

Interactive comment on “Soil CO₂ efflux errors are log normally distributed – Implications and guidance” by Thomas Wutzler et al.

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We thank anonymous Referee #1 (RC1) for his encouraging and constructive comments.

Find the full comment in the attached pdf. Here, we summarize the main points.

RC1 suggest to make the lognormal assumption the default case, sees a need to argue for normal assumption instead, and wishes to change the interpretation accordingly. In our discussion, we tried to be conservative and accepted the alternative assumption of lognormal distribution only with those scenarios that showed a difference and improvement compared to the business-as-usual of the normal/Gaussian assumption. In regard of the intended audience, we hesitate to adopt this stronger point of view and

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would rather stick to the more conservative default of the normal assumption.

RC1 also suggested a revised model for analysis and fitting all chambers together with this model and hence change the analysis. We agree that such an analysis was more elegant and concise. However, we applied the analysis and see several discrepancies of the suggested model (possible new appendix C). The main problem is that chamber effects and properties of the error structure vary with time. While there might be statistical models that can deal with these issues, it will be difficult for many readers to replicate with their tool-set. Therefore, we want to stick to the current method based on shifting time windows. In this journal that primarily deals with measurements and their processing, we plan to keep the current approach of estimating true values by the LUT algorithm and focus on the structure of the resulting residuals. The LUT approach is familiar to ecologists working on Eddy-Covariance sites.

We want to add an additional appendix B, where we extend our work with fitting both error terms (instrumentation error at normal scale and process error at log scale) using bayesian hierarchical modelling. Although the necessary statistical tools and their explanation go beyond the basic message and guidance of this paper, we are interested in the opinion of RC1.

Please also note the supplement to this comment:

<https://www.geosci-instrum-method-data-syst-discuss.net/gi-2019-10/gi-2019-10-AC1-supplement.pdf>

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