Report on Geoscience Standing Scientific Group (GSSG)

to SCAR Executive meeting

Sofia, Bulgaria, 11-14 July 2005

Prof. Alessandro Capra
Chief Officer, GSSG
June 2005

GSSG Office Bearers are **:** Chief Officer prof. Alessandro Capra, Deputy Chief Officer prof. Ross Powell and Secretary prof. Brian Storey .

The following present the GSSG Activities since XXVIII SCAR Open Science Conference, Bremen and XXVIII SCAR delegates meeting, Bremerhaven**.** This report provides a summary from each Expert Group (EG) , Action Group (AG) and Scientific Research Programme (SRP).

The proposed "Treaty and CEP" Action Group has not developed, considering that it should overlap with ATCM activites. A Group of Specialist within GSSG has been composed in order that the GSSG has appropriate representation at ATCMs.

In addition to the activities reported, GSSG CO has been involved in a number of formalised activities such as the review of JCADM and SCAR Fellowship evaluation.

Particular attention has been reserved to finalize most activities to IPY07. Specific GSSG initiatives for IPY are presented in EG and AG sections and in appendix.

There will be a short presentation of the Internal Symposium on Antarctic Earth Sciences 2007, planned in Santa Barbara, California, USA, prepared form Robin Bell, Chair of the National Steering Committee .

Action Groups

Communication and Outreach Action Group (COG)

Convenor: Glenn Johnstone (Australia)

COG Terms of Reference: 1)To gather, collate and disseminate geospatial and geoscientific information relevant to GSSG members and activities through electronic communication methods (website and listservers). 2)To maintain an up-to-date website for the GSSG containing information on member contact details, observatory details, reports from meetings / symposia etc., links to GSSG projects, SSG publications. 3)To form and maintain strong links with SCAR and non-SCAR bodies to promote geospatial and geoscientific information for use in research and planning. 4)To research, publish and distribute regular newsletters on GSSG activities. 5)To cooperate closely with the SCAR Secretariat in relation to their activities on communication and outreach for 2004-06

*Work Plan 2004-2006:1*Electronic Communication2.Publications 3. Liaison 4. Meetings

Activities undertaken in 2005 **:**

- maintenance of the GSSG web site
- publication of new GSSG newsletter "GeoReach" 4.1 version.

Note and recommendation for SCAR Executive: Unfortunately the Chairman of this Action Group, Mr Glenn Johnstone has meant he no longer has institutional support for undertaking COG activities, but has been able to carry on in a part-time capacity with some funding assistance from GSSG. The GSSG will support him with sufficient funds only for Georeach publication and GSSG web site upgrading.

As the job Glen does is pivotal and also performed efficiently and professionally, I would like to request that the SCAR Executive provide additional financial support for him, which will allow him to perform COG activities for all SCAR SSGs and eventually for SRPs.

Marine Survey Coordination Action Group

Conveners: Phil O'Brien (Australia), Miquel Canales (Spain), Ron Macnab (Canada), Rainer Gersonde (Germany)

Background: Members engaged in marine geoscience research have identified a need for additional mechanisms for communication between those working in this field, especially communication of planned surveys before they take place. This is important in enhancing collaboration and reducing duplication of effort. The Acoustics Action Group has identified coordination of surveys to avoid unnecessary resurveying as an important measure to minimise the environmental footprint of marine research.

Terms of Reference: To develop mechanisms for improved communication about planned marine surveys within the Antarctic community.

Milestones: 1. Develop web forms for documentation of essential details of planned surveys for posting on the GSSG web site (2005).

2. Develop list of contacts among national operators and the marine geoscience community (via CONMAP) to obtain the information needed (2005).

EXPERT GROUPS

Geographic Information (GI)

Convenor : Steffen Vogt (DE)

Activities 2005/06:

As set out in the current SCAR Strategic Plan one of the most useful services SCAR can provide to the scientific community is a comprehensive and integrated high level data and information management system to facilitate interdisciplinary, pan-Antarctic science.
Understanding that geographic location is a fundamental element for integrating andcommunicating Antarctic science knowledge, the GI group aims to create an Antarctic Spatial Data Infrastructure (AntSDI) by:
• Providing Antarctic fundamental geographic information products and policies in support of science programs
• Integrating and coordinating Antarctic mapping and GIS programs
• Promoting open standards approach to support free and unrestricted data access
• Promoting capacity building within all SCAR nations
To make the Antarctic Spatial Data Infrastructure initiative more visible to the Antarctic community a website under www.antsdi.scar.org is under development. This website is intended to promote the awareness, advocacy, development and implementation of AntSDIendorsed standards and specifications and the technology upon which they are based.
It serves as repository that consolidates information on standards, specifications and tools. It offers a supportive environment that is contributing to the ongoing evolution and interoperability of the AntSDI in providing an open forum for discussions, presentations, and (pre-)operational services.
In support of AntSDI the group currently operates nine projects in the GI Programme. These are:
1. Place Names (SCAR CGA- leader Roberto Cervellati-ITA)
2. Topographic Database (SCAR ADD – leader Adrian Fox –UK)
3. Map Catalogue (SCAR MapCat – leader Henk Brolsma- AUS)
4. King George Island GIS (SCAR KGIS – leader Steffen Vogts -DE)
5. Spatial Data Model (leader Henk Brolsma –AUS)
6. Geospatial Information - Enabling Technologies (leader Jerry Mullins – USA)
7. Cybercartographic Atlas of Antarctica (leader Fraser Taylor – CAN)
8. GIS Collaboration in East Antarctica (leader Alexander Yuskevitch – RUS)
9. Antartic Data Linkages (leader Peter Pulsifer – CAN)

For details on the goals and specific actions for 2004-06 of each project please refer to the Work Programme of EGGI at http://www.geoscience.scar.org/geog/geog.htm. The website also provides links to the products generated by the projects.

Open standards for AntSDI: Liaison with ISO TC 211

To assist within the Antarctic community the promulgation and implementation of the ISO 19xxx family of standards related to Geographic Information SCAR has class A liaison status to ISO TC211. Early access to standards drafts ensures that specific Antarctic requirements are being met in the standards and that emerging standards are included in Antarctic data management policies in a timely manner. The liaison officers Paul Cooper (BAS) and Larry Hothem (USGS) have attended the ISO TC211

meetings in 2004/05 and reported back to EGGI. Applicable ISO 19xxx standards are being implemented within AntSDI specifications.

Place-names and consistency of positions

The SCAR Composite Gazetteer of Antarctica continues to be the premier source for Antarctic place-names. Amendments are being published quarterly and the CGA currently holds more than 35 000 entries. In a modern, spatially enabled data infrastructure gazetteers play a pre-eminent role. They allow to relate place-names to real world locations in an automatic way. If the positions listed with a place-name are inaccurate this leads to ambiguities and confusion. In a SAR activity this might even have life-threatening consequences. A report assessing the issue of multi-naming and the positional accuracy of named places listed in the SCAR CGA for King George Island is available on the SCAR KGIS website. Considering the historical and political implications of place-names it remains a challenge to set up a feasible policiy to establish more consistent positions for named locations.

Workshops since SCAR XXVIII:

In order to discuss and implement AntSDI specifications members of EGGI have met at two workshops:

Date	Hosted by	Topic
2004-11-29 to 2004-12-03	BAS, Cambridge / UK	Mapping of ADD data structure to SCAR Feature Catalogue model
2005-03-06 to 2005-03-08	USGS, Baltimore / USA	Implementation and evaluation of pilot AntSDI web-services

Summaries of the workshops will be available on the AntSDI website.

EGGI Planning 2005-06:

Until SCAR XXIX all projects continue to work against the action items set out in the work plan for 2004-06.

For inclusion in the respective data management plans of IPY projects AntSDI has to become more visible to the community prior to IPY. To communicate AntSDI to the relevant stakeholders the www.antsdi.scar.org website will go live in October 2005.

2005-10: AntSDI website goes live

2005-09: Workshop on AntSDI web services, Ottawa (tbc)

2005-09: Participation at ISO TC211 Meeting, Montreal

2005-10: AntGIS 05 Workshop, Santiago/Chile (tbc)

2006-07: EGGI business meeting prior to SCAR XXIX (tbc)

2006: AntGIS 06 Workshop “Spatial Data Management for IPY” Date and location tbc (prior to SCAR XXIX ?)

GEODETIC INFRASTRUCTURE OF ANTARCTICA (GIANT)

*Convenor***:** Reinhard Dietrich (DE)

GIANT projects:

1. Permanent Observatories (Leader: Mr John Manning Co-Leader: Gary Johnston AUS)

2. Epoch Crustal Movement Campaigns (leader:Prof Reinhard Dietrich –DE Co-Leader Prof Alessandro Capra –ITA)

3. Physical Geodesy (Leader: Prof Alessandro Capra- ITA Co-Leader: Mirko Scheinert –DE)

Activities: Collaboration with IAG Antarctic Gravity project (chaired by Mirko Scheinert

4. Geodetic Control Database (Leader: Glenn Johnstone Project Co-Leader: Gary Johnston – AUS)

5. Tide Gauge Data (Leader: Dr Kazuo Shibuya JAP- Co-Leader: Australia (Henk Brolsma, Gary Johnston)

6. Atmospheric Impact on GNSS Observations in Antarctica in relation to Geophysical research (Leader: Ukraine – Gennadi Milinevsky Co-Leader: Poland - Jan Cisak, Italy – Pierguido Sarti)

7. Ground Truthing for Satellite Missions (Leader: Reinhard Dietrich -DE Co-Leader: USA - Bea Szatho)

8. Geodetic Advice on positioning limits of special areas in Antarctica (Leader: Tcl. Jorge Perez – Chile)

9. In situ GNSS Antenna Tests and Validation of Phase Centre Calibration Data (Leader: Larry Hothem – USA Co-Leader: Poland - Jan Cisak)

10. High Accuracy Surface Change and DEM's from Satellite and Airborne Imager (Leader: Prof E Dongchen-China-Co-Leaders: Dr Lin Lin Ge,John Manning – AUS)

11 High Accuracy Kinematic GPS Positioning (Leader: Matt King – UK)

Activities in 2004/2005:
1. Organization of the SCAR GPS Campaign 2005, which was successfully carried out last Antarctic summer 2. Reanalysis of all SCAR GPS Campaign data with the Bernese software, contribution of this reanalysis as an Antarctic regional densification solution to the International Terrestrial Reference Frame 2005, thus providing a highly precise and consistent coordinate set for all Antarctic GPS sites 3. Active participation in the organization of IPY activities, special focus on the proposed research project POLENET (Polar Earth Observatory Network for IPY).

Planned activities:
1. Group meeting in Cairns (August 2005, IAG General Assembly) 2. Session on Antarctic Geodesy and the IPY at the AGU Fall Meeting (San Francisco, December 2005)
IPY initiatives
GOIA (Geodetic Observatories in Antarctica) and POLENET (Polar Earth Observing Network) were proposed like Expression of Intent (EoI) for the International Polar Year (IPY). The GOIA EoI is attached as Appendix A. GOIA and POLENET has been accepted in the Geophysical Observatories cluster of lead projects in the Arctic and Antarctic region. At the last EGU Assembly in Wien, POLENET has been proposed with structured approach in order to represent the related EoI's . The full proposal is under development and will be discussed with and other partnerships. POLENET proposal is attached in appendix B.

PERMAFROST AND PERIGLACIAL ENVIRONMENST (EGPPE)

Convenor: Jan Boelhouwers
Co-conveners: Jim Bockheim, Mauro Guglielmin
Secretary: Megan Balks

The new Expert Group on Permafrost and Periglacial Environments (EGPPE) started its activities in October 2004 to bring together permafrost scientists from the SCAR and International Permafrost Association (IPA) community and raise the information base about the role of permafrost in the Antarctic Environment.
Specific aims include:

- To provide coordination, communication and exchange of data amongst Antarctic permafrost researchers within SCAR and IPA and promote interaction and collaboration with SCAR and IPA working groups.
- To collect and collate spatial data on permafrost and cryosols and contribute to databases for Antarctic soils, permafrost and ground ice conditions including the active layer.
- To develop and promote monitoring/observation protocols and networks (CALM, GTN-P, periglacial processes).
- To promote international cooperation and facilitate collaborative field research.
- To address specific science questions pertaining to Antarctic permafrost (see Madison workshop recommendations below).

