Biogeosciences Discuss.,
https://doi.org/10.5194/bg-2018-458-SC2, 2018

Interactive comment on "Source Partitioning of H_2O and CO_2 Fluxes Based on High Frequency Eddy Covariance Data: a Comparison between Study Sites" *by* Anne Klosterhalfen et al.

A. Klosterhalfen

a.klosterhalfen@fz-juelich.de

Received and published: 14 November 2018

Thank you for your comment and suggestion! This other approach should indeed be referred to in any further version of our study. However, we understood that the main strength of the Skaggs et al. approach is in finding the optimal solution much faster than any earlier approach, rather than considerably changing results.
Our implementation of the source partitioning approach after Scanlon and Kustas (2010) resembles the procedure of Palatella et al. (2014) very closely. The only difference lays within terms of finding valid solutions with a minimal error in $\rho_{q'c'}$ and water use efficiency (WUE) at leaf-level. Because we converted Equation 15 in

Scanlon and Sahu (2008) solving for $\sigma^2_{c'_p}$ directly, we were left with only one unknown variable: $\rho_{c'_p c'_r}$. By insisting upon very low errors in $\rho_{q'c'}$ and WUE we found almost always the same solutions as the approach after Palatella et al. (2014), even though we passed on the implementation of the globally convergent Newton's method.
Skaggs et al. (2018) developed an algebraic solution simplifying the source partitioning procedure with a similar approach to ours. Using his analytical approach, we assume, would not change our results, but it might improve the rate of convergence to a solution. Preliminary tests done by Todd Scanlon comparing the approaches after Palatella et al. and Skaggs et al. support this: in addition to obtaining partitioning solutions for slightly more time steps, the new approach was more computationally efficient. Thus, in the face of an already extensive methodology, input variables and sites tested, we currently prefer the used approach and are confident that the impact on the results would be minimal.

Anne and Alex

Interactive comment on Biogeosciences Discuss., https://doi.org/10.5194/bg-2018-458, 2018.