Report on WORKSHOP ON CYBERINFRASTRUCTURE FOR POLAR SCIENCES

Data Management for Arctic Observing

A Community White Paper
Prepared for the Arctic Observing Summit 2013

Peter L. Pulsifer¹, Lynn Yarmey², Øystein Godøy³, Julie Friddell⁴,
DeBruin⁵, Mark A. Parsons¹

1 National Snow and Ice Data Center, University of Colorado, Boulder, CO
2 Norwegian Meteorological Institute, Oslo, Norway
3 Canadian Cryospheric Information Network, University of Waterloo
4 CEN: Centre d'Études Nordiques, Laval University, Québec, QC
5 NIOZ Royal Netherlands Institute for Sea Research, Texel, The Netherlands

POLAR CONNECTIONS

REPORT OF THE POLAR CONNECTIONS INTEROPERABILITY WORKSHOP AND ASSESSMENT PROCESS

7-10 NOVEMBER 2016

Authors: Peter L. Pulsifer, Julie Friddell, Pip Bricker, Øystein Godøy, Colleen Strohbach, David Arthur, Lynn Yarmey, Andrew Fleming

TOWARDS AN INTERNATIONAL POLAR DATA NETWORK

P. L. Pulsifer¹*, L. Yarmey², Ø. Godøy³, J. Friddell⁴,
W. Manley⁵, A. Gayford⁶, A. Hayes⁷, S. Nickels⁸, C. Strohbach⁹

*National Snow and Ice Data Center, University of Colorado
80309-0469, USA
*E-mail: pulsi@nsidc.org
¹Norwegian Meteorological Institute, Henrik Mohns plass 1,
N-2007, Trondheim, Norway
²Canadian Cryospheric Information Network, University of Waterloo,
200 King Street West, Waterloo, ON N2L 3G1, Canada
³Research Data Alliance, Remusat Polytechnic Institute, 75,
Rue de la Courbe, Québec, QC G1R 5A6, Canada
⁴CEN: Centre d'Études Nordiques, Laval University, Québec,
QC G1R 5A6, Canada
⁵NIOZ Royal Netherlands Institute for Sea Research, Texel, T,
1795 SB, The Netherlands

EU-PolarNet

WP3
D3.8 White paper on European polar data accessibility

EU-PolarNet retreat

International Forum on Data Activities in Global Data Systems Communiqué

Recommendations & Observations Arising From the 'International Polar Data Forum'

16-18 October 2016, Tokyo, Japan

polaris

High-Level Requirements for the Next Generation of Observing Systems for the Polar Regions

Summary Report

Prepared for: European Space Agency

Prepared by: Polar View Earth Observation Limited

Workshop on Arctic Data Coordination at IPY 2012, Montreal

A workshop to begin to design an Arctic Data Coordination Network will be held at IPY 2012, Montreal, Friday 27 April, 1:30-11:00, Room 9133.

Arctic Data Coordination Network (ADCN) under the auspices of SAON, IASC, and the Arctic Council Research Coordination Network to make this as possible. The idea is to use the best of all worlds. A short report will be prepared and submitted to the SAON Board, IASC, and the Arctic Council.

Statement of Principles and Practices for Arctic Data Management

April 16, 2013

All IASC-endorsed scientific results shall be verifiable and reproducible through ethically open access to all data necessary to produce those results. Data shall be preserved, accessible, and used in accordance with its specific needs of fair attribution and use.

To this end, IASC Council approves the following actions:

1. Endorsement of the Statement of Principles and Practices for Arctic Data Management.

PDPS: Review of Selected Existing Resources

Global Cryosphere Watch

World Meteorological Organization

Home About News Cryosphere Now Surface Satellites Activities Reference Data Portal Outreach

Highlights

New assessment page: Check out the new page that provides an overview of recent changes across the cryosphere. Look for it in the *Cryosphere Now*.