International Workshop on Antarctic Permafrost and Soils, Madison, 14-18 November 2004.
Funded by the National Science Foundation (NSF) Office of Polar Programs, Antarctic Section and supported by the IPA and SCAR, the International Workshop on Antarctic Permafrost and Soils was attended by 34 invited participants from 14 countries. The main goals of the workshop were to initiate the preparation of a database and maps of permafrost and ground ice features and soils in the Antarctic region. The workshop was conducted over four days and involved (1) presentations on the importance of the workshop for the goals of particular organizations, (2) presentations by country on available data for permafrost, ground ice, active layer, soils and periglacial processes, (3) posters and oral presentations of current research,

(4) breakout sessions and a synthesis of recommendations, and (5) a group discussion on future research needs and priorities.
The following recommendations resulted from the workshop:

- A common database for Antarctic permafrost, ground ice, active-layer dynamics, and soils is required with a responsible manager at a central repository.
- The database will include point data, aerial photographs, ortho-photographs, maps (land cover, surficial geology, soils, etc.), satellite imagery, digital elevation models (DEMs), and a geographic information system (GIS).
- A system of boreholes is recommended to be established in the Antarctic region for characterizing permafrost conditions (thickness, temperature, composition, etc.) and observing the response of Antarctic permafrost to climate change.
- A specialist group should prepare a map using the database for showing the distribution of permafrost in the Southern Hemisphere.
- The current CALM (Circumpolar Active Layering Monitoring) program should be expanded by developing 12 to 15 sites distributed across environmental gradients from the Andes to the sub-Antarctic islands and through the Antarctic Peninsula and Transantarctic Mountains to the McMurdo Dry Valleys, complemented by 2 to 3 coastal-inland transects. Together with existing CALM sites in Antarctica, the subprogram should be designated CALM-South (CALM-S).
- A specialist group should prepare soil maps using the database for the Transantarctic Mountains and the Antarctic Peninsula and sub-Antarctic islands, with future maps proposed for Queen Maud Land, Enderby Land/Vestfold Hills, and Wilkes Land.
- A coordinating committee will oversee the tasks listed above, with specific tasks to be accomplished by the following subcommittees (1) Database Group, (2) Permafrost Group, (3) Soils and Geomorphology Group, and (4) CALM-S/GTNP Monitoring Group.
- Progress toward achieving these goals will be reported annually at specially selected scientific meetings and conferences.
- Funding and endorsements will be sought by individuals and groups of principal investigators through national governments in conjunction with the International Polar Year (2007/2008) and other programs and organizations.
- Future research needs for permafrost, periglacial and soil environments in Antarctica were identified and prioritized.

Antarctic Permafrost and Soils (ANTPAS) – EGPPE contribution to IPY
The EGPPE and its affiliated working groups in the IPA developed the Antarctic, Sub-Antarctic Permafrost and Periglacial Environments and Soils (ANTPAS) Expression of Intent (EoI) for the International Polar Year (IPY). The EoI is attached as Appendix C. ANTPAS has been accepted in the permafrost cluster of core projects and implements the Thermal State of Permafrost lead project in the Antarctic region. The full proposal is under development and will be discussed with related EoI's and other partnerships at the ANTPAS workshop in Potsdam (12-17 June 2005). Links with other SSGG IPY activities should be strengthened.

First Climate and Cryosphere International Science Conference, 11-15 April 2005, Beijing
Jan Boelhouwers represented the EGPPE and its ANTPAS IPY activity. Discussions with IPA and IPY representatives facilitated the incorporation of the ANTPAS activities in the global network of permafrost observatories and monitoring network for the IPY. ANTPAS activities contribute directly to CliC project area 1 through the

CALM-S/ GTN-P network. Issues of data management were discussed for follow up at the European Permafrost Conference in Potsdam, June 2005.

ANTPAS – EGPPE website and maillist
The EGPPE and its ANTPAS project now has its own website and maillist to facilitate communication and information distribution. The website is under development and can be found at http://erth.waikato.ac.nz/antpas/.

Future meetings
2005: II Eur. Conf. Permafrost, 12-17 June, Potsdam.
2006: XXIX SCAR Open Science conference, 12-14 July, Hobart
2007: ISAES, 26 August – 1 September, Santa Barbara
2008: 9th Int. Conf. Permafrost, 23-27 June, Fairbanks

Suggestions and Requirements

1. *Antarctic Permafrost and Soils (ANTPAS) integration in the SSGG initiatives for IPY.*

To date, communication within the EGPPE community has been strongest with related IPA working groups and the RiSSC project in the Life Sciences SSG. The ANTPAS project needs better integration and visibility within the SSGG initiatives for the IPY. Clear links exists with the Climate Processes, Remote Observatories, Bench Map Series, and Outreach and Education initiatives, listed in the SCAR SSGG IPY document.

2. *Funding request for ANTPAS activities*

The permafrost expert group is planning science meetings and sessions at both the 2006 SCAR Open Science meeting and the 2007 ISAES. As part of the IPY initiative several new PhD's will be engaged in the science activities. Limited financial support for these young scientists is requested to allow presentation of science results and participation in project development meetings. Financial assistance will preferentially be targeted at applicants from Southern Hemisphere countries with limited economic resources.

Budget for young scientist support
2006 SCAR Open Science Meeting, Hobart (AU) US$5000,-
2007 ISAES, Santa Barbara (USA) US$5000,-

New International Bathymetric Chart of the Southern Ocean

Convenor: Hans Werner-Schenke

Background: The topography of the Southern Ocean surrounding Antarctica is still largely unknown. Sea floor topographic maps are important for many areas of research and for safe navigation. The survey activities of modern icebreaking vessels during the last decade using multibeam systems have increased the data availability, making it possible for compilations of new bathymetric charts around Antarctica.

Workplan:

2005: Preparation of proposal to IOC GA 2005 in Paris, formal approval by IOC
CGOM Meeting in Monaco April 2005, IBCSO as part of the IOC OM Program
GEBCO Meeting in June 2005, Mexico, Collaboration with GEBCO
Participation at the IAG in Cairns, AGS 05, incl. 1st EB Meeting for IBCSO

2006: SCAR Conference in Hobart, Report to GSSG
2nd Editorial Board Meeting
GEBCO GC
HCA –Meeting.

More than 20 countries have expressed their interest in participating in IBCSO.
A first product in form of a DEM will be most probably available in 2006.

New Zealand Vaughan, Fred Davey

Australia	Phil O'Brian, Hank Brolsma, Howard Stagg
China	Dongchen
Japan	Kazuo Shibuja, Shin Tani
Korea	
India	Panday,
South Africa	HO
Italy	Uni Trieste
Great Britain	Larter, Livermore, Morris
France	Moussat
Spain	Canals, Maldonado
Germany	Schenke
Norway	Sand
Russia	Udintsev, Leitschenko, HDNO
Ukraine	Greku
Chile	HO, Vicuna
Argentina	HO,
Uruguay	Roldos
Brazil	IPY
United States	Haxby, Cherkis, Divins, Newton, MacGillivary
Canada	Macnab, Taylor

Activities undertaken in 2005: received a number of requests from other (SCAR) countries and different organizations regarding bathymetric data exchange, set-up of cooperation programs. Requests came from Norway, Australia, New Zealand, Great Britain, Italy, Spain, Russia, United States. Most of the requests dealt with proposals for data submission and development of a data base.
The IOC/IHO GEBCO organization are still very supportive to this project.

Antarctic Digital Magnetic Anomaly Project (ADMAP)

Convenor: Marta Ghidella

Following the progress of the IAGA-SCAR Working Group for the Antarctic Digital Magnetic Anomaly Map Project (ADMAP) in completing its goals since the 9th ISAES meeting in Potsdam, Germany.

I) ACCOMPLISHMENTS:

A. At the 9th ISAES meeting, the SCAR Geosciences Scientific Standing Group created an 'ADMAP Action Group' chaired by Marta Ghidella that worked to have ADMAP formally designated an 'Expert Group' at the SCAR28 meeting in Bremen, Germany, on 25 July 2004. These efforts resulted in our proposal at SCAR28 that we operate within the reorganized SCAR as the 'ADMAP Expert Group' chaired by Marta Ghidella. At the SCAR delegate's meeting in Bremerhaven, Germany in October, 2004, the proposal was adopted and funded at $1K for the first year and $2K for the second year. The Working Group is currently seeking funds from the international agencies with Antarctic interests to match SCAR's support of our efforts

to monitor Antarctic magnetic survey activities and update the digital database for timely distribution to the international geosciences community.

B. Marta Ghidella also coordinates ADMAP's participation in the World Digital Magnetic Anomaly Map (WDMAM) project.

C. The ADMAP grids were released to the public in November, 2003 and are available at url => http://www.geology.ohio-state.edu/geophys/admap

The released ADMAP grids include:

1) the 5-km grid of airborne and shipborne survey data only with large coverage gaps
2) the 5-km grid of airborne and shipborne survey data with the coverage gaps filled in using a crustal magnetization model that satisfies both the near-surface and 400-km altitude magnetic observations from the Magsat satellite mission. This map merges over 400 thousand line-kilometers of airborne and shipborne survey data with more than 5.6 million line-kilometers of Magsat satellite observations.

   The map was published under the citation=> *Golynsky, A., M. Chiappini, D. Damaske, F. Ferraccioli, J. Ferris, C. Finn, M. Ghidella, T. Isihara, A. Johnson, H.R. Kim, L. Kovacs, J. LaBrecque, V. Masolov, Y. Nogi, M. Purucker, P. Taylor, and M. Torta, 2001, ADMAP – Magnetic Anomaly Map of the Antarctic, 1:10 000 000 scale map, in Morris, P., and R. von Frese, eds., BAS (Misc.) 10, Cambridge, British Antarctic Survey*.
3) and a preliminary 10-km grid of airborne and shipborne survey data with the coverage gaps filled in using a crustal magnetization model that satisfies both the near-surface and 650-km altitude magnetic observations from the Ørsted satellite mission.

D. At the AGU Fall'03 meeting in session GP21D, the convener, Michael Purucker, announced the free release of these ADMAP grids to the public.

E. At the end of April, 2005, Peter Morris retired from the British Antarctic Survey and his duties as Co-Chair of ADMAP. The founding Co-Chair, Ralph von Frese, will continue serving ADMAP until the next meeting of the full Working Group.

F. Peter Morris also produced a CD of the aeromagnetic profiles used for the map published by *Golynsky et al., (2001)* in the format agreed upon at the ADMAP III meeting of the Working Group in Columbus, Ohio. The CD contains limited metadata giving the basic details of the datasets and a simple location map for each survey. We are currently working to complete the CD as described in section II- below.

G. Since the publication of the map, the ADMAP Working Group has produced 2 Ph.D. dissertations and over 40 in-review, in-press, or published scientific papers. The APPENDIX at the end of this report gives the citations of these scientific works.

II) *CURRENT EFFORTS:*

A) We are producing a CD-ROM of the ADMAP grids and related surveys for release to the public through the World Data Centers. In addition to the aeromagnetic survey data that have been already transcribed to the CD, we are working to incorporate:

1) the marine magnetic anomaly values and related coordinates that were used for the production of the ADMAP grid. These marine anomalies were mostly gleaned from the GEODAS CD (http://www.marine-geo.org/antarctic),

2) the 5-km grid published by *Golynsky et al. (2001)*,
3) the 5-km grid of aeromagnetic and marine anomalies,
4) the 5-km regional anomaly grid with Magsat gap predictions, and
5) documentation describing the production of the CD.
6) The CD will have the same authorship as the map published by *Golynsky et al., (2001)*.

B) With NASA support, Dr. Hyung Rae Kim is integrating CHAMP magnetic observations into the ADMAP database and helping to develop a comprehensive analytical model for representing the ADMAP data for crustal applications. In these activities, he is collaborating with Dr. Luis Gaya-Piqué who is participating in this project at the Byrd Polar Research Center of The Ohio State University with support from the U.S. National Science Foundation and the Istituto Nazionale di Geofisica e Vulcanologia in Rome, Italy.

*III) RECOMMENDATIONS***:**

A) The ADMAP Working Group wants to produce the CD before the end of 2005 and release it to the World Data Centers before Summer, 2006.
Completing this objective requires roughly a quarter of dedicated effort by one or two Working Group members and the meeting of the full Working Group. The Working Group meeting is necessary to endorse the CD's release to the World Data Centers (WCDs) and renew ADMAP's protocols for maintaining and updating the database. The meeting is also necessary to plan ADMAP's contributions for the International Polar Year (IPY).
B) To contribute to the International Polar Year, the ADMAP Working Group must plan for:

1) implementing ADMAP's protocols to maintain and update the database with new airborne and shipborne magnetic survey data and related metadata as they become available, and
2) updating the near-surface anomaly predictions from Magsat in the ADMAP database with the significantly more accurate observations from the Ørsted and CHAMP satellite missions. In the longer run, we also must consider incorporating magnetic gradient measurements that will become available towards the end of the current decade from ESA's recently authorized multi-satellite SWARM mission. These observations will greatly improve crustal anomaly detail at satellite altitudes since one of the mission's main objectives is to model the polar external fields.
3) developing improved modeling of the Antarctic core field and its secular variations, and external fields for better definition of the crustal anomalies in magnetic survey data,
4) compiling rock magnetic and other physical properties into a database to support geological applications of the ADMAP data,
5) developing and promoting regional and continental scale interpretation efforts of the ADMAP data. This will provide new insight into global tectonic and geologic processes in the Antarctic context. New data and interpretations will also enhance studies addressing interplays between geological boundary conditions, Antarctic ice sheets and climate change. Finally, these efforts will also greatly assist in identifying high-priority areas for new collaborative magnetic surveys.

6) expanding collaborative efforts with Arctic working groups for more bi-polar magnetic exploration and research.
7) providing a broad collaborative framework for new frontiers in the magnetic exploration of the polar regions, such as by long-range aircraft and UAVs.

At the next meeting of the full Working Group, we will not only unveil the CD and release it to the WDCs, but also arrange for the publication of recent ADMAP results in special issues of the scientific journals. In addition, we must consider new initiatives for the Working Group members including the recent effort by the Italian, US, and other national Antarctic programs to launch the next generation of ADMAP. Since 2002, the Working Group has expended considerable time and effort on this ongoing initiative that will allow ADMAP to serve Antarctic geomagnetic studies into the IPY and beyond.

