

Effect of additional controls

The peak in chlorine loading of the atmosphere has passed.

Normal atmospheric processes cause the stratospheric chlorine loading to fall but we cannot change the rate of fall because that is governed by the materials that are already in the atmosphere. We can only change the amount going into the atmosphere.

If all releases were to stop now, the ozone hole should disappear by the year 2033. With the emissions that are expected, the hole should go by 2048.

Most (40%) of the difference is due to emissions of Halons.

The expected emissions of CFCs contribute 6%.

HCFCs contribute less than 1%.

More information

The effectiveness of controls cannot be gauged using Ozone Depletion Potentials (ODPs). These mislead because they address only the [potency for ozone depletion and not the actual impact](#) on the ozone layer.

The Scientific Assessment conducted for the WMO in 2002 (4) shows that there will be a risk of [ozone depletion](#) until the middle of the 21st century. This is the time that chlorine loading is expected to return to normal levels that existed before the appearance of the Antarctic Ozone hole. This is the timescale that is important.

Normal atmospheric processes cause the [stratospheric chlorine loading](#) to fall but there is little or no capability to change the rate of fall because it is determined principally by the materials that are already in the atmosphere.

The peak in chlorine loading has passed; contributions from most of the individual ODS are falling. The exceptions are the Halons (in particular Halon-1211) and CFC-12. Contributions from HCFCs are expected to increase by a small amount in the future, although the consumption of these materials in the developed world has reached the cap set by regulations.

There is general agreement between the estimates of global production and emissions of ODS made by regulators, industry and scientists. These show that the [Montreal Protocol](#) is working and fit with the observed reduction in chlorine loading (4).

The rate of reduction in chlorine loading, and the length of time that it remains above the historic level are influenced by continuing emissions of ODS; in turn influenced by regulations. Chlorine loading is therefore an ideal tool to estimate the effectiveness of control measures directed towards reducing ozone depletion.

The Scientific Assessment conducted for the WMO in 2002 (4) shows that the most effective measure to assist recovery of the ozone layer would be to contain the Halons. This would reduce the [Equivalent Effective Stratospheric Chlorine \(EESC\)](#) loading by 11% over the future period at risk and would shorten that period by 3 years. This assessment also concluded that the benefit from containing CFCs would be similar, at 9% (and 3 years' reduction). In the case of HCFCs, most of the effect is expected to come from material produced in the future and a moratorium on

HCFC production would reduce EESC by 5% and affect the period by one year.

In a previous assessment, by the UK's Stratospheric Ozone Review Group in 1999 (5), similar conclusions for Halons and CFCs were drawn but the effect from HCFC reductions in the EU Regulation EC 2037(2000) would be to reduce EESC by only 0.3%, with no effect on the period at which the atmosphere is at risk.

There are three principal reasons for this small effect:

- HCFCs have a lower intrinsic effect in the stratosphere because they contain less chlorine and it is less effective in ozone depletion than the chlorine in CFCs;
- HCFCs decompose in the lower atmosphere so that, while CFCs are transported completely into the ozone layer, a smaller proportion of HCFCs reaches the layer; and
- Use (and so emission) of HCFCs is significantly less than CFCs (about 25%) and they have been produced over a shorter period of time so that the "banks" of unreleased material in equipment are smaller.

(April 2003)

Quotes

4. Scientific Assessment of Ozone Depletion: 2002, World Meteorological Organization, Global Ozone Research and Monitoring Project Report No. 47, WMO, Geneva, 2003.

5. Stratospheric Ozone: 1999, Seventh Report of the UK's Stratospheric Ozone Review Group, DETR, London, 1999.