Report of the SCAR/COMNAP
Joint Committee on Antarctic Data Management (JCADM)

July 2003 – July 2005

Introduction
Scientific data are very valuable. In the first place their intrinsic value for scientific research: without data no science. But there is also an economical value of data: it's extremely expensive to collect the data. This is especially true for Antarctic data.
To maximize the value of data and to preserve data for future (re)use, data need to be carefully managed in a professional manner. Data management includes all activities to archive data, to make data accessible and to exchange data. To make archived data accessible the existence and availability of the data must be made known. This includes building (metadata) directories and catalogs, defining exchange formats and developing web techniques for data exchange over the Internet.

Antarctic data
For Antarctic data the Antarctic Treaty (Article III – 1c) demands that
"Scientific observations and results from Antarctica shall be exchanged and made freely available"
To facilitate preservation and exchange of Antarctic data, nations are called upon to establish National Antarctic Data Centres (ATCM XXII Resolution 4.1).
To coordinate Antarctic data management and to support SCAR and COMNAP to fulfill the Antarctic Treaty obligations as described above, SCAR and COMNAP established the SCAR/COMNAP Joint Committee on Antarctic Data Management (JCADM) in 1997.

JCADM Terms of Reference
The JCADM Terms of Reference are:

JCADM is responsible for the Antarctic Data Directory System (ADDS) which comprises the Antarctic Master Directory (AMD) and the National Antarctic Data Centres (NADCs). This includes:
· 	The promotion of data management within the Antarctic Scientific Community
· 	Providing guidance to the AMD host
· 	The assistance in establishing Antarctic data management policies and priorities
· 	The recruitment of NADCs; these NADCs then catalogue datasets and provide information on data sets to the scientists and others with an interest in Antarctic Science
· 	The encouragement of scientists to submit metadata to the Antarctic Data Management
	System
· 	The reporting to SCAR and COMNAP (hence Treaty) on Antarctic data management issues

Members of JCADM are the managers of the National Antarctic Data Centers, or a relevant national contact if a NADC has not yet been established.

JCADM meets annually, with every second meeting in conjunction with SCAR.

JCADM activities in the period July 2003 – July 2005

JCADM meetings
In 2003, JCADM met in Brussels (JCADM-7).
JCADM-8 was held in Bremen in July 2004, in conjunction with the SCAR Open Science Conference and the annual COMNAP meeting.
Meeting reports can be found on the JCADM web site (www.jcadm.scar.org) and in annexes 1 and 2 of this document.
JCADM-9 will be hold in Buenos Aires, Argentina, September 12-16, 2005.

Recruitment of NADCs
When JCADM was established in 1997, 15 nations were involved. A proactive recruitment strategy in the period before JCADM-7 resulted in an increase in the number of nations represented in JCADM. Since JCADM-7, the following 26 nations are involved: Argentina, Australia, Belgium, Canada, Chile, China, Estonia, Finland, France, Germany, India, Italy, Japan, Korea, Netherlands, New Zealand, Norway, Peru, Poland, Russia, Spain, Sweden, Switzerland, Ukraine, United Kingdom, United States.
Recruiting has continued in the first half of 2005, resulting in the nomination of JCADM representatives from Malaysia and South Africa.
Bulgaria and Uruguay have shown interest to join JCADM.
Invitations to join were sent to Brazil, Czech Republic, Ecuador and Pakistan.

Capacity building
JCADM has put much effort in capacity building in the past and is continuing to do so.
The JCADM web site is the main vehicle for capacity building. It contains guidelines on all aspects of Antarctic data management and on setting up a NADC. The JCADM web site underwent a major revision in 2004 and is being completely redesigned in 2005.
JCADM has also organised a series of regional capacity building workshops. The latest one of these workshops was held in conjunction with the JCADM-7 meeting in Brussels in 2003. The next capacity building workshop will be hold in conjunction with JCADM-9 in Buenos Aires.

Populating the Antarctic Master Directory.
The Antarctic Master Directory (AMD) is the internationally accessible, web-based, searchable record of Antarctic data set descriptions. The Antarctic Master Directory is a resource for scientists to advertise the data they have collected and to search for data they may need. The AMD is hosted by the Global Change Master Directory (GCMD).
The dataset descriptions are in the Directory Interchange Format (DIF) and commonly referred to as 'DIFs'.
The DIFs are provided by the NADCs.
The number of DIFs has grown from 2751 in July 2003 to 3503 in July 2005. Currently 19 nations have contributed to the AMD, while some other nations are about to contribute their data set descriptions.

The AMD is increasingly being used. About 100 DIFs per month were retrieved in July 2003. This has grown to about 400 retrievals per month in the first quarter of 2005.

Liaise with SCAR groups and projects
Most DIFs describe national Antarctic data sets. JCADM realizes that SCAR programmes and projects have been neglected in the past. In 2002 an attempt was made to improve liaison

with the, then newly formed, Standing Science Groups. This attempt failed largely due to the way it was set up and due to the large burden of work on the Chief Officers. At JCADM-8 a new action item was defined to improve liaison with the SSGs by creating project DIFs for all SCAR projects. One of the JCADM Chief Officer also acts as liaison with the Expert Group on Geo Information (EGGI).

The future JCADM meetings in conjunction with the SCAR meeting will be organized in a way to allow attendance of and interaction with the SSG meetings.

Contact with other relevant data management organizations

A NADC is a region-based data centre, whereas oceanographic, atmospheric, geological, etc. data centres are discipline-based data centres.

JCADM is actively seeking cooperation with its counterpart organizations. At the national level, JCADM members are to contact their Arctic and oceanographic counterparts. At the international level, contact has been established with the Committee on International Oceanographic Data and Information Exchange (IODE) of the Intergovernmental Oceanographic Commission (IOC). SCAR and JCADM were represented at the IODE-18 meeting in April 2005 by the JCADM Chief Officer, who also gave a presentation on Antarctic data management and JCADM. The IODE Committee instructed the Chair, Dr. Lesley Rickards, to continue to seek close collaboration with JCADM and to find ways, together with the Chief Officer of JCADM, to expand the existing collaboration.

This collaboration between JCADM and IODE was also presented by Dr. Lesley Rickards at the IOC Assembly in June 2005.

The existing collaboration is aimed at expanding the AMD to include results from similar existing oceanographic metadata directories (EDMED and MEDI), pertaining to Southern Ocean data sets. The British Oceanographic Data Centre (BODC) and the Global Change Master Directory (GCMD) are working together on this subject. First results are to be expected by the end of 2005.

