

AirCore, aircraft, and FTS measurement campaign at Sodankylä

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AirCore, a long piece of stainless steel tubing with one end open and the other closed, is an innovative tool for collecting air sample during descent from a high altitude. At the Sodankylä TCCON site (67.368 N, 26.633 E, 179 m.a.s.l), we have obtained regular AirCore profile measurements of CO₂/CH₄/CO since September 2013.

To improve the AirCore measurement technique, and the utilization of AirCore profiles for evaluating remote sensing measurements from FTS, an intensive InGOS campaign took place at Sodankylä in June 2015. We flew a total of six AirCore packages, which provides a comprehensive data set for comparison, and AirCore profiles in four consecutive days (June 20-June 23, 2015) for evaluating remote sensing measurements from the TCCON instrument, and from the EM27/SUN. Meanwhile, a low-altitude aircraft was flown to make measurements in the boundary layer for complementing and validating the AirCore profiles at the lower altitude.

We present the two-year AirCore profiles of CO₂/CH₄/CO over Sodankylä and compare the integrated AirCore column averages with retrievals from the TCCON instrument and the EM27/SUN. Furthermore, we will discuss the uncertainties of the profiles and of the integrated column averages due to various reasons, e.g. the pressure drop across the dryer, the non-equilibrium flow. Moreover, we demonstrate the use of AirCore profiles to evaluate the remote sensing retrievals.