Geophysical Research Abstracts
Vol. 12, EGU2010-3922-1, 2010
EGU General Assembly 2010

Combined FTIR-micrometeorological techniques for long term flux measurements of greenhouse gases and their applicability for $^{13}CO_2$ fluxes

Thorsten Warneke (1), Chris Caldow (2), and David Griffith (2)

(1) Institute of Environmental Physics, University of Bremen, Bremen, Germany (warneke@iup.physik.uni-bremen.de), (2) Centre for Atmospheric Chemistry, University of Wollongong, NSW, Australia

Fourier Transform InfraRed (FTIR) spectrometry has been deployed for continuous long term flux measurements on a flat, homogeneous circular grass paddock in New South Wales, Australia. The rationale for using FTIR spectrometry is its capability to measure many species simultaneously. The flux measurement techniques combined with FTIR – spectrometry in this study were Disjunct Eddy Accumulation (DEA) and Flux-Gradient (FG).
The fluxes of CO_2 derived from the FTIR-DEA and FTIR-FG measurements agree well and have been validated by Eddy Covariance Licor measurements. Variations in the observed fluxes could be attributed to temperature increase and water availability over the 5 months measurement period. In addition to CO_2, CH_4, CO and N_2O FTIR-spectrometry is also capable to measure $^{13}CO_2$. The isotopic fluxes of CO_2 allow to separate net ecosystem exchange of CO_2 into its gross one-way component fluxes, ecosystem respiration and photosynthesis. It has been shown that it is possible to measure the isoflux of CO_2.