New developments in satellite tropospheric NO_2 products

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Tropospheric NO_2 columns retrieved from measurements of nadir viewing satellite instruments such as GOME, SCIAMACHY, and OMI are now covering a time period of 20 years. These data sets have been used for many scientific studies including the determination of the tropospheric NO_2 distribution, global and local temporal changes of the NO_2 burden, estimates of NOx emissions, their sources and their temporal evolution, determination of the atmospheric lifetime of NOx, and validation of atmospheric models.

Since the first observations performed by the GOME instrument, the spatial coverage as well as the spatial resolution of the satellite observations have improved significantly, and further improvements will be realised with the upcoming Sentinel-5P and Sentinel 4 instruments. However, some fundamental problems of remote sensing of tropospheric NO_2 remain and new approaches are needed to overcome them at least partially.

In this presentation, an update will be given on some recent results obtained with existing satellite instruments, some attempts to better exploit the information content of the data will be discussed, and an outlook be given on the potential of the S5P and S4 instruments with respect to the observation of shipping NOx emissions.