



## **A multi-year comparison of lysimeter and eddy covariance measurements of evapotranspiration at the Rietholzbach catchment**

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Measurements of evapotranspiration are required for many meteorological, climatological, ecological, and hydrological research applications and developments. Here we examine and compare two well-established methods to determine evapotranspiration at the site level: lysimeter-based measurements ( $E_L$ ) and eddy covariance (EC) flux measurements ( $E_{EC}$ ). The analyses are based on parallel measurements carried out with these two methods at the research catchment Rietholzbach in northeastern Switzerland, and cover the time period June 2009 to December 2015. The measurements are compared on various time scales, and with respect to a 40-year lysimeter-based evapotranspiration time series. Overall, the lysimeter and EC measurements agree well, especially on the annual time scale. On that time scale, the long-term lysimeter measurements also correspond well with catchment water-balance estimates of evapotranspiration. This highlights the representativeness of the site-level lysimeter and EC measurements for the entire catchment despite their comparatively small source areas and the heterogeneous land use and topography within the catchment. Furthermore, we identify that lack of reliable EC measurements using open-path gas analyzers during and following precipitation events (due to limitations of the measurement technique under these conditions) significantly contributes to an underestimation of  $E_{EC}$  and to the overall energy balance gap at the site.