

# Fiducial Reference Measurements for Ground-Based Infrared Greenhouse Gas Observations (FRM4GHG) campaign at the Sodankylä TCCON site

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Recently several new portable infrared spectrometers have become available for ground based solar infrared absorption measurements of total column greenhouse gas amounts. However the performances of these instruments have not been fully characterized. The ongoing ESA funded campaign “Fiducial Reference Measurements for Ground-Based Infrared Greenhouse Gas Observations (FRM4GHG)” at the Sodankylä TCCON site aims at characterizing several of the portable spectrometers. During the campaign the TCCON type measurements (*Wunch et al., 2011*) are run under various atmospheric conditions to provide comparisons with the reference TCCON instrument. The remote sensing measurements are accompanied by AirCore (*Karion et al., 2010*) launches from the Sodankylä site. The AirCore in situ reference profiles will be used to verify the calibration of the remote sensing instruments involved.

The campaign focuses on CO and CH<sub>4</sub> measurements in support of the ESA Sentinel-5P validation. In addition also CO<sub>2</sub> will be retrieved and other gases. Thus the campaign data can be used for validation purposes of also other satellite measurements and model simulations. The results are expected to provide a comparative characterization of the participating instruments with respect to the TCCON instrument. The outcome of the campaign will be used for the further development of new observation sites to complement the TCCON network and improve support for the validation of the existing and future satellite missions and models. Here we provide an overview of the campaign objectives and instrumentation as well as the first results of the measurements, which have been obtained since the start of the campaign in March 2017.

## References

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