

# The Scientific Committee on Antarctic Research and the Antarctic Treaty

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**ABSTRACT.** The Scientific Committee on Antarctic Research (SCAR) had its antecedents in the Special Committee on Antarctic Research of the International Geophysical Year, and thus its establishment in 1958 predates the Antarctic Treaty. As a body of the International Council for Science (ICSU, formerly the International Council of Scientific Unions) it is a nongovernmental organization, yet it has been intimately linked to the governmental discussions at the Antarctic Treaty since the first Antarctic Treaty meeting in 1961. Its primary role has always been to develop and coordinate international scientific research, but it has also provided independent advice to Treaty Parties on many scientific and environmental questions, initially through national government delegations. Only in 1987 was SCAR itself granted the status of observer and the right to attend Antarctic Treaty Consultative Meetings (ATCMs) and to submit information and working papers. This paper looks at the changing relationship between SCAR and the Treaty Parties, at some of its most important science inputs to the ATCM, and at the way SCAR itself has changed. Its earliest input to governance was advice on conservation that became the Agreed Measures for the Conservation of Antarctic Fauna and Flora of 1964, and for the first 40 years of the Antarctic Treaty, SCAR provided major input on protected areas and protected species, as well as environmental impact and monitoring. Its proposals for seal conservation and management gave it a specific role in the Convention for the Conservation of Antarctic Seals, and its Biological Investigations of Marine Antarctic Systems and Stocks (BIOMASS) programme laid the foundations for the Convention for the Conservation of Antarctic Marine Living Resources (CCAMLR). Its nonpolitical stance has allowed it to provide the only unified gazetteer for the Antarctic. The organization of SCAR remained virtually unchanged for around 30 years until the logisticians split to form the Council of Managers of National Antarctic Programs (COMNAP) in 1989. The organization was languishing, but a major review of structure and function changed that in 2000, resulting in the establishment of Open Science Conferences, major new international programmes, increased educational outreach, and a greater input to the annual Antarctic Treaty meetings, often on controversial subjects like marine acoustics or specially protected species. There are currently 31 full members with 4 associate members and 9 ICSU union members.

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## **INTRODUCTION**

The International Geophysical Year (1956–1957) was one of the most important international events in the history of twentieth century science. The original

idea for this was apparently conceived by a small group of physicists led by Lloyd Berkner in the United States and Sidney Chapman in the United Kingdom over dinner at the house of James van Allen in the spring of 1950 (Belanger, 2006). The proposal was for a coordinated series of measurements of many key geophysical variables using agreed protocols, especially in the polar regions. The proposers enlisted the support of the National Academy of Sciences and the Royal Society as well as many of their colleagues, and the International Council of Scientific Unions (ICSU) Executive Board rapidly and with enthusiasm endorsed the theme when it was proposed in 1951. In response to a suggestion by the World Meteorological Organization that the polar focus was too narrow, Chapman widened it and suggested the International Geophysical Year (IGY) rather than just an International Polar Year (Belanger, 2006). From its small beginnings it grew initially to involve scientists from 46 countries, but by the time it ended scientists from 67 countries were taking part. It was, to a large part, modelled on the previous International Polar Years, and it was therefore significant that the organizers had declared that there were two scientific frontiers that should be attacked: outer space and the Antarctic. Both constituted major unknowns at that time, and developments in technology, especially in rocketry, made the scientific prospects much more attractive than they had ever been before.

Twelve countries finally decided that they would work in the Antarctic. Several (Argentina, Australia, Chile, France, and the United Kingdom) already had stations there but intended to augment their work, whereas the new countries (Belgium, Japan, New Zealand, Norway, South Africa, the Union of Soviet Socialist Republics (USSR), and the United States) all needed to establish themselves there. After some arguments the sites for all the stations were agreed and the IGY got under way.

It is difficult to imagine 50 years on just how revolutionary this international programme was. The aftermath of the Second World War, the expansion of Soviet military activities and the spread of communism, and the militarization and aggressive stance of the United States threw a pall across the world. The research turned out to be even more productive than the scientists expected, and the international collaboration engendered was, during the time of the Cold War, a very positive and surprising result. The scientific community soon began to lobby for a continuation of the Antarctic work, citing the need to get a long-term return on the infrastructure investment and the value of the data that were being produced and pooled for all to use. Unknown to them, President Eisenhower had already decided that a permanent agreement was necessary, both to stop

the arguments between Chile, Argentina, and the United Kingdom over sovereignty and to ensure that the Soviets were not able to militarize the Antarctic and escalate the arms race to a new level. He used the pleas from the science community as window dressing to support his initiation of secret talks in 1957 between the 12 countries toward a new Antarctic Treaty for the continent (Berkman, this volume).

Meanwhile, the ICSU Comité Speciale de l'Année Géophysique Internationale (CSAGI) had already decided at its fourth meeting that a more permanent international focus for Antarctic science would be necessary and recommended to ICSU that a Special Committee on Antarctic Research should be formed. This was the beginning of SCAR.

This paper will examine the development of the relationship between the Antarctic Treaty Parties and SCAR, using examples to indicate how scientific advice has laid the foundations for both law and policy.

## EARLY DAYS

The first meeting of SCAR was organized at The Hague in February 1958. The ICSU had decided that it would be attended by delegates from the 12 countries active in the Antarctic as well as representatives of the five most relevant scientific unions (International Union of Geodesy and Geophysics [IUGG], the International Geographical Union [IGU], the International Union of Biological Sciences [IUBS], the International Union of Pure and Applied Physics [IUPAP], and the Union Radio Scientifique Internationale [URSI]) and one from the World Meteorological Organization. They gathered for a three-day meeting that laid the firm foundations for what would follow over five decades.

All the participating nations except New Zealand and South Africa were there as well as two of the unions, all represented by scientists except Chile (whose ambassador attended as an observer). Only Belgium, the USSR, and the United States brought advisors along, so it was a small meeting of 18 people (Figure 1). R. Fraser and E. Herbays represented ICSU, W. Schytt IGU, A. Bruun IUBS, and G. Laclavère IUGG whilst N. Herlofson chaired the meeting. The main objectives were to agree to a constitution for the committee, elect officers, frame a budget, and prepare a scientific plan for the years after IGY. A draft constitution had been prepared, apparently by Valter Schytt, based on other ICSU constitutions, and circulated in advance. It was commendably short at this stage!

