



## **OMI NO<sub>2</sub> validation by ground-based Multi Axis DOAS and Direct Sun observations during the DANDELIONS campaigns**

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The DANDELIONS (Dutch Aerosol and Nitrogen Dioxide Experiments for validation of OMI and SCIAMACHY) project encompasses validation of OMI, SCIAMACHY and AATSR measurements of aerosols and nitrogen dioxide (NO<sub>2</sub>) over the Netherlands. Two measurement campaigns took place in Cabauw (52° N, 5° E), one from May to July 2005, and the second in September 2006. We report on ongoing efforts to validate satellite measurements of total and tropospheric NO<sub>2</sub> columns using a combination of ground-based Multi Axis DOAS and Direct Sun measurements.

The Multi Axis DOAS (MAXDOAS) technique relies on measurements of the UV-visible spectrum of the sunlight scattered by the atmosphere, whereby NO<sub>2</sub> absorption can be quantified using the Differential Optical Absorption Spectroscopy (DOAS) technique. By scanning viewing angles successively from zenith to the horizon, atmospheric light paths of increasing length into the lower troposphere are sampled so that the measured NO<sub>2</sub> columns can be vertically resolved, providing independent information on the tropospheric and stratospheric contents.

Complementary to MAXDOAS observations, Direct Sun measurements are characterized by a well defined geometrical path and therefore provide accurate total NO<sub>2</sub> columns.

In this work, total and tropospheric NO<sub>2</sub> columns retrieved during the DANDELIONS campaigns are compared to OMI NO<sub>2</sub> column products, with the aim to assess the

overall agreement between ground-based and satellite measurements and to conclude on the merits of the combined MAXDOAS/ direct-sun technique in a satellite validation context. The study focuses more particularly on several issues: the sensitivity of satellite measurements to clouds being present in the field of view, the strength of co-location criteria and the role of the ghost column in case of cloudy pixels.