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Improvement of the operational Near-Real-Time total ozone retrieval algorithm for GOME-2 on MetOp-A & MetOp-B and perspectives for TROPOMI/S5P

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The TROPOMI (Tropospheric Monitoring Instrument) is the payload instrument for the Sentinel 5 Precursor (S5P) mission which will provide atmospheric composition products including ozone during the time frame from 2016 to 2022. It will consequently extend the data record initiated with GOME/ERS-2 and continued with the SCIAMACHY/ENVISAT, OMI/AURA and GOME-2/MetOp missions.

Here we present the Near-Real-Time (NRT) TROPOMI/S5P total ozone retrieval algorithm which is based on the "DOAS-style" GOME Data Processor (GDP) algorithm Version 4.x. The DOAS technique for total ozone retrieval was deployed from the start of the GOME/ERS-2 mission in 1995 and is currently being used for the generation of the ESA SCIAMACHY and EUMETSAT O_3M-SAF GOME-2 operational products. The enhancements in GDP 4.8 (the latest version of the GDP 4.x algorithm) are described first, and then we present the Global validation results for GOME-2/MetOp-A (GOME-2A) and GOME-2/MetOp-B (GOME-2B) total ozone measurements using Brewer and Dobson measurements as references.

GOME-2A and GOME-2B total ozone data have been used operationally in the Copernicus atmospheric service project MACC-II/III (Monitoring Atmospheric Composition and Climate - Interim Implementation) NRT system since October 2013 and May 2014 respectively. It is expected that the follow-on Copernicus Atmosphere Monitoring Service (CAMS) project will use NRT TROPOMI/S5P in addition to GOME-2 total ozone data.

One of the major error of 'DOAS-style' algorithm is the use of a single wavelength (at 325.5 nm) to calculate the air mass factor (AMF) especially at large SZA (solar zenith angle). The improvement of AMF calculation at larger SZA by using the AMF correction look-up-table will be presented. The operational processing of TROPOMI/S5P measurements is two orders of magnitude more data than that from GOME-2. Here we discuss performance enhancements of the retrieval algorithms such as the development of an acceleration method for Radiative Transfer Model (RTM) simulations.