

SCAR



Polar collaborations are key to successful policies

Expand the remit of the Scientific Committee on Antarctic Research to coordinate the influx of infrastructure, says its president, Steven L. Chown.

The Antarctic Treaty, now signed by 53 countries, enshrines the idea of a continent free of discord and set aside for science. In 1959, nations pledged to give up territorial claims on the region, to use the continent only for peaceful purposes, to cooperate on scientific investigations and to freely share results. An addendum called the Environmental Protocol to protect the region and prohibit mining came into force in 1998. No other major agreements under the treaty have been enforced since (see page 161).

Meanwhile, research infrastructure is booming. Nations including China, Germany, South Korea, New Zealand and the United Kingdom have been building new research stations or upgrading existing ones. Australia, Norway and the United Kingdom have launched or will soon launch research vessels much larger than their predecessors. In May, Australia announced that it would, subject to environmental approvals, build the first paved runway on the continent, a 2.7-kilometre airstrip that will open up East Antarctica to large aircraft all year round. Several other countries are also upgrading their air access.

Why all the interest? Understanding the region is essential to predicting global environmental change, particularly sea-level rise — with its implications for people and property. And there are geopolitical considerations, too. More countries want to maintain a presence below the 60th parallel south, especially as the Southern Ocean becomes more accessible to fishing (see page 177).

But too few nations are building the intellectual capacity to complement the accumulating infrastructure. They should be looking for ways to share research resources and coordinate efforts. Diffuse activity will not provide the kind of information that world leaders can act on. It is time to focus.

The Scientific Committee on Antarctic Research (SCAR), which I head, was established almost at the same time as the treaty, and acts as a scientific adviser for the region. It already coordinates activities ranging from marine-predator surveys to space-weather forecasts, which provide geomagnetic-storm warnings that are necessary to secure electricity grids and satellites.

SCAR is often asked for advice on everything from bioprospecting to the potential influence of drones on wildlife, but is rarely funded to provide it. Countries that readily invest millions of dollars in infrastructure often struggle to find funds for policy-relevant science. They would get a much better return on their investment if they put a tiny fraction of infrastructure spending towards coordinated research.

The remit of SCAR should be formally expanded to coordinate resources more broadly and to formulate scientific questions whose answers could shape global agreements. One crucial question is how long the Southern Ocean will continue to take up carbon as its waters warm and acidify. Another is how changing krill populations will alter ecosystems, which include iconic predators such as penguins,

seals and whales, and threaten fishing grounds.

The most urgent task is to understand the Antarctic ice sheets well enough to reduce uncertainties about sea-level change. More research is needed into how ice shelves buttress ice sheets, how the ocean, ice shelf and atmosphere interact, how melting water fractures ice shelves and how snowfall on the continent is changing.

Clarity on these fronts is needed to hold signatories of the Paris climate agreement to their promises to reduce greenhouse-gas emissions and to help adapt to coming changes. Without good models, much planning effort will be wasted. In fact, without better information from the Antarctic, global human populations near the coasts will not be able to work out how to accommodate higher sea levels and more-frequent storm surges. Failure to plan appropriately will make it harder to act not just on climate change but also on migration, justice and conservation.

Gaining the needed clarity will require shared infrastructure and coordination. This could take the form of joint research cruises to collect sediment and ice cores, sub-ice-shelf investigations by autonomous vehicles and modelling to improve estimates of changes in local ice-shelf and ice-sheet behaviour across the Antarctic.

In April, the United Kingdom and United States announced they would work together to study the broad, fast-moving Thwaites Glacier flowing into the Amundsen Sea. Other researchers could join up throughout the region, and SCAR could facilitate and support more such efforts, align modelling and empirical data gathering and ensure that data and infrastructure, such as ships and stations, are readily available.

SCAR has a track record of facilitating successful collaborations. These include the discovery of the ozone-layer hole and elucidation of its chemistry, and clarification of the relative importance of food-web paths in Southern Ocean ecosystems. Doing such science is, however, quite different from ensuring that its results inform policy.

Happily, SCAR has another unique capability, one that drew me to the organization. The committee is a designated adviser to the parties to the Antarctic Treaty, and their delegations are well placed to influence decisions about the region and its neighbours. SCAR can also advise global bodies such as the Intergovernmental Panel on Climate Change, the United Nations Framework Convention on Climate Change and the Convention on Biological Diversity.

In other words, SCAR is poised to coordinate research effectively and to convey its findings to the bodies that are best able to act on the information. Parties to the treaty should seize this unique opportunity to support science that can bring better decisions for the planet. ■

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