

# Eastern Asian emissions of anthropogenic halocarbons deduced from aircraft concentration data

---

[Paul I. Palmer](#), Daniel J. Jacob, L. J. Mickley, Donald R. Blake, Glen W. Sachse, Henry E. Fuelberg, Christopher M. Kiley

---

*J. Geophys. Res.* , 108, 4753, doi:10.1029/2003JD003591, 2003.

---

## Abstract

Halocarbons are a class of ozone-depleting gases whose production is banned in developed countries by the Montreal Protocol, and is subject to a series of restrictions in developing countries. Recent aircraft measurements of Asian outflow over the western Pacific (March-April, 2001) offer important constraints for estimating emissions from eastern Asia (China, Japan, and Korea), a region whose consumption of halocarbons is particularly uncertain. We report the first aircraft-deduced emission estimates of selected halocarbons from China, Japan, and Korea. We calculate an eastern Asian carbon tetrachloride (CCl<sub>4</sub>) source of 18.5 Gg yr<sup>-1</sup>, considerably larger than previous estimates and a major contributor to the global budget for this gas. Our results for methyl chloroform (CH<sub>3</sub>CCl<sub>3</sub>) are in general agreement with inventories for 1999 derived from government records, and our emission estimates for CFC-11 and CFC-12 are consistent with those calculated from records of production and consumption. For Halon 1211 we find only a strong local source originating from the Shanghai area. Our emissions result in a 40% increase in ozone depletion potential (ODP) from previous estimates of eastern Asia for the gases studied, amounting to a ~10% global increase in ODP.

---

The full version of this paper is available as a pdf file [\[Full Text \(pdf\)\]](#).