JCADM is investigating the possibility to contribute to the Global Biodiversity Information Facility (GBIF) by offering Antarctic scientists an Antarctic regional GBIF node to enter and find Antarctic biodiversity information. The JCADM member from the UK is the official liaison between JCADM and GBIF. In line with this initiative, JCADM is actively involved in the SCAR-MarBIN project. Four JCADM members attended the SCAR-MarBIN implementation meeting in Brussels at the end of May 2005.

JCADM and the International Polar Year 2007-2008 (IPY)

JCADM has written a document called "Recommendations on data management for the International Polar Year 2007-2008" in August 2004 and submitted this to the IPY Planning Group. This document, together with a similar document from the CliC IPO, formed the basis for the section on IPY data management in the IPY Framework document.

The JCADM Chief Officer gave a presentation on the possible JCADM contribution to IPY data management at the IPY Consultative Meeting in Paris in March 2005. The JCADM Chief Officer warned the IPY Joint Committee and the audience about the very slow pace with which the IPY data management structure is being developed.

Data access

JCADM recognizes the need to move from only providing access to metadata towards providing access to data as well. However, this requires a considerable increase in resources for NADCs. JCADM is investigating ways to realize this.

JCADM review and recommendations
JCADM was, in the words of the SCAR Executive Director, "reviewed very favorably" by an international Review Team in April 2005 (see JCADM Review document).
Even though the final draft version of the JCADM Review document has been made available very recently, JCADM has already started addressing several of the Recommendations (see below) of the Review Team (more notably Recommendations number 4, 7, 8, 9, 10, 14, 15, 16, 20). A detailed action plan with time frame, based on the Recommendations, will be presented to the SCAR and COMNAP Executives after the JCADM-9 meeting next September.

Table 1: JCADM Action Items from JCADM-8 Meeting

Related to:	Item	Deadline	Who
Supporting the AMD	All NADCs will contribute new DIFs to the AMD	1/07/05	All NADC representatives
Supporting the AMD	Creation of project DIFs for all SCAR projects	1/03/05	Helen Campbell - Physical Sciences SSG, Taco de Bruin - Life Sciences SSG, Peter Pulsifer – Geo Sciences SSG
Supporting the AMD	Creation of project DIFs for all national and international non-SCAR projects	1/03/05	All NADC representatives
Supporting the AMD	Harvest the GEOCAM dataset to the AMD	1/07/05	GCMD
Supporting the AMD	Update JCADM Listserver with quarterly stats on AMD	Each Quarter	GCMD
Supporting the AMD	Enable distributive searching of the Polar ODIN datasets	1/07/05	GCMD
Supporting NADCs	All NADCs will have national portals to the AMD	01/12/04	All NADC representatives, and GCMD
Supporting NADCs	Establish contact with each National Oceanographic Data Centre (NODC)	1/02/05	All NADC representatives
Supporting IPY	Draft an IPY data management plan for SCAR and ICSU	1/09/04	Taco deBruin
Supporting IPY	Establish contact with Arctic counterparts.	1/02/05	All NADC representatives. Arto Vitikka to furnish list of Arctic contacts
Supporting new	Review JCADM website,	1/10/04	Helen Campbell

NADCs	in particular the Guidelines section and comment		
Supporting new NADCs	Create a tutorial section of DocBuilder on JCADM website	1/02/05	Greg Scharfen and Rob Bauer
Supporting JCADM	Update JCADM on GIG activities	1/07/05	Peter Pulsifer
Supporting JCADM	Liaise with GBIF to inform JCADM on GBIF developments	1/07/05	Helen Campbell
Supporting JCADM	Write a letter to SCAR to become a partner in GBIF	1/02/05	Taco de Bruin

Recommendations from the final draft version of the JCADM Review document:

5. Recommendations

5. 1 To JCADM:
Antarctic Master Directory (AMD)

1. JCADM should continue to encourage managers of NADCs and the scientific community to submit entries to AMD to improve coverage (it is believed that about one third/no more than 40% of data sets are described in AMD?)

2. All nations should continue to submit metadata sets to AMD, for example

• JCADM to continue to find out more about what is going on at the national level outside the NADCs (for example *via* SCAR National Committees), and

• JCADM and NADCs to encourage metadata submissions to AMD from university groups

3. In order to meet the requirements of Treaty Article IIIc it is highly desirable that the metadata in AMD do contain links to the original data (and JCADM should encourage links to the data sets themselves through AMD)

4. JCADM should establish and/or improve linkages with other (compatible) metadata directories (e.g. EDMED, MEDI)

5. JCADM should work with GCMD to investigate the addition of astronomy categories and key words.

6. JCADM should work with GCMD to add additional key words where appropriate (e.g. sea surface temperature)

7. Put all 26 NADC portals with their logos on the portals page of AMD

8. JCADM, in cooperation with GCMD, should expand AMD to be a window into all possible data sets – e.g. global maps of piston cores including those from the Southern Ocean, JCOMMOPS (e.g. Argo, VOS, SOOP, Drifting Buoys, GLOSS), GBIF, OBIS, SuperDarN, WDCs etc. this would achieve a step function increase in population and utility.

9. JCADM, in conjunction with the RT Chair and Executive Secretary SCAR, should consider reviewing GOSIC entries in GCMD and flag those relating to Antarctic data sets, so that these are available through the AMD. Similarly, JCADM should provide GOSIC with information on those AMD entries which should be accessible through GOSIC.

10. Use satellite experts to evaluate what entries are in the GCMD that relate to the Antarctic region, and what should be added (and flagged in the AMD part of the GCMD).

11. JCADM should review what *in situ* data set descriptions are missing from AMD but already included in GCMD (e.g. global data sets with an Antarctic component) and ask GCMD to flag these in AMD

12. JCADM to ensure that international Antarctic region data collection activities are included in AMD

13. JCADM should review and check existing AMD entries periodically

Communication

14. JCADM to improve communication with data collecting scientists and users (including SSGs, SRP Steering Committees, SCAR Expert and Action Groups), through provision of clear information about use of and input to AMD, including examples (from scientists) of what research can be done using data from AMD, and guidance for searching

15. JCADM to use opportunities such as conferences and newsletters to make the scientific communities more aware of opportunities offered by/benefits of the AMD, the NADCs and JCADM.

16. JCADM to establish communications and collaboration with EGGI, starting with JCADM-9, and continuing with intersessional meetings to discuss areas of mutual interest, including the EGGI sub-project Antarctic Data Linkages and liaison regarding geospatial information activities

Organisational

17. An annual written report should be made available for the Executive Committees (by end May)

18. As part of its annual report JCADM should produce a quantified plan of what will be done over the year, e.g. estimate of likely additions to AMD.

