



Photo by Grant Dixon © Commonwealth of Australia

Within the easterly Antarctic Circumpolar Current is the Polar Frontal Zone, an oceanic boundary situated around 55°S where cold, dense Antarctic water meets and descends beneath warmer northern waters. The relatively large temperature difference across the Polar Frontal Zone acts as a barrier to the freezing point of sea water (-1.8°C). In the southern parts of the Antarctic Circumpolar Current about 2°C at the Polar Frontal Zone. The Antarctic Circumpolar Current is the largest ocean current in the world and carries a vast amount of heat, salt and carbon dioxide among the world's oceans. In the spring and summer, high light levels and locally abundant nutrients promote the rapid growth of microscopic floating plant cells (phytoplankton), which in turn support the rich marine fauna.

THE SOUTHERN OCEAN

350 million years ago Antarctica has been near or over the South Geographic Pole. About 160 million years ago, Gondwana began to break up, with the other continents moving north. Once the continents separated, water began to circulate around Antarctica in the Antarctic Circumpolar Current, separating the continent from the warm waters to the north. Australia, the last fragment of Gondwana, began its northward movement from Antarctica approximately 55 million years ago.

Photo by Wayne Pappas, Australian Antarctic Division © Commonwealth of Australia



The most abundant animal is the 5cm Antarctic Killi (*Lupinus subsp.*), whose total population has been estimated to be around 500 million tonnes. Killi feeds on the phytoplankton and often forms vast swarms. Killi is important in the diets of a large range of fish, squid, penguins and other birds, seals and whales. Many birds and mammals also feed on fish and squid. Great whales migrate to Antarctic waters each summer to feed on krill. Antarctica was part of the ancient super-continent of Gondwana, which broke up to form Antarctica, Australia, Africa, South America and India. The entire super-continent moved south, and for the last

The Antarctic ice sheet is dynamic. It is fed by snowfall that is highest near the coast. Much of the interior receives only about 50mm (water equivalent), less than half the annual rainfall of the world's hottest deserts. The accumulated snow compacts to become ice. The accumulation of snow is balanced by the drainage of ice towards the coast, initially at speeds as low as a few metres per year. Closer to the coast much of the ice drains via large glaciers that may move at hundreds of metres per year. The Australian Antarctic Territory includes one of the largest glaciers in the world, the Lambert Glacier, which feeds the Amery Ice Shelf – a huge floating slab of ice up to 800m thick. Icebergs break off and drift into the surrounding ocean and eventually melt.

A profound influence on the weather, particularly in the Southern Hemisphere.

Antarctica is almost twice the size of Australia. Less than 2% of Antarctica is ice-free and the ice sheet, which has an average thickness of approximately 2.4km, is up to 4.8km thick in the Australian Antarctic Territory. Antarctica contains about 70% of the world's fresh water – if it were to melt, the sea level would rise by approximately 70m. The mean altitude of the ice surface is approximately 2.3km, giving Antarctica the highest average elevation of all the continents. In contrast, Australia's average elevation is only 340m. The Australian Antarctic Territory also features the highest point of the ice sheet (4100m) and the lowest recorded temperature on Earth (at the Russian station of Vostok in 1983 (-89.6°C)).

THE ICE CONTINENT

Few life forms permanently inhabit Antarctica.

Plants (such as mosses, lichens and algae) and micro-organisms (such as bacteria and fungi) are found in ice-free areas. Two species of flowering plants occur near the tip of the Antarctic Peninsula. Tiny animals are associated with these plant communities. Seals, penguins and other birds spend most of their lives at sea, only coming ashore to breed and moult.

THE AURORA AND THE OZONE HOLE

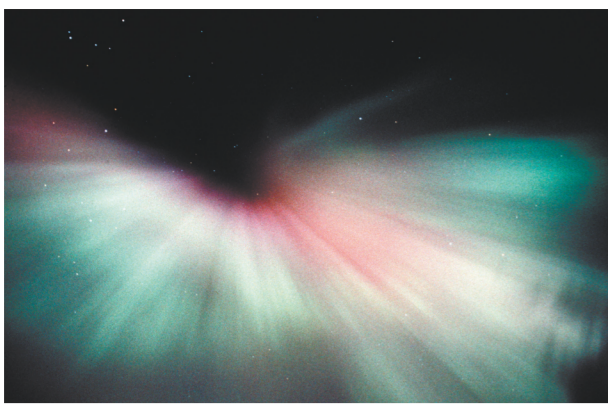
The annual formation and melting of such a large area of sea ice is one of the greatest seasonal events on the planet, and has a profound influence on global oceanic circulation, heat flow between atmosphere and ocean, and the biology of the Southern Ocean.

