

## Response to editor comments on Revision 2 of egosphere-2023-2687

**The authors would like to thank the editor and reviewers for their time and effort for reviewing and improving this manuscript. We apologize for misunderstanding some of the previous comments.**

### Reviewer 1

- 1. Page 1: Please, make sure that reviewer's comments made on some areas of the text are applied along the whole manuscript including abstract, introduction, methods, results, discussion and conclusions. As highlighted several times by the reviewers "Ni/Cd/PTE do not have chemical fractions". All these expressions need to be rewritten to "Ni/Cd/PTE in XXXX fraction/s..."**

Authors' response: This correction has been implemented throughout the manuscript as requested by the reviewers.

- 2. Page 2, lines 71-73: This sentence is not accurate. Biochar can be used as soil amendment. It is not necessarily a soil amendment. This needs rewriting, including addressing the comment of the reviewer: Biochar can be used for many things including water filtration. Change to "Biochar can be used for a number of applications including..."**

Authors' response: The sentence has been amended as follows: "Biochar can be used for a number of applications including as a soil amendment that sequesters soil carbon (C) and for stabilization of PTEs in polluted sites (El-Naggar et al., 2018).

- 3. Page 3, line 109: enhancement or increase?**

Authors' response: We have changed the word to increase as suggested by the reviewer.

- 4. Page 3, line 129-134: The authors have not addressed the reviewer comment "L121 with an auger and placed into what? How was the sample then transported to the lab. How were they stored in the lab before preparation?"**

Authors' response: the missing information has been added as follows: "The composite soil sample was placed in polyethylene bags in the field and then transported to laboratory where it was immediately air-dried, passed through a 2 mm sieve and then stored at room temperature until the physicochemical analysis was performed."

- 5. Page 4, lines 143-144: Review punctuation. That sentence does not need to be in parentheses. A period is needed between sentences. Also, this sentence does not fully answer the reviewer comment "I would like a short explanation on how the drying and rewetting cycles contribute to equilibrate Ni with the soil".**

Authors' response: The parentheses have been removed, and the requested information has been added as follows: "The repeated wetting and drying cycles were performed to simulate field processes."

- 6. Page 5, lines 184-187: The following reviewer's comment has not been addressed " "from" the pots. In what and where was the soil stored before analysis?"**

Authors' response: The requested information has been added as follows: "After separating the roots, the soil from the pots was immediately air-dried, and then passed through a 2 mm sieve and stored in

labelled polyethylene bags at room temperature, to be subsequently utilized for performing Ni sequential extraction and release kinetics”

- 7. Page 6, line 195: Please maintain coherence along the text. If you say ml, use ml all along. Also, I do not understand why it is used fifty-milliliter here, instead of 50 ml.**

Authors’ response: The correction has been made as suggested by the reviewer.

- 8. Page 6, lines 213-223: Authors have not addressed reviewer's concerns about "low relative to what" comments. There are lots of "low" properties described in this paragraph. Low should be stated compared with some other situations.**

Authors’ response: The respectable reviewer has mentioned a good point. We compared the soil properties values in this experiment to exact values in the cited literatures for other situations (calcareous soils of Iran located at different regions). Please see the revised manuscript.

- 9. Page 10, lines 289-292: This sentence is hard to understand. Please rewrite.**

Authors' response: This sentence has been rewritten to improve clarity as follows: “The interaction of treatments (biochars and Si levels) had a statistically significant effect ( $P < 0.01$ ) on Ni concentration in all the soil chemical fractions, except for the Car fraction. Whereas the main effects of individual treatments (biochars and Si levels) on Ni concentration in all the soil chemical fractions were significant.”

- 10. Page 10: I consider this is not a satisfactory solution to reviewer's comment " For clarity state what is being reduced in the WsEx fraction". What it is reduced in Ni in WsEx fraction, not the fraction itself. This "solution" to reviewer's comments is a clear example of other comment by the same reviewer " I would appreciate if after making all the corrections that the authors read through the manuscript again carefully, at least twice, as it seems to me, that in a rush to get it re-submitted a plethora of careless mistakes have been made/missed."**

Authors’ response: All such instances have been corrected so that it now reads “Ni concentration in the WsEx fraction. This correction has been made throughout the manuscript to improve clarity.

- 11. Page 11, line 321: The comment of the reviewer, which has been answered in the separated document, has not been addressed here. "Sentence beginning “Due to the...” How does this information from the Ma et al., study relate to this study?"**

Authors’ response: We agree with the reviewer that this statement does not directly relate to the previous sentences, and thus we have rewritten and moved the sentences to Page 11, lines 312-315, where it directly relates to the discussion on the synergistic decrease in Ni content in the WsEx fraction in the SM500+S2 treatment.

- 12. Page 12, Table 4: There are 4 significant figures in those numbers in yellow, while there are three in the green ones, and the rest of the table. Please check for consistency in the number of significant digits along the manuscript.**

Authors’ response: The number of significant digits has been corrected in Table 4, and throughout the manuscript as suggested by the reviewer.

- 13. Page 12, line 338-342: I do not think that moving the sentence to this part of the manuscript fully addresses reviewer's comment "The decrease in the concentration of Ni in the carbonate form with an increase in the Si levels...”, to what is this referring? As found in this study? What treatment/s?"**

Authors' response: We have added a sentence to help explain the discussion of the data based on the statistical analysis (2-way ANOVA) of the data: "As there was no significant interaction effect between biochar type and Si levels on the Ni concentration in the Car fraction, only the significant individual main effects of biochar and Si levels are shown in Fig. 5." This explains why only the main effect of Si level on Ni content in Car fraction is discussed in lines 339-341, as also clearly shown in Figure 5. Presenting the results in this manner is consistent with the results of the factorial 2-way ANOVA.