19. JCADM to formally report to the SCAR and COMNAP Executive Committees (one year) and the Delegates (intervening year).

20. Consider developing a network of allied data centres (e.g. WMO, NODCs, GBIF, OBIS, CCAMLR, etc.) through bilateral partnerships.

21. Improve capacity for long term data stewardship, including compiling data sets

Annex 1
Report of the Seventh Joint Committee on Antarctic Data Management Meeting (JCADM-7)
Brussels, June 30 - July 4 2003

Attendance
JCADM Executive:
Dean Peterson Chief Officer   (New Zealand)
Lee Belbin   Deputy Chief Officer (Australia)
Taco de Bruin Deputy Chief Officer (The Netherlands)

National Antarctic Data Centre (NADC) representatives:
Argentina (Celia Izquierdo)   Belgium (Maaike Vancauwenberghe)
Canada (Peter Pulsifer)   Estonia (Jüri Ivask)
Finland (Arto Vitikka)   Germany (Manfred Reinke)
Japan (Mitsuo Fukuchi and Toru Hirawake) Korea (Hosung Chung and Sung Dae Kim)
Norway (Stein Tronstad)   Poland (Krzysztof Jazdzewski)
Russia (Vasily Smolyanitsky)   Switzerland (Marc Rolli)
United Kingdom (David Hyett)   USA (Greg Scharfen and Rob Bauer)
Ukraine (Gennadi Milinevsky and Svetlana Kovalenok)

There were also representatives from a number of associated groups:
David Kendig   NASA's Global Change Master Directory (GCMD)
Glenn Johnston   SCAR Geosciences Standing Scientific Group
Patricia Mergen   Global Biodiversity Information Facility (GBIF)
Claude de Broyer   Belgium Institute of Natural Sciences
Bruno Davis   Belgium Institute of Natural Sciences
Angelino Meerhaeghe   Belgium Institute of Natural Sciences
Mark Thorley   National Environment Research Council UK (NERC)

JCADM's Mandate and Associated outcomes:
The Joint Committee on Antarctic Data Management's mandate is to
    1. Recruit National Antarctic Data Centres (NADCs) within SCAR countries.

    Over the past year the JCADM executive have spent considerable time and effort in recruiting. Much to Taco de Bruin's credit JCADM has grown from 16 representatives to a total of 26 countries. This proactive recruitment created the largest JCADM meeting to date, 18 countries represented, including 8 new member countries.

    2. To empower those NADCs to collect dataset descriptions of Antarctic scientific data for the Antarctic Master Directory (AMD).

    The total number of Directory Interchange Format files (DIFs) in the AMD has increased from 2032 (May 2002) to 2544 (April 2003) a 25% growth in the AMD. The growth can be attributed to the excellent support received from the GCMD in creating and deploying tools to assist NADCs in creating DIF metadata records to the AMD. The GCMD have also supported the creation of NADC portals to the AMD. These portals are hosted by the GCMD, provide a national badged view of their metadata in the AMD and a national DIF creation facility.

The Meeting
JCADM is extremely grateful to the Belgian Federal Public Planning Service Science Policy offices for their generous travel support and for the facilities of the meeting. The 7th meeting of JCADM was structured to: educate emerging countries on populating and using the AMD and general data management protocol; to plan future strategies to better align to SCAR and COMNAP needs; and to discuss issues arising over the past year.

Key elements of the meeting and associated outcomes were:
- The Chief Officer welcomed eight new representatives of NADCs at the meeting and began a series of presentations on data management and the position of JCADM within the Antarctic Treaty System (ATS).
  - o It was realised when planning the meeting that there would be a large number of new NADC representatives at the meeting and there would be a large range of the levels of knowledge regarding data management and the ATS.
  - o The presentations and discussions led to the dissemination of information on guidelines to the new NADCs.
  - o The GCMD personnel and Australia have volunteered to help the emerging countries with data set protocols, data portals and DIF creation.

- Reports were given by the national delegates and the Chief Officer on the 2002/03 achievements
  - o Creation of a detailed NADC task list for the coming year, to be added to by countries not present at the discussion. (Appendix 1)
  - o Creation of list of data catalogues associated with the Antarctic and Southern Ocean

- David Kendig presented a report on the status and recent developments of the AMD and the associated toolkit.
  - o Identified the need for a modified Antarctic specific MD-9 (MD-9 lite).
  - o Identified the need for an INTEROP representative from JCADM.

- Taco de Bruin presented the existing JCADM starter kit and a half-day associated workshop on using the AMD was facilitated by David Kendig.
  - o Identified the need for an update of starter kit and examples NADC structures and associated costs posted on the JCADM web site.
  - o Two national data management workshops in the coming year will be held in Ukraine and Estonia.

- Lee Belbin and Dean Peterson led a discussion on ways JCADM and the NADCs could better support SCAR, COMNAP, CEP and ATCM activities.
  - o Linkages into the Scientific Standing Groups need to be rejuvenated. Assignment of all JCADM members into SSG, COMNAP and CEP.
  - o Acknowledgement of a need for clear communications between COMNAP/JCADM and SCAR.
  - o Identified the need for Project DIFs to assist SCAR and COMNAP and other ATCM parties with information on activities within past and current international programmes and national projects.
  - o Identified that direct links to the CEP and CCAMLR are also needed for JCADM.

- o As a first step to assist the exchange of information within the Treaty System, create a portal for Antarctic databases for Antarctic researchers on the JCADM Web site.

- Claude de Broyer gave a presentation on Belgium's biodiversity project, Glenn Johnstone presented an update on GIG activities and Peter Pulsifer presented Canada's initiative on a Cybercartographic atlas.
  - o Acknowledgement that a close connection between JCADM and GIG through dual membership needs to be maintained.
  - o JCADM will cooperate closely in the future with the biodiversity project of Belgium and the Cybercartographic atlas.

- Maaike Vancauwenberghe and Dean Peterson gave updates on SCAR and COMNAP activities.
  - o Creation of two presentations: one for Belgium to COMNAP and one for the Chief Officer to the SCAR / COMNAP executive.

