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Ozone Volume Mixing Ratios in the Tropical Upper Troposphere from Sentinel-5P TROPOMI data: Algorithm Development Update

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The TROPOspheric Monitoring Instrument (TROPOMI), on board the Sentinel 5 precursor (S5p) satellite, was launched in October 2017. The TROPOMI instrument has a high spatial resolution and a daily coverage of the Earth. More than one year of level 2 data (version 1.1.5) of ozone and cloud properties (fraction and height) is now available. Using the operational S5p GODFIT ozone and OCRA/ROCINN CRB cloud dataset, we derive tropical upper tropospheric ozone volume mixing ratios (TUTO) using the cloud slicing method [Ziemke, 2001].
The first operational cloud slicing algorithm (CSA) was not optimised for the high spatial resolution of S5p and the TUTO quality value was not characterised. An updated algorithm (CHOVA, Cloud Height induced Ozone Variation Analysis) was introduced to better cope with the new instruments characteristics. The temporal sampling of cloud/ozone data is not needed anymore and the spatial sampling can be reduced to below 5° latitude/longitude grid boxes. Using a quality check based on the statistical properties of the cloud, ozone and retrieval parameters, we can exclude unrealistic TUTO values. Comparisons with ozone sondes show a good agreement when taking into account the principal differences between a sonde point measurement and a satellite sampled mean value.
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