



First Eddy Covariance Flux Measurements of Methanol by PTR-TOF

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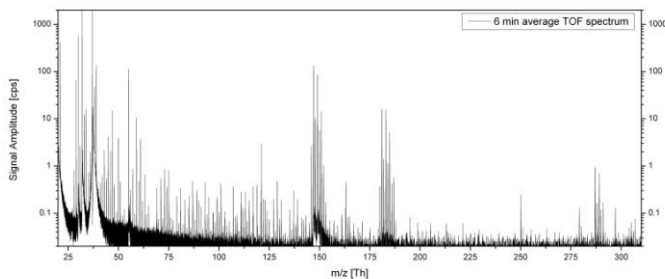
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Experimental Setup:

A Proton Transfer Reaction Time of Flight Mass Spectrometer (PTR-TOF) was evaluated to measure methanol fluxes using the **eddy covariance** method. The PTR-TOF was employed at a well characterized temperate meadow field site in the Stubai valley, Austria, to measure **VOC fluxes** above an intensively farmed **grass land**.

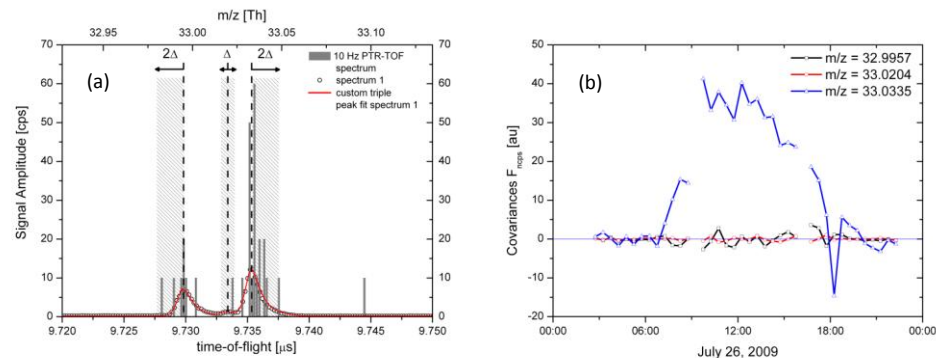


The high time resolution of the PTR-TOF allowed storing full mass spectra up to m/z 315 with a frequency of 10 Hz. Each spectrum contains about 150,000 acquisition bins. Di- and Trichlorobenzene (m/z 146.9763 and m/z 180.9373) was continuously added to guarantee a precise time of flight to mass conversion.



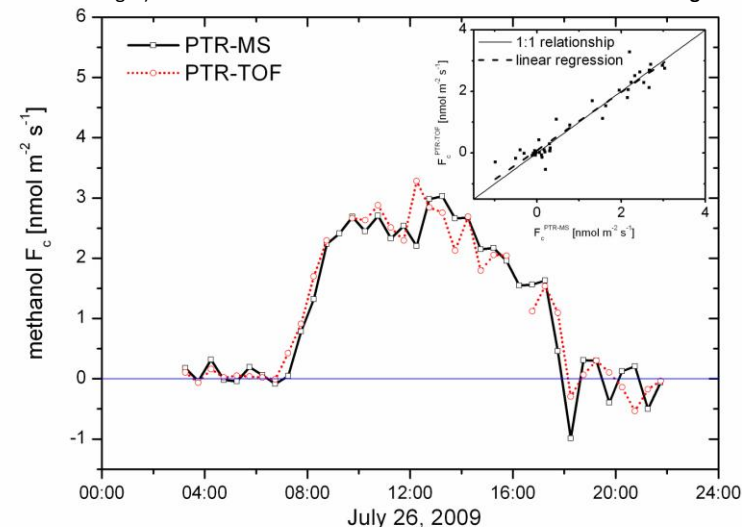
Data Reduction:

Due to the high mass resolving power of the PTR-TOF **three isobaric peaks** were found at a nominal mass of m/z 33 (a). According to **6 min average spectra**, summation intervals are calculated to get **0.1 s time resolved spectral** information of each isobaric peak needed for eddy covariance flux calculations. Only one of the three peaks contributed to eddy covariance fluxes (b). The exact mass of this peak agrees well with the exact mass of **protonated methanol** ($\text{CH}_3\text{O.H}^+$, m/z 33.0335).



First Results:

The **eddy covariance methanol fluxes** measured with PTR-TOF were compared to **virtual disjunct eddy covariance methanol fluxes** simultaneously measured with a conventional PTR-MS (compare to Poster BG 19 presented by Ines Bamberger). The methanol fluxes from both instruments show **excellent agreement**.



Outlook:

Fluxes of further 80 masses have been found and data will be published later this year (Ruuskanen; in preparation)

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Reference:

Müller, M., Graus, M., Ruuskanen, T. M., Schnitzhofer, R., Bamberger, I., Kaser, L., Titzmann, T., Hörtnagl, L., Wohlfahrt, G., Karl, T., and Hansel, A.: First eddy covariance flux measurements by PTR-TOF, Atmos. Meas. Tech., 3, 387-395, 2010.