We like to thank the reviewer for the time spent and the valuable comments. They helped us to improve the manuscript. Please, see below our answers to the single comments.

Generally: in l. 58 you first introduce methane (CH4), but later you switch randomly between "CH4" and "methane" in the text. To provide consistency, please use always "CH4" in the text after first mentioning it in l. 58. Please check the same also for other abbreviations you introduced.

Thank you for this comment, we will unify the use of abbreviations throughout the manuscript.

l. 99: This sentence might be difficult to understand. I recommend to divide it into two sentences for each first and second area.

We will divide it from “The first area is dominated by permafrost plateau, while the second one is thawing, wetter areas. “ to

“The first area is dominated by drained permafrost plateau. The second area is thawing and thus resulting in wetter conditions.”.

l. 124 and others: there is a space character missing between value and unit. Please write "0 °C" instead of "0°C" and check also the other parts of the manuscript regarding that.

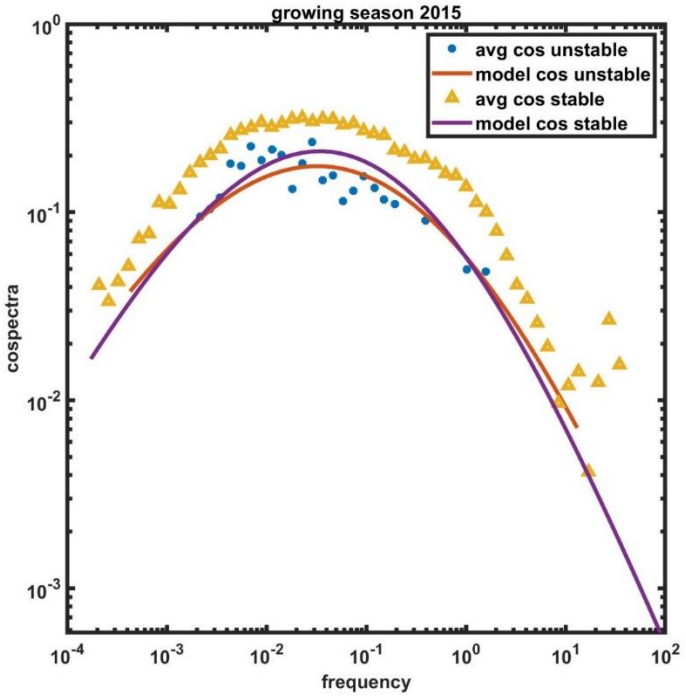
Thank you for this comment, we will unify space character between values and units.

l. 126 and later: in many parts of the manuscript you give both air and peat temperatures with 2 decimal places. Is this really justified, considering the uncertainties of the sensors?

We will change it to 1 decimal place

l. 153: The intake tube of the LGR analyzer had a length of almost 30 metres, which is a relatively long tubing. Did you carefully check whether the measured CH4 signal was dampened due to the flow characteristics of the sampling tube? How does the co-spectra look like? Are there any signs for a dampening effect in the high-frequency range, and if possible, did you apply a suitable correction? Please provide a short statement on that in your manuscript.

We analyzed this with the cospectra of the CH_4 and w. This does not show a dampening effect at the high frequency (see figure below), thus the high frequency attenuation does not seem to be very large. Furthermore, the postprocessing software we used to calculate fluxes includes correction for high-frequency losses. We will add a statement on this in the text.



l. 160: The LI-7200 ist an enclosed path analyzer. Additionally, the official notation of the manufacturer is "LI-COR". Please write it consistent in the manuscript.

In principle enclosing an open path analyzer will make it a closed path analyzer, no matter what term the manufacturer uses. We will however change the text following manufacturers terminology throughout the manuscript.

In l. 257, 316 you write "global radiation", in l. 465, 467, 565 you name it "shortwave radiation". I recommend to write "shortwave incoming radiation" generally in the entire manuscript

We will change to shortwave incoming radiation throughout the manuscript.

l. 436: You report an average emission of 24 mg-CH4 m-2 d-1 for the eastern sector in wintertime, which is in accordance with Table 6. However, refering to Fig. 4, wintertime emissions at the eastern sector seem to be substantially lower than 24 mg-CH4 m-2 d-1. Are the mean values, maybe, in Table 5 and 6 the gap-filled ones? a) If yes, please clarify in the table descriptions and in l. 433, l. 437. b) If yes, why does the gap-filled value seem to be substantially higher than the the non-gap-filled data? c) If no, what is the reason for this discrepancy?

It was calculation error where averages from two winter periods were sum instead of averaging. New values were calculated and will be used in the revised manuscript.

