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Tropospheric trace gas column observations from GOME-2 for air quality applications

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This contribution focuses on the tropospheric GOME-2 trace gas column products developed in the framework of EUMETSAT's Satellite Application Facility on Ozone and Atmospheric Chemistry Monitoring (O_3M-SAF). We present an overview of the retrieval algorithms for tropospheric NO_2, SO_2, CH_2O and tropical tropospheric ozone, and we show examples of air quality applications using observations from the GOME-2 instruments on MetOp-A and MetOp-B.

The tropospheric trace gas column products are retrieved from GOME-2 solar backscattered measurements in the UV and VIS wavelength regions using the GOME Data Processor (GDP) version 4.7. Tropospheric NO_2 is retrieved with the Differential Optical Absorption Spectroscopy (DOAS) method in the 425-450 nm wavelength region. SO_2 emissions from anthropogenic sources can be measured by GOME-2 using the UV wavelength region around 320 nm. The GOME-2 NO_2 and SO_2 products are available in near real time, i.e. within two hours after sensing. For CH_2O, an optimal DOAS fitting window around 335 nm has been determined for GOME-2. Tropospheric ozone columns for tropical areas are derived from GOME-2 observations using a cloud slicing method.

The use of tropospheric trace gas observations from the GOME-2 instruments on MetOp-A and MetOp-B for air quality observations will be illustrated for China and Europe. Time-series of tropospheric ozone, NO_2, SO_2 and CH_2O for the Pearl River Delta in Southern China (including Hong Kong) are analysed to investigate possible trends in air pollutants. This highly populated sub-tropical area frequently suffers severe episodes of photochemical smog. Furthermore, comparisons of tropospheric GOME-2 observations with ground-based measurements from several sites in Europe and China will be presented.