



VOC flux measurements with PTR-MS over Grassland: possibilities and limitations

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Grassland systems emit a variety of mainly oxidized VOC compounds. Measurements and estimates of these emissions are an important issue in environmental research. A major challenge is the determination of fluxes over different ecosystems due to the large spatial inhomogeneities and temporal dynamics. The most advanced method to determine exchange fluxes is the eddy correlation (EC) technique, which directly determines the vertical flux of a trace component by measuring the covariance between fluctuations in vertical wind velocity and the mixing ratio of the trace components. Proton transfer reaction mass spectrometry (PTR-MS) allows fast and sensitive VOCs measurements satisfying the requirements for doing EC flux measurements of many relevant compounds, such as methanol, acetaldehyde, acetone or C₅/C₆- alcohols and -aldehydes. Measuring close to a short canopy such as a managed grassland has the advantage of smaller fetch requirements, but the contribution of small eddies that cannot be resolved by the analytical system is larger. We report measurements over grassland with special emphasis on different calculation methods of the EC fluxes. Corrections of high frequency losses are presented and limitations in the interpretation of the flux measurements are discussed in light of analytical, meteorological and site-specific characteristics.