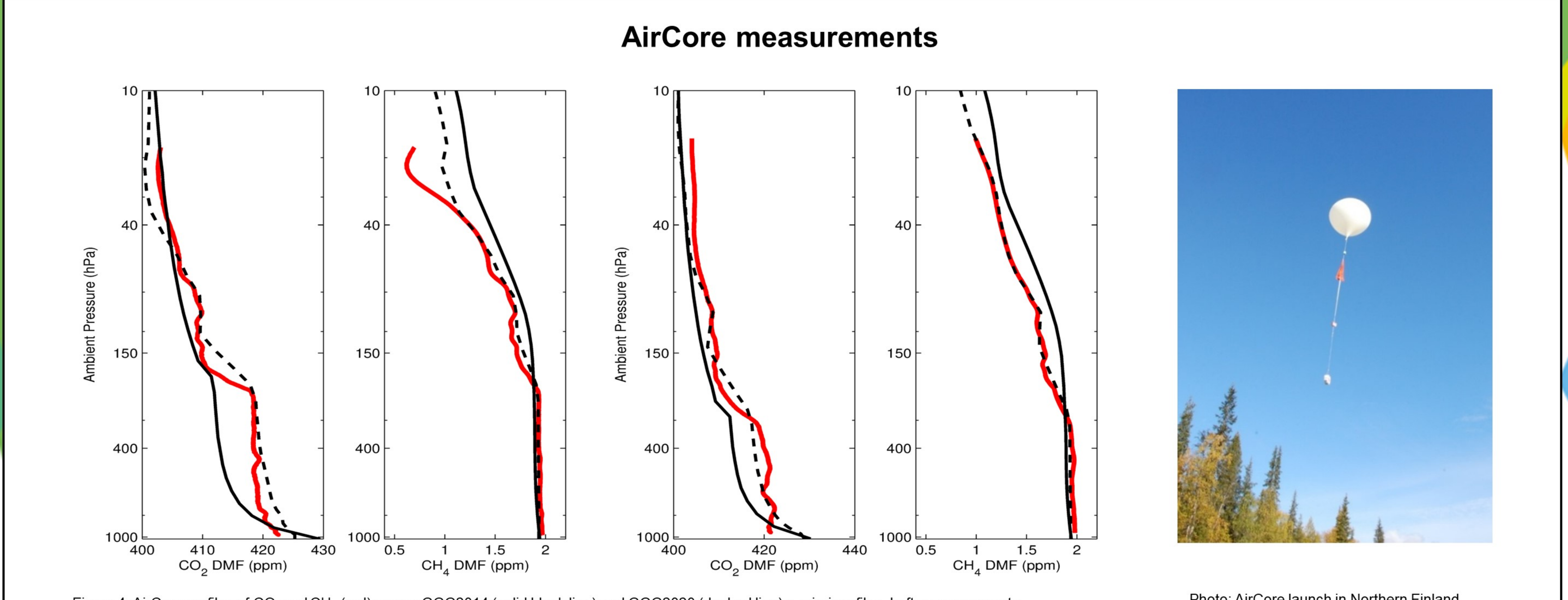
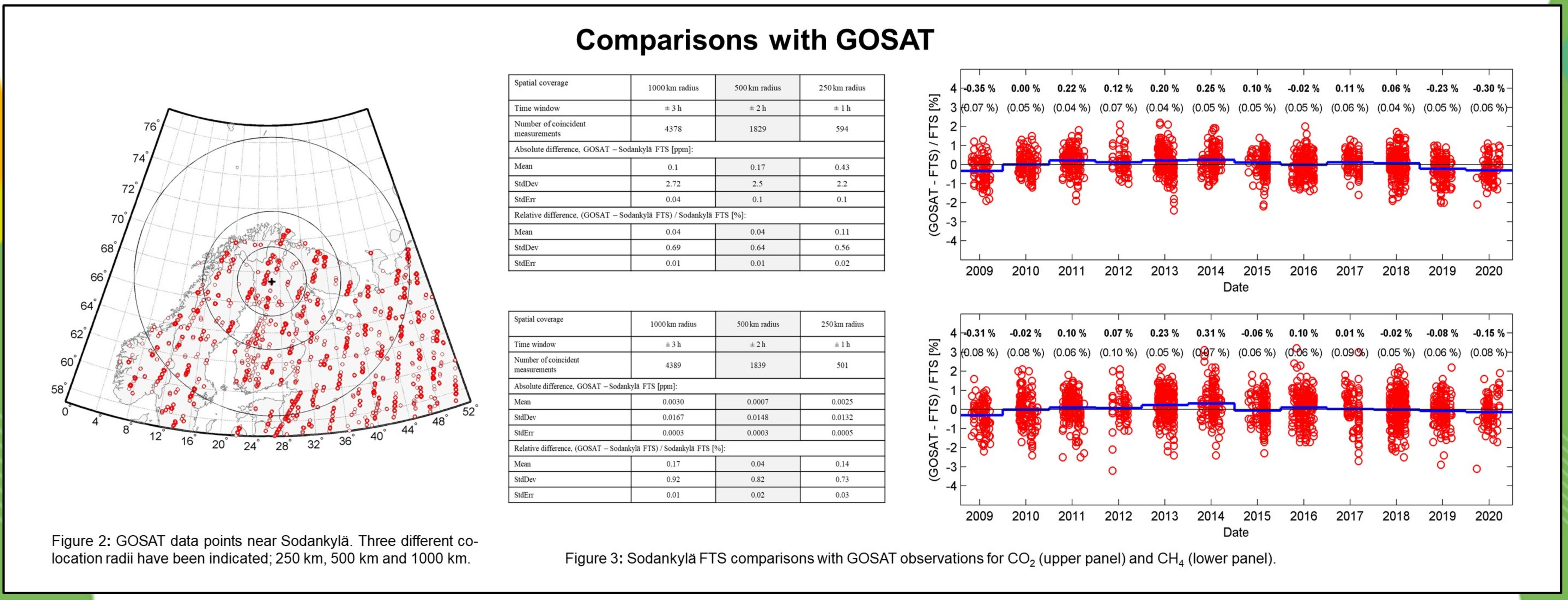
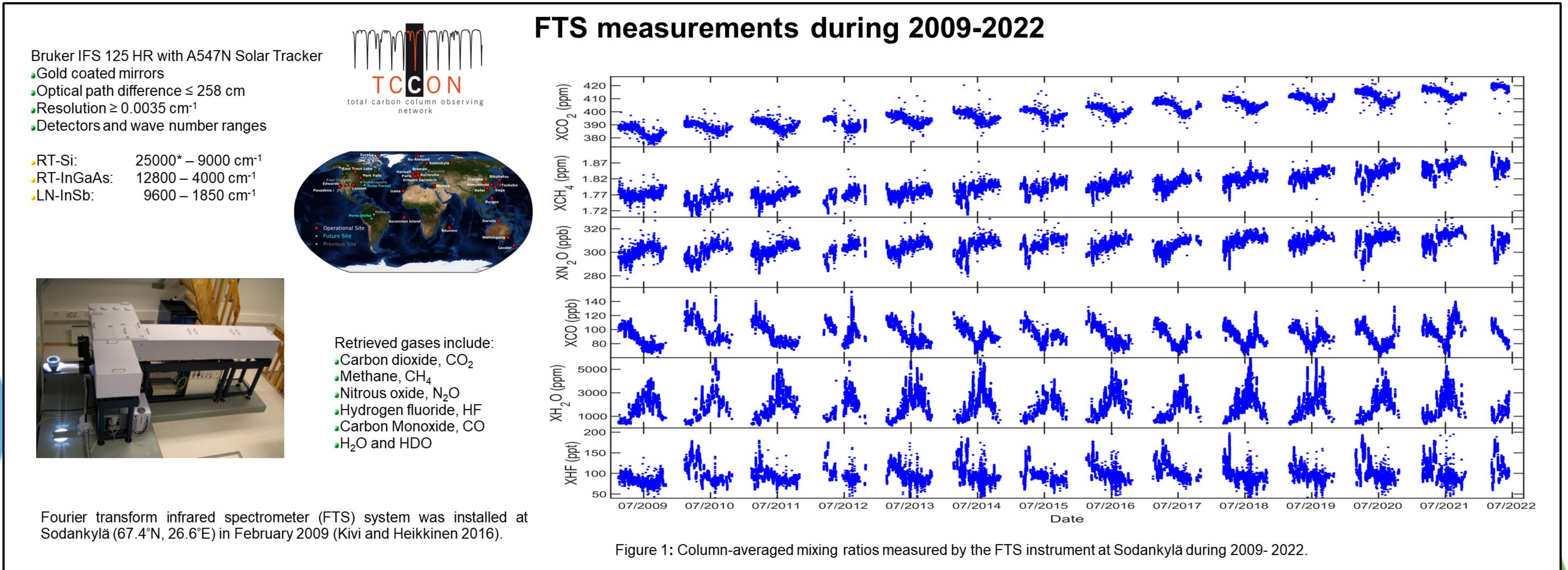




