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Biogeosciences Discussions

Interactive comment on "Eddy covariance carbon flux in a scrub in the Mexican highland" *by* Aurelio Guevara-Escobar et al.

Anonymous Referee #1

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The manuscript by Guevara-Escobar and co-authors present a brief description of CO2 fluxes in a xerophytic shrubland in Mexico. The topic is relevant for Biogeosciences as much more information is needed in water limited ecosystems, underrepresented regions around the world, and ecosystems with different metabolic strategies (e.g., CAM, C3, C4). That said, I found the manuscript and the information presented limited in scope and premature.

Comments:

Introduction: The introduction lacks a clear scientific question and related hypothesis. Providing new measurements of NEE at underrepresented ecosystems is important, as well as comparing GPP estimates with satellite-derived products. That said, this manuscript should emphasize what is new (beyond new measurements) and have a

testable hypothesis if possible. The introductions resemble a technical report and could be improved by framing it around a clear scientific question.

Methods section: This section requires substantial reorganization and more information. The authors should link the methods to the research questions/hypotheses, provide more information about the site and how data was processed and analyzed. Maybe a section about data analysis would help to improve this section.

Results/Discussion section: I strongly recommend separating results from the discussion. Without a clear scientific question and testable hypothesis, it is difficult to evaluate this section and the novelty of the results. The authors touch different topics from leaf level photosynthesis, ecosystem level fluxes and remote sensing but I feel that there is disconnection between the results in this section. Finally, due to the limited dataset and analyzes, this section seems to be over-interpreting the results and consequently I wonder if this manuscript is premature for this study site.

Conclusion: I believe that this section is not fully supported by the data analysis and results. Again, it is difficult to evaluate this manuscript as the authors touch several topics, but none is analyzed in detail leaving the manuscript presenting a very broad (and potentially over interpreting) view of results. I respectfully believe that this is a good first step to summarize results from this study site, but this study requires substantial improvements in quality and quantity of data (e.g., longer datasets), conceptual organization (e.g., questions/hypotheses), and further analyzes to test clear hypotheses to provide a novel scientific contribution.

Figure 1 is difficult to interpret because the legend is not informative. I interpret it as mean diel patterns for the months represented in the figure, where the top panel is 2017 and the bottom one 2018. It is not clear why the authors present diel means and not the actual data or how many days were used to calculate the diel means for each day. Consequently, the methods section needs much more description about data quality, data availability, and data analysis to fully evaluate these results and the discussion.

Comments in detail

Study site: Description of the study site could be improved by following BADM guidelines for AmeriFlux. Although compiling all variables is challenging, a better description of the site is needed in order to compare this site with others across the world.

Lines 85-86 – I disagree with this statement as reporting energy balance closure is a good practice for data interpretation and data comparison.

Lines 87-95 – This belongs to data QA/QC and flux partitioning but a better description is needed.

Section 2.3 – Why not simply using the ORNL DAAC MODIS/VIIRS land product subsets tool?

Line 121-122 – LAI was only measured 2 times? Why only two days and not reporting a seasonal trend? Where those dates representative for maximum LAI?

Line 125 - It is unclear how the use of the Li-6400XT fits into the main purpose of the manuscript. How these data were used? Any upscaling approach?

Section 5 data availability: The proper place to host the eddy covariance data would be a standardize repository such as AmeriFlux or FLUXNET. Zenodo is a good place for overall code and ancillary datasets from this study but I appreciate the effort for archiving the dataset.

Figure 2 – How the eddy covariance data was aggregated for this analysis?

Figure 3- More discussion about why this figure is presented and what does it means for addressing a scientific question is needed.

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