Sutton Bonington 17 July 2023

Dear Dr Park,

Thank you for your positive response to our revisions. We have now addressed the second set of reviewers comments. The specific responses are highlighted below.

Yours sincerely

Sofie Sjogersten (on behalf of all the authors).

Detailed response

Reviewer 1

1. Despite the authors acknowledging that Figure was corrupted on submission, they have replaced the figure with the same version (i.e., still missing data points for panel D in the pdfs I received). This must be ammended before the paper is finalised.

We have ensured this figure now displays correctly.

2. Similarly, the authors agreed with me that Figure 3 could be improved by slightly offsetting the data points in the horizontal axis, but on both the tracked changes and manuscript files I can't see any difference in the revised version of this Figure. I suggest the authors may have misplaced the revised figure?

We had made a small displacement in the figure in the resubmitted MS. As the reviewer did not notice this we now increased the displacement so that it is clearer to the reader.

3. Minor grammatical point: On the author's correction to L133-136 Sphagnum requires capitalising and italicising in the revised manuscript.

We have corrected this.

4. Minor grammatical point: In the author's correction to L39-42 should it read "28 times that of CO2"? If so this should be amended.

Thank you, we have made this change.

Once these final changes are made, and the Figures are replaced with the correct versions, I believe the paper will be ready for acceptance.

Reviewer 2

The authors have adequately addressed most of the issues raised by the reviewers, but some minor revisions could be addressed for publication.

Minor comments:
Authors should add the novel methodology described in their response to the discussion section, if it is not included; “a novel methodology (in ASPIS-InSAR) for assessing the risk of future elevated methane emissions linked to areas that are subsiding and will turn into methane emitting areas in the near future.”

We have reworded the sentence in the discussion that addresses this point following the reviewers suggestion on L557.

Line 184-186, pg7: It is still unclear. It seems to me that authors used vegetation phenology metrics (e.g., onset, offset) derived from seasonal NDVI variation and air temperature. If so, authors should provide a brief description on which phenology detection method has been used. For the air temperature, did authors use 0 degree temperature as a threshold to identify vegetation phenology onset? Please specify it. The methodology used in the paper should be repeatable.

We have added details on the approach we took to the methods section. L190 and 199 now reads: We defined the spring period to start from when the ground became snow free, air temperature rose above 5°C and soil temperatures at 5 cm depth rose to above zero while NDVI remained low (< 0.25), this coincided with the month of June. We defined the summer growing season as the periods from the start of July when the NDVI increased from the non-growing season NDVI of < 0.25 to > 0.5 and soil temperatures were consistently over 5°C and daily mean air temperatures were mostly 10°C or above. The NDVI peaked mid-August with values around 0.7. The summer period included July and August. We identified the onset of autumn by a drop in NDVI at the end of August that occurred in parallel with a drop in the daily mean air temperature which fell below 10°C at this time. By the end of September, the vegetation had senesced, and the mean daily air temperatures started reaching freezing conditions.

Section 2.4: Did authors use Pix4D mapper? There are a series of the Pix4D software. Please specify it.

We used version 4.6.4. We have added this to the paper.