Solid Earth
Discussions
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Interactive comment on "Effect of soil coarseness on soil base cations and available micronutrients in a semi-arid sandy grassland" *by* L. Lü et al.

L. Lü et al.

ruzhenwang@iae.ac.cn

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Comments from Reviewer #1: Comment: In the Introduction the processes including soil coarsening around the world are briefly mentioned, but they are not mentioned along the text. It would be important to discuss which factors are driving soil coarsening in the study area.

Response: We added information related to soil coarseness in the context. Please see Line 41-42, Line 55-64, Line 70-77, Line 78-81, and Line 88-92. And now, the driving factors of soil coarseness in this area can be found in Line 55-59 and Line 90-92.

Comment: In the Study area the authors should induce a reference to some other factors which affect desertification in this region, such as vegetation, lithology (bedrock, sediments?) or aeolian processes (significant?)

Response: The information with reference to other factors has been added. Please find in Line 109-114.

Comment: Are soil layers different along the sections? If it is homogenous, mention it. If soil layer show distinct features, this might have affected your sampling and therefore your experiment. Please clarify it.

Response: We agree with the suggestion. This information has been added in Line 126.

Comment: Another thing which you may have influenced your data at depth are cryogenic processes. The area records freeze-thaw cycles during at least 4-5 months per year. Freeze-thaw cycles affect the vertical structure of the soil through cryoturbation activity. How this process may have affected your data?

Response: The reviewer brings up a good point and we have expanded our speculation related to freeze-thaw cycles. Please see Line 296-299.

Comment: You present nice data about soil base cations and available micronutrients at different depths, but you do not discuss how they influence soil formation processes (pedogenesis).

Response: This information has been added in Line 304-307.

Comment: Tables are OK, but the paper would substantially improve with 1/2 new figures including the site location, soil sections, etc.

Response: This figure has been added as Fig. 1. Mr. Xiao helps to create this figure, so we added him as a co-author.

Comment: Line 41 add comma after world; Line 97 change expect to 'expected'; Line 109 after mm, change to 'which defines the area as semi-arid'.

Response: These has been corrected in the context. Please see Line 41, Line 100, and Line 115.
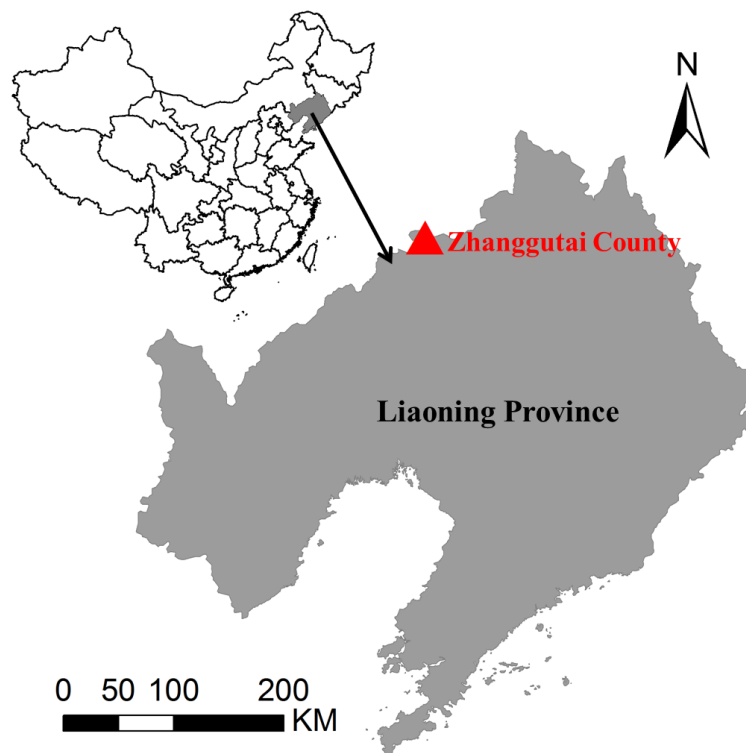
C3

