

REPORT TO XXVII SCAR FROM GEOSCIENCE STANDING SCIENTIFIC GROUP

Terms of Reference

1. Identify geoscientific research and geospatial data problems and needs in the Antarctic.
2. Promote international effort to solve such problems.
3. To integrate and coordinate Antarctic geoscience research, mapping and GIS programs
4. Contribute to global geodesy for the study of the physical processes of the earth and the maintenance of the precise terrestrial reference frame
5. To make data (geographic, geodetic, geophysical) available to the Antarctic and global user communities to meet scientific research requirements.
6. Provide a common geographic reference system for all Antarctic scientists and operators as the basis for sound data management.
7. To establish and maintain strong links with all Antarctic science research groups and Antarctic data management groups.
8. Provide advice for management of the Antarctic.
9. Encourage the application of Antarctic research to global problems.

Officers

Chief Officer: Philip O'Brien - Australia

Deputy Chief Officer: Alesandro Capra - Italy

Secretary: Bryan Storey - New Zealand

The Group have appointed a number of coordinators for its subgroups.

Organisation

The Standing Group identified groups that address priority areas. They are:

1. Geospatial Information Group of Experts (GIG)
2. Antarctic Neotectonics Scientific Research Programme (ANTEC)
3. Scientific Research Programme on Subglacial Antarctic Lake Exploration (SALE)
4. Age, Growth and Evolution of Antarctica (AGEANT) Action Group
5. Permafrost Action Group (PAG)
6. Antarctic Climate Evolution (ACE) Science Programme Planning Group
7. Communication and Outreach Action Group

Terms of reference and work plans are attached.

Within these groups are a series of projects and working parties that will have designated coordinator.

Report from Geospatial Information Group of Experts (GIG)

Background

The new Geospatial Information Group of Experts was formed as a result of the SCAR restructure. The group met on Friday 19th July to identify a terms of reference and develop a forward workplan. Past details of a number of the projects are given in the separate report of the Working Group on Geodesy and Geographic Information dated 17th July

GIG Terms of Reference

1. To make fundamental reference data (geographic, geodetic, geophysical) available to the Antarctic and global user communities to meet scientific research requirements.
2. Contribute to global geodesy for the study of the physical processes of the earth and the maintenance of the precise terrestrial reference frame
3. To integrate and coordinate Antarctic mapping and GIS programs
4. Provide a common geographic reference system for all Antarctic scientists and operators as the basis for sound data management.
5. To establish and maintain strong links with all Antarctic science research groups and Antarctic data management groups.

Summary of Meeting

John Manning (Australia) was elected Chairman of the Geospatial Information Group of Experts. Glenn Johnstone (Australia) as Chairman of the Geoscience Communication and Outreach Action Group (COG) will provide Executive Officer support to the group as part of his overall responsibilities in GSSG. It was resolved to continue with same structure for operations as previously employed in the WG-GGI. Coordinators were appointed for the two major WG-GGI programs:

- Geodesy (GIANT): John Manning (Australia)
- Geographic Information: Janet Thomson (UK)

Work Plans 2002-2004

The following work plans with responsibilities and general deliverables were developed

GIANT Program Work Plan 2002 - 2004

1. Permanent Observatories

Project Leader: Australia - [Mr John Manning](#)

Collaborator:

Goal: To develop an infrastructure of permanent geoscientific (ie. seismologic, geomagnetic, geodetic and gravimetric) stations to bring all individual networks to a common datum, and to provide geoscientific information for the global monitoring and analysis of natural earth processes.

Activities:

1. Extend the network of permanent observatories to include seismic and geomagnetic techniques which provide data for crustal deformation studies
2. Post details of all permanent sites on web site
3. Complete and publish cGPS base station specifications.
4. Record survey results of accurate local ties between collocated techniques and add to web site
5. Collaborate with other SCAR scientists to identify requirements for space geodetic sites

2. Epoch Crustal Movement Campaigns

Project Leader: Germany - [Prof Reinhard Dietrich](#)

Collaborators: Italy, Chile, Japan, China, Australia, USA

Goals:

1. To densify the geodetic infrastructure established from the permanent observatories; and
2. To develop a deformation model for surface movement vectors within a common Antarctic reference frame.

Activities:

1. Co-ordinate annual continental or regional epoch campaigns
2. Maintain orderly data archive and data access from these campaigns
3. Identify and coordinate integration of regional campaigns (eg. TAMDEF and VLNDEF)
4. Facilitate GPS connections to tide gauge bench marks
5. Deliver results to ITRF in conjunction with results from permanent observatories
6. Collaboration with appropriate IAG Antarctic Crustal Deformation Sub-Commission
7. Integration of solutions using ITRF guidelines
8. Provide project results to ANTEC

3. Physical Geodesy

Project Leader: Italy - [Prof Alessandro Capra](#)

Collaborators: Germany, Australia, Russia, USA, Japan, Canada

Goal: Compilation and analysis of physical geodesy data, for the development of a new high resolution Geoid for the Antarctic.

