

SCAR PRESENTATION

TO OPEN SESSION FOR THE INTERNATIONAL POLAR YEAR

PARIS, MARCH 31, 2004

What is SCAR?

SCAR, the Scientific Committee on Antarctic Research, is an interdisciplinary committee of ICSU. SCAR is charged with *the initiation, promotion and co-ordination of scientific research in Antarctica*, which includes the Southern Ocean. SCAR is therefore the central organisation dealing with Antarctic science.

SCAR evolved from the Special Committee on Antarctic Research established by ICSU to co-ordinate the continuing scientific research of the twelve nations active in Antarctica during the International Geophysical Year 1957-58, and provides scientific advice to the Antarctic Treaty System.

In recognition of SCAR's role in international cooperation in Antarctica, it was awarded the Prince of Asturias Prize for International Cooperation, 2002. The award is used to sponsor 5 young scientists to undertake a research project in a SCAR country other than their own.

The membership of SCAR comprises the National Committees of national scientific academies or research councils of those nations that are active in Antarctic research, relevant ICSU Scientific Unions, and Associate Members comprising those national scientific organisations planning to become active in Antarctic research. There are 27 Full Members, 7 ICSU Union Members, and 4 Associate Members.

SCAR Delegates meet biennially to determine SCAR policy and strategy. The Delegates elect a President and four Vice-Presidents from amongst themselves who, together with the Immediate Past President, constitute the Executive Committee, which is responsible for conducting the day-to-day administration of SCAR through its Secretariat at the Scott Polar Research Institute (SPRI) in Cambridge, UK.

In 2000, SCAR was reorganised to operate with three Standing Scientific Groups (Geosciences, Life Sciences, and Physical Sciences). The new structure enables SCAR to address interdisciplinary science more efficiently, and integrate more effectively with other international and global programmes. Each group is structured in several sub-groups to accommodate their various activities. Action Groups address specific matters and will normally complete their activity in 2-4 years. Expert Groups will address matters on a longer time-scale. Scientific Programme Planning Groups have been established to develop plans for research programmes. If adopted, such Scientific Research Programmes will normally be multi-disciplinary, will usually involve more than one Standing Scientific Group, and will have a lifetime of 5-10 years. Outline plans for the first set of science programmes were considered by the SCAR Executive in August 2003; it is intended that these programmes will start in late 2004 once they are ratified by the SCAR National Delegates.

To illustrate the range of expertise that SCAR can call upon, current SCAR scientific groups include:

Geosciences

- Action Groups on: “Age, Growth and Evolution of Antarctic (AGEANT)”, “Permafrost (PAG)”, “Communication and Outreach”;
- Expert Group on “Geospatial Information”;
- Scientific Programme Planning Groups on: “Cenozoic Antarctic Climate Evolution (CACE)”, Antarctic Neotectonics (ANTEC)”;
- Scientific Programme Group on: “Subglacial Antarctic Lake Exploration (SALE).

Life Sciences

- Action Groups on: “Global International Waters Assessment (GIWA)”, Best Practices for Conservation”;
- Expert Groups on: “Birds”, “Seals”, “Human Biology and Medicine”;
- Scientific Programme Planning Group on: “Evolution and Biodiversity in Antarctica: the Response of Life to Change” (EBA);
- Scientific Programme Groups on: “Ecology of the Antarctic Sea-Ice Zone (EASIZ)”, “Antarctic Pack Ice Seals (APIS)”, “Evolutionary Biology of Antarctic Organisms (EVOLANTA)”

