



Automated Measurements of Greenhouse Gases by Ground-based Fourier

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Currently Greenhouse Gases are measured basically with In-Situ measurements. However these information are biased by uncertainties for instance in the knowledge of the vertical transport from the ground through the troposphere and furthermore their spatial coverage is limited.

Essential improvements will be obtained by Satellite measurements: This remote sensing method can assess the global coverage of trace gas concentrations and it calculates the total column of the relevant gases. Therefore the interpretation by inverse models does not require knowledge on the vertical mixing.

The necessity to calibrate and validate Satellite data can be satisfied with ground based FTIR-measurements. With their properties to measure the total column of gases and to provide data with high precision ground-based remote sensing FTIR-measurements form the link between the satellites and the surface In-Situ data.

In the framework of two EU-projects GEOmon and IMECC two fully automated FTIR-systems were built at the Institute of Environmental Physics (IUP) in Bremen, Germany. After the installation the systems were operated in different test series in comparison with the Bremen TCCON instrument at the Institute until the end of 2008. In the intercomparisons, the CO₂/O₂ ratios agree considerably well with slight differences coming from the difference in modulation efficiencies and phase errors. Optical realignments of the instruments greatly reduce the difference between the O₂ and CO₂ VMRs.

In the poster the results of the comparison experiments with the Bremen TCCON instrument will be presented. Furthermore the first measurements of the stations in Poland and France will be analysed, after the transfer of the FTIR systems took place in the beginning of 2009.