The sterling international work done during IGY ensured the unopposed election of Georges Laclavère from France as president, with Keith Bullen from Australia as



**FIGURE 1.** Participants in the first SCAR meeting, The Hague, February 1958. 1, Dr. L. M. Gould, United States; 2, Dr. Ronald Fraser, ICSU; 3, Dr. N. Herloffson, convenor; 4, Colonel E. Herbays, ICSU; 5, Professor T. Rikitake, Japan; 6, Professor Leiv Harang, Norway; 7, Dr. Valter Schytt, IGU; 8, Dr. Anton F. Bruun, IUBS; 9, Mr. J. J. Taljaard, South Africa; 10, Captain F. Bastin, Belgium; 11, Captain Luis de la Canal, Argentina; 12, Sir James Wordie, United Kingdom; 13, Professor K. E. Bullen, Australia; 14, Dr. H. Wexler, United States; 15, Ingénieur Général Georges Laclavère, IUGG; 16, Ingénieur Général André Gougenheim, France; 17, Mr. Luis Renard, Chile; 18, Dr. M. M. Somov, USSR; 19, Prof. J. van Mieghen, Belgium. From Wolff (2010).

vice-president and Valter Schytt as secretary. Costs were estimated at \$6000 per year, so the initial contribution was set at \$500 per nation with the intention to move to a sliding scale in future years based on the number of overwintering staff. The establishment of the World Data Centres by ICSU had already removed one potential task from their list of key scientific activities, but the range of science within IGY needed to be broadened now that the emphasis was not principally on geophysics. The meeting set up three working groups to discuss future research programmes: WGI Meteorology, Oceanography, Cosmic Physics, Biology & Physiology; WGII Geology, Glaciology, Morphology & Cartography, and WGIII Seismology, Gravity & Vulcanology. Given the limited information on biology, this initial disciplinary listing seems still heavily biased to Earth science and physics and is probably a

reflection of the expertise around the table. This structure of working groups changed at later meetings as more scientists became directly involved. In addition, it was agreed that SCAR's area of interest would be determined principally by scientific features. The SCAR scientists agreed on the Antarctic Convergence (Polar Front) as the general northern boundary but then decided that some islands lying north of this would need to be included for biological reasons: Ile Amsterdam, Iles Crozet, Gough Island, Iles de Kerguelen, Macquarie Island, Prince Edward Islands, Ile Saint-Paul, South Georgia, and Tristan da Cunha. They also agreed to establish the *SCAR Bulletin* to provide a reporting link to the global community.

Most importantly, they stated that "the continuation of scientific activity in Antarctic research should be regarded as being inspired by the interest aroused by the

activities of IGY but was in no way an extension of the IGY.”(SCAR, 1959). This statement was clearly a get-out clause for politicians who wanted to draw a line under their national involvement and had, at that stage, the potential to severely limit future involvement.

As a component body of ICSU SCAR had to adopt their normal method of national representation, which was through a committee constituted within the national academy of sciences. Since all 12 countries were already ICSU members, this did not cause any problem, but it did take a little time for all of them to establish committees, not all of which have functioned effectively over the past 50 years. Although at the time this must have seemed a logical and effective route for communicating with the active scientists, within a few years it became clear that this would be a troublesome and ineffective linkage for many countries.

Political wrangling was continuing over who would continue to work in Antarctica and just how extensive that work would be. The politicians worried over the escalating bill for, as some saw it, scientists to have a good time at the taxpayers' expense. The impetus seemed to be failing when, at the Fifth CSAGI Meeting in Moscow in August 1958, a formal proposal from Soviet scientists to continue Antarctic research galvanized both the scientists and their politicians. It seemed that the Soviet scientists were desperate to maintain the international links that the IGY had fostered as well as capitalising on the international recognition gained by the launch of Sputnik 1. To assuage the politicians, they needed to find a new name for the one-year extension and the “Year of International Geophysical Co-operation” became the new title, but however it was dressed up it was clear that if the USSR was staying, so were the Americans and many others.

## SCAR AND THE ANTARCTIC TREATY

The State Department pushed ahead with its plan for a new governance system, capitalizing on the wave of scientific enthusiasm. The 60 secret meetings in Washington eventually resulted in sufficient agreement for the countries to decide that a more formal and public negotiation could take place to finalize the details of the Antarctic Treaty (Hanessian, 1960). Meeting in Washington, D.C., starting on 15 October 1959, the Contracting Parties, as they styled themselves, finally signed the Antarctic Treaty on 1 December 1959. In the process of agreeing to the Antarctic Treaty the Contracting Parties had found a way of setting to one side the sovereignty claims and disputes, had demilitarized a continent and ensured that it could

not be used for dumping nuclear waste, had established an international inspection procedure (which was effectively the first nuclear arms treaty), and had formally recognized that the continent should be used only for peace and science for the good of all mankind. Given the range of national objectives, the superpower struggle for supremacy, and the history of animosity between many of the participating countries, this was a remarkable achievement.

The parties had recognized at an early stage that to govern the continent they would need good scientific advice. Although SCAR is not mentioned in the Antarctic Treaty itself, right from the first Consultative Meeting in Canberra in 1961 the importance of input from SCAR was formally recognized. Indeed, many of the delegations contained scientists associated with SCAR: e.g., for Australia, R. Carrick, F. J. Jacka, and P. G. Law; for France, G. Laclavère; for New Zealand, E. I. Robertson; for Norway, A. K. Corvin; for South Africa, M. P. van Rooy; for the United Kingdom, B. B. Roberts; for the USSR, M. M. Somov; and for the United States, T. Jones.

In the final report of the First Antarctic Treaty Consultative Meeting (ATCM, 1961) the first four recommendations all dealt with science, and Recommendation I-IV was specifically devoted to SCAR:

The Representatives agree without prejudice to the rights of Governments, to make such arrangements as they deem necessary to further the objectives of scientific co-operation set forth in the Treaty:

- 1) That the free exchange of information and views among scientists participating in SCAR, and the recommendations concerning scientific programmes and co-operation formulated by this body constitute a most valuable contribution to international scientific co-operation in Antarctica,
- 2) That since these activities of SCAR constitute the kind of activity templated in Article II of the Treaty, SCAR should be encouraged to continue its advisory work which has so effectively facilitated international co-operation in scientific investigations.

