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Intercomparison of total column trace gas measurements by two TCCON FTIR instruments at Wollongong, Australia

Dietrich Feist (1), Marc Geibel (1), Ronald Macatangay (2), Nicholas Deutscher (3,2), Nicholas Jones (2), and David Griffith (2)

(1) Max Planck Institute for Biogeochemistry, Biogeochemical Systems, Jena, Germany (dfeist@bgc-jena.mpg.de, +49-(0)3641-577300), (2) School of Chemistry, University of Wollongong, Wollongong, Australia, (3) Institute of Environmental Physics, University of Bremen, Bremen, Germany

The Total Carbon Column Observing Network (TCCON) provides total column measurements of various atmospheric trace gases like CO_2, CH_4, CO, and N_2O at high precision. At each site, the measurements are performed with Bruker IFS125HR Fourier Transform Infrared (FTIR) spectrometers that are operated by individual research groups. Instrument setup, operation and data processing follows common standards and best practices defined by the TCCON community.

Most TCCON instruments are built for a specific location and remain there after initial setup. However, the TCCON instrument by the Max Planck Institute for Biogeochemistry has been designed to be mobile and to be able to operate in many regions of the world. The FTIR instrument has been built into a 20-foot shipping container that can easily be transported over land and sea at reasonable cost. Once it is set up, it can run fully automatically for several months without maintenance or operator intervention.

To verify that the instrument can still achieve the expected measurement quality after transport and setup at a remote site, it was transported from Germany to Wollongong, Australia, for a test campaign. The instrument remained at Wollongong from June to December 2010. During this time, it measured simultaneously with another TCCON instrument at the University of Wollongong. This study presents results from these first co-located measurements of two independently constructed TCCON instruments.