Cryosphere In the News

Automated detection of ice cliffs within supraglacial debris cover
31 May 2018, 5:53 am
the-cryosphere-discuss.net

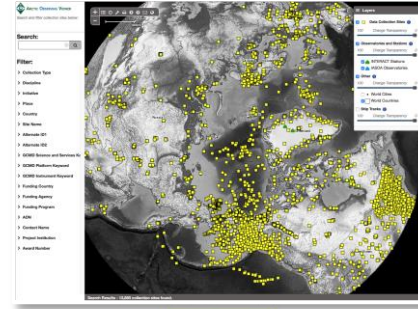
The first Americans could have taken a coastal route into the New World
30 May 2018, 6:00 pm
sciencematters.org

Japanese whale hunters kill 122 pregnant minke
30 May 2018, 4:02 pm
newswires.bbc.co.uk

Bleever bounty: Invasive species within Canada?
30 May 2018, 3:01 pm
rortm.ca

Warm winter, thin ice?
30 May 2018, 11:39 am
the-cryosphere-discuss.net

[More Cryosphere in the News](#)



Inuit Knowledge Centre

HOME INUIT & RESEARCH ABOUT US OUR WORK NAASAUTTI CONTACT

Inuit Qaujisaarvingat: Inuit Knowledge Centre at ITKI

"Advancing Inuit knowledge for sustainable Arctic science and policy"

Inuit Qaujisaarvingat (Inuit Knowledge Centre) was launched in 2010 as a centre on research housed at Inuit Tapiri Kanatani in Oslo.

Inuit Qaujisaarvingat is working to bridge the gap between Inuit knowledge and western science and build capacity among Inuit to respond to global interests in Arctic issues.

[LEARN MORE](#)

Inuit Perspectives on Arctic Security Cover

Inuit to speak up, speak out

Documenting Inuit Perspectives on important topics

[LEARN MORE](#)

Full-specific statistics presented in ways that are easy to understand and use.

[Click to enlarge photo](#)



Egg Counts

Map of the Arctic region showing egg counts.

Filter options:

- Alpha: Select the average of seven years within the selected area.
- Gamma: Group all events within the selected area and treat them as a single event.
- Zeta: Gamma Alpha

Additional: Group of related events

% Dominance (Bergin/Parker): Numerical comparison of the most abundant species

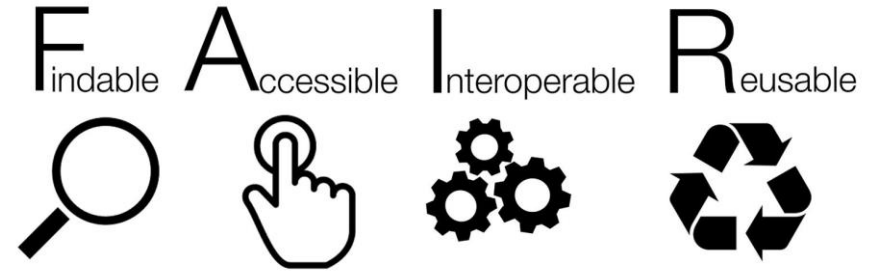
Gamma/Bergin/Parker: This index quantifies the uncertainty associated with species prediction

Philo's Evenness: Species evenness quantifies how close in count each species is within a sampling event

