# Observational study of the short-lived ozone depleting substances, bromoform and dibromomethane

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Bromoform ($CHBr_3$) and dibromomethane ($CH_2Br_2$), which undergo photolytic degradation and react with OH to produce inorganic bromine, are the large contributors of organic bromine from the ocean to the atmosphere, where it can affect stratospheric and tropospheric ozone chemistry (Carpenter and Liss 2000; Montzka and Reimann 2011). These naturally produced ozone-depleting substances (ODS) are attracting more interest as concentrations of anthropogenic ODS decrease under the provisions of the Montreal Protocol. The major sources of these bromocarbons are believed to be seaweed or macroalgae, followed by phytoplankton and other biological sources, but many uncertainties remain with regard to their production amount and mechanism. In this study, we conducted high-frequency long-term measurements of $CH_2Br_2$ and $CHBr_3$ at Hateruma Island, and found that the relationship between $[CH_2Br_2]/[CHBr_3]$ and $[CHBr_3]$ could be explained by their chemical decay in the atmosphere with a fairly consistent $CH_2Br_2/CHBr_3$ initial emission ratio, and some additional coastal effects. By combining these data with NOAA global observation data (14-yr monthly data from 14 ground stations), we obtained new insight into the global sources of these bromocarbons and their chemical degradation.

Keywords: bromocarbons, sources, long-term observation

 