Physical Sciences

- Action Groups on: “Plateau Astronomy Site Testing in Antarctica (PASTA)”, “Middle Atmosphere Dynamics and Relativistic Electron Precipitation (MADREP)”, “Antarctic Peninsula Tropospheric-Ionospheric Coupling (APTIC)”, “Oceanography”, “Reference Antarctic Data for Environmental Research (READER)”, “Antarctic Katabatic Winds”, “Antarctic Tropospheric Aerosols and their Role in Climate (ATAC)”.
- Expert Groups on: “Solar-Terrestrial Processes and Space Weather (STEPS)”, “Antarctic and Astronomy and Astrophysics (AAA)”, “Operational Meteorology in the Antarctic”, “Ice Sheet Mass Balance and Sea Level (ISMSS)”, “International Trans-Antarctic Scientific Expedition (ITASE)”, “Antarctic Sea-Ice Processes and Climate (ASPeCT)”.
- Scientific Programme Planning Groups on: “Antarctica and the Global Climate System”, “Inter-hemispheric Conjugacy on Environmental, Solar-Terrestrial and Atmospheric Research (ICESTAR).

The proposed SCAR programmes reflect the questions that are currently important in Antarctic science and the areas of science of primary interest to SCAR members, and cover the fields of marine biota; the glacial history of the Antarctic; the upper atmosphere and space physics; sub-glacial lakes; and climate links between the Antarctic and the rest of the Earth system. Although there is as yet no oceanography programme, SCAR has a fast growing interest in promoting the oceanographic research needed to establish the strong connections between Southern Ocean processes and world climate. To that end SCAR is taking an active role in establishing the new SCAR/SCOR/IOC Coordinating Group on Interdisciplinary Southern Ocean Science (ISOS), and is exploring co-sponsorship of the Southern Ocean CLIVAR-CLIC group and the Southern Ocean GLOBEC programme.

These new scientific initiatives will be the focus of discussion at the SCAR Open Science Conference and associated SCAR science group meetings in Bremen in July 2004. The Conference is likely to be attended by some 600+ people. The National Delegates meet to decide on the new programmes in Bremerhaven in October 2004. Aside from the science programmes, a SCAR-COMNAP Joint Committee on Antarctic Data Management (JCADM) has been created to advise SCAR and COMNAP on all aspects of Antarctic data matters. JCADM comprises the managers of each National Antarctic Data Centre (NADC), or relevant national contacts if an NADC has not yet been established. It enlists NADCs and helps them document their national Antarctic datasets through the creation and use of index (metadata) records. The result is the Antarctic Master Directory, a web based metadata catalogue, which can be accessed by anyone interested in Antarctic information.

In addition, SCAR is working with others on the development of a proposal to the IGOS Partners for a Cryosphere Theme. In recent years, the Cryosphere has received increasing attention from the climate science community, national and international policy makers, the media, and the general public. The reasons are multiple, including:

- The Cryosphere is one of the key components of the Earth's Climate System, and is probably the most under-sampled element within that system;
- It has a large effect on the predictability of weather and climate, and knowledge of the Cryosphere is therefore vital in many levels of decision making;
- It plays an important role in generating and mediating the conditions for possible abrupt climate change;
- It is the factor of largest uncertainty among contributors to mean sea level rise;
- It critically affects the pathways and patterns of the world sea-borne trade;
- It provides many of the most useful indicators of long-term climate change.
- There are important positive feedback mechanisms between elements of the cryosphere and the rest of the climate system that have the potential to amplify small temperature changes caused by greenhouse gas emissions.

We expect the Cryosphere Theme to become fully active in 2006. The Theme will create a framework for coordination of cryospheric observations conducted by research, long-term scientific monitoring, and operational programmes, and for generating the data and information needed for both operational services and research. It will strengthen national and international institutional structures responsible for cryospheric observations, and increase resources for ensuring the transition of research-based Cryosphere observing projects to sustained observations.

What is the Significance of the IPY for SCAR?

The IPY offers SCAR the possibility of enhancing the contribution that its programmes are already making to advancing leading edge science in all disciplines in the Antarctic region, from the ionosphere to the mantle and from the ice cap to the deep sea floor. SCAR hopes that IPY endeavours will focus on needs and challenges already identified by the extensive scientific community engaged in its programmes, and will build on these existing platforms.

