



Current status of the ground-based greenhouse gas observations within the Total Carbon Column Observing Network (TCCON)

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The Total Carbon Column Observing Network (TCCON) has been established in 2004 and has become a vital component in the global observing system for greenhouse gases. TCCON represents an indispensable validation resource for satellite measurements and adds important complementary information to the existing in situ measurements.

The determination of the sources and sinks of greenhouse gases from atmospheric concentration measurements requires inverse modeling. Until recently these models were solely based on surface in-situ measurements. The confidence in the fluxes inferred from these in situ measurements is limited due to the difficulties in describing the vertical transport in the model and due to the sparse spatial coverage of the sampling sites.

Column measurements overcome some of the limitations of the in situ network. They are much less sensitive to vertical transport and therefore provide complementary information to the in situ measurements and space-borne sensors provide global coverage. Following the first observations by SCIAMACHY and AIRS the Japanese satellite GOSAT, dedicated for greenhouse gas observations, now allows to measure CO₂ and CH₄.

We will describe the current status of the TCCON, show advances of the network calibration against the WMO standards, present studies towards a closer understanding of the carbon cycle and finally show current validation of satellite observations.