

## **STRATEGIC DIRECTIONS FOR THE SCAR GEOSCIENCE STANDING SCIENCE GROUP (SSG-GS) – a discussion starter**

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SCAR was originally conceived as the body to coordinate international science within the Antarctic and to provide scientific advice to the Antarctic Treaty and its bodies. I see these as the 2 big items for which we have a role. Over time, SCAR has also developed a role in coordinating and managing Antarctic data. Adding any more tasks may become difficult given the volunteer workforce and limited resources.

### **Functions**

#### **Science Coordination**

The SSG-GS is a place where new directions for science can be discussed and directions set. It can also bring perspectives from the wider scientific and Treaty communities to earth scientist to help develop new scientific research directions.

Some suggested directions:

#### ***The record of life in a warmer Antarctica:***

A major public concern is the likely fate of the Antarctic biota in a warmer world. Records of Antarctic and Southern Ocean biota from warmer epochs exist in drill and sediment cores and outcrops. Ironically, much work has gone towards answering the more difficult questions of palaeotemperatures in the past, based on the fossil record. What is now needed is an assessment of the record of change in the marine ecosystem with climate change. Additional insights can come from cores that recovered microfossils and outcrop records including relict penguin colonies.

#### ***Crustal structure and composition of the whole continent:***

Geophysical techniques have reached the stage where a new understanding can be reached of the bulk of Antarctic beneath the ice. Aeromagnetic and aerogravity combined with magnetotelluric and seismic surveys have the potential to define crustal structures and provide insights into rock types that can be supplemented with drilling and the study of detrital minerals to derive a new understanding of the continent and its relationships to adjacent continents.

#### ***Geological processes and the Antarctic biota***

Geological processes have a major impact on the Antarctic biota from controlling seabed character for benthic organisms to the migration and evolution of species. There is major scope for multidisciplinary research to come to a better understanding of life on and around the continent. In particular, geological and geophysical research can improve our understanding of local scale changes in ice extent through time which control the availability of refugia for animals and plants during ice ages. Recent work on zooplankton genetics suggests that some coastal areas have remained ice free for millions of years. This needs to be tested with a reappraisal of the geological records of ice advance and retreat around these regions to understand the apparent conflicts in interpretation of ice extents that currently exist.

### **International Coordination**

The SSG-GS has a role in putting together international groups to work on projects of mutual interest. It does this well where there are active members who take responsibility for the coordination. Activities can stop when people move on.

The SSG-GS can do more in incorporating people from new and emerging Antarctic nations into the community. The Geodesy project has had a laudable history of bringing fringe countries into active participation.

SCAR is the about the only body where cross disciplinary projects can develop. This is happening but the SSG-GS needs to keep working on cross-discipline possibilities.

### **Advice to the Treaty**

SSG-GS has a role that is not so intense or continuous as the LSSG. However, important activities that exist are:

- The SCAR Seismic Data Library
- The Marine Acoustics Action Group which has presented 3 reports to the CEP.
- The Seeps and Vents action Group will also feed into CCAMLR measures for protecting Vulnerable Marine Ecosystems.

A suggested area for development might go by the title:

#### ***Antarctica's geological highlights: protecting the assets while maintaining access:***

Antarctica has many rare, unique and important outcrops. These features need to be protected from excess sampling, or thoughtless construction of facilities, while at the same time allowing access for geoscientists studying them. Once areas are officially protected it is usually assumed that their value is biological, so geoscience research is prohibited or extremely restricted. At the same time, unexplored areas with potentially high geological values may be built on with only regard for biological importance.

Some mechanism is needed to flag potential locations of high importance so they can be assessed before management plans are put in place.

As a group we have rarely considered conservation of geological features, probably because, in many circles, conservation means keeping geologists out. We will have to make the running on this because conservation is seen as a biologist preserve.

### **Data management**

The GSSG already has the SCAR Seismic data Library under its umbrella, and the Antarctic Digital Magnetic Anomaly Project (ADMMap) as well as the International Bathymetric Chart of the Southern Ocean (IBCSO) and Antarctic Bedrock Mapping (BEDMAP). There have also been smaller geodetic and geographic information data

bases, some of which have gone to the Standing Committee on Antarctic Geographic Information (SC-AGI).

Most data bases are supported by a host institution but they all could use more support from the community. Could data base coordination and oversight function be pulled together into a more visible activity so that maybe SCAR nations could be asked for a separate data management subscription?

#### Conclusion

I see the 3 main aims of the GSSG:

1. International and multidisciplinary science coordination.
2. Scientific advice to the Treaty.
3. Fostering international data sharing and management in the earth sciences in Antarctica.