



Dealing with disjunct concentration measurements in eddy covariance applications: a comparison of available approaches

L. Hörtnagl, A. Hammerle, G. Wohlfahrt

Institute of Ecology, University of Innsbruck, Austria (lukas.hoertnagl@uibk.ac.at)

Until the time-of-flight proton-transfer-reaction mass spectrometry (TOF-PTR-MS) has sufficiently matured to be routinely applied for eddy covariance flux measurements, conventional proton-transfer-reaction mass spectrometers (PTR-MS) have to be used for quantifying the biosphere-atmosphere exchange of volatile organic compounds (VOC). As a consequence, concentrations of different VOC have to be measured sequentially, resulting in repeat rates on the order of a few seconds (depending on how many VOC species are targeted and the respective integration times), as opposed to the true eddy covariance method, where repeat rates of ten to twenty times a second are standard. Here we simulate the effect of disjunct sampling on eddy covariance flux estimates by progressively decreasing the time resolution of CO₂ fluxes measured at 20Hz above a temperate mountain grassland in the Stubai Valley (Austria). Fluxes are calculated with the true eddy covariance method and compared to results from the virtual disjunct eddy covariance (vDEC) method and the approach suggested by Spirig et al. (2005: ACP 5, 465-481).