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In-Situ Measurements of BrO in the early 2011/2012 Arctic Polar Vortex

F. Heinecke, A. Afchine, M. von Hobe, A. Richter, A. Schönfeld, C. Steinert, O. Suminska, V. Tan, and F. Stroh
Germany (f.heinecke@fz-juelich.de)

The Bromine Monoxide radical was measured along with Chlorine Monoxide with the HALOX instrument during two flights of the M55-Geophysica high-altitude research aircraft from Kiruna (Sweden) employing the Chemical Conversion Resonance Fluorescence (CCRF) Technique, first demonstrated on aircraft by Brune et al., 1989. In the effort to narrow down the remaining uncertainties for the inorganic Bromine loading (Br_y) of the stratosphere, In-Situ BrO data provide valuable information, as BrO is the most abundant inorganic Bromine species in sunlit stratospheric air.

The BrO detection limit was lowered by recent modifications of the optical setup in the HALOX instrument aiming at the reduction of stray light. However a closer look at the stray light problem also revealed the need for an improved instrument calibration. A concept for a reliable calibration was developed. The new method will be applied to the new dataset and compared to the former calibration. The results from the acquired BrO data along the flight track will be discussed and compared to earlier measurements. Based on the demonstrated field performance the potential of the CCRF technique to quantify the extremely low BrO concentrations in the UTLS and TTL regions in future tropical field measurements will be evaluated.

Brune, W. H., J. G. Anderson, and K. R. Chan (1989), In Situ Observations of BrO Over Antarctica: ER-2 Aircraft Results From 54°S to 72°S Latitude, J. Geophys. Res., 94(D14), 16,639–16,647, doi:10.1029/JD094iD14p16639.