

## Chlorine Loading of the Stratosphere

Chlorine loading gives a measure of the actual environmental impact of an Ozone Depleting Substance (ODS) that is impossible to obtain just using Ozone Depletion Potential (ODP).

Chlorine loading is the contribution of the compound to the real quantity of reactive halogen in the stratosphere. For an ODS that contains chlorine, it is the atmospheric concentration of that compound expressed as its chlorine content. For an ODS that contains bromine, the concentration is multiplied by a factor to take account of the higher potency of bromine for ozone depletion. Currently the recommended factor is 45 (4).

Unlike chlorine and bromine, fluorine is inert in the stratosphere and does not deplete ozone.

If a compound is not emitted into the atmosphere then it will have no chlorine loading.

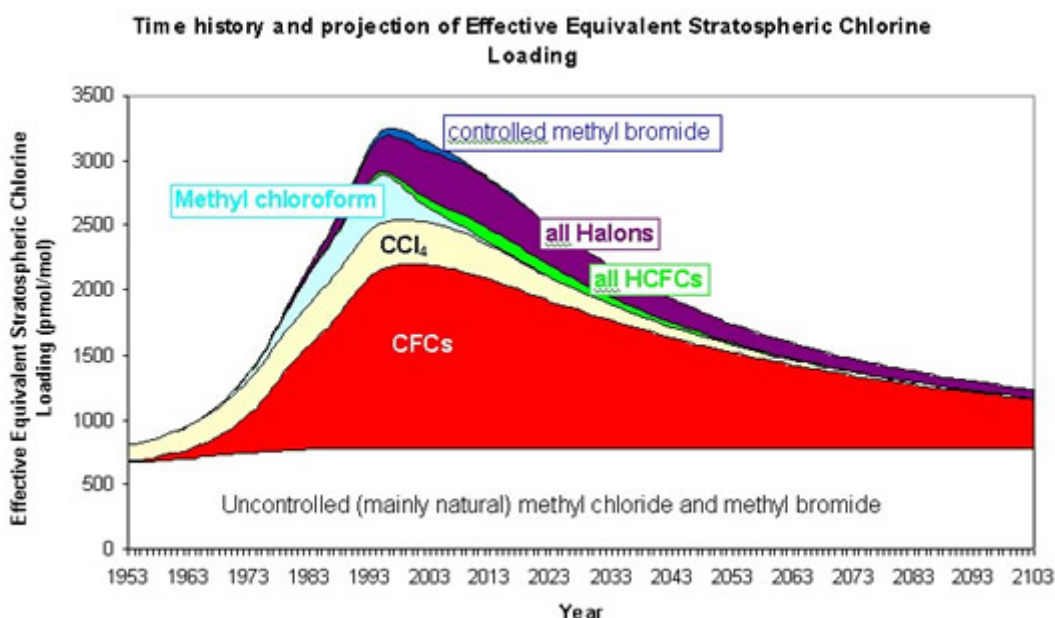
Chlorine loading evolution shows not only the current concentration and impact, but also exactly the way the impact will change with time as the compound is removed by atmospheric chemical processes. It is explicitly time-dependent. On the other hand, [ODP is simply the potential potency of the Ozone Depleting Substance](#).

Chlorine loading is a far better guide to future impact on the ozone layer than "ODPtonnes" or "time dependent ODP" and, for this reason, has been used in every Scientific Assessment conducted for UNEP since 1991 (1, 2, 3, 4).

The impact on stratospheric ozone of a particular ODS can be gauged explicitly by incorporating the stratospheric effectiveness of chlorine, which is different for each ODS. The resulting parameter is the Equivalent Effective Stratospheric Chlorine contribution of the substance. [This is directly related to ozone depletion](#) and was used in the WMO 2002 Scientific Assessment(4) to gauge the effectiveness of control measures.

Historical and anticipated Stratospheric Chlorine Loadings from all ozone depleting substances over the period 1950 to 2100 (adjusted for transport time to the stratosphere) are shown in the accompanying picture.

(April 2003)



## **Quotes**

- 1.**Scientific Assessment of Ozone Depletion: 1991, World Meteorological Organization, Global Ozone Research and Monitoring Project Report No. 25, WMO, Geneva, 1991.
- 2.**Scientific Assessment of Ozone Depletion: 1994, World Meteorological Organization, Global Ozone Research and Monitoring Project Report No. 37, WMO, Geneva, 1995.
- 3.**Scientific Assessment of Ozone Depletion: 1998, World Meteorological Organization, Global Ozone Research and Monitoring Project Report No. 44, WMO, Geneva, 1999.
- 4.**Scientific Assessment of Ozone Depletion: 2002, World Meteorological Organization, Global Ozone Research and Monitoring Project Report No. 47, WMO, Geneva, 2003