Activities:

1. Compilation of geodetic data and a gravimetric database (using Russian gravity data, ADGRAV database)
2. Investigate the ADMAP database and link into the Physical Geodesy database
3. Collaboration with IAG Antarctic Gravity project and SCAR Solid Earth Working Group
4. Analysis and validation of observations and database specifically BEDMAP, RAMP (AMM1 & 2), airborne radar profiles
5. Develop a simulation model & geoid model on a test area in North Victoria Land, in collaboration with IGES.
6. Coordinate with Project 8 on new satellite gravity data mission

4. Geodetic Control Database

Project Leader: Australia – [Glenn Johnstone](#)

Collaborator: Au

Goal: Maintain the master index for Antarctic positional control, including all levels of accuracy

Activities:

1. Maintain database and add in newly acquired data
2. Italy to provide further details on NVL points (photos, etc)
3. Collaboration with Steffen Vogt for KGI geodetic control
4. Australia (Henk Brolsma & John Manning) to help develop guidelines for photo identification (collaboration from Jerry Mullins) – October 2002
5. Publish guidelines for geodetic control identification on web site

5. Tide Gauge Data

Project Leader: Japan - [Dr Kazuo Shibuya](#)

Collaborators: Australia, China, Germany, New Zealand, Italy, Russia, USA (Amos), UK (Woodworth), other specialists as required

Goal: To consolidate the collection of and access to Antarctic tide gauge information

Activities

1. Revise information on the web to benchmark values and connections to IGS GPS observations sites
GPS stations
2. Gather information on history of establishment and operation of Antarctic tide gauges
3. [Research](#) and list all permanent and significant tide gauges established for hydrographic information and scientific studies. [Also available is [tide gauge instrumentation information](#) and [tide gauge reference information](#)]
4. List all known sea level determinations, dates and accuracy estimates for all significant tide gauges
5. Identify benchmark values and connections to GPS observations sites
6. Facilitate index data into the Geodetic data base
7. Post meta data on web
8. Produce 'best-practice' guidelines on establishment and calibrating on bottom mounted and acoustic type gauges in Antarctic conditions.
9. Investigate GLOSS guidelines and compatibility with Antarctic conditions

6. Atmospheric Impact on GPS Observations in Antarctica

Project Leader: Poland - [Dr Jan Cisak](#)

Collaborators: Germany, Italy, USA, Australia (IPS), Norway, China

Goal: To understand the ionospheric and tropospheric impact of the atmosphere on the quality of GPS observations in Antarctica

Activities:

1. Facilitate access to GPS observations from permanent GPS sites and SCAR GPS epoch campaigns for computation of atmospheric delay to GPS signals
2. Examine the correlation with magnetic storms
3. Research impact of differing levels of solar and meteorological activity on Antarctic GPS observations
4. Report on participation in international studies
5. Report on project findings
6. Continue collaboration with Iono_WG of IGS
7. Search for existing research (PhD) that is currently being conducted – may be able to assist with data analysis
8. Develop recommendations for future GPS observations to minimise impact on GPS network surveys

7. Remote Observatory Technologies

Project Leader: USA - [Mr Larry Hothem](#)

Collaborators: Japan (GSI), Australia, Italy, Netherlands (Swartz)

Goal: Identify technology and monitor developments for the deployment of geophysical and geodetic measurement sensors, and ancillary support equipment, at unattended remote (no existing infrastructure for power, shelter and communications) Antarctic localities.

Activities:

1. Power generation: monitor and report on developments and experiences in use of solar, wind, fuel cells, and other methods of power generation. Includes information on voltage regulation devices, voltage control devices, temperature sensors, and other ancillary devices used for power systems.
2. Batteries: compile information on type and make of batteries deployed at remote sites.
3. Data communications: monitor and report on developments for controlling operations and retrieving data from remote sites via satellite communication techniques, such as IMARSAT, Iridium, ARGIS, etc.
4. Engineering factors: investigate component heating requirements, static discharge hazards, benefits of redundant systems, solar mounting options, reliability of wind generators, etc.

5. Annual status report: summarize at end of each austral summer status, developments and experiences in deploying instruments and support systems at remote unattended sites in Antarctica, to include list of stations, names, locations, country sponsor, initial and ending deployment dates, specifics (if available) on hardware deployed, data communication systems (if any), and URLs for additional information. What worked and what failed (why). Provide report to Outreach and Communication Group by March 2003 and March 2004.
 6. Experiences in Arctic polar regions: monitor experiences in deployment of sensors at remote unattended sites. Include in annual status report.
 7. Information dissemination: provide for incorporating at Geosciences SSG website, URLs linking to information on "remote observatory technologies," that will include technical publications, projects reports, manufacturers, key contacts, etc.
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8. Ground Truthing for Satellite Missions

Project Leader: Germany - [Prof Reinhard Dietrich](#)

Collaborators: Italy, Australia, USA (U of Texas)

Goal: To ensure new satellite missions are integrated with the Antarctic geodetic system

Activities:

1. To identify and report on new satellite missions that will provide geodetic data or require geodetic support (eg. ICESAT, CryoSat, Envisat)
 2. Coordinate ground truthing campaigns in Antarctica with other known researchers
 3. Liaison with satellite mission principal investigators and ANTEC
 4. Facilitate the transfer of satellite mission data to the Antarctic community
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9. Geodetic Advice on positioning limits of special areas in Antarctica

Project Leader: Chile

Collaborators: Germany, Australia, USA

Goal: To provide advice to SCAR, through the Geoscience Standing Scientific Group on the geodetic aspects of protected area definitions.