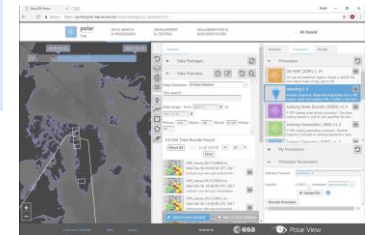


Technical Themes and Issues

- Findable
- Accessible
- Interoperable
- Reusable



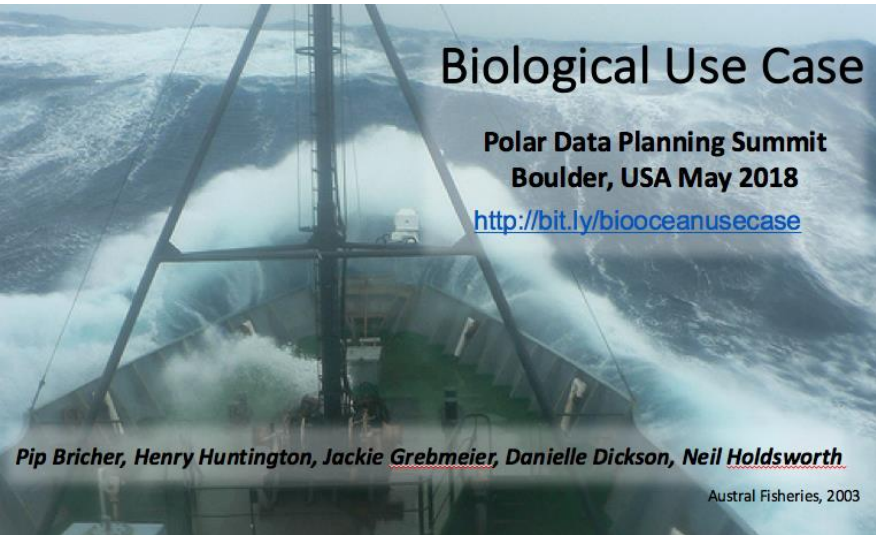
- Utilization of Indigenous Knowledge, observations and perspectives



- Education and training
- Cost/sustainability

Working Session

Use Cases



Biological Use Case

**Polar Data Planning Summit
Boulder, USA May 2018**

<http://bit.ly/biooceanusecase>

Pip Bricher, Henry Huntington, Jackie Grebmeier, Danielle Dickson, Neil Holdsworth

Austral Fisheries, 2003

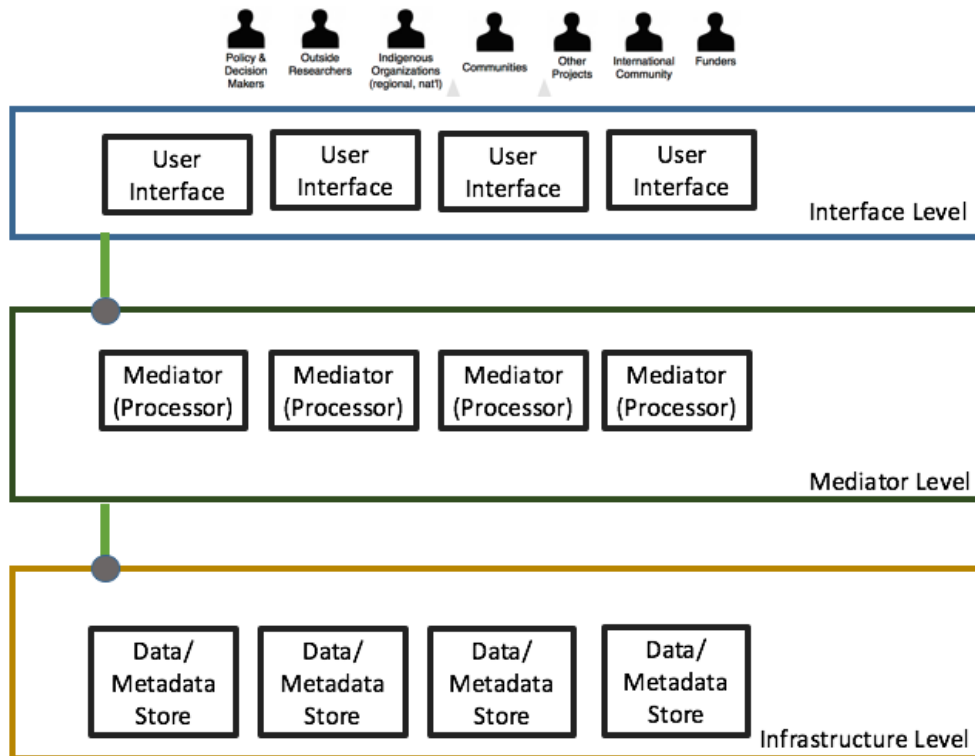
Scenario for data discovery/federation and access through standardised web services
discussion on cryospheric extremes



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?

