

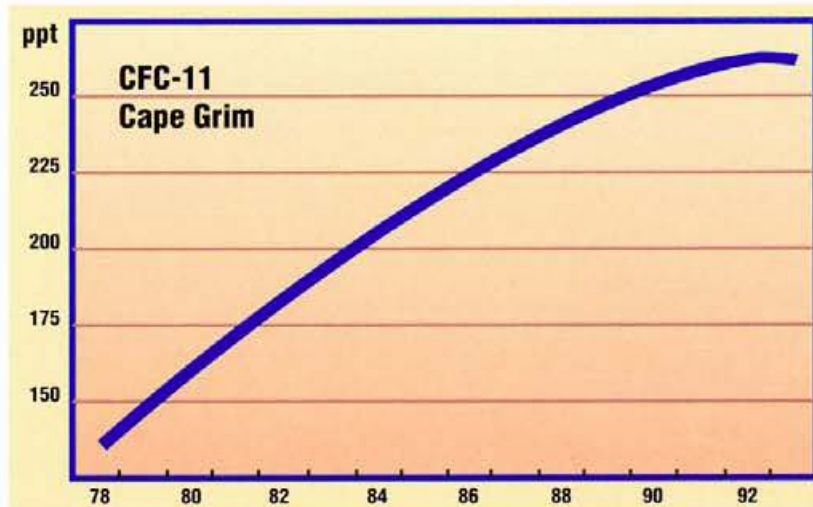
Ozone depletion: *the hole story*

Last spring, atmospheric scientists relayed the news that the 1993 Antarctic ozone hole was the largest on record (about 24 million square kilometres). Fortunately though, there is brighter news on the horizon.

Recent monitoring results from Tasmania's Cape Grim Atmospheric Research Station and elsewhere indicate that growth rates of all major chlorine and bromine containing ozone-depleting substances in the lower atmosphere (or troposphere) are slowing or have stopped. These results show that we are well on the way towards meeting the objectives of the Montreal Protocol.

The Montreal Protocol, an international agreement designed to protect the ozone layer, was most recently revised in Copenhagen in 1992. Production of chlorofluorocarbons and most other ozone-depleting chemicals will virtually cease by January 1, 1996. Another meeting to assess the efficacy of the revised protocol will be held in Europe next year.

Projections made by Dr Paul Fraser from CSIRO's Division of Atmospheric Research indicate that tropospheric chlorine in the Southern Hemisphere will stop growing between 1996 and 1999. Northern hemispheric and global atmospheric chlorine



levels are likely to stop growing earlier, but within a year of southern hemispheric levels, probably between 1995 and 1998.

Fraser expects stratospheric chlorine levels (and stratospheric ozone destruction) to peak some three to five years later. However, stratospheric chlorine levels are likely to remain sufficiently high to initiate springtime Antarctic ozone holes until at least 2015.

Meanwhile, scientists are continuing to measure chlorofluorocarbons (CFCs), hydrochlorofluorocarbons or HCFCs (the

Measurements at Cape Grim and other locations indicate that growth rates of major chlorine and bromine-containing ozone-depleting substances (such as CFC-11) in the troposphere are slowing or have stopped. (ppt = parts per trillion)

replacement chemicals for ozone-damaging CFCs) and other ozone-depleting chemicals in one of the largest studies of ozone-depletion and its causes ever conducted. The measurements are being taken from a NASA ER-2 high-altitude plane flying over Australia, Antarctica and New Zealand.

The study, dubbed ASHOE – the Airborne Southern Hemisphere Ozone Expedition – is based in Christchurch. It involves four series of flights to monitor the onset and development of the Antarctic ozone hole. In recent years, the hole has become an annual event.

Ozone depletion affects Australia year round. We now receive greater levels of harmful ultra-violet radiation than we did in the past, due to declining amounts of upper atmospheric ozone.

NASA, the US National Aeronautical and Space Administration, and NOAA, the US National Oceanic and Atmospheric Administration, are leading the expedition, which includes CSIRO, the Bureau of Meteorology and from the Cooperative Research Centre for Southern Hemisphere Meteorology. CSIRO's input is funded by the Commonwealth Environment Protection Authority, the Association of Fluorocarbon Consumers and Manufacturers, and the Aerosol Association of Australia.

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Land and water care update

Rural industries produced nearly a quarter of Australia's export earnings in 1992-93. Unsustainable use of natural resources in the past 200 years, however, has degraded much of Australia's farming and grazing land and led to deteriorating water quality in our lakes and rivers.

Agricultural export earnings will ultimately be degraded as fast and irretrievably as our soils and water unless sustainable farming systems are adopted. In response to this need, CSIRO established the Land and Water Care Program in 1989.

The program has brought together scientists and skills from eight CSIRO divisions. It also involves collaboration with departments for land and water management; universities; research and development corporations responsible for rural industries; and the Murray Darling Basin Commission. Communicating research results to farmers is one of the program's key goals. This is being achieved with the help of regional Landcare groups.



A report on the progress of the Land and Water Care Program is now available. The report, *Outcomes '93*, summarises research carried out between 1991 and 1993 in the following areas: controlling salinity; water quality and erosion; sustainable temperate grazing; managing rangelands; land resource assessment; and sustainable cropping.

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