Activities:

1. Undertake a scoping study on how limits are described for protected areas and the accuracy of the coordinates (September 2003)
2. Liase with former GOSEAC, CEP and other relevant groups
3. Identify difficulties / problems related to coordinates (September 2003)
4. Identify pilot project areas (September 2003)
5. Develop guidelines for surveying and describing limits (SCAR XVIII)

Geographic Information Program Work Plan 2002-2004

1. Place Names (SCAR Composite Gazetteer)

Project Leader: Italy – Prof Roberto Cervellati

Collaborators: UK, Germany

Goal: Provide an authoritative database of all Antarctic place names approved by recognised bodies, for reference by national Antarctic naming authorities, scientists and operators.

Activities:

1. Continue to collect descriptions and dates of approval for letters B to Z
2. Address non-responding countries via letter through former GGI representatives / SCAR delegates / COMNAP delegates / Place Names Committees
3. For new or modified entries include source of co-ordinates (Australia to suggest fields)
4. If countries supply names for submarine features advise GEBCO
5. Investigate links to existing gazetteers for place names above 60° South
6. Publish a "Supplement 2004" including all new information compiled since 1998
7. Remove SCOUT program from website
8. Prepare position paper on multiple names for SCAR XXVIII

9. Advise KGIS and Larseman Hills GIS projects on pilot studies related to establish common coordinates per SCAR Gazetteer feature using GIS
10. Address the resourcing of the SCAR Composite Gazetteer from two years on prior to SCAR XXVIII

2. Antarctic Digital Database (ADD)

Project Leader: UK – Mrs Janet Thomson

Collaborators: Australia, USA, Germany

Goal: Provide a SCAR standard small scale topographic GIS database, for use by scientists and operators, and contribute topographic data to global mapping initiatives.

Activities:

1. Australia to check coding for ice shelves / glacier tongues
2. Add Chinese / Lambert traverses for version 4.0
3. Italy to supply ITASE data for version 4.1
4. Release ADD 4.0 in August 2002
5. Release ADD 4.1 including bedrock contours from BEDMAP, improved elevation data derived from BKG ERS Altimeter DEM, and improved metadata in Decemeber 2002 (provided funding is available)
6. Get advice from other SCAR groups on northern limits for extension above 60°S
7. Workshop on extension above 60°S: To investigate northern limits and to involve relevant national data providers in the project
8. Identify data sources for extension above 60°S
9. Migrate the ADD to object oriented data model and create the Antarctic Map Server

3. Map Catalogue

Project Leader: Australia – Mr Henk Brolsma

Collaborators: UK, USA, Germany, Chile

Goal: To maintain a public-access catalogue of all Antarctic mapping products

Activities:

1. Ask relevant countries through former GGI representatives / SCAR delegates / COMNAP delegates to check existing entries and to add new or missing ones
2. Evaluate which countries will provide translation of catalogue interface into Spanish, French, and Russian (Australia to write explanatory notes first)
3. Provide a SCAR Map Catalogue start page
4. Implement a geographical mask search tool
5. Define additional fields if necessary
6. Evaluate inclusion of SCAR geological map catalogue (at BAS)
7. Link US and BAS thumbnails into the map catalogue
8. Request countries to provide thumbnail scans of their maps

4. King George Island GIS (KGIS)

Project Leader: Germany – Mr Steffen Vogt

Collaborators: Argentina, Chile, Brazil, Poland, China, Korea, UK, Uruguay

Goal: To produce an integrated geographic database for use by all countries, for use in multi-disciplinary applications.

Activities:

1. Continue obtaining and integrating data: high resolution topography for Eastern part of the island, thematic data
2. Evaluate available nearshore bathymetry data
3. Publish meta data on the Antarctic Master Directory
4. Maintain database, website and user's manual
5. Continue promoting KGIS among users / data producers (attend 3rd Scientific Coordinators Meeting on KGI, liase with CEP, CoMNAP and IAATO)
6. Maintain close links to related GIS projects on KGI
7. Organise KGIS workshop in March/April 2003 in Freiburg including participants from Argentina, Brasil, Chile, China, Czech Republic, Germany, Korea, Poland, Russia, UK, Uruguay (provided funding is available)
8. Continue contributing to the development for the SCAR spatial data standards

9. A UK-Germany pilot study on place names: propose common coordinates per SCAR Gazetteer feature using GIS (provided funding is available)
10. Link data into Cybercartographic Atlas (provided funding is available)
11. Enquire possibilities to establish mapserver

5. Spatial Data Standards

Project Leader: Australia – Mr Henk Brolsma

Collaborators: UK, USA, Germany, Chile

Goal: To provide a SCAR standard spatial data model for use in SCAR and national GIS databases.