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

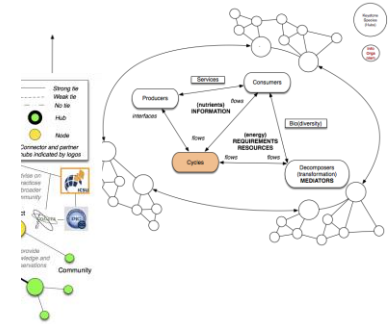
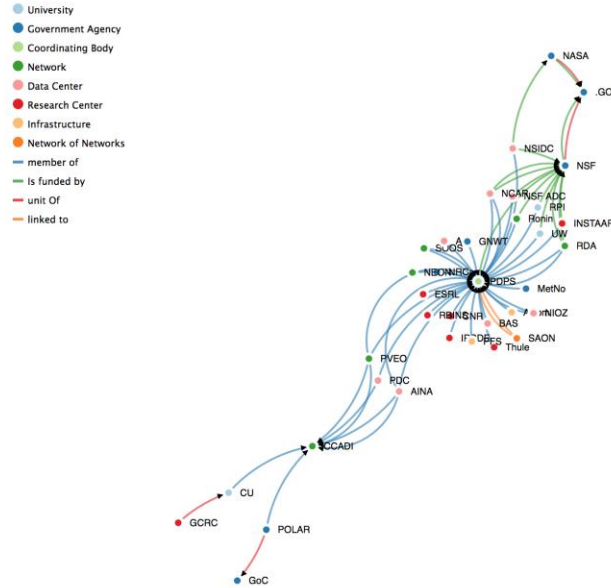
█ Data/metadata flow

Results – focus on discovery

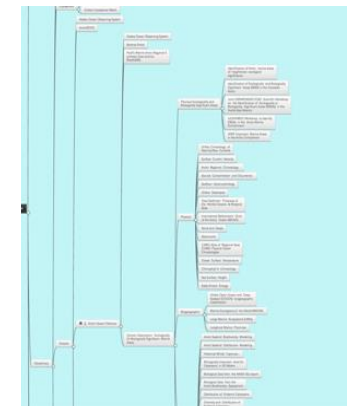


Context and Organizational Challenges Track

International Ecosystem of Organizations and Data Resources



et al. (2014). Towards an Network. *Data Science* org/10.2481/dsj.IFPDA-16



```

OPTIONAL (?subject org:classification ?sClassification .
?sClassification rdfs:label ?sClassificationName ).
OPTIONAL (?object org:classification ?oClassification .
?oClassification rdfs:label ?oClassificationName ).
OPTIONAL (?linkType rdfs:label ?linkName .
FILTER (lang(?linkName) = "en")
)?subject org:hasPrimarySite ?site .
?site org:siteAddress ?siteAddr .
?siteAddr vcard:country-name ?sCountry .
?object org:hasPrimarySite ?osite .
?osite org:siteAddress ?ositeAddr .
?ositeAddr vcard:country-name ?oCountry .
}
    
```