Since the mid-1970s, the concentration of stratospheric ozone over Antarctica during spring has decreased by about 70%. This phenomenon, known as the Ozone Hole, is linked with the release of chlorofluorocarbon gases primarily from the Northern Hemisphere. Stratospheric ozone depletion is now recognised as a global problem, having an impact on the amount of solar ultraviolet radiation that reaches the Earth's surface at all latitudes. The increase in ultraviolet radiation may be having significant effects on the Earth's ecosystems.

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Photographer unknown © Commonwealth of Australia



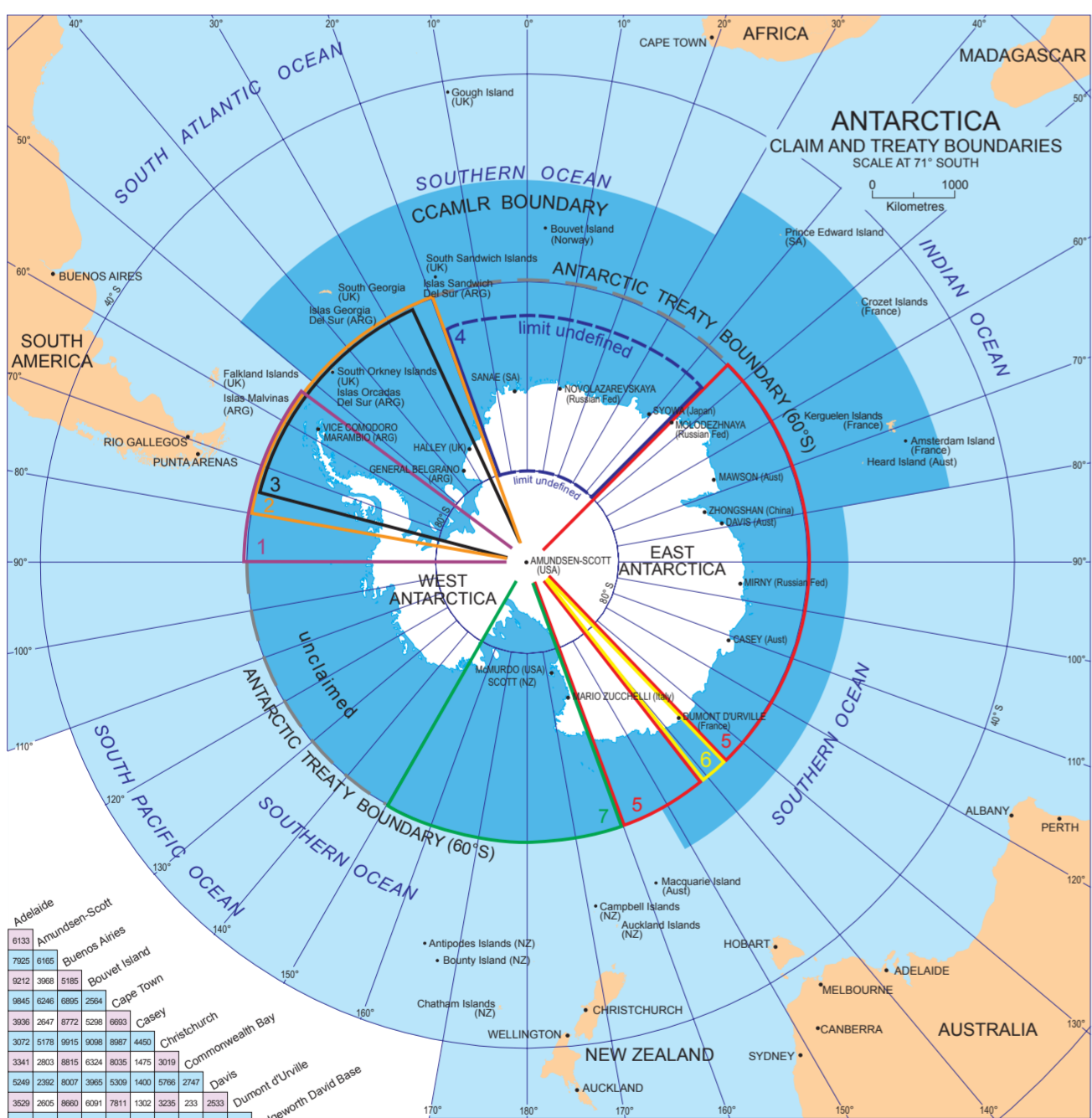
- to maintain the Antarctic Treaty System in its
- and enhance Australia's influence in it;
- to protect the Antarctic environment;
- to understand the role of Antarctica
- in the global climate system; and
- to undertake scientific work of practical, economic and national significance.