Activities:

1. Continue developing the SCAR Feature Type Catalogue and the SCAR Spatial Data Model
2. Provide SCAR Feature Type Catalogue online for comments – finalise by end August 2002
3. Creation and incorporation of symbology
4. Investigate metadata / data quality requirements
5. Ensure compliance to ISO TC211 and OGC standards
6. TC211 “Standards-In-Action” symposium – presentation on SCAR FTC to TC211 meeting (Switzerland, 21 May 2003) – Steffen Vogt to attend and present current research.

6. National On-line Atlases

Project Leader: USA – Mr Jerry Mullins

Collaborators: Australia, China, Canada

Goal: To develop a distributed network of national Antarctic online atlas nodes linked to the Cybercartographic Atlas hub.

Activities:

1. Version 2 of US Antarctic Atlas (incorporating ADD V3.0) be made available online by end 2002
2. Build up a collaborative group for participation in the project
3. USA to provide Communications and Outreach Group a list of new satellite missions relevant to Antarctic geospatial information to be made available on the GGI website – October 2002
4. Keep group members informed on available imagery collections
 - contact for aerial photography collections – August 2002
 - details on what they have – September 2002
 - USARC provide scanned flight line indexes for web site - December 2002)

7. SCAR Cybercartographic Atlas of Antarctica

Project Leader: Canada – Prof D.R.Fraser Taylor

Collaborators: Australia, USA, China, Argentina, Chile, IHO, Poland

Goal: To provide an online Antarctic Cybercartographic Atlas

Activities:

1. Prepare a detailed technical framework for the atlas (December 2002)
2. Hold a workshop of key stakeholders (Ottawa, May 2003)
3. Continue development of the content of the Atlas (August 2002 – March 2003)
4. Contact key groups in the scientific standing groups and standing committees of SCAR to incorporate case studies for the atlas (August 2002 – March 2003)
5. Consolidate linkages with the key online nodes for the atlas and add new nodes as appropriate (August – December 2002)
6. Develop contacts with key information providers/users of the Atlas such as COMNAP, IAATO, etc. (August 2002 – March 2003)
7. Begin full implementation of the Atlas (January 2003)
8. Complete a working version of the atlas for demonstration at the XXVIII SCAR meeting, Bremen, Germany, July 2004

8. East Antarctica GIS

Project Leader: Russia – Mr Alexander Yuskevitch

Collaborators: Australia, China, Italy

Goal: To develop and finalise a proposal for GIS collaboration at a key site in East Antarctica.

Activities:

1. Australia to revise the Russian proposal and to take forward a regional GIS of Larseman Hills in cooperation with China and Russia
2. Circulate draft proposal for comment
3. John Manning to follow up with Russia on the regional geodetic control database
4. Propose common coordinates per SCAR Gazetteer feature using Larseman Hills GIS

9. IHO Bathymetry Proposal

Project Leader: Australia – Mr John Manning

Collaborators: Canada, New Zealand, IHO

Goal: Support the proposal for the production of a new International Bathymetric Chart of the Southern Ocean.

Activities:

1. John Manning to contact Hans-Werner Schenke regarding Ron Macnab and his involvement in the International Bathymetric Chart of the Southern Ocean

10. Grove Mountains ortho-rectified satellite image map

Project Leaders: E Dongchen and Henk Broisma

Collaborators: Australia, China

Goal: To prepare a 1:25 000 scale ortho-rectified satellite image map of the Grove Mountains.

Activities:

Activities:

1. Identify other information sources (eg. Geological information from China)
2. Identify existing maps
3. China to digitise existing topographic maps and develop a digital elevation model
4. Identify existing satellite imagery, ground control, connection between datums and topographic surveys
5. Determine medium and high-resolution satellite imagery to purchase
6. Australia to acquire high-resolution satellite image (Jan-Feb 2003)
7. Georeference and Ortho-rectify the imagery using existing mapping and ground control
8. Design and produce satellite image maps (dual language, Chinese/English)
9. Start on a compilation of a GIS for the Grove Mountains

Proposed Meetings 2002-2004

The Working Group proposes the following intersessional meetings in 2002-2004.

- Trans Antarctic Mountains Regional Coordinators meeting – Wellington, New Zealand – November 2002
- Antarctic Geodesy sessions at EGS/EUG/AGU - Nice, France – April 2003
- GI Technical experts meeting – Freiburg, Germany – April 2003
- Antarctic Geodesy sessions at IUGG – Sapporo, Japan - July 2003
- ISAES symposium – Potsdam, Germany – September 2003
- Antarctic Geodesy Workshop (AGS'03) – Ukraine – September 2003
- Place Names meeting – Rome, Italy – March 2003
- Cybercartographic Atlas symposium – Ottawa, Canada – May 2003
- Antarctic Geodesy sessions at EGU - Nice, France – April 2004
- XXVIII SCAR meeting – Bremen, Germany – July 2004
- East Antarctic Regional GIS meeting – Wuhan, China – November 2004

GIG Standing Resolutions

The previous WG-GGI Standing Resolutions were reviewed and updated.

Standards

1. That members will apply approved SCAR geodetic and geographic standards, specifications and guidelines in their national Antarctic programs.

