

GeoReach

Newsletter from the
SCAR Geoscience Standing Scientific Group



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From the CO's Desk

I am looking forward to seeing as many of you as possible at our Business meeting in St Petersburg on Sunday 6th and Monday 7th July. The full agenda is sent as a separate email which I hope you have received. We have a full agenda with some break out sessions for Action Group meetings which are open to all GSSG attendees. National representatives are asked to come with a brief written report of their Geoscience activities over the past 2 years with, if appropriate an indication of future plans. The current GSSG officers will be standing down after this meeting and ask that you consider suitable nominations for consideration on Monday 7th.

GSSG Office Bearers 2007-2008

Chief Officer:

Prof Alessandro Capra
University of Modena and Reggio Emilia , ITALY.

Deputy Chief Officer:

Prof. Ross D. Powell
Northern Illinois University, UNITED STATES

Secretary:

Prof. Bryan Storey
Gateway Antarctica, University of Canterbury, Christchurch,
NEW ZEALAND

SCAR News

The March edition of the SCAR Newsletter is now available to view on the website at

<http://www.scar.org/news/newsletters/issues2008/mar08.html>

Open Science Conference

The second circular for the SCAR/IASC open Science Conference is now available on the SCAR website at

<http://www.scar.org/>

GSSG News

Business Meeting

Our GSSG Business meeting will be held on Sunday 6 July, 9am, Room A2 Petrodvovets Hall, St Petersburg and Monday 7 July 2.00pm, Room A2 Petrodvovets Hall, St Petersburg. An agenda has been sent as a separate email attachment.

IUGG

This is to draw your attention to the latest copy of the IUGG E Journal (Volume 8, No. 4, 1st April 2008) This short, informal newsletter is intended to keep IUGG Member National Committees informed about the activities of the IUGG Associations, and actions of the IUGG Secretariat. Past issues are posted on the IUGG web site

<http://www.iugg.org/publications/ejournals/>.

Contents:

- IUGG Annual Report for 2007.
- News from the International Council for Science (ICSU).
- News from the International Polar Year (IPY).
- News from the Electronic Geophysical Year (EGY).
- Report on the Workshop "A systems Analysis Approach to health and well-being in the urban environment".
- IUGG-related meetings occurring during April - June 2008.

Antarctica, A keystone in a changing World

Is a collection of 338 short research papers, extended abstracts, and short summaries presented at the 10th ISAES. Eleven overview papers are printed in a book that has been published. You can see and download the keynote papers in the book at the NAP website:

http://www.nap.edu/catalog.php?record_id=12168#orgs

and soon in the Online Proceedings

<http://pubs.usgs.gov/of/2007/1047/>.

Evolution and Origin of Planet Earth

There is a new publication about evolution and the origin of the planet earth with interesting new discoveries, which shows the biogenous origin of planets in all probability. You can open this link to see more at http://www.bod.de/index.php?id=296&objk_id=125264. If you don't like to open any links you can find it in Google. Title "The Planet-Embryo"; written by S. Eva Nessenius."

The Paleomap from Professor Christopher Scotese was evaluated in a new way with the knowledge about geobiology and astronomy.

Mesozoic Marine Biotas from Western Gondwana

The special issue of Geological Journal 42 (2) of April 2007 devoted to the "Mesozoic Marine Biotas from Western Gondwana: Evolution and Palaeobiogeography" is available on line at <http://www3.interscience.wiley.com/cgi-bin/home/1903>. This special issue represents the follow-up of the Symposium S-9 of the Gondwana 12 Symposium held in Mendoza, Argentina, in November 2005. Most of the contributions in this special issue deal with the marine biota from Patagonia, especially from the Neuquén Basin, famous in the Southern Hemisphere for its extensive outcrops and very well-preserved fossils. The Cretaceous/Paleogene boundary is the Gondwana reference not only for phylogenetic investigations but also for biostratigraphic and palaeobiogeographic studies. Thus, both the specific and the more extended and broad papers are substantial contributions that shed light on the understanding of the biota of the southern continents.

GSSG Structure

The Standing Scientific Group on Geosciences (SSG-G) comprises the following groups approved at XXIX SCAR in 2006:

Action Groups (AGs):

Marine Acoustics (the impacts of acoustic technology on the marine environment).
Sub-Ice Geological Exploration (SIGE)

Expert Groups (EGs):

Geodetic Infrastructure of Antarctica (GIANT)
Antarctic Permafrost and Periglacial Environments (PPE).
Antarctic Digital Magnetic Anomaly Project (ADMAP)
International Bathymetric Chart of the Southern Ocean (IBCSO).
Antarctic Neotectonics (ANTEC) now amalgamated with IPY project POLENET.

