

Greenhouse gas measurements at Sodankylä, Finland and comparisons with satellite borne observations

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Poster

At Sodankylä, Finland (67.37° N, 26.63° E) ground-based instrumentation has been regularly maintained to contribute to the validation of space-based measurements. The Sodankylä site participates in several ground-based networks such as the Total Carbon Column Observing Network (TCCON), the Network for the Detection of Atmospheric Composition (NDACC), the COllaborative Carbon Column Observing Network (COCCON), the Global Climate Observing System (GCOS) Reference Upper-Air Network (GRUAN), AErosol RObotic NETwork (AERONET), Système d'Analyse par Observation Zénithale (SAOZ), Integrated Carbon Observation System (ICOS) and others. Relevant space borne missions (both present and in preparation) include the NASA OCO-2 mission; the GOSAT and the GOSAT-2 missions; ESA Sentinel 5-P, TanSat, CNES MicroCarb; the Copernicus Carbon Dioxide Monitoring mission CO2M; ESA Sentinel 5; MERLIN, a joint mission by DLR and CNES and other missions.

Here, we present time-series of greenhouse gas measurements at Sodankylä and comparisons with the satellite borne observations. Fourier Transform Spectrometer (FTS) measurements at Sodankylä were established in early 2009. The FTS observations were recently reprocessed using the latest version of the TCCON retrieval software GGG2020. We have also performed comparisons with balloon borne AirCore observations. At Sodankylä the balloon borne AirCore observations were established in September 2013 and the profile measurements have been taken in the vicinity of the Sodankylä TCCON station. The AirCore vertical profiles cover the altitude range from 30-35 km to the Earth's surface. The AirCore observations are directly related to the World Meteorological Organization in situ trace gas measurement scales. Therefore, it is possible to use the AirCore observations for calibration of the remote sensing observations.

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