

General Comments:

This is a well-designed study that provides useful insight into how climate and vegetation influences the biogeochemistry of peatland bog ecosystems. The Introduction is straightforward and provides the necessary information to guide the audience into the Results and Discussion. The hypotheses are testable and largely clear, although the 2nd hypothesis could be more specific in regards to how processing is expected to affect peatland $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$. The methods and statistical analyses are suited to address the study hypotheses. The changes made by the authors to the Results and Discussion in response to reviewers comments have greatly improved the clarity of these sections. Additionally, the findings in these sections are much more suited to the study design and answering the stated hypotheses.

However, there are some changes that could be made to improve clarity and to reconcile missing or mislabeled information. I recommend that this manuscript be accepted if revisions are completed based on the comments below.

Specific Comments:

The initial paragraph of the Introduction uses the terms “acrotelm” and “catotelm” to describe areas of active C loss and C sinks in peatland bogs. Use of these terms could provide reference points for those in the audience unfamiliar with how peatland bog biogeochemistry changes with depth, particularly as depth explained a substantial portion of $\delta^{13}\text{C}$ and ^{14}C patterns in this study. However, these terms are only referenced once again throughout the entire manuscript. It may be useful to match these terms with the corresponding peat coring depths in the study to provide a reference for the audience on expected areas of C loss and C storage.

P.4, L. 3-9: Consider organizing the hypothesis to match the order with which they are addressed in the Discussion. This would help provide clarity if the reader refers back to the hypothesis while reading the Discussion.

Table 4: Was there an explanation for why the core at -213 cm was older (9200±200 Age cal yr BP) than the core at -225 cm (6775±260 Age cal yr BP)?

Technical Comments:

P. 10, L. 34: Indenting of this paragraph is inconsistent with rest of the manuscript.

P. 11, L. 20: The author’s name in “(Skrzypek et al., 2005, 2008)” appears to be misspelled and should be changed to “Skrzypek.”

Figure 2: Is a plot missing a label on this figure? I only see 16 plots labeled but the caption states that there are 17. The initial version of this figure had plot 2 labeled by the outlet in the first photograph, but it is not visible in the new figure. Additionally, plot 2 was not listed in the Groups in Table 3.

Table 3: Similar to the comment above, Table 3 states that plot 921 is within Groups 1 and 2, but plot 921 doesn’t appear anywhere else in the manuscript, including the plot coefficients of Figure 5.

Table 3: The line “ $\delta^{15}\text{N}$ model, adjusted $r_2 = 0.660$, $p < 0.001$ ” should be shifted left to begin over the corresponding “Source” in the table.