First results of tropospheric formaldehyde retrievals with TROPOMI onboard the Copernicus Sentinel-5 Precursor Mission

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The Sentinel-5 Precursor (S5P) was successfully launched on the 13th of October 2017, with on board the TROPOspheric Monitoring Instrument (TROPOMI). With a spatial resolution of 3.5x7 km^2, about 12 times finer than OMI, TROPOMI has started to provide important information on natural and anthropogenic emissions of trace gases and aerosols, with an unprecedented level of details.

The prototype of the TROPOMI tropospheric formaldehyde (HCHO) retrieval algorithm has been developed at BIRA-IASB and implemented at the German Aerospace Center (DLR) in the S5P operational processor UPAS. In this work, we present the S5P HCHO Level 2 retrieval algorithm (De Smedt et al., 2017). We provide a first assessment of the performances of the operational TROPOMI HCHO L2 product, and relate them to COPERNICUS mission requirements and pre-flight instrument specifications.

Comparison with previous satellite observations are also discussed. For this purpose, we use the recent QA4ECV multi-sensor HCHO dataset based on OMI, GOME-2 and SCIAMACHY measurements and daily forecasts of the HCHO vertical profile shapes provided by a new version of the TM5-MP model, running at the spatial resolution of 1x1 degree in latitude and longitude. Based on these first results and comparisons, possible improvements to the operational algorithm are proposed. Finally, the benefits of the TROPOMI spatial resolution for the HCHO observations and the detection of non-methane volatile organic compound sources are illustrated.

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QA4ECV: Quality Assurance for Essential Climate Variables (http://www.qa4ecv.eu). http://doi.org/10.18758/71021031