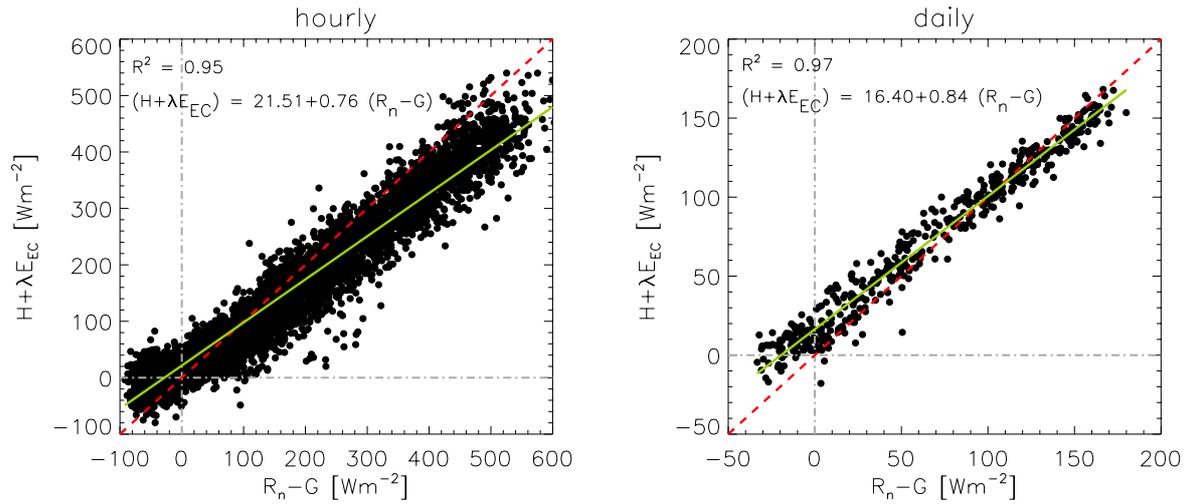Hydrology and
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Supplement of

A site-level comparison of lysimeter and eddy covariance flux measurements of evapotranspiration

