Greenhouse Gas Retrievals for the CO2M Mission using the FOCAL method - First Performance Estimates -

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The first satellite of the European CO2M constellation is planned to be launched in 2026. Three different retrieval algorithms to derive XCO2 and XCH4 are currently under development for the operational processing system. One of these algorithms is based on the FOCAL (Fast atmOspheric traCe gAs retrieval) method, which has already successfully been applied to measurements from OCO-2 (Reuter et al., 2017a,b), GOSAT and GOSAT-2 (Noël et al, 2021, 2022).
Here, we show the recent results generated using the CO2M version of FOCAL.
To assess the quality of the FOCAL retrievals, a large set of simulated spectra has been generated using the radiative transfer model SCIATRAN. These simulations consider the actual viewing geometry of the CO2 instrument and corresponding geophysical scene data (including different types of aerosols and varying surface properties) which were taken from model data for the years 2015 and 2020.
By application of the FOCAL retrieval to these simulated data it can be shown that the FOCAL method is able to fulfil the challenging requirements on systematic errors (e.g. spatio-temporal bias for XCO2 < 0.5 ppm) for the CO2M mission.

References:

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