ADMAP Ph.D. dissertations and scientific papers in-review, in-press, and published from 2002-present)

A) Ph.D. dissertations:

1) Gaya-Piqué, Luis R., 2004, Analysis of the Geomagnetic Field in Antarctica from Near-surface and Satellite Data, Obs. Ebre - Ramon Llull University (Spain) & INGV (Italy).
2) Kim, Hyung Rae, 2002, Antarctic Lithospheric Anomalies from Ørsted Satellite and Near-surface Magnetic Observations, The Ohio State University, Columbus, Ohio (USA).

B) Papers in-review:

1) Ferraccioli, F., P.C. Jones, M. L. Curtis, P.T. Leat, and T.R. Riley, (in-review), Tectonic and magmatic patterns in the Jutulstraumen rift(?) region, East Antarctica, as imaged from high-resolution aeromagnetic data, Earth, Planets and Space.
2) Ferraccioli F., Damaske D., Bozzo E., and Talarico F., (in-review), Aeromagnetic anomalies as a tool for Early Paleozoic terrane analysis over Oates Land and Victoria Land (East Antarctica), Geological Society, London, Special Publications.

C) Papers in-press:

1) Gaya-Piqué, L.R., A. De Santis, J.M. Torta, (in-press), Use of Champ magnetic data to improve Antarctic Geomagnetic Reference Model, in: C. Reigber, H. Luehr, P. Schwintzer (Eds.), Second CHAMP Mission Results for Gravity, Magnetic and Atmospheric Studies, Springer-Verlag, Heidelberg.
2) Golynsky, A., M. Chiappini, D. Damaske, F. Ferraccioli, C. Finn, M. Ghidella, T. Ishihara, H.R. Kim, L. Kovacs, V. Masolov, P. Morris, Y. Nogi, and R. von Frese, (in-press), ADMAP – A digital magnetic anomaly map of the Antarctic, in: IX ISAES Proceedings, Springer-Verlag, Heidelberg.
3) Golynsky, A. V., Golynsky, D. A., Masolov, V. N. and Volnukhin, V. S., (in-press), Magnetic anomalies of the Grove Mountains region and their geological significance, in: IX ISAES Proceedings, Springer-Verlag, Heidelberg.4) Golynsky, A. V., Masolov, V. N., and Volnukhin, V. S. and Golynsky, D. A., (in-press), Crustal provinces of the Prince Charles Mountains region and surrounding areas in _ light of aeromagnetic data, in: IX ISAES Proceedings, Springer-Verlag, Heidelberg.
5) Kim, H.R., R.R.B. von Frese, Golynsky, A.V., and P.T. Taylor, (in-press), Magnetization modeling of the Maud Rise crust in the southwest Indian Ocean, in: S. Okuma and R. Saltus (Ed.s), Earth, Planets, and Space.

D) Papers published in 2005:

1) von Frese, R.R.B., H.R. Kim, P.T. Taylor, and M.F. Asgharzadeh, 2005, Reliability of CHAMP anomaly continuations, in: C. Reigber, H. Lühr, P. Schwintzer, J. Wickert (Eds.), Earth Observation with CHAMP Results from Three Years in Orbit, Springer Verlag, Heidelberg, pp. 287-292.

2) Taylor, P.T., K.I. Kis, R.R.B. von Frese, J.V. Korhonen, G. Wittmann, H.R. Kim, and L.V. Potts, 2005, Effect of varying crustal thickness on CHAMP geopotential data, in: C. Reigber, H. Lühr, P. Schwintzer, J. Wickert (Eds.), Earth Observation with CHAMP Results from Three Years in Orbit, Springer-Verlag, Heidelberg, pp. 279-286.

3) Kim, H.R., L.R. Gaya-Piqué, R.R.B. von Frese, P.T. Taylor, and J.W. Kim, 2005, CHAMP magnetic anomalies of the Antarctic crust, in: C. Reigber, H. Lühr, P. Schwintzer, J. Wickert (Eds.), Earth Observation with CHAMP Results from Three Years in Orbit, Springer-Verlag, Heidelberg, pp. 261-266.

E) Papers published in 2004:

1) Kim, H.R., R.R.B. von Frese, Golynsky, A.V., P.T. Taylor, and J.W. Kim, 2004, Applications of satellite magnetic observations for estimating near-surface magnetic anomalies, Earth, Planets, and Space, v. 52, pp. 955-966.

D) Papers published in 2003:

1) Damaske, D., Ferraccioli F., & Bozzo E., 2003. Aeromagnetic anomaly investigations along the Antarctic coast between Yule Bay and Mertz Glacier. Terra Antartica 10(3), pp. 85-96.

2) Damaske, D., Ferraccioli F., Bozzo E., Chiappini M., 2003. Images of aeromagnetic anomalies over Edward VII Peninsula, northwestern Marie Byrd Land, Antarctica, Geol. Jahrbuch B95, pp. 79-100.

3) Ferraccioli, F. and Bozzo E., 2003. Cenozoic strike-slip faulting from the eastern margin of the Wilkes Subglacial Basin to the western margin of the Ross Sea Rift: an aeromagnetic connection. In: Intraplate Strike-Slip Deformation Belts (Storti, F., Holdsworth R.E., & Salvini F., eds). Geological Society, London, Special Publications, 210, pp. 109-133.

4) Ferraccioli, F., Damaske D., Bozzo E. & Talarico F., 2003. The Matusevich aeromagnetic anomaly over Oates Land, East Antarctica. Terra Antartica 10(3), pp. 221-228.

5) Kim, H.R., R.R.B. von Frese, P.T. Taylor, and J.W. Kim, 2003, CHAMP enhances utility of satellite magnetic observations to augment near-surface magnetic survey coverage, in: C. Reigber, H. Luehr, P. Schwintzer (Eds.), First CHAMP Mission Results for Gravity, Magnetic and Atmospheric Studies, Springer-Verlag, Heidelberg, pp. 296-301.

6) Reitmayr, G., Korth W., Caneva G., Ferraccioli F., 2003. Gravity survey at the Oates Coast area, East Antarctica, during the joint German Italian expedition 1999/2000, Terra Antartica 10(3), pp. 97-104.

7) Talarico, F., Armadillo E., Ferraccioli F., & N. Rastelli, 2003. Magnetic petrology of the Ross Orogen in Oates Land (Antarctica). Terra Antartica 10(3), pp. 197-220.

8) von Frese, R.R.B., 2003, Advances in crustal and subcrustal studies from new generation satellite geopotential field missions, in: P. Stauning, H. Lühr, P. Ultré-

Guérard, J. LaBrecque, M. Purucker, F. Primdahl, J.L. Jørgensen, F. Christiansen, P. Høeg, and K.B. Lauritsen (Ed.s), ØIST-4 Proceedings (4th Ørsted International Science Team Conference), Narayana Press, Copenhagen, pp. 107-114.
9) von Frese, R.R.B., H.R. Kim, P.T. Taylor, and J.W. Kim, 2003, CHAMP, Ørsted, and Magsat magnetic anomalies of the Antarctic lithosphere, in: C. Reigber, H. Luehr, P. Schwintzer (Eds.), First CHAMP Mission Results for Gravity, Magnetic and Atmospheric Studies, Springer-Verlag, Heidelberg, pp. 309-314.
10) von Frese, R.R.B., L.V. Potts, H.R. Kim, C.K. Shum, P.T. Taylor, J.W. Kim, and S.C. Han, 2003, CHAMP gravity anomalies over Antarctica, in: C. Reigber, H. Luehr, P. Schwintzer (Eds.), First CHAMP Mission Results for Gravity, Magnetic and Atmospheric Studies, Springer-Verlag, Heidelberg, pp. 180-186.

E) Papers published in 2002:

1) Bozzo E., F. Ferraccioli, M. Gambetta, G. Caneva, M. Chiappini, and D. Damaske, 2002, Total magnetic anomaly map 1:250,000 over northern Victoria Land between central Rennick Glacier and Evans Névé (Antarctica), In: Gamble J.A., D.N.B. Skinner, S. Henrys (ed.s), Antarctica at the close of a millenium. Proceedings of the 8th International Symposium on Antarctic Earth Sciences, Royal Society of New Zealand Bulletin, v. 35, SIR Publishing, pp. 625-627.
2) Bozzo E., G. Caneva, M. Chiappini, D. Damaske, F. Ferraccioli, and M. Gambetta, 2002, Total magnetic anomaly map of northern Victoria Land between central Rennick Glacier and Evans Névé, In: E. Bozzo and D. Damaske (ed.s), Antarctic Geomagnetic 1:250,000 map series, Museo Nazionale dell'Antartide-Sez. di Scienze della Terra, Siena, Italy, Ministero dell'Università e della Ricerca Scientifica e Tecnologica- Programma Nazionale delle Ricerche in Antartide.
3) Bozzo, E., Ferraccioli, F., Spano, M., Chiappini, M., Damaske, D., Behrendt, J., 2002, Recent progress towards the compilation of an integrated magnetic anomaly map of the Ross Sea sector of Antarctica, In: Gamble J.A., D.N.B. Skinner, S. Henrys (ed.s), Antarctica at the close of a millenium. Proceedings of the 8th International Symposium on Antarctic Earth Sciences, Royal Society of New Zealand Bulletin, v. 35, SIR publishing, pp. 629-634.
4) Chiappini, M., F. Ferraccioli, E.Bozzo, and D. Damaske, 2002, Regional compilation and analysis of aeromagnetic anomalies for the Transantarctic Mountains-Ross Sea sector of the Antarctic, Tectonophysics, v. 347, pp. 121-138.
5) Damaske D., E. Bozzo, G. Caneva, M. Chiappini, A. Colla, F. Ferraccioli, A. Meloni, and H.D. Möller, 2002, Total field magnetic anomaly map 1: 250,000 of Marie Byrd Land (Edward VII Peninsula/Sulzberger Bay area) Antarctica, In: Gamble J.A., D.N.B. Skinner, S. Henrys (ed.s), Antarctica at the close of a millenium. Proceedings of the 8th International Symposium on Antarctic Earth Sciences, Royal Society of New Zealand Bulletin, v. 35, SIR Publishing, pp. 635-637.
6) Ferraccioli, F., Bozzo E., and G. Capponi, 2002, Aeromagnetic and gravity anomaly constraints for an early Paleozoic subduction system of Victoria Land, Antarctica. Geophys. Res. Lett., v. 29, 10.1029/2001GL014138.
7) Ferraccioli F., E. Bozzo, and D. Damaske, 2002, Magnetic anomalies over the King Edward VII Peninsula crustal blocks, Marie Byrd Land (West Antarctica), In: Gamble J.A., D.N.B. Skinner, S. Henrys (ed.s), Antarctica at the close of a millenium. Proceedings of the 8th International Symposium on Antarctic Earth Sciences, Royal Society of New Zealand Bulletin, v. 35, SIR Publishing, pp. 533-538.

8) Ferraccioli, R., E. Bozzo, and D. Damaske, 2002, Aeromagnetic signatures over western Marie Byrd Land provide insight into magmatic arc basement, mafic magmatism and structure of the Eastern Ross Sea Rift flank, Tectonophysics, v. 347, pp. 139-165.
9) Ferris, J.K., A.P.M. Vaughan, and E.C. King, 2002, A window on West Antarctic crustal boundaries: The junction between the Antarctic Peninsula, the Filchner Block, and Weddell Sea oceanic lithosphere, Tectonophysics, v. 347, pp. 13-24.
10) Ghidella, M.E., G. Yáñez, and J.L. LaBrecque, 2002, Revised tectonic implications for the magnetic anomalies of the western Weddell Sea, Tectonophysics, v. 347, pp. 65-86.
11) Golynsky, A.V., P. Morris, L.C. Kovacs, and J.K. Ferris, 2002, A new magnetic map of the Weddell Sea and the Antarctic Peninsula, Tectonophysics, v. 347, pp. 3-12.
12) Golynsky, A.V., S.V. Alyavdin, V.N. Masolov, A.S. Tscherinov, and V.S. Volnukhin, 2002, The composite magnetic anomaly map of the East Antarctic, Tectonophysics, v. 347, pp. 109-13) Jones, P., A. Johnson, R.R.B. von Frese, and H. Corr, 2002, Detecting rift basins in the Evans Ice Stream region of West Antarctica using airborne gravity, Tectonophysics, v. 347, pp. 25-
14) Kim, H.R., R.R.B. von Frese, J.W. Kim, P.T. Taylor, M.E. Purucker, and T. Neubert, 2002, Ørsted verifies regional magnetic anomalies of the Antarctic lithosphere, Geophys. Res. Lett., v. 29(#15), pp. ORS 3-1 to 3-3.
15) Kletetschka, G., P.J. Wasilewski, and P.T. Taylor, 2002, The role of hematite-ilmenite solid solution in the production of magnetic anomalies in ground- and satellite-based data, Tectonophysics, v. 347, pp. 167-178.
16) Kovacs, L.C., P. Morris, J. Brozena, and A. Tikku, 2002, Seafloor spreading in the Weddell Sea from magnetic and gravity data, Tectonophysics, v. 347, pp. 43-64.
17) Tikku, A.A., K.M. Marks, and L.C. Kovacs, 2002, An Early Cretaceous extinct spreading center in the northern Natal valley, Tectonophysics, v. 347, pp. 87-108.
18) Torta, J., A. DeSantis, M. Chiappini, and R.R.B. von Frese, 2002, A model of the secular variation of the geomagnetic field of Antarctica, Tectonophysics, v. 247, pp. 179-187.
19)von Frese, R.R.B., P.T. Taylor, and M. Chiappini (ed.s), 2002, Magnetic Anomalies of the Antarctic, Tectonophysics, v. 247, pp. 1-187.