Directories

2. That members will contribute all relevant geospatial information to SCAR through their National Antarctic Data Centres.

Information Exchange

3. That members will exchange and make freely available geodetic and geographic data, in accordance with the Antarctic Treaty. A minimum of two copies of maps, charts and other geographic publications shall be automatically distributed to the Antarctic Mapping Centres of the SCAR countries.

Control Points

4. That members will make ground control points, including photographic identifications, and tide gauge information available on the World Wide Web for use in other Antarctic mapping and research applications.

Geodetic Datum

5. That members adopt the International Terrestrial Reference Frame 2000 (ITRF2000) at an epoch of 2000.0 together with the GRS80 ellipsoid, as the geodetic datum for all Antarctic activities.

Web site

6. That a comprehensive web site outlining project activities, reports, contact details and links be maintained.

Global Programs

7. That SCAR supports all relevant global science programmes through the contributions of Antarctic geodesy and geographic information.

GIG Recommendations

GIG recommends that SCAR XXVII adopt the following recommendations - see end of document.

Funding Applications to SCAR 2002-2004

Applications for SCAR funding support were discussed and will be incorporated in the overall Geoscience Standing Scientific Standing Groups application.

John Manning
GIG Chairman

21st July 2002

ANTEC: Antarctic Neotectonics Scientific Research Programme

The ANTEC Scientific Research Programme promotes and coordinates multidisciplinary, multinational research relevant to Antarctic neotectonics.

The "Terms of Reference" for the ANTEC Scientific Research Programme are:

1. Oversee the ANTEC Science & Implementation Plan, including:
 - a. In consultation with international ANTEC science community, continue to review 'target sites' where deployment of geodetic and seismic stations and arrays and airborne, marine and field campaigns are required to best address neotectonic research objectives, updating plans as required based on accumulating data from current deployments.
 - b. Encouraging and coordinating installation of instruments at permanent sites and in regional networks of instruments (GPS, gravity, seismic) for focused studies in the target areas identified in the ANTEC plan.
 - c. Promotion of an "Antarctic Array" facility, charged with:
 - d. Facilitating the acquisition and sharing of instrumentation
 - e. Identifying logistic needs and coordinating deployments of remote observatories and field campaigns to maximize logistic resources
 - f. Advancing technological developments required for autonomous remote observatories and new measurement techniques, through information exchange and by seeking requisite support for development
 - g. Ensuring that protocols for data collection, archiving and distribution are meeting the needs of the research community.
 - Continuing liaison with SCAR and international research programmes with complimentary scientific aims to ANTEC.
 - Assisting information exchange about Antarctic neotectonics research activities, via a world wide web resource and an email list server.
 - Promoting 'living' compilations of accumulating neotectonics research results (seismicity, crustal motions, active faults, landscape chronologies, etc.) by convening working groups and producing web-based maps and databases.
 - Profiling Antarctic neotectonics research results via publishing thematic journal issues and synthesis volumes, and by scheduling thematic symposia at international scientific meetings on a yearly basis.
2. Promotion of scientific research opportunities and directions by:
 - Holding workshops and symposia to promote activity in promising research directions in neotectonics and geodynamics of Antarctica.
 - Encouraging new studies in relevant areas, such as stress determinations, tectonic geomorphology and landscape evolution (including new geochronological tools), and volcanology.

3. Report to the SCAR Executive and the SCAR Geoscience and Physical Science Groups on ANTEC activities, progress and plans.

ANTEC – WORK PLAN, 2003

Symposia

1. April, 2003: EUG-EGS-AGU : *Glacio-Isostasy and Neotectonics*
2. September, 2003: ISAES Potsdam: *Neotectonics - the SCAR ANTEC Programme*

Workshops

In conjunction with EGU-AGU 2003:

1. Advances in Modeling Glacio-Isostatic Adjustment
Goal: Develop numerical models to deal with lateral heterogeneity
Strategies:
 - Focus on post-glacial rebound
 - Bring in modellers with experience in extensional regimes and subduction zones
 - Integrate PGR and continental-scale stress modeling
2. Autonomous remote observatories
Goal: Exchange information on technological advances in power sources, real-time data transmission, and other requirements for deep-field instrumentation

In conjunction with ISAES-Potsdam 2003:

1. Antarctic Geologic Boundaries
Goal: to establish protocols for compilation of lineaments (potential geologic boundaries) from the extensive new aerogeophysical data sets and new satellite remote sensing data (magnetics, gravity, imagery), geological boundaries from rock outcrop, and fault maps from marine geophysical data.

Meeting of Scientific Research Programme

The primary group meeting will be held in conjunction with the ISAES meeting at Potsdam.

Seismic Coordination Activities

Improving coordination of Antarctic seismological research is a primary ANTEC focus for the next two years. A series of activities are planned:

1. Participate in Workshop "Structure and Evolution of the Antarctic Plate", sponsored by U.S. National Science Foundation, in March, 2003, Boulder, Colorado, USA, which will have a major focus on needs seismic infrastructure in Antarctica.
2. Development of AnSWeR, the Antarctic Seismology Web Resource, which will have two main functions:
 - a) A means of exchanging information and data between seismologists working in Antarctica or wishing to use data from Antarctic stations.

