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IMECC campaign - the first European aircraft calibration campaign of Fourier Transform Infrared (FTIR) Spectrometer Sites

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Space-based observations of CO2, for example with the GOSAT satellite, can significantly improve the source-sink estimates by understanding the distribution of the greenhouse gas, provided they are sufficiently precise and accurate. For calibration and validation of satellite measurements the worldwide Total Carbon Column Observing Network (TCCON) of ground-based solar absorption FTIR-spectrometers was found. FTIR-spectrometry is the only technique which can measure the total column of CO2 with a sufficient high precision and accuracy. To establish the essential link between the satellite observations of CO2 and the global in situ surface network the FTIR-measurements need to be calibrated against the in situ network. Uncertainties in the spectral line parameters are too large to achieve the necessary accuracy using a self-calibrating approach. Instead, aircraft and balloon profiling above the FTIR stations have to be used to address the absolute calibration. Therefore in September/ October 2009 the first European aircraft calibration campaign was accomplished as part of the EU-project IMECC. During the campaign in situ CO2 profiles were taken with an aircraft over the TCCON stations in Bremen (Germany), Bialystok (Poland) and Orleans (France) which are operated by the IUP in Bremen. Additionally profiles were taken over the TCCON sites in Karlsruhe (Germany), Jena (Germany) and Garmisch-Partenkirchen (Germany). In cooperation with the Caltech (USA) the data were analysed and the scaling factors for the six European FTIR-sites determined. These results and an overview of the campaign will be presented.
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