# Open Letter: Promoting effective use of semantics in Polar science and operations

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In this letter, we introduce The Polar Vocabularies and Semantics Working Group, originally established as a joint effort between the joint SAON/IASC Arctic Data Committee and the Data Management Collaboration Team of the Interagency Arctic Research Policy Committee. Further, we invite communities of practice to actively engage with us in our activities (described below), to advance the state of semantics-based applications in polar activities (and to increase interoperability between stakeholders and rights holders within existing and emerging digital ecosystems).

> "Semantics - the study of meaning - helps us make sense of the world
> - and semantic technologies help us digitise and translate that to computers"

Polar digital stakeholders and rights holders - including Indigenous, scientific, and operational communities - are truly interdisciplinary, and semantic technologies are considered a key element for bridging understanding and enhancing interoperability among communities, disciplines, and nations. Thus, our working group brings together experts focused on how semantics and vocabularies can facilitate the digitisation, preservation, and ethical management of knowledge aligned to the FAIR[1], CARE[2] and other principles. The group is open to all individuals and organizations with an interest in this topic, and has come to represent a large group of data management activities in the Arctic and Antarctic communities. The group currently includes members from both Europe and North America, but aims to expand its regional representation.

Our working group's activities include:

- Promoting awareness and reuse of existing vocabularies and other semantic resources;
- Scoping coordination strategies for semantic resources across polar communities;
- Enabling and organizing regular communication across polar data communities;
- Helping communities connect to useful and interoperable vocabularies, thesauri, ontologies and related resources commensurate with their needs;
- Co-developing and sharing semantic technologies and tools based on these efforts;
- Informing the polar community about broader activities (e.g. within the Federation of Earth Science Information Partners - ESIP, and Research Data Alliance - RDA), and acting as ambassadors from the polar community to other initiatives, such as the UN Decade of Ocean Science for Sustainable Development;
- Showcasing good practices and demonstrations of the benefits of semantic technologies, while acknowledging risks and pitfalls (e.g. digital (re)colonization) where relevant.

Through these activities, our working group aims to enhance the uptake of effective, community-focused, and sustainably interoperable semantic technologies across Polar communities. Currently, such uptake is limited due to a lack of familiarity with semantic technologies. As a result, there are considerable opportunities to apply semantic technologies to

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[1] FAIR: Findable, Accessible, Interoperable, Reusable, https://doi.org/10.1038/sdata.2016.18
[2] CARE: Collective benefit, Ability to control, Responsibility, Ethics (https://www.gida-global.org/care)

advance solutions from (meta)data management to high-throughput, and ethical, Artificial Intelligence across Polar communities.

To fill this capacity gap, we aim to cultivate greater community participation and ownership in semantic technologies and resources relevant to polar issues. We recognize that semantics are inextricably linked to worldview and acknowledge that a lack of adequate awareness and representation has, and may, be potentially harmful to those worldviews, knowledge systems, and the people who hold them. Therefore, we hope that greater community participation will lead to better understanding of a diversity of these knowledge systems, and that this participation will enrich the current work.

Such capacity sharing and alignment - coupled with robust and inclusive governance models - will better focus the power of semantic technologies to user needs and societal priorities, helping coordination of digital resources contributing to, e.g., the Arctic Societal Benefit Areas and the Sustainable Development Goals. Our aim is to lower the threshold to use and develop the digital knowledge management and application solutions that semantic technologies offer, integrating them into diverse scientific and operational workflows.

We hope that you will engage with us in our efforts to align and leverate semantic resources to promote digital interoperability and knowledge sharing between your stakeholders and ours.

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