

Biogeosciences Discuss., referee comment RC1
<https://doi.org/10.5194/bg-2022-8-RC1>, 2022
© Author(s) 2022. This work is distributed under
the Creative Commons Attribution 4.0 License.

Comment on bg-2022-8

Anonymous Referee #1

Referee comment on "Changes of the aerodynamic characteristics of a flux site after an extensive windthrow" by Bruna R. F. Oliveira et al., Biogeosciences Discuss., <https://doi.org/10.5194/bg-2022-8-RC1>, 2022

General comments:

The manuscript fits the scope of BG but is rather a site characterization after a sudden change in vegetation. It confirms what would be expected after the windthrow, quantifies the resulting changes, and emphasizes the relevance of properly determining aerodynamic characteristics but lacks substantial new findings.

The scientific approach is valid, however, it should be described in more detail and linked more closely to previous research findings.

Overall, the manuscript is well structured and the scientific results are presented clearly and concisely.

Specific comments:

(1) The paper would benefit from including more previous research findings in both the introduction and the discussion.

(2) In lines 21-26 you briefly discuss the influence of surface heterogeneity on turbulent fluxes. I don't see the relevance to your research since the area you're investigating is

mostly homogeneous, at least concerning the vegetation, and you also state that, in this specific case, the windthrow doesn't change the heterogeneity or produce forest edge effects.

(3) Line 12-13 & 31-32: You state here that, among other things, you want to investigate the effect of the windthrow on the zero-plane displacement height but later (in section 2.2; Line 77) you mention that the zero-plane displacement height is estimated based on your experience. I think it's okay to do it that way. However, then the announcement to study the influence on the zero-plane displacement height itself is misleading because actually the influence of a changed zero-plane displacement height on turbulent fluxes and footprint area is studied.

(4) Line 28: I would expect windthrow to increase stand heterogeneity by creating patches of different tree heights and roughness lengths. Why does the windthrow do not affect the heterogeneity of the stand in this case?

(5) Section 2.1 is difficult to understand if the reader doesn't know the previously published Oliveira et al. (2021) paper. Also, the mentioned paper does not include a description of the site after the windthrow. What happened to the burned eucalypt trees? What height do the newly grown trees have now (after the windthrow)? Are the young trees maritime pine or eucalypt trees? Is it a homogeneous forest? Are there patches of different tree species/heights? If so, what size do they roughly have?

(6) Line 108-114: It would enhance the quality of this paper if you properly described how you processed the data. Could you generally state more clearly on what kind of data your analysis is based on, e.g. how many measurements remained for the analysis of aerodynamic characteristics (chapter 2.2) or what steps were applied in the processing of the CO₂ fluxes. The information on which months were investigated and e.g. that no gap filling was applied should be stated in the methods section, not (only) in the results section. Also, the fact that you only used 2020 measurements with different roughness lengths is an important aspect of your approach that should be explained in the method section.

(7) Line 177-181: This should also be mentioned in the methods section, already, or moved to the discussion.

(8) Line 191: Are the fallen pine trees the key factor here? In Figure 1, it appears that a new vegetation layer has emerged since the fire, which was not affected by the windthrow and is taller than the trunks lying on the ground.

(9) 248-250: You should consider including this in the discussion instead of adding new information in the conclusion.

Technical comments:

Line 11: remove the comma after "2017"

Line 12: "large-scale" instead of "large-sale"

Line 103: "windthrow-induced" instead of "windthow-induced"

Line 104: "and" instead of "while"

Line 111: remove the comma after "omitted"

Line 118: add "the" before "inter-annual"

Line 154: "ecosystem" instead of "ecoystem"

Line 156: I think the word "windbreak" refers more to "protection from the wind" than to something being destroyed by wind. I suggest consistently using "windthrow" instead.

Line 157: remove the second "m"

Line 157: insert comma after "Also"

Line 170: "the" instead of "ther"

Line 175: insert space between "windthrow" and "were"

Line 178: "because then you get flow distortion problems due to the mast" is informal language

Line 198: insert comma after "Also"

Line 218: "appropriate" instead of "approriate"

Line 225: "windthrow" instead of "wind break"

Line 226: "ecosystem" instead of "ecosytem"

Line 243: remove second point

Line 253: "relatively" instead of "realtively"

Line 254: "relatively" instead of "relative"