



TCCON measurements from Ascension Island: lessons learned during the first year of operation

Dietrich Feist, Ina Burjack, and Sabrina Niebling

Max Planck Institute for Biogeochemistry, Jena, Germany (dfeist@bgc-jena.mpg.de)

The Total Carbon Column Observing Network (TCCON) consists of several sites that measure greenhouse gases like CO₂, CH₄, CO, N₂O, and others across the globe. Each site has a Fourier Transform Spectrometer (FTS) that combines a large bandwidth with a high spectral resolution. The instruments use the sun as a light source and retrieve the total column concentrations of the greenhouse gases. They augment the existing network of ground based in-situ measurements and provide a valuable reference for satellite measurements.

The latest TCCON station is the FTS operated by the Max Planck Institute for Biogeochemistry in Jena, Germany. It is located on the remote Ascension Island (7.92° S, 14.33° E) in the South Atlantic Ocean and is the only equatorial station in the TCCON so far. Operation started in May 2012. The instrument runs fully automatic with very limited operator intervention.

Ascension Island is a very demanding site and a number of technical and logistical problems had to be overcome to install a TCCON instrument there. Still, the unique location is worth the effort: local carbon sources and sinks are negligible on this small island, the air in the total column comes from tropical Africa most of the time and sometimes from the Amazon region - two active regions that are basically not covered by atmospheric greenhouse gas measurements. Besides, Ascension Island is one of the rare places where satellite sun-glint measurements on the ocean surface can be validated directly.

This study presents the time series obtained from the Ascension Island site during the course of the first year of operation. The data quality is assessed with respect to TCCON standards and comparisons with available other data sets like satellite measurements, ground-based in-situ measurements and model results are presented.