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NEW DEVELOPMENTS IN THE SCIAMACHY LEVEL 2 GROUND PROCESSOR TOWARDS VERSION 7

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SCIAMACHY (SCanning Imaging Absorption spectroMeter for Atmospheric ChartographY) aboard ESA's environmental satellite ENVISAT observed the Earth's atmosphere in limb, nadir, and solar/lunar occultation geometries covering the UV-Visible to NIR spectral range. It is a joint project of Germany, the Netherlands and Belgium and was launched in February 2002. SCIAMACHY doubled its originally planned in-orbit lifetime of five years before the communication to ENVISAT was severed in April 2012, and the mission entered its post-operational phase. In order to preserve the best quality of the outstanding data recorded by SCIAMACHY, data processors are still being updated. This presentation will highlight three new developments that are currently being incorporated into the forthcoming version 7 of ESA's operational level 2 processor:

1. Tropospheric BrO, a new retrieval based on the scientific algorithm of (Theys et al., 2011). This algorithm had originally been developed for the GOME-2 sensor and was later adapted for SCIAMACHY. The main principle of the new algorithm is to split BrO total columns, which

are already an operational product, into stratospheric VCD_{strat} and tropospheric VCD_{trop} fractions. BrO VCD_{strat} is determined from a climatological approach, driven by SCIAMACHY O_3 and NO_2 observations. Tropospheric vertical column densities are then determined as difference $VCD_{trop} = VCD_{total}–VCD_{strat}$.

2. Improved cloud flagging using limb measurements (Liebing, 2015). Limb cloud flags are already part of the SCIAMACHY L2 product. They are currently calculated employing the scientific algorithm developed by (Eichmann et al., 2015). Clouds are categorized into four types: water, ice, polar stratospheric and noctilucent clouds. High atmospheric aerosol loadings, however, often lead to spurious cloud flags, when aerosols had been misidentified as clouds. The new algorithm will better discriminate between aerosol and clouds. It will also have a higher sensitivity w.r.t. thin clouds.

3. A new, future-proof file format for the level 2 product based on NetCDF. The data format will be aligned and harmonized with other missions, particularly GOME and Sentinels. The final concept for the new format is still under discussion within the SCIAMACHY Quality Working Group.

References:

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P. Liebing: New Limb Cloud Detection Algorithm Theoretical Basis Document, 2016.

N. Theys et al.: Global observations of tropospheric BrO columns using GOME-2 satellite data, Atmos. Chem. Phys., 11, 1791–1811, 2011.