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TROPOMI NO_2 slant column retrieval: details, uncertainties and comparisons with other satellite based NO_2 data

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Nitrogen dioxide (NO_2) tropospheric and total column data derived from satellite based observations are of great value for air quality and climate studies. These vertical column densities (VCDs) are determined from NO_2 slant column densities (SCDs), where the SCDs are retrieved using a Differential Optical Absorption Spectroscopy (DOAS) technique.

The NO_2 SCD retrieval for new TROPOMI instrument are based on improvements of the DOAS approach operationally used for the NO_2 SCD retrievals of OMI (the OMNO$_2$A processor) as described in Van Geffen et al. (2015; 2017).

The QA4ECV project has shown that OMI NO_2 SCDs of OMNO$_2$A agree well with optimised QA4ECV and recent NASA retrievals, but that there are substantial differences in the reported SCD uncertainties and in the independent statistical estimate of the SCDs based on the spatial variability over a remote Pacific Ocean sector (Zara et al., 2017).

The poster describes the details of the TROPOMI NO_2 SCD retrieval and compares the SCDs to retrieval results using the QDOAS software package (Danckaert et al., 2017), as well as to operational OMNO$_2$A NO_2 SCDs of OMI. This comparison is possible because TROPOMI measures at almost the same time from almost the same orbit as OMI with comparable swath widths, though with different spatial resolution (3.5x7 km vs. 13x24 km at nadir). The poster further investigates NO_2 SCD uncertainties in comparison with the OMNO$_2$A and QA4ECV results using the independent statistical approach.

References

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