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Halogen oxides from MAXDOAS observations at Belgrano station (Antarctica, 78ºS) in 2013

Olga Puentedura (1), Margarita Yela (1), Manuel Gil (1), Manuel Perez-Camacho (1), Monica Navarro-Comas (1), and Hector Ochoa (2)

(1) INTA, Observación de la Tierra, Madrid, Spain (puentero@inta.es), (2) Dirección Nacional del Antartico, Buenos Aires, Argentina.

BrO and IO play an important role in the tropospheric distribution of ozone. Tropospheric distribution of both radicals in Antarctica is still an open issue since there are some uncertainties over both its geographical and vertical distribution. Accurate MAXDOAS measurements of both components are important to set the their vertical distribution and to understand the halogen chemistry in the troposphere in Antarctica, where BrO and IO ground based measurements are very sparse and satellite observations have some limitations.

In February 2011 a Multiaxis Differential Optical Absorption Spectroscopy (MAX- DOAS) instrument was installed at Belgrano II station (Antarctica) to have a better understanding of BrO distribution in this site and to improve the Antarctic program INTA has been performing from 1994 for stratospheric ozone monitoring and research. In this same framework in February 2013, a second MAXDOAS spectrometer started to measure IO continuosly. Both instruments have been entirely developed at INTA including the detector read-out electronics and have been been robustly designed for continuous operation in rough environment like Antarctica.

Belgrano station is a candidate to be a NDACC site for continuous monitoring of atmospheric composition. Within the framework of NORS project NDACC expertise is being exported to MAXDOAS observations carried out in this station.

In this work IO and BrO MAXDOAS DSCD between 2º and 90º elevation angles are presented from February to early April and from September to October 2013. Tropospheric IO is detected almost every day of measurement above the detection limit and the seasonal evolution show a good agreement with previous works as Saiz-Lopez et al., 2007, with higher columns towards the end of February, early March. The observed behaviour during the spring is, however, highly variable. Tropospheric BrO is as well detected during the whole period of measurements above detection limit with columns increasing towards the end of the period. During spring the column is, as in the case of IO, highly variable with some strong and sudden enhancements episodes during the month of September and October.