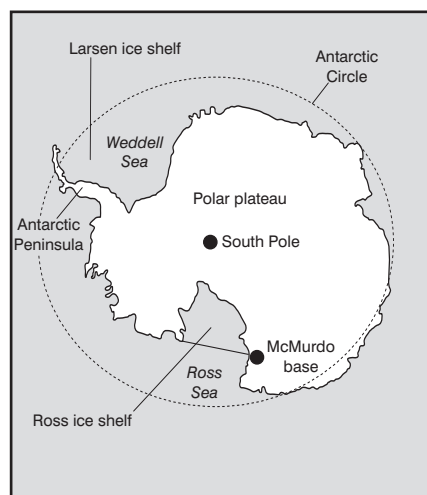


## Antarctica – politics, resources and tourism: ‘More than ice and penguins’

Figure 1: Key features of Antarctica



and 750,000 Elephant seals. The surrounding waters are also home to eight species of whale.

The terrestrial life is less well known, as it is dominated by micro-organisms, microscopic animals, algae, lichens, mosses and liverworts. Only two flowering plants are found on the Antarctic Peninsula. They are all highly vulnerable to impact from human activity.

### Politics

There are no native peoples of Antarctica (although at least three children have been born in Antarctica, at scientific stations). There is a

permanent population of scientists of up to 10,000 in summer and 1,100 in winter.

Although no one nation has control of Antarctica, seven countries lay claim to territory (Figure 2). Their claims are founded on one or more of:

- discovery and exploration of areas by their nationals
- proximity to Antarctica
- seeking to control natural resources.

The claims of Argentina, Chile and the UK overlap. None of these claims are recognised by other nations. The USA and Russia have openly reserved the right to make territorial claims.

### Physical geography

Antarctica is the fifth largest continent at 14 million km<sup>2</sup>, the size of the USA and Mexico combined. The adjoining area of Southern Ocean represents a further 36 million km<sup>2</sup>. It is the largest wilderness area on Earth. The interior is a high, flat plateau, averaging 2,500m, with Mount Vinson the high point at 4,892m. Less than 5% of the land is ice-free, the ice being on average 2,000m thick.

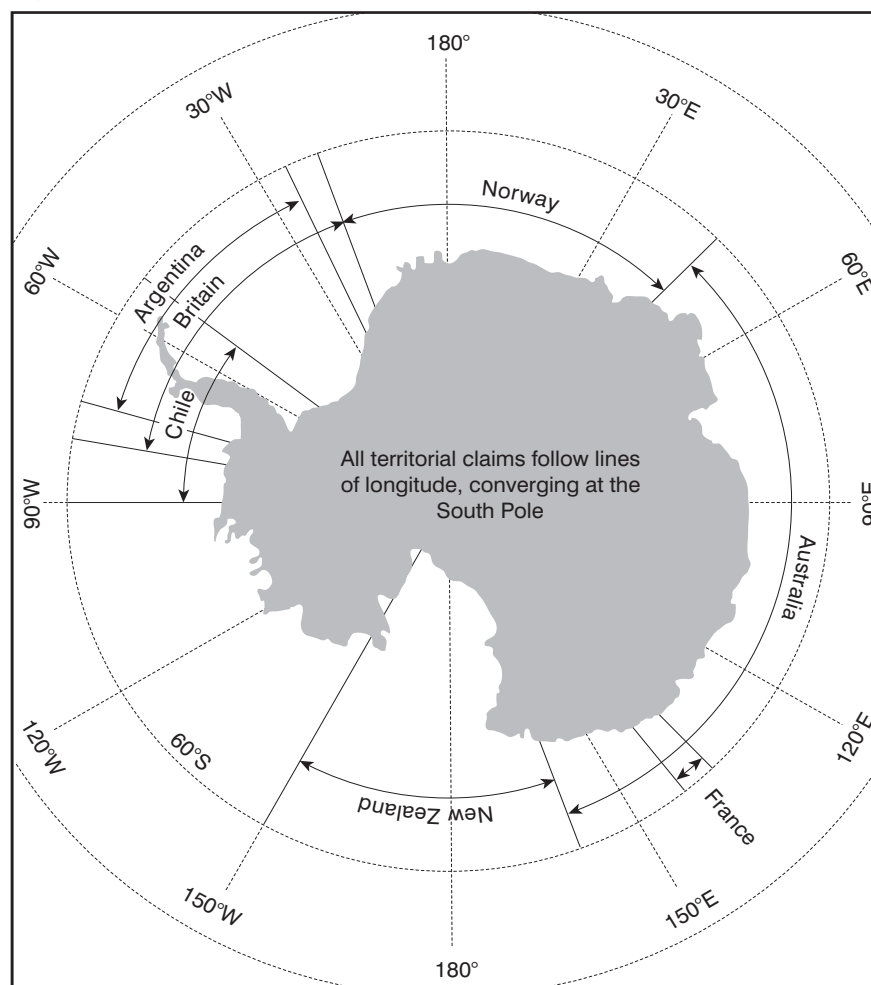
Antarctica is dark from April to August, with mean winter temperatures for the Antarctic Peninsula of -9°C and -68°C for the Polar Plateau. Precipitation levels are low, ranging from 70mm at the South Pole to 400mm at the coast. The plateau experiences high winds, up to a record of 327km/h.