At that same meeting the Contracting Parties took the first steps to rectify the lack of any specific conservation measure in the Antarctic Treaty itself. Using a report published by SCAR in 1960 (Carrick, 1960), they agreed to Recommendation I-VIII, “Conservation of the Antarctic Flora and Fauna,” establishing an interim measure that in 1964 they would turn into Recommendation III-VIII, “Agreed Measures for the Conservation for the Antarctic Fauna and Flora.” Linked to this was Recommendation III-X asking

that SCAR should continue to report on conservation matters especially with respect to proposals for specially protected species and specially protected areas.

At the Fourth Meeting of SCAR in October 1961 in Wellington the Biology Working Group seized on the progress toward the Agreed Measures and promptly drew up a list of suggested protected areas, as well as recommending that the Ross seal and the fur seals should be designated as specially protected species. At IV ATCM in Santiago in 1966, 15 new protected areas were designated, and the Ross and fur seals were formally given special protection. Interestingly, the Biology Working Group had completed its 1961 report with the statement that “research in Antarctic biology would suffer if SCAR becomes too involved in the political and economic aspects of conservation, as distinct from the formulation of principles and recommendations based upon scientific work.” Clearly, SCAR had already recognized the difficult balancing act it would need to achieve if its inputs to policy were to be valued yet its nonpolitical status was to be protected.

### THE DEVELOPMENT OF THE CONVENTION FOR THE CONSERVATION OF ANTARCTIC SEALS

There were other politics on the horizon that drew SCAR in even more closely to the Antarctic Treaty. The notification by Norway that a pilot sealing expedition would go to Antarctica in 1964 drew immediate attention to the history of sealing and its disastrous consequences for fur seals. The Consultative Parties quickly passed Recommendation III-11 urging that any pelagic sealing be undertaken in such a way as not to disrupt the ecosystem nor threaten the integrity of species. They followed this at the next meeting with Interim Guidelines on the Voluntary Regulation of Antarctic Pelagic Sealing (Recommendation IV-21) and urged SCAR to continue its interest (Recommendation IV-22) in the subject. The SCAR had, indeed, been active, with the Biology Working Group first producing a statement on pelagic sealing in August 1964 and establishing a Subcommittee on Seals to consider the problems in more detail. Returning to the subject in 1968 the Biology Working Group had the report of the subcommittee to consider. This report proposed a revision of the Antarctic Treaty’s Interim Guidelines, changing many of the details and laying out details of permissible catches in Annex A and the location of sealing zones in Annex B. An important element in the SCAR response was the acceptance of the principle that seals were a resource that could

be sustainably harvested and that, despite the wishes of some scientists, it was not possible to argue for a complete ban on commercial sealing.

This concern over seals finally resulted in the first of the additional conventions to the Antarctic Treaty. The Convention for the Conservation of Antarctic Seals (CCAS), agreed by the Consultative Parties in 1972 in London, specifically mandates SCAR to provide scientific advice on stock sizes and management. To involve an independent nongovernmental ICSU body directly in this way was certainly unusual, and indeed, the signing of the instrument was delayed until 2 June 1972, the day after SCAR formally accepted the task. One longer-term commitment by SCAR as a result of CCAS was the formation and support of a new Group of Specialists on Seals, part of whose role was to be prepared to provide advice to CCAS if needed. Since commercial sealing has never restarted, the convention has never been used, but SCAR continues to collect data annually on seal numbers killed in scientific research.

### BIOMASS AND CCAMLR

Others beside the seal biologists had also become alarmed at the prospect of major changes in the Southern Ocean. American biologists at the Second SCAR Biology Symposium in 1968 (Holdgate, 1970) had noticed the way in which the Soviet Union was researching krill; they recognized not only how little was really known about krill but also that it did appear to be a keystone species in the Southern Ocean food web. The Soviet Union had both research vessels and trawler fleets in the Southern Ocean and was actively catching krill, having mastered the technical problems of processing the animals prior to freezing them, as well as catching large quantities of fish. There were no controls on any of these actions as the Antarctic Treaty specifically did not cover the high seas.

These U.S. scientists persuaded the National Science Foundation to fund the first multidisciplinary oceanographic cruise on board the USNS *Eltanin* in 1972 to study the structure and function of the Ross Sea ecosystem (El-Sayed, 1973). Meanwhile, at the SCAR Biology Working Group meeting in August 1972 in Canberra a strong case was made for a new focus on marine resources, and a new Subcommittee on Marine Resources was established, with S. Z. El-Sayed as its chairman. Meeting in Montreal in 1974, the subcommittee made rapid progress, and in 1975 the SCAR Executive Committee established it as a new Group of Specialists on Southern Ocean Ecosystems and their Living Resources. In November of the same year

the Scientific Committee on Oceanic Research (SCOR) agreed to cosponsor the group, as did the International Association for Biological Oceanography (IABO) and the Advisory Committee on Marine Resources Research of the United Nations Food and Agriculture Organization. Activities increased as VIII ATCM asked SCAR to provide a report on progress on Antarctic marine living resources. The group met in 1975 in Cambridge and then again in Woods Hole in August 1976, where, in a much larger conference format, the proposal for cooperative studies in the Southern Ocean was developed, and Dick Laws devised its new acronym, BIOMASS: Biological Investigations of Marine Antarctic Systems and Stocks.

The BIOMASS programme was on a much larger scale than anything SCAR had attempted before. It lasted over 10 years, with three international field seasons, involving many ships from 11 countries. Its scientific outputs were considerable (El-Sayed, 1994), but just as important was the way in which this research activity stimulated the Treaty Parties to develop a new system of governance and management for the Southern Ocean. In 1977 at IX ATCM the parties agreed to establish a new convention for the sustainable management of marine living resources and thus was born the Convention for the Conservation of Antarctic Marine Living Resources (CCAMLR), which was signed on 20 May 1980 and came into force on 7 April 1982. The SCAR scientists were closely involved in advising on the scientific basis for the convention, which was established on a new principle: maximum sustainable yield without disturbing the existing ecological relationships between species. Equally important was the acceptance by the politicians of the scientific argument that the CCAMLR boundary should not be that of the Antarctic Treaty but a relevant biological one: the Antarctic Polar Front (Antarctic Convergence). As Nigel Bonner has said (Bonner, 1987:145), “CCAMLR is a philosophical scientist’s convention. It is certainly not a convention for fisheries managers,” yet it has been made to work and its principles have since been adopted for other regional fisheries.