ANTEC: Antarctic Neotectonics

Convener: Terry Wilson, Ohio State University, USA

Background: ANTEC was approved by SCAR in 1998 at the meeting in Chile. The group was appointed by the executive in 1999. ANTEC thematic symposia have been held each year at international meetings (European Geophysical Society; European Union Geology; American Geophysical Union); a major science planning workshop was held in 2001; and poster sessions and workshops have been convened at SCAR meetings in 2002 and 2004. Given the existence of ANTEC for some years, the GSSG thought it appropriate that ANTEC continue as an Expert Group for another 2 years in its present form rather than be further developed as a Program.

Terms of Reference: The ANTEC group promotes and coordinates multidisciplinary, multinational research relevant to Antarctic neotectonics. The main roles of ANTEC include 1) coordinate an implementation plan for deployment of geodetic and seismological stations in Antarctica; 2) encourage coordinated geophysical and geological work to complement station deployments; 3) ensure that protocols for data collection, archiving and distribution are meeting the needs of the international research community; 4) Promote scientific research opportunities and promising directions in neotectonics and geodynamics of Antarctica by holding workshops and symposia; 4) liaise with international research programmes with complimentary scientific aims to ANTEC.

Activities Undertaken in 2004-2005:

December, 2004: AGU, San Francisco, USA : *Lithospheric Structure and Neotectonics of the Antarctic Plate*

August 8-11, 2005, Calgary, Alberta, Canada, Earth System Processes II [GSA sponsored] : Geodynamics, Ice Sheets & Climate

2005: Autonomous remote observatories for IPY

Coordinators: E.Ivins, T. Wilson

This will be the major workshop to finalize a science and implementation plan for deployment of a network of remote autonomous observatories for the International Polar Year. It is tentatively planned to be held in conjunction with a joint IRIS-UNAVCO meeting, including a planned Polar session, in Washington state.

IPY initiative within ANTEC is POLENET (see at GIANT AG section and in Appendix B)

SCIENTIFIC RESEARCH PROGRAMS

Antarctic Climate Evolution (ACE)

The ACE steering committee had its first meeting in 2005 at the EGU meeting in Vienna, with two further meetings in 2005, to be held in August at Aberystwyth, UK, at the international Association of Sedimentologists meeting, and in December at San Francisco, USA, for the Fall Meeting of the American Geophysical Union. ACE has been identified as a potential core activity by the ICSU/WMO Joint Committee for the International Polar Year and was invited by the committee to further develop its proposal into one that could become a core IPY project associated with some other expressions of interest that included arctic and bi-polar programs.

ACE - IMPLEMENTATION PLAN

Executive summary of ACE implementation plan

- A 10-person steering committee is proposed, which includes expertise sufficient to lead the scientific programme of ACE.
- Six sub-committees are being established to conduct the science programme. Membership of these committees allows ACE to widen involvement in the programme, in terms of both gender and nationality.
- ACE steering committee officers have a 3-year term of office (co-Chairs will stand down in 2008). The sub-committee structure of ACE allows future involvement in the steering committee from a wide-range of scientists.
- A website has been constructed to inform the public, media, schools and colleges, and scientists about the progress of the project (www.ace.scar.org).
- ACE has already established a strong record of publishing scientific findings in peer-reviewed journals. An edited book on ACE is being planned for publication in 2007.
- A timetable of activity has been defined, and dates/locations of forthcoming meetings have been coordinated with major international symposia.
- Plans for outreach, education and data management are in line with SCAR advice.

Approach to implementation

We propose that the ACE Scientific Research Programme be led by a steering committee of 10-12 persons. The committee would meet formally at least once a year, and conduct the rest of its business either remotely of when the majority of committee members are present at international symposia. Members will serve for a 3-year term, with the possibility of extension depending on contribution and performance. We propose that Martin Siegert and Robert Dunbar be identified as co-Chairs, to be replaces in 3 years time. The steering committee (membership of which is detailed below) has knowledge of thematic issues and has appropriate regional (field), technical and logistical experience.

Committee

The following persons are nominated as the initial steering committee of ACE.

Martin J. Siegert – University of Bristol, UK co-chair
Robert B. Dunbar – Stanford University, USA co-chair
Robert M. DeConto – University of Massachusetts, USA media and website
Fabio Florindo – Istituto Nazionale di Geofisica e Vulcanologia, Italy secretary
Carlota Escutia – University of Granada, Spain
Robert Larter – British Antarctic Survey, UK
Tim Naish – Institute of Geological and Nuclear Sciences, New Zealand
Ross D. Powell – Northern Illinois University, USA
Sandra Passchier – National Geological Survey, The Netherlands
Gary Wilson – University of Otago, New Zealand

Function of the programme and subcommittees

The central function of ACE is to coordinate the integration of improved geological data and Antarctic palaeoclimate modelling at different time slices, including the Eocene-Oligocene onset of glaciation and the mid-Oligocene transition. Five subcommittees have been set up to coordinate scientific work within these timeframes. The sub-committee names, and their current chairs, are as follows:

LGM-Holocene	Chair: Tony Payne (UK)
Pleistocene	Chair: Tim Naish (NZ)
Middle Miocene-Pliocene	Chair: Alan Haywood (UK)
Oligocene-Miocene	Chair: Rob DeConto (USA)
Eocene/Oligocene	Chair: Jane Francis (UK)
Radio-Echo Sounding:	Chair: Detlef Damaske (Germany)

Terms of reference for sub committees

The sub-committees provide the overall leadership, direction and management for their respective topic. The main functions of the committees are to:

- Develop and implement an action plan.
- Encourage and facilitate communication and collaboration among research scientists working on any aspects of Antarctic climate evolution pertinent to the respective topic.
- Ensure that activities of the committee are communicated and wherever possible, integrated with those of other time-based themes, modelling themes and process-based themes of the ACE programme.
- Investigate, develop and exploit avenues for future funding in support of ACE objectives.
- Advise the research community on the types of geoscience data required for palaeoclimate modelling and effective model-data intercomparison, and the critical locations for which such data are needed for the time periods listed.
- Provide advice/assistance as needed on technical issues related to geoscience field and laboratory programmes and to palaeoclimate modelling studies pertinent to the time periods listed.
- Promote data access and data sharing (and data-contributions to the SDLS, Antarctic data centres, and World Data Centres [WDC]) to facilitate and

expedite data syntheses needed for developing new field programmes and enhancing palaeoclimate models.
- Summarize and report the results of these efforts to the scientific and wider community on an ongoing basis at workshops and symposia.
- Contribute to formal reporting that will be presented to SCAR every two years.

LGM-Holocene ACE sub-committee

Rationale: The ice sheets of Antarctica were so much larger at the last glacial maximum (LGM, ~21,000 years) than today that global sea level dropped by around 20 m. The ice sheets at the LGM left a wealth of geological data, which can be used to constrain, validate and test numerical ice-sheet/climate models. Such work is critical to evaluating the evolution and stability of the present ice sheet. There are many questions to be answered with respect to the ice sheet configuration and flow at and after the LGM. The keys to answering the questions are (1) to enhance the sophistication of the models, and (2) to integrate geological data on past ice sheet and climate conditions with model output. The LGM-Holocene sub-committee will facilitate the co-ordination of research agendas in the following areas:

- Numerical modelling of the Antarctic ice sheet with special application to the causes of grounding-line evolution during deglaciation.
- The use of Earth-System models (in particular, coupled ocean-atmosphere GCMs) to understand climate change in the circum-Antarctic region from the LGM onwards, and the implications of these changes for the ice sheet.
- The integration of the on-shore and off-shore geomorphological records of ice thinning and grounding-line retreat.
- The integration of long-term sea-level records with inverse geophysical modelling to constrain mass loss from Antarctica.
- The development of high-resolution palaeo-climate records from ice cores and deep-sea cores from the Southern Ocean, and the development of a consistent chronology to link individual records.

The sub-committee will focus attention on the following open research questions: Has grounding-line retreat stopped? Can present-day changes be attributed to on-going retreat? How synchronous was deglaciation in the various sectors of the ice sheet? To what extent does the geomorphology reflect local rather than regional effects? What caused deglaciation? Can high-resolution chronologies be used to distinguish between the effects of sea-level rise and accumulation-rate change? What is the role of ice streams in controlling the rate of grounding-line retreat and volume loss? To what extent are ice streams transients features within the ice sheet and what are the controls on their long-term dynamics? What was the contribution of the ice sheet to eustatic sea-level rise and how was this contribution distributed spatially and temporally?

The sub-committee will address these aims by convening dedicated sessions at relevant international scientific conferences such as the AGU, EGU, INQUA and IGS; making research grant proposals to the relevant national funding agencies with particular reference to the forthcoming IPY; and jointly co-writing a chapter reviewing modelling and observational literature for the LGM-Holocene as part of a dedicated ACE edited volume. The sub-committee will meet occasionally, primarily

during larger international conferences and will seek funds from ACE itself to facilitate this.

The sub-committee as expertise in: the numerical modelling of ice sheets and palaeo-climate; ice and deep-sea sediment core records; on-shore and off-shore geomorphology; and sea-level records and modelling.

Committee Membership: Tony Payne (Chair, UK); Philippe Huybrechts (Belgium); Catherine Ritz (France); David Pollard (US); Colm O'Cofaigh (UK); Mike Bentley (UK); Howard Conway (US); Eric Wolff (UK); Glenn Milne (UK); Rob Dunbar (US)

Pleistocene ACE sub-committee

Rationale: Studies of Antarctic ice cores show that Pleistocene climate variability in the different sectors of the southern high latitudes has occurred out of phase. This variability raises questions about the response of the southern high latitudes to external climate drivers, such as orbital insolation, solar variability, and internal amplifiers such as thermohaline circulation and carbon-cycle changes that operate at both Milankovitch and millennial-decadal time scales. Answers to these questions will improve our understanding of the vulnerability of the ice sheet during Pleistocene climatic optima and its potential impact on (1) global thermohaline circulation as a southern source of melt water discharge, and (2) sea level rise well beyond the present sea level stand. The Pleistocene sub-committee will facilitate Antarctic and global environmental research investigating:

- The interval of Late-Pliocene global cooling co-incident with development of a bi-polar cryosphere (*working jointly with the Mid-Miocene Pliocene sub-committee*).
- The period of Mid-Pleistocene reorganisation of the climate system (1.0-0.4 Ma) – Mid-Pleistocene Climate Transition (MPCT).
- Major glacial terminations and super-interglacial periods (e.g. marine isotope stages 31, 11, 9 and 5) of extreme climatic warmth.

The primary focus of this sub-committee is to provide new knowledge of the role the Antarctic in the bi-polar cryosphere. It will take an integrated approach which combines atmospheric (ice core), proximal marine (SHALDRILL, ANDRILL, ODP), distal deep marine (ODP), and far-field seal-level (Wanganui Basin, Huon Peninsula etc.) records to provide boundary conditions and constraints for Earth system and climate modelling studies. In particular the committee is interested in the influence of Pleistocene Antarctic ice cover on global sea-level and ocean circulation. To achieve this the committee will:

- Integrate existing datasets with new proximal datasets from EPICA, SHALDRILL, ANDRILL and ODP/IODP to determine ice sheet/shelf responses to climate forcing, including variability at a range of temporal scales (10^2-10^4 years), and possible collapses.
- Relate Antarctic ice variability to thermohaline circulation as expressed by variations in abyssal Pacific inflow along eastern New Zealand to the Pacific Ocean (ODP Leg 181 datasets)
- Synthesise global proxy data for key climatic transitions (Late Pliocene, Mid-Pleistocene, Late Pleistocene termination-interglacial)

- Undertake numerical modelling studies of ice sheet dynamics and global climate for these transitions

Committee Membership:
Tim Naish (NZ Chair); Lionel Carter (NZ) accepted; Eric Wolff (UK) accepted; Andew Mackintosh (NZ) accepted; Ross Powell (US) accepted; Will Howard (AUS) accepted; Dominique Raynaud (France)?; Rainer Gersonde (Germany); Philippe Huybrechts (Germany)?; Richard Hindmarsh (UK)?; Gary Clarke (Canada)?; John Chappell (AUS); Stuart Henrys (NZ) accepted; Reed Scherer (US); David Pollard (US)?; Rob DeConto (US)?

Middle Miocene-Pliocene ACE sub-committee

Rationale: The middle-to-late Miocene period represents a time of significant ice sheet expansion in Antarctica. The sea stable isotope record shows a mid-Miocene "climatic optimum" centred at about 15 Ma, followed by strong enrichment of oceanic $d^{18}O$ over the next 6 Ma. It is during this interval that East Antarctic glacial ice is thought to have evolved into a major and permanent ice sheet. The Pliocene Epoch is a critical time for understanding the nature of the Antarctic ice sheet as IPCC projections of global temperature rise suggest that we will reach Pliocene levels within the next hundred years. Of key importance in this time interval is the timing of the transition of the EAIS from a polythermal, dynamic condition to a predominantly cold stable state. Two opposing and vigorously defended views prevail. The long-standing view is that the EAIS became stable in mid-Miocene time, evidence of which is primarily from the longevity of the landscape and well-dated surfaces and ash deposits in the Dry Valleys region along the western border of the Ross Sea. Another controversial view is that terrestrial glacial deposits, known as the Sirius Group, scattered through the Transantarctic Mountains, indicate dynamic ice sheet conditions as recently as Pliocene time, based on diatom biostratigraphy and preserved vegetation. The Mid Miocene and Pliocene ACE sub-committee will facilitate Antarctic and global environmental research investigating:

- The period of middle Miocene cooling
- The period of late Miocene cooling
- Pliocene warm periods
- The Pliocene - Pleistocene transition (*working jointly with the Pleistocene sub-committee*).