### Flora and fauna

Antarctica is renowned for the birds and mammals of the Southern Ocean, which come ashore at its coastal fringes. It is estimated that over 100 million birds, from 35 species of seabirds, including seven species of penguin, breed along the coast and on offshore islands.

Antarctica plays host to six species of seal. Estimates show up to 15 million Crabeater seals, 800,000 Weddell seals,

Figure 2: Territorial claims on Antarctica



Source: [http://www.discoveringantarctica.org.uk/9\\_claims.php](http://www.discoveringantarctica.org.uk/9_claims.php)  
<http://www.classroom.antarctica.gov.au/introduction/references-and-resources/classroom-antarctica-resources/maps/maps/TerritoriesClaims.pdf>

In the 1950s, as scientific interest in Antarctica increased, scientists sought to protect the region and create a system of control. The result was the 1959 Antarctic Treaty, originally signed by the seven territory-claiming nations plus Belgium, Japan, South Africa, the Soviet Union and USA, who also had activities in Antarctica. There are now 46 signatories, of which 28 countries are full Antarctic Treaty Consultative Parties (ATCPs).

The treaty clearly set out its intentions through its 14 articles:

- Article 1: Antarctica shall be used for peaceful purposes only
- Article 2: Antarctica should be a site of scientific investigation
- Article 4: no nation would be obliged to surrender its claim, and no new claim could be made.

Since 1961 the treaty has evolved through four further international agreements:

- 1964 Agreement for the Conservation of Antarctic Fauna and Flora - superseded by the 1998 Environmental Protocol
- 1972 Convention for the Conservation of Antarctic Seals (CCAS)
- 1982 Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR)
- 1998 Protocol on Environmental Protection to the Antarctic Treaty.

The Environmental Protocol:

- commits the parties to 'comprehensive protection of the Antarctic environment'
- designates Antarctica as a 'natural reserve, devoted to peace and science'
- bans all commercial mineral resource activity
- requires environmental impact assessment of activities.

The Protocol's regulations are mandatory and legally binding on all the signatory parties. After 2048, the Protocol may be revised, but any changes would require a 75% majority among the ATCPs.

### Non-governmental organisations (NGOs)

Due to Antarctica's unique features it has long held the interest of environmental NGOs. Greenpeace had a permanent base from 1987 to 1991, and during the 1987/88 season they made world headlines when protesters

blocked the building site for a French airstrip. In conjunction with the World Wide Fund for Nature, they campaigned to have Antarctica designated as a World Park. The Antarctic and Southern Ocean Coalition (ASOC), a global coalition of over 1000 environmental NGOs, has worked since 1978 to ensure that Antarctica remains an unspoiled wilderness.

### Human activities and their impact

Despite the extent of the Antarctic Treaty system, with its respected process of continual review and the distance from large areas of population, Antarctica is affected by a number of human activities.

### Scientific research

Perhaps surprisingly, scientific operations on the continent have caused environmental problems over the years.

There are approximately 40 permanent scientific bases, with associated infrastructure, including 26 airports and 53 heliports. Bases vary in size, but typically have 50 summer staff and 15-20 winter, although the US McMurdo base has up to 1,000 summer personnel.