The SCAR was granted the status of observer at the CCAMLR Scientific Committee once it was established, but since so many SCAR scientists were already involved in national delegations, it initially rarely took up the role. Later, it appointed a marine scientist as the official SCAR representative to ensure that requests to SCAR could be formally targeted and to allow for an independent report to the Biology Working Group at the following SCAR meeting.

These early exchanges set the model for the relationship between SCAR and the Antarctic Treaty for the first 25 years where SCAR’s ideas, suggestions, and

recommendations were filtered into the ATCMs through national delegations. Some authors (e.g., Herr, 1996) have included SCAR as a part of the Antarctic Treaty System, but that suggests an equality of legal persona that has never existed between governmental and nongovernmental representation. Of course, SCAR scientists were included within many of the national delegations, but the organization itself did not initially have any formal representation.

Vidas (1996) has suggested that the changes (the admission of observers and experts as well as the Acceding Parties) were largely a response to the charge at the United Nations that the Antarctic Treaty System (ATS) was an “exclusive club” of rich and powerful states and that their discussions were veiled in secrecy, with the hope of defusing further criticism. Certainly, the latter charge was true, and it is difficult to understand at this distance why secrecy was apparently so important in the governance of an uninhabited continent. Perhaps the first and natural refuge of diplomats in any intergovernmental meeting at that time was to deprive the public they represented of any useful information so that they could work untrammelled by public opinion.

Criticism eventually had some effect. The Consultative Parties responded to increasing public concern in 1983 by first allowing Non-Consultative Parties to attend the meetings, then admitting as Consultative Parties India, Brazil, China, and Uruguay (undermining the argument at the United Nations that only developed states could achieve the highest status), and finally inviting both observers and experts to attend the meetings, thus meeting the criticisms from the international environmental lobby.

So, finally, at XIV ATCM in 1987 in Rio de Janeiro, SCAR and CCAMLR were both formally invited to take their place as observers and were requested to provide reports of their activities to the plenary. Since then, SCAR’s input to the Antarctic Treaty meetings has steadily increased, not only in terms of providing information and working papers but also in the institution of a SCAR science lecture to the plenary, the first of which was given by Claude Lorius (then president of SCAR) at XV ATCM in Paris.

## CONSERVATION INITIATIVES

Having had a major hand in establishing CCAMLR, SCAR was already moving on. The Biology Working Group Subcommittee on Conservation was chaired by Nigel Bonner, a seal biologist, then head of Life Sciences Division at the British Antarctic Survey. Bonner had watched with interest the development of a World Conservation Strategy by the International Union for the Conservation of Nature

(IUCN, 1980) with assistance from the United Nations Environment Program (UNEP) and the World Wildlife Fund (WWF). The IUCN had observed continuing and accelerating degradation of habitats globally, widespread pollution, and damage from the development of infrastructure, a lack of adequate conservation legislation, and governments whose priorities were short-term and economic rather than long-term and strategic. Published in 1980 (IUCN, 1980), the objective of the strategy was to integrate conservation and development in a global framework within which national and regional strategies could be developed. Section 18 was devoted to the Global Commons and drew particular attention to the need to manage the Southern Ocean living resources sustainably. In 1982 IUCN proposed that a joint meeting be held with SCAR to bring conservationists together with Antarctic scientists. Following this, at the 16th IUCN General Assembly in 1984 Antarctica was designated as a region in which IUCN should actively promote the protection, management, and conservation of the environment and natural resources.

The IUCN formally approached SCAR, and Bonner was designated to work with their convenor (Martin Angel) on developing such a regional conservation strategy for the Antarctic, covering both the land and the surrounding ocean. With support from both sides the joint IUCN/SCAR Symposium on Requirements for Antarctic Conservation was held in Bonn in April 1985. Out of this was developed the Strategy for Antarctic Conservation (IUCN, 1991). For whatever reason, IUCN and SCAR failed to send the strategy to the ATCM, which at that point, was rather absorbed in agreeing the Protocol on Environmental Protection to the Antarctic Treaty, and the valuable lessons that could have been utilized were lost. Indeed, the strategy was not written in a user-friendly fashion, and its published format was not well designed. Despite all the effort put into drafting and agreeing it, the strategy failed to make any substantive mark on Antarctic environmental governance.

## FINDING A CONSENSUS ON MINERALS

The Antarctic Treaty is silent on all forms of resource, not only because the extent and value of Antarctic resources were unknown in the 1950s but also because achieving agreement on these, even as abstract aspirations, would have been too difficult for the Washington talks. Although marine living resources (first as seals and then as fish and krill) were the initial resources legislated for, the question of mineral resources was already floating steadily

upward. Interest in Antarctic minerals was first expressed at VI ATCM in Tokyo in 1970, in an attempt to interest Contracting Parties in developing a minerals regime ahead of the need for one (Joyner, 1996). This proved to be excellent timing as the actions of the Organization of Petroleum Exporting Countries (OPEC) in 1973 in restricting the world supply of hydrocarbons and causing a quadrupling of the price jerked governments into considering all sorts of new possibilities for future hydrocarbon development. In addition, in 1971–1972 drilling by the *Glomar Challenger* in the Ross Sea had discovered traces of methane but no oil, fuelling media speculation that there could be extensive oil reserves in Antarctica. The VII ATCM in Wellington began the discussions ostensibly as part of a concern that mineral extraction would have serious impacts on the environment. At their next meeting in Oslo in 1975 their Recommendation VIII-14 invited SCAR to make an assessment of the possible environmental impacts of mineral exploration and exploitation.

The SCAR was immediately apprehensive about this, and at XIV SCAR in Mendoza there was very spirited discussion about what should be done to provide a reply. Some biologists were concerned that any response by SCAR would be seen as supporting mineral exploitation whilst others from the geological sciences saw this as an opportunity to lay out what little was really known about economic mineral resources and correct many widely publicized misunderstandings. In the end, SCAR established the Group of Specialists on Environmental Impact Assessment of Mineral Resource Exploration and Exploitation in the Antarctic (EAMREA), chaired by Jim Zumberge, a geologist, but containing a wide range of both geologists and biologists. Parts of their report submitted to IX ATCM proved politically unacceptable (especially to the USSR), and the Antarctic Treaty then established its own Intergovernmental Group of Experts which produced a parallel report (Bonner, 1993b).

