



ANTARCTICA NEW ZEALAND INFORMATION SHEET

HUMAN INFLUENCES ON ANTARCTICA

In accordance with the Antarctic Treaty and the Protocol on Environmental Protection, New Zealand is committed to maintaining Antarctica as a pure and natural environment. This task becomes increasingly difficult as interest in exploitation of the extensive living resources of the Southern Ocean continues to rise as the global demand for protein grows. This is not only because of the increasing world population, but in response to steady or declining fisheries catches within the major world fisheries.

Since the International Geophysical Year, 1957, Antarctica has been recognised as a prime site for observation of global atmospheric change resulting from increasing anthropogenic emissions of greenhouse gases (CO₂, CO, CH₄, N₂O). Its remoteness from the major gas sources allows Antarctic measurements to reveal those trends and inter-annual variations, which have true global significance. The two major global environmental issues of climate change and stratospheric ozone depletion stem from the anthropogenic modification of atmospheric composition and highlight the vulnerability of our atmospheric environment to change.

The release of chlorofluorocarbon compounds (CFCs) has shifted the balance of the stratospheric chemical system, reducing ozone concentrations and increasing potentially damaging solar UV radiation at the Earth's surface. Ozone loss has also caused the stratosphere to cool, extended the time the polar jet-stream stops high latitude air mixing to other latitudes and contributed to lower temperatures at the Earth's surface. This contrasts with the continuing increases in greenhouse gases, such as carbon dioxide and methane, which are predicted to cause surface warming with widespread consequences. New Zealand has a stake in these global changes as well as a regional interest in their Antarctic context. Hence measuring the concentration, distribution, and temporal change of gases involved in ozone depletion chemistry and greenhouse gas change over Antarctica is vital.

Past exploitation within the Southern Ocean decimated stocks of some species (e.g. baleen whales), and current fisheries focus on finfish and krill. Although commercial fisheries for Antarctic finfish have developed relatively recently, stocks of several fish species have already been substantially reduced from their original levels. These stocks are now regulated (via the Convention on the Conservation of Antarctic Marine Living Resources, CCAMLR) through an ecologically-based management regime. Practical management of these stocks is difficult, however, both politically and because information on the biology and population dynamics for target species is limited, and because of uncertainty in the response of the Antarctic marine ecosystems to changes in fish stocks. This information is essential if the living resources of the Southern Ocean are to be sustainably harvested and previously depleted populations restored to levels of maximum production.

New Zealand is a signatory to the Antarctic Treaty and the Antarctic Environmental Protocol and plays a key role in the development of environmental protection measures for the Antarctic. While Antarctica is viewed as a cold, isolated, pristine environment, unaffected by human or industrial activities, human influences are a reality. For example, DDT residues and PCBs are detected in marine mammals in the Antarctic. The difficulty is to evaluate environmental risk posed by human activities when chemical, physical and biological processes in the Antarctic are poorly understood. Metabolic processes proceed slowly at cold temperatures and this raises concern since the recovery of the Antarctic environment to a disturbance is expected to be slow. Increased knowledge of the fundamental processes that dominate in this extreme environment might give an insight into the control mechanisms and hence be used to develop appropriate environmental indicators.