In particular the committee will co-ordinate and input relevant research activities for the Neogene from the British Antarctic Survey core programme GEACEP (Greenhouse to Ice-house Evolution of the Antarctic Cryosphere & Palaeoenvironment). These efforts will include:

- New data acquisition from the Ross Sea region as well as the Antarctic Peninsula in general.
- Data synthesis of global proxy climate and environmental data for the Mid Miocene, Late Miocene, Pliocene and the Plio-Pleistocene transition.
- Earth System Modelling studies for the Mid and Late Miocene cooling, Pliocene warming and the Plio-Pleistocene transition.

Provisional Committee:

Dr Alan M. Haywood, UK; Dr John L. Smellie, UK; Prof. Allan Ashworth, USA; Prof. Paul J. Valdes, UK; Dr Sandra Passchier, the Netherlands; Dr Carrie Lear, UK; Dr David Cantrill, Sweden.

Oligocene-Miocene ACE sub-committee

The Oligocene-Miocene boundary marks a significant transition in the development of the Antarctic cryosphere, where small dynamic ice sheets of the late Oligocene rapidly expanded to continental scale in the early Miocene. Sediment cores recovered in Western Ross Sea indicate orbital modulation of the ice sheet during the transition. It is argued that the transition occurred as a consequence of a unique set-up of orbital parameters during an interval of declining CO_2 that led to a prolonged period of cold summer orbits, during which time a large ice sheet established. The main functions of the committee are to develop and implement environmental research investigating:

- The Eocene-Oligocene climate transition and earliest Oligocene glaciation.
- The nature and timing of Oligocene ice sheet variability.
- The response/role of Antarctica in possible Late Oligocene global warming.
- Transient cooling events including the Mi1 glaciation.
- The nature of early Miocene ice sheet variability.
- The Mid-Miocene Climate Optimum (MCO) and it's signature in Antarctica.
- Mid-Late Miocene cooling and stepped ice volume increase (*working jointly with the Miocene-Pliocene sub-committee chaired by Dr Alan Haywood*).

Emphasis will be placed on understanding Antarctica's role in (and response to) fundamental climate transitions and ephemeral events through the late Paleogene and early Neogene. This will be accomplished through the synthesis of newly acquired data from Antarctic field investigations with data from ongoing deep sea drilling expeditions and sequence stratrigraphic reconstructions of eustasy. These synthesized data will be integrated into numerical modelling studies to 1) test data-driven hypotheses, 2) explore the envelope of climate-cryosphere behavior in response to specific forcings, and 3) to explore possible mechanisms and feedbacks responsible for the dramatic Antarctic and global environmental changes recognized in Paleogene and Neogene proxy climate records.

Committee Membership: Robert DeConto (chair) USA; David Pollard (proposed) Penn State University, USA; Matthew Huber (proposed), USA; Steve Pekar, USA; David Harwood (proposed), USA; Catherine Stickley (proposed), UK; Katarina Billups, USA. Members from other nations are TBA.

Eocene-Oligocene ACE sub-committee

*Rationale***:** The Eocene-Oligocene interval was a critical time in Antarctica's geological history because it involved a fundamental climate change that saw the end of the Mesozoic greenhouse (ice-free) climate and the birth of our present icehouse world. The Eocene climate record in Antarctica is represented by sediments and fossils, including rich assemblages of fossil plants, that signal warm temperate climates to latitudes as high as ~65-70°S 50 million years ago. By the latest Eocene

climates had cooled and ice formed at sea level in Antarctica, as shown by glacial sediments. The ice sheets expanded as the Oligocene climate cooled further. The programme of activity will include the following:

- Compilation of data on existing Eocene and Oligocene geological proxies for climate from Antarctica. Time intervals of interest include: (1) Early Eocene peak greenhouse warmth; (2) Latest Eocene-Oligocene onset of glaciation; (3) Oligocene climate cooling.
- Interpretation of palaeoclimate for this interval from proxy data
- Analysis of global linkages, particularly from the marine isotope record.
- Publication on Eocene-Oligocene climates of Antarctica and global links
- Comparison with climate-vegetation model outputs

Provisional Committee:
Prof Jane Francis, UK; Prof Sergio Marenssi, Argentina; Dr Vanessa Thorn, NZ; Prof Mike Hambrey, UK; Prof Jim Zachos, USA; Dr Henk Brinkhuis, Netherlands, Dr Barbara Mohr, Germany.

Radio-echo sounding ACE sub-committee

Rationale: Radio-echo sounding is critical to the ACE programme in that it provides data on subglacial topography and conditions, which are essential to models of the ice sheet. RES data also provide information on internal ice sheet layering which can also be used to validate ice sheet models and investigate flow and accumulation conditions during the Pleistocene. RES can also offer information about ancient landscapes, which is relevant to ice sheet history over much longer timescales. Several significant regions of Antarctica have yet to be surveyed using RES. Such data gaps lead to fundamental problems in ice sheet model boundary conditions. These gaps lie predominantly in the Antarctic interior, where field logistics are difficult to coordinate.
The IPY may be used to stimulate data acquisition in these areas. Existing proposals such as GigaGAP and ICECAP are in an advanced stage of development. The ACE-RES subcommittee will act to encourage the use of RES in Antarctica and bring together new RES projects to coordinate activities. The outcome of this sub-group will be to complete the RES coverage of the ice sheet, and supply information to the Antarctic ice sheet modelling community. The action plan, to be developed over the summer 2006, includes the following:

- Establish an up-to-date overview of RES surveys.
- Develop a simple questionnaire to be sent to all possible scientists holding RES data acquired after the last SCAR-BEDMAP update.
- Update BEDMAP if possible (renew the BEDMAP initiative within SCAR).
- Check all IPY proposals with regard to RES. Establish contact to these groups - keep track on these activities.
- Distribute information on RES surveys to the community to establish contacts between scientist acquiring RES data, and to make the data available to ice-sheet modellers.

Provisional Committee:
Detlef Damaske, Germany; Ian Allison (Australia); Don Blankenship (USA); Robert Bindschadler (USA) (for IPY Mass Balance); Sun Bo (China); Heinz Miller

(Germany)(for IPY Traverses); Shuji Fujita (Japan); Ignazio Tabacco (Italy); David Vaughan (UK)

Data management

Successful development, testing and refinement of palaeoclimate models depend on the accessibility of relevant observational data. Therefore ACE will encourage responsible archiving of data and samples to established data centres and repositories. Furthermore, through its website, ACE will establish a directory of such data centres and repositories to help researchers locate the data they need. ACE will also foster continued development of the Antarctic Data Library System for Cooperative Research (SDLS), which was set up under the former SCAR-ANTOSTRAT project. The SDLS now contains most of the processed data from marine multichannel seismic surveys that have been carried out around Antarctica.

ACE and the International Polar Year (IPY)

The IPY provides a unique opportunity to plan, fund and undertake international collaborative research in the polar regions. By the time of IPY (2007-8), the ACE programme will be fully functioning. It is therefore highly appropriate that ACE, as an existing major international Antarctic research programme, seeks to become involved in IPY research in order to fulfil the ambition of this intense period of investigation. ACE has been acknowledged as a potential IPY core programme, following assessment of our 'expression of intent'. ACE is in the process of forming a full IPY proposal to be submitted on 30th June 2005.

Links to other SCAR programmes

ACE has formal links with three other SCAR SRP proposals. The first is Subglacial Antarctic Lake Environments (SALE), the second is Antarctica and the Global Climate System (AGCS) and the third is Evolution and Biodiversity in Antarctica (EBA).

ACE and SALE will interact in three ways. First, the palaeoclimatic record contained in subglacial lake sediments will provide important new information from the interior of the continent. ACE and SALE will collaborate on the acquisition of such records. Second, the ice sheet history quantified through numerical modelling as part of the ACE programme will offer important constraints on the formation and development of subglacial lake environments. ACE will provide SALE with model results in order for the history of subglacial lakes to be established in the context of ice sheet and climate evolution. Third, the radio-echo sounding exploration of Antarctica planned by ACE will uncover the locations of subglacial lakes and the basal ice sheet conditions that govern their existence. We will provide SALE with such information to assist the planning of subglacial lake exploration.

Investigating Antarctic history over glacial-interglacial periods is appropriate to the study of both modern and ancient environments. ACE and AGCS aim to investigate

this history as a component of much broader and distinct science plans. Further, each SPPG has compatible yet discrete specialisms that are well suited to studying the glacial-interglacial history of Antarctica. ACE contains expertise in ice-sheet/climate modelling, marine and terrestrial geology, marine geophysics and radio-echo sounding. AGCS includes expertise in atmospheric modelling and ice coring. This combined expertise covers the full suite of knowledge required to build a sub-committee on the Pleistocene history of Antarctica.

ACE and EBA have mutual interests in understanding past environments. For ACE such work is central to its programme of work. For EBA it is critical to evaluating how and why the present distribution and form of biota exists in Antarctica. Palaeoclimate information, collected and modelled through ACE will be made available to EBA. Members of EBA have been contacted; we are still waiting to hear from this SCAR programme. Members of EBA will be encouraged to attend ACE meetings to discuss results and inform the ACE community about the various inputs the EBA programme requires.

Links to other international programmes

ACE has relevance to several major international programmes. In particular several members of the ACE programme are also involved in the Antarctic Drilling Programme, ANDRILL. ANDRILL aims to acquire sedimentary records of past climate change from a variety of locations around the Antarctic Continent. ACE is able to support ANDRILL by offering small funds to assist with meetings, and helping the integration of numerical modelling and geological data. In addition, ACE has good connections with the science programme of the European Project for Ice Coring in Antarctica (EPICA). ACE can assist EPICA by facilitating comparison, integration and modelling of EPICA (and other ice coring results) with palaeoclimatic data from other sources (e.g. marine and lake sediment cores and terrestrial geological records). In particular, ACE can serve as a means by which the ANDRILL, EPICA and ice sheet modelling communities may integrate.

Outreach and education

ACE will endeavour to support and encourage the next generation of Antarctic scientists in three ways. First, an online lecture series paralleling the findings and outcomes of the ACE programme will be made available to schools, colleges and universities via the ACE website (www.ace.scar.org). These lecture materials will comprise downloadable power-point presentations, and will match ACE's scientific programme. Second, we will encourage young scientists to take part in ACE workshops by offering bursaries for travel and subsistence. Although the level and number of the bursaries will be dictated by funds available, it is hoped that at least two bursaries will be available for each workshop/meeting. The condition of each bursary will be a report by the holder about their research and workshop experiences, which will be posted on the ACE website. Third, we will facilitate an exchange scheme between our respective institutions to allow young scientists to take part in fieldwork and to sample the research culture of other nations. Similar schemes operate

within, for example, the Worldwide University Network, and it is anticipated that external funds (from such schemes) will be used to support the exchanges arranged through ACE.

ACE will liaise with the SCAR office to ensure effective communication and outreach, as set out in the 'SCAR Communications Plan' and 'A Strategy for Capacity Building and Education'.

Symposia and workshops

Workshops and sessions to be organised by ACE include:

- Workshop on the use of ice sheet and climate modeling, Boston 2005-6.
- A session of Pliocene global warming will be convened at the Earth Systems Processes 2 meeting in Calgary, August 2005.
- Sessions on all the ACE sub-committee programmes will be convened at the International Symposium on Antarctic Earth Sciences (USA Santa Barbara, Sept. 2007).
- Paleogene-Neogene climate-ice sheet modelling workshop at the ANDRILL data integration meeting in New Zealand in 2007.
- An international research meeting on the Neogene and Antarctica at Cambridge, UK during the summer of 2008.
- Greenhouse-icehouse transition session at Fall AGU in 2008, focusing on the latest results from numerical climate, cryosphere, and ocean modelling studies

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Funding

Future applications for external funding of ACE activities will include:

- Work on the LGM will be funded initially through a UK-NERC application, organized by Tony Payne.
- Pleistocene work will be funded through applications to ANDRILL (both the McMurdo Ice Shelf Project in 2006-2007 and the Southern McMurdo Sound Project in late 2007), SHALDRILL, IODP, the NZ Marsden Fund and, possibly, IMAGES.
- Both Mid Miocene and Pliocene, and the Eocene-Oligocene work, will be the foci of a future proposal for ANDRILL drilling, aided by a proposed UK-NERC consortium grant.
- RES will be funded by a series of applications to national funding agencies, including the USA, UK and Germany. Much activity will be planned for the IPY period, 2007-9.

Timetable of activities

The tasks, deliverables and time-lines we envisage are outlined in Table 1. This should be viewed as a guide, as it is difficult to be prescriptive in charting future progress in research.

