A novel portable FTIR spectrometer for the observation of CH4 and CO2 sources

By F. Hase et al.

Author contact: F. Hase, KIT, IMK-ASF (frank.hase@kit.edu)

We present a compact FTIR spectrometer for the measurement of greenhouse gases by solar absorption spectroscopy. This novel device (EM27/SUN) has been developed by KIT in cooperation with Bruker Optics, Ettlingen. Due to the unparalleled level of stability achieved with the portable EM27/SUN, several spectrometers can be distributed around a region of interest (e.g. a city, a livestock breeding area, a power plant, fracking sites, …) and the observed upwind-downwind differences of column-averaged greenhouse gases abundances can be used for estimating the source strength.

In this talk, the instrumental characteristics of the EM27/SUN spectrometer are discussed. Next, the software used for spectral processing and analysis is described. Methods for proper calibration of the spectrometer are outlined and the achieved level of stability and internal consistency is demonstrated. Collocated measurements with a high-resolution reference spectrometer of TCCON (Total Carbon Column Observing Network) are used for ensuring that the data retrieved from the EM27/SUN are traceable wrt TCCON. Finally, will show results from recent campaign activities.