



Quantifying VOC exchange over grassland - an intercomparison of different flux measurement methods

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The introduction of proton transfer reaction mass spectrometry (PTR-MS) for measurements of volatile organic compounds (VOCs) has enabled the application of the eddy covariance method for investigating the VOC exchange of various ecosystems. Different variants of this method exist and among the types recently applied for measuring VOC exchange fluxes are (direct) eddy covariance (EC), virtual disjunct eddy covariance (VDEC) and disjunct eddy covariance (DEC) techniques. We conducted an experiment to compare the DEC, VDEC and EC techniques among each other and in parallel to measurements with dynamic chambers over a managed grassland site. All these techniques were able to measure emission fluxes of several oxygenated VOCs during two typical cutting and drying cycles. While emissions were detected throughout the whole growing phase, they were highest after cutting and during the grass drying phase and decreased after the hay was collected. The advantages and limitations of the different techniques are presented and their uncertainties are discussed. The best choice of the method depends not only on these uncertainties but also on the inherent practical limitations in the field application of interest.