New Graph Filter Graph



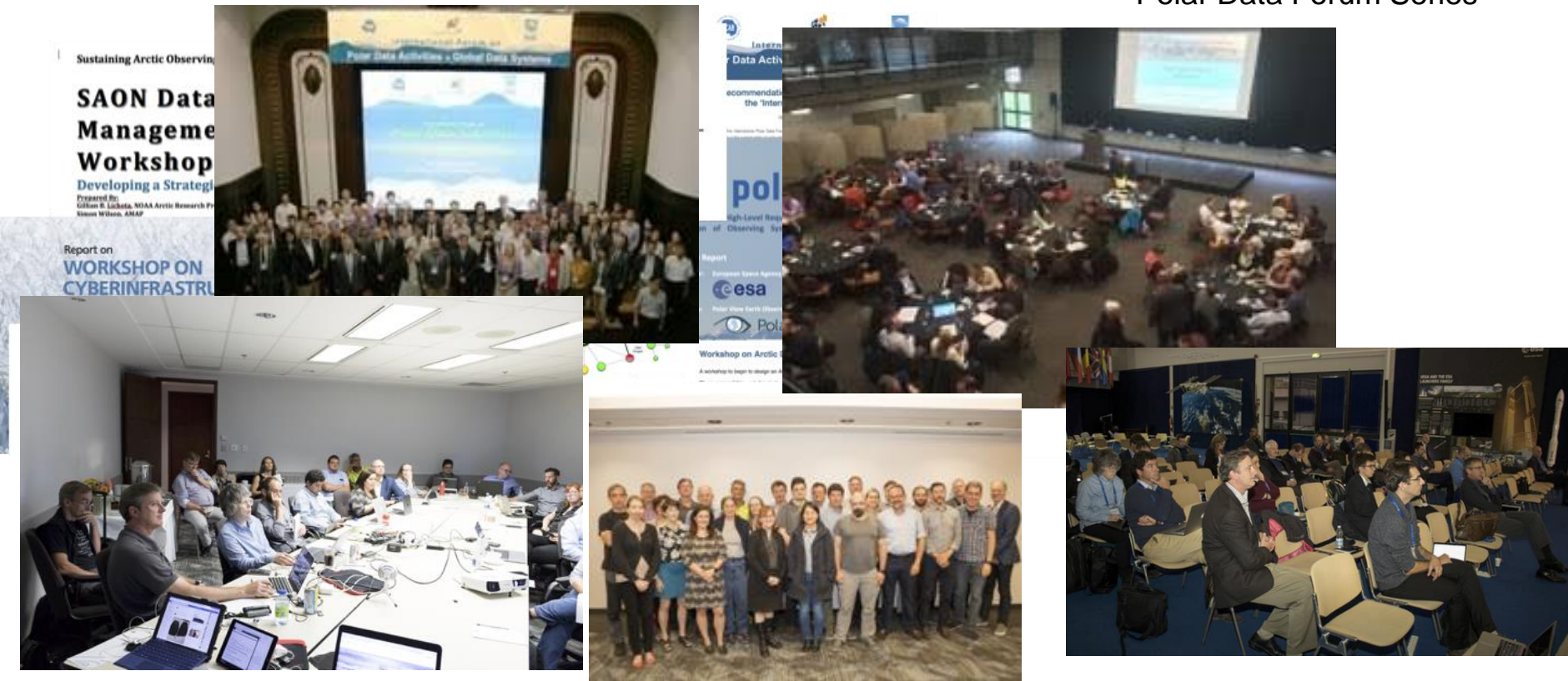
Summary of Topics

- 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?
- Will require a balance of top-down structure and bottom-up activities (structure, agency) – “soft governance”
- We have a good sense of actors and very good coordination, however need to discuss the actor space (part of governance)

Next Steps

Collaboration and Coordination

Polar Data Forum Series



Continued Collaboration

- Practical collaboration recognized as one of the most positive components of the Polar Data Planning Summit
- Model proposed to coordinate through **regular high-level meetings** (i.e. Polar Data Forum series) **+** **frequent working meetings** (e.g. taking advantage of the meetings of existing groups)
- Establish ongoing resources. Raising these resources will become a priority for the data community
- Use collaboration to underpin development of practical implementation proposals

Conclusion



- Results of the Summit being/will be shared at POLAR2018, AOS and made available to ASM 2018 and other venues
- Next Arctic Data Committee +++ meeting hosted by WMO fall 2018
- **We need to be “Practical Visionaries”**

**THANK YOU
KIITOS
GIITU
NAKURMIK
MERCİ**