- Manfred Reinke gave a report on SCAR XXVIII 2004 meeting in Bremen.
  - o JCADM will increase the awareness within the Antarctic scientific community of the importance of data management by advertisement of the AMD web site, brochure and getting involved earlier with future science projects.
  - o JCADM will ask for a three-block session during the SCAR meeting titled "Data management: teaching old dogs new tricks".
  - o JCADM will ask for a key note presentation time on Tuesday morning at the SCAR meeting

- Mark Thorley presented an overview of the Data GRID and gave an "Ex-Chief Officer perspective" to JCADM.
  - o JCADM needs to rearrange its focus from JCADM to NADCs and acknowledge new technologies when they are available to the AMD.
  - o Update the NADC status template

- Plenary discussion on agreed action items for JCADM and for each NADC present
  - o NADC action list for next 12 months (Appendix 1)
  - o JCADM action list for next 12 months (Appendix 2)

Appendix 1: JCADM Action Items from JCADM-7 Meeting

Related to:	Item	Deadline	who
SCAR Conference	Obtain approval for a separate session during all three blocks	14/7/03	Manfred Reinke Convener: Dean Peterson
SCAR Conference	Submit Poster and presentation to session	15/01/04	All Review Committee: (Dean Peterson, Greg Scharfen, Rob Bauer, Stein Tronstad)
SCAR Conference	Submit a presentation to plenary on Tuesday	15/01/04	Manfred Reinke to obtain slot Lee Belbin to present talk
SCAR Conference	Submit proposals for presentations to SSGs	15/01/04	Dean Peterson Taco de Bruin Lee Belbin
SCAR Conference	Create brochure and poster	11/01/03	Rob Bauer and Marc Rolli
Supporting new NADCs	Redesign/ Update Starter Kit	10/01/03	Taco deBruin, David Hyett, Maaike Vancauwenberge and GCMD
Supporting new NADCs	Create a range of examples of NADCs	10/01/03	Taco de Bruin
Supporting new NADCs	Create a status matrix of all NADCs	10/01/03	Lee Belbin
Supporting new NADCs	Write an official letter of support to emerging NADCs	10/01/03	Dean Peterson
Supporting new NADCs	Recruit new NADCs	7/7/04	Taco de Bruin
Supporting new NADCs	Create an internet / email workshop for new NADCs	15/01/04	Gennadi Milinevsky and GCMD
Supporting new NADCs	Hold an evening workshop for new NADCs at SCAR	15/01/04	Dean Peterson and GCMD
Supporting new NADCs	Develop new portals to AMD	7/7/04	All GCMD
JCADM Business	Write an update on the financial situation of AMD	10/01/03	Dean Peterson Lee Belbin
Supporting SCAR and COMNAP	Create project DIFs for all national programmes / projects	7/7/04	All
Supporting SCAR and COMNAP	Create project DIFs for all SCAR programmes	7/7/04	Dean Peterson, Taco deBruin and Lee Belbin
Supporting SCAR and COMNAP	Generate SSG subgroups of NADCs	10/01/03	Dean Peterson, Taco deBruin and Lee Belbin

Supporting SCAR and COMNAP	Create a complete list of database catalogues related to Antarctica	7/7/04	Peter Pulsifer

Appendix 2: List of NADC action items from JCADM – 7 meeting

Argentina
1. Data policy
2. Project DIFs
3. National portal
4. Establish connection with other Argentinean Sub-Antarctic data centers
5. Continue adding DIFs to AMD

Australia
1. Load all JCADM-7 material to JCADM Web site
2. Contact Steven Chown about a JCADM presentation to the LSSSG in Bremen
3. E-mail JCADM listserver to enlist members in support of the LSSSG
4. Continue to develop Antarctic Biodiversity database in accordance with emerging GBIF standards collaborating with Claude der Broyer
5. Aim at 10% increase in DIFs
6. Improve data/metadata ratio by 5%
7. Continue to submit project DIFs to the AMD
8. Assist Peter Pulsifer with a database of Antarctic science databases
9. Create SERFs covering AADC services
10. Assist with development and delivery of Bremen Plenary presentation on JCADM
11. E-mail at least one information report on JCADM to the LSSSG Listserver
12. Commit at least one day to transfer JCADM experience to Dean peterson

Belgium
1. Link from national web site to Belgian AMD portal
2. Establish contact with scientist to increase dataflow into AMD
3. Update existing DIFs
4. Create new (project) DIFs
5. Biological databases online (at least 2)

Canada
1. Start developing data policy, protocols
2. Establish national portal (GCMD)
3. Populate AMD with DIFs
4. Create DIFs/SERFs documenting active projects
5. Present (activities) to CCAR meeting
6. Write article for CCAR newsletter

Estonia
1. Establish national portal (GCMD)
2. Populate AMD with DIFs
3. Create DIFs/SERFs documenting active projects
4. Organize seminar about JCADM for Estonian Antarctic scientists

Finland
1. Establish national portal and NADC
2. Raise awareness of AMD amongst national Antarctic scientific community
3. Support scientists in creating DIFs and SERFs

Germany
1. Antarctic contents from PANGAEA as DIFs into AMD
2. Create DIFs/SERFs documenting active projects

Japan
1. Design new website
2. Encourage scientists to submit (more) DIFs
3. Project DIFs
4. Data policy

Korea
1. Data policy
2. Database update and forwarding DIFs to AMD
3. Project DIFs

Netherlands
1. 12 new DIFs
2. Project DIFs
3. Redesign web site
4. AMD portal
5. Data policy / reorganize national Antarctic data structure

New Zealand
1. Increase funding for NADC
2. Redesign web site
3. Creation of national portal
4. Enforce DIF submittance
5. 21 new DIFs
6. Project DIFs

Norway
1. 20 new DIFs into AMD
2. 1 dataset online
3. Set up NADC website
4. Raise awareness within Antarctic scientific community about AMD

Poland
1. Create (data) DIFs and submit to AMD
2. Raise awareness amongst national Antarctic scientific community

Russia
1. Redesign national web site
2. Project DIFs
3. Create (data) DIFs and submit to AMD
4. Raise awareness amongst national Antarctic scientific community
5. Increase number of online datasets
6. Present activities to SCAR meetings (meteorology, cryology, sea-ice)

Switzerland
1. Establish national portal (GCMD)
2. Populate AMD with DIFs
3. Create DIFs/SERFs documenting active projects

Ukraine
1. Data policy
2. Create DIFs
3. Establish national portal
4. Redesign web site
5. project DIFs for long term national projects
6. Data base for climate, upper atmosphere and meteorological data
7. At least 1 dataset online
8. National workshop on JCADM, AMD, Antarctic data management

United Kingdom
1. Identify new DIFs
2. Update existing DIFs
3. Project DIFs
4. Raise awareness within BAS about AMD

