Agenda Item: 5.4

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SCADM Report

Executive Summary

Title: SCADM Report

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Relevant URLs or references to other reports: SCAR Data and Information Strategy: http://www.scar.org/publications/reports/Report_34.pdf (or IP4c), SCAR DIMS Implementation Plan: http://scadm.scar.org/0files/SCAR_DIMS_Implementation_PlanV2.pdf

Introduction/ Background: The committee in SCAR responsible for all aspects of data and information management is the Standing Committee on Antarctic Data management (SCADM). At its 2009 business meeting, the SCAR Executive endorsed the SCAR Data and Information Strategy (DIMS), which was drafted by SCADM and an ad-hoc working group, consisting of representatives from the Science Standing Groups and the SCAR Executive. Following endorsement of the Strategy, the Chief Officer of SCADM, developed and promulgated a SCAR Implementation Plan designed to unpack key aspects of the Strategy, after consulting both SCADM and SCAGI members at a joint SCAGI/SCADM meeting held in Amsterdam in September 2009 and Science Standing Group members in Cambridge (early 2010). This report outlines the key recommendations made in the DIMS, lists the tasks in the DIMS Implementation Plan, introduces the need for a SCAR Data Policy and provides a progress report on where SCAR currently sits in terms of DIMS Implementation.

Important Issues or Factors: The SCAR DIMS can only be implemented if SCAR members commit to undertaking actions identified in the Implementation Plan and agree to follow the principles in the draft SCAR Data Policy. SCADM is primarily an information sharing body, with only a few members having established National Antarctic Data Centres with the capacity to take on the long-term stewardship of data. In the main these Centres operate independently and not as part of a SCAR system of interoperable repositories. The goal of developing an Antarctic Data Management System will only be realized through national contributions and active collaboration. Currently, national commitment to implementing the DIMS is low. There are a few members "carrying" the rest of the community in terms of SCAR data management support. This model is not sustainable.

Recommendations/Actions and Justification: Delegates should consider how their nation can contribute to DIMS implementation, or alternatively determine whether the current terms of reference for SCADM should be modified to better reflect its role as an information sharing forum only, rather than a group charged by SCAR with delivering data management infrastructure and services.

Expected Benefits/Outcomes: Improved SCAR data management infrastructure and practices. Alternatively, better alignment between member's expectations of SCADM with respect to data management functions and SCADM's ability to deliver on its terms of reference.

Partners: Potential DIMS Implementation partners include: Polar Information Commons, GCMD, WMO, IASC, Creative Commons, Science Commons, Global Biodiversity Information Facility, IODE.

Budget Implications: GCMD receives $10K p/a for its support on metadata matters (i.e. supplies AMD system and a part-time liaison officer).

SCADM Report

1.0 Overview of SCAR DIMS

Although it has been developing capacity for international data management amongst its member nations since 1992, in 2009 SCAR endorsed its first Data and Information Strategy (DIMS). This Strategy is designed to assist SCAR to more effectively implement its programs and activities aimed at coordinating high quality, international scientific research in the Antarctic and research related to examining the Antarctic region's role in the Earth system. Strategy outcomes will also improve SCAR's ability to provide independent scientific advice to the Antarctic Treaty System Consultative Parties and other organizations on issues of science and conservation affecting the management of Antarctica and the Southern Ocean.

The committee in SCAR responsible for all aspects of data and information management is the Standing Committee on Antarctic Data management (SCADM). Data and information are valuable and irreplaceable resources. In the pursuit of many science objectives (especially those of a pan-Antarctic nature) it is necessary to use data and information collected by scientists from many countries. SCAR recognizes the critical importance of the stewardship of data and information within national and international programs and the importance of data accessibility by the international Antarctic scientific community. SCAR does not consider data management to be an "add-on" or an additional task in Science. It is a fundamental aspect of modern earth system science and is essential to addressing complex questions about how our planet works and how it will respond in the future.

Vision

The Strategy's vision is to build an Antarctic Data Management System (ADMS), capable of supporting inter-disciplinary Antarctic science and SCAR activities within the Antarctic Treaty System. The ADMS should be viewed as a science enabler. Through a range of individual activities SCAR is already making progress towards achieving this vision. But much more can be achieved. The likelihood of realising desired goals will be greater if appropriate strategic foundations are put in place to facilitate better coordination of individual and often disconnected efforts. The success of the Strategy will be highly correlated with the extent to which SCAR's national members commit to Strategy execution.

Strategies

The strategies that SCAR will pursue have been grouped under five topics and include:

(i) Policy, Leadership, Coordination and Governance

This cluster of recommendations aim to better articulate governance arrangements and foster strong leadership, suitable for driving the development of a distributed, but loosely federated, shared infrastructure. This will involve development of a SCAR Data Policy that stipulates the norms that SCAR members should adopt with respect to data sharing and access; data management planning; and establishment of National Antarctic Data Centres (NADCs). Recognising that dedicated leadership is essential for driving development of any shared infrastructure, SCAR members should consider seconding appropriately trained professionals to the SCAR Secretariat and/or assist with raising external funds to support infrastructure development positions. To strengthen existing components of the ADMS, opportunities for partnering arrangements should be explored between SCAR data management groups and those institutions involved in the reformation of the Intergovernmental Oceanographic Data Exchange (IODE) and ICSU World Data Centre Systems. If the ADMS ultimately expands more through partnerships with these types of global systems than through an expansion of the SCAR NADC network, it may then be prudent to review the role, membership and function of SCADM.