THE AUSTRALIAN ANTARCTIC PROGRAM

Australia has had a continuous presence in Antarctica since 1954, building an international reputation for the quality of its scientific work. The Antarctic Treaty entered into force in 1991 and the Protocol on Environmental Protection to the Antarctic Treaty was adopted in 1991 and entered into force in 1998. It designates Antarctica as a "natural reserve, devoted to peace and science", prohibits mining and subjects all activities to prior assessment of their impacts. It also provides measures relating to waste disposal, management of protected areas and the prevention of marine pollution.

THE ANTARCTIC TREATY SYSTEM

The Antarctic Treaty entered into force in 1961. It is a landmark agreement that ensures the peaceful use of Antarctica, guarantees freedom of scientific research and removes the potential for sovereignty disputes among Treaty Parties.



- Territorial Claims**
- 1 Chilean Antarctica
 - 2 British Antarctic Territory
 - 3 Argentine Antarctica
 - 4 Dronning Maud Land (Norway)
 - 5 Australian Antarctic Territory
 - 6 Adélie Land (France)
 - 7 Ross Dependency (New Zealand)



Australian Government
Department of the Environment and Heritage
Australian Antarctic Division

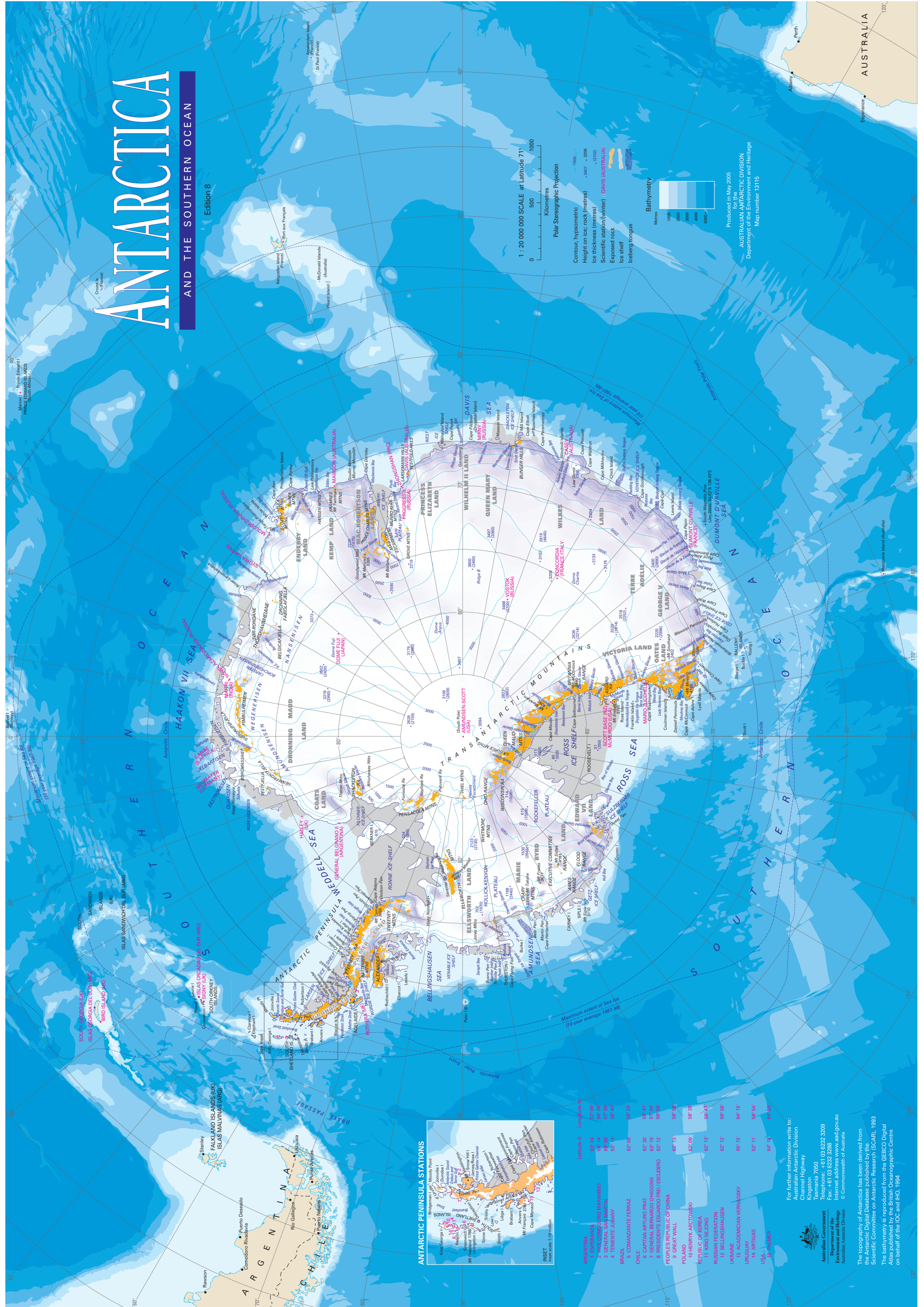
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Valued, protected and understood

