

### **Response to Reviewer's comments:**

I thank the authors for their important work in revising this article. Their detailed responses to my questions are convincing, and they have all been answered.

#### **Authors' Response:**

Thank you for the feedback to improve the quality of the manuscript.

I would suggest that the authors add the data from this article to an open database (e.g. zenodo) where the data will be more easily accessible to the community, rather than in data reports.

#### **Authors' Response:**

We have uploaded the relevant data in an open database as suggested needed to reproduce the work of this manuscript. We have added the following sentence under "Code and data availability" of the revised manuscript to provide the link for the dataset. The dataset contains a README file along with the dataset containing information on the 44 sediment cores used in this study including, ID, the geographical location, the year of sampling, classification of  $^{137}\text{Cs}$  and  $^{210}\text{Pb}$  profiles, cumulative  $^{137}\text{Cs}$  inventory, and organic carbon sequestration rate since 1954 and 1963 based on  $^{137}\text{Cs}$  and  $^{210}\text{Pb}$  dating techniques.

"The R code for the distance sampling modelling along with the data to run the code is available at <https://doi.org/10.5281/zenodo.10951658>. The organic carbon (OC) sequestration rates data used to check the comparability of the radioisotope profiles can be found in the Supplement. These sequestration rate data and the geographical locations, years of sampling, and additional information about the sediment cores are available at <https://doi.org/10.5281/zenodo.13696300>."

Also, it might be interesting to add a geographical term (e.g. North America) in the title to balance the discussion related to the specificity of  $^{137}\text{Cs}$  in certain regions of the world.

#### **Authors' Response:**

Thank you for your suggestion. We think the same technique can be applied anywhere with  $^{137}\text{Cs}$  fallout and opted to stay with the current title. We acknowledge the distribution of  $^{137}\text{Cs}$  is not uniform globally. Therefore, (1) cumulative  $^{137}\text{Cs}$  inventory value to screen/interpret the profiles needs to be validated against the known local reference level, and (2)  $^{137}\text{Cs}$  with additional time-markers, for example in Europe and Japan, need to be adjusted to compare with  $^{210}\text{Pb}$ , but the steps and interpretation outlined in the manuscript can be followed.

As users of fallout radionuclides, we are aware of the regional nature of fallout rates. All users of FRNs are also aware of this. Therefore, we do not think that it is necessary to state "North America" in the title.

Note that we have revised the title instead to "Comparison of radiometric techniques for estimating recent organic carbon sequestration rates in inland wetland soils". That is, we removed the word "temperate" before "inland wetland soils"; the regionality has to do with where the bombs exploded and atmospheric circulation at those locations and times, not the climate.