	Mean	Standard deviation	The standard error of the mean
	[mg-CH_4 m^{-2} d^{-1}]		
2014 E	12.04	3.83	0.49
2015 E	11.08	2.27	0.26
2016 E	13.12	3.48	0.35
2014 W	9.58	3	0.64
2015 W	7.4	1.85	0.26
2016 W	6.98	4.51	0.58

l. 637, "Method...": is there a word missing at the beginning of the sentence?

We will change from “Choosing one of them as the most appropriate is not obvious, because all of them has strong and week points. Method required the less preparation before use, so the faster to apply is moving mean.” to

“Choosing one of them as the most appropriate is not obvious, because all of them show both strong and week points. The method that required the least amount of preparation before use and that was thus the fastest to apply is the moving mean.”.

l.699f: You conclude a "gentle increase" of CH4 fluxes in spring, and a "more rapid decrease in fall". Figure 4 somewhat differs to that finding: I see no difference in increase / decrease ratio for 2016, while for 2014 and 2015 there seems to be a more rapid increase in spring, followed by a less rapid decrease in fall? Am I wrong?

Thank you for this suggestion. We checked it and you are right. Speed of the increase and decrease were estimated and presented in the table below. Line 699-700 will be rewritten.

Year and ecosystem	spring	autumn
	[mg-CH4 m-2 d-2]	
2014 E	1.63	-0.59
2015 E	0.42	-0.35
2016 E	0.69	-0.55
2014 W	0.4	-0.22
2015 W	0.21	-0.16
2016 W	0.24	-0.25

Fig. 1: change m/s => m s-1.

We will change it.

Fig. 2: The water table level (WTL) is given in metres above sea level. For what reason? I guess it could be more intuitive to give relative values referencing to the ground level. In l. 164 you introduced a ground level (a.g.l.) baseline - maybe you could do that also for WTL?

We have calibrated WTL based on the different dataset and it is in the m a.g.l. (figure below). Furthermore, we found out that the WTL data from 2014 had unknown offset, as the elevation of the sensor was not properly recorded in the metadata. We have now calibrated the WTL data against another dataset, to remove this offset.

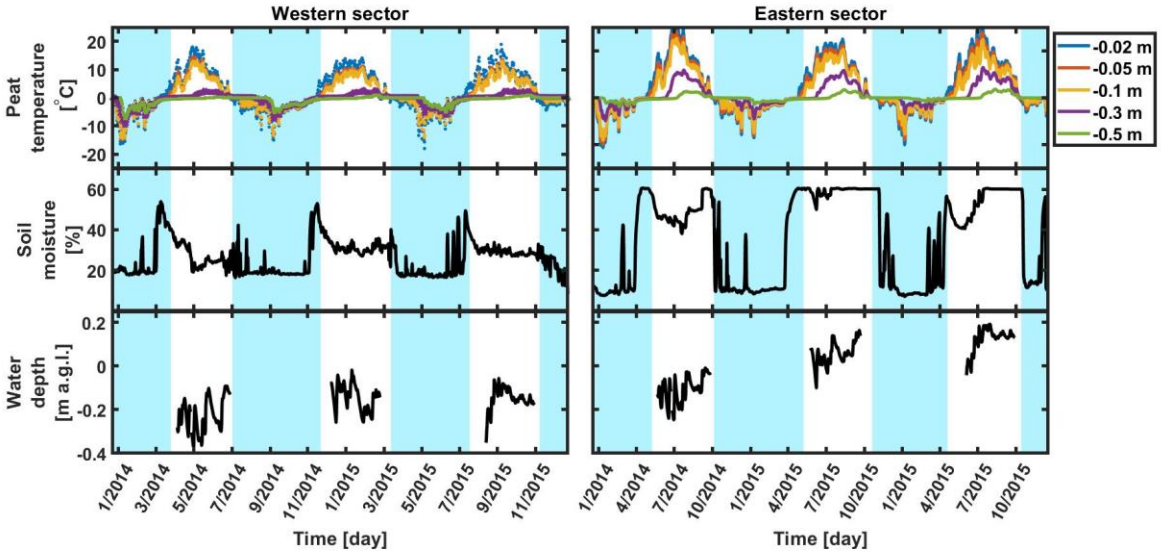


Fig. 3, upper panel: To avoid misunderstandings, I recommend to add the information that the red contour lines correspond to the 10 % to 90 % contributions of the flux.

We will add % markers to the isolines.

Fig. 5: Shouldn't you change "temp" to "surface peat temperature" in the x-axis label? Additionally, you never use the term "breakout week" in neither text nor the figure itself. Please clarify the figure and/or figure description.

