TCCON network data for the validation of Sentinel-5P Methane and Carbon Monoxide (TCCON4S5P): project status

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The Total Carbon Column Observing Network (TCCON) is a network of ground-based Fourier Transform Spectrometers that record direct solar absorption spectra of the atmosphere in the near-infrared spectral region. Using these spectra, accurate and precise column-averaged abundances of atmospheric constituents including CO_2, CH4, CO, N2O, HF, H_2O and HDO are retrieved. The data are then tied to the WMO reference scale by the comparison to vertically resolved in-situ measurements performed by aircrafts and AirCores. In the ESA-AO proposal TCCON4S5P, we will focus our efforts on the geophysical validation of Sentinel-5P Methane (CH4) and Carbon Monoxide (CO) total column products using coincident TCCON data from the whole network which includes currently about 24 stations distributed globally. This proposed activity will be carried out as part of a rapid data delivery and validation effort for the first twelve months followed by a second phase where the focus will be on the continuous long-term validation during the operational lifetime of the satellite. In addition to this, a TCCON-constrained global XCH4 model field that is globally consistent with TCCON and the model prior has been developed and will be used to produce high spatial resolution fields for regions of special interest. This will provide a reference for satellite XCH4 validation also for regions far away from TCCON sites. Furthermore, the possibility of reducing the intercomparison error utilizing a-posteriori correction of satellite and ground-based XCH4 retrievals to a realistic common prior will be investigated as part of this project. This presentation will give an overview and discuss the current status of the project.