

Atmos. Meas. Tech. Discuss., referee comment RC3
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Comment on amt-2022-210

Anonymous Referee #3

Referee comment on "Toward quantifying turbulent vertical airflow and sensible heat flux in tall forest canopies using fiber-optic distributed temperature sensing" by Mohammad Abdoli et al., Atmos. Meas. Tech. Discuss., <https://doi.org/10.5194/amt-2022-210-RC3>, 2022

The authors present a very challenging approach to measure wind and sensible heat flux with fiber optic distributed temperature sensing. Unfortunately, the results of the study are not so promising as it appeared that the shroud did not work well to measure vertical wind speed. I appreciate the authors braveness to submit (partly) failed experiments. Also failed experiments can help the community to learn. Having said this, I think the current manuscript needs major revisions as it seems more a good draft than a full paper (yet). Problem statement and method section miss essential information and certain choices are not well explained. Additionally, I think that also many of the figures can be improved with less abbreviations and make them more self-explanatory (e.g., by giving the figure titles as 'setup 1, setup 2'. this would also reduce the caption length). In the attached pdf I commented in detail. Here I only indicate my main comments.

- The outline of the study is that the authors first investigate several shroud configurations on a grass field (EBG). The 'best' shroud is then later used in a follow-up experiment in a forest. However, in the method section there is barely any information on the different setups and why shroud color, mesh size, rigidity or shape would affect the measurements. What were the design criteria. This part should be extended and improved.
- Why are not all the shroud experiments (EBG) compared to the sonic (thus also setup 1 and 2)? Now the benchmark is the 'unshrouded' FODS measurements, which is also an experimental method. I would benchmark the shrouds to the sonic as this is likely closer to the truth.
- Base the first test, the authors pick 'the best shroud' setup to apply it in a forest. Only surprising change, is that 'suddenly' the shroud length is increased. While from study 1 the authors could have learned that dimensions matter for the wind direction. This is in my view a major shortcoming of this paper.
- Despite the admitted 'failure' of the forest experiments, the authors still show the initial plan to calculate the sensible heat flux. But what is the value of this, once the wind speed measurements are not correct?
- The reference list contains 34 references, from which 16 are from the own research

group. This is almost 50%! I highly recommend to put the study into a more broad context. Many other groups also worked in this study field, including groups that also work with FODS. In the attachment I added some suggestions.

I hope my comments help to improve the manuscript.

Please also note the supplement to this comment:

<https://amt.copernicus.org/preprints/amt-2022-210/amt-2022-210-RC3-supplement.pdf>