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Corrigendum to "A site-level comparison of lysimeter and eddy covariance flux measurements of evapotranspiration" published in Hydrol. Earth Syst. Sci., 21, 1809–1825, 2017

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We would like to inform the reader that there was an error in the post-processing of the eddy covariance (EC) data in the above-mentioned paper. While the post-processing was correctly described in the respective Sect. 2.3, some of the described corrections were by mistake not activated in the processing software. This namely concerns the conversion of the buoyancy flux into the sensible heat flux (Schotanus et al., 1983), and the correction of density fluctuations (Webb et al., 1980). In addition, the spectral correction for sensor separation was not explicitly considered (Moore, 1986).

Applying these corrections results in an average increase in the latent heat flux λE_{EC} of 13 % and an average decrease in the sensible heat flux H of 12 %. This does not affect the conclusions of the paper, and the overall comparison of the EC data with the lysimeter estimates qualitatively, however, leads to smaller changes in Figs. 4–8, Table 2 and some stated numbers of the paper. The main differences are the following.

- Change in the overall energy balance gap from 86.4 % to 90.8 % (Sect. 3.2); improvement in the regression slope of the turbulent fluxes versus the available energy from 0.77 to 0.8 (Fig. 4).
- The EC estimates still mostly underestimate $E_{\mathrm{L_0}}$ in summer, but mostly overestimate it in the other seasons (Sect. 3.3, Figs. 5 and 6).
- As a consequence, except for $E_{\mathrm{EC\_H}}$ the eddy covariance estimates show mostly higher values than the lysimeter estimates on the yearly timescale (Table 2). Moreover, the mostly negative mean biases on the hourly timescale turn into mostly positive biases (Fig. 7).
- The contribution of the amount of underestimation of latent energy during precipitation hours to the overall energy balance gap changes from about 15 % to about 22 % (Fig. 8, Sect. 4.2).

The corrected Figs. 4–8 and Table 2 are provided in the following, and the corrected data are available at https://doi.org/10.3929/ethz-b-000282395.

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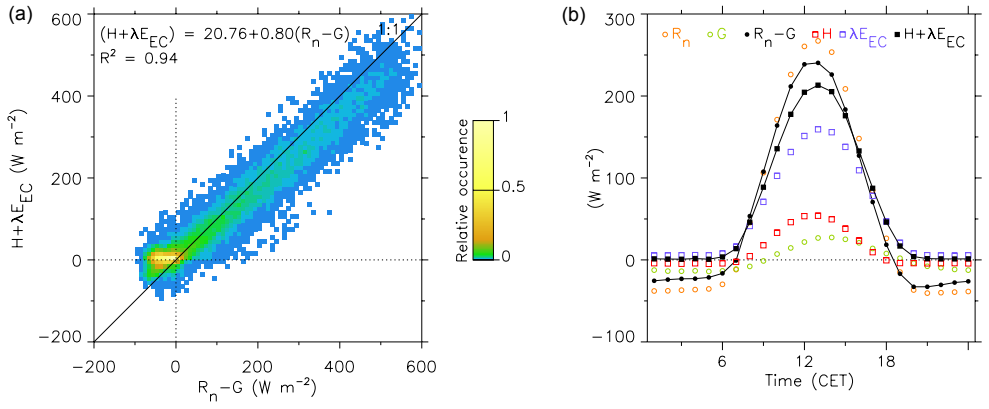

Figure 4. (a) Sum of turbulent fluxes (i.e., sum of sensible heat flux H and latent heat flux λE_{EC}; $H + \lambda E_{\mathrm{EC}}$) versus the available energy (i.e., net radiation R_{n} minus surface soil heat flux G; $R_{\mathrm{n}} - G$) and **(b)** mean daily pattern of the energy balance components. Graphs are based on measured hourly values (i.e., excluding gap-filled data, and masked for precipitation and wind directions affected by the tower) for the time period 1 June 2009–31 December 2015.

