

GeoReach

Newsletter from the
SCAR Geoscience Standing Scientific Group



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2. Geoscience contributions to the International Polar Year 2007.
3. Ongoing management of geophysical data. What structures do we need? How can we get JCADM to help?
4. Marine acoustics - an update on how is this issue is impacting national programs.

Other agenda items are most welcome. Send them to me (phil.obrien@ga.gov.au). There are 2 rooms booked so there is scope for us to break up into Action Groups and Expert Groups and any other sort of group we like.

An important meeting also scheduled for Potsdam is the Seismic Data Library group, convened by Alan Cooper. The SDLS is increasing in importance because of the issues surrounding anthropogenic noise in the marine environment so I would encourage everyone interested in marine geophysics to come.

Following ISAES at Potsdam is the Third Antarctic Geodesy Symposium in Lviv, Ukraine. The First Circular is available on our web site:
www.geoscience.scar.org/geodesy/ags03/

On a sad note, many of us have been shocked by the tragic death of Kirsty Brown who was killed by a leopard seal while diving near Rothera. Our sympathies go to her family, friends and colleagues in the British Antarctic Survey and to all those who knew her through her work in the UK and Australia.

Yours truly

Phil O'Brien
Chief Officer

From the CO's Desk

Dear Geoscience Antarcticans,

The ISAES meeting in Potsdam is drawing closer. Apart from a week of great science and the usual socialising, it is an important chance for our SG to meet and discuss some important issues. Firstly, I have received confirmation that we have 2 meeting rooms on the 6th and 7th September at the "Telegrafenberg". I have several items I think should be discussed. They are:

1. Report on SCAR activities and operation of the new SG structure.

Acoustics Report Update

Dr. David Walton has compiled an Information Paper to CEP VI at XXVI ATCM - concerning the current situation with regard to the report of the SCAR workshop on Marine Acoustic Techniques in the Antarctic Environment. The report comments on input from the German ATCM delegation and the proposed SCAR actions.

According to the paper the SCAR actions are as follows:

1. SCAR has now made the report of the workshop more widely available, by posting it on the SCAR web site.
2. SCAR has noted firstly that there have been further incidents elsewhere in the world involving the death of marine mammals and secondly that this is an active research field in which new data are becoming available.
3. SCAR has recommended to all its National Committees that they follow the practices outlined in the Recommendations from the Cambridge workshop until anything more authoritative is provided.
4. SCAR has also established an international Action Group of specialists to consider the comments from Germany, any new incidents since the workshop, new research data and the Berlin workshop report when it is available.
5. SCAR intends to provide further information to the CEP in due course on the effects of acoustics on the Antarctic marine ecosystem.

Dr Walton has asked for proposed membership of the Action Group, (specifically from those SSG's headed by Phil O'Brien and Steven Chown).

Further information and a copy of the report can be found on the [CEP web site](#).

GIG News

Summary from EUG meeting, Nice, France, April 2003

A number of Antarctic papers and posters were presented and informal meeting of the GIANT program members were held. This resulted in consideration to initiate two new projects

- A study group to examine the establishment of a high precision Antarctic

reference frame so that millimetre movements of geological features can be more easily computed from on a continental wide geodetic observations.

- A study group to develop a geodetic project for the next IGY proposals to establish a geodetic infrastructure on remote rock features leading to horizontal movement vectors from GPS observations.

The need to have a Principal Investigator from the group involved in the upcoming [GOCE program for Antarctic Gravity applications](#) was identified.

GIANT field activity summer 02/03

Italy had a very successful season establishing and extending geodetic infrastructure in Northern Victorian land and reoccupying ties to the US TAMDEF project to the south. The two projects will be integrated in a geodetic computation.

USA reported partial success with the remotely operating sites in the Transantarctic Mountains at Fishtail Bluff, Mt Fleming and the coastal site at Cape Roberts.

New Zealand upgraded their long running tide gauge at Cape Roberts and the tide gauge at Scott base. Sea level calibrations were undertaken at both tide gauge sites.

Australian and German geodesists cooperatively participated in the [PCMEGA](#) expedition to the Southern Prince Charles Mountains - 22 sites were occupied with GPS and a DORIS beacon was deployed for some time on the Lambert Glacial stream. Extensive aeromagnetic and aero-gravity was flown over some 30 000 line kilometres by the Geophysical personnel. Ground gravity was observed at 23 sites. Tide gauge calibrations to sea level were carried out at Davis and Zhongshan bases.

