



FTS Measurements of Carbon Dioxide and Methane at Sodankylä, Finland

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Measurements of column CO_2 and CH_4 have been performed at Sodankylä (67.4° N , 26.6° E) since February 2009 using a Fourier Transform Spectrometer (FTS), operating in the near-infrared spectral region. Sodankylä is one of the stations participating in the Total Carbon Column Observing Network (TCCON), thus our measurements include column-averaged, dry-air mole fractions of carbon dioxide (XCO_2) and methane (XCH_4). During the seven-year period of observations from year 2009 until 2015 we observed a positive trend of 2.2 ± 0.2 ppm per year in XCO_2 and 7.1 ± 0.8 ppb yr^{-1} in XCH_4 . Our data have also contributed to the validation of space borne measurements. In case of the Greenhouse gases Observing SATellite (GOSAT) observations the relative difference in XCO_2 has been -0.04 ± 0.02 % and the relative difference in XCH_4 has been -0.09 ± 0.03 %. In situ profile observations over Sodankylä have been performed using balloon borne AirCore sondes. The method provides vertical profiles of gas concentration in the troposphere and lower stratosphere and is used to evaluate the accuracy of the FTS retrievals. Here we present AirCore measurements of CO_2 , CH_4 , CO and column comparisons with the FTS measurements.