Scientific Programme Groups (SPGs):

Antarctic Climate Evolution (ACE)
Sub glacial Antarctic Lake Environments (SALE, jointly sponsored with the Life Sciences Standing Scientific Group)

Antarctic Climate Evolution (ACE)

ANDRILL'S Southern McMurdo Sounds Project

Andrill's project, one of the larger IPY-endorsed programs www.andrill.org, recovered a 600 m-thick stratigraphic interval documenting the Antarctic coastal environment during the warm middle Miocene climatic optimum (17.5 to 14.5 Ma). A disconformity separating the middle and upper

Miocene intervals in the AND-2A drill core represents a substantial climate step into cold, glacial conditions of the late Miocene. Operating from a floating sea-ice platform in Western Ross Sea (October-December 2007), the ANDRILL drilling system recovered an excellent quality core with 98% sediment recovery through the 1138.54 meter cored interval. Lower and middle Miocene shallow marine sediments, deposited in the subsiding Victoria Land Basin on the coastal plain seaward of the rising TransAntarctic Mountains, record repeating lithological changes that reflect variations in sea-level, glacial proximity, and climate. Fossils preserved in these strata suggest non-polar climate conditions similar to southern Patagonia and southwestern New Zealand today, influenced by high sediment discharge from river run-off and high coastal turbidity. An excellent chronostratigraphy provides age control for the drill core and a network of seismic lines in the western Ross Sea. These results are vital to SCAR's ACE program (www.ace.scar.org) whose objectives are to integrate geological and paleoclimatic data into climate and ice sheet models to constrain estimates of ice volume variability and terrestrial and marine paleotemperature.

SIGE Sub-Ice Geological Exploration

The Sub-Ice Geological Exploration (SIGE) Action Group aims to look into ways of developing a collective SCAR-wide pan-Antarctic approach to drilling into the rocks beneath the ice to improve our understanding of Antarctica's geological history. The first meeting to develop a five year work plan will be held on Sunday 6 July at 2.00pm, Room A2 Northern Hall in St Petersburg at the SCAR Open Science Conference July 2008.

Geodetic Infrastructure of Antarctica (GIANT) (Chair: Reinhard Dietrich)

Description: The Expert Group on Geodetic Infrastructure of Antarctica (GIANT) provides a common geodetic reference system for all Antarctic scientists and operators. It also contributes to global geodesy for studying the physical processes of the earth and the maintenance of the precise terrestrial reference frame, and provides information for monitoring the horizontal and vertical motion of Antarctica.

Activities: Together with SCAR's Antarctic Neotectonics (ANTEC) Expert Group, GIANT is a leader in the bipolar IPY POLENET (Polar Earth Observing Network) project, to which GIANT will contribute the Antarctic GPS component. A POLENET workshop was organized in the frame of the 10th ISAES in Santa Barbara/USA in August 2007.

Antarctic Permafrost and Periglacial Environments (PPE) (Chair: Jim Bockheim)

See related website:

www.earth.waikato.ac.nz/antpas/index.shtml

Description: Antarctic Permafrost and Periglacial Environments (EG-PPE) has the following key aims and objectives:

- A common web-accessible repository for permafrost and soils data.
- The production of thematic maps on Antarctic permafrost and soils.
- A system of boreholes providing data on permafrost and soil properties, records of past

environmental change, and recording permafrost responses to climate change.

- A well-designed monitoring system recording active layer and periglacial process responses to climate change along selected environmental gradients.

For further information, please go to the conference website <http://www.nicop.org> or contact Elizabeth Lilly (email: elilly@nicop.org).

Antarctic Digital Magnetic Anomaly Project (ADMMap) (Chair: Marta E. Ghidella)

See <http://earthsciences.osu.edu/admap/>

Description: The Antarctic Digital Magnetic Anomaly Project (ADMMap) aims to map Antarctica's magnetic anomaly field to aid in understanding geological processes. It is managed jointly with IAGA (International Association of Geomagnetism and Aeronomy). ADMMap contributes data to the World Magnetic Anomaly Map. For details see: <http://www.geology.ohio-state.edu/geophys/admap>

International Bathymetric Chart of the Southern Ocean (IBCSO)

(Chairs: Hans Werner Schenke & Norbert Ott)

Description: The SCAR Expert Group on the International Bathymetric Chart of the Southern Ocean (IBCSO) aims to produce a high quality bathymetric map of the Southern Ocean together with additional topographic, geophysical, and other data. The IBCSO is a contribution to the General Bathymetric Chart of the Oceans (GEBCO). The Intergovernmental Oceanographic Commission (IOC) and the International Hydrographic Organization (IHO) provide official support to IBCSO by adoption as a regional ocean mapping programme and assistance of the Hydrographic Commission on Antarctica (HCA).