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Supplementary Figure 1: Energy balance closure as evaluated from the ordinary least squares regression based on (left) hourly data and (right) daily data. Only days where maximally five of the hourly values were gapfilled are considered, which leaves 462 days of valid EC observations. The dashed red line indicates the 1:1 line, the green line the regression line.
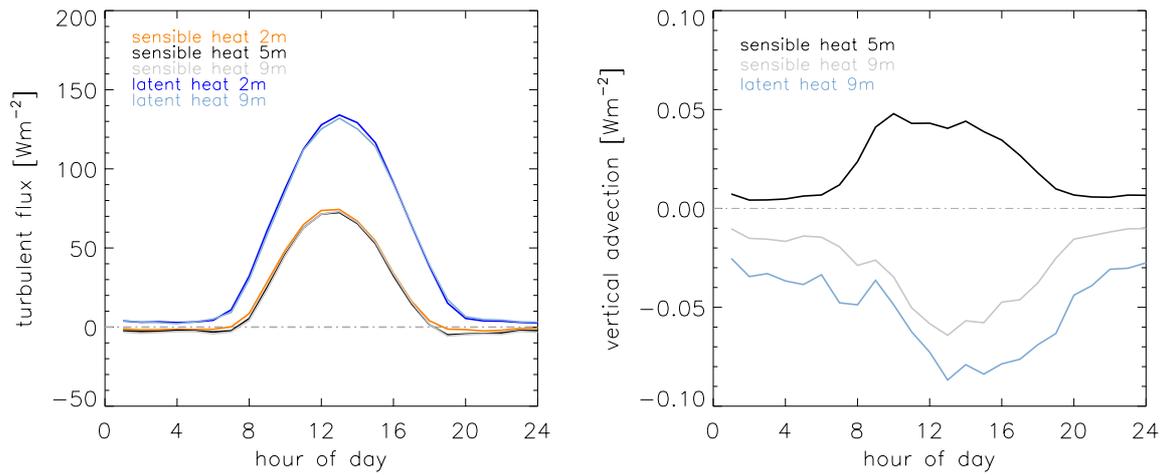
**Supplementary Figure 2: (left) Mean daily cycles of the turbulent fluxes at the different measurement levels and (right) vertical advection at these levels.**
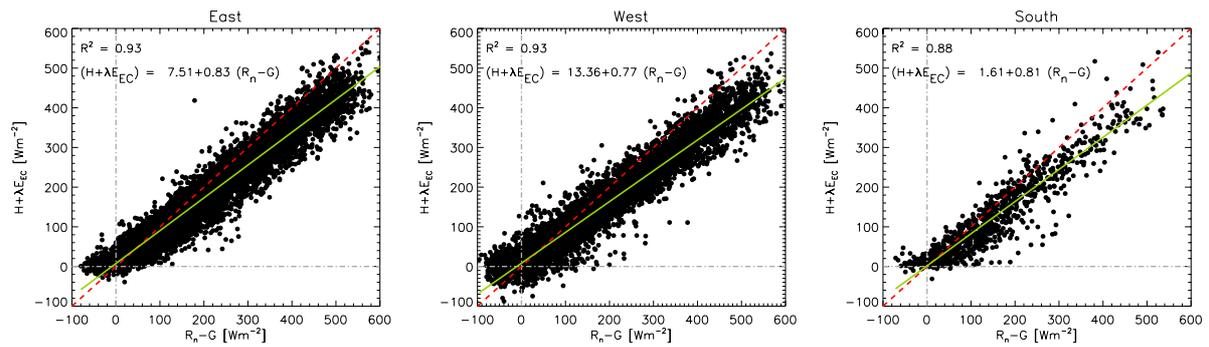
Supplementary Figure 3: Energy balance closure as evaluated from the ordinary least squares regression between the daytime hourly estimates of the turbulent fluxes against the available energy, separated by the three 90°-wind sectors. (left) Regression based on hours with wind from sector east, (middle) from sector west and (right) from sector south. The dashed red line within each panel indicates the 1:1 line, the green line the regression line.
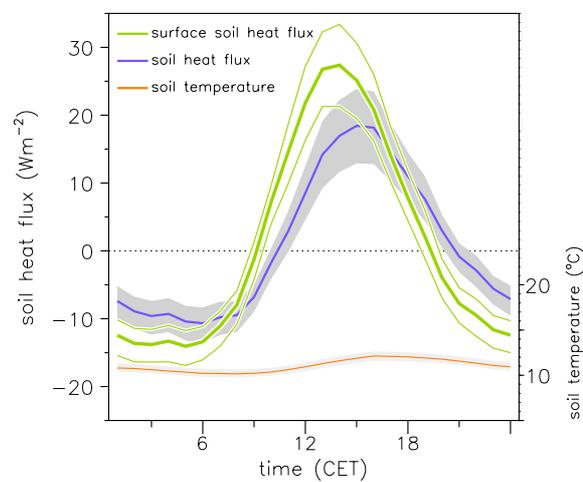
Supplementary Figure 4: Daily cycles of surface (green lines) and 5-cm (purple) soil heat fluxes, as well as of soil temperature (5 cm depth, orange). For the latter two, solid lines present the data based on the averages of the three heat-flux plates and the three soil temperature sensors respectively, while the range is based on the data from the three individual sensor locations (and displays the minimum and maximum values respectively). For the surface soil heat flux, the estimate calculated from the averaged heat-flux plates and temperature sensors is displayed (thick line), along with a minimum and maximum estimate based on the individual sensor locations (thin lines).
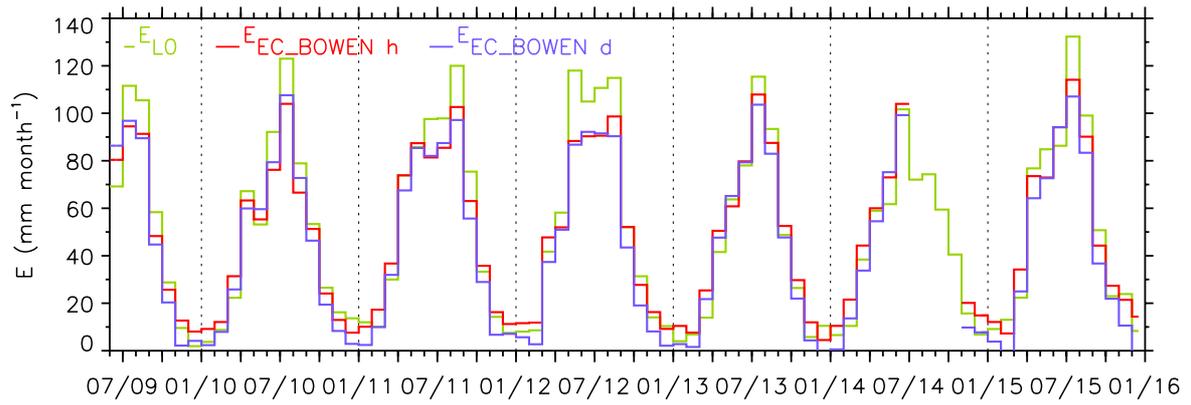
Supplementary Figure 5: Monthly values of the different evapotranspiration estimates for the time period June 2009 to December 2015. E_{L0} denotes lysimeter evapotranspiration with values set to zero during hours with rain, E_{EC_BOWEN} EC-based evapotranspiration force-closed on hourly ($E_{EC\_BOWEN\,h}$) and daily ($E_{EC\_BOWEN\,d}$) time scale according to the Bowen ratio.