The Antarctic Treaty soon saw that such a contentious subject would need lengthy negotiations away from public view and these could not be contained within the normal ATCM agenda. A series of Special Consultative Meetings was begun under the chairmanship of Chris Beeby from New Zealand, leading in 1988 to a consensus in the form of the Convention on the Regulation of Antarctic Mineral Resource Activities (CRAMRA). During the course of these negotiations SCAR was again asked for advice, producing a new report “Antarctic Environmental Implications of Possible Mineral Exploration and Exploitation” in 1986.

All this effort appeared to be in vain because although all parties signed CRAMRA, the refusal first by Australia

and then by France and New Zealand to ratify it effectively consigned it to limbo. Yet the new environmental thinking that went into the safeguards in CRAMRA was to find an unexpected outlet in a more general instrument for environmental protection.

### **THE FORMATION OF THE COUNCIL OF MANAGERS OF NATIONAL ANTARCTIC PROGRAMS**

The SCAR Working Group on Logistics had been one of the first formed after SCAR was established. It never sat easily alongside the other purely scientific working groups, but it did have the advantage of ensuring that science and logistics periodically met together and talked. In its early days it was tasked with responding to several Antarctic Treaty requests on communications, transport, and even data management. As SCAR membership increased, the diversity of appointments of national programme managers increased, with some from science backgrounds, others from technical and engineering backgrounds, and some, from South American countries in particular, managers from diplomatic or military backgrounds. The degree of autonomy that each had varied widely and, with it, the degree of political control, as well as the extent of resources that each controlled. Organizing the working group proved a continuing problem, yet SCAR felt strongly that having the managers within the SCAR umbrella was the most effective way to keep communications going and integrate the science and logistics for efficiency.

When Edward Todd was Director of the Office of Polar Programs (OPP), he apparently developed some strong views on SCAR, believing that SCAR was interfering in the way that the United States made its decisions about science programs and logistics. In 1983 he wrote, with respect to the Logistics Working Group, “some SCAR participants forget that commitments to SCAR are not governmental commitments by most SCAR participants who have no such charter; this confusion has led SCAR to assume management direction of research activities to which governments are not committed, and to unwarranted criticism of governments that have declined the presumed commitment of resources necessary to implement them” (Fowler, 2000:32). This streak of irritability persisted in the United States, and the appointment of Peter Wilkness as Director of the National Science Foundation Office of Polar Programs exacerbated it further. Wilkness saw the working group as an ineffective anachronism and questioned

how government employees (the managers) could realistically make themselves subservient to a nongovernmental body (SCAR Executive Committee). He began to talk up the need for change in San Diego in 1986 and reinforced this at a special meeting in Boulder in 1987. In all this he found a willing supporter in Jim Bleasel, the director of the Australian Antarctic Division and the chairman of the Working Group on Logistics. Together they persuaded the managers that their rightful place was in their own autonomous organisation. Discussions continued through into the next SCAR meeting in Hobart, where on 15 September 1988 the Council of Managers of National Antarctic Programs (COMNAP) was formed. To try to find a face-saving formula, the new organization was described as being “federated” to SCAR, but in reality, the managers had broken free completely, appointing David Drewry as the first chairman and Al Fowler as executive secretary in a new independent secretariat (Fowler, 2000).

Appearing at the next ATCM in Bonn in their own right, COMNAP made a major impression on the Contracting Parties as a well organized and professional body and immediately began to undertake studies at the request of the Consultative Parties. This impression was, of course, helped by the extensive resources under the control of the managers, who could easily divert both staff and thousands of dollars into exercises they thought politically important. This was in sharp contrast to SCAR whose report, presented by Dick Laws as President, had suggested that SCAR had problems funding the work necessary to meet the constant stream of requests from the Antarctic Treaty. In particular, he said, “If the ATCPs do not give reasonable weight to the views of SCAR and if SCAR is unable to attract the relatively substantial (but absolutely small) extra funds required it may be obliged to concentrate on primary science and withdraw from giving advice on applied or management problems. The ATCPs have not responded to SCAR requests for extra funding to enable it to carry out the applied science function. To help SCAR make a decision it asks the ATCPs to make clear their intentions” (ATCM, 1992:232). He went on to lay out what should be the relevant responsibilities of Treaty Parties, SCAR, and COMNAP and cautioned against the Consultative Parties taking advice from environmental pressure groups. This sort of straight talking was not to the liking of some Consultative Parties, who questioned the role of SCAR and, by inference, its temerity in telling governments what should be done. Although many Consultative Parties came to the rescue of SCAR, no funding was forthcoming, and by breaking the implicit rules that

govern discussions at Antarctic Treaty meetings, this report made the role of SCAR at ATCMs harder to achieve immediately afterward.

## THE PROTOCOL REVOLUTION

The sudden demise of CRAMRA and the rapid negotiation of the Protocol on Environmental Protection to the Antarctic Treaty have been well documented (Chaturvedi, 1996). By pulling many of the environmental protection elements from CRAMRA and rationalizing the many conservation and management recommendations already agreed, the Consultative Parties were able to draft the protocol much more quickly than might have been expected for such a key international document. Such was the speed that SCAR, although present, was largely left out of the loop as the meetings concentrated on agreeing the form of the text and its limitations rather than dealing in detail with its implementation. As far as science is concerned the Protocol on Environmental Protection established a much more coherent approach to conservation and environmental management and finally brought some much needed tools (like environmental impact assessment) into normal use. As is often the case with Antarctic Treaty legislation, it provides careful ambiguity in some key areas (for example, what exactly are “associated and dependent ecosystems” or “minor or transitory impacts”) and sets out goals with little indication of how they can be achieved. Nevertheless, by establishing the Committee for Environmental Protection (CEP) it provided a potentially powerful forum for developing environmental advice independent of SCAR.

The SCAR saw both opportunities and drawbacks in the new system. In order to cope with the increased number of environmental requests from the Antarctic Treaty, the SCAR Executive Committee had decided in 1988 to convert the Subcommittee on Conservation to the Group of Specialists on Environmental Affairs and Conservation (GOSEAC). Initially chaired by Nigel Bonner and then later by David Walton, it was required (SCAR, 1988)

to advise SCAR on matters directly related to environmental affairs and conservation in the SCAR area of interest, in particular:

- identification of environmental criteria relating to research activities and associated logistic support, as well as to relevant commercial activities and the selection of sites for all types of stations,

- environmental aspects of waste disposal
- protected areas in the Antarctic
- additional protective measures.

