

Introduction

Ozone is both beneficial and harmful to us. Near the ground, ozone forming as a result of chemical reactions involving traffic pollution and sunlight may cause a number of respiratory problems, particularly for young children. However, high up in the atmosphere (19-30km) in a region known as the stratosphere, ozone filters out incoming radiation from the Sun in the "cell damaging" ultraviolet part of the spectrum. Without ozone in the stratosphere, life on earth would not have evolved. Thus with the development of the ozone layer came the formation of more advanced life forms.

Concentrations of ozone in the stratosphere fluctuate naturally in response to variations in weather conditions and amounts of energy being released from the sun, and to major volcanic eruptions. Nevertheless, during the 1970s it was realised that man-made emissions of CFCs and other chemicals used in refrigeration, aerosols and cleansing agents may destroy significant amounts of ozone in the stratosphere, thereby letting through more of the harmful ultraviolet radiation. Then, in 1985, a large "ozone hole" was discovered above the continent of Antarctica during the springtime. This has reappeared every year. In response to this, and additional fears about more widespread global ozone depletion, 24 nations signed the Montreal Protocol on Substances that Deplete the Ozone Layer (1987). This legally binding international treaty called for participating developed nations to reduce the use of CFCs and other ozone depleting substances. In 1990 and again in 1992, subsequent amendments to the Protocol brought forward the phase out date for CFCs for developed countries to 1995.

Protecting the ozone layer is essential. Ultraviolet radiation from the Sun can cause a variety of health problems in humans, including skin cancers, eye cataracts and a reduction in the ability to fight off disease. Furthermore, ultraviolet radiation can be damaging to

microscopic life in the surface oceans which forms the basis of the world's food chain, certain varieties of crops including rice and soya, and polymers used in paints and clothing. A loss of ozone in the stratosphere may even affect the global climate.

International agreements have gone a long way to safeguarding this life-supporting shield. Nevertheless, for there to be real and long-lasting success, everyone must become part of the solution. Individual efforts taken together can be powerful forces for environmental change. There are a number of things that we, as individuals, can do to both protect the ozone layer. These include proper disposal of old refrigerators, the use of halon-free fire extinguishers and the recycling of foam and other non-disposable packaging. Finally, we should all be aware that whilst emissions of ozone depleters are now being controlled, the ozone layer is not likely to fully repair itself for several decades. Consequently, we should take precautions when exposing ourselves to the Sun.

The Atmospheric Research & Information Centre (aric), through its Atmosphere, Climate and Environment Information Programme, has compiled a series of 20 topical fact sheets concerning the subject of ozone depletion. The series is divided into three sections - the *science of ozone depletion* (10), the *impacts of ozone depletion* (6), and *managing ozone depletion* (4). Together, they describe what ozone, the ozone layer, ozone depletion and the ozone hole are, how ozone depletion occurs, mankind's influence, its impacts, and the international agreements put in place to control it. The fact sheet series is aimed at students involved in Key Stage 4 of the National Curriculum (GCSE) and higher. Although some of the concepts covered by the fact sheets may be challenging, a glossary is provided to compliment the main text, which sometimes contains words and phrases that may seem unfamiliar to the reader. aric hope that the reader will find this fact sheet series a useful information resource on ozone depletion.