Developments in Polar Data Management 2006 – 2019 and Beyond: standardization and community-building in support of enhanced interoperability

Peter L. Pulsifer¹, Sandra McCubbin¹, Stein Sandven², and Mark A. Parsons³

¹Geomatics and Cartographic Research Centre, Carleton University, Ottawa, Canada
²Nansen Environmental and Remote Sensing Centre, Bergen, Norway
³Rensselaer Polytechnic Institute, Troy, New York, USA

A consortium of polar data coordinating bodies has recently hosted a number of useful workshops and events to foster collaboration between individuals, institutions, projects and organizations. These events have built on polar data coordination efforts including progress made during the International Polar Year, focused workshops in 2016, 17, and 18, and three Polar Data Forum meetings (2013,15,19).

These and other activities have identified a need for continued community development and detailed technical collaboration in order to advance Polar Data Management. Technical activity has centred on achieving federated search through the exchange of standardised, well formatted discovery metadata. This is an important first step towards an interconnected polar data system and important gaps and mitigation have been identified at the levels of standardisation, exchange protocols, and eventually semantic annotation of datasets.

These activities have been and will continue to be organized by a group of coordination bodies including the IASC-SAON Arctic Data Committee, the Southern Ocean Observing System, Standing Committee on Antarctic Data Management, GEO Cold Regions Initiative, Polar View, Arctic Portal, ELOKA, Canadian Consortium on Arctic Data Interoperability, U.S. Inter-agency Arctic Research Policy Committee Arctic Data Sub-Team, and the WMO Global Cryosphere Watch.

As a contribution to these international efforts, in January 2020, the European Union Horizon 2020 project CAPARDUS was established as a coordination and support action with the objective to establish a comprehensive framework for development, understanding and implementation of Arctic standards with focus on environmental topics and related data. The framework will integrate standards used by communities active in the Arctic and polar regions including research
and services, Indigenous and local communities, commercial operators and governance bodies. Development of standards is important for many technologies and services (e.g. federated search) that can bring broad social and economic benefits within and beyond the Arctic region.

In this presentation we first provide a synthesis of more than a decade and a half of activity and development in polar data management and interoperable data sharing. Results from this analysis reveal two primary areas of successful developments: i) social and organizational including data policy, building working relationships, and funding cyberinfrastructure; ii) technical developments in federated search, semantic interoperability, and use of web services. Patterns, advancements and development gaps are identified and discussed. Secondly, we present an overview of the first quarter of activity under the CAPARDUS project, including a preliminary model aimed and enhancing appropriate levels of standardization in the polar data community.