We will change “temp” to the “peat temperature”. Also we will change the text from

“Figure 5. Weekly averages of CH4 fluxes vs surface peat temperature (top panels), vs the best correlated layer (middle panels), and vs the deeper layer (bottom panel). Data were divided into the beginning of the growing season (blue dots) and end of the growing season (orange triangles), where breakout week was the week with the highest emission.” to:

“Figure 5. Weekly averages of CH4 fluxes vs surface peat temperature (top panels), vs the best correlated layer (middle panels), and vs the deeper layer (bottom panel). Data were divided into the beginning of the growing season (blue dots) and end of the growing season (orange triangles). Weeks with emission before reaching the maximum weekly averaged emission was defined as the beginning of the growing season. Weeks with emission after reaching the maximum weekly averaged emission was defined as the beginning of the growing season. “

Table 1: Tables are always harder to understand than figures, especially when comparing

different years and footprints. I suggest to replace table 1 by a figure with the DOY (1 - 366) on the x-axis, and the years (2014, 2015, 2016) on the y-axis. You then draw the unfrozen periods into the plot, using the color codes (grey = western, green = eastern) of Fig. 4. This makes it much simpler to compare different years and footprints.

Write an answer here…

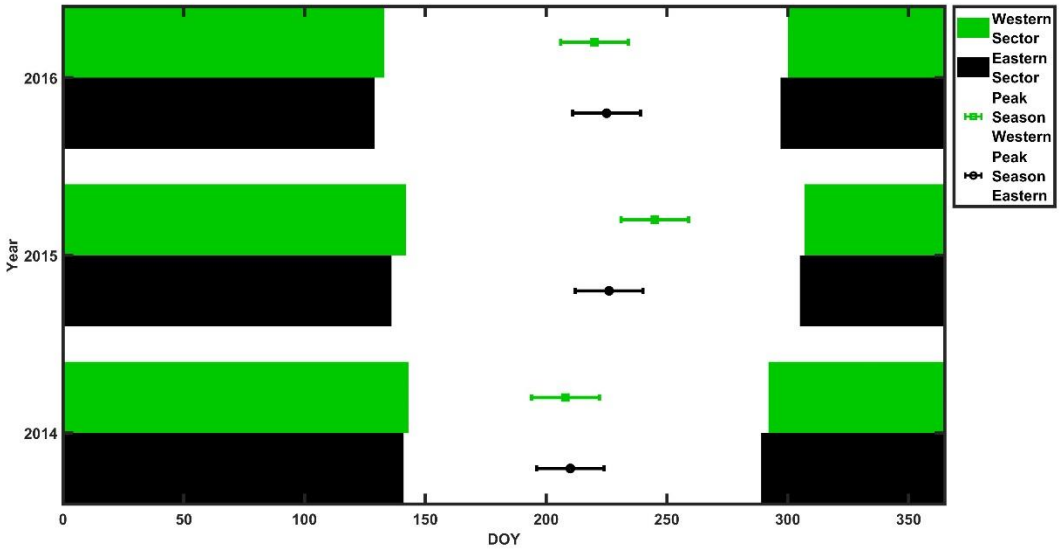


Table 7: I guess, "normalization" means that you used temperature-based normalization approach following Rinne et al. (2018) as stated in l.559? This makes sense, however it remains somewhat unclear until reading l. 559 later. Please clarify in the table description and in l. 450 to avoid misunderstandings.

This is correct. We will replace the sentence

“Controlling factors were examined before and after temperature normalization (Table 7), to avoid effect of cross-correlation between explanatory parameters.”

with

“Controlling factors were examined before and after temperature normalization of the CH4 fluxes following Rinne et al. (2018) (Table 7). It was done to avoid effect of cross-correlation between explanatory parameters.”

Table 9: Please write the unit "g-C m-2 yr-1" to be consistent with Table 8 and Table 10.

We will change it to the one unit throughout the manuscript.

Table 10: The annual emissions of the type "thawing wet surface" is 11 +/- 2 g-CH4 m-2 yr-1? Do you mean +/- 2.0? Additionally: why is the cell in first column, fifth row, which refers to 28.3 +/- 1.7 g CH4 m-2 yr-1 empty? It is also "thawed fen", I guess?

Yes, the two values were for the thawed fen.

type of wetland	***Annual emission [g-CH_4 m^{-2} yr^{-1}]***	***References***
palsa plateau	3.6 ± 0.7	this study
thawing wet surface	11.0 ± 2.0	this study
thawed fen	21.1 ± 2.2	Jackowicz-Korczyński et al. 2010
thawed fen	28.3 ± 1.7	Jammet et al. 2017
shallow lake	6.5 ± 0.8	Jammet et al. 2017