The study examines the carbon emissions of a Danish peatland three years after rewetting, focusing on the cultivation of *Phalaris arundinacea* using paludiculture with two levels of harvest and fertilization intensity, as well as a control group.

Based on the authors' responses to comments made by reviewers 1 and 2, I see improvements in the authors' manuscript. However, some points are still unclear to me and should be improved to better understand the study and make the results comparable to those of other studies.

General comments:

- What remains unresolved for me is the streamlining of the main results. The manuscript is now very long, yet more text and graphs were included in the last revision instead of being reduced. For example, is the PCA information necessary, or could it be removed?
- You have many figures (eight) and tables (six) in the main part of the manuscript (not including the appendix). Are they all necessary for explaining the results, or could some be moved to the appendix or supplementary materials, or even removed if they don't add any additional information?
    - For example, I recommend moving Figure 7 and Tables 4 and 6 to the appendix.
    - In addition, I recommend combining Tables 2 and 3, as mentioned in detail below.
    - In addition, I recommend adapting Figure 2. The most interesting part is Panel B, so I would increase its size and reduce the size of Panel A, for example by putting them next to each other with a width ratio of 1:2. Currently, panel A is larger than panel B, which shifts the focus in the wrong direction.
    - I recommend removing Table 1 because it is the result of a previous study and does not provide valuable insights that cannot be explained in one to two sentences.
- The differences in carbon emissions among the four blocks can be explained by peatland heterogeneity in hydrology and water chemistry (perhaps as a result of peat mineralization?). With the current experimental design, spatial heterogeneity has a greater influence on carbon emissions than different land use intensities. In my opinion, the explanations and limitations are not clearly stated in the abstract and conclusion yet.
- Why was linear interpolation used to account for annual CH_4 fluxes instead of a model like the one used for CO_2 fluxes? The preliminary study (Nielsen et al., 2024) even used a temperature-dependent CH_4 model to calculate annual CH_4 fluxes. As you mentioned, higher temporal resolution of environmental parameters improved the models and changed the annual fluxes significantly.
- Since the subheading is called "Annual Carbon Balances" in the Results chapter, I don't understand why CO_2 and CH_4 fluxes are treated separately. Furthermore, Tables 2 and 3 have different layouts; one is sorted by block, and the other is sorted by treatment, which I find confusing. I recommend merging the two tables. Additionally, one table uses SE, while the other uses SD. Be more concise throughout the manuscript and arrange the tables consistently to make it easier for the reader to recognize patterns, differences, etc.
- Why are methane fluxes not considered in the net ecosystem carbon balance throughout the manuscript, even though CH_4 flux data are available? However, the CH_4 is suddenly considered in the NECB in two sentences (one in the abstract and one in the discussion). This makes it confusing.
- Then, there is the issue of the units of CO_2 and CH_4 fluxes. Why aren't the same kind of units used for both carbon fluxes? Annual CO_2 fluxes are in C units, and annual CH_4 fluxes are in CH_4 units. Why aren't the same units used as in the preliminary study (Nielsen et al., 2024)? I recommend expressing the annual fluxes in CO_2 equivalent because this makes them more

comparable to other GHG emissions from paludiculture or other agricultural uses, with or without rewetting. Alternatively, use C units for both C fluxes, not just CO_2 fluxes.

- Why weren't nighttime measurements carried out at least a few times in addition to daytime chamber measurements? Would that have improved your results?
- For me, it is unclear how the rewetting procedure was performed in the study area. This is important for readers to understand the study area and results better. Do I understand correctly that the ditches or drainage pipes were never closed, but maintenance was stopped? Does the area still lose water (and carbon) laterally? In the discussion chapter, however, you suddenly wrote, "after blocking the drainage ditches." Are the ditches blocked manually or not? I am confused. I recommend adding a sentence about this in the study area description to clarify.

Specific comments:

- Title: On the one hand, I prefer the new title to the previous one, but I would like it to be more specific in terms of its type of paludiculture. On the other hand, I cannot find the term 'heterogeneity' or a description of it in the abstract. So, is it not important enough to be in the title, or does the heterogeneity of the WTD between sites, for example, explain the different emissions rather than the treatment, in which case I highly recommend including it in the abstract as well?
- L17: Why did you choose to use the colloquial name of the crop instead of the scientific name in the abstract? In addition, the abbreviation of the plant name is not used again in the abstract.
- L40: I would refrain from using the term 'carbon footprint' in the abstract, as it is mainly used for products rather than ecosystems or agricultural areas. I would rather stick to terms such as 'carbon sink' or 'carbon source', or 'carbon uptake' or 'carbon release'.
- L54: The abbreviation 'N' is not explained.
- L81: I would use 'ways' instead of 'pathways'.
- L137 ff: All used abbreviations should be explained in the figure captions, as these should be understandable without reading the text. The y-axis names should also be consistent.
- L148 ff: It would be good to make it clearer in this subchapter that your experimental design was the same as in the previous study (Nielsen et al., 2024), since you continued the chamber measurements at the same sites, but only used a portable gas analyzer instead of gas sampling for GC.
- L163: It would be good to add that every block has at least one (?) WTD measurement and probably the same for the Ts. It was not clear to me where the WTD was measured until I saw the figure for the WTD in the results chapter showing that every block had at least one measurement.
- L199: The abbreviation 'nrmse' is not explained.
- L273: Here, you used the term 'electrocoductivity', but in most tables in the manuscript, you named it 'electrical conductivity'. Be more consistent.
- L315: Five-cut or 5-cut treatment: Be consistent in how you name your treatments.
- L370: The abbreviation NSE is not explained.
- L371: The abbreviation is now written in capital letters (NRMSE); in the method chapter, it was written in lowercase. Be consistent.
- L463: I would recommend using the term 'water parameter' in the table header instead of 'W.C. parameter', as otherwise new abbreviations are introduced that would need to be explained in the table captions. Alternatively, remove the entire table as recommended above.

- L482f: You used the same comparison (NECB results with Koch et al., 2023) as in the first sentence of the chapter, but the differences are different now. Please correct the duplicate comparisons and remove the incorrect sentence.
- L497ff: It would be good to name the CH_4 emission ranges of these citations.
- L499f: Until now, you have used the NECB without considering the CH_4 emissions, but have suddenly included them. I found this very confusing. I would still recommend using the NECB with CH_4 emissions throughout the manuscript. Otherwise, please stick to one approach/definition and do not change it within the manuscript.
- L500: Please explain the abbreviation GWP and cite the reference for the GWP of 27 for CH_4.
- L574: A space is missing between 'as' and 'higher'.
- L667: I think the unit for N_2O emissions should be CO_2 equivalent instead of CO_2-C, and 'ha-1' and 'a-1' are also missing.
- L684 ff: This sentence is more than four lines long. I would recommend splitting it into a few shorter sentences to make it easier to read.
- Tables A1 and A2: 'Ago' probably means 'August', but to make that clearer, I would recommend using the abbreviation 'Aug' instead.
- Figure A2: In the 1:1 plots, it would be helpful to include metrics showing how comparable the measured and modelled values are. Were all values from the four blocks used together?
- As the data at Zenodo is not yet publicly available and there is no data description. It is unclear which data will be made available, and it cannot be reviewed.