United States of America
1. Web site redesign / AMD portal
2. Continue DIF collection and outreach
3. Begin project DIFs/SERFs
4. Coordinate with new Antarctic Sciences Programme Manager

GCMD:
1. Build Antarctic project portal
2. Create country portals
3. Automated statistics (real time?)
4. Create simplified version of MD8/9
5. ISO compliance

Annex 2

Report of the Eighth Joint Committee on Antarctic Data Management Meeting (JCADM-8)
Bremen, July 29 – 30, 2004

Attendance
JCADM Executive:
1. Dean Peterson,   Chief Officer   (New Zealand)
2. Taco de Bruin,   Deputy Chief Officer (The Netherlands)

National Antarctic Data Centre (NADC) representatives:
3. Canada (Peter Pulsifer)   4. Chile (Ricardo Jaña & Patricia Vacuña)
5. Estonia (Jüri Ivask)   6. Finland (Arto Vitikka)
7. France (Thierry Lemaire & Yves Frenot) 8. Germany (Manfred Reinke)
9. Italy (Claudio Rafanelli)   10. Japan (Mitsuo Fukuchi & Toru Hirawake)
11. Korea (Jae-Shin Kang)   12. Switzerland (Marc Rolli)
13. UK (David Hyett & Helen Campbell)   14. USA (Greg Scharfen & Rob Bauer)
15. Ukraine (Svetlana Kovalenok)

There were also representatives from a number of associated groups:
Tom Northcutt   NASA's Global Change Master Directory (GCMD)
Bruno Davis   Belgium Institute of Natural Sciences
Chad Dick   CliC IPO
Jacqui Burgess   Ministry of Fisheries, New Zealand
Paul Berkman   EvREsearch LTD, USA

Apologies
Celia Izquierdo   Argentina
Maaike Vancauwenberghe   Belgium
Lee Belbin   Deputy Chief Officer, Australia
Stein Tronstad   Norway
Wojciech Majewski   Poland
Victor Lagun   Russia
Antonio Barragan   Spain

JCADM's Mandate and Associated outcomes:
The Joint Committee on Antarctic Data Management's mandate is to
   1. Recruit National Antarctic Data Centres (NADCs) within SCAR countries.

       Over the past year the JCADM have pursued recruitment of the remaining countries
       within SCAR. France has shown renewed interest in JCADM with a new appointment for
       their NADC coordinator and Uruguay is pursuing membership of JCADM.
       15 country representatives attended the meeting in Bremen. There are now a total of 26
       countries involved in JCADM.

   2. To empower those NADCs to collect dataset descriptions of Antarctic scientific data
       for the Antarctic Master Directory (AMD).

The total number of Directory Interchange Format files (DIFs) in the AMD has increased from 2544 (April 2003) to 2966 (June 2004), a 17% growth in the AMD. The growth can be attributed to the continued work by existing NADCs and the implementation of new NADCs. The GCMD has supported the creation of NADC portals to the AMD. These portals are hosted by the GCMD and provide a national view of their metadata in the AMD and a national DIF creation facility.

3. Support NADCs to act as a repository for Antarctic science data.

NADCs vary greatly in the resources available for storing and disseminating Antarctic science data. NADCs submit data to relevant World Data Centres. In addition, NADCs have also made data freely available on the Internet as data files, as databases and using Web Services to international science portals such as the Global Biodiversity Information Facility and the Ocean Biogeographic Information System. Currently, over 30 million data records have been placed online by NADCs.

The Meeting
The SCAR meeting has been changed from a business meeting to a science conference and business meeting. The new-style SCAR meeting was a large success. JCADM benefited from a two-day session on data management entitled "Antarctic geospatial information, data management and information portals: management and application in science". This was followed by a two-day JCADM business meeting.

The titles of the talks given in this two-day session were:

1. The Joint Committee on Antarctic Data Management (JCADM): past, present and future (Dean Peterson, NZ)
2. Discovering the growing data resources in the Antarctic (Tom Northcutt, GCMD, USA)
3. Data flow and data dissemination during the 'International Polar Year 2007-08': building on experiences in oceanography (Taco de Bruin, Netherlands)
4. Publishing and citing scientific primary data (M. Diepenbroek, Germany)
5. The on-line atlas of Antarctic research (C. Hallum, USA)
6. A discovery service for knowledge related to research platforms (A Macario, Germany)
7. Antarctica on my desktop (Dean Peterson, NZ)
8. Serving Antarctica: making topography available on the web (J McKenna, Australia)
9. Standards in Antarctica: a report on the liaison between SCAR and ISO TC211 (A. Cooper, UK)
10. PANGAEA – long-term archive and library for multidisciplinary data from Antarctic research (H. Grobe, Germany)
11. Can the SCAR feature catalogue help in providing common semantics for Antarctic spatial data? – The KGIS experience (S. Vogt, Germany)
12. Biodiversity studies in Antarctic shelf environments: opportunities and challenges for geographic information systems (C. Cogan, Germany)
13. Web-portal of Russian Antarctic Program – gate to meta and factual information (Victor Lagun, Russia)
14. Web site for medical information sharing in Antarctica (S. Pillon, Italy)
15. Antarctic Treaty Searchable Database – 1959 to the present (Paul Berkman, USA)

16. Building a data infrastructure in support of the Cybercartographic Atlas of Antarctica (Peter Pulsifer, Canada)
17. A geographical information system applied to the Antarctic Specially Manage Area (ASMA) of Admiralty Bay (N. Dani, Germany)
18. A virtual international Antarctic magnetometer network (V.O Papitashvili, USA)
19. Visualization of earth science spatial data for Antarctic research as part of the Cyber cartographic Atlas of Antarctica project (B. A. Woods, Canada)

Key elements of the business meeting and associated outcomes were:
- The Chief Officer **welcomed the 15 country representatives and guests** to the JCADM meeting.
  - Because of the reduced length of the meeting (2 days instead of 5 days) the country reports on NADC activities were presented as posters in the poster session of the SCAR meeting. This strategy gave the science community a better idea of JCADM and NADC activities.
  - Along with official JCADM representatives there were a number of guests at the meeting, some participated in the discussions and gave presentations, which will be reported on later in this document and others just listened to the discussions and presentations.