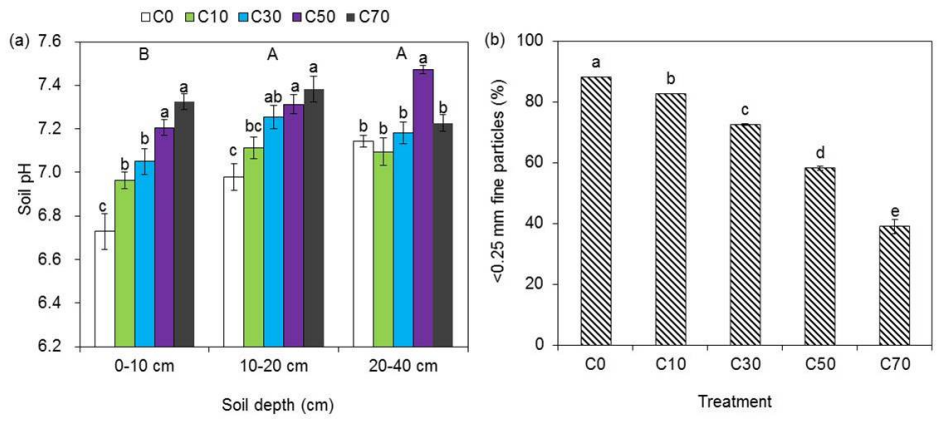**Fig. 1.** Fig. 1 Location of the experimental site.

Fig. 2. Fig. 2 Soil pH values for three soil depths (a) and proportion of soil fine particles (< 0.25 mm) for 0-10 cm soil in different soil coarseness degrees of 0% sand addition (C0), 10% (C10), 30% (C30),
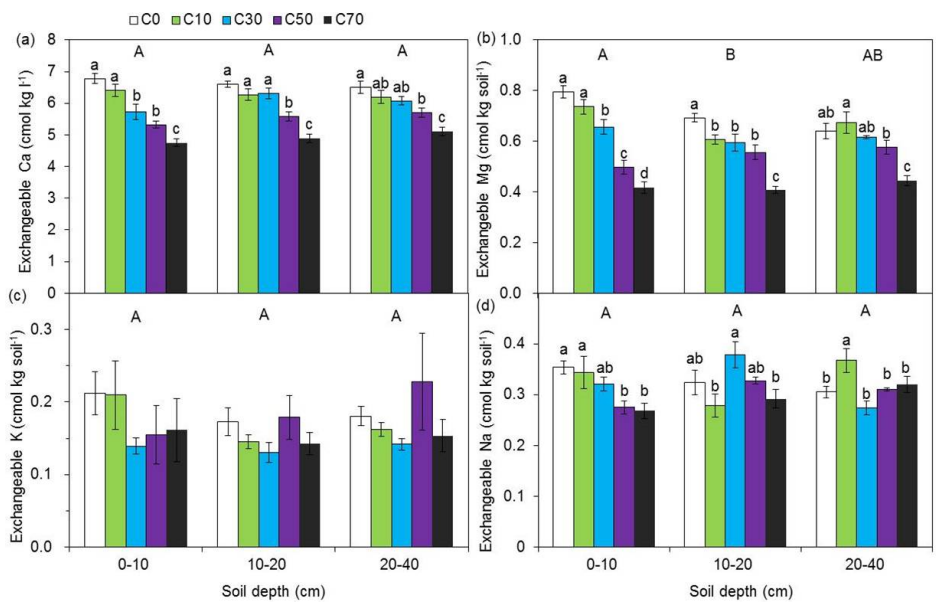
C5

