

***Interactive comment on* “Standardized flux seasonality metrics: A companion dataset for FLUXNET annual product” by Linqing Yang and Asko Noormets**

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Referee #2

The authors offer an important dataset to the ESS community. By processing FLUXNET data to characterize the seasonality of fluxes at more than 200 sites across the planet, the authors have provided a benchmark dataset comparable to the land surface phenology datasets produced from MODIS and VIIRS time series. Moreover, the authors have taken care to investigate the robustness of their estimates obtained from seasonality modeling through resampling statistics on the one hand and alternative flux partitioning techniques on the other. I expect that these data will find many

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willing users.

Response: Thank you very much for your positive and constructive comments. Below, we address every comment carefully and explain the corresponding changes in the manuscript.

The narrative is concise and well-written, but I do have a few minor edits and comments.

line 9: is it really high accuracy or rather high precision?

Reply: Thank you very much for your question. What we want to present is the seasonality of ecosystem processes can be decomposed to identify key transition points and phase durations with high accuracy because of high quality of eddy covariance data. So, we prefer to keep the original writing 'with high accuracy'. The precision is, to a degree, indicated by the confidence intervals of the parameter estimates, and is, in fact, quite low.

lines 29-30: you may want to include here a highly relevant publication that appeared after you submitted this manuscript: Weltzin, J.F., Betancourt, J.L., Cook, B.I., Crimmins, T.M., Enquist, C.A., Gerst, M.D., Gross, J.E., Henebry, G.M., Hufft, R.A., Kenney, M.A. and Kimball, J.S., 2020. Seasonality of biological and physical systems as indicators of climatic variation and change. *Climatic Change*, 163(4), pp.1755-1771.

Reply: Thank you for bringing this publication to our attention. We have included this citation as suggested.

line 49: "compared" is more accurate than "truthed" since these approaches are looking at related but distinct processes.

Reply: changed as suggested.

line 68: update "in prep"?

Reply: This paper has since been published, and the reference is updated.

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line 89: I think that “same phenomenon” is more precise description than “truth” here

Reply: changed as suggested.

line 104: of course, abscission occurs in only a subset of these land covers and sites

Reply: Thank you for your comment. In this research, we only consider sites with 1) distinct seasonality of all fluxes; 2) data coverage of observed and high-quality gap-filled data >75% (defined by variable-specific data quality flags in the FLUXNET database (Reichstein et al., 2005)) (Line 78-80). Further, Sites with non-standard flux seasonality, where the R2 of model fit was below 0.75, were filtered out during general model fit assessment (Line 105-106).

line 114: citation needed for Grubbs' Test

Reply: citation has been added (Grubbs, F. E.: Procedures for Detecting Outlying Observations in Samples, Technometrics, 11, 1-21, <https://doi.org/10.1080/00401706.1969.10490657>, 1969.)

line 229: decode MDS (or is this related to FSMD?)

Reply: It is spelled out as Marginal Distribution Sampling, which is a version of look-up table used in gapfilling of fluxes. We have defined it in the manuscript, too.

line 270: This what? It is not clear to what the isolated relative pronoun points.

Reply: We are sorry we did not express clearly. Here, what we want to talk it the performance of seasonality metrics extracted from daily peak ecosystem respiration data and daily integrated ecosystem respiration data. To avoid ambiguity, we have changed it to 'we will report here the differences between the metrics estimated from the daily peak ecosystem respiration and daily integrated ecosystem respiration data'.

line 304: update “in prep”?

Reply: Thank you for the attention to our further analysis work. We have finished it and

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submitted to the journal Global Change Biology.

line 316: this use of “metadata” is odd and misleading. Try instead “latent features”.

Reply: changed as suggested.

line 327: omit “satellites” with the archived data, the docx file is named “Instrucations” and should be in pdf rather than Word.

Reply: Both changes made as suggested.

Interactive comment on Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2020-58>, 2020.

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