Support of IBCSO is provided by SCAR, which is interested in using IBCSO products for a variety of scientific projects and applications. The building of bathymetric databases is strongly recommended within the International Polar Year. SCAR and SCOR distributed Circulars regarding bathymetric data acquisition in polar regions and their transfer to project databases. Additionally, the SCAR/SCOR Expert Group on Oceanography formulated an explicit request to member states for bathymetric data needed for the completion of the Bathymetric Charts in Antarctica.

POLENET

ANTEC has recently merged with the International Polar Year approved POLENET programme. POLENET is the 'POLAR Earth observing NETWORK' and aims to co-ordinate the deployment of new seismic, GPS instrumentation, leaving a legacy of improved observing infrastructure and encouraging an integrated, interdisciplinary approach to interpreting the results (similar to ANTEC, but with Antarctic as well as Arctic science goals). See POLENET website: www.polenet.org

Sampling Code of Conduct

Background

The GSSG discussed some problems that have arisen occasionally where localities have been damaged unnecessarily by field sampling activities. In the worst example, a locality has been completely denuded of fossils. Other localities have paint markings, possibly from many years ago and others have damage inflicted by testing of equipment. The slow rates of change in parts the Antarctic mean that minor damage may persist for many years. The group also recognised that, in the past, some workers did not collect location information sufficient to allow the exact location of sample sites. There is no longer a reason not to collect precise GPS information that would allow location of the sample site by subsequent workers.

Recommendations

The GSSG believes this is not so serious or widespread a problem as to require action at the Treaty level or a formal recommendation to SCAR but that a Code of Conduct endorsed and publicised by the GSSG will help prevent future problems. This code will be distributed to national representatives for distribution within national programs.

The Code endorsed by the GSSG is as follows:

SCAR GEOLOGICAL SAMPLING CODE OF CONDUCT

- Sampling should be done with the minimum disturbance practical.
- Sampling should be kept to the minimum necessary to achieve the research.
- Enough material/specimens should be left to allow future workers to understand the context of the material. (*Note: The GSSG recognises that it may be necessary to collect a rare, fragile specimen, thus leaving no further material.*)
- Sample site should be left free of markings (paint, labels etc). *This recommendation applies to markings with a short term use. The GSSG recognises that some activities require permanent features such as geodetic monuments.*
- Samples should be collected with the necessary information to allow precise location of the sample site by subsequent workers.

Necessary metadata: Location - Latitude & Longitude (GPS) with geodetic datum specified (WGS84).

Type of GPS measurement – Equipment used and time of measurement. The type and method of GPS collection determines accuracy. The GSSG recommends that hand held GPS be read for longer than 10 minutes to give accuracies of a 1-2 m. shorter periods will only give accuracies of 10s of meters.

- Specimens should be retained in a recognised repository after the project finishes.

Repository should retain the metadata and link to the Antarctic Master Directory so future workers can find the material and make sample available to future workers.

Marine Survey Coordination

Since the SCAR meeting in Hobart, the Marine Surveys coordination group held discussions with Taco de Bruin, of JCADM, about whether a combined SCAR cruise data base or system would be worthwhile. He pointed out that international systems already exist and should be used rather than inventing another system. We therefore suggest that members look at

http://www.researchvessels.org/ship_gen.asp

as a venue for posting survey plans. In addition, articles in GeoReach are another venue to keep each other informed.

Report on the meeting of Antarctic Geoscientists at New Delhi (India).

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The credit to evoke interest in Antarctic geology in India goes to Dr. C.S. Pichamuthu who way back in 1966 drew comparison between charnockites occurring in south India with those in Enderby Land (East Antarctica). With the emergence of Plate Tectonic theory, geology was revolutionized which led to a belief that the continents evolved through cycles of orogeny involving accretion and then break up. Accordingly, it was indicated that the Eastern Ghat Mobile Belt (EGMB) and parts of Enderby Land had a common Proterozoic evolutionary history. Subsequently a Super continent that came into existence during late Proterozoic early Mesozoic time named Gondwanaland brought about amalgamation of east and west Gondwana. Larger part of India, East Antarctica, Madagascar and Australia were considered to be the cratonic fragments of east Gondwanaland that got amalgamated with Africa, South America and Central Droning Maud Land comprising west Gondwana.