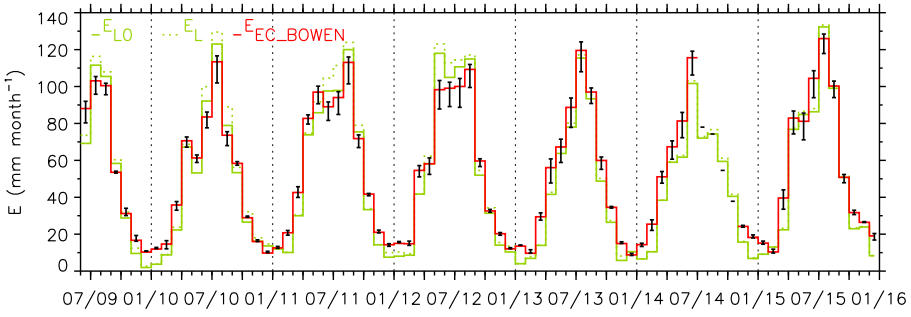

Figure 5. Monthly values of the different evapotranspiration estimates (with E_{L} denoting lysimeter evapotranspiration, $E_{\mathrm{L_0}}$ lysimeter evapotranspiration with values set to zero during hours with precipitation, and $E_{\mathrm{EC\_BOWEN}}$ EC-based evapotranspiration corrected according to the Bowen ratio) for the time period June 2009 to December 2015. The black bars indicate the range based on $E_{\mathrm{EC\_H}}$ and $E_{\mathrm{EC\_E}}$ (i.e., E_{EC} corrected by assigning the energy balance closure gap to sensible heat flux only and to latent heat flux only; see Sect. 2.3). Note that from July to October 2014 an energy gap correction is not possible due to missing soil heat flux (see Sect. 2.5) and thus $E_{\mathrm{EC\_BOWEN}}$ and $E_{\mathrm{EC\_E}}$ are not available.

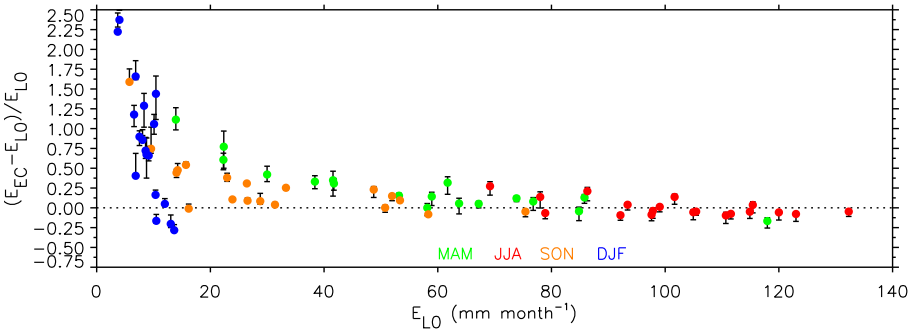

Figure 6. Monthly relative differences between lysimeter evapotranspiration $E_{\mathrm{L_0}}$ and EC-based evapotranspiration E_{EC}, i.e., $(E_{\mathrm{EC}} - E_{\mathrm{L_0}})/E_{\mathrm{L_0}}$ versus the absolute values of $E_{\mathrm{L_0}}$. Different seasons are displayed in different colors. The points indicate $E_{\mathrm{EC\_BOWEN}}$ (E_{EC} corrected according to the Bowen ratio) and the black bars indicate the range based on $E_{\mathrm{EC\_H}}$ and $E_{\mathrm{EC\_E}}$ (E_{EC} corrected by assigning the energy balance closure gap to sensible heat flux only and to latent heat flux only). Note that the July to October 2014 values with missing $E_{\mathrm{EC\_BOWEN}}$ and $E_{\mathrm{EC\_E}}$ (see Sect. 2.5) are omitted.

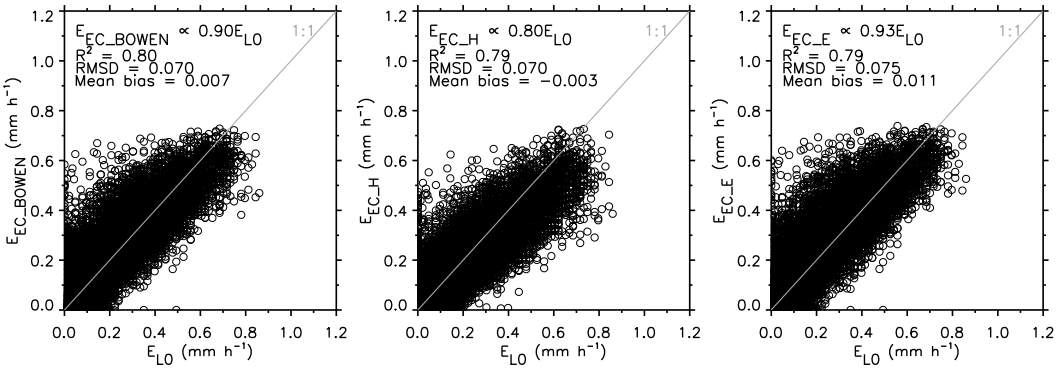

Figure 7. Comparison of hourly EC-based evapotranspiration E_{EC} with lysimeter evapotranspiration E_{L_0} based on measured values (i.e., excluding gap-filled data, and masked for precipitation and wind directions affected by the tower) in the time period 1 June 2009–31 December 2015 ($n = 30\,552$ for E_{EC_H} and $n = 29\,941$ for E_{EC_BOWEN} and E_{EC_E}). The comparison is shown separately for E_{EC} corrected according to the Bowen ratio (E_{EC_BOWEN}), and E_{EC} corrected by assigning the energy balance closure gap to sensible heat flux only (E_{EC_H}) and to latent heat flux only (E_{EC_E}).

