Dr. Yang,

Thank you very much for your careful review of our manuscript and our responses. We are more than happy to make the requested changes. Please see our responses below to your suggestions.

Sincerely,

Russell Doughty and coauthors

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1) The legend in Figure 1 is too small. I have to zoom in a lot to see the text. Consider moving it outside the main image area.

Response:
We agree! To save space in the final publication and to facilitate a timely response, we have described the legend in the figure caption.

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2) Several sentences in the discussion need to be supported by either the current work or others' paper. For example, in Section 4.3., the authors started with "Our study encompassed several tropical forest ecoregions with mean annual precipitation at or below 1700 mm, such as the 399 Eastern Guinean, Western Congolian Swamp Forest, and Northwestern Congolian Lowland Forest. " which can be referred back to Figure 1.

Response:
Thank you. We now cite Figure 1 here as requested.

Moreover, the authors wrote "First, trees in drier evergreen forests may have evolved mechanisms to optimize water use efficiency, such as closing stomata during periods of high VPD to reduce transpiration losses, which in turn affects photosynthesis. Second, these forests might rely on deep root systems to access groundwater during dry periods, but prolonged low precipitation can still lead to water deficits affecting canopy function. Finally, the tree species in these regions may have traits that are adapted to lower water availability, such as being semi-deciduous, influencing the overall ecosystem response to environmental drivers. " These are all reasonable points, but they should be supported by properly citing other works. Otherwise, it may read as hand-waving to the readers.

Response:

We now provide citations for each of these statements. Thank you very much for pointing this out; the changes improve our manuscript.

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3) I would reconsider the argument in Section 3.3. Here, the authors wrote, "In less moist forests (mean annual precipitation < 2000 mm), we found that SIF was significantly positively correlated with precipitation and significantly negatively correlated with VPD (Figs. S1 and S2). This suggests that soil moisture availability is a key driver of photosynthesis in these regions; limited precipitation leads to soil moisture deficits that constrain plant physiological processes." Although we can interpret this as that more soil moisture leads to more SIF emission, the other side of the result is high VPD leads to lower SIF. Thus the result does not support one or the other, but it indicates that both may have played a role. Reviewer 2 also had a similar comment.

Response:
This is a great point! We have revised that argument as:

In less moist forests (mean annual precipitation < 2000 mm), SIF was significantly positively correlated with precipitation and significantly negatively correlated with VPD (Figs. S1 and S2). These dual relationships suggest that photosynthetic activity in these regions is driven by both soil moisture availability and atmospheric water demand. On one hand, limited precipitation reduces soil water content, constraining stomatal conductance and thereby lowering photosynthesis. On the other hand, high VPD can prompt stomatal closure to mitigate water loss, which in turn decreases carbon uptake and SIF. Hence, the interplay between precipitation and VPD jointly regulates photosynthetic fluxes, and both factors should be considered when interpreting SIF variations in less moist forests.