- b) A source of information on Antarctic earthquakes and earth structure derived by earthquake seismic methods.

We aim it to become the first source of earthquake-related information for both seismologists and the geoscience and glaciological communities as a whole. Dr. Anya Reading, Australian National University, will have primary responsibility for AnSWeR development.

3. Visit the main global seismological organization, IRIS, to establish coordination between the Antarctic Seismology Web Resource and the IRIS data archives.

Preparation of Publications

Special Volume: Contributions on Ice Sheets, Neotectonics and Sea Level
AGU Monograph *or* Special Volume of International Journal (decision in 2002)
Compilation of Papers from 2002 symposia
Editors: James & Jacka, Dietrich & Morelli

Update of ANTEC Web Resources

The established ANTEC web site (www.scar-ggi.org.au/geodesy/antec/antec.htm) will be updated with new information on current neotectonics-related research programs, bibliography, and more extensive descriptions of ANTEC objectives and activities.

ANTEC – WORK PLAN, 2004

Symposia

1. XXVIII SCAR – Bremerhaven, 2004: Neotectonics & Ice Sheets (interdisciplinary symposium)
2. Thematic symposium to be organized at Fall AGU meeting, December, 2004.

Workshops

1. Late 2004, Utah, USA: Penrose Conference: Geodynamics, Ice Sheets & Climate This major workshop is planned to highlight Antarctic neotectonic research within the context of global research on the feedback between tectonism and climate.

Meeting of Scientific Research Programme

The primary group meeting will be held in conjunction with the SCAR meeting at Bremen.

Seismic Coordination Activities

Continued activities, outlined above for 2003:

1. Coordination meeting of Antarctic seismologists, to be held in conjunction with Fall AGU meeting, December, 2004.
2. Continued development of AnSWeR, the Antarctic Seismology Web Resource.

Preparation of Publications

We plan a major contribution to the ISAES Symposium volume.

Scientific Research Programme on Subglacial Antarctic Lakes Exploration (SALE)

Terms of Reference (TOR)

- 1) Refine, expand and embellish the Cambridge 1999 workshop's scientific objectives.
- 2) Develop the critical requirements/criteria for lake(s) selection.
- 3) Provide scientific guidance and input to COMNAP deliberations on logistics and drilling technologies for subglacial lake entry and sample retrieval.
- 4) Develop a set of objectives for technology developments related to the science objectives as opposed to only entry and retrieval.
- 5) Consider and recommend organizational strategies/models for managing an international exploration program.
- 6) Delineate information gaps and the sequence or timing that is needed to progress toward the ultimate goal of lake entry and sample retrieval - are there milestones along the critical path and what are they?
- 7) Consider the environmental ramifications and how the Comprehensive Environmental Evaluation (CEE) and Environmental Impact Assessment (EIA) process needs to be applied for support of subglacial lake exploration and the role of other SCAR and Treaty bodies [Group of Specialists on Environmental Affairs and Conservation (GOSEAC), Committee on Environmental Protection (CEP)].
- 8) Devise a series of SCAR activities to facilitate and promote the exploration of subglacial lakes such as targeted workshops.
- 9) Be a proponent of subglacial lake exploration with National Antarctic Programs to garner the financial and logistical resources needed for the program.

Work Plan 2002-2004

Presented to SSG at Shanghai, China, July 2002

Year	Meetings of Committee	Community Outreach Efforts
2002	October 2002, in California in conjunction with NSF sponsored workshop FASTDRILL	
2003	April 2003 St. Petersburg, Russia	(1) Special Session EUG April, Nice (2) Special Session IASES (3) Special Session Fall AGU
2004	January 2004 Grenoble, France Final Meeting of committee to complete report to present to SCAR Science Committees SCAR Delegates CONMAP	

Age, Growth and Evolution of Antarctica (AGEANT) Action Group

Coordinator: Chris Wilson (University of Melbourne, Australia)

Background

A key geological problem in East Antarctica is distinguishing major crust-forming events in terms of their age and extent. Isotopic data combined with other geological approaches provides reliable data on crustal growth and deformation. A large amount of isotopic data has emerged over the last decade, but they are widely dispersed in the literature.

Aims

AGEANT aims to develop a web-based, interactive database for Antarctic isotopic and geochronological data and to encourage investigators to contribute to it and to participate in scientific research using the pooled data.

Workplan

1. Development and population of web-based database for isotopic data (2002-2004).
2. Special session at ISAES meeting, Potsdam, September 2003.

Permafrost Action Group – PAG

Coordinator: Wayne Pollard

Members: Ross Powell, RiSCC representative, Kevin Hall (IPA representative), plus 1 additional representative from the Antarctic permafrost community.

Background

Permafrost plays an important role in the evolution Antarctic landscapes and it is likely much older than Arctic permafrost. Permafrost research in Antarctica has been uncoordinated and lacking direction. The International Permafrost Association (IPA) has proposed to become "the relevant body advancing permafrost science in the Antarctic region" however there is also a need to link permafrost research with other work on Antarctic climate change and environmental management.

