The referee comments are copied in *blue*, our reply is in black

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> *General comments:*
> *This manuscript deals with the decoupling in atmospheric boundary layer in a forest canopy, through the identification of static stability, from temperature profile obtained by the DTS technique. Forest canopy studies, which contain higher vertical resolution, are rare and may contribute to understanding the exchanges between under-canopy/canopy/free atmosphere above. Particularly, in very stability, conditions, the decoupling of layers under-canopy induce the accumulation, important in quantifying the exchange of momentum, water and scalars between the forest atmosphere, because contributes this balance. The manuscript add understanding of the flow over forests and is well written, succinct and well organized. However, I have some considerations (suggestions): - I mainly suggest use the instruments at 0.8~1m installed, in some way (sonic anemometer). You can use both for u* analysis, as well include others turbulent parameters, such σw or VTKE, in relationships with temperature gradients via DST technique. (If the measurement period coincides). - A second methodology to determine decoupling thresholds of layers can be interesting, reinforcing your results. Either for all period, or maybe in case study (same periods used in section 3.1). I believe this is feasible, if high frequency measurements are available in anemometer (Gill3D), in the specific comments I better present this suggestion.*

Dear referee,

Thank you for taking the effort to read our manuscript, and thank you for the compliments. Sadly the sonic anemometer at 1 m broke down and only functioned for a short period of time. This is not clearly stated in the manuscript and will be corrected.

> *Specific comments:*
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> *Lines 15 – 16: "This points towards the understory layer acting as a kind of mechanically 'blocking layer' between the forest floor and overstory", in fact I believe that a dense canopy, the leaves can act as turbulence filter. For that, it would be necessary adjust the time window of averages (in this case you used 15 min. I may be wrong!),to better observe this filtering. Some studies in forests have shown the turbulence in time scales until 100 seconds is restricted within canopy, while movements with larger scales can reach top and pass to above. Please consider adding something related to this.*

In this study we used time averages of 15 minutes due to the limitations of the measurement technique. With DTS it is currently not possible to measure gradients at the required precision on much smaller time scales. The response speed of the ables used in this study (up to 5 minutes in slow moving air) is also a limiting factor.

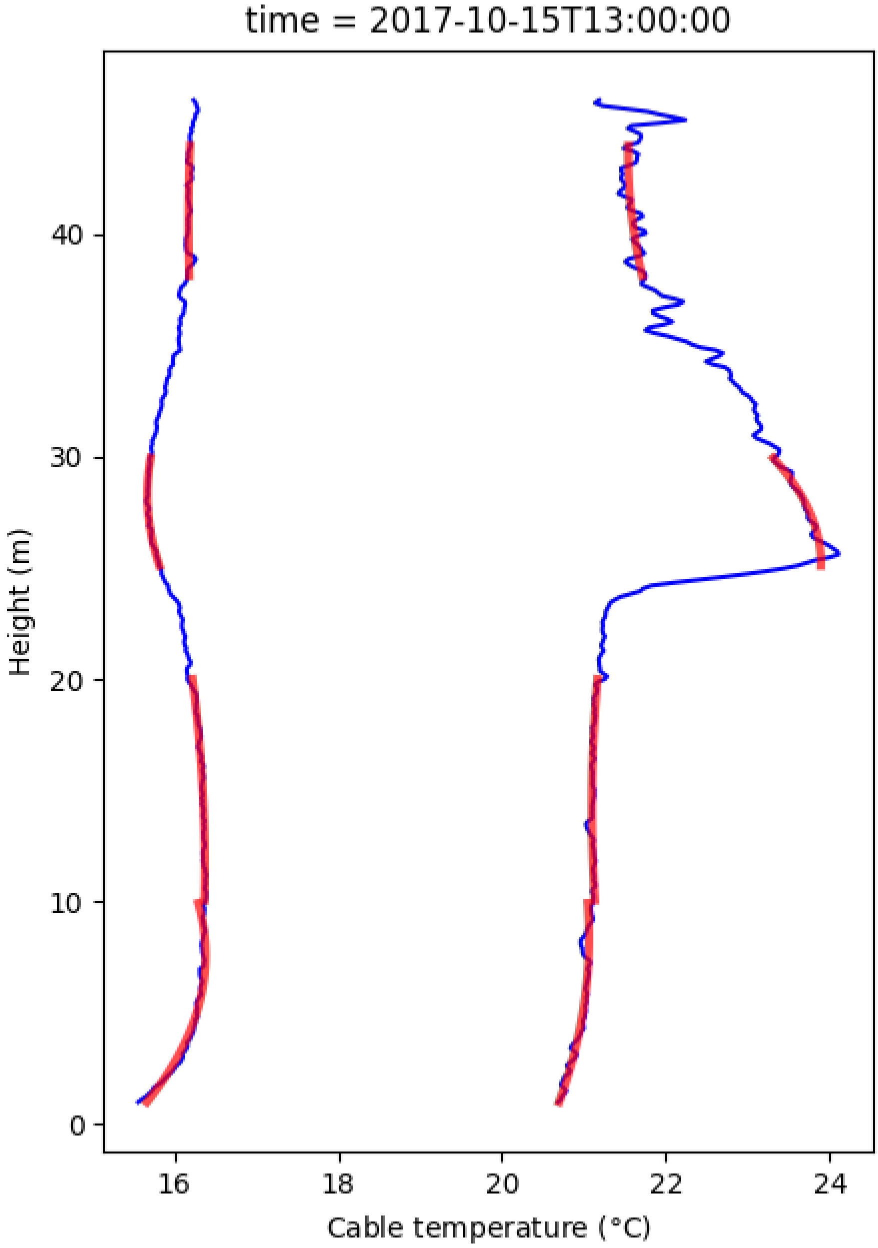
We will add information on time scale dependent turbulence filtering by the canopy to the discussion.

