

Biogeosciences Discuss., referee comment RC2
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Comment on bg-2022-8

Anonymous Referee #2

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-RC2>, 2022

General comments:

This paper describes changes in aerodynamic characteristics of an eddy covariance site following a windthrow. It highlights the importance of aerodynamic characteristics for flux measurements and determining the flux footprint.

The results are presented clearly and concisely, but the paper is narrowly focused on describing the specific characteristics of this site and doesn't include much discussion of the literature or the implications of this work. Overall, the paper would benefit from adding more background and discussion to connect this work to the broader context. In addition, more details should be included about the estimation of the zero-plane displacement and the sensitivity of the results to this estimation.

Specific comments:

- Lines 21-26: The introduction would benefit from more clearly explaining the background and motivation for this work. This opening paragraph is focused on the effects of heterogeneity, although this doesn't seem to be the focus of this study. I suggest expanding the introduction to include more context from previous work and explain the motivation for this study.
- Lines 31-39: Since this study simply uses an estimate of zero-plane displacement before and after windthrow, this section should be rephrased to make clear that the objectives were to study the effects of the change in zero-plane displacement and

roughness on the turbulence characteristics and flux footprint. Line 31 implies that this study is examining the zero-plane displacement itself.

- Lines 49-50: The previous paragraph states that an objective of the study was to examine changes in the zero-plane displacement height, so this statement about the zero-plane displacement height is confusing. I suggest clarifying here the time periods of data that are used in this study (before and after the windthrow), and that $d=3.8$ just refers to the before-windthrow calculations.
- Lines 74-79: Given the focus of this paper on changes in the zero-plane displacement, this section should include some justification of how these values of the zero-plane displacement were chosen.
- The sensitivity of the results regarding the stability parameter, turbulence characteristics, and footprint to the chosen value for zero-plane displacement (and roughness) should be examined further. How do the results change if a different values of d and z_0 are used? For example, Line 239 states that the difference in footprint area “would probably not have been as large if a slightly better value of $z_0=0.5\text{m}$ had been assumed before the windthrow.” Calculations could be repeated with this different value to show the sensitivity of the calculated footprint area to d and z_0 .
- The discussion sections should include more connections to the literature and discuss the broader implications of these findings.
- Line 246-250: This should be moved to the discussion section.
- Some of the data is not publicly available and is listed as “available on request.” From my understanding, Biogeosciences’ data policy requires data to be in a public repository.

Technical corrections:

Line 170: “For the 2020 period”

Line 175: “windthrow were”

Line 243: Remove second period after “reasonable as well”