



Open- vs. closed-path eddy covariance measurements of the net ecosystem carbon dioxide and water vapour exchange: a long-term perspective

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Here we use six years of CO₂ and H₂O flux data obtained with the eddy covariance method above a mountain grassland in the Stubai Valley (Austria) using concurrent scalar concentration measurements with an open- and a closed-path infra-red gas analyser. It is shown that, provided the appropriate post-processing steps are applied (in particular frequency response corrections and density corrections), fluxes measured with both systems correspond very well on a long-term basis, with a tendency of a bias during high-flux periods. An analysis of the random flux uncertainty also reveals little differences between both systems. As expected for the temperate mountain climate of the study site, instrument-related data gaps were more frequent with the open-path system and were biased towards periods of rain and dew formation. The combined effects of differences in absolute flux values, their uncertainty and gap statistics on deriving annual CO₂ and H₂O budgets are examined by gap-filling the data using several different methods.