

23 May 2017

Dear Canadian Polar Data Workshop attendee:

The purpose of this position paper, once it is finalized, is to represent the views of the polar data community, which have been identified by consensus of the contributors, and the actions and policies which we will commit to undertake and support, with the assistance of others, for the improvement of data management in Canada.

The information in this draft comes from previous discussions and reports but will be discussed during the CPD Workshop in Ottawa, 30-31 May 2017 and revised according to the outcomes of the Workshop and ensuing full community engagement. The final document, which should be as complete but concise as possible, can be used as a discussion guide for engaging organizations and individuals to advocate for collaborative actions to reach the goals of our community.

Please review the remainder of this document and come to the CPD Workshop prepared to provide your thoughts for how to improve it. We appreciate your consideration and look forward to hearing your ideas!

-- The Planning and Advisory Committees for the Canadian Polar Data Workshop

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Canadian Polar Data Community Position Paper

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Background

As the effects of climatic and environmental change become more apparent around the world, Canada's Arctic regions are experiencing dramatic changes in weather patterns, the natural environment, social systems, and economic development. A prime example of this is shrinking sea ice in the Arctic Ocean and Canadian Archipelago which is affecting the life cycle of many marine mammals, food security of Arctic residents, and international trade and politics by allowing access to previously inaccessible routes. In particular, Inuit culture and daily living are closely tied to the environment. From essential travel routes across ice and land to subsistence harvesting activities, alterations to the regional landscape have profound impacts on northern Canadian's livelihoods and wellness. These changes have significant impacts on not only the people living in northern Canada but also the animals and plants in both the Arctic and Antarctic. Along with environmental protection, maritime safety, and infrastructure development, these are some of the many reasons for increasing interest in study and understanding of the polar regions.

New and existing research initiatives in Canada are producing a wealth of data and information about the Arctic which lays the groundwork for understanding our northern areas and improving the lives of northerners and all Canadians. In addition, Canadian scientists participate in Antarctic research to measure and understand the changes to the ice, flora, and fauna of the southern continent. Effective stewardship to prevent underutilisation and loss of these valuable data resources is critical to making information available for decision making, so that the people concerned can respond optimally to the new situations presented by climate and environmental changes. The importance of good data management is now being realized by government, the private sector, and academia, and many initiatives are underway to improve data stewardship. This document presents issues and recommended solutions for management of polar data. However, the polar data community recognizes that creators and managers of non-polar data face similar challenges as we do, thus we hope to inspire dialogue and action which will inform and contribute to improved stewardship of data across multiple fields of research in Canada as well as at the international level.

Management of Polar Data in Canada and Internationally

As the importance of data and their proper stewardship are increasingly recognized, numerous initiatives have set the stage for designing and establishing an effective research data management system in Canada. Efforts have included the 2011 Canadian Research Data Summit¹, advancement of the Canadian Open Government portal² and Open Science Action Plan³, and establishment of the

¹ <https://www.rdc-drc.ca/wp-content/uploads/Background-to-the-2011-Canadian-Research-Data-Summit1.pdf>

² <http://open.canada.ca/en>

³ <http://open.canada.ca/en/commitment/06-open-science>

Leadership Council for Digital Infrastructure⁴ and Research Data Canada⁵, activities which provide a vision for defining roles and building a national research data management infrastructure and policy environment. At the same time, in response to the increasing volume of data resulting from Arctic research in Canada, the Canadian polar data community has grown in size, capability, and complexity, enhancing the need to identify and connect the various organizations which produce, steward, and support polar data in Canada. In May 2015, a Canadian Polar Data Workshop (CPDW) was held in Ottawa to facilitate conversation between groups and to present options for coordination of our activities. The CPD Workshop agenda was crowd-sourced through a six-week national consultation on polar data, in the form of an online survey answered by individuals from 30 organizations. The Workshop was attended by 50 people and resulted in the following outcomes:

- Presentations were made on data sharing, access, preservation, interoperability, policy, funding, and partnerships.
- Availability of funding, sustainability of archives and services, and data providers' and users' rights were noted as the greatest challenges to polar data management.
- Interoperability of archives and data formats were described as the greatest technical challenges.
- The participants were extremely keen to collaborate and coordinate their activities on polar data management, to benefit Canada and to make our efforts more effective.