Themes	2005-6	2006-7	2007-8	2008-9	**2009-10**
Holocene/last glacial maximum/ and Pleistocene	Internal layers, ice flow and accumulation reconstruction.	Complete review of Antarctic ice sheet – ice shelf – Southern Ocean record	Review of data collected by IMAGES and ANDRILL projects.	Assess reviews of Quaternary and Pliocene in light of new data from S Ocean and sub-Ross IS core. International meeting on the Neogene and Antarctica, Cambridge, summer 2008.	Publish state-of-the art report on data and modelling AIS history and behaviou from a perspective o both long terr (10^3-10^6 years and short-terr (1 to 10^2 year climate chang over the last 5 million years.
Pliocene	Continue review of sedimentary cores from Legs 178 and 188 (plus sediment cores from national programs). Continue fostering IODP proposals for Wilkes Land and Ross Sea. Earth Systems Processes 2 meeting in Calgary, August	Continue review of sedimentary cores from Legs 178 and 188.	Complete review of on-land and offshore record. Revise IODP proposals for Wilkes Land and Ross Sea. Develop proposals using SHALDRIL and ANDRILL technologies. Convene session at ISAES, Santa Barbara USA		
Middle Miocene	Continue review of sedimentary cores from Leg 188. Continue fostering IODP proposals for Wilkes Land and Ross Sea	Complete review of offshore record – revise IODP proposals for Wilkes Land and Ross Sea. Develop proposals using SHALDRIL and Cape Roberts (ANDRILL)	Revise IODP proposals for Wilkes Land and Ross Sea. Convene session at ISAES, Santa Barbara USA	International meeting on the Neogene and Antarctica, Cambridge, summer 2008. Assess reviews in light of new ANDRILL, SHALDRIL and IODP data.	Publish state-of-the art report that includes new data from ANDRILL, SHALDRIL, IMAGES and IODP integrated wit modelling AI history and behaviour for the period from 50 to 10
Oligocene-Miocene boundary			Convene session at ISAES, Santa Barbara USA		

Eocene-Oligocene	Continue review of sedimentary cores from Leg 188. Continue fostering IODP proposals for Wilkes Land and Ross Sea.	technologies. Paleogene-Neogene climate-ice sheet modelling workshop at the ANDRILL data integration meeting in New Zealand in 2007	Convene session at ISAES, Santa Barbara USA	Greenhouse-Icehouse trans. Session at AGU-Fall meeting, Dec 2008	Ma ago.
Radio Echo Sounding	Analyse existing data to reveal internal layer structure of both ice sheets	Plan future exploratory research	Begin new surveys of East and West Antarctica, to fill data gaps. Convene session at ISAES, Santa Barbara USA	Continue surveys, and provide data to numerical ice sheet modeling community.	Continue surveys, and provide data t numerical ice sheet modelir community.

Table 1. Outline of tasks, deliverables and timelines for work to be carried out under the aegis of the ACE programme from 2005 to 2010.

Timetable of steering committee meetings
ACE plans to undertake steering committee meetings at the following dates/locations (many of which will take place around existing conferences).

2005

- August 2005, Aberystwyth, UK. International Association of Sedimentologists meeting.
- December 2005. San Francisco, USA. Fall Meeting of the American Geophysical Union.

2006

- July 2006, SCAR Open Science Meeting, Hobart, Australia
- December 2006. San Francisco, USA. Fall Meeting of the American Geophysical Union.

2007

- March 2007, steering committee meeting to coincide with the start of the IPY in order to coordinate activities during the IPY period. Location TBA.
- August 2007, 10th International Symposium on Antarctic Earth Sciences (ISAES X) University of California, Santa Barbara, USA.

2008

- July 2008, SCAR Open Science Meeting, St Petersburg, Russia.
- December 2008. San Francisco, USA. Fall Meeting of the American Geophysical Union.

Subglacial Antarctic Lake Exploration (SALE)

The SALE steering committee had its first meeting in 2005 at the EGU meeting in Vienna. A Program Offcie has been established at Texas A&M University and it has a new website (http://salepo.tamu.edu).
SALE has been identified as a potential core activity by the ICSU/WMO Joint Committee for the International Polar Year and was invited by the committee to further develop its proposal into one that could become a core IPY project associated with some other expressions of interest that included arctic and bi-polar programs. In developing its material for IPY, the SALE committee has agreed to the following main points.

Deliverables - SALE will provide the following deliverables:

- maintain and make widely available an up-to-date inventory of subglacial lake features;
- a standard identification scheme for subglacial lake environments;
- a current bibliography of relevant articles from peer reviewed journals, meeting reports and the lay press;
- a website with links to all activities related to subglacial lake environments including national programs, meetings, and reports acting as a portal to data held by others;
- methodology and technology workshops in response to community needs;
- expert groups on clean sampling technologies and other environmental stewardship issues in response to community needs;
- workshops, scientific sessions, and symposia;
- review of CEEs for SALE projects and field activities as requested;
- advice on all aspects of SALE as requested by SCAR including convening of expert groups when additional expertise is needed;
- promotional materials, a web site, an available speaker and topics list, interactive tools for educating the public, a bibliography (including press releases and articles in the print and visual media), meeting reports, contact information for the media; and
- common protocols and standards for data management that ensure quality and comparability across programs.

Milestones
Workshops, symposia and special sessions at major conferences are important for fostering collaboration. The exchange of ideas in the furtherance of planning will be a primary mission of SALE.

- *Year 1* – Program Meeting - I; review/revise terms of reference, metrics of performance, scientific objectives, etc.; elect program officers; and report progress to SCAR.
- *Year 2* – Program Meeting - II; organize and hold a workshop; promote and organize SALE sessions at appropriate scientific meetings; develop a session for the SCAR Science Conference and report progress to SCAR.
- *Year 3* - Program Meeting - III; promote and organize SALE sessions at appropriate scientific meetings; develop a popular science article on SALE, and report progress to SCAR.
- *Year 4* - Program Meeting - IV; organize and hold a workshop; promote

and organize SALE sessions at appropriate scientific meetings; develop a popular science article on SALE, develop a session for the SCAR Science Conference; and report progress to SCAR.

- *Year 5* – Program Meeting - V; promote and organize SALE sessions at appropriate scientific meetings, organize a major SALE international symposium.
- *Year 6* – Program Meeting - VI; promote and organize SALE sessions at appropriate scientific meetings; develop a popular science article on SALE, develop a session for the SCAR Science Conference; and report progress to SCAR.
- *Year 7* – Program Meeting - VII, organize publication of a SALE book, promote and organize SALE sessions at appropriate scientific meetings; develop a popular science article on SALE; and report progress to SCAR.
- *Year 8* – Program Meeting - VIII, publish the SALE book; develop a major keynote session for the SCAR Science Conference; and report progress to SCAR.

This timetable and the deliverables should be reviewed and revised as necessary at the first SALE meeting and reviewed at each subsequent meeting.

Metrics of Success

The measures of success of a program that serves primarily in an advocacy role are difficult to quantitatively define. However, it is important to develop metrics of performance that provide SCAR with some indication of a program's impact. The following are proposed as possible metrics of performance for the SALE SRP:

- workshops held, attendance, and reports produced;
- sessions focusing on exploration and research of subglacial lakes (number and quality) held at national and international meetings, attendance, and resulting proceedings publications;
- peer-reviewed publications each year (number and quality) related to subglacial lake exploration and research;
- articles in the popular press including numbers of interviews given by SALE members as well as website hits;
- formation of national scientific steering committees; and
- leverage of funds from other sources.

The SALE leadership will regularly canvas the community for these statistics and keep up-to-date records for annual performance reviews. It is proposed that during the first meeting of SALE that these metrics be revisited and a final set of performance criteria be agreed and communicated to the SCAR Executive for final approval.

SALE Scientific and Technological Milestones

SALE has put forward a comprehensive plan for facilitating and coordinating the exploration and study of subglacial lake environments. The scientific objectives will be accomplished by a network of independent but synergistic programs to be conducted by individual nations or teams of scientists from several nations. While the ultimate goal is entry, sampling and characterization of subglacial environments like Lakes Vostok, Concordia, Elsworth; analogue settings such as Dry Valley lakes, can provide valuable information and experiences to guide planning and implementation of the ambitious SALE agenda. In our planning activities related corollary and complementary programs and projects are included that will inform the work of SALE.

SALE involves technological challenges and objectives as well as scientific goals. A range of milestones have been developed that include specific activities as well as basic scientific questions. Since SALE is the continuation of SALEGOS, many activities and projects are already in progress and will be accomplished in the near term. Longer milestones will be dependent on securing funding and completion of field programs yet to be scheduled. Programs and technological development activities are listed in the year they start but many continue over a period of years with milestones being accomplished sequentially. More detailed timelines and milestones can be found in each program's planning documents. These milestones will be regularly revisited/revised and will assist in setting the agenda for future SALE meetings.

Scientific Milestones
2004/2005

1) Continuing studies to establish the organic carbon content and origins within the Vostok accretion ice to define carbon/energy sources for supposed microbial communities in the lake and test the hypothesis of ultra-low DOC content in Lake Vostok (Russia, US, France).
2) Continuing studies of solid (mineral) inclusions in the accretion ice to decode depositional conditions in the western shallow bay of Lake Vostok, mode of debris transportation to the lake bottom, the geological nature (rock composition and age) of the western lake coast and to test the hypothesis of a hydrothermal contribution to Lake Vostok (Russia).
3) Updated inventory of subglacial lakes (UK)
4) Further retrieval of additional Lake Vostok accretion ice (3623 – 3700m) for further characterization of ice chemistry and microbiology (Russia).
5) Over-snow radar profiling and reflection seismic experiments in the area of Lake Vostok to study lake boundaries, shore bedrock topography, lake bathymetry, sub-ice environments and to model ice sheet and water circulation, and ice sheet/water interaction (Russia).
6) Assess the biological contents preserved within East Antarctic Ice Sheet in relationship with past climate. Evaluate the potential of East Antarctic ice cores (e.g.: Vostok, Epica Dome C, Epica Droning Maud land) for providing records of the biological Aeolian input over period encompassing 1 million years. Expected outcomes: i) record of biological emission from ocean and continent (possible link

with EBA), ii) estimate of the longest time limit for DNA survival in ice (France, Russia, Denmark).

7) Assess the biological content linked to the in-situ biological activity within the ice sheet and the basal ice of deep ice cores using microscopy and DNA-based methods. Test the hypothesis of biological activity in ice layers enriched with possible microbial gaseous by-products. (France, Russia, US, Denmark)
8) Assess the microbial content of Lake Vostok from accretion ice studies**.** Test the hypothesis concerning the sterility of Lake Vostok (main water body) sterility and the microbial thermophilic signatures and hydrothermal contribution to Lake Vostok coming from the bottom (France, Russia, US).
9) Assess the cycles of major chemical elements, organic carbon compounds, heavy metals, and gases for Lake Vostok. Evaluate the physical and chemical properties of accretion ice formed in shallow and deep waters over the lake as proxies of actual lake water properties. Test hypotheses concerning: i) the accumulation of atmospheric gases in Lake Vostok and specifically high oxygen tension, ii) potential hydrothermal contributions to Lake Vostok and iii) lake water contributions from a possible ancient evaporitic reservoir to Lake Vostok (France, Russia, US, Italy).
10) Assess Lake Vostok the heat and mass balance using water geochemical components such as : ^{2}H, ^{18}O, ^{3}He, ^{4}He. Conduct tests to determine if Lake Vostok is a closed system or part of an ice melt network. Constrain the geothermal heat flux, the exchanges of water and heat with the overlying glacier, and the water circulation (France, Russia, US, UK).
11) Assess the origin and evolution of Lake Vostok (link with ACE**)**. Evaluating origin of the sediments trapped into the accretion ice. Evaluate the recent geological settings, thickness and coverage of sediments at the bottom of the lake. Estimate potential of sediment to depict episodes before the Antarctic glaciation (France, Russia, US)

2006/2007

1) Characterization of subglacial Lake Ellsworth morphology and geological setting by remote sensing (pending – UK)
    a. Mapping of lake extent and subglacial drainage basin, from radio-echo sounding; Determination of lake bathymetry, from seismic sounding; Measurement of lake-floor sediment thickness (and possible structure) from seismic sounding. These measurements will reveal the best cite within the lake for the exploratory mission, planned for 2008/9.
2) Continue geophysical observations (over-snow radar profiling and reflection/refraction seismic experiments) in the area of Lake Vostok to study lake boundaries, shore bedrock topography, lake bathymetry, sub-ice environments and to model ice sheet and water circulation, and ice sheet/water interaction (Russia).
3) Characterization of the origins of surface and basal ice recovered in the Vostok ice core using shallow cores and radars along the flow line (US/French-pending).
4) Continue investigations under items 6 to 11 from 2004-2005.

2007/2008

1) Characterization of ice flow (from surface GPS measured over two seasons, starting 2006-7) and ice accumulation (from surface measurements and snow pits, measured over two seasons, starting 2006-7) over subglacial Lake Ellsworth: Season 2 (pending – UK)

2) Determination of water circulation in Lake Ellsworth; using computational fluid dynamics modeling, and data acquired in 2006/7 as inputs and boundary conditions.
3) Airborne geophysical surveys over Princess Elizabeth Land (to the East of 75 degrees E) to study bedrock topography, sub-ice environments, subglacial lake distributions and crustal structure of this previously unstudied region of Antarctica (Russia)

2008/2009

1) Descriptions of the physical conditions in Lake Ellsworth from direct measurement (UK)
   a. Measuring whether the water in Lake Ellsworth is chemically and/or thermally stratified with respect to depth (using a CTD probe)
   b. Visualization of Lake Ellsworth (using a video probe)
2) Description of the geochemistry, microbiology and sedimentary records in Lake Ellsworth from direct sampling (UK)
   a. Characterization of particle size and lithology of lake-floor sediments, from sedimentological studies of lake-floor samples.
   b. Determination of the nature of the climate 'record' within lake-floor sediments (we will not know the nature of this until samples are returned)
   c. The identification of life, using life-marker chips in board probe, and using microbiological investigations of samples. The variability (through the water column) of life, and its relation to physical environment, will be measured in situ and through sample return (which will require subsequent laboratory work).
   d. Quantification of water currents in the lake, using electrochemical techniques.
3) Continuing airborne geophysical surveys over Princess Elizabeth Land and in the area to the north-east of Lake Vostok to study bedrock topography, sub-ice environments, subglacial lake distribution and crustal structure of this Antarctic region (Russia)
4) Continuing geophysical observations (over-snow radar profiling and reflection/refraction seismic experiments) in the area of Lake Vostok to study lake boundaries, shore bedrock topography, lake bathymetry, sub-ice environments and to model ice sheet and water circulation, and ice sheet/water interaction (Russia).