Thus, SCAR was well prepared for engaging with the CEP when it finally came into being and provided a wide range of assistance, including workshops organized on protected areas, subantarctic island management, and environmental education; a handbook for the preparation of protected area management plans; detailed protocols for environmental monitoring of human impacts; checklists for inspections of protected areas and incinerator emissions; input to the Liability Annex discussions, bioprospecting, and marine acoustic impacts; and a detailed revision of every management plan for a Specially Protected Area or Site of Special Scientific Interest proposed or revised.

## GEOGRAPHICAL NAMES

In undertaking science in Antarctica it has always been necessary to be able to name topographic features so that specimen collection localities can be identified and maps produced of biological and geological observations. The early expeditions provided some names, but as exploration and then the IGY progressed, names began to be a problem.

The disputes over sovereignty were a major part of the problem the Consultative Parties had in acting at the Antarctic Treaty level, and as more and more maps began to appear with duplicate names the possibility of chaos loomed. The SCAR Working Group on Geodesy and Geographic Information had been tracking the problem for many years, noting how individual countries promulgated new names for existing named features, the lack of any agreed nomenclature for describing features, and the poor positional data that often accompanied new names. By scientific standards many countries were doing a very poor job. At XXII SCAR in 1992 in Bariloche the working group resolved to compile a composite gazetteer, with Italy volunteering to compile the database and Germany developing a set of toponymic rules for naming. The SCAR Composite Gazetteer of Antarctica was first published in 1998 (SCAR, 1998) and has been continually updated ever since. Although originally issued as a printed publication, it soon became available online.

None of this work was either requested or supported by Treaty Parties, yet the arrival of the final product gave a new tool to everyone. Since SCAR had been careful to

include all names that could be validated without suggesting which one should be used, the gazetteer was as politically anodyne as it could be and is now the basic reference source for all.

## MARINE ACOUSTICS

Sometimes actions for environmental protection can have major consequences for science, and SCAR has had to employ considerable resources over a long period in order to ensure that policies are based on the best science available rather than on political agendas. An excellent example is the difficulties raised by a licensing authority over certain types of marine research.

There have been a variety of cases around the world where whale stranding appears to have been associated with marine noise or where some measure of disturbance has been credited to nearby military, commercial, or scientific activities (Weilgart and Whitehead, 2004), but the evidence is very confusing, partial, and possibly species specific. In 1998 Germany decided that the deployment of seismic instruments in the Southern Ocean was likely to cause unacceptable impact on marine mammals. Since German ships needed a permit from the Federal Environment Agency (Umwelt Bundes Amt) to operate, this effectively stopped all marine geophysics programmes. The German SCAR Committee asked if there really was evidence to support this contention. The SCAR decided to establish an ad hoc group to look at marine acoustics and produced an initial information paper for the ATCM promising to follow up with more detailed evidence (SATCM, 2000). The output from a SCAR workshop in Cambridge in 2001 (O'Brien, 2004) provided the basis for two papers to the Antarctic Treaty (ATCM, 2002a, 2002b) whose general conclusions were that the evidence available did not justify a ban on seismic surveys or scientific echo sounders in Antarctic waters but that mitigation strategies should be used as a precautionary measure. There was a further paper in Madrid (ATCM, 2003), and then SCAR held another international workshop in Cadiz. The final discussion on marine acoustics took place at the Edinburgh ATCM in 2006, where SCAR provided a report on the Cadiz workshop (which included a new risk assessment system for seismic studies) (ATCM, 2006a) and a case study of ship noise based on the *Polarstern* (ATCM, 2006b) and COMNAP provided a detailed breakdown of all seismic equipment on Antarctic research vessels (ATCM, 2006c). Meanwhile, in 2002 the Conference on the Impact of Acoustics on Marine Organisms had been organized in Berlin, under

the auspices of Deutsche Forschungsgemeinschaft, which added some more details to the SCAR publications and again highlighted the lack of any solid data from the Antarctic on which to base regulations (Anonymous, 2004). For some within Germany this information was not sufficient, and they turned to promoting the application of the precautionary principle instead. It was made clear to the Consultative Parties by SCAR on several occasions that a sensible regime needed new research to establish not only which species might be affected, the degree of impact, and its severity but also the effectiveness of the mitigation measures proposed. It would appear that the appeal fell on deaf ears, and no such research was funded. Although the *Polarstern* initially used foreign licences to operate multinational geophysics cruises, there were eventually changes in the restrictions on low-power seismic systems, and some science was able to be undertaken. No other Consultative Party followed Germany in restricting its geophysics research, and there are still no new data from the Southern Ocean to substantiate the need for restrictions.

## ACCESS TO DATA

One of the fundamental elements of the Antarctic Treaty (Article III, paragraph 1(c)) is that all data collected within the Antarctic Treaty area should be freely available to all. The development of databases in World Data Centres during and after IGY was an important step in this direction for some scientific fields. However, these centres did not encompass all aspects of Antarctic science, and it became clear that a new initiative was necessary to allow access to the very considerable amounts of data that were being produced. In 1985 at the XIII ATCM, during discussions on human impacts on the environment, Consultative Parties decided that there was scope for improvement in data management and, in Recommendation XIII-5, asked SCAR what steps could be taken to improve the comparability and accessibility of scientific data. The SCAR-COMNAP ad hoc Planning Group on Antarctic Data Management was formed in June 1992, and its first report proposed developing an Antarctic Data Directory System comprising National Antarctic Data Centres linked through an Antarctic Master Directory. This proposal was reported to the Antarctic Treaty (ATCM, 1992), and these ideas, elaborated at the second meeting (SCAR, 1994), became the basis for all future developments.

In 1997 COMNAP and SCAR finally reached agreement on joint funding and joint oversight for the committee, and the ad hoc committee became the Joint Committee

for Antarctic Data Management (JCADM). It is fair to say that SCAR took the leading role in developing the framework of National Data Centres and the establishment of the metadata directory, and although the joint nature of the funding continued for some years, COMNAP never provided any serious input into what it considered to be a wholly scientific exercise. It was, of course, also meant to incorporate COMNAP data, but managers were unwilling to entrust any of their data to it.

