



Total column carbon dioxide and methane measurements at Sodankylä

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Carbon dioxide and methane are the two most important anthropogenic greenhouse gases. Total column measurements of these gases have been performed at various Total Carbon Column Observing Network (TCCON) sites using solar Fourier Transform Spectrometers (FTS), operating in the near infrared spectral region. Sodankylä in northern Finland (at 67.4° N, 26.6° E) is one of the sites of the TCCON network. At Sodankylä we have performed FTS measurements since early 2009. Here we present a description of the instrumentation at Sodankylä and analysis of five years of reprocessed TCCON retrievals at the site. Relevant to the FTS measurements, in September 2013 we have started with balloon borne AirCore profile measurements of CO₂, CH₄ and CO at Sodankylä. The aim is to continue with year around activities, thus adding available column information for the winter period. The AirCore measurements are expected to provide improved profile and total column estimates for the FTS retrieval system. A total gas column measured by an AirCore sampling system is directly related to the World Meteorological Organization in situ trace gas measurement scales. Secondly, an AirCore measurement has the benefit of reaching higher altitudes compared to the aircraft in situ measurements. Therefore AirCore data could be used to validate and improve the accuracy of the FTS total column CO₂ and CH₄ retrievals at the site.