Geophysical Research Abstracts, Vol. 7, 07130, 2005
SRef-ID: 1607-7962/gra/EGU05-A-07130

1 Oceanic emissions of bromoform (CHBr3) and their contribution to the global budget of tropospheric BrO

G. Sousa Santos (1), M. Schultz (1), B. Quack (2)

(1) Max-Planck Institute for Meteorology, Hamburg, Germany, (2) Leibniz-Institute of Marine Sciences, Kiel, Germany (santos@dkrz.de / Fax: +49 40 41173 298 / Phone: +49 40 41173 207)

Bromoform ($CHBr_3$) is a natural halocarbon mainly emitted by oceanic sources. It is a short-lived gas with a global lifetime of 26 days and a burden of 14 Gg of Br in the atmosphere. Most of its degradation occurs in the lowest 2.5 km. However, there are indications that $CHBr_3$ has a large impact on upper tropospheric ozone and perhaps even affects ozone in the lower stratosphere. Emission estimates for this specie range from 2.5 to 20 Gmol Br yr^{-1}. In order to evaluate these estimates, we developed a $CHBr_3$ emissions inventory and performed simulations with the global chemistry transport model MOZART-2. The bromoform sea-to-air flux is spatially and temporally variable. Measurements indicate that emissions are highest in some coastal and shelf regions, especially in the tropical and subtropical latitudes. We assessed various scenarios for the emission flux distribution: (1) a homogeneous flux throughout the ocean, (2) a lower flux from the open ocean and enhanced values in coastal areas, (3) a parameterisation involving the sea surface temperature. All three simulations pose an upper limit of 3.5 Gmol Br yr^{-1}on the global emissions flux of $CHBr_3$, which is at the low end of the literature estimates.

In order to investigate the impact of $CHBr_3$ on tropospheric ozone, a simplified halogen scheme for the MOZART-2 chemistry transport model was developed. Preliminary simulations yield a global tropospheric average BrO concentration of 0.2 ppt

resulting from bromoform alone. This is somewhat lower than the observations of BrO in the free troposphere from GOME (DOAS), which hint at a value between 1-2 ppt.