Despite the efforts of many people JCADM grew more slowly than expected, not least because some national operators were apparently unable to establish a national Antarctic data centre. Recommendation XXII-4 addressed this point directly but failed to get all the managers to act. After a major review in 2005 a reorganization of both the role and objectives has ensured that JCADM is now firmly linked into the new SCAR programme structure, and the objectives of the original Antarctic Treaty recommendation are closer to being met. One of the key objectives of SCAR in recent years has been the development of a comprehensive data and information management strategy for the Antarctic, into which the activities of JCADM would fit. Such a strategy was developed in time for the XXX SCAR meeting in St. Petersburg in 2008. At that meeting, delegates endorsed the strategy and, following COMNAP's decision to discontinue partially funding JCADM, agreed that JCADM should become the Standing Committee on Data and Information Management (SCADM). The SCAR intends to draw the attention of the Consultative Parties to the new data strategy, as a means of getting it widely applied for the benefit of all.

### REORGANISING SCAR

Elzinga (2009) has suggested that the pressure from new applicants to SCAR, enthusiastic to gain Consultative Status at the ATCM before CRAMRA came into operation, as well as the admission of SCAR to the ATCM as an official observer, triggered the development of a strategy discussion within the organisation. Although these were certainly relevant factors, there were many others, including the increasing importance of scientific conservation issues, a change in the Executive Secretary, the formation of COMNAP and the Standing Committee on Antarctic Logistics and Operations (SCALOP), and a determination by several presidents, including Claude Lorius and Dick Laws, to reexamine the objectives of the organization in the light of science trends. It also seems likely to have been influenced by the identification of Antarctic ozone

depletion in 1985, the recognition that ice cores could provide key palaeoclimatic data, and the identification that the Southern Ocean was a major carbon sink, all combining to suddenly thrust what was considered regional science onto a global stage. This point was commented on by David Drewry in the first editorial in the new journal *Antarctic Science* (Drewry, 1989). The establishment of the Intergovernmental Panel on Climate Change (IPCC) in 1988 as well as the continuing development of the International Geosphere-Biosphere Program (IGBP) all pointed toward the need for a more-integrated cross-disciplinary approach to science, including that from the Antarctic, which was reflected in the development of a new SCAR programme on global change (SCAR, 1992).

In addition to internal discussions of change the General Council of ICSU decided to undertake a review of SCAR using an international panel chaired by Rita Colwell from the United States. The SCAR did not initially handle this review well but, rather late in the day, was able to provide the indications that ICSU needed to guarantee their support for the continuation of SCAR. The review committee's report was both supportive of what had been achieved and critical of the internal organisation, not least because the available funds were insufficient to meet an increasingly demanding role both in science coordination and in advice to the Antarctic Treaty. In addition, the report suggested that a merger with International Arctic Science Committee (IASC) might be considered to form a single polar committee and that an Antarctic Science Foundation could be formed to raise more funding (Colwell, 1993).

Delegates to XXII SCAR in Bariloche spent some time discussing the report and suggesting changes to the SCAR strategy as well as responses to the ICSU report. The SCAR responded to the report by disagreeing with the proposals for a foundation and especially with a merger with IASC but welcoming the recognition that funding was too low. The SCAR Executive Committee clearly felt that the report failed to understand the political dimension of interactions with the Antarctic Treaty, where a lack of sound science advice could seriously disadvantage Antarctic research in the future (SCAR, 1993). However, the comments on internal efficiency did strike home, and some minor changes were made to improve information flow.

The SCAR then lapsed back into complacency, apparently not recognizing that its structure and organization were woefully inadequate in a fast-moving and rapidly changing world. The Executive Committee did decide to make some changes, but little progress was made at either XXIII SCAR or at XXIV SCAR, and it was not until XXV SCAR in Concepción in 1998 that a force for change

appeared. Six strategy papers were tabled, addressing a wide range of possibilities, but it was only when Chris Rappley from the United Kingdom and Jörn Thiede from Germany challenged the slow pace of change, and proposed an ad hoc review group with an independent chair, that change really became the focus of attention. This ad hoc group was chaired by Phil Smith from the United States, whose Antarctic credentials went back to IGY, and its remit was drawn widely enough for all possibilities to be examined. Its report was discussed by the SCAR Executive Committee in 2001, and implementation was agreed at XXVII SCAR in 2002. The most fundamental changes were the appointment of an executive director, the establishment of major peer-reviewed science programmes, an increase in funding, etc. The effect of all of these changes began to be felt immediately as new five-year programmes were devised; delegate committees were given new responsibilities for oversight; existing committees were merged, changed, or closed; and an experienced international scientist became the first executive director. The SCAR had suddenly woken up!

## THE FUTURE

According to Herr (1996), the role played by SCAR in the development of the ATS was well beyond a passive legitimating influence. He says (p. 106), "SCAR helped to make the ATS work in terms of effectiveness by acting as a facilitator for regime objectives, providing a clearing house for scientific information. Moreover, its constituent organs at the national level in many countries served as a lobby group for both resources and support for the ATS regime." Indeed, others from the more militant elements of the nongovernmental organisation sector have seen this role as far too quiescent, gaining influence by being co-opted into the system rather than questioning it. This fine line between policy and science, between advocacy and reporting, is one that SCAR has been walking for the last 50 years. As Zumberge (1987:8), a previous president of SCAR, wrote, "The line between science and politics has become more finely drawn, and SCAR must exercise constant vigilance to avoid becoming tangled in policy matters that, while they may relate to scientific activities, are the business of the Consultative Parties that administer the Antarctic Treaty and related agreements." Keeping to the right side of the line can be very difficult at Antarctic Treaty meetings when it is clear that inexperienced delegates are proposing unsound policies that will have serious impacts on science! The scientific contributions made to discussions at the Antarctic Treaty owe a

great deal to the activities of Nigel Bonner, David Walton, and Steven Chown, whose presentations and explanations at the Antarctic Treaty meetings have provided a much higher profile for SCAR science than before.

Nigel Bonner (1993a) had suggested, rather pessimistically, that the formation of COMNAP, the establishment of the Scientific Committee of CCAMLR, and the development of the Committee for Environmental Protection (CEP) would all lead to a weakening of SCAR's role and influence. Although at that point the future did, indeed, seem rather grey, now almost 20 years later the situation appears to have changed significantly. Although there are more experts providing science input to the CEP, the Consultative Parties now seem much more able to recognize the good science from the dressed-up polemic. The new working relationships with both CEP and CCAMLR have provided SCAR with many opportunities to respond to requests and to take the initiative, and the relationship with COMNAP is functional, although still far from perfect. The role of science in the ATS continues to be a strong one, with SCAR providing the lead.