ISO TC211 Plenary meeting and GI standards in action workshop

The SCAR representative to ISO TC211 is Mr Paul Cooper, from the British Antarctic Survey. The ISO TC211 representative to SCAR is Mr Larry Hothem from USGS. The following is a report from Paul Cooper on the last TC211 meeting:

"The 16th Plenary Meeting of the ISO TC211 took place in Thun, Switzerland, on 22-23 May 2003. It was preceded by working group meetings on 19-

20 May and by a "Standards in Action" workshop on 21 May. Paul Cooper attended these meetings as the liaison between SCAR and TC211, and also as an expert on Project Team 19136.

Project Team 19136 is concerned with harmonizing the OpenGIS Geographic Markup Language (GML) standard with the TC21 suite of standards, in order that GML itself will become an ISO standard, not merely an industry standard. The project is well under way, and the next milestone will be the creation of what is known as a "Committee Draft" of the proposed ISO standard later this year. The standard is based on version 3 of GML, and supports topological structuring of data. Once a Committee Draft has been created it will pass through the Draft International Standard and Final Draft International Standard stages before being finally adopted as ISO 19136. As part of this progress, I have taken on the task of harmonizing 19136 with the Draft International Standard 19112, which has the daunting title "Spatial referencing by geographic identifiers", but which in fact means things like placenames, zip-codes and post-codes! I would be pleased to hear from anyone who has a view on this matter, but please note that the deadline is mid-July. Those who are interested in change mapping may be interested to learn that a paper was presented on temporal topologies, and if adopted, this will mean that GML is able to express temporal relationships as well as purely spatial relationships.

The "Standards in Action" workshop was well attended, attracting people from both the technical workshops preceding it and the plenary sessions succeeding it. It was, by and large, a presentation of excellent work being done by agencies active in cadastral or national infrastructure mapping. Steffen Vogt gave an excellent presentation with the title "Standardizing Antarctica", which was very well received.

The plenary session on the final two days was a formal meeting, and as SCAR does not have voting rights I was there primarily as an observer. During the meeting I gave a brief report on SCAR activities relevant to standards. A series of resolutions were passed, but the one that is probably of most interest to the Antarctic community is resolution 249, changing the scope of project 19126. The full text of the resolution is at <http://www.isotc211.org/opendoc/211n1451/211n1451.pdf>, but the gist is that 19126 is becoming more generic in its scope and will provide profiles for implementing Feature Catalogues (19110) and registers for Feature Catalogues (19135).

The meeting of course had a lighter side, including a reception by the local council of Thun in a mediaeval town hall – the wine was especially welcome, as we had just had an hour and a half's walking tour of Thun, which is quite a hilly town. And on the first day many people were disconcerted to find that a standard European plug would not fit in the Swiss extension leads provided by the hotel – the local electrical supply shops must have done a roaring trade in suitable power leads! The value of standards was proved immediately – lets hope that GIS can do a better job than the domestic electricity industry."

Paul Cooper
British Antarctic Survey

TIGA solutions

The International GPS Service (IGS) has set up a pilot project to utilise existing GPS data that has been tied to a local tide gauge to assist in defining an absolute sea level datum. The routine computation of changes in the absolute sea level datum will be an important contribution to climate change studies. This project is known as "GPS Tide Gauge Benchmark Monitoring" or TIGA.

Australia has submitted global solutions to TIGA that uses continuous GPS data from all global sites located in the vicinity of a tide gauge. This includes details for Antarctic sites for the period 1995 to 1998

- Mawson
- Davis
- Casey
- McMurdo
- Higgins
- Syowa
- SANAEIV
- Dumont d'Urville

Data is being processed for the above sites from 1998 to 2003 and the following tide gauge sites will also be added when data is made available.

- Palmer
- Terra Nova Bay
- Cape Roberts
- Zhongshan

Upcoming Activities - prior to XXVIII SCAR

Global Map Forum 03

The [Global Map Forum 2003](#) was held in conjunction with the 16th United Nations Regional

Cartographic Conference for Asia and the Pacific conference in Okinawa Japan 12-15th July 2003.