India made her maiden entry to Antarctica in 1981 by way of launching the first ever scientific expedition to this icy continent. Subsequently established two permanent bases namely Dakshin Gangotri (the first one which is now totally submerged) and Maitri which is currently an operational Indian research base situated on Schirmacher Oasis which is a part of Central Droning Maud Land (CDML). This Indian Antarctic station thus offered an unique opportunity to understand the process that formed the super continent Gondwanaland of which India, Africa, Antarctica were an integral part. CDML apparently has grown around an archaean nuclei during 1100 Ma Grenvillian orogeny. This region has witnessed extensive tectono-thermal perturbation during Grenvillian orogeny and got affected greatly by the Pan-African orogeny which recorded extensive magmatism as manifested in Anorthosite-Ferrogabbro-charnockite and Granite. The Indian Geologists attempted to study the CDML in detail to better understand the processes involved in its evolution and also correlating it with other similar parts of the Gondwanaland.

Having gained a vast experience in CDML geology during the past twenty five years, it was thought most appropriate to discuss and share the results with fellow researchers having common scientific interests. Accordingly, it was jointly decided by the Geological Survey of India (GSI) and the National Centre for Antarctic and Ocean Research (NCAOR), Goa (the nodal agency of Indian Antarctic Programme) to celebrate the occasion of the silver Jubilee year of Indian Antarctic Programme by organizing a two

days Seminar on 'Earth Science of East Antarctica' (ESEA) at New Delhi.

The recently convened Seminar was inaugurated by Prof. U.R. Rao, Former Chairman, ISRO in the august presence of Dr. S.K. Acharyya, former Director General, GSI, Dr. P.S. Goel, Secretary, Ministry of Earth Sciences, Shri. A.K.D. Jadhav, Secretary, Ministry of Mines and Dr. K.N. Mathur, Director General, GSI. On this occasion two books along with special DVD on new station in Antarctica and special logo for Indian Antarctic Expeditions were released.

During these two days a total of 40 research papers were received out of which 21 papers were presented orally while 19 papers were presented through Posters Display under the following broad themes ;

1. Geology of Central Droning Maudland (CDML).
2. Geochronological/Radiometric studies in India-Antarctica-Africa linkages and Gondwana land Palaeoconstruction.
3. Satellite Remote sensing and Airborne Surveys in CDML.
4. Ice core Drilling and Palaeoclimatic Reconstructions in CDML.
5. Geomorphology, Glaciology and Lake Sediments studies in Schirmacher Oasis.
6. Geophysical Investigations in CDML

Three Key Note Addresses were also presented by eminent scientists from India and abroad. Prof. U.R.Rao in his key note address laid emphasis on the use of Remote Sensing in study of Antarctic Science by Indians. Dr. S.K. Acharyya advised that research should be on modern lines. Both the above speakers were emphatic that collaborative science has to be given its due importance in Antarctic Studies. On the other hand Prof. H. Frimmel of Germany, while praising the Indian Earth Science community for their contributions, also advised against isolated and repetitive work.

In the concluding session of the seminar an Expert Group Panel under the Chairmanship of Shri. V.K. Raina, discussed the outcome of the Seminar and deliberated on the future earth science studies in Antarctica from an Indian point of view. Before making their recommendations the panel invited some young workers as well as stalwarts actually engaged in Antarctic studies for their views. They suggested that while giving emphasis on thematic studies in CDML, Kimberlitic and ultramafic rocks, which are reported from Droning Maud Land should be targeted. Similarly, detailed geochemical study of Lamprophyres in the region be taken up in earnest. Emphasis was further laid on the fundamental studies in geology viz. field work in detail and quality petrography of rocks should be given due importance. Training of earth scientists in modern approaches to petrography may be arranged. The necessity of regular Seminars of interactive nature on every 3 or 4 years on various aspects of the Antarctic Earth Science in India was deeply felt by the polar geoscientists to avoid repetition of work and for sharing of knowledge and linking of themes in different fields.

The salient observations and recommendations of this seminar are briefly outlined below.

- Extensive use of the laboratory facility at NCAOR is to be made for scientific data analysis and the facility may be upgraded with gas chromatography mass spectrometry (GCMS) for analysis of air bubbles trapped in ice cores. Basic research should continue in isotope analysis of ice cores retrieved from shallow drill holes.

