

## **Major Revisions**

### **General comments:**

This paper presents a study on PAH contents and patterns in post-pyrogenic soils of drained peatlands in West Meshcheur using a fluorescence spectroscopy approach.

On a general comment, I think it is an interesting work but, according to me, it needs improvements to be published in Solid Earth.

In that way, I can give some comments:

- The paper must be checked by a native speaker before resubmission. The vocabulary and phrases should often be correct because it is difficult to understand the sense.
- The punctuation of the text is often missing leading to confusions for the reader.
- I do not really understand the sampling. I mean that there are maps with sampling locations with numbers but there are not all the number pointed on the maps. For example: pits 1 and 10 are missing on the figure 2; pits 1, 4, 12, 13 and 14 are missing in the figure 3. You do not mention the pits in the written paragraph. I do not understand what the objectives of your work are and how you could answer to using this sampling.
- Some of results are also missing. Table shows results of pits 7 and 12; Table 2 shows results of pits 11, 5, 8 and 9; Table 3 shows results of pits 13 and 14; Figure 5 presents results of pits 3 and 2; Figure 7 presents results of pits 10 and 6. What about pits 1 and 4?
- It is quite difficult to compare results presented in a table and results showed in a figure. It could be interesting to homogenize the result presentation.
- Figures 6, 8 and 10 are not showing ANOVA results? The statistically differences between results are not shown? And the corresponding p-values? These graphs are not ANOVA analysis.
- From which results (pits) are calculated the means, SEs and SDs of the figures 6, 8 and 10? What is the number of replicates? Are they analytical replicates or sample replicates?
- In the table 1, 2 and 3, you cannot write 0 when you did not detect PAHs. Perhaps there are PAHs but in a level under the limit of detection of your analytical method. You have to put  $< \text{LOD}$  instead of 0 and you have to indicate in the material and method section the limit of detection (LOD) and limit of quantification (LOQ) of your analytical method for each PAH.
- The soil sampling and laboratory analysis section is confused for me. Could you add details about the extraction method (ASE, sonication...), the volume of solvent, the masses of soil extracted... Could you detail also the spectrofluorometric method? For example, what are the optimum wavelengths used for each component (excitation and emission)? Could you show a PAH luminescence spectra? How were calculated the PAH concentration (external calibration?) The analyses were done in replicates?
- Did you validate the analytical method using a certified reference material (CRM) for example?

**Specific comments:**

1. 32: what the different groups you are dealing with?

Fig.3: “investigated soils”

Table 2 is not showing PAH concentrations in histic podzols?

Try to use PAH and PAHs at the appropriate place.

Correct the numerous orthographic mistakes, phrases and tense.