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# Trend analysis of stratospheric BrO using ground-based UV-visible and SCIAMACHY limb observations at 60°N, 44°N, 28°N, and 45°S

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Recently, we have published a trend analysis of stratospheric bromine monoxide (BrO) columns derived from ground-based zenith-sky UV-visible observations made from 1995 to 2005 at the NDACC (Network for the Detection of Atmospheric Composition Change) stations of Harestua (60°N, 11°E) and Lauder (45°S, 170°E). The time series of stratospheric BrO vertical column densities have been fitted using a statistical model including a linear trend and seasonal components represented by polyharmonic functions. The inclusion of such functions in the model enables to fit the strong seasonality of BrO in the stratosphere. At both stations, the polyharmonic fit gives a positive trend of +2.5%/year for the 1995-2001 period, while a negative trend of -1%/year is found after 2001. Given the mean age of air over Harestua and Lauder, the decline of BrO in the stratosphere after 2001 is consistent with the reported decline of long-lived bromine source gases observed since the second half of 1998. This study provided therefore the first clear evidence for a decline of the stratospheric bromine loading in response to the Montreal Protocol limiting the production of brominated and chlorinated source gases.

In this presentation, we extend the trend analysis at Harestua and Lauder until 2008. We also include time series of BrO vertical columns retrieved at two other NDACC stations: Observatoire de Haute Provence (OHP; 44°N, 5.5°E) and Izaña (28°N, 16°W). The period covered by the observations is 1998-2008 for OHP and 2004-2008 for Izaña. Moreover, the trend values at the four NDACC stations are compared to the results of a trend analysis of time series of collocated stratospheric BrO columns retrieved from SCIAMACHY limb observations.