**14. Page 13, line 364: Use capital letters after a period.**

Authors' response: This correction has been made as pointed out by the reviewer.

**15. Page 14, line 379 : indicate that...**

Authors' response: This correction has been made as pointed out by the reviewer.

**16. Page 14, lines 382-386: These two sentences (from lines 373 to 376) make no sense and they do not fully answer the reviewer question "Same comment for L. 283 – 284 ("It has been shown that the application of Si to cultivated soils resulted in a reduction of soil organic matter content". Authors' response: Unfortunately, it is currently not possible to measure the amount of soil organic matter. Reviewer response: OK, I understand that it may not be possible to measure the amount of SOM, but then the original sentence "It has been shown that the application of Si to cultivated soils resulted in a reduction of soil organic matter content" should be written in a hypothetical way"**

Authors' response: These sentences have been rewritten to improve the language and intended meaning, as follows:" Changing the Si levels from S<sub>0</sub> to S<sub>2</sub> reduced the Ni concentration in the OM fraction by 16.8% (Table 4). Ma et al. (2021) reported that the application of Si to cultivated soils significantly reduced soil organic matter content, which could explain why the Ni concentration in OM fraction was reduced in the present study. They indicated that Si facilitates the decomposition of organic matter by enhancing soil pH."

**17. Page 14, line 398: known that...**

Authors' response: This correction has been made as pointed out by the reviewer.

**18. Page 14, line 405: a comma is needed before which.**

Authors' response: This correction has been made as pointed out by the reviewer.

**19. Page 14, line 420: This "main effects" is unclear. Main on statistical analysis?? based on what?**

Authors' response: Main effects refers to the results of the 2-way ANOVA, where interaction effects as well as main effects of the two factors (i.e. biochar type and Si level) were assessed. Actually, main effects of Si application levels are including averages amongst biochar treatments, at each Si application level, as shown in the table by "mean". The sentence was change to "The main (mean) effects of Si application showed that increasing the Si levels from S<sub>0</sub> to S<sub>2</sub> had no statistically significant effect on the Ni content in the Res fraction" to further clarity.

**20. Page 15, line 437: remove particularly, and quantify the "more"**

Authors' response: The word particularly has been removed. The relative decrease in Ni content in WsEx fraction have been added in parentheses to quantify the synergistic effect.

**21. Page 15: This concern has not been addressed "Seems to me that SM500 S2 has more than 50% less Ni relative to the control with no silicon and about 50% of the shoot Ni relative to the same biochar with no Silicon." If 32% is an average amongst treatments (instead of segregated by biochar addition), this needs to be clarified.**

Authors' response: This sentence shows the main effects of Si application on the change of Ni concentration in the shoots (without considering the effects of biochar application). In other words, the averages amongst biochar treatments, at each level of Si application, have been compared statistically. For better clarity, In Table 5, the main effects of Si levels (averages amongst biochar treatments) are shown in the right part of the table in bold, vertical and with capital significant letters, while the main effects of biochars (averages amongst Si treatments, at each biochar type) are shown in the bottom part and in bold, horizontal and with capital significant letters. The interactive effects (15 treatments) have been also shown in the center part with small significant letters. In order to further clarity, we changed the sentence to: "The main (mean) effects of Si application levels showed that changing the Si levels from  $S_0$  to  $S_2$  resulted in 32% decrease in the Ni concentration in shoots from 8.56 mg Ni kg<sup>-1</sup> dry matter (DM) to 5.82 mg Ni kg<sup>-1</sup> DM (Table 5)". Also, for indicating the interactive effects, the sentence was changed to: "The interactive effects of treatments indicated that the lowest Ni concentration in shoots was observed in the combined treatment of **SM500+S<sub>2</sub>** (4.45 mg Ni kg<sup>-1</sup> DM), which showed a **57.2% decrease** compared to the control (CS<sub>0</sub>: without Si and biochar addition) (10.4 mg Ni kg<sup>-1</sup> DM) (Table 5)".

**22. Page 15, lines 451: To address reviewer's comment (#61), I would suggest to add the full suite of these results (Pearson coefficients of all variables, as stated in the methods) as supplementary material. Comment was: "L413-416 – there is no data shown to confirm this statement and this sentence is a bit random. Perhaps start with something along the lines of that you compared shoot Ni concentrations with Ni concentrations in the soil fractions. From this analysis it was found.... Similarly soil pH"**

Authors' response: The results of the Pearson correlation were added to the supplementary information as suggested by the reviewer.

**23. Page 16, Table 5: Add this is mean.**

Authors' response: The word mean has been added to Table 5 as pointed out by the reviewer.

**24. Page 20: I do not consider that this sentence is a satisfactory solution to the reviewer's comment "Please say something about how you think your results arising from a soil amended with Ni compares to an aged Ni-contaminated soil. In other words how representative is your experiment to the real life situation?"**

Authors' response: A statement has been added to emphasize that the present study deals with recently contaminated soils. It is difficult to say how the results would differ from aged Ni-contaminated soils, as even aged field sites contain PTEs in the more exchangeable and soluble fractions, which would react with the amendments in this study.

**Dear editor**

The manuscript was carefully edited by one of the authors whose first language is English to improve the writing quality as suggested by the respectable editor. In the two rounds of review, we have used our best efforts to correct and improve the quality of the manuscript based on the reviewers and editor comments in order to publish it in Soil Journal. In the recent revision, an attempt was made to read the manuscript several times and eliminate possible writing errors. We apologize again for misunderstanding some of the previous comments. We look forward to your positive response.

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