Reply to Editor Comments

In blue we copied the comments of the editor, in black our replies.

Dear authors,
after carefully considering the two (very contrasted) reviews received on your revised manuscript, I would like to invite you to (i) consider the suggestions for technical corrections suggested by referee #1, and (ii) account for the concerns raised by referee #2 (i.e., that the proposed method cannot be applied based on the meteorological measurement setup). The latter point may be addressed by developing (e.g., as part of the discussion/conclusion/outlook) on the need - with a view on potential future follow-up research - for accounting for the limitations of the experimental set-up used in this study and outlining potential avenues for improvements.
I am looking forward to receive an updated version (after minor revisions) of your contribution.

Reply:

Dear Editor, aiming to improve the manuscript readability we fix the technical corrections proposed by referee #1 as follows:

1) Page 3, line 4
making difficult to -> making it difficult to
Reply: Corrected.

2) Page 4. Line 19, "from 5:00 to 18:30"
In Table B1 the earliest initial time was 5:10 and the latest final time 18:00. Please consider to unify the descriptions.
Reply: For this correction, we did the following changes:
We added in page 4, line 11:

> "… 18:30 hours local time (UTC-6). However, the light conditions affected the images selected as suitable for analysis (see Appendix B)."

We updated the caption and footnote of Table B1 as follows:

> **Caption:** "Time windows with suitable images for analysis during the 5 sampling days surveyed with the camera."
>
> **Note:** "… of the survey. The camera was set to take images from 5:00 to 18:30, the time windows showed in the table correspond to the period with images suitable for analysis."

3) Page 7, line 4
vapor water -> water vapor
Reply: Corrected.

4) Page 7, line 15
due the absence -> due to the absence
Reply: Corrected.

5) Page 7, line 22

the moist adiabatic -> the dew point temperature
Please delete " at Tz and Tdew.z" because Γdew is independent of the temperatures.
Reply: Corrected.

6) Page 8, lines 4 to 5
This because -> This is because
Reply: Corrected.

7) Page 12, line 12
However, is -> However, it is
Reply: Corrected.

8) Page 12, line 15
Egea et al., 2017) (-> Egea et al., 2017;
Reply: Corrected.

9) Page 13, line 4
de forest -> the forest
Reply: Corrected.

10) Page 13, line 13
fot he -> for the.
Reply: Corrected.

Aiming to clarify the concerns expressed by referee #2, we added the following:

1.: A description of the main limitations that current techniques have when measuring fluxes under highly wet atmospheric conditions (Page 12, line 1):

> "This paper described the formation of visible vapor plumes based on photographs as a visual indication of a process that is usually invisible to the human eye. The occurrence of this phenomenon under rainy conditions makes difficult to quantify its contribution to the forest evaporation with current measuring techniques. Vapor plumes occurrence during rainy days compromise the performance of more sophisticated instruments that are highly sensitive to rain or mist conditions Centre for Atmospheric Science, 2020, Mauder and Zeeman, 2018}. Instruments such as sonic anemometers (e.g., CSAT3, CSAT3B) and Open Path CO2/H2O Analyzers (e.g., LI-7500) are strongly affected by high humidity and rainfall Campbell Scientific Inc., 2017, 2019, Foken et al., 2012b, LI-COR, 2016, Moncrieff et al., 2005). The presence of rain causes departures from the measurements increasing the sonic speed (Camuffo 2019, Kelton and Bricout, 1964, Peters et al., 1998) or blocking the face of the transducers (Campbell Scientific Inc., 2017) causing a frequency loss during rain events (Zhang et al., 2016). The eddy-covariance technique is considered as the standard measurement for determining atmospheric fluxes, however, it is dependent on fully turbulent transport over a homogeneous surface (Foken et al., 2012a). This means that the localized nature of the visible vapor plumes makes measuring them very susceptible to sensor placement, complicating its monitoring using eddy--covariance systems located high above the canopy. Additionally, measuring devices based on 3D wind components (e.g., eddy--covariance systems) are developed to measure water in gas form (Foken et al., 2012a)

and are not intended to measure visible vapor plumes that are ascending clusters of tiny water particles (Spellman.2012)."

2.: A sentence linking the techniques limitations to further quantification attempts (Page 13, line 11):

"… While the quantification of its contribution to the hydrological cycle have to overcome the limitations of current measuring techniques."

3.: Following the recommendation of adding potential future follow-up research topics to the manuscript, we improve two paragraphs with the following additions:

Page 13, line 25:

"… vapor plumes. Also, these sites provide an opportunity to quantify the bias that eddy--covariance systems make due to the existence of this phenomenon. Direct measurements of atmospheric water (gas and liquid phase) can be achieved with closed-path gas analyzers (e.g, LI-7000DS-LI-COR, EC155-Campbell Sci., FMA-Los Gatos Research), allowing to determine the total water content in the air. These measurements will …"

Page 13, line 31:

"Finally, further research can search for the detailed source of vapor with the implementation of direct measurements of water stable isotopes using mass spectrometers or cavity output spectroscopy. This type of research can provide more insights into the effect of vapor plumes on the micro-climate of forest ecosystems. Moreover, the occurrence of this phenomenon in other vegetation types may be addressed to understand the main drivers and the role played in local hydrological systems."

We also add a final remark on the conclusion summarising the new additions on the manuscript (see Page 14, line 14):

"The exploratory nature of this work, opened new research opportunities aiming to improve the setup to monitor this phenomenon and provide a further accurate quantification of the contribution within the local hydrology."