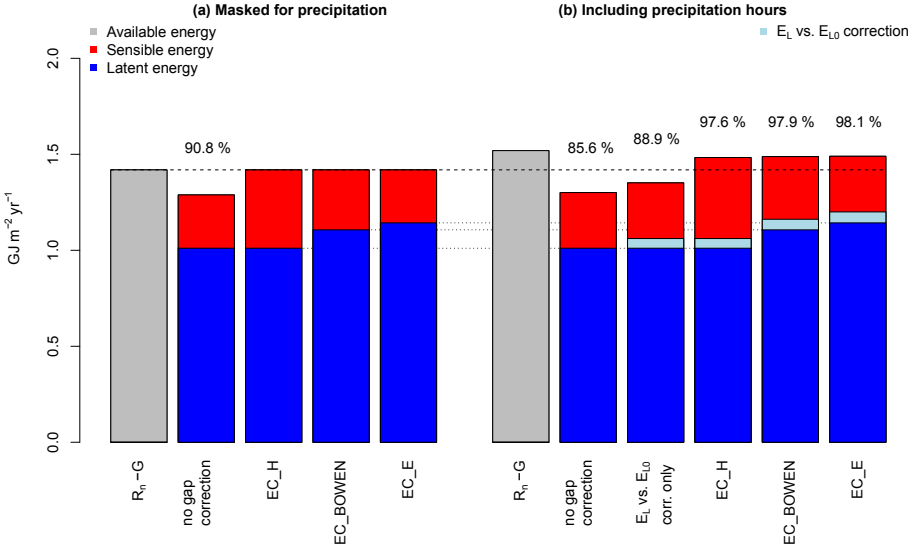

Figure 8. Yearly aggregated available energy ($R_n - G$) versus the sum of turbulent fluxes (for daytime, time period June 2009 to December 2015, excluding gap-filled data), with percentages denoting the amount of closure. **(a)** Totals calculated from hourly data masked for precipitation. The energy closure amounts to 90.8 % for the measured turbulent fluxes (i.e., no gap correction) and the gap becomes per definition closed for the three applied corrections (i.e., correction according to the Bowen ratio, EC_BOWEN, and correction by assigning the energy balance closure gap to sensible heat flux only, EC_H, and to latent heat flux only, EC_E; see Sect. 2.3). **(b)** Totals calculated by also including precipitation hours. Here the gap is corrected by applying a correction for missed evapotranspiration during hours with precipitation (based on the lysimeter evapotranspiration estimates E_L and E_{L_0}, denoted E_L versus E_{L_0} correction) plus considering the energy gap correction based on the precipitation-masked data (see text for details).

Table 2. Lysimeter (E_L and E_{L_0}) and EC (E_{EC}) evapotranspiration – including E_{EC} corrected according to the Bowen ratio (E_{EC_BOWEN}), and E_{EC} corrected by assigning the energy balance closure gap to sensible heat flux only (E_{EC_H}) and to latent heat flux only (E_{EC_E}) – for 6 hydrological years and the respective 6-year averages. Percentages denote the differences of E_{EC} and E_L to E_{L_0}. Note that for 2013/2014 and 2014/2015 an energy gap correction is not possible for a 4-month period due to missing soil heat flux (see Sect. 2.5) and thus E_{EC_BOWEN} and E_{EC_E} are not available (denoted as NA in the table). Units in mm yr^{-1}.

Hydrological year	E_L	E_{L_0}	E_{EC_BOWEN}	E_{EC_H}	E_{EC_E}
2009/2010	589 (+8 %)	543	575 (+6 %)	546 (+1 %)	591 (+9 %)
2010/2011	704 (+7 %)	659	671 (+2 %)	627 (−5 %)	693 (+5 %)
2011/2012	704 (+5%)	672	679 (+1 %)	625 (−7 %)	704 (+5 %)
2012/2013	542 (+4 %)	521	599 (+15 %)	548 (+5 %)	626 (+20 %)
2013/2014	537 (+2 %)	526	NA	582 (+11 %)	NA
2014/2015	647 (+1 %)	638	NA	631 (−1 %)	NA
Average	621 (+5 %)	593	631 (+6 %)	593 (0 %)	653 (+10 %)