# Carbon dioxide and methane measurements at Sodankylä, Finland and comparisons with satellite borne observations

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**AirCore** is an atmospheric sampling system to measure vertical profiles of greenhouse gases in the troposphere and stratosphere (Karion et al., 2010). AirCore profile measurements of  $\text{CO}_2$ ,  $\text{CH}_4$  and CO have been performed at Sodankylä during all seasons.

**Conclusions**  
 FTS measurements have been performed at Sodankylä, Finland since early 2009. Here, GOSAT  $x\text{CO}_2$  and  $x\text{CH}_4$  values have been compared to our ground-based FTS measurements. Within the 500 km /  $\pm 2$  h coincidence criteria the mean difference was found to be 0.04 %  $\pm$  0.01 % for  $x\text{CO}_2$  and 0.04 %  $\pm$  0.02 % for  $x\text{CH}_4$ . We have also performed year around AirCore measurements at Sodankylä. We find that TCCON GGG2020 a priori profiles are generally in good agreement with our AirCore measurements.

**References**  
 Karion, A., et al., AirCore: An Innovative Atmospheric Sampling System, J. Atmos. Ocean. Technol., 27, 1839–1853, <https://doi.org/10.1175/2010JTECHA1448.1>, 2010.  
 Kivi, R. and Heikkinen, P.: Fourier transform spectrometer measurements of column  $\text{CO}_2$  at Sodankylä, Finland, Geosci. Instrum. Method. Data Syst., 5, 271-279, doi:10.5194/gi-5-271-2016, 2016.  
 Wunch, D., et al., Comparisons of the Orbiting Carbon Observatory-2 (OCO-2)  $X_{\text{CO}_2}$  measurements with TCCON, Atmos. Meas. Tech., 10, 2209-2238, <https://doi.org/10.5194/amt-10-2209-2017>, 2017.