The manuscript "Suitability of fiber-optic distributed temperature sensing to reveal mixing processes and higher-order moments at the forest-air interface" reads well in the current state and presents a substantial scientific contribution to the community, highlighting the applicability of distributed temperature sensing on a variety of application fields.

After considering a number of minor, rather technical, suggestions (see below), I think the manuscript is ready to be published.

General: check the whole text for the use of articles, they are missing regularly.

Abstract

line 12: put a comma before and after "however"

line 16: replace "discern" with "be discerned"

page 2

line 9: ...respectively. Yet, it is...

line 16: information on

line 26: why is Traeumer in capital letters?

line 27: put a comma after yet?

line 29: replace yet with but. Split sentence in two: "......(e.g. at measurement towers). Consequently, spatial details..."

line 30: Hence,...

page 3

line 16: what is meant with transition periods?

line 20: systems

line 30: split sentence. "....to boundary layer top. Consequently, the DTS system bridges...."

page 4

line 10: remove "the" before north-south direction. Write North and South in capital letters.

question for my interest: why do you have three different sonic types along the tower?

line 27: name the range of the lidar

page 5

line 12: reformulate "This setup enabled reference measurements at both...."

line 13: ".., and provided"

line 20: shouldn`t the mean be constant for each time averaging interval to ensure a proper application of this composition...?

page 6

line 6: "This value" refers to u* or the T*?

line 10: "as a function..."

line 22: one bracket missing after the numbers

line 30: "...be approximated by"

page 7

lines 1-3: "An estimate for the attenuation of the DTS-derived temperature variance due to imperfect high frequency response and lower sampling frequency can be derived by"

line 28: comma after "Similarly"

page 8

line 20: the experimental setup

line 21: comma after hence?

line 25: split sentence; "...outer cable (sheath, protection). These are...."

line 27: estimate

line 28: due to the fibre-optic cable

page 9

line 9: "showed" instead of "did show"

page 11

line 5: ...can be considered independent...

line 8: you use "dependence" at several other places in the manuscript, here you use "dependency". Be consistent.

line 9:...can be considered constant...

page 12

table 1 heading: ...derived via...

line 1: comma after hence

line 3: comma after hence

line 4: ...a fixed value...

line 7: replace "did cause" with "caused"

page 13

line 1: comma before "suggesting"?

Figure 5: write wT in the figure with overbar and apostrophes, as it is standard to describe the turbulent fluxes

page 14

line 2: the sensor separation between DTS and sonic was the same above and below canopy, right...? if so, it cannot be used as argument here.

lines 7 - 10: split this sentence in two.

line 18 - page 15 (line 2): split this sentence in two.

page 15

first paragraph: this is a quite big difference in the temperature profiles between DTS and reference. I wonder if the authors want to say a sentence about strategies to improve DTS in this regard. Without considering the radiation errors DTS seems useless with regards to T profiles.

page 16

line 17: site (it`s only one)

line 18: ...a previous study...

line 18 - line 21: split sentence and reformulate.

line 22 - 24: not sure if everyone will understand what you try to say with this sentence

line 27: in which regard are they in line with previous studies...?

line 30: fluxes are constant with height only in the surface layer, and this surface layer is not very big...; furthermore, here we are in and above a forest which modifies the atmospheric stratification schemes.

page 17

line 15: ...the vertical what? Feels like here is a noun missing.

page 18

line 18: replace "do demonstrate" with "demonstrate"

line 22: to which surface are you referring here? soil surface? canopy top?

page 19

line 1: comma after "in principle"

page 20

fig. 9: it might be useful to indicate in this fig. that blue is standing for the unstable stratification example and pink for the stable stratification example. Maybe switch colours as blue is often used intuitively for stable stratification.

page 21

fig. 11: it would help the reader to name directly in this fig. that you are referring here to the stable stratification nighttime example. Also, it would help to indicate how gradients were calculated (upper height - lower height, I guess).

line 5: in line with what from Thomas et al. (2012)? And what in Thomas et al. (2012) is complemented? Readers will not have the content of Thomas et al. (2012) in mind. Reformulate: "...these results are in line with their findings and complement them."

line 14: in the current study...

page 22

line 9: ...help to separate...

line 10: ...since the measurements allow the tracking of the temperature...

line 16: place a comma after "ultimately"

Generally to the conclusions and outlook:

can the authors briefly acknowledge the shortcomings of DTS which got obvious in this study and give information on how these can be overcome? I have e.g. in mind the topic radiation error which appears to be quite substantial. And which makes the use of derived absolute temperatures questionable. Give a brief overview please on the current limitations of DTS and how they will be tackled in the future.