Supplementary Table 1: Hourly data based statistics (R^2, RMSD, relative bias (i.e., $\frac{\overline{E_{EC\_BOWEN}-E_{L0}}}{\overline{E_{L0}}}$), number of data) comparing EC (E_{EC_BOWEN}) with lysimeter based evapotranspiration (E_{L0}) for different wind directions (i.e., sectors east, west, south and all together) vs. high and low wind speeds (i.e., greater and lower-equal than the median wind speed). Statistics are based on measured values only (i.e., excluding gap-filled data) and masked for precipitation. Units of RMSD in mm, R^2 and relative bias as fractions.

	high wind speed				low wind speed			
	R^2	RMSD	Rel. Bias	Number	R^2	RMSD	Rel. Bias	Number
East	0.79	0.090	-0.024	3707	0.81	0.067	-0.071	4777
West	0.77	0.081	0.041	9435	0.71	0.040	-0.271	10176
South	0.76	0.017	0.138	132	0.69	0.077	0.187	1004
All	0.78	0.084	0.016	13274	0.79	0.052	-0.112	15957

Supplementary Table 2: As Supplementary Table 1, but for different times of the day (i.e., all-day, daytime and nighttime) vs. high and low water vapor pressure deficits (i.e., greater and lower-equal than the median vapor pressure deficit).

	high vapor pressure deficit				low vapor pressure deficit			
	R^2	RMSD	Rel. Bias	Number	R^2	RMSD	Rel. Bias	Number
All	0.76	0.088	-0.023	14967	0.28	0.037	-0.086	14968
Day	0.67	0.107	-0.037	8043	0.53	0.063	0.147	8044
Night	0.06	0.031	-0.247	6922	0.00	0.027	-0.568	6925

Supplementary Table 3: As Supplementary Table 1, but for different times of the day (i.e., all-day, daytime and nighttime) vs. wind from different directions and without RMSD.

	All			East			West			South		
	R^2	Rel. Bias	Number	R^2	Rel. Bias	Number	R^2	Rel. Bias	Number	R^2	Rel. Bias	Number
All	0.80	-0.029	30002	0.81	-0.045	8602	0.78	-0.031	20242	0.71	0.175	1158
Day	0.75	-0.001	16154	0.77	-0.035	6495	0.74	0.015	8735	0.68	0.192	924
Night	0.04	-0.374	13847	0.03	-0.444	2107	0.04	-0.359	11506	0.00	-0.573	234