

# CO<sub>2</sub> total column amounts at the TCCON sites Izaña (28.3 N, 16.5 W) and Karlsruhe (49.1 N, 8.5 E)

S. Dohe (1), F. Hase (1), E. Sepúlveda (2,3), A. Gomez-Pelaez (3), M. Schneider (1), T. Blumenstock (1) and O. García (3)

(1) Institute for Meteorology and Climate Research (IMK-ASF), Karlsruhe Institute of Technology, Germany. (2) La Laguna University, Tenerife, Spain. (3) Izaña Atmospheric Research Centre, Agencia Estatal de Meteorología (AEMET), Spain.

contact: susanne.dohe@kit.edu

The Total Carbon Observing Network (TCCON) is a global network of ground-based Fourier Transform Spectrometers recording direct solar spectra in the near-infrared (NIR) spectral region. Accurate and precise column-averaged abundances of different greenhouse gases (GHGs) are retrieved, which are used for carbon cycle research (Olsen and Randerson, 2004) and for satellite validation (e.g. SCIAMACHY, GOSAT, OCOII...). Official TCCON data is generated using the GFIT code developed at NASA/JPL (e.g. Toon et al., 1992). In this study, we compare FTIR retrieval results with in-situ measurements as well as the GFIT code with the radiative transfer and retrieval algorithm PROFFIT (developed at KIT, Hase et al., 2004).

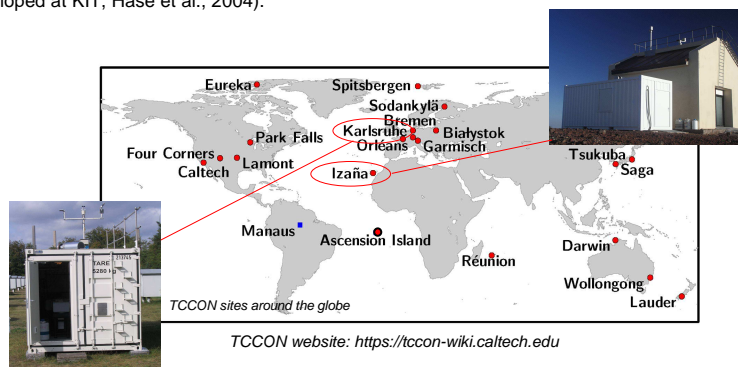
## 1. LOCATIONS

### Izaña, Tenerife Island, Spain

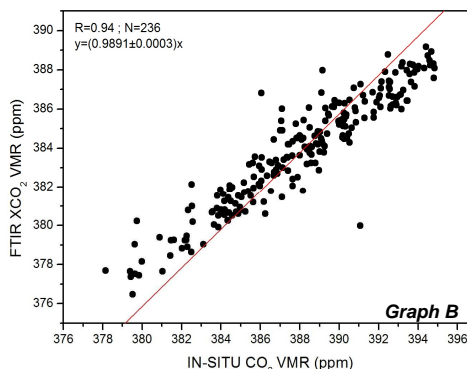
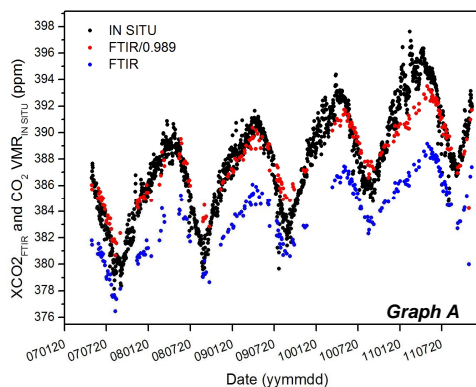
The Izaña Atmospheric Research Center is a subtropical high mountain observatory located at 2370 m altitude over a temperature inversion layer acting as a natural barrier for local pollution. It is operational since 2007 for the NIR spectral region and is well representative for atmospheric background conditions.

### Karlsruhe, Germany

The FTIR-Spectrometer at KIT Campus North is located at 110 m altitude and is operational since the end of 2009. Because of the flat terrain the site is favorable to validate satellite data.



## 2. RESULTS



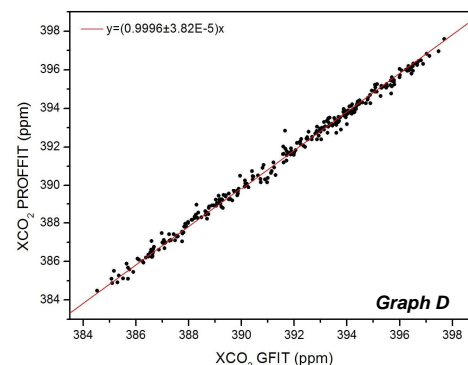
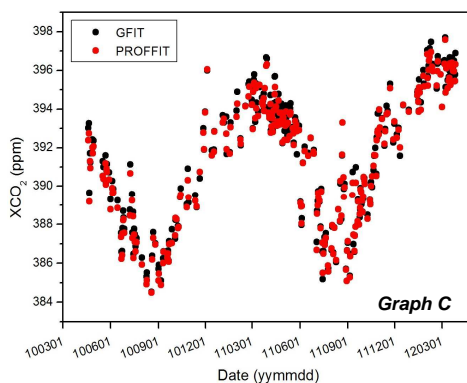
### Izaña – FTIR vs. In-situ

**Graph A** shows the daily mean FTIR-XCO<sub>2</sub> Volumen Mixing Ratio (VMR) and simultaneous in-situ-CO<sub>2</sub> VMR from May 2007 to November 2011 at Izaña site. **Graph B** shows a correlation plot between the retrieved XCO<sub>2</sub> VMR and the in-situ VMR (collocated night measurement, mostly in the free troposphere). The comparison indicates excellent agreement wrt the WMO calibration scale: PROFFIT: 0.989 ± 0.003; GGG: 0.989 ± 0.002 (Messerschmidt et al., 2011).

### Karlsruhe – PROFFIT vs. GFIT

**Graph C** shows the daily mean XCO<sub>2</sub> FTIR-measurements at Karlsruhe site from April 2010 to March 2012 analysed with PROFFIT and GFIT.

**Graph D** shows the correlation plot between the XCO<sub>2</sub>-values for PROFFIT and GFIT. We see a very good agreement with a standard deviation of ~0.25 ppm and a bias of ~-0.05%.



## 3. Conclusions

We presented the FTIR CO<sub>2</sub> VMR values at the TCCON sites Izaña and Karlsruhe. There is an excellent agreement between the FTIR and In-situ results for Izaña wrt the WMO calibration factor of 0.989. For Karlsruhe we see a very good correlation between the results for the two different algorithms PROFFIT and GFIT.

## REFERENCES

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