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# Result of storage term measurements at a sandy grassland site

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Eddy covariance (EC) technique is common technique to investigate fluxes over ecosystems. In the past 20 years the focus was on the carbon dioxide ($CO_2$) budget of ecosystems measured as net ecosystem exchange (NEE).

Night underestimation of fluxes is a frequent problem, addressed by several EC studies. When the turbulence is low the accumulation of $CO_2$ close to the ground can be significant, so the storage term (rate of change of storage, RCS) has to be taken into account. In the case of tall vegetation storage measurements are routinely done, but in the case of short vegetation it is often neglected based on the assumption that its positive values after sunset and negative values at dawn extinguish each other when calculating daily and yearly sums.

The EC system at the sandy grassland (Bugacpuszta, Hungary) was complemented by a 5-level (0.2, 0.5, 1, 2 and 4m) concentration profile measuring system and the storage term was calculated from the profile at half-hourly intervals. RCS was also calculated using only the concentration measurements of the EC system assuming linear concentration profile between the surface and the level of the measurement (linear approach).

When comparing the uncorrected and the corrected (profile method) half-hourly fluxes storage correction did not affect the daytime NEE values (slope=1.0084, const=-0.0053, $R^2$=0.9922) and had only a minor effect on the measured $R_{eco}$ values (slope=0.9577, const=0.0066, $R^2$=0.9173).

Yearly sums were calculated for the first whole year (August, 2013 - July, 2014) of the concentration profile measurement. Application of the linear approach storage correction enhanced the sink (more negative NEE) by 12 gC $m^{-2}$ $year^{-1}$ as compared to the uncorrected yearly sum. On the other hand, the use of storage terms calculated from the concentration profile measurements increased the sink activity by 54 gC $m^{-2}$ $year^{-1}$. Considering this more than 4 fold difference, concentration profiling should also be considered in case of grasslands when calculating storage.

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