SCAR has submitted a joint data set for the whole of Antarctica to this global project and will attend the forum to discuss the tight specifications (for example, it is difficult to meet the vegetation overlay requirement). There are also some issues surrounding the way in which the Antarctic data will be shown. The current Global Map data model does not allow for polar stereographic projections to be used to display the polar regions within the dataset. The use of the polar stereographic projection would allow the whole of the continent to be shown contiguously rather than the current latitude/longitude projection which breaks the continent at the 180^o point.

[P.S. John Manning reports that Global Map has accepted the submitted dataset, as produced by BAS, and it will be released in the next few months.]

Cybercartographic Atlas Symposium, Ottawa, 2003

The CAAP proposes to have a workshop for interested participants to examine a number of issues including:

- the user needs analysis process
- the development of a prototype model - which will be demonstrated at the Science meeting of XXVIII SCAR in Bremen.

Further details about the timing and location of the workshop are currently being developed.

JCADM 7 meeting

Glenn Johnstone participated in the JCADM 7 meeting in Brussels, Belgium from 30 June - July 4. He gave 2 presentations to the meeting - one on general GSSG activities of interest to JCADM members and the second on more specific GIG activities and where there maybe scope for joint or collaborative work between JCADM and GIG.

Glenn reports that the meeting was well attended, with a number of new JCADM members participating. It was very useful to have GSSG representation at the meeting - both through Glenn and Peter Pulisfer from Canada (talking about the Cybercartographic Atlas). It gave JCADM members a chance to understand more about the activities being undertaken by the

Geosciences SSG and for us to see what JCADM are doing.

Glenn would like to thank the Belgium [Federal Office for Scientific, Technical and Cultural Affairs \(OSTC\)](#) for support to attend the meeting.

Documents from the JCADM 7 meeting are available from the [JCADM web site](#).

Antarctic GIS workshop - Wuhan

A specialist geographic information event (similar to the [2nd International Antarctic GIS Workshop](#)) is being considered for sometime in May 2004. The Chinese Antarctic Centre of Surveying and Mapping at Wuhan University and Prof E Dongchen have very kindly offered to host this meeting.

Further details about the 3rd International Antarctic GIS Workshop will be circulated on the GEOSCI-L listserv when they become available.

NZ Antarctic GIS workshop

A specialist geographic information workshop on Antarctic GIS was held in mid-July in Christchurch, New Zealand. The following dot points may be issues of interest to GSSG members. [My thanks to Michelle Finnemore at Gateway Antarctica for providing the information].

- The [Antarctic aerial photo catalogue](#) is now set up and is available on-line. A high number of the photos have been scanned. Flight line data and low resolution images are available via the web page and are part of the Gateway Antarctica Antarctic GIS. More photos will be added to the on-line collection as and when required and when time and budgets permit.
- To date 1048 Antarctic maps from the Antarctica New Zealand collection have been catalogued and filed (there are approximately 250 more to catalogue). The catalogue is available to view through the University of Canterbury Library Search system (PAC at www.library.canterbury.ac.nz). The collection is a reference-only collection and the maps can be viewed by anyone at the University of Canterbury Library. Once the cataloguing is complete the corner points of each map will be entered into the Gateway Antarctica Antarctic GIS.

- The National Institute of Water & Atmospheric Research ([NIWA](#)) have done wide beam surveys in the Ross Sea Region (RSR), for example around the [Balleny Islands](#). NIWA is also generating a tidal model of the RSR area.
- A number of charts recently produced by LINZ in the RSR, were presented:
 - Cape Adare to Cape Daniell, 1:200,000, NZ149008, 2003.
 - Possession Islands, 1:60,000, NZ149007, 2003.
 - Cape Adare and Cape Hallett, 1:50,000, NZ149006, 2003.
 - Ross Sea, 1:2,000,000, NZ14900, 1998.

[All of the above charts will be catalogued and added to the reference collection at Gateway Antarctica.]

- The [LINZ New Zealand Chart Catalogue](#) is available on-line.
- A representative from the NZ Institute of Geologic and Nuclear Sciences ([GNS](#)) was at the meeting. Primarily, GNS is interested in the geologic mapping of Antarctica and particularly in the Dry Valleys region, however GNS may be branching out from the Dry Valleys region in the future.
- GNS is currently involved in Antarctic projects such as [ANDRILL](#), [Tectonics of the Transantarctic Mountains](#) and [VALMAP](#) (Valleys Mapping Project 1:50,000).
- A print out of the Dry Valleys Geologic data was presented to the group.
- Version 2 the [US Antarctic Atlas](#) has now been released and Version 3 will be available by end of the year. Version 3 will move to ARCIMS to take advantage of the US National Map programme capabilities ("clip and strip" enabled).
- The LIDAR database (collected summer 2001/2002) is almost fully edited. [Interim data is available](#) for download from the USGS Antarctic Atlas site. The final data files will replace this when they are complete. The data covers portions of the Dry Valleys, Royal Society and Convoy ranges, White Island and Ross Island.