Since 2015, there have been numerous additional activities to coordinate and advance polar and non-polar data management, including creation of the Canadian Consortium on Arctic Data Interoperability (CCADI); design and prototyping of Marine and Arctic Spatial Data Infrastructures⁶, the Canadian Geospatial Data Infrastructure, and the Federal Geospatial Platform⁷ at the Department of Fisheries and Oceans and Natural Resources Canada; development of the Portage Network⁸ of the Canadian Association of Research Libraries; release of the Tri-Agency Open Access Policy on Publications⁹; and release of the Tri-Agency Statement of Principles on Digital Data Management¹⁰, among others. These activities complement national consultations and workshops which have surveyed and defined the data communities in Canada and have proposed activities and policies for development of a national data management infrastructure. Progress has been made to increase collaboration and identify needs and options, but a national infrastructure and framework are still missing, as are independent structures for data sovereignty.

International polar-focused activities include creation of the Arctic Data Committee (ADC) of the International Arctic Science Committee (IASC) and the Sustaining Arctic Observing Networks (SAON)¹¹ and gathering of the international Arctic and Antarctic data community at the Polar Data Forum I in Tokyo in 2013 and Polar Data Forum II hosted at the University of Waterloo in Ontario in 2015¹². Canada provides representation on and contributes to the ADC, the Standing Committee on Antarctic Data Management of the Scientific Committee on Antarctic Research¹³, and the Research

⁴ <http://digitalleadership.ca>

⁵ <https://www.rdc-drc.ca>

⁶ <http://www.opengeospatial.org/projects/initiatives/arcticstdp>

⁷ <http://www.nrcan.gc.ca/earth-sciences/geomatics/canadas-spatial-data-infrastructure/geospatial-communities/federal>

⁸ <https://portagenetwork.ca/about/>

⁹ http://www.science.gc.ca/eic/site/063.nsf/eng/h_F6765465.html?OpenDocument

¹⁰ http://www.science.gc.ca/eic/site/063.nsf/eng/h_83F7624E.html?OpenDocument

¹¹ <http://arcticdc.org>

¹² <http://www.polar-data-forum.org>

¹³ <http://www.scar.org/scadm>

Data Alliance¹⁴. Canadian organizations are also members of the World Data System of the International Council for Science¹⁵ and the Open Geospatial Consortium¹⁶ and are involved in activities to connect Canadian and international data management systems. The intergovernmental Group on Earth Observations (GEO) has established a Cold Regions Initiative¹⁷ that aims to link polar activities to the broader global community. In addition, new regional initiatives such as the European Union-funded INTAROS project¹⁸ have significant data management and use components that will be available for implementation and involve partnerships with Canadian communities and researchers.

These activities have helped bring people and organizations together but each have only engaged a subset of members of the polar data community. Following on the success of the first CPDW, a second Canadian Polar Data Workshop was held in Ottawa in May 2017 to expand the community of participants; set explicit tasks related to the themes of collaboration, funding, policy, and self-governance; and assign owners responsible for coordinating the activities. XX people participated, including representatives from data repositories, Indigenous and northern communities and organisations, research funding agencies, federal agencies with northern and polar mandates, etc., etc.

Our Vision and Commitment

CPD Workshop participants and other contributing members of the Canadian polar data community have defined our collective vision as follows:

As a global leader in polar research, Canada has an obligation to share polar research data and products with Canadians and the rest of the world. To promote the emerging national vision for preserving and sharing data, the Canadian polar data community will provide leadership through collaboration with national and international partners to develop policies and systems for improving data management across academic, sectoral, and jurisdictional boundaries.

To achieve this vision, Canada's polar data community commits to the following actions:

- We will establish a governance structure and implement a national management plan to facilitate coordination of polar data activities and enhance interoperability through a robust technical infrastructure and human network.
- We will invite all interested Canadian stakeholders and rights holders to join the national collaboration and will facilitate participation of Inuit and other northern Canadians.
- We will collaborate with Indigenous communities and organizations to develop resources to support Indigenous-led data stewardship and ensure Indigenous access to needed data and information.
- We will forge links with international groups and polar data communities in other countries and industries to strengthen the global polar data community and accelerate progress toward common goals.

¹⁴ <https://www.rd-alliance.org>

¹⁵ <https://www.icsu-wds.org>

¹⁶ <http://www.opengeospatial.org>

¹⁷ <http://earthobservations.org/coldregions.php>

¹⁸ <http://www.intaros.eu>

- We will identify funding and other resources to support this coordination initiative.
- We will function via consensus of the community.

