Review of Methyl chloroform: Metadata on Distributed Emissions

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Emission Functions

Methyl chloroform (CCl\textsubscript{3}CH\textsubscript{3}, 1,1,1-trichloroethane) was primarily used as a solvent in a wide range of industrial and commercial processes from which emissions occur much more promptly than from, for example, refrigeration systems. Because most purchases were made to replace material that had already been emitted, emissions are an effectively invariant function of sales. Incorporating delays in the supply chain and the average delay between purchase of the material by the user and its emission, 75% of the material is emitted in the year of purchase and 25% in the following year (Midgley and McCulloch, 1995). Similar functions were applied to the relatively small quantities of methyl chloroform that were recently stockpiled. Simple delays, of one and two years, were used to account for the stock holding times.

Basic Data on Sales

The database for annual production and sales of methyl chloroform over the period 1951 to 2000 was combined from early estimates (Neely and Plonka, 1976), audited industrial data (Midgley, 1989; Midgley and McCulloch, 1995; CEFIC, 1997) and data submitted to the United Nations Environment Programme under the Montreal Protocol (UNEP, 2002). Methyl chloroform is unique among the ozone depleting substances controlled by the Protocol in that it is the sole member of a classification "Group" and so data are specific. However, the UNEP data are not audited and are quoted as ODPtonnes (Ozone Depletion Potential multiplied by the number of metric tonnes). The combined data set is reported in McCulloch and Midgley (2001).

Geographical Distribution of Emissions

Audited production and sales of methyl chloroform are subdivided into geographical regions in the industrial database. This enabled sales to be assigned to countries on the basis of each national share of the total regional Gross Domestic Product, as described in Midgley and McCulloch (1995). This use of relative GDP as a distribution function was shown to be valid for fluorocarbon solvents in McCulloch et al. (1994). Within each country, emissions were assigned to gridsquares using the population distribution in Li (1996).

Results are presented here as the percentage distribution among gridsquares. Absolute emission from each gridsquare in 1990 should be calculated by multiplying global emission for 1990 in Table 1 (MCFEM) by the gridsquare percentages in Table 2 (download Table 2) (MCF90) (Keene et al., 1999). For other years, the distribution in Table 2 (download Table 2) should be applied to the global emission for the appropriate year. While global emissions change relatively rapidly, distribution is affected only by relative economic activity and population dynamics, which have slower rates of change.
with time. It is expected that the distribution can be applied to the years 1985 to 1995 without significantly increasing uncertainty but this has not been tested. It can be applied to years beyond this range only with caution and new distributions for more recent years are under development.

**Time Series of Global Emissions**

Based on McCulloch and Midgley (2001) the time series (1951 to 2000) of methyl chloroform emissions and their uncertainties is shown in [Table 1](#)

Future emissions will be governed by the controls required by the Montreal Protocol and by the quantity of material currently in the "bank" (that is: material which is in use but has not yet been emitted). A scenario for future releases of CFC-11 was described in Madronich and Velders (1999). This scenario has been updated to take account of the significant reduction in productive capacity that has occurred in recent years and will be published in Fraser and Montzka (2003).

**Development**

In view of the changes brought about by the Montreal Protocol, it is proposed to revise the distribution functions to provide gridded data for the year 2000.

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**References**


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