- A **report by the JCADM Chief Officer** was given for the achievements of JCADM over the past year (2003/04). The highlights of the previous year's accomplishments were discussed as well as major focus points for the meeting.
  - After the meeting in Belgium in July 2003, a presentation on JCADM and the AMD was given by the Chief Officer to the COMNAP and SCAR executive. A decision was made by COMNAP and SCAR to continue funding JCADM at US$10,000 per annum for the AMD. The split of money between SCAR and COMNAP has been set at 70% SCAR / 30% COMNAP.
  - JCADM has increased its profile through the production and release of a pamphlet explaining JCADM. Rob Bauer was thanked for his efforts and funding to get the document published.
  - JCADM's response to IPY and how it would be part of the data management system was talked about. A decision to focus on this topic over the next two days was made.
  - The action items relating to each NADC and JCADM were discussed and two new action lists were created based on what had been completed and the new items from the JCADM-8 meeting.

- Tom Northcutt presented a **report on the status and recent developments of the GCMD and ISO 19155.**
  - An introduction on metadata and the AMD was given for new members and guests at the meeting.
  - There is a new mandatory DIF field named: ISO topic category. This DIF field is populated from a drop-down menu in DIF Builder.
  - Software to customize the national portals is being developed. This will be a useful tool since all NADCs are now required to have a national portal to the AMD.
  - The DIF is ISO19115 core compliant and the GCMD plans to maintain this compliance with any changes that occur. This is another reason to continue the use of the AMD instead of creating separate metadata systems.

> o Checks on DIF content are the responsibility of staff/scientists (first), NADCs (second) and then AMD staff (third).

- Tom Northcutt presented a progress report on the AMD.
  - o The AMD has grown from 1828 in January 2002 to 2966 in June 2004.
  - o The contribution per country is shown below.

DIF Distribution by Contributing Country
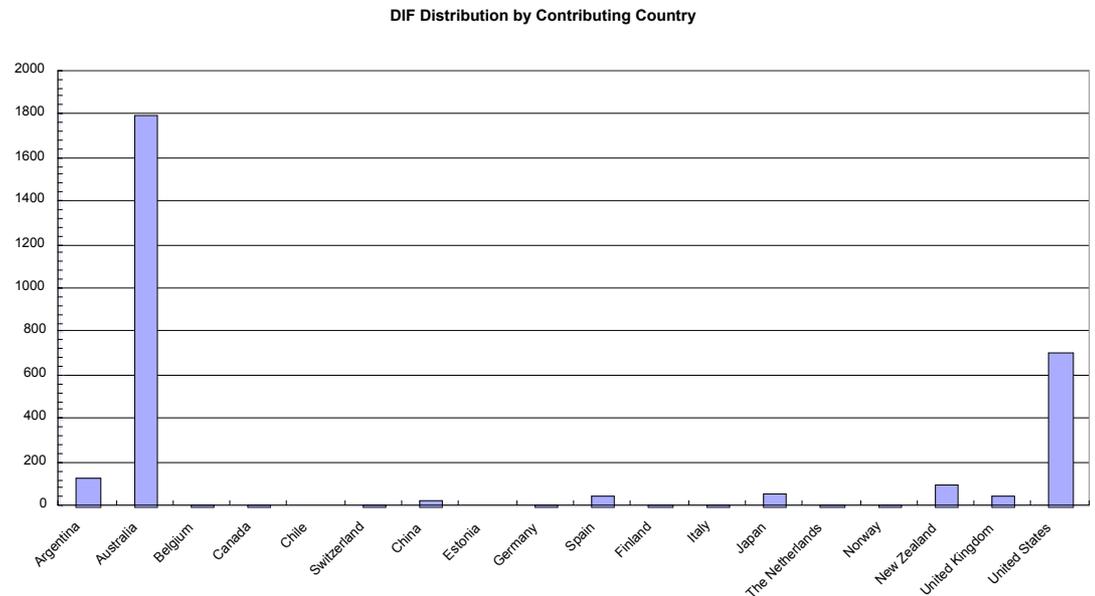
> o There was a concern that the AMD still only represents a fraction of the total Antarctic data. Actions towards rectifying this problem were discussed at length and are presented later in this document (Appendix 2).
> o There were discussions around how best to present the AMD statistics. It was decided to send the statistics to the JCADM listserver so that everyone could see them each quarter. It was also stated that there has been too much time and effort spent on reporting to different committees the usefulness of the AMD. A statement was made that the AMD is the only and obvious choice for best practice data management and that we don't really have an alternative, therefore less time should be spent on justification and more time on generating metadata and managing data.

- An action item from the JCADM-7 meeting was the **creation of project DIFs for SCAR projects and national projects.** This was done for recent SCAR LSSG projects. Examples of these are:

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APIS - APIS - Antarctic Pack Ice Seals 1994-1999, plus historical
data from the 1980's [APIS] APIS - Energy requirements and daily
food consumption of crabeater seals in the Antarctic winter pack-
ice [ASAC_1090]

RiSCC - Regional Sensitivity to Climate Change in Antarctic
Terrestrial Ecosystems [RiSCC]: the periantarctic region
[ASAC_1015] ***(plus 13 other RiSCC records)***

EVOLANTA - Conservation of plant biodiversity in Antarctica - a
genetic approach [ASAC_2152]
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EASIZ - Feeding Ecology of Marine Copepods in the Nearshore Prydz
Bay Area, Antarctica [ASAC_691] EASIZ - The fate of primary
production in Antarctic sea ice: the role of metazoan grazers.
[ASAC_1328]

ASPECT - Sea Ice Observations from the Akademic Fedorov (37th
Russian Antarctic Expedition) [ASPECT_AF110191]  ***(plus 72 other
ASPECT records)***

ITASE - ITASE reconnaissance firn core drilling and climate
variability studies [ASAC_1236] ITASE - Amery shallow ice coring
[ASAC_1224]
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However, project DIFs from other SCAR groups and from many national projects still remain to be included.

- o It was pointed out that there is a database for projects within the AMD, which can link DIFs associated with them. It was proposed to use this as the template to create project DIFs.
- o To better ensure that project DIFs do exist in the future it was proposed that each SCAR project have associated with it a data manager. To make this happen over the next year three individuals volunteered to get the information from SCAR and begin the process. The volunteers are: Peter Pulsifer for Geo-Sciences, Helen Campbell for Physical Sciences and Taco de Bruin for Life Sciences.
- o NADCs are also encouraged to connect data management with each national project and any non-SCAR international projects that they are involved with.

- There was a lengthy discussion on existing **database catalogues related to Antarctica** and how JCADM should include them in the future.
  - o It was agreed that the AMD must be a comprehensive library of Antarctic information to be a success.
  - o There are already DIFs in the AMD reflecting database catalogues (for example, the SCAR Biodiversity database).
  - o There are two ways to further improve this: data harvesting or distributed searching. Both methods will be looked into by the GCMD. Harvesting will be tested using the GEOCAM data set and distributed searching will be tested using the PolarODIN idea.

