

# MEETINGS

## Antarctic Science

Once upon a time, dinosaurs roamed Antarctica and swam in its seas. Since then, life evolved as the climate cooled into the ice ages. Life will no doubt continue to evolve there as the globe now warms. But nowadays, humans are having a profound and direct effect on life in Antarctica, the sub-Antarctic islands, and the surrounding Southern Ocean, which are being invaded by a wide range of alien species including microbes, algae, fungi, bryophytes, land plants, invertebrates, fish, birds, and mammals.

These species have come to survive, and in some cases dominate, terrestrial, freshwater, and marine habitats in the sub-Antarctic islands, Steven Chown of the University of Stellenbosch, South Africa, told the King of Sweden and meeting participants in the annual lecture by the Scientific Committee on Antarctic Research (SCAR) in the recent 28th Antarctic Treaty Consultative Meeting (ATCM), in Stockholm, Sweden.

The Antarctic Treaty sets out the basis for the governance of Antarctica as a continent for peace and science. Responsibility for regulations governing scientific and other activities in Antarctica and the surrounding Southern Ocean south of latitude 60°S lies with the annual ATCM of the parties to the treaty. The activities of the ATCM are of more than passing interest to the scientific community, which is represented at the consultative meeting by the SCAR. Other observers to the meeting having an interest in science include the representatives of the operators of Antarctic bases (the Council of Managers of National Antarctic Programmes, or COMNAP), who ensure the logistics for Antarctic science, and the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR).

In the sub-Antarctic islands, Chown said, these species are causing considerable damage by altering local ecosystems. Rats and cats brought by ships have caused dramatic changes in the numbers of some seabird species, while mice are eating native invertebrates. Also, alien plants can reduce local diversity by as much as 40%.

Chown noted that alien species arrive in many ways, including in personal baggage, attached to fresh vegetables, on ship hulls, and in ballast water. There is a strong relationship between the numbers of humans that visit a Southern Ocean island and the numbers of species that have been introduced and become established.

Recent increases in human activity in the Antarctic have been considerable. For example, in the 2001–2002 season, the latest for which full information is readily available, Antarctic Treaty nations deployed 4390 personnel at 67 sites in Antarctica, significantly more than in previous years. Tourist numbers have soared from about

6000 in 1992 to over 24,000 from October to March 2004–2005; most tourists visited the Antarctic Peninsula.

Chown noted that a dramatically warmer climate over the past 50 years in the Antarctic Peninsula region and on many sub-Antarctic islands (though not, as yet, in East Antarctica) makes these environments less hostile to new species. The chances of successful colonization of the Antarctic region by alien species are likely to increase substantially with more visitors and more warming, unless appropriate control measures are put in place. Prevention may be less expensive and more long-term than an eradication program.

Future meetings of the Parties to the Treaty will address the challenge posed by the rising tide of introduced species. A workshop on the introduction of nonnative species will be held prior to the 2006 ATCM in Edinburgh, Scotland, as the basis for developing plans to limit such introductions.

### *Environmental Measures, New Bases Discussed*

During the Stockholm meeting, an agreement was reached, after 13 years of negotiations, on liability arising from environmental emergencies. The agreement, which now forms Annex VI to the Protocol on Environmental Protection to the Antarctic Treaty, requires Antarctic base operators to undertake reasonable preventive measures to reduce the risk of environmental emergencies and their potential adverse impact, and to establish contingency plans for dealing with such emergencies.

Meeting participants also approved plans for the construction of new Antarctic bases to replace the current Halley (United Kingdom) and Neumayer (Germany) bases, and learned about India's and Belgium's plans to develop new stations. Also discussed were new methods for treating sewage to reduce environmental damage at Antarctic bases, and proposals for several Antarctic Specially Protected Areas and Antarctic Specially Managed Areas. Participants approved the Practical Guidelines for Developing and Designing Environmental Monitoring Programmes in Antarctica, which had been developed by COMNAP based on joint workshops by SCAR and COMNAP.

Also during the meeting, ATCM's Committee for Environmental Protection (CEP) considered matters of conservation and environmental protection in and around Antarctica. The CEP aims to protect endangered species and endangered habitats, and to restrict opportunities for inadvertent introductions of alien species. The CEP asked SCAR to assess the status of the Southern Giant Petrel and the Macaroni Penguin, which are classified as "vulnerable" globally, to see if they merit adoption as "specially protected species" by the Antarctic Treaty Consultative Parties. SCAR was also asked to assess if continuing special protection was

needed for fur seals, which are still listed as specially protected species despite massive increases in their numbers. In addition, SCAR will assess the status of the Ross Seal.

### *Plans for the International Polar Year*

The meeting included discussions about plans and proposals for research to be carried out in the region during the International Polar Year 2007–2008, and the establishment of an IPY International Programme Office, directed by David Carlson, at the British Antarctic Survey in the United Kingdom. The Parties expressed their support for the IPY and its activities, which promise to lead to a significant and ongoing increase in observations of the ocean, ice, and atmosphere at both poles that will provide valuable inputs to models of the climate system. For more information about IPY plans, see the Web site: <http://www.ipy.org>.

Delegates from Australia discussed the SCAR-led Census of Antarctic Marine Life (CAML), which is a component of the global Census of Marine Life, and which will contribute to the IPY. CAML is now supported by a grant from the Sloan Foundation of \$1.2 million over four years.

CAML will investigate the distribution and abundance of Antarctica's marine biodiversity, how it is affected by environmental change, and how change will alter the nature of ecosystem services provided by the Southern Ocean, in the form of fisheries, for example. Powerful, new genetic and molecular tools will be used to determine the extent to which the fauna and flora are homogeneous or differentiated. The data will be made available through SCAR's Marine Biodiversity Information Network (MarBIN).

Delegates from the Russian Federation noted that in accordance with the decisions and agreements reached at the 26th ATCM in Madrid, in 2003, Russia plans to drill 50 m farther toward the surface of subglacial Lake Vostok, as part of that nation's plans for the IPY. The objective is to sample ice that had formed from lake water, as a means of assessing the probable chemistry and biology of the lake. This drilling will provide the Russian scientists with the information they need to prepare, for a future ATCM, a comprehensive environmental evaluation on their plans to penetrate the lake itself. It is understood that to facilitate eventual drilling into the lake, they have developed a new, clean technology; the technology has been successfully tested in Greenland, although the results are not yet widely available.

The documents submitted for the consideration of the 28th ATCM are available on the Web page of the Antarctic Treaty Secretariat: <http://www.ats.org.ar/28atcm/buscador.php>. Among them is Information Paper 85 (IP085, Biodiversity in the Antarctic), a summary of the lecture by Steven Chown referred to above.

The 28th Antarctic Treaty Consultative Meeting was held in Stockholm, Sweden, on 6–17 June 2005.

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