Aims

- 1) To assess (review) the state of permafrost science in Antarctica.
- 2) To identify gaps and priorities in Antarctic permafrost science.
- 3) To establish links with the broader permafrost community and put Antarctic permafrost into a global context.
- 4) To assess the potential impact of climate change on Antarctic permafrost.

Workplan

- 1) Constitute a small group of permafrost specialists (W.Pollard (coordinator), Ross Powell (Geoscience SSG), representative from RiSCC, K. Hall (IPA representative), plus another representative from permafrost community .
- 2) Organize a meeting at 8th International Permafrost Conference in Bern Switzerland, July 2003 (IPA), organize a workshop on Antarctic permafrost linked to the Potsdam ISAES Conference in September 2003
- 3) Prepare an "action paper" identifying Antarctic permafrost issues to delivered at SCAR 2004 in Bremehaven

Antarctic Climate Evolution (ACE) Science Programme Planning Group

Coordinators

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Background

It is recognised that the polar regions are more sensitive to climate change than lower latitudes and that Antarctica with its huge ice sheet is a major driving force for changes in global sea level and climate. Records of past changes in Antarctic climate and ice cover can be found in both the ice (last 0.7 Ma) and sediments (last 50+Ma). These show that rising atmospheric CO₂ levels even today are exceeding those found in ice cores, increasing interest in Antarctic climate and ice sheet behaviour in the more distant past. The new generation of General Circulation Models now provide a means of testing past climate and ice sheet scenarios for a range of boundary conditions such as topography and atmospheric CO₂ level. Interaction between geoscientists and modellers can improve the understanding of model boundary conditions and provide hypotheses for testing by field data. This interaction is necessary to improve the understanding of Antarctic climatic history and ice sheet behaviour on all time scales.

Aim

To advance understanding of Antarctic climate and glacial history through paleoclimate and ice-sheet modelling using fully integrated terrestrial and marine geological investigations on all time-scales. Outcomes may be used to provide a long-term perspective on global change in the Antarctic region for IGBP and IPCC as well as other sectors of the Antarctic science community.

Specific functions include:

- encourage and facilitate communication and collaboration among scientists by organizing workshops and symposia, sharing/compiling information, coordinating/planning laboratory and field operations
- advise community on the types of geoscience data required for modeling and critical locations (and ages)
- provide advice/assistance on technical issues of field, laboratory and modeling programs
- promote data access and sharing (SDLS, Antarctic Data Centers, World Data Centers) to facilitate and expedite data syntheses
- summarize and report results to community through workshops, symposia, websites, etc.
- formal report to be presented to SCAR after 6 years

Work Plan 2002-2004

Presented to SSG at Shanghai, China, July 2002

Year	Meetings	Reason
2002	Special session at AGU (Dec 2002)	Community outreach for project
2003	Planning meeting (post AGU 2002)	Establish an Implementation Plan for the group
2004	Modeling Workshop (February, 2004) Data-mining Workshop (Pre-SCAR, Bremen, July 2004)	To establish the modeling research group and formulate a plan To establish current geological, geophysical, oceanographic and glaciological data available for constraining models

Communication and Outreach Action Group (COG)

Background

A new Communication and Outreach Group was formed as a result of the SCAR restructure. Glenn Johnstone (Australia) was appointed as Coordinator of COG and asked to identify a terms of reference, a proposal on what funding the Group would require and develop a forward work plan. This Action Group has grown out of the previous WG-GGI's Outreach Program which has been expanded to include all the communication requirements for the Geoscience Standing Scientific Group (GSSG).

COG Terms of Reference

1. To gather, collate and disseminate geospatial and geoscientific information relevant to GSSG members through electronic communication methods (website and listservers).
2. To establish and maintain an up-to-date website for the GSSG containing information on member contact details, observatory details, reports from meetings / symposia etc., links to SSG 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 SSG activities

Work Plan 2002-2004

1. Electronic Communication

Project Leader: Glenn Johnstone

Goal: To assist the Standing Scientific Group in achieving its objectives.

Activities:

6. Expand and maintain website for GSSG and host at Geoscience Australia
 7. Amalgamate existing web resources (such as the ANTEC site) into the new site
 8. Maintain listservers
 9. Maintain the list of contacts for the exchange of map, chart and geographic publications
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2. Publications

Project Leader: Glenn Johnstone

Goal: To publicise GSSG activities.

Activities:

9. Publications
 - Develop a bibliography of key GSSG papers
 - Encourage Action Groups and Projects to publish their work in a timely manner
 10. Produce support materials for Antarctic geoscience related conferences, workshop, symposia etc on GSSG activities.
 11. 'Best practice' guidelines on observatory related activities and data management
 12. Maintain metadata for GSSG products in the AMD
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3. Liaison

Project Leader: Glenn Johnstone

Goal: To establish and maintain communication between GSSG members, SCAR and related external bodies.