> *Lines 39 – 40: "These regimes vary per site and are dependent on both the forest structure and the ambient weather conditions. In particular, the subcanopy tends to be decoupled during the day, when highest temperatures are found at the top of the canopy, and to be coupled in the night when lowest temperature occurs at the canopy top". The layer under canopy decoupled from the atmosphere above forest, generally, at night. You need review, because it's confused, or you be referring only the layers within canopy?*

We will change this sentence to "… most commonly the subcanopy tends to be coupled during the day, and to be coupled in the night when the canopy cools down due to radiative cooling." and refer specifically to the 'nighttime problem' in the revised manuscript.

> *Section 2.4: Using polynomial fit, could you expose example of the profiles/ gradients from raw data and after being adjusted.*

In the image below the polynomial fits are plotted over the raw data of Figure 4a.



Maybe, can determine differents Richardson numbers, taking advantage the temperature profile. One stability parameter above and another within the forest. Consider using the bulk Richardson number. (MAHRT, et al.,2013).

We are sadly not able to calculate the bulk Richardson number as we do not have the required data (i.e., difference in horizontal wind components) due to the lack of continuous understory wind speed measurements.

Lines 189 -190: "This will cause a stable stratification above the canopy and above the forest floor, while the bulk of the canopy (2 – 26 m) is unstably stratified due to the colder air in the overstory." I don't think 2 – 26 m is unstable, but rather, near-neutral. However, if the classification was *unstable, show the temperature gradient quantification that led this classification, it seems is very subtle.*

For the nighttime profile during the clear diurnal cycle we classified the 2 – 26 m section as stable due to the presence of the cold air in the overstory. The (potential) temperature difference between the overstory and understory is approximately 0.7 K, we think this is sufficient to classify that section as unstable.

Section 3.2: About forest floor discussion, is interesting analyzes between temperature gradient and friction speed at 1 m (sonic anemometer). Maybe, extrapolate using turbulence at level for other analyzes.
Section 3.3 – Also with the eddy covariance (48 m) and sonic anemometer (0.8~1m) systems, you can use some other turbulent parameters, perhaps σw or VTKE (VTKE= 0.5 (σuˆ2 +σvˆ2 +σwˆ2) ˆ1/2), in temperature gradients classification. If you choose VTKE, its relation with the average wind (could compare with the wind above and within canopy), can help determining threshold at under-canopy layer starts to be decoupled from levels above (see: SUN et al., 2012, ACEVEDO, et al. 2016).

We would have liked to have made these comparisons and calculations, but sadly the sonic anemometer at 1 m broke down and only functioned for a short period of time, not overlapping with the other sensors. This is not clearly stated in the manuscript and will be clarified in the revised version.

Technical corrections:
line 95: “mean speed speed” double.

Thank you. This has been corrected.