- Helen Campbell and Chad Dick gave an **update on the Climate and Cryosphere project (CliC).**
  - o The CliC project was established by the World Climate Research Programme (WCRP) in March 2000. CliC addresses the entire cryosphere (i.e., snow cover, sea-, lake- and river- ice, glaciers, ice sheets, ice caps and ice shelves, and frozen ground including permafrost) and its relation to climate.
  - o The principal goal of CliC is to assess and quantify the impacts of climatic variability and change on components of the cryosphere and their consequences for the climate system, and determine the stability of the global cryosphere.
  - o JCADM should maintain contact with CliC, especially through the IPY. Chad Dick is a strong advocate for JCADM.

- Taco de Bruin and Dean Peterson had a lunch meeting with Colin Summerhayes (Executive Director SCAR) and Lesley Rickards (Chair IODE) regarding a **Polar ODIN proposal**. Taco de Bruin gave a presentation to JCADM on the meeting.
    o It was realised before the meeting that JCADM members were, in many cases, not aware of their own National Oceanographic Data Centre (NODC) counterpart and vice versa. An action item to make contact with all NODCs was agreed to by all NADC representatives present at the JCADM meeting.
    o The information already contained in the NODCs around the world may contain data from the Antarctic. This data will be harvested after the initial contacts are made.

- There was a long **discussion on data management requirements for IPY**, resulting in a **first draft for an IPY data management plan**. The plan has been emailed to ICSU, SCAR and COMNAP (Appendix 1).
    o An action item was agreed to establish contact with the Arctic counterparts in those countries with an Arctic research program.

- Taco de Bruin gave an update on the **revised JCADM website and the redesigned Starter Kit**.

    o Maaike Vancauwenberghe and Taco de Bruin have reworked the JCADM website, in particular the Starter Kit portion (renamed "Guidelines"). The upgraded website is now online and open for comments and revisions.
    o Helen Campbell will look over the text of the general website and comment.

- Tom Northcutt demonstrated **DocBuilder, PreDIF and DIF Template** to the JCADM attendees.
    o A tutorial section for DocBuilder will be added by Rob Bauer and Greg Scharfen to the Guidelines page of the website.

- Helen Campbell presented a **status report on GBIF**.
    o MarBIN, OBIS and GBIF were all discussed.
    o It was proposed that SCAR becomes a partner in GBIF. This will cost SCAR but the benefits would be considerable given that GBIF is a world leader in sharing information from multiple sources.

- A plenary discussion on **agreed action items for JCADM and for each NADC present is presented in Appendix 2.**

Appendix 1

Recommendations on data management for the International Polar Year 2007-2008

SCAR-COMNAP Joint Committee on Antarctic Data Management (JCADM)

August 2004

1. Introduction

The International Polar Year 2007-2008 (IPY) is an ambitious and enterprising international programme which aims to increase our understanding of the Earth's polar regions. This paper gives a brief overview of recommendations from the Joint Committee on Antarctic Data Management (JCADM) for managing the data sets which will result from the IPY.

The polar regions are increasingly being recognized for their profound significance on the Earth's climate and ultimately on the Earth's environment, ecosystems and on human society (IPY, 2004). The ICSU IPY Planning Group recognizes that an intense, interdisciplinary, and internationally coordinated campaign of research and observations can deepen our understanding of polar processes and their global linkages. If the knowledge and observations realized from this programme are to become a legacy for future generations, a 'snapshot' to be used as a benchmark for understanding change, then this knowledge and the observations upon which it is built must be effectively managed to ensure the greatest benefit to humankind in the near and distant future.

The ability to integrate and share information from disparate sources is central to the vision of an interdisciplinary scientific approach that addresses questions and issues lying beyond the scope of individual disciplines[1]. Realizing these higher level goals, however, is dependent upon the lower levels systems that support the integration and sharing of information. Polar researchers and society in general are realizing that failure to consider lower level design and implementation strategies can have significant long term costs. These costs are realized in terms of decreased fiscal efficiency (i.e. duplication of effort) and, more importantly in this context, the potential loss of information and consequent loss of potential for developing new scientific knowledge and understanding. A strong data and information management strategy can support several objectives as set out by the IPY Planning Group including:

- Ensure data collected under the IPY are made available in an open and timely manner
- Intensify the recovery of relevant historical data and ensure that these also are made openly available
- Develop and embrace new technological and logistical capabilities

2. An IPY Data Management Strategy: Managing the IPY Final Data Set

In fifty years time, during the next IPY, the Final Data Set resulting from IPY 2007/08 may be seen as the most important single outcome of the programme. This data set, which is the result of a period of intensive measurements, will act as a benchmark data set. A data set which can serve as a baseline against which global change is measured. Excellent data management, carefully staged and professionally executed, is a prerequisite for achieving this vision.

With professional data management, the IPY Final Data Set will be a valuable legacy passed on from our generation to future generations of polar scientists. The IPY Final Data Set can be the

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1 IPY, 2004 - http://www.ipy.org/concept/objectives.html

cornerstone upon which new and exciting polar science is built, and will be the authoritative source for high-quality advice to policy makers and decision takers. These benefits maximize the return on investment made during the IPY.

Without effective data management data may be lost forever. The absence of sound data management practice, which includes proper data description, will reduce the immediate usefulness and the ultimate 'life-time' of data. Lack of adequate data management in IPY may severely impede or even eliminate the ability of the IPY programme to achieve its ambitious goals.

The scientific issues being addressed in the IPY are large and complex, and require a high degree of cooperation between scientists and the ability to access and work with data from a wide range of scientific disciplines. For Antarctic research the Antarctic Treaty therefore calls on parties to "exchange and make freely available scientific observations and results from Antarctica". In the context of the IPY and beyond, the open, free and unrestricted exchange of data and information should be applied to both polar regions and form the starting point for the IPY Data Management Strategy.

3. Data Management Recommendations

3.1 IPY Data Advisory Group (DAG)
The proposed task of developing an IPY Data Management Strategy will require extensive preparation. Therefore, JCADM advises ICSU to establish an IPY Data Advisory Group (IPY-DAG) as soon as possible, to organize and oversee IPY data management.

The main task of this IPY-DAG is to establish specific goals for IPY data management, based on the scientific questions formulated in the IPY Science Plan.

