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Observed distribution of halocarbons in the Southern Hemispheric UTLS and implications for the bromine and chlorine budget of the lowermost stratosphere

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Since the end of the 1980's, the Montreal Protocol regulates production and use of chlorine and bromine containing substances because they thin out the ozone layer. This has led to a phase out of the long-lived halocarbons like the chlorofluorocarbons (CFCs). Next to the long-lived halocarbons, bromine and chlorine containing substances with atmospheric lifetimes of less than 6 months can reach the lower stratosphere. These substances, also known as "very short-lived" substances (VSLs), have their origin both from natural and anthropogenic sources. An increase of the relative contribution of the VSLs to the stratospheric halogen loading is assumed. Due to their short lifetime, chlorine and bromine of these gases are released quickly into the stratosphere, making them particularly effective catalysts for destruction of ozone in the lower stratosphere.

Here we present airborne measurements of halocarbons including chlorine and bromine VSL source gases. Measurements were taken on the HALO aircraft during the measurement campaign SOUTHTRAC in the Southern Hemisphere UTLS. Using an airborne GC/MS system in electron impact ionization mode, samples were taken in a time resolution of around 6 minutes. One of the focuses are the exchange processes between the Northern and Southern Hemisphere. We further compare results of this campaign with these of previous ones of the Northern Hemisphere.