- Earth science studies in Antarctica have to be made more competitive. It has been realized that CDML is a potential area capable of addressing problems like growth of continent and mechanism leading to its fragmentation. However, it is also observed that the research on these aspects are being carried out in isolation. This has hampered generation of critical data and new ideas. The data presented by various workers during the seminar are critically deficient in geo-chronological information. This is primarily due to a lack of facility. Therefore, the panel feels that there is a need to upgrade the existing facility at NCAOR with induction of an ion probe or, alternatively, a suitable state-of-the-art SHRIMP / IDTIMS / LA ICPMS may be setup at GSI.
- India's Earth Science program in Antarctica has no major international collaboration while the international community has been pursuing most of the problems outlined above as global campaigns; such as ITASE (International Trans Antarctic Scientific Expedition), IDEA-IPY 2007 (International Polar Year). Therefore, there is a need to initiate collaborative research programs with reputed international geoscientific institutions.
- There is also a need for scientific collaboration between the geoscientists of different national institutions by encouraging sabbatical work.
- Currently, most of the investigations are being dictated by the constraints of logistics. To overcome this difficulty, the possibility of working at Antarctic bases of other countries may be explored.
- There is a need to take up objective-oriented scientific projects involving different institutions instead of institutional programs.
- Participation of university students and young scientists in the national Antarctic program, as well as in the programs of other Antarctic Treaty nations, should be encouraged.
- There is an imperative need to plan the national scientific programs in Antarctica at least two years in advance. For example, the Australian Antarctic Division is planning all its scientific programs five years in advance, which helps in proper arrangements of the required logistics.
- GSI's Air-borne Mineral Survey and Exploration Wing can offer the services of state of the art DHRUVA-helicopter equipped with multi-channel sensors for geophysical surveys. The feasibility of utilizing this facility in Antarctica needs to be explored.
- With the ground work of preparing regional geological maps of Wohlthat Mountains having been completed more emphasis needs to be given on thematic mapping of the terrains. Similarly, geology of the area around third station site in Larsemann Hills is already well established. We should look for research oriented problems in the area with a view to contributing on hitherto unknown aspects of the geology of the terrain.
- Geological database compiled on a GIS platform interfaced with a thematic info RDBMS may be initiated.
- A transect to South Pole from Maitri may be planned in the near future for deep seismic profiling, collection of magnetic data, drilling of shallow ice core samples and shallow subsurface profiling using GPR.
- Dating of moraine surfaces through cosmogenic nuclide dating technique and/or TL-dating techniques may be taken up to date the palaeo-glacial surfaces which will be useful for building the glacial history of CDML.
- A permanent magnetic observatory may be set up at Maitri because of its suitable location with respect to the wobbling auroral hole near 70° S latitude. Placement of 3-5 unmanned magnetometers and GPS at suitable locations is recommended.
- A permanent seismological observatory should be set up at the site of the new station in Larsemann Hills.
- Geological / geophysical studies of the shelf area need to be taken up.
- A peer-reviewed Status Report on the Antarctic Earth Science activities by India should be published on the occasion of International Polar Year (2007) to consolidate the knowledge gained so far and for future guidance to scientific activities in Antarctica.
- An earth station at Maitri may be set up for real time data transmission.
- Study of reversal of polarity in sediments is advised.

The exchange of ideas and opinion amongst Indian and foreign workers relevant to the subject matter of the seminar widened our knowledge on various aspects of earth sciences in CDML region of Antarctica, especially when viewed in the light of Gondwanaland reconstruction. As a follow-up, actions are being taken up to meet the aforesaid recommendations. It is hoped that Indian Antarctic Earth Science Programme will emerge at par with other International programmes in Antarctic Earth Sciences. This seminar was just a beginning of the long celebrations of International Polar Year (IPY) and Silver Jubilee of the Indian Antarctic Programme

2008

9th International Conference on Permafrost

29 June - 3 July, 2008, Fairbanks, Alaska

The conference marks the 25th Anniversary of the formation of International Permafrost Association (IPA), 50th Anniversary of IGY and 25th Anniversary of the first IPY. The main Theme for this conference is: "Permafrost on a Warming Planet: Impacts on Ecosystems, Infrastructure and Climate".

Registration and further particulars are available on the conference website: <http://www.nicop.org/>

33rd International Geological Congress

5 - 14 August, 2008, Oslo, Norway

Several sessions on polar geosciences are being planned, especially those linked to IPY activities. For more information, go to: <http://www.33igc.org/>

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