(ii) Cultural Change and Incentives

Strategies in this group focus on fostering a culture willing to share and collaborate on data management related activities. Data sharing between SCAR scientists is highly patchy both within and between member countries. Data citation systems are being touted as a mechanism to achieve improved data sharing practices between scientists. The Scientific Committee on Oceanic Research (SCOR), amongst others has been

trialling approaches to data citation. SCAR could formally partner with SCOR in piloting such a system within its NADCs. More could also be done to build an ADMS and to change cultural practices if SCAR's peak data groups harnessed their collective capabilities to garner funding from external sources. Additionally, more money would be available for scientific data management if SCAR educated funding sources about the need for data management to be an explicitly funded component of supported projects.

(iii) Leveraging Resources and Systems

In this category recommended actions involve leveraging existing SCAR and non-SCAR systems, capabilities and resources and supplementing these where there are obvious deficiencies to create a network of designated permanent data archives capable of the long-term management and publication of all types of SCAR related data. The number of NADCs is low relative to the number of national SCAR Members. Of the NADCs that do exist, only a few have significant capabilities. A functional ADMS will be difficult to develop solely through an expansion of the NADC network. SCAR should identify a small number of existing and complementary data access networks with which to affiliate and then promote NADC involvement in these networks. By "affiliating" rather than building from scratch, SCAR can expand its ADMS at minimal cost and at the same time achieve greater interoperability with other networks. It is also important that SCAR's peak data management groups (i.e. SCADM and the Standing Committee on Antarctic Geographic Information - SCAGI) work more closely together in pursuing common goals. Now that the distinction between managing and publishing spatial and non-spatial data is disappearing, consideration might be given in the future to amalgamating SCADM and SCAGI.

(iv) Standards and Interoperability

Strategies in this grouping revolve around agreement on, and implementation of, standards that support the interoperation of technology platforms and data transport protocols. In particular, development or adoption of standards to describe and encode data objects, equipment, processing techniques and instruments that ultimately function to permit data integration and aggregation. A key component of the ADMS is the Antarctic Master Directory (AMD) metadata system. It is therefore crucial that SCAR works closely with the AMD host organisation (i.e. the Global Change Master Directory-GCMD, sponsored by NASA) to help determine the functionality of future iterations of this technology platform. Equally important is the need to recognise that SCAR science covers highly diverse data types and data management requirements. The ADMS must be geared to meeting this diversity of needs. To achieve this goal, further enhancement of the ADMS should be under-pinned by developing an implementation roadmap.

(v) Outreach and Guidance

Actions presented in this topic encompass education, outreach and guidance on all facets of the system's operation, protocols and functions. Growing the number of NADCs and improving the capabilities of those that exist could be achieved using a more formalised training and mentoring campaign. Both SCADM and SCAGI should improve their communication mechanisms and mediums. Much of the data management that currently occurs within SCAR science projects is conducted under circumstances outside of the influence of either of SCAR's peak data management coordinating groups. The network of NADCs on which the SCAR ADMS should be founded therefore needs to be expanded and become interdependent with other, successful thematic and global data networks that are currently being patronised by SCAR research programs or which have the potential to add value to SCAR science. Several opportunities exist to more closely align SCAR data management with large international data management facilities and networks (notably the ICSU WDCs, IODE, the WMO Information System [WIS], the IPY Data and Information Service [IPYDIS] and the Polar Information Commons [PIC] initiative), all of which conversely need to align themselves with scientific data sources (such as SCAR).

2.0 Overview of Draft Data Policy

The draft SCAR Policy has been modeled on the IPY data policy and is consistent with ICSU and WMO policies regarding data access principles. The policy seeks to articulate and formalise aspects of SCAR data management activity that have hitherto been informally undertaken or implied (e.g. open data sharing by virtue of adherence to Article III.1.c. of the Antarctic Treaty).

The Policy formalises the SCAR approach to data sharing as being full, free and open. Enshrined in the Policy is also the requirement for SCAR projects to create metadata (descriptive) information for all datasets

generated in the course of a project and for that metadata to be deposited, as a minimum, in the Antarctic Master Directory (AMD). All nations affiliated with SCAR are also urged to establish a National Antarctic Data Centre (NADC), or appoint an existing national institution with appropriate capabilities, to act as the NADC. All SCAR-sponsored projects are also requested to develop data management plans as part of project planning. An example data management plan template has been supplied as a reference. Lastly, SCAR data providers and users are encouraged to adhere to the standard scientific practice of acknowledging (i.e. citing) data that is used in the course of research.

