

Re-evaluation of the Lifetimes of Ozone-depleting Substances

S. Reimann¹, M. Ko², P. Newman³ and S. Strahan³

¹EMPA, Laboratory for Air Pollution/Environmental Technology, Duebendorf, Switzerland; +41448234638, E-mail: stefan.reimann@empa.ch

²NASA Langley Research Center, Hampton, VA 23681

³NASA Goddard Space Flight Center, Greenbelt, MD 20770

Estimating the average lifetime of a molecule in the atmosphere is crucial to understanding the atmospheric concentrations of ozone depleting substances (ODS). Predicting the concentration is the first step in obtaining estimates for ozone depletion and greenhouse forcing. Because the lifetimes of ODSs are also used to predict how the future concentrations change with emissions, they also have implications on policy decisions for limiting future release of Hydrochlorofluorocarbons (HCFCs) and other replacement compounds under the Montreal Protocol.

During the last 25 years, various methods have been used to derive lifetimes. Within the last several years evidence is growing that the lifetimes of certain ODSs are possibly somewhat longer than published values. The “Lifetime of halogen source gases” activity under the World Climate Research Programme (WCRP)/Stratospheric Processes And their Role in Climate (SPARC) project has convened a working group to re-evaluate these ODS lifetimes. The goal is to estimate the numerical values for lifetimes and their uncertainties, and to quantify how the values may depend on factors such as the use of different lifetime definitions (e.g. steady-state/instantaneous lifetimes) and changing climate.

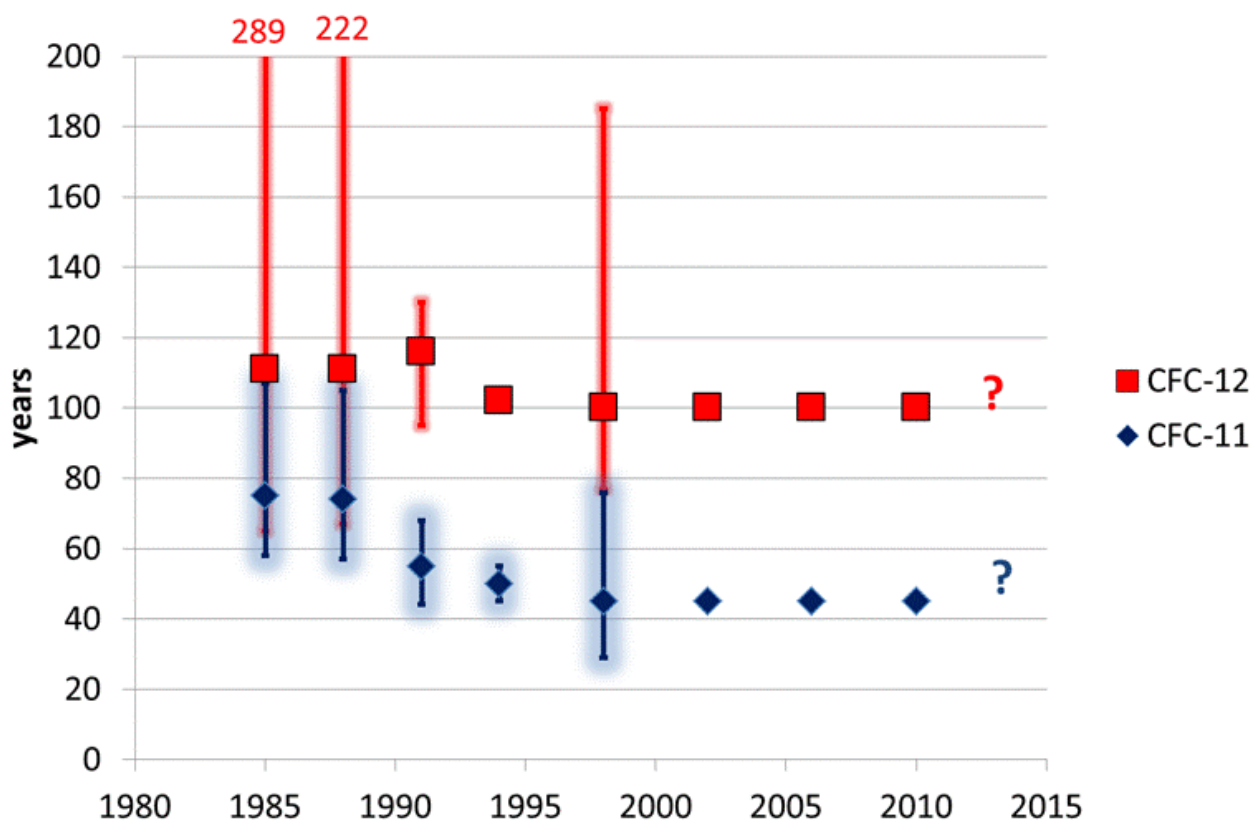


Figure 1. Estimated average lifetimes for Chlorfluorocarbons CFC-11 and CFC-12 in the course of the last 25 years.