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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Scalar turbulent behavior in the roughness sublayer of an Amazonian forest" *by* Einara Zahn et al.

Anonymous Referee #2

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This is a very important study, well presented by the authors. It has two main qualities: - Usefulness: with the upcoming tall tower in the Amazon, a study of this kind is essential. It will serve as an important reference for future flux analysis at the site; - An important new insight: the finding that zenith angle "controls" the validity of the similarity hypothesis is, to my knowledge, a new one. The reasoning proposed by the authors to explain it makes sense.

For these reasons, I recommend publication. I have a few suggestions to the authors, so I am rating it as "accept pending minor revisions":

1. After all screening and flitering for data quality and stationarity, a small percentage of the total data is left for the analysis. Although I understand that this is part of the nature of turbulence data, I feel it would be important to openly discuss how this fact

affects the significance of the results. Do the authors expect that a similar percentage of flux measurements will also need to be discarded at the site? Mabe the authors could mention that when using MOST to infer fluxes from profiles, a larger fraction of data may be used. I also suggest you show (in a table,maybe) what fraction of data is used for each range of zenith angle considered in the analysis. That would hint the reader whether the problems associated with high zenith angle are the same ones that cause lack of stationarity, for instance.

2. In section 3.2, you associate intermittency to skewness. Although I can understand the idea, it sounds strange, because there is another statistical momment, kurtosis, that is inherently associated with intermittency. The same association is later done at line 168.

3. line 181. The concern about similarity validity depending on the large scales of the flow is certainly a valid one, but it had never been presented before, in the manuscript. Given its importance, I expect that some readers will read the introduction with that idea in mind. I suggest addressing it before.

4. Figure 1 is not very informative. How about presenting histograms for each level?

5. Why aren't Sk_u values shown?, given tht they are even included in the discussion that precedes the figure?

6. Likewise, in figure 3, the dissipation rates (epsilons) could be directly shown as a function of z/L, along with the existent similarity expressions for this relationship. I would be very curious to see that.

7. line 329. I like the explanation for the similarity between CO2 and temperature, based on the signs of entrainment. I would also add that the surface fluxes between these two quantities also have opposite signals in the vast majority of the cases.

small issues:

line 40: remove "to" at the end of the line; line 239: "and" instead of "e"

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