The coastal location of many bases means that they occupy the limited breeding space of penguins and other sea birds. Resupply by ship gives rise to the risk of accidents and oil spills. In January 1989 the Bahia Paraiso, an Argentine navy transport ship carrying supplies and tourists, ran aground, releasing 250,000 gallons of fuel into sea. The effects were fortunately limited to species of sea bird, krill and moss, with most populations seeing mortality rates of less than 20%.

In July 1995, approximately 21,000 gallons of oil were spilled from a poorly constructed fuel storage system in Argentina's Marimbo base. Similar

incidents have occurred on other bases, including Russian and United States bases.

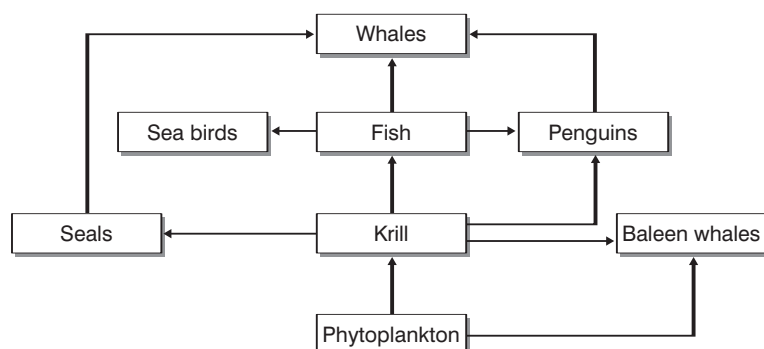
Many of the bases are accessed by air, requiring the construction of runways. In 1987 the French base blasted a runway through the breeding area of a diverse bird community. In January 2008, Australians landed a commercial jet on a specially created runway, initiating a permanent four-hour air link for their scientists, operating up to 20 times a year. They do not immediately plan to open the air service to tourists, however in 2007 Australia's environment minister, said: 'There is no reason why this runway could not be used down the track for a tourism operation.'

### Mineral exploitation

Antarctica has similar geological traits to other mineral-rich areas of the world. Seams of coal have been discovered along the continent's coasts and in the mountains. Activity has been deterred so far by lack of commercially viable quantities and the technical difficulties of working in extreme conditions. However, given the current global demand for energy and minerals, it is foreseeable that there will be interest in the future.

The latest concerns come with claims of sovereignty being made over areas of the seabed off Antarctica. The continental shelf is considered to hold the region's greatest potential for oil: the Weddell and Ross Sea areas alone are thought to possess 50 billion barrels, equivalent to Alaska's estimated reserves. Under the Law of the Sea Convention, claims can be made for up to 350 miles off existing territories. The UK lodged a claim in October 2007, described as 'a safeguard for the future'. Australia has already lodged a claim and it is likely the five other nations with territorial claims will do the same, before a May 2009 United Nations deadline.

Figure 3: Simplified Southern Ocean food web showing the central role of Krill



These claims would not allow contravention of the Environmental Protocol ban on mineral resource activities, which includes oil and gas tapping under the seabed.

## Fisheries

Fishing is the only large-scale resource exploitation on going in Antarctica.

The potential impacts are:

- over-fishing of target species
- effects on species that depend on the target species as food
- killing of other species accidentally caught
- destruction of habitat by fishing gear.

Antarctic fisheries have already been affected. In the late 1960s the marbled notothenid and icefish were targeted. More recently, the focus has been on the Patagonian toothfish, an unattractive fish that has an excellent flavour. It has been 'rebranded' as the Chilean Sea Bass, and is now in high demand in expensive restaurants. The results has been that the fishing quotas are being exceeded.

The biggest concern lies with the Antarctic krill. This is the key species within the ecosystem of the Southern Ocean (Figure 3). These shrimp-like invertebrates feed directly on phytoplankton, and grow to a length of 6 cm. They live in large schools, reaching densities of 10,000-30,000 per cubic metre.

Krill numbers dropped significantly from the start of the industry in the 1970s, and their decline may account for the decline in some penguin species. The demand for krill continues to rise due its increasing use as an

aquaculture feed, especially in salmon farms, and their enzymes have pharmaceutical uses. In Japan 43% of the catch is processed for human consumption.