Technological Milestones

2004/2005

1) Development of a vibrating drill to sample the 20m thick ice cover of Lake Vida (McMurdo Dry Valleys) and search for life –funded (US).
2) Development of clean Lake Vostok drilling technologies (implementation of this project will require a permit from the national Inter-Ministry Commission on Consideration of Applications of the Russian Physical Persons and Legal Entities on Activity in the Antarctic Treaty Area). Technologies will be developed to transport equipment through the borehole drilling fluid of the borehole including full-scale trials (Russia).
3) Design a fast drill system with 4km capability to be applied to ice in Antarctica (France)
4) Design "clean technologies" for ice drilling. Selection of drill fluids compatible with sub-glacial environments (France)

5) Contribute to the inventory of ice-borne and ice-related DNA signatures in open gene databases. Continue to establish comprehensive bio-decontamination protocols and DNA-targeted methods adapted to the very low biological contents of deep ice cores samples in order to decipher in situ signals from artefacts and contaminants (All nations)
6) Development and construction of a ROV-AUV system, sediment coring system and oceanographic moored observatory for sub-ice shelf and subglacial lake exploration (US).
7) Development of an AUV to search for life beneath the ice of the dry valley lakes (US, proposal pending)

2006/2007

1) Development of clean Lake Vostok drilling technologies for lake entry and water sampling (implementation of this project will require a permit from the national Inter-Ministry Commission on Consideration of Applications of the Russian Physical Persons and Legal Entities on Activity in the Antarctic Treaty Area). Clean technologies will be developed to transport equipment through the borehole drilling fluid including full-scale trials (Russia).
2) Proof-of-concept field operation with the ROV-AUV through the Ross Ice Shelf (US)
3) Development of hot-water drill capable of melting a borehole through 3.5 km of ice in West Antarctica. (UK)
4) Development of equipment necessary for subglacial lake exploration (to include Conductivity/Temperature/Depth device, camera and lighting, life-marker chips, raman spectrometer, tuned laser diodes, microscope and sample chambers). (UK)
5) Construction of a subglacial lake exploration probe, with tether, communications system and winch, to include the apparatus described above. (UK)
6) Continuing design of a fast drill system with 4 km capability to be applied to ice in Antarctica (France).
7) Continuing design "clean technologies for ice drilling. Selection of drill fluids compatible with subglacial environments (France)

2008/2009

1) Development of clean Lake Vostok drilling technologies for sediment sampling (implementation of this project will require a permit from the national Inter-Ministry Commission on Consideration of Applications of the Russian Physical Persons and Legal Entities on Activity in the Antarctic Treaty Area - Russia).
2) Development of ecologically clean observatories and sampling devices that can be transported through the borehole drilling fluid including full-scale trials (Russia).
3) Continuing design of a fast drill system with 4 km capability to be applied to ice in Antarctica (France).
4) Continuing design of a clean technological setting for ice drilling. Selection of drill fluids compatible with subglacial environments (France)

Related Studies

2004/2005

1) A study of the "pink" ice from the bottom of the NGRIP core – (pending – US, France, Denmark, UK)
2) A study of particles (biotic and abiotic) in the WAIS Divide core – (pending - US)
3) A study to examine life in icy soils – (pending - US)

4) A study of microbial contents and diversity in temperate glaciers (Illimani-Andes, Mont Blanc) (France)
5) Results of a Microbial Observatory program search for novel genomes and physiologies in the permanently ice covered lakes of the dry valleys (2004-2008 - US).
6) Findings from the McMurdo Dry Valley LTER (2004-2009) on biodiversity in Dry Valley lake ice and water columns (US)
7) US NAS NRC report on "Prevention of the Forward Contamination of Mars" sponsored by NASA through the Space Studies Board of NAS - 2005 (US)
8) Analogous lake (e.g. Radok) and ice (e.g. EPICA Dome C and Droning Maud land cores) studies for microbiology and genomics (Russia/France/Denmark)

2006/2007

1) Further findings from the McMurdo Dry Valleys LTER (2004-2009) on biodiversity in Dry Valley lake ice and water columns (US)
2) Further results of a Microbial Observatory program search for novel genomes and physiologies in the permanently ice covered lakes of the dry valleys (2004-2008 - US).
3) Further analogous lake (e.g. Radok) and ice (e.g. EPICA ice cores) studies for microbiology and genomics (Russia/France/Denmark)
4) Aerogeophysical studies of Gamburtsev Mountains and surrounding terrains for identification of additional lakes 2006-2009 (Austrailian/German/US)

2008/2009

1) Further findings from the McMurdo Dry Valleys LTER (2004-2009) on biodiversity in the Dry Valley lake ice and water columns (US)
2) Further results of a Microbial Observatory program (2004-2008) search for novel genomes and physiologies in the permanently ice covered lakes of the dry valleys (2004-2008 - US).

REPORT on the Internal Symposium on Antarctic Earth Sciences 2007

From Robin Bell**,** Chair National Steering Committee **.** http://isaes2007.geol.ucsb.edu

Antarctica: A Keystone in a Changing World ISAES-2007

The International Symposium on Antarctic Earth Science (ISAES) is the major international Antarctic Geoscience meeting convened once every four years that brings together ~400 scientists from over 35 countries. This weeklong symposium in 2007, sponsored by SCAR and the U.S. National Science Foundation, will address major topics in Antarctic Earth science. The meeting will be convened at the University of California, Santa Barbara (UCSB) August 26 through September 1, 2007.

The focus of the 10th ISAES-2007, marking the beginning of the International Polar Year, will be Antarctica: A Keystone in a Changing World. A preliminary list of potential symposium topics includes: Antarctic Climate Evolution: Global Linkages from Records in Ice cores, Geological cores, Outcrops, and Models; GeoCryoDynamics: Feedbacks and Coupling between the Geosphere, Cryosphere and Climate; Antarctica in the Global Geodynamic System; Antarctic Earth Science in the International Polar Year; Polar Education and Outreach Initiatives; Antarctica's Impact on Global Biosphere Evolution; New Frontiers in Technologies and Polar Databases.

The Symposium program will include oral and poster presentations, field excursions, exhibits, workshops, and social events. A major block of housing is available on the UCSB campus to early registrants. The cities of Santa Barbara and Goleta also offer quality accommodations.

10th ISAES Committees

U.S. Organizing Committee

Robin Bell; chair of 10th ISAES
Alan Cooper; Publications manager
Ian Dalziel; International coordination; US VIPs
James Kennett; Co- Symposium Manager
Bruce Luyendyk, Symposium Manager
Samuel Mukasa; Development
Ross Powell; Workshops
Carol Raymond; Publications, co-manager
Christine Siddoway; Field excursions
Terry Wilson; Program Committee chair
Chuck Kennicutt, SCAR ex-officio

Program Committee

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Hubert Miller, Germany
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IPY INITIATIVES

Appendix A Geodetic Observatories In Antarctica (GOIA)

Proposal Information (ID 536)

Concise outline of proposed activity

Since several years geodetic observatories have been performed in Antartica through continuous or periodical data acquisition. As geodetic observatories we are considering VLBI, GPS, Doris, absolute gravimetry, tide gauge stations. They were installed principally on rock surfaces but somewhere on ice. Unfortunately the observatories are sparse and their distribution is inhomogeneous for logistic and environmental reasons, overall it was difficult to install remote stations. An effort was produced within GIANT (Geodetic Infrastructure of Antarctica) group of SCAR in order to coordinate the international activity. See on web site http://geoscience.scar.org/geodesy for more details on actual geodetic observatories situation.

The intent for IPY 07-08 is to improve international efforts in a coordinated activity that allows to increase the number and the distribution of remote GPS stations, coupled with meteorological stations, tide gauge and absolute gravimeter installations. Moreover the intent is to create the network of permanent observatories together with periodical observatories that will acquire data contemporary during IPY event. The opportunity to collocate GPS receiver with meteorological stations and , possibly, radio soundings is very important considering the application of GPS data processing for atmospheric parameters study and weather broadcasting.

The aim of the activity should be pursued involving more countries than possible and, in the case that will be difficult or impossible for some nation to install own receiver, the instrumentation should be furnished by other nations for periodical measurement during IPY 07-08. Focusing to a particular period, IPY 07-08, should be possible to facilitate the common international efforts to install new permanent observatories and in the same time could guarantee the advantage of having periodical observatories at least performing all together contemporary.

The contemporary performance of a network of geodetic observatories will be a great advantage in terms of scientific results and demonstration of a success in international cooperation and coordination in applied research on Antarctica.

A creation of geodetic observatories database with real time data acquired is an ulterior advantage of the proposed activity. SCAR GSSG web page could host a Geodetic Observatories GIS containing data archiving and location detailed map.

IPY 2007-2008 theme(s) addressed by the project

Theme 1 – The current state of the polar environment	Y
Theme 2 - Change in the polar regions	Y
Theme 3 - Polar-global linkages and interaction	Y
Theme 4 - Investigating new frontiers	Y
Theme 5 -The polar regions as vantage points	
Theme 6 - Human societies in polar regions	

Major target of the proposed activity

Natural or social science research	Y
Education/Outreach and Communication	
Data Management	Y
Legacy	
Other Targets	

Significant advance(s) in relation to the IPY themes and targets can be anticipated from this project

The proposed activity could give significant advances in relation to the determination of present environmental status of antarctica by quantifying the spatial and temporal variability of geodetical parameters, integrating the informations at continental scale. The observatories will develop and enhance the study of the Earth's surface variation, sea level change and the Earth's density with the goal of earth shape better definition and surface variation and /or deformations determination. The network of geodetic observatories is connected to global network to advance our understanding of Antarctica - global interactions by studying data tele-connections on all scales. New frontiers of earth science in antarctica are based even on surface variation that reflect interior mass changement and surface kinematic effects. The polar regions study, in terms of arctic-antarctic interection, should be performed through GPS network data utilitation for meteorological study and prediction at global scale
What international collaboration is involved in this project? (see Note 2)
Activities actually is made within SCAR GSSG GIANT expert Group.
SCAR GPS Epoch campaign.
TIGA project for sea level variation measurements.
International network of tide gauges.
International GPS network for geodynamics studies (IGS network).
Italy- USA- New Zealand GPS networks for Victoria Land crustal deformation control.

FIELD ACTIVITY DETAILS

Outline the geographical location(s) for the proposed field work (see Note 3)
The geodetic observatories should be located on rock surface on whole Antarctica continent; it is easier to find location along the coast but even in the interior on mountains and willows. In the interior the stations on rock should be integrated with geodetic observatories on ice, precisely connected in a network frame. See Geodetic

Control Database on http://geoscience.scar.org/geodesy for controlling the actual geodetic observatories distribution.

Approximate timeframe(s) for proposed field activities

Arctic Fieldwork time frame(s)	*Antarctic Fieldwork time frame(s)*
	10/06 – 03/09

Significant logistic support/facilities will be required for this project? Can these resources be usefully shared with other projects?
Multi instrumented platforms
Helicopters
Existing field stations
New field stations
Remote camp
Observatories
Fuel depots
Twin otters

Project infrastructure

A network of permanent geodetic observatories linked to international network. Moreover a series of stations location where it should be possible to replace instruments in the future.
Web-GIS of geodetic observatories in terms of data management.

Required logistics

Consortium of national polar operators	Y
Own national polar operator	Y
Another national polar operator	Y
National agency	Y
Military support	Y
Commercial operator	Y
Own support	
Other sources of support	
Further details - 50 words max	

Project been "endorsed" at national or international level

Y	Further details – 50 words max Expression of interest is in the process of being considered by the Italian National Committee for IPY. Geodetic Permanent observatories and G.I.S. of geodetic control database endorsed at international level by SCAR within Geosciences Standing Scientific Group.

PROJECT MANAGEMENT AND STRUCTURE

Project a component (established over the IPY 2007-2008 timeframe) of an existing plan, programme or initiative or is it a new autonomous proposal?
It is an extension of an existing activity and partially new in terms of well defined integration of observations in a network performing in a specified period.
The creation of geodetic observatories GIS located close to SCAR is a new product that should finalize a long historical research activity and to enhance a new geodetic infrastructure.New Project

Project organitation and management

Coordinating different nations able to install new geodetic observatories to make acquisition during the same time.
Furnishing instruments to nations that have not observatories and instructing personnel to perform instruments.
Giving help and coordinating remote stations installation.
Organizing data transmission to control centre even in a real time downloading.
Common centre of Data processing.
Analysis of data processing
GIS implementation of Geodetic Observatories detailed map location, historical information's data archiving and processing results.
GIS implementation on SCAR GSSG web page

Initial plans of the project for addressing the education, outreach and communication issues outlined in the Framework document
Outreach and communication on international cooperation to realize an Antarctic infrastructure network results
Contribute to science interconnecting continental observations to global data set.
WEB-GIS system implementation managed from SCAR

Initial plans of the project to address data management issues (as outlined in the Framework document)
Collecting data and information from different geodetic national project in Antarctica.
SCAR GSSG
SCAR JCADM

Funds for the project.

