



## **Very short-lived Substances as Sources for Stratospheric Bromine**

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### Abstract

Halogen-containing gases, when transported into the stratosphere, release chlorine and bromine atoms, which can lead to the destruction of ozone by catalytic cycles. Long-lived anthropogenic source gases like chlorofluorocarbons (CFCs), chlorocarbons, methyl bromide (CH<sub>3</sub>Br, also with natural sources) and halons are the most important sources for stratospheric halogen. While the budget of stratospheric chlorine is relatively well understood, greater uncertainties are present in terms of quantity and attribution of stratospheric bromine. BrO measurements in the stratosphere indicate abundances of inorganic bromine Br<sub>y</sub> that cannot be explained by the contribution from the long-lived halons and methyl bromide only. Additional input is expected to be provided by natural very-short-lived substances (VSLS), inorganic product gases and bromine tied to aerosols.

We present measurements of all important brominated source gases, including the five most abundant VSLS, in the tropical tropopause layer (TTL) from balloon-borne air samples collected in June 2008 in Teresina (Brazil). The results were used to derive a local budget of organic bromine, which is revealing a considerable contribution from VSLS. We discuss variabilities in the concentrations of VSLS species both in the TTL and in the tropical marine boundary layer to assess the significance of our measurements on a global scale.