Activities:

7. Continued liaison at a working level with key SCAR and non-SCAR
 - Life Sciences, Physical Sciences, Data and ATS Standing Committees
 - COMNAP (STADM/JCADM)
 - CEP
 - Relevant IUGG groups
 - Global Map, Digital Earth, GSDI
 - ISO TC211
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Glenn Johnstone
COG Coordinator

21st July 2002

Recommendations

SSG on Geosciences recommends that SCAR XXVII adopt the following recommendations.

Amendment to the existing recommendation (SCAR XXVI-2)

1. Place Names

Noting that the SCAR Composite Gazetteer of Antarctica (CGA):

- has been published in March 1998 by the SCAR Working Group on Geodesy and Geographic Information (WG-GGI);
- contains names data from twenty-two SCAR member countries and the International Hydrographic Organisation (IHO) / International Oceanographic Commission (IOC);
- comprises around 34,165 entries for 17,097 features, with about 10% of features having two or more entirely different names.

Also noting the increasing importance being placed on names for operational and research purposes there is a requirement for a greater accuracy of the coordinates

Considering that, in the interests of both scientific clarity and operational safety, the general principle of 'one name per feature' should apply for all new feature names;

The Geospatial Information Group of Experts (GIG) *recommends* to SCAR that:

National Committees, directly or through their national Antarctic naming authority:

10. refer to the CGA in considering all proposals for new place names;
11. avoid adding new place names to features already named;
12. submit all new approved place names to GIG for inclusion in the CGA;
13. provide existing data to the GIG for inclusion in the CGA.

Amending existing recommendation (SCAR XXVI-3)

2. Bathymetric Data

Noting that the lack of bathymetric information in large areas of the Southern Ocean is a limiting factor in bathymetric mapping and nautical charting;

Noting the initiative from the IHO for an improved International Bathymetric Chart for the Southern Ocean (IBCSO)

Further noting the key role of the IHO Data Center on Digital Bathymetry (DCDB) located at the US National Geophysical Data Center (NGDC) in Boulder, CO, and the efforts of the IOC/IHO organizations for updating and maintaining the General Bathymetric Chart of the Ocean (GEBCO);

Considering the need for bathymetric maps for the morphological interpretation of the sea-floor structure and general oceanographic studies, the geo-location of scientific data, and the general requirements for precise nautical charts to ensure the safety of navigation in Antarctic waters;

The GIG *recommends* that:

1. SCAR supports the acquisition of echo-sounding data on all vessels operating in Antarctic waters and the delivery of the gathered measurements to the IHO DCDB for further use in bathymetric mapping;
2. wherever possible, vessel transits should be planned through oceanic regions where few bathymetric data exist in order to gather additional bathymetric information.

Amending existing recommendation (SCAR XXVI-11)

3. Geodetic and Geographic Information

Noting the Antarctic Treaty Article III (1c) requirements regarding data exchange,

Recognising that the information products produced by the SCAR Geoscience Standing Scientific Group are all derived from the work of National Committees and Programmes:

SCAR *recommends* that National Committees request National Programmes to provide continuing access for all SCAR members to fundamental geodetic and geographic information, including:

- geodetic observations and databases;
- geodetic control point and tide gauge records;
- remotely sensed data (including satellite imagery and aerial photography)
- topographic and bathymetric data;
- and place names data.

Amending existing recommendation (SCAR XXVI-12)

4. Airborne Gravity Data for Geoid Computation

Noting that determination of a high resolution geoid in Antarctica benefits research of the ice density of the Antarctic ice sheet, determination of surface elevation relative to mean sea level, and the calibration and validation of satellite missions;

Recognising that there is a major gap in gravity data required for the computation of a high resolution geoid in Antarctica;

Considering the current lack of gravity data, the need to acquire gravity data at close intervals (optimally spaced between 10 and 50 km), that new satellite gravity missions will leave a gap from 82 to 90 degrees south, and that airborne gravity observation is considered the most cost effective and reliable method for collecting data;

SCAR *recommends* that National Committees request National Programmes:

- support a scientific programme of airborne gravity to cover gaps in Antarctica gravity data; and
- encourage all researchers to coordinate their efforts in Antarctic gravity data acquisition, in particular airborne gravity data, and to provide such data to the SCAR Geoscience Standing Scientific Group for incorporation into a physical geodetic database of Antarctica.

New Recommendations

5. Geodetic observations at remote locations

Recognising the technological advances being made in low power operation, data storage capacity and data communication at remote Antarctic sites

The Geospatial Information Group of Experts:

Recommends that National Committees, where possible, place long-term GPS observatories on remote bedrock features (as identified by the SCAR ANTEC group – www.scar-ggi.org.au/geodesy/antec/proposed_gps.htm) to provide information on the current tectonic motion of the Antarctic plate.

6. King George Island Geographic Information System

Noting the SCAR recommendation XXVI-6 concerning rationalization of scientific activities on King George Island the Geospatial Information Group of Experts

Recognising that a Geographic Information System for the whole island has been produced and is now available on the internet

Recommends that countries with program activities on King George Island should make use of this integrated system for science activity, environmental planning and logistic operations.

And *further recommends* that National Committees, through their National Programmes, continue providing spatially referenced data to the GIS for the mutual benefit of all National Programmes with activities on the island.