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TROPOMI glyoxal tropospheric column retrievals: description, inter-satellite comparison and validation

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The ESA S5p+Innovation programme aims at supporting the development of new TROPOMI scientific products. As part of this activity, a glyoxal tropospheric column algorithm, relying on heritage from SCIAMACHY, GOME-2 and OMI, has been adapted to TROPOMI and further developed. This product provides information on volatile organic compounds (VOC) emissions as glyoxal is mainly released in the atmosphere as an intermediate product of VOC oxidation, but also directly emitted from biomass burning events.

We present here the BIRA-IASB S5p glyoxal product, which relies on a DOAS approach: spectral fits in the 435-460 nm window provide glyoxal slant columns, which are then converted into tropospheric columns by means of air mass factors and application of a background correction. In particular, the algorithm has been improved to mitigate the impact of scene brightness inhomogeneity and of non-linearity in case of strong NO2 absorption. The retrieved columns are provided along with total error estimates resulting from the propagation of uncertainties at every step in the algorithm chain.

We also highlight the excellent consistency between the retrievals from TROPOMI and those from OMI and GOME-2A/B obtained with a similar algorithm. In addition, the good quality of the product is demonstrated with comparisons with MAX-DOAS glyoxal observations at a few stations in Asia and Europe.