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Arthropod-mediated ecosystem services
Managing for ocean biodiversity
Designing intensively managed landscapes

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No future for the Antarctic Treaty?

Climate change is exposing Antarctica's natural resources to potentially irreversible degradation. The Antarctic Treaty, which turns 50 this year, has shielded the region's sensitive terrestrial and marine ecosystems, but we are on the brink of the modern world's last great land-grab. Several nations are making new claims in Antarctica by exploiting loopholes in the Treaty. The international community must now choose between letting the Treaty crumble in the face of these challenges or mobilizing to protect Antarctica's largely pristine ecosystems on a permanent basis.

The Southern Ocean (SO) has long been regarded as the most isolated body of water on Earth. Bounded by the Antarctic Circumpolar Current and physiologically shielded by extremely low water temperatures, the SO was considered less prone to biotic invasion than other seas. Surface waters off the western Antarctic Peninsula are now among the fastest-warming on the planet, and climate change is drawing down the physiological barriers to invasion (Aronson *et al.* 2007, *Annu Rev Ecol Evol Syst* **38**: 129). As the waters warm, alien species are more likely to establish viable populations. Activities such as discharging ballast water from ships will only exacerbate the problem. Unfortunately, multinational commitments to address localized anthropogenic perturbations may not be sufficient to reverse the rapid trajectory toward a radical restructuring of Antarctic marine ecosystems. Adaptive management must focus on mitigating climate-change effects, which even within optimistic scenarios cannot be countered in the mid-term.

Concluded in Washington, DC, on 1 December 1959, the Antarctic Treaty has since been ratified by 45 nations and applies to the ocean and landmass south of 60° S latitude, with the goal of ensuring "...in the interest of all mankind that Antarctica shall not become the scene or objective of international discord". Since then, the Treaty has been strengthened by recommendations adopted at Consultative Meetings, which are attended by representatives from the signatory states (the "states parties") and supported by the Scientific Committee on Antarctic Research (SCAR). SCAR has purview over research conducted in the Treaty area and is concerned with environmental and conservation matters. The Treaty tolerates territorial claims maintained by several states parties. Some states parties, however, have taken the precaution of including in their claims adjacent territories north of 60° S, which are outside the Treaty area. This is especially true for countries that do not physically border the SO, but maintain SO islands as overseas territories. Western governments own most of these islands, and they are precisely the nations with the technological means to exploit Antarctica.

Environmental threats, including a burgeoning tourist industry, are increasingly a concern. The international community relies on the voluntary commitment and self-policing of ship operators to ensure proper waste management, as well as to avoid the introduction of invasive species by way of ship hulls, ballast water, and clothing or footwear. Driven by the recent spate of cruise ship accidents in the region, the states parties recently proposed new restrictions on the number of tourists coming ashore at any one time.

The UN Convention on the Law of the Sea (UNCLOS) sets the tone for future claims on fossil fuels and other natural resources of the oceans. UNCLOS provides the basis for asserting rights over the sea floor, including its mineral and fossil-fuel deposits, beyond a country's exclusive economic zone and based on an assessment of continental-shelf extensions on the sea floor. Nations submitting claims to UNCLOS need to provide geophysical data demonstrating that the claimed areas are natural extensions of their territorial landmasses. Several countries have already submitted claims, some of which include parts of the seafloor beneath the SO.

The recent rush for undersea real estate in the Arctic shows how quickly national actions can become a source of international concern (Cressey 2008, *Nature* **451**: 12), with little recourse in the short term. Without shared international responsibility for meaningful management of the polar regions, mitigating the impacts of climate change will be difficult. This can only be achieved by an internationally shared willingness to enforce the Treaty and by taking action on climatic warming.

As the world's fossil-fuel crisis deepens and developing economies increase their demand for limited natural resources, Antarctica will become a focus of intensive resource exploitation. It is crucial for the international community to anticipate these developments in order to have policy in place, and we propose that the UN take up this issue immediately. Polar ecosystems are among the least disturbed but most vulnerable ecosystems on the planet (Halpern *et al.* 2008, *Science* **319**: 948). In the end, we are left with the fundamental ethical question: are we willing to risk the last pristine places on Earth?



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