With increasing restrictions on access to the krill fisheries in the Northern Hemisphere, the pressure on Southern Ocean krill stocks are intensifying.

### Management of fisheries

The Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR) (1982) controls commercial fisheries in the Southern Ocean, working on an ecosystems basis that takes in to account not only the species being fished, but also their prey and predators species. They monitor all fishing in the region.

In November 2007 a significant increase in the annual total allowable catch, from 450,000 tonnes to 2.645 million tones, was agreed for the CCAMLR fishery off Eastern Antarctica. This was considered sustainable following a scientific survey reporting a krill biomass of 28.75 million tonnes. There was also an increase in a second area from 100,000 tonnes to 746,000 tonnes a year.

A range of additional conservation and protection measures has balanced the increases. All vessels fishing the CCAMLR area must participate in their vessel monitoring system and those operating in Eastern Antarctica must have observers aboard. The new measures also require frequent reporting of krill catches. However, there still remains the potential for localised impacts on the ecosystem if large portions of the catch are taken within a small area.

### Bio-prospecting

Antarctic fish are highly sought-after by biotechnology companies, which invent new medicines, foods or industrial products from living organisms. These companies are interested in the way some Antarctic species use an anti-freeze protein in their blood to prevent them from freezing solid. They are also studying how fish of the Southern Ocean can slow their heartbeat, saving energy during the winter.

There are already 92 applications for patents that use Antarctic organisms in the USA, and 62 in Europe.

### Whaling

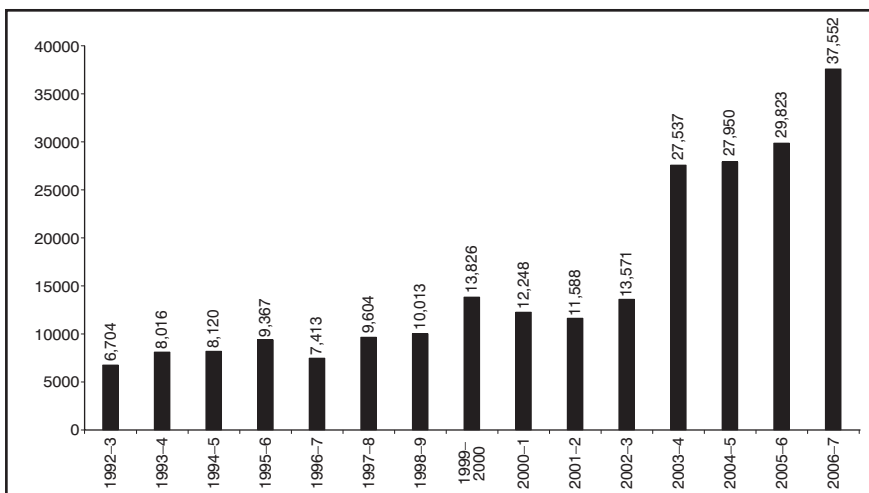
Antarctic whaling began on a large scale in 1904 with the building of a whale processing station on South Georgia, when such activity was the norm. Today whaling has been banned through the International Whaling Commission (apart from for scientific research). However in December 2007 it took international pressure for Japan to cancel their plans for a scientific catch of 50 humpback whales. They continued with their plans to take up to 935 minke whales, and 50 endangered fin whales, despite close monitoring by interested governments and environmental NGOs Greenpeace and Sea Shepherd, with the latter seeking to disrupt their activities throughout January 2008.

### Tourism

Tourism has come a long way from the earliest tourist arrivals in the 1920s as fare-paying tourists, arriving on ships servicing scientific or commercial bases on the Antarctic Peninsula. The current pattern of ship-borne tourism started in the 1970s. Aeroplane landings are limited to the interior, but overflights have occurred since 1956, with regular service from Australia and New Zealand commencing in 1977. All tourist flights ceased, following a crash in 1979; however they have subsequently recommenced.

Today, the International Association of Antarctica tour Operators (IAATO), state: 'Antarctica is likely to remain a specialised and relatively expensive niche destination offered by a limited number of experienced operators'. Despite this, tourism has grown considerably over the last 15 years and is very much on the schedule of those tourists seeking new experiences (Figure 4).