Fig. 3. Fig. 3 Soil base cations of exchangeable Ca (a), Mg (b), K (c) and Na (d) for three soil depths in different soil coarseness degrees of 0% sand addition (C0), 10% (C10), 30% (C30), 50% (C50) and 70% (
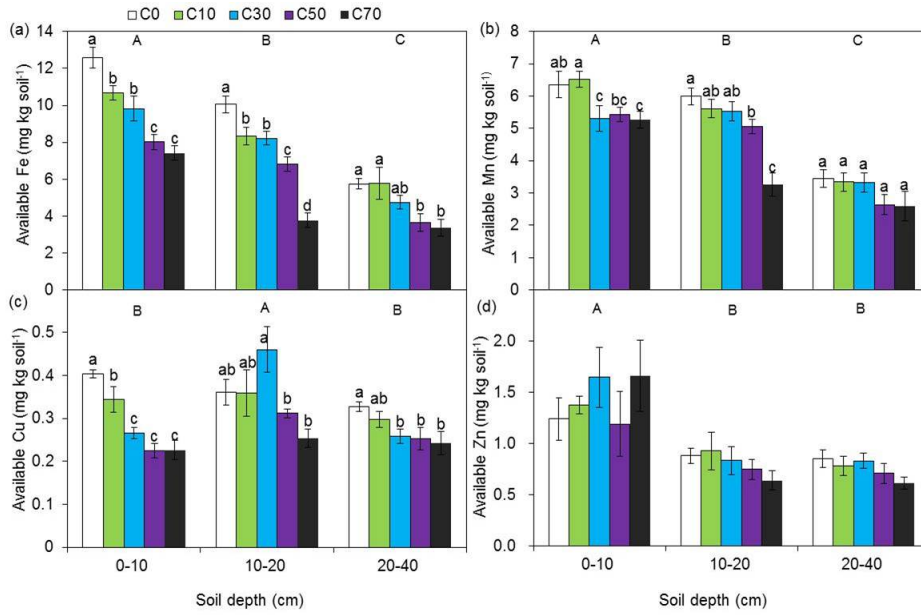
C6

Fig. 4. Fig. 4 Soil available micronutrients of available Fe(a), Mn (b), Cu (c) and Zn (d) for three soil depths in different soil coarseness degrees of 0% sand addition (C0), 10% (C10), 30% (C30), 50% (C50)
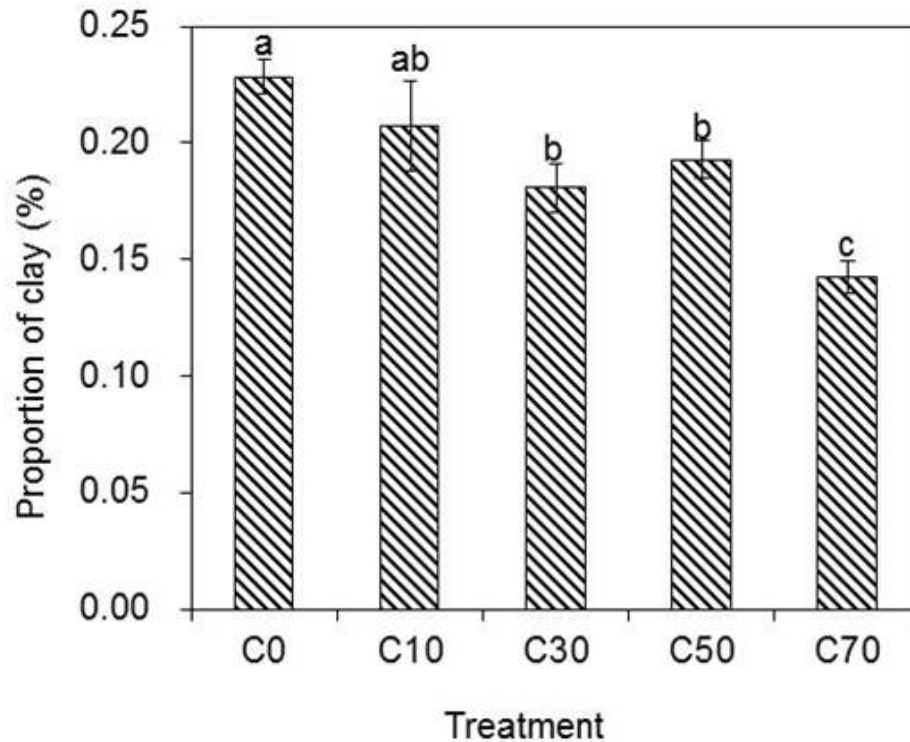
C7

Fig. 5. Fig. S1 Proportion of soil clay particles for 0-10 cm soil in different soil coarseness degrees of 0% sand addition (C0), 10% (C10), 30% (C30), 50% (C50) and 70% (C70). Data represent mean ± SE (n=6).

C8