For example, *inter alia*, considerable improvements are desirable in:

- * integrating geophysical initiatives to improve understanding of continental tectonics, and to establish the thermal evolution of the continental crust (through the Action Group on Age, Growth & Evolution of Antarctica - AGEANT)
- * studying 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 (through the Cenozoic Antarctic Climate Evolution (CACE) Programme)
- * understanding the recent geological history of Antarctica (through the Scientific Research Programme on Antarctic Neotectonics - ANTEC);
- * unifying the existing programmes on Ecology of the Sea Ice Zone (EASIZ), Regional Sensitivity to Climate Change in Antarctic Terrestrial and Limnetic Systems (RiSCC), Evolutionary Biology of Antarctic Organisms (EVOLANTA), to develop a Scientific Programme on Evolutionary Biology in Antarctica;
- * creating a Marine Biodiversity Information Network to compile, disseminate, and integrate information on Antarctic marine biodiversity for scientific, monitoring, management and conservation purposes (Southern Ocean biodiversity is an important and significant component of the World marine biodiversity, since the Antarctic marine region covers 10% of the World Ocean area, and is the habitat of numerous and highly adapted species, while a large part of the Southern Ocean biodiversity remains unknown in particular in the deep sea);
- * analyzing, understanding and modeling katabatic wind events (through Modelling and Observational Studies of Antarctic Katabatics - MOSAK);
- * understanding the role of Antarctic Tropospheric Aerosols in Climate, making particular use of the Aerosol Optical Depth network in the Antarctic;
- * understanding the relationship between Ice Sheet Mass Balance and Sea Level (ISMSS).
- * understanding the evolution of lakes beneath the Antarctic ice sheet, and assessing their history and that of their biota through time.

The IPY also provides an additional means of focusing attention on key questions regarding climate variability and change in the Antarctic, like the following ones that are linked to the oceans, including:

- Why has the extent of Antarctic sea ice increased over the last two decades when mean global air temperatures have been increasing?
- Have changes in the water masses on the continental shelf to the west of the Antarctic Peninsula played a role in the rapid warming on the western side of the Peninsula over the last 50 years – the largest temperature increase on Earth?
- How are signals of tropical ENSO variability transferred to the Antarctic and why is the extra-tropical response of some ENSO events different?
- What are the mechanisms behind the Antarctic Circumpolar Wave (ACW) and why has the amplitude and phase of the wave changed over recent decades?

- What regional and global factors are responsible for decadal time scale climate variability in the Antarctic?

Finally, in the context of the Cryosphere Theme, the IPY provides opportunities: to expand the critical measurements needed to validate satellite data; to ensure comprehensive observations of sea-ice (including edge position, concentration, thickness, age and snow depth on ice, the efficient exchange of these data, their use in operational services, and subsequent processing for research applications and climate studies); and to significantly enhance ice-sheet and ice-cap monitoring.

How May SCAR Contribute to Achieving the Goals of the IPY?

SCAR is a unique avenue for communication to governments through the Antarctic Treaty mechanism, thereby offering a route for additional promotion of the IPY in government circles, with the aim of attracting support and commitments for IPY goals.

SCAR also provides a direct connection to an extensive network of scientific experts in polar sciences, and to those who make decisions on policies and funding in the Antarctic sciences at the national level in 27 countries from which support for an IPY would be desirable.

SCAR's distributed network of experts has the breadth of experience and the quality to provide comprehensive and meaningful reviews of IPY proposals, and to contribute to the development of IPY plans.

SCAR can encourage the development from within its current and new programmes and activities of novel proposals for consideration within the IPY. SCAR can also offer the integration of the results of novel IPY activities into its existing programmes, thereby adding value to both the ongoing and new efforts.

SCAR can offer ready access through JCADM to the network of Antarctic databases, which should be essential for the storage and management of the data collected through IPY initiatives.

SCAR's fundamental role of and success at the coordination of Antarctic science, offers tremendous potential for strengthening IPY efforts in such a way as to ensure synergy with existing efforts, avoidance of duplication, and the filling of important gaps in knowledge and understanding.

SCAR will therefore take a leading role in providing scientific advice for the IPY process.