Recommendations from the Canadian Polar Data Community

During the first¹⁹ and second CPD Workshops²⁰ and ensuing community engagement, the following were recommended to improve polar and other data management in Canada:

1. The federal government should help lead data stewardship activities in Canada. The polar data community can serve as a partner to realize the following goals:

- Unified policy for data management
- A national, interoperable data infrastructure for preservation and access for future generations
- Guidance and support to researchers to manage their data
- An effective long-term funding strategy to support data management

These activities may be led by the Chief Science Advisor and/or Assistant Deputy Ministers of the science and technology agencies (S&T ADMs), including the Tri-Agencies, but would likely also include other relevant stakeholders such as universities, Indigenous, northern, and international organizations.

Federal leadership will accelerate the efforts of the Canadian polar data community and contribute to improved data management in other disciplines.

2. Funding agencies should support data management activities.
 - Beginning with polar research, data management plans²¹ and funding directed at data management activities, including outreach and reporting back to involved communities, should be included in project proposals.
 - Funding for data management should be included in agency budgets, as incremental amounts to individual projects but also as baseline funding for development of data management infrastructure and systems.
 - A funding program for data, similar to the Northern Supplements, may be a way to support individual polar researchers.
 - Funding support for infrastructure should be sustained as short-term funding of data archives is a major concern due to potential data loss when funding is discontinued.
 - Agencies should consider extending these requirements and support to other research disciplines, where appropriate, given that data management plans are an emerging international best practice across the research enterprise.
3. Ethically open data and open publication should be the default position of funding agencies and data collectors, with unusual requests for exceptions considered and approved on an individual basis.

¹⁹ LeDrew, E., Friddell, J., and Alix, G., 2016, Canadian Polar Data Workshop, *Report prepared in partial fulfillment of deliverables required by NSERC Statement of Work: Canadian and International Polar/Arctic Research Data Management – Context and Avenues to Enhance Collaboration*, 243 pp.
https://secondcanadianpolardataworkshop.files.wordpress.com/2017/04/nserc_cpdw_report_final_march_2016.pdf

²⁰ <https://secondcanadianpolardataworkshop.wordpress.com>

²¹ <http://iasc.info/data-observations/iasc-data-statement>

- Beginning with the polar community, but ideally extending to other disciplines as appropriate, the sharing policies and expectations should be defined in a formal data management plan for every project.
 - If a data producer seeks to protect data for reasons beyond those that are commonly accepted²², he/she should fully justify the exception and have the justification peer reviewed.
4. Employers and funding agencies should advocate for professional credit to researchers who archive data, to recognize their effort as a legitimate scholarly contribution.
 5. Canadian data, even if collected by people from other nations, should be archived in and available from Canadian repositories.

Realization of these goals will not only improve data management across disciplines but will also strengthen the international data community, increase transparency and inclusion, and reduce duplication of effort in research as well as data management activities. Although we are focusing on polar data initially, the framework created here can be used for improving collaborations and data management with other groups. Progress in these focused areas will advance the responsible and effective management of the nation's valuable research data resources, so that the results of effort spent on observing and understanding our world today will be protected and available to future generations of Canadians and global citizens.

Invitation to Participate

We take this opportunity to invite you to contribute to this effort. We look forward to working with governments, academia, industry, and all interested rights holders and stakeholders to translate the excitement we feel in the polar data community into action for improving data stewardship in Canada.

We anticipate forming thematic working groups or other methods of engagement in the months ahead, depending on the responses we receive and the level of interest and commitment expressed.

For further information, please contact:

-- *The Planning and Advisory Committees of the Second Canadian Polar Data Workshop*²³

²² Common exceptions to the requirement of full, free, open, and permanent access to polar data, which would not normally require special approval, are:

- Where human subjects are involved or in situations where small sample sizes may compromise anonymity, confidentiality shall be protected as appropriate and guided by the principles of informed consent and the legal rights of affected individuals;
- Where local and traditional Indigenous knowledge is concerned, rights of the knowledge holders shall not be compromised;
- Where data release may cause harm or compromise security or safety, specific aspects of the data may need to be protected (for example, locations of nests of endangered birds or locations of sacred sites); and
- Where pre-existing data are subject to access restrictions, access to data or information using this pre-existing data may be partially or completely restricted.

²³ <https://secondcanadianpolardataworkshop.wordpress.com/about/>

This position paper has been shared with many members of the polar data community in Canada, but some potential contributors or participants may have been missed. If you would like to join the effort, please contact us. We welcome your interest and contributions!

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