The IPY-DAG should include:
  - Scientists and data managers from the Antarctic and the Arctic science communities
  - Representatives from ICSU's World Data Centre system
  - Representatives from JCADM and the GCMD
  - Representatives from relevant discipline based data centres

3.2 Data Information Unit
The IPY-DAG should seek to establish a Data Information Unit (DIU). The DIU proved to be the key element in the extremely successful World Ocean Circulation Experiment (WOCE) data management effort.

The DIU:
  - is the central gateway to the online (and distributed) IPY data resource
  - actively tracks the data flow within the IPY field programmes

Note that the DIU is certainly not identical to the IPY International Programme Office.

4. Implementation Details for an IPY Data Management Strategy

4.1 Use existing infrastructure:
Considering the relatively short period until the start of the field phase of the IPY on March 1, 2007, JCADM recommends that the IPY Data Management Strategy should make use of existing data infrastructures and proven concepts as much as possible:

  - The DAG needs to take into account the existence and abilities of the international Joint Committee on Antarctic Data Management (JCADM) for the Antarctic region and the absence of a similar body for the Arctic region.
    JCADM consists of the managers of the National Antarctic Data Centres, or a relevant national contact if a NADC has not yet been nominated. Currently 26 SCAR nations are represented on JCADM. JCADM coordinates the development of the Antarctic Data Directory System (http://www.jcadm.scar.org/adds.html).

Since there is no Arctic counterpart to JCADM, the DAG needs to bridge between the two regions by investigating the possibility of seeking alliances with initiatives like the ARCUS Spatial Data Infrastructure. The DAG should also link with other discipline based global data communities.

- Use the Global Change Master Directory (GCMD), which hosts the Antarctic Master Directory (AMD - http://gcmd.nasa.gov/Data/portals/amd), as the IPY metadata directory for data discovery. The GCMD contains a large number of Arctic data set descriptions as well.

- Work with the SCAR Geographic Information Group of Experts to ensure that developments related to the proposed Antarctic Spatial Data Infrastructure program are incorporated and utilized within the IPY Data Management Strategy.

- Use existing data reporting schemes to track IPY data. For oceanography the instrument used is the Cruise Summary Report (CSR, also known as ROSCOP), other disciplines could use the pre-DIF concept, as developed by JCADM.

- Use the existing data archive infrastructures, such as the ICSU World Data Centres and the national archives.

- Learn the lessons from other global scientific programmes with successful data management, such as the World Ocean Circulation Experiment (WOCE).

4.2 IPY Data Management Issues

The IPY-DAG should consider the following issues:

- IPY Data Management Plan
  The IPY data management plan, which is part of the overall Data Management Strategy, should define the goals for IPY data management, based on the scientific questions in the IPY Science Plan. It should establish which data and data products are needed to meet the scientific goals. It should outline the IPY organizational data structure, which must be operational before the start of the field phase.

- Project/Programme data management plans
  ICSU should require that each IPY proposal contains a data management plan. This plan should include the appointment of a dedicated project data manager, appropriate funding for data management, and describe how the project data management plan is linked into the IPY Data Management Plan.

- Data policy
  The IPY data policy should guarantee free and timely access to and exchange of data. The data policy should also address ownership issues.
  There should be a willingness, probably at the level of the funding agencies, to enforce the data policy if necessary.

- Data reporting
  To safeguard all data collected in the framework of IPY, an effective data reporting scheme should be set up. An example of such a scheme is the use of Cruise Summary Reports (CSR) in oceanography. For IPY, the pre-DIF concept as developed by JCADM, could be used.

- Data security
  International data sharing will be an essential component of the IPY, and therefore security of data (e.g. firewalls, backup) will be vital.

- Data documentation
  Detailed data set descriptions are vital to ensure the long-term usability of data, and therefore

to maximize on the investments made in science.

- Data formats
  Common data formats and standards are a prerequisite to data sharing both nationally and internationally, which is an inherent component of IPY.

- Data storage and archiving
  The IPY science programmes are likely to produce vast quantities of data, which will require effective and secure storage, and (in most cases) post-project archiving.
  ICSU's World Data Centres were established to be long-term deep archives.

- Data directories/discovery
  Discovery level metadata is vital to the long-term success of all scientific endeavours.

- Data integration
  Wherever possible data sets should be integrated both through time, and across disciplines.

- Data products
  The scientific community should define the data and data products needed to meet the scientific goals from the IPY Science Plan.

- Data management funding
  Data management must be seen as an important component of any science project, and funds must be set aside from the outset, to ensure that important information is not lost during a project, or after a programme is completed.

Finally, ICSU should solicit proposals on data integration which address interdisciplinary global issues and which make use of, or develop innovative information technologies.

JCADM
August 2004

On behalf of JCADM,

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Appendix 2: JCADM Action Items from JCADM-8 Meeting

Related to:	Item	Deadline	Who
Supporting the AMD	All NADCs will contribute new DIFs to the AMD	1/07/05	All NADC representatives
Supporting the AMD	Creation of project DIFs for all SCAR projects	1/03/05	Helen Campbell - Physical Sciences SSG, Taco de Bruin - Life Sciences SSG, Peter Pulsifer – Geo Sciences SSG
Supporting the AMD	Creation of project DIFs for all national and international non-SCAR projects	1/03/05	All NADC representatives
Supporting the AMD	Harvest the GEOCAM dataset to the AMD	1/07/05	GCMD
Supporting the AMD	Update JCADM Listserver with quarterly stats on AMD	Each Quarter	GCMD
Supporting the AMD	Enable distributive searching of the Polar ODIN datasets	1/07/05	GCMD
Supporting NADCs	All NADCs will have national portals to the AMD	01/12/04	All NADC representatives, and GCMD
Supporting NADCs	Establish contact with each National Oceanographic Data Centre (NODC)	1/02/05	All NADC representatives
Supporting IPY	Draft an IPY data management plan for SCAR and ICSU	1/09/04	Taco deBruin
Supporting IPY	Establish contact with Arctic counterparts.	1/02/05	All NADC represen-tatives. Arto Vitikka to furnish list of Arctic contacts
Supporting new NADCs	Review JCADM website, in particular the Guidelines section and comment	1/10/04	Helen Campbell
Supporting new NADCs	Create a tutorial section of DocBuilder on JCADM website	1/02/05	Greg Scharfen and Rob Bauer
Supporting JCADM	Update JCADM on GIG activities	1/07/05	Peter Pulsifer
Supporting JCADM	Liaise with GBIF to inform JCADM on GBIF developments	1/07/05	Helen Campbell
Supporting JCADM	Write a letter to SCAR to become a partner in GBIF	1/02/05	Taco de Bruin