Funds should be received from different National agencies involved.
SCAR GSSG for Geodetic Observatories GIS.
SCAR JCADM for metadata definition and data archiving.

Additional information

It is planned to collaborate with, at least, other two EoI for IPY 0708, called "Polenet" (Lead contact: Terry Wilson - USA) and TANGO (Lead contact: A.Morelli – Italy).

PROPOSER DETAILS

Lead Contact for the Expression of Intent

Title	Professor
First Name	Alessandro
Surname	Capra
Organisation	DIASS –Polytechnic of Bari
Address 1	Viale Turismo n.8 – Taranto
Address 2	
Address 3	
Postcode/ZIP	74100
Country	Italy
Telephone	+39-099-4733215
Mobile	+39-338-6893276
Fax	+39-099-4733229
Email	a.capra@poliba.it
Repeat Email	

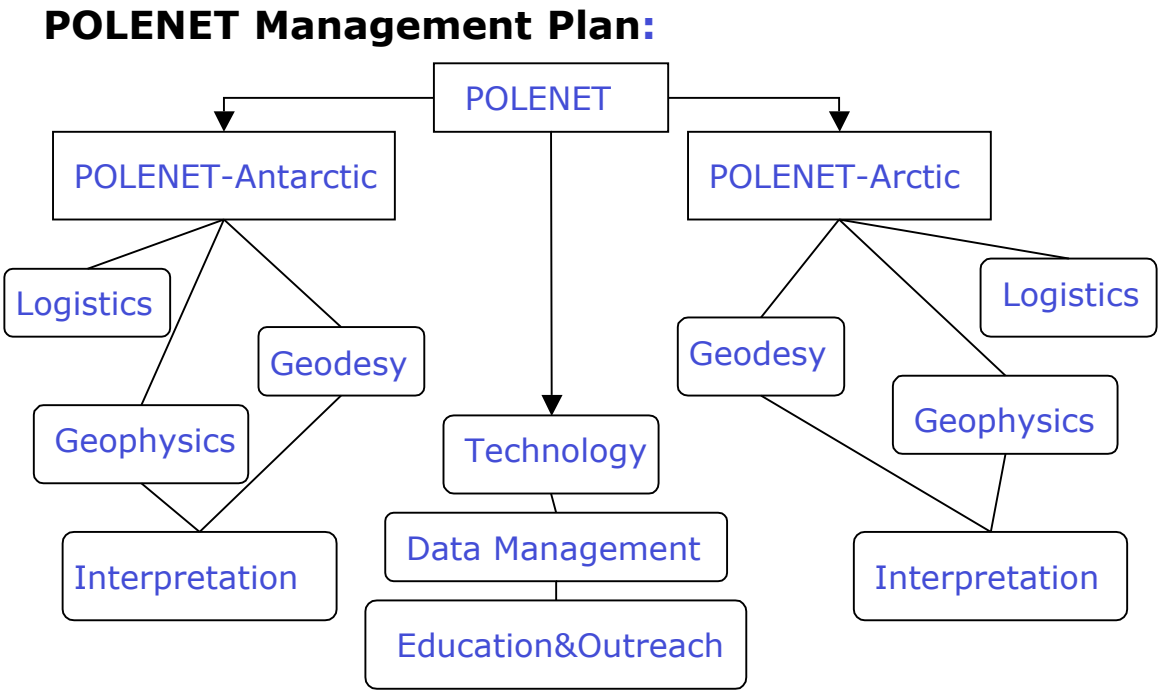
List up to six other project members and their affiliation.

Name 1	John Manning
Organisation	Geosciences Australia
Name 2	Reinhard Dietrich
Organisation	Dresden University- Germany
Name 3	Terry Wilson
Organisation	Polar Bird Research- Ohio State University -USA
Name 4	Larry Hothem
Organisation	NGS -USA
Name 5	Kazuo Shibuya
Organisation	National Institute of Polar Research (NIPR)-Japan
Name 6	Tony Bevin
Organisation	Land Information-New Zealand

Appendix B POLENET Polar Earth Observing Network for the International Polar Year

Terry Wilson and Reinhard Dietrich for the POLENET Team

Terms of reference : Polar regions have a unique geodynamic environment with close interactions of the solid earth with the cryosphere, the oceans and the athmosphere and direct links to the global climate system
In order to investigate these interactions within the polar earth system an IPY programme is proposed to deploy remote geophysical observatories on the continents and possibly offshore in addition to existing sites
The principal components of the observatories will consist of contineous GPS and seismometers with the potential addition of meteorology packages, geomagnetic observatories, tide gauges and gravimeters



Appendix C: Antarctic and sub-Antarctic Permafrost, Periglacial and Soil Environments (ANTPAS - Antarctic Permafrost And Soils) EOI 627

PROPOSAL INFORMATION
(ID No: 627)

Antarctic and sub-Antarctic Permafrost, Periglacial and Soil Environments (ANTPAS - Antarctic Permafrost And Soils)

Outline
Antarctic permafrost is integral to the terrestrial cryosphere, however, knowledge of its distribution, thickness, age, and physical and geochemical properties is fragmented or absent for large sectors of the continent and sub-Antarctic islands. At the same time, active layer and permafrost conditions are highly sensitive to climatic fluctuations and changes will affect regional hydrology, ecosystems functioning, landscape stability, human infrastructures and environmental impacts. Antarctic permafrost and soils hold potential to archive long-term (Ma) records of past environmental conditions and biological activity, and provide millennial-scale archives of surface temperature. Furthermore, this is the closest analogue for understanding planetary permafrost. The combined working groups of the International Permafrost Association (IPA) and the SCAR Standing Scientific Group on Geosciences (SSGG) on Antarctic Permafrost and Periglacial Environments, with several partner organisations and groups, have launched the ANTPAS project to develop an internationally coordinated, web-accessible, database and monitoring system on Antarctic permafrost and soils.

Specific objectives are to:
Integrate existing datasets on permafrost, ground ice, active-layer dynamics and soils into a common, web-accessible, database system. This will also provide a managed, open-access repository for all new data developed under this project and future ongoing monitoring.
Produce a set of thematic maps on Antarctic permafrost and soils as models of our current scientific understanding of the region. They will also provide useful information for the location of sites for detailed studies on past and future climate changes.
Utilize non-invasive imaging methods including remote sensing/photogrammetry/GIS, as well as imaging sub-surface conditions with geophysical methods.
Implement a network of boreholes and collect intact cores (up to >100 m at select sites) along selected environmental gradients to measure chemical, physical and biological parameters in permafrost as proxies for past environmental conditions, as well as to record permafrost responses to climate change. This forms the Antarctic component of the IPA Thermal State of Permafrost (TSP) project, and extends the current Circum-polar Active Layer Monitoring (CALM) network to the Antarctic region (CALM-S).
Implement a monitoring network of active-layer and periglacial conditions and process responses to climate change coupled to the borehole network (CALM-S).
ANTPAS will develop an extensive program of activities that will have long-term

important scientific outputs on our understanding of the Antarctic terrestrial cryosphere, its responses to climate change and human impacts. The established monitoring network will provide a platform for long-term monitoring of the thermal state of permafrost and future responses to climate change. The database system will provide a legacy for systematic archiving of Antarctic permafrost and soils parameters. It currently enlists 36 primary investigators from 15 countries.

Theme(s)	Major Target
The current state of the polar environment Change in the polar regions Polar-global linkages and teleconnections Exploring new frontiers	Natural or social sciences research

What significant advance(s) in relation to the IPY themes and targets can be anticipated from this project?
Theme 1 -Characterize permafrost and soil parameters, including results from applications in remote sensing/photogrammetry/GIS and geophysical techniques, and develop in a web-accessible database -'Snapshot' view of current active-layer and permafrost conditions at GTN-P and CALM-S boreholes provides baseline data for future changes in permafrost. Theme 2 -Long-term (Ma) environmental change record based on chemical, physical and biological parameters from boreholes.
Themes 3 and 5 -Extension and integration of permafrost and active-layer response signals to climate change from Antarctica in the global cryosphere through the global networks GTN-P and CALM-S.
Theme 4 -Exploring Earth's oldest permafrost and soils as an analogue for planetary permafrost and astrobiology (IPA Astrobiology WG, NASA).

What international collaboration is involved in this project?
ANTPAS is coordinated by the IPA and SCAR SSGG working groups on Antarctic permafrost. ANTPAS implements the GTN-P and CALM networks in the Antarctic regions (IPY/TSP of IPA and CliC/IGOS). ANTPAS integrates with SCAR SSGG activities. Other collaborators: IPA Cryosols, Periglacial Processes, and Astrobiology working groups; Dry Valleys LTER, RiSCC, NASA, IPY/ANTPAGE.

FIELD ACTIVITY DETAILS

Geographical location(s) for the proposed field activities:
The database system will be located where appropriate support can be achieved (such as NZ Gateway Antarctica or NSIDC). The monitoring systems will be placed along environmental gradients from the sub-Antarctic islands to Antarctica, with additional regional transects on the continent. Site location for the initial deep borehole project is under discussion.

Approximate timeframe(s) for proposed field activities:
Arctic: n/a
Antarctic: 11/06 – 03/07 11/07 – 03/08 11/08 – 03/09

Significant facilities will be required for this project:
Core-drilling, sampling and frozen-storage capability, including transport by snow terrain vehicles, helicopter or Twin-otters. Field camps will be required at drill and active-layer sites. Mostly routine logistical support for summer expeditions including helicopter support in some regions. Air-borne geophysical surveys and mapping.

Will the project leave a legacy of infrastructure?
A data repository for existing and new data sets on Antarctic permafrost and soils will be established. An Antarctic observational network for permafrost and ground temperature and related meteorological data (AWS) will provide long-term data on changes in climate and environment (part of the International Network of Permafrost Observatories (INPO)).

How is it envisaged that the required logistic support will be secured?
Own national polar operator
Another national polar operator
National agency
Military support
Own support
Other sources of support

Logistics are mainly at the individual national project level. Large drilling activities will take place in an international collaborative context.

Has the project been "endorsed" at a national or international level?
ANTPAS is endorsed by the IPA, ISPRS (International Society for Photogrammetry and Remote Sensing) and support is pending from the SCAR GSSG and the IUSS (International Union of Soil Sciences). All IPA and SCAR working group members have been asked to include ANTPAS in their national IPY proposals.

PROJECT MANAGEMENT AND STRUCTURE

Is the project a short-term expansion (over the IPY 2007-2008 timeframe) of an existing plan, programme or initiative or is it a new autonomous proposal?
New

This is a new autonomous programme developed by the combined IPA and SCAR working groups in collaboration with the IPA Cryosols and Astrobiology working groups in support of IPY. In part, it extends existing activities, notably GTN-P and its TSP/INPO, and CALM, to the Antarctic.

How will the project be organised and managed?
The ANTPAS coordinating committee consists of the committee of the two initiating working groups and the leaders of the sub-groups of each project component. Annual meetings have been established to develop and track plans. A website and listserver have been developed (http://earth.waikato.ac.nz/antpas/). Additional meetings are planned by the sub-groups as required. The Second European Conference on Permafrost, Potsdam, June 2005, hosts the next full planning meeting.

What are the initial plans of the project for addressing the education, outreach and communication issues outlined in the Framework document?
An outreach component of the database website including map outputs and explanatory notes. Participating researchers will include undergraduate and graduate student involvement in their national project submissions. Public lectures and press releases

What are the initial plans of the project to address data management issues (as outlined in the Framework document?
Data management concerns are central to the proposal. NZ Gateway Antarctic could host the web-based database system and offer long-term data management support, with mirror sites at other institutions such as the U.S. Antarctic Resource Center. Need for links to national digital map products, National Snow and Ice Data Center (NSIDC, USA), AADC.

How is it proposed to fund the project?
Funding will be applied for by individuals and research groups through their national funding agencies. International, collaborative projects will be encouraged, particularly for those countries without existing Antarctic infrastructure. Pending an IPA planning proposal with the International Union of Geological Sciences funding of meetings and resources can be coordinated.

Is there additional information you wish to provide?
The following countries are involved in ANTPAS at this stage. Those indicated with * have existing CALM or TSP sites. Argentina, Brazil, Canada, France, Germany, Italy*, Japan, New Zealand*, Portugal*, Russia, Spain*, South Africa, Sweden*, Switzerland, USA*. Discussions involving China and Australia will take place during the forthcoming WCRP/CliC conference.

PROPOSER DETAILS

Dr Jan Boelhouwers
Villavägen 16
Uppsala
75236
Sweden

Tel: +46 18 4712524
Mobile: no
Fax: +46 18 4712737
Email: jan.boelhouwers@natgeog.uu.se

Other project members and their affiliation

Name	Affiliation
Jim Bockheim	University of Wisconsin, Madison, USA
Mauro Guglielmin	Insubria University, Italy
Megan Balks	University of Waikato, New Zealand

Ron Sletten	University of Washington, Seattle, USA
David Gilichinsky	Russian Academy of Sciences, Pushchino, Russia
Miguel Ramos, Jéronimo López-Martínez, Beatha Csatho	University of Alcalá, Alcalá de Henares, Spain, University Autonoma of Madrid, Spain, Byrd Polar Research Center, Columbus, USA