Soil CO2 efflux errors are log normally distributed Implications and guidance
by Thomas Wutzler, Oscar Perez-Priego, Kendalynn Morris,
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Detailed comments on the Reply by the authors
Anonymous Referee 1

In addition to the comments on the discussion website, I reply to the detailed replies by the authors, using their flags "RC1-x"

RC1-1
"Scatter interval" in fact is not used as a term in the literature. My use of it reflects that nothing is predicted here, but the interval is used for a comparison with the observations that have been used for defining it through the estimation of the parameters. I can easily understand that you prefer to call it "prediction interval".

RC1-2
A qq plot should show the adequacy of the shape a distribution family. It only makes sense if the parameters for the observations used in the graph can be assumed to be the same. The main violation of assumptions is precisely that the quantities shown here do not have the same scale parameter. Therefore, showing this is violation is the essential step, and Fig.2 does this. Showing a qq plot which suffers from false assumptions is misleading. I would threrefore just drop it here. You might produce one for appropriately rescaled quantities later.

RC1-3
Yes, clearly. My comment just explained why I found Fig. 1 misleading. No objection to Fig. 2 (except that the plotting symbol should be smaller to reduce overplotting).

RC1-5
Here, I misinterpreted the plots because they are dominated by the outliers, and the boxes appear like an indication of the medians only.

RC1-6 to RC1-8
The suggested model is perfectly taken up in Appendix C. The critical remarks about the lack of fit stem from a very high standard. It would of course be very surprising if such a model would perfectly fit when used for the whole year. My tentative interpretations of what I see are:
a. Fig. C2 suggests a nice result if the model is fitted to these 5 days. There is a surprising jump at noons (if the date labels refer to midnight) which

need expert interpretation.

b. Fig. C1 shows common time patterns for the 4 chambers. Some are quite extreme changes (late April). The choice of h(t) is not suitable for describing such patterns. The rainfall episodes that you mention in the paper might be translated into a respective term in the model, and this might improve the fit.

c. As far as the plot is not flawed by too large plotting symbols which lead to the pink chamber overplotting the patterns of the other chambers, it is clear that the temporal pattern is not exactly parallel for the 4 chambers. That is, there is an interaction when long periods are fitted. This also calls for expert interpretation.

In summary, I think that the model has great potential for showing patterns to be interpreted. When applied to short periods, if may well provide a better alternative to the LUT method. While such considerations should be useful for further investigation, I do not suggest that they need to be developed in the present paper.

RC1-9
Yes, the new formulation is better.

RC1-10
You could add such a remark as "going a step further, one can postulate..." If the message is adopted, it makes life simpler ...

RC1-11 and RC1-12
Ok, then my conjecture was wrong.

RC1-13
This was just a suggestion. It is your paper.