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## **NO<sub>2</sub> climatology at Southern Polar Regions**

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A long term monitoring program for NO<sub>2</sub> vertical column (VCD) by zenith-sky visible absorption spectroscopy in the Antarctic region was initiated in 1994 by an Agreement between INTA (Spain) and DNA/IAA (Argentina). Three scanning spectrometers were deployed at Ushuaia (55°S, 68°W), Marambio (64°S, 56°W) and Belgrano (78°S, 35°W) between 1994 and 1995. The stations are representatives of mid latitudes, the edge and the core of the Antarctic polar vortex, respectively. Spectra have been reanalysed by using common cross sections settings defined as standard in the Andoya NDACC intercomparison in order to homogenize the data for a proper comparison between instruments. Based on 14 years daily mean (1994-2007) a picture of the meridional distribution of the NO<sub>2</sub> VCD at high latitude has been obtained by the analyses of seasonal wave, interannual variability, diurnal variation and dependence with the light available. Ground based (GB) data are compared to GOME and SCIMACHY measurements for the three stations. A photochemical box model has been used to correct for differences in times of measurements between satellites and GB. However, some seasonal dependence still remains. NO<sub>2</sub> seasonal wave at tropical/mid latitudes is modulated by photochemistry through the number of light hours in the stratosphere and to a lesser extend by the upper stratosphere temperature, but in high latitude this wavy structure is distorted by denitrification processes within the vortex as can be seen by the strong asymmetry between autumn and spring in the NO<sub>2</sub> VCD as a function of the hours of light.