ANTARCTICA

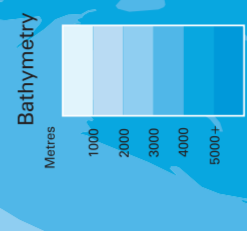
AND THE SOUTHERN OCEAN

Edition 8



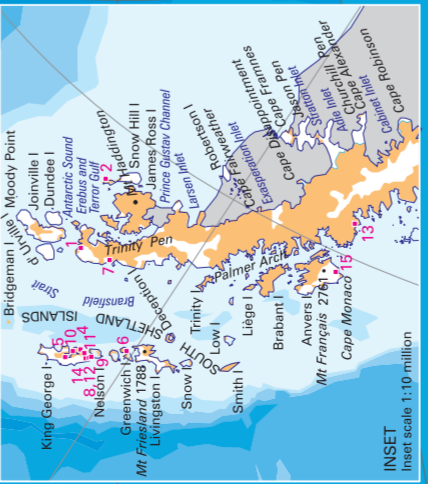
1 : 20 000 000 SCALE at Latitude 71°
Kilometres
0 500 1000
Polar Stereographic Projection

Contour: hypsometric
Height on ice: rock (metres) +307 +308
Ice thickness (metres) +3102
Scientific station (winter) - DAVIS AUSTRALIA
Exposed rock
Ice shelf
Iceberg tongue



Produced in May 2005
for the
AUSTRALIAN ANTARCTIC DIVISION
Department of the Environment and Heritage
Map number 13115

ANTARCTIC PENINSULA STATIONS



- | | |
|------------------------------------|---------|
| ARGENTINA | 62° 06' |
| 1 ESTEROS | 62° 29' |
| 2 VESUBIO | 62° 30' |
| 3 GENERAL SAN MARTIN | 62° 31' |
| 4 TENENYTE JUBANY | 62° 32' |
| BRAZIL | 62° 34' |
| 5 COMANDANTE FERRAZ | 62° 34' |
| CHILE | 62° 30' |
| 6 CARTAN ARTURO PRAT | 62° 19' |
| 7 GENERAL BERNARDO O'HIGGINS | 62° 12' |
| 8 PRESIDENTE EDUARDO FREI ESCOBERO | 62° 12' |
| PEOPLES REPUBLIC OF CHINA | 62° 13' |
| 9 GREAT WALL | 62° 13' |
| POLAND | 62° 09' |
| 10 HENRYK ARCTOWSKI | 62° 13' |
| REPUBLIC OF KOREA | 62° 12' |
| 11 KING SEJONG | 62° 12' |
| RUSSIAN FEDERATION | 62° 15' |
| 12 BELLINGSHAUSEN | 62° 11' |
| UKRAINE | 62° 13' |
| 13 ACADEMICIAN VERNADSKY | 62° 13' |
| URUGUAY | 62° 11' |
| 14 ARTIGAS | 62° 11' |
| USA | 62° 13' |
| 15 McMurdo | 62° 13' |

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