Figure 4: Seaborne, airborne and land-based Antarctic tourism



Source: IAATO

Tourism is concentrated at a small number of ice-free sites, for ease of access and because these sites offer major fauna and historical interest. The fauna of Antarctica and the Southern Ocean is one of its main draws, in particular the seabirds and seals. Most arrive on one of 40 vessels carrying a few hundred passengers each, which offer shore visits and specialist guides. There are a few larger vessels with up to 960 passengers conducting sightseeing cruises only. A 15-day voyage to the Antarctic Peninsula costs from approximately £4,500. An estimated 1,000 tourists also arrive by private yacht, which is almost totally unreported and unregulated.

Land-based activities include mountaineering, camping at a penguin colonies, exploration by snowmobile or on skis and trips to the South Pole. Many of these tourists are flown into summer tourist bases. Sea kayaking and scuba diving trips are also offered. A 20-day trip to climb Mount Vinson costs approximately £15,000.

The potential impacts are:

- damage to the landscape - Antarctic soils and vegetation are very susceptible to damage by trampling
- disturbance of wildlife
- introduction of weeds and diseases, particularly those affecting birds
- marine pollution - fuel and oil leaks, as well as illegal dumping of sewage and shipboard waste
- damage to seabed life from repeated anchoring at sites
- introduction of non-endemic marine organisms
- damage to historic artefacts
- interference with scientific programmes
- litter and waste at landing sites.

Actual impacts include the crash of an Air New Zealand DC-10 in November 1979 and the sinking of two tourist ships. In 1989 the Bahia Paraiso sank of the Peninsula, and in November 2007 the M/S Explorer sank near the South Shetland Islands.

### Management of tourism

In 1991 seven tour companies formed the International Association of Antarctica Tour Operators (IAATO) to represent Antarctic tour operators, to advocate, promote and practise safe and environmentally responsible private-sector travel to the Antarctic. Today, IAATO is comprised of 99 companies from 16 countries (<http://apps.iaato.org/iaato/directory/> 7 Jan 2008).

### IAATO's key obligations on operators

1. Provide prior notification of, and reports on, their activities to the competent authorities.
2. Conduct an assessment of the potential environmental impacts of their planned activities.
3. Provide for effective response to environmental emergencies, especially with regard to marine pollution.
4. Ensure self-sufficiency and safe operations.
5. Respect scientific research and the Antarctic environment.
6. Prevent the disposal and discharge of prohibited waste.

IAATO also requires its members to abide by the regulations set by the ATCPs. However, membership of IAATO is voluntary.

In addition to this voluntary industry scheme, the ATCPs are concerned about the potential impact of tourism. The Environmental Liability annex of the Environmental Protocol requires companies to take 'prompt and effective response action' in case of environmental damage. If the operator fails to do so, it is liable to pay the full cost of the clean-up.

In May 2007 the ATCPs issued recommendations for ship-based tourism that parties:

1. discourage or decline to authorise operators that use vessels carrying more than 500 passengers from making any landings;
2. encourage or require tour operators to:
  - a) coordinate with each other such that not more than one tourist vessel is at a landing site at any one time
  - b) restrict the number of passengers on shore at any one time to 100 or fewer
  - c) maintain a minimum 1:20 guide-to-passenger ratio while ashore.

There are also campaigns from concerned environmental groups such as ASOC for the ATCPs to develop a Convention for the Regulation of Antarctic Tourism, consistent with the approach taken with other industries.

### Conclusion

Many would consider that due to the size of Antarctica, combined with the harshness of its landscape and climate, it is a robust environment capable of withstanding relatively small-scale usage by humans. However, it does retain an iconic status that has led, to campaigns to designate it as a World Park, the aim being to keep Antarctica as the final pristine environment, which could be held up as an example for other pressured natural environments. For the time being, the pressures affecting Antarctica are managed through the Antarctic Treaty System and voluntary codes of conduct. However as demand for resources, especially minerals, oil and gas builds, the possibility of greater impacts loom over Antarctica's future.

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## F o c u s Q u e s t i o n s

- 1 Explain why operating with an understanding of the Antarctic food web is essential for the fishery industry.
- 2 Evaluate the effectiveness of the Antarctic Treaty system in managing current and future tourism pressures on Antarctica.
- 3 Assess the impact that may be placed on the Antarctica Treaty system as global demand for access to natural resources grows.