



The TROPOMI CO total column amount: Improved data quality and example applications.

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Since about one year, the Tropospheric Monitoring Instrument (TROPOMI) on ESA's Sentinel-5P satellite is fully operational. Here, measurements in the 2.3 μm spectral range are used to infer the total column amount of carbon monoxide (CO) with high spatial resolution ($7\times 7\text{ km}^2$) and daily global coverage with the required accuracy and precision of better than 10% and 15% respectively. Using the operational software package SICOR, we show in this contribution that the data quality of the TROPOMI CO dataset can be significantly improved by updating the molecular spectroscopic database. We evaluate four different data sets for molecular absorption lines, HITRAN 2008, HITRAN2012, HITRAN2016 and the most recent line list of ESA's Scientific Exploitation of Operational Missions (SEOM) Improved Atmospheric Spectroscopy Databases (IAS) project analysing the spectral fit quality and the agreement with CO ground-based measurements of the TCCON and NDACC network. The newer data sets for molecular absorption lines reduces the bias between the TCCON and TROPOMI measurements to less than 3%. Furthermore, we discuss a posteriori correction for detector row dependent retrieval biases. Finally, using the improved data product, we discuss the emission estimates from CO pollution plumes by forest fires and steel plant emissions from the last year of the TROPOMI observations.