

Reviewer #??

Comments to Author

The manuscript “On the choice of the driving temperature for eddy-covariance carbon dioxide flux partitioning” by G. Lasslop et al. discuss the empirical scheme of eddy covariance measurements to divide net ecosystem CO₂ exchange (NEE) into gross primary production (GPP) and ecosystem respiration (R_{eco}) using observations of FLUXNET eddy covariance CO₂ flux. They found that the choice of temperatures for the estimation of nighttime R_{eco} results in differences in estimates of GPP, R_{eco}, and NEE. In addition, the impact of choice of temperatures are difference between two flux partitioning algorithms. The manuscript addresses one of the uncertainty in eddy covariance studies.

However, the paper is poorly written, discussion is incomplete, and there are some strained interpretations of results. For instance, author wrote that this study showed different result from previous studies on the correlations of air/soil temperatures to nighttime NEE in Section 3.2. But this issue are not investigated and discussed fully in the manuscript. It is necessary to specify the statistic on analyses, such as median and correlation, otherwise the results can not be interpreted. Another example is the optimized temperature T_{opt} – this parameter is not used effectively in the analyses. Detailed analyses on the weight parameter of T_{opt} can produce the information about why the driving temperature for eddy covariance CO₂ flux varies among observation sites.

Although the results are important for the studies using eddy covariance observations, large parts require clarification and additional analyses before it can be published.

Specific comments

P. 9832, L. 15: It is preferable to cite references in this sentence “... they take place.”.

P. 9839, L. 13: New paragraph.

P. 9840, L. 8: New paragraph.

P. 9840, L. 8–P. 9841, L. 8: Fig. 3 is insufficient in information. You should specify the values of median and correlation in Fig. 3 and then discuss the difference among T_{***} based on the specified statistical values.

P. 9840, L. 16–23: Nighttime eddy covariance fluxes are contaminated by non turbulence atmospheric motions. I believe all data with negative correlation between nighttime NEE and temperature should be removed from the analysis. Otherwise, you should produce the evidence that water stress forces the negative correlation using moisture observations, such as VPD and soil water content.

P. 9840, L. 23: New paragraph.

P. 9841, L. 1–3: In the previous studies,

P. 9841, L. 8: Again please specify the statistic.

P. 9841, L. 24–28: Are the differences of correlations in Fig. 6 statistically significant?

P. 9842, L. 15–16: Could you estimate soil temperature at 5 cm depth at Hyytiälä site using interpolation and discuss how sensitive is the difference of soil temperature measurements between 2 cm

and 5 cm depths to the correlation with nighttime NEE?

P. 9843, L. 8–13: It is difficult to understand this paragraph. What is “conservative estimate”? Please rewrite this paragraph.

P. 9861: Please correct mistaken/missing characters in the text.

P. 9862: Please specify the values of median in Figs.