ANTEC News

Report on the Workshop on the Structure and Evolution of the Antarctic Plate (SEAP)

The SEAP workshop took place in Boulder Colorado, 3-5 March 2003. It was attended by a broad range of seismologists, other geophysicists, geologists and glaciologists with the aim of discussing scientific goals and technical challenges related to expanding our knowledge of the Antarctic continent by seismic means. The international community was well represented with contributions from scientists of many nations. At the centre of discussions was the concept of a major new network of Antarctic permanent seismic observatories. To this was added a second group of portable seismic stations to be deployed across the whole continent in sequence, over a decade or more, recording seismic ray-paths that will image the continent in greater detail than can be achieved with permanent observatories alone. In many cases it would be possible to co-locate seismic stations with GPS and other geophysical data acquisition. An active source seismic facility, to record detailed rock, sediment or ice structure at selected locations, was also discussed.

There is little doubt that a major seismology programme, with substantial international contribution and collaboration, is the preferred way forward in addressing the outstanding tectonic and geodynamic questions concerning the Antarctic continent and surrounding ocean. The scientific goals and optimum station locations are being finalised with considerable input from the ANTEC (Antarctic Neotectonics) Scientific Programme Planning group. A proposal will be generated for submittal to the United States National Science Foundation and is likely to include many international collaborators. ANTEC will help to coordinate this collaborative effort. Potential collaborators are encouraged to express their interest to Dr Anya M. Reading (anya@rses.anu.edu.au) and the SEAP organising committee (anquetil.colorado.edu/seap2003/committee.html)

ANTEC at EGS/EUG/AGU Meeting in Nice, April, 2003

There were several interesting sessions at the Nice meeting on topics related to Antarctic neotectonics, including a symposium sponsored by the ANTEC group entitled *Glacio-Isostasy and Neotectonics*, convened by Clark Fenton, Robert Muir-Wood, and Anya Reading. The aim of the session was to bring together researchers working

in both currently and formerly glaciated regions in order to examine the current level of understanding of glacio-isostasy and its impact on crustal tectonism. The session focused on contemporary observations and models, and how they can be used to understand both prehistoric neotectonic activity and to refine estimates of future tectonic behavior of glaciated regions. Contributions from the fields of glaciology, crustal rheology, seismology, geodetics, neotectonics, paleoseismology, and geomorphology are sought

A special volume of the *Journal of Geodynamics* stemming from the Nice sessions is being coordinated by Georg Kaumann, Patrick Wu and Anya Reading, focused on topics of post-glacial rebound modelling, glacially-induced seismicity, geodetic signatures of PGR and modern tectonic motions, and crustal structures related to PGR-induced flexure. Anyone interested in providing a contribution to this volume on ANTEC-related topics should contact Dr. Anya Reading as soon as possible (anya@rses.anu.edu.au).

ANTEC-sponsored Thematic Issue of *Global and Planetary Change*

A substantial special volume of this journal, edited by Tom James, Reinhard Dietrich, Jo Jacka and Andrea Morelli, has been developed from contributions to several ANTEC-sponsored symposia and workshops in 2001 and 2002. Twenty-five contributions cover topics including neotectonic studies related to ice sheets and glaciers, Antarctic seismicity and structural geology, and Antarctic glaciology. The review process is in progress with final submission of revised manuscripts to Elsevier in the August-September time frame.

ANTEC at ISAES

ANTEC is a major theme of the International Antarctic Earth Science symposium to be held in Potsdam, Germany, 8-12 September, 2003. Over 20 oral and 20 posters have been submitted to the ANTEC theme for the meeting. The ANTEC group is hosting an information meeting in conjunction with the Potsdam meeting (time and place to be announced shortly), and will have informational materials on ANTEC science programmes to distribute. Major topics of discussion will include a major ANTEC-coordinated geodetic and seismic deployment as part of the 2007-08 International Polar Year activities, and proposing ANTEC as a Scientific Research Programme of SCAR in 2004.

