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Total Carbon Column Observing Network (TCCON) activities at Izaña Atmospheric Research Center, Tenerife Island (28.3 N, 16.5 W) and KIT Campus North, Karlsruhe, Germany (49.1 N, 8.5 E)

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The Total Carbon Observing Network (TCCON) is a global network of ground-based Fourier Transform Spectrometers recording direct solar spectra in the near-infrared spectral region. With stringent requirements on the instrumentation, data processing and calibration, accurate and precise column-averaged abundances of CO₂, CH₄, N₂O, HF, CO, H₂O, and HDO are retrieved. Achieving such high precision is essential for using the column-averaged data in carbon cycle research (Olsen and Randerson, 2004) and for Satellite validation (e.g. SCIAMACHY, GOSAT, OCO...).

TCCON was established in 2004. Actually there are 19 sites affiliated around the world, Izaña being fully operational since May 2007 and Karlsruhe since 2009. While Izaña is a subtropical high mountain observatory located at 2.3 km altitude over a temperature inversion layer acting as a natural barrier for local pollution, Karlsruhe is a continental site located at 110m a.s.l. in a flat terrain.

An overview of the TCCON activities performed at Karlsruhe Institute of Technology and Izaña Observatory will be presented and the ground-based FTIR measurement technique will be described. The official fitting algorithm is GFIT developed at NASA/JPL. In this presentation we will apply a different procedure for calculating the trace gas abundances from the measured spectra, the fitting algorithm PROFFIT (F. Hase, et. al., 2004). First examples for retrievals of CO₂ will be shown and the quality of the data will be documented. Furthermore, the column-averaged abundances of CO₂ will be compared with the simultaneously performed surface in-situ measurements for the Izaña Observatory.

Literature references:

- Hase, F., et al., J.Q.S.R.T. 87, 25-52, 2004.
- Olsen, S.C. and Randerson, J.T., J.G.Res., 109, doi: 10.1029/2003JD003968.