



Tropospheric columns using SAOZ zenith sky spectrometer

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The main objective of the SAOZ uv-visible spectrometers is the measurement of the stratospheric ozone and NO₂ columns by zenith sky differential optical absorption spectroscopy. Since 1988, about 20 instruments have been installed at various latitudes on the globe, in remote stations, far from polluted sources. Recently, new nadir viewing satellite instruments (OMI) are providing NO₂ maps with a high spatial resolution and are thus able to show large in-homogeneities and high values in the NO₂ fields around specific cities or regions, mostly related with polluted areas. In order to validate these observations, a SAOZ dedicated to NO₂ tropospheric measurements has been installed inside Paris, France, on the roof of the University.

To validate the method developed to separate in the NO₂ signature, the tropospheric and the stratospheric contributions, three SAOZ instruments have taken part in the GEOMON/NDACC/ESA CINDI campaign in Cabauw, Netherland, in June-July 2009. One was installed on the ground to determine total tropospheric column, another one on top of the 230 m tower to determine partial tropospheric column and a third one was used as a mobile instrument to evaluate the inter-pixel variability in the satellite NO₂ observations. SAOZ tropospheric columns have been compared to the local in-situ measurements, the integrated MAXDOAS, sondes and Lidar profiles and to OMI satellite measurements showing a good agreement at low SZA (Solar zenith angle). Tests have been conducted to improve the SAOZ data at large SZA using campaign MAXDOAS measured NO₂ and aerosols profiles to generate more “realistic” daily variations of tropospheric AMF.

The SAOZ tropospheric column evaluation and improvements developed in the frame of the CINDI campaign have been adapted to the other SAOZ instruments located in polluted areas.