The details of the ANTEC meeting at Potsdam are as follows:

Reception and information meeting, Sunday 7th September 1700 to 18.30 at the AWI research unit located at the "Telegrafenberg" (the science campus "Albert Einstein") in the Konferenzraum room no 115.

AGEANT News

Preparations are being made for a discussion session of AGEANT's role at the 9th ISAES in Potsdam, September 2003. This follows discussions held during the [PCMEGA](#) (Prince Charles Mountains Expedition of Germany and Australia) in January-February 2003 and the [REVEAL](#) (Remote Views and Exploration of Antarctic Lithosphere Workshop meeting in Denver, August 2002).

The foreshadowed discussions at the ISAES include the following subjects-

- Developing links and maintenance of common geochronological databases e.g. links to the Geoscience Australia database such as "[OZCHRON](#)". A suggestion for an AGEANT website was made with links to such databases. It is proposed to have a mock-up version available at the 9th ISAES conference in 2003 for discussion.
- Compilation of comparable tectonic features and geochronological regions within continental blocks. Dr E Mikhalski (VNIIOkeangeologia, St Petersburg, Russia) was initiating an example from the Prince Charles Mountains, which will be discussed at the 9th ISAES conference in 2003.
- Integrate geophysical initiatives into continental tectonics, again links to a web site have been suggested.
- Establish the thermal evolution of the continental crust
- Understand the nature of Rodinia and Gondwana reconstructions and it was suggested there should be an interaction between AGEANT participants and the setting up of a new IGCP program. A report will be made at the 9th ISAES conference in 2003 on progress.

ACE News

ACE is a new, international research initiative to study the climate and glacial history of Antarctica through palaeoclimate and ice sheet modelling

investigations, purposefully integrated with terrestrial and marine geological and geophysical evidence for past changes.

The outline bid for ACE was submitted to SCAR following an ACE workshop on palaeoclimate modelling, Amherst, USA. Our website was launched in July 2002 (www.ace.scar.org), maintained at the University of Massachusetts by Robert DeConto. A workshop report from the Amherst meeting is available from this site (www.ace.scar.org/wkrpt.pdf). In December 2002 ACE held a full day's session at the Fall AGU meeting in San Francisco, USA. A further meeting was held at the EGU/AGU Spring meeting in Nice, France, in April 2003.

Although ACE has only SPPG status, its scientific programme is already underway, with the first two papers directly related to the ACE science plan published in *Nature* in January 2003 (DeConto and Pollard, 2003a; Barrett, 2003). Furthermore, a special volume of *Global and Planetary Change*, comprising papers presented at the Nice EGU meeting, is currently in progress (edited by Fabio Florindo).

The full ACE proposal has been completed, thanks in great part to an editing meeting held in Nice after the EGU, and was submitted to the SCAR Executive in May 2003 for consideration at the Executive meeting in July 2003.

Barrett, P. 2003. Cooling a continent. *Nature*, 421, 221-223.

DeConto, R.M., Pollard, D. 2003a. Rapid Cenozoic glaciation of Antarctica triggered by declining atmospheric CO₂. *Nature*, 421, 245-249.

Upcoming meetings

- [International Symposium on Antarctic Earth Sciences \(ISAES\)](#) – Potsdam, Germany – September 2003
- International Hydrographic Bureau - Antarctic Hydrographic Committee meeting, Monaco, 08-10 September 2003. Contact [Captain Hugo Gorziglia](#), for further information.
- [Fall AGU meeting](#) in San Francisco, 8-12 December, 2003
- [32nd International Geological Congress](#) International Union of Geological Sciences, 20 - 28 August 2004, Florence, Italy

- International Symposium on the Geology and Geophysics of the Southernmost Andes, the Scotia Arc and the Antarctic Peninsula (GeoSur 2004), Buenos Aires, 22-23 November 2004

Next Edition

We would ask for your contributions to the next edition on:

- News items
- Field work/workshop reports
- Reports from leaders of Action Groups, the Expert Group, Scientific Research Programmes and Scientific Programme Planning Groups
- Diary events

Details should be sent to Glenn Johnstone <glenn@glennjohnstone.freemove.co.uk>.

The deadline for contributions to the final edition for this year is:

- Vol. 2 No. 4 - Monday 20 October 2003