3.0 Overview of SCAR DIMS Implementation Plan

To realise its strategic data management vision, SCAR has developed a roadmap to action recommendations in the DIMS in the form of a Data and Information Strategy Implementation Plan. Only a limited number of nations have, so far, expressed interest in collaborating on identified tasks. There are three over-arching projects , each of which have one or more sub-tasks. The projects identified have sufficient scope to permit even those countries with minimal data management capability to contribute in some form. It is, disappointing therefore, that so few SCAR members have agreed to participate in these projects.

In summary the three projects are:

- **Project 1**: Interoperable Data Repository Network
  Goal: To demonstrate a distributed, interoperable network of polar data centres and institutions capable of interchanging data online, according to a specified set of domain and IT standards.
- **Project 2:** Improving The Relevance And Utility Of SCAR Products
  Goal: To improve the scientific relevance, utility and overall community governance of products that are "badged" and "marketed" as SCAR products.
- **Project 3:** Polar Information Commons
  Goal: To work with Arctic colleagues to help build the Polar Information Commons (PIC) (which is essentially an extension of the SCAR Data Repository Network outlined in project 1).

4.0 Progress To Date on DIMS Implementation

Since publication of the Implementation Plan some tasks, within some projects, have attracted activity. A meeting was convened by the Netherlands, in the margins of the IPY Conference in Oslo, with several parties interested in pursuing development of a SCAR ISO metadata profile (Task 1.1 of Project 1). Arctic and Antarctic nations were represented at the meeting. A project plan for this task is being established by the Netherlands.

Also in the margins of the IPY conference, the Chief Officer of SCADM convened a meeting of parties (Netherlands, Norway, Belgium, Australia) interested in establishing interoperable demonstration data portals (Task 1.3 of Project 1). After the conference attempts have been made to attract additional participants but so far only the countries already listed remain engaged. The SCAR SCADM business meeting will be used to start drafting a project plan for this task.

Fundamental to the carriage of Project 1 is Task 1.2 – "Establishing a standards-based registry interface to the AMD". Since the DIMS Project Implementation Plan was crafted, the GCMD has worked with the GEOSS community to establish such an interface. The GCMD is yet to confirm that it will make this machine interface available to the SCAR community and their decision is pending.

The SCADM Chief Officer and former CO (Netherlands) are members of the Polar Information Commons (www.polarcommons.org) Steering Committee and have been actively working towards the launch of this new initiative (the launch was held in Oslo). The PIC is an over-arching program that seeks to unify Arctic and Antarctic approaches to the sharing and exchange of polar data. It will, when fully evolved, consist of PIC badged data, a PIC Repository Network that will take carriage of the long-term stewardship of polar data and a linked PIC Cloud into which data can be placed that is difficult to find a home for. Australia has already "badged" some of its AMD metadata as belonging to the PIC (Task 3.1 of Project 3) and has also developed a production prototype of a PIC Cloud Repository Service (http://piccloud.arcs.org.au/piccloud/) for use by Arctic and Antarctic researchers who don't have anywhere to deposit their data (Task 3.3 of

Project 3). The GCMD has provided a temporary facility within the AMD DocBuilder metadata editor tool to allow members to "badge" metadata and data.

No nations have volunteered as yet to collaborate on Project 2 (Tasks 2.1. and 2.2) or on Task 3.2 of Project 1, although Australia, through the Chief Officer of SCAGI has been liaising with Google Earth regarding the use of SCAR products (e.g. SCAR Gazetteer) in Google's application (which is relevant to Project 2). There has been no consensus from SCAR members on how implementation of SCAR products could be achieved within the Google product, given the constraints that Google has placed on the use of SCAR location and feature names.

5.0 Issues For Delegates To Consider

- The DIMS Implementation Plan is currently unfunded.
- There are only a very small handful of nations expressing an interest in DIMS Implementation projects, with Australia, the Netherlands (and the GCMD) the only SCAR members actively resourcing any DIMS Implementation Plan activity.
- The current level of effort being expended by the countries actively engaged is not sustainable.
- If members are not inclined to direct resources to DIMS implementation activities should SCAR re-assess the role and function of SCADM (see current terms of reference at Appendix 1) ?

Appendix 1

SCADM ToRs

SCADM is the SCAR entity responsible for the Antarctic Data Management System (ADMS); it provides:

- A single portal for recording information about data holdings - the Antarctic Master Directory (AMD), and;
- A distributed system for storing and providing access to that data – the National Antarctic Data Centres (NADC).

Specific ToRs include:

- To promote long-term preservation and accessibility of data relating to Antarctica and the Southern Ocean in sustainable repositories,
- To assist in establishing Antarctic data management policies, priorities and best practices,
- To support the establishment and ongoing work of National Antarctic Data Centres, in accordance with ATCM XXII Resolution 4.1 (1998),
- To encourage submission of metadata and data to the Antarctic Data Management System,
- To further improve and populate the AMD and provide guidance to the AMD host,
- To provide linkages to other relevant data management systems and thereby enhance the ADMS, In partnership with SCAGI to work with SCAR SSGs and SRPs, COMNAP and the Antarctic Treaty Secretariat to identify and develop fundamental datasets of value to the Antarctic Community.