The development of a new form of interaction between the CEP and SCAR has taken some time. The special status of SCAR in providing advice to the Antarctic Treaty is clearly indicated in the Protocol on Environmental Protection, but the final wording adopted is less supportive than that originally proposed by Sweden (Bonner, 1993b, p. 107): "In carrying out its functions, the Committee shall have regard to the work of the Scientific Committee on Antarctic Research . . . To that end, SCAR shall be invited to present their views and to comment on proposals within their competence put forward by the Committee. Such comments shall be presented together with the report from the Committee." After almost 40 years of SCAR providing a wide range of environmental and conservation advice the Consultative Parties clearly thought that the CEP was immediately going to provide a scientific committee for the Antarctic Treaty. This it failed to do, not only because for many years it lacked adequate expertise but also because the CEP also decided that a number of areas where SCAR had previously provided advice and assistance would now be dealt with by the Consultative Parties. The SCAR was told its help was no longer required, especially in areas like management plans for protected areas. Tension developed between the CEP and SCAR, not least when it became clear that the outputs being agreed were much less satisfactory than when SCAR had provided them.

As the CEP has matured and grown in expertise, although more slowly than most people had hoped, it has also redeveloped its links with SCAR, so that for the

immediate future the two sides are agreeing a work plan. This plan will deliver well-considered science advice at a pace that SCAR can manage and the CEP can properly consider by ensuring that the energy and time of the CEP is properly focused at each meeting on a smaller number of key topics. The SCAR has, of course, continued to pursue its own science agenda and, where appropriate, passed its findings to the Antarctic Treaty. The latest input, one of the most important for many years, has been the synthesis on Antarctic climate and the environment (Turner et al., 2009).

Meanwhile, SCAR has also approached IUCN about revising the Antarctic conservation strategy to meet the needs of the twenty-first century. The IUCN is now actively engaged in seeking possible sponsorship for this (IUCN, 2009). Linked to this, there is a need for more-detailed information on the natural biodiversity in Antarctica so that non-native species can be more easily identified, and considerable work is needed to rationalize the protected areas on land and develop, with CCAMLR, a sensible range of marine protected areas.

Environmental monitoring of activities is a continuing requirement for which SCAR and COMNAP have provided a wide range of reports. However, the monitoring of tourism activities and the potential use of the data to manage areas by closure or visitor limits is a contentious area that so far has defied agreement and funding. Equally important is the provision of pattern and trend data to the CEP and to the IPCC on the effects of climate change.

The SCAR is at present flourishing as never before. It has 31 members, with another four countries as associate members. Its programmes are addressing global science questions where the data are relevant not only to the Antarctic Treaty Parties but to many other countries and organizations. Its relationship with IASC and SCOR continues to develop, and its Open Science conferences every two years now attract over 1,000 scientists.

Although this paper has necessarily focused on the history of interactions between SCAR and the ATS, a much fuller account of the first 50 years of SCAR activities is contained in Walton and Clarkson (In press). The SCAR has undertaken a remarkable range of activities over the past 50 years in support of good governance of the Antarctic. Throughout this entire period it has not received any financial support from the ATCM whatever the size of the task that was proposed. Now, with a permanent secretariat, the Consultative Parties are still unwilling to use its potential and allow the secretariat to service the CEP more directly by holding databases and working directly with science organisations like SCAR to ensure that the right

information is available at the right time. It could even commission small pieces of work if it was provided with minimal funds, but this seems unlikely to happen given the level of control that some Parties insist on exerting over the secretariat. The symbiosis between the Antarctic Treaty and SCAR will, however, continue because it is in the long-term interests of both sides to ensure that the governance of a continent for peace and science is, indeed, underpinned by good science.

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National Research Council. 1986. Antarctic Treaty System: An Assessment: Proceedings of a Workshop Held at Beardmore South Field Camp, Antarctica, January 7-13, 1985. 10. The Antarctic Treaty as a Scientific Mechanism The Scientific Committee on Antarctic Research and the Antarctic Treaty System James H. Zumberge INTRODUCTION Both the Antarctic Treaty and the Scientific Committee on Antarctic Research (SCAR) were legacies of the International Geophysical Year (IGY) of 1957-1958. Antarctica - Antarctica - The Antarctic Treaty: With the ending of IGY the threat arose that the moratorium too would end, letting the carefully worked out Antarctic structure collapse into its pre-IGY chaos. In the fall of 1957 the U.S. Department of State reviewed its Antarctic policy and sounded out agreements with the 11 other governments that were active in Antarctica during IGY. On May 2, 1958, U.S. Pres. Dwight D. Eisenhower issued identical notes to these governments proposing that a treaty be concluded to ensure a lasting free and peaceful status for the continent. Preparatory talks by the 12 governments were held in Washington, D.C., beginning. The Antarctic Treaty was signed in Washington on 1 December 1959 by the twelve nations that had been active during the IGY (Argentina, Australia, Belgium, Chile, France, Japan, New Zealand, Norway, South Africa, United Kingdom, United States and USSR). The Treaty, which applies to the area south of 60° South latitude, is surprisingly short, but remarkably effective. The Scientific Committee on Antarctic Research (SCAR) coordinates Antarctic research programs and encourages scientific cooperation. Through its various subordinate groups it is able to provide expert information on a range of disciplines and on the scientific implications of operational proposals of the Treaty meetings. SCAR also provides scientific advice to the Antarctic Treaty Consultative Meetings and other organizations on issues of science and conservation affecting the management of Antarctica and the Southern Ocean. In that role, SCAR has made numerous recommendations on a variety of matters, very few of which have been incorporated into Antarctic Treaty instruments.[5][6]. Activities. SCAR meets every two years to conduct its administrative business at the SCAR Delegates Meeting. The executive committee comprises the president and four vice-presidents. The SCAR Secretariat is staffed by the executive director, executive officer and an administrative assistant.[7]. SCAR is charged with initiating, developing and coordinating high quality international scientific research in the Antarctic region (including the Southern Ocean), and on the role of the Antarctic region in the Earth system. SCAR provides objective and independent scientific advice to the Antarctic Treaty Consultative Meetings and other organizations such as the UNFCCC and IPCC on issues of science and conservation affecting the management of Antarctica and the Southern Ocean and on the role of the Antarctic region in the Earth system.