

The use of FTIR-spectrometry to measure (greenhouse) gas fluxes at ecosystem scale

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Fluxes between the biosphere and atmosphere are not all well known, especially not for remote areas. Fourier Transform InfraRed (FTIR) spectrometry has the advantage of being able to measure gas concentration of different gases (CO₂, CO, N₂O, CH₄, δ¹³CO₂) simultaneously. Furthermore, it is possible to apply FTIR-spectrometry to different (flux) measurement techniques, such as the flux gradient or flux chamber method. In combination with suitable software, FTIR is capable of independently executing measurements for longer time periods with minimum manual maintenance. Besides, because of the mobility of the FTIR-spectrometer, it is possible to quantify gas fluxes in remote areas.

The use of FTIR-spectrometry for ecosystem flux measurement has been tested and evaluated in different ecosystems and campaigns: a peat extraction site (Quickborn, Germany), an InGOS N₂O flux-chamber intercomparison campaign (Roskilde, Denmark), InGOS N₂O flux intercomparison campaign (Edinburgh, UK), an arid grassland and a poplar plantation (Viterbo, Italy).

By use of FTIR flux data, different subjects could be studied: general flux patterns, Eddy Covariance versus FTIR Flux gradient measurements, spatial flux heterogeneity, the role of photo and thermal and respiratory isotopic δ¹³CO₂ patterns. In this presentation, an overview will be given of the campaigns and the main results.