The investigation provides information from an understudied ecosystem type. Therefore, the data is valuable. The interpretation of the data is challenging given the limitations in data that could be generated. This calls for a more thorough discussion to avoid having to rely too much on speculation. The method section also requires some clarifications.

GREEN: Thank you for providing feedback. We have replied to each comment/suggestion in green. Relevant lines that already exist in the current text are highlighted in red.

L 65: It would be good to come up with a hypothesis which reed bed zone stores the most carbon. One should be able to derive such a hypothesis from existing literature. Please elaborate.

GREEN: Thank you. We have included additional information to this section based on Reviewer 1's comments as well.

On Line 64 we have added: "Published findings suggest that most C storage in other types of vegetated coastal systems occur in their sediment and belowground roots and rhizomes (Howard et al. 2014) and that this also may hold true for reed beds (Dong et al. 2012). Results from Buczko et al. 2022 suggest that C storage may vary between reed bed zones as well."

L 75 and Table S1: Please add precise geographical coordinates for all sampling locations to Table S1.

GREEN: Thank you. We have now included our coordinates in Table S1, as suggested.

L 105: Good that you were able to sample in this environment. The description sounds as if you succeeded in obtaining undisturbed samples, making possible the calculation of bulk density. Please add a sentence stating this here.

GREEN: Thank you. We have included additional information to this section based on your suggestion.

On Line 105 we have added: "These sampling techniques enabled us to collect undisturbed samples from which bulk density could be calculated."

L 160, Ch. 3.2: In Ch. 2.2 it is stated that these stocks were integrated across the whole core. If these stocks apply to the sampling depth of the cores, which sometimes were sampled down to 50 cm and sometimes to 100cm, how can they be compared. Please state this more clearly, possibly also in Ch. 2.2.

GREEN: We have included additional information on this topic based on Reviewer 1's comments as well. We do agree it should be included earlier in Ch. 2.2. Thank you for the suggestion.

On Line 105 we have added: "Total organic carbon (TOC), LOI, and DBD were measured in 10cm intervals across the length of each sediment core. Sediment C stocks (mass per area) were calculated using LOI, TOC, and DBD for both the whole sampled core length and the upper-most organic matter rich layer. While some papers look at the uppermost 10cm for sediment C stock data, there is less data published on C stocks from deeper soil depths and these depths can be interesting to look at (Yost & Hartemink 2020). Because of this, we wanted to include our full core length data."

L 169 and elsewhere: The term "statistically" is not required. This should be clear.

GREEN: We have removed "statistically" here and reduced its use throughout the rest of the manuscript. Thank you.

Figure 7: Please add "Biomass" before "Belowground C Stocks" at the top of the table.

GREEN: Thank you. We have fixed the title of Figure 7 to read "Belowground Biomass C Stocks"

L 230: Do we really need the expression "to combat climate change"? It is relevant and we want to know. Isn't that good enough?

GREEN: Thank you. We have adjusted the wording to read "as part of climate change mitigation". We have also made the same adjustment to the wording in the abstract on line 34.

L 230: Concerning the expression "unique". Wouldn't "different" be a better expression?

GREEN: We have changed the wording from "unique" to "different".

L 231-232: What is that rate? Where is that calculated? Starting which rate does it need to be accounted for? Please avoid unclear statements.

GREEN: Thank you for pointing out this misunderstanding. You are correct, we are not referring to a specific calculated rate of accumulation here.

On line 232, we have adjusted the wording to read: "C storage is occurring in these systems in amounts that need to be accounted for in reed bed management plans."

L 274-281: This paragraph appears out of place here. It provides context that would fit better in the introduction chapter.

Red: Information about reed management programs is already discussed in the introduction section in Lines 51-58. Additionally, the importance of understanding C storage in reed beds as it relates to management practices is stated in the Conclusion section Lines 319-321.

Green: We have made additional adjustments to the paragraph, as requested by both you and Reviewer 1.

On lines 274-277, the paragraph has been reworded to read: "There has been an increased interest in reed bed management practices focused on removing aboveground biomass (e.g., Finnish-Swedish Interreg BalticReed project co-funded by the European Union). Some of these projects argue that removing aboveground biomass can serve as a way of reducing nutrient inputs to major water bodies, however previous research indicates aboveground biomass contains relatively low C content (Dong et al. 2012) and our findings support this."

Discussion: The Discussion picks up some important issues, but given lacking data -and this data is hard to determine- there is some speculation. The discussion would benefit from looking a bit more into processes of C allocation in the sediment. It is probably impossible to come up with C sequestration rates and the question of the stability of the sediment C cannot be answered as well.

GREEN: Thank you for your feedback. You are correct that the goal of this paper is not to determine C sequestration rates or the long-term stability of sediment C in reed beds but to, instead, quantify C stocks in different reed beds along coastal Finland, similar to what Buczko et al. 2021 did for the German coast. Since published data on C stocks in reed beds in our area is lacking, we needed to quantify how much C is in the reed beds and where it is located before anything else. We have changed wording throughout the paper so that this is more clear.

We've changed the text in lines 15, 61, 65, 235, 237, 271-273, 286.

We have added a sentence related to the environmental processes that drive C allocation to line 307 (section 4.5 Remaining Uncertainties and Future Recommendations) that reads: "We collected data from sites that covered a range of different environmental gradients such as salinity and wave exposure as a baseline for future investigations that explore how different environmental factors influence C storage in reed beds. At these high-latitudes, coastal reed beds are strongly influenced by seasonal succession, implying that an insightful analysis of environmental drivers requires data collected across different seasons."

We have made several other changes to our Discussion section based on Review 1's comments. These include:

Line 238: Cleophas et al. 2024 found that higher DBD was associated with lower OM and we see these trends clearly in our own DBD and LOI data.

Line 245: The C stocks shown in figure 4 correspond with the same LOI and DBD trends found in Clephas et al. 2024 and discussed in the previous section.