

Interactive comment on “Organic matter dynamics along a salinity gradient in Siberian steppe soils” by Norbert Bischoff et al.

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A note upfront from the submitting person: This review was prepared by two master students in geography or earth system science at the University of Zurich. The review was part of an exercise during a second semester master level seminar on “the biogeochemistry of plant-soil systems in a changing world”, which I organize. We would like to highlight that the depth of scientific knowledge and technical understanding of these reviewers represents that of master students. We enjoyed discussing the manuscript in the seminar, and hope that our comments will be helpful for the authors.

Rising temperature and anthropogenic influences are the main reason why salt affected soils become more frequent. This study aims to investigate the organic matter dynamics of three different soil types (Kastanozem, non-sodic Solonchak, sodic Solonchak),

C1

along a salinity gradient in the South-Western Siberian Kulunda steppe. Soil samples and the aboveground plants and underground biomass have been characterized by a variety of methods. The results of this study were different from similar studies in the literature, and, and the authors had to reject their initial hypothesis. Surprisingly, organic carbon stocks in the salt-affected were not smaller than in the non-salt-affected soils. Also the abundance and stability of the particulate organic matter was not influenced by salinity. The proportion and stability of mineral-bound organic matter was not reduced under high sodicity levels. Thus, salt-affected soils contribute significantly to the organic carbon storage in the examined region. Also most of the organic carbon was present in stable mineral-organic associations which implies a long-term sequestration.

We liked the readability of the paper. The abstract, the introduction, the discussion and the conclusion are interesting to read. It is a very relevant topic that is important under future climate. However, we had problems to understand the experimental set up. Could the sampling and experimental set up be summarized in a figure or table? Also, for the belowground plant samples we did not understand how they were taken. Were they taken in the profile? Or in about 5 meter distance in every depth, or just once?

As we are only in our second master semester the method section was too long for us. We understand that this section is important for replication. Would it be possible to shorten this section and/or move the details (set up, used instruments, packages, etc.) in the appendix? For non-experts it would help for faster understanding.

We also found many references to figures and tables in the supplement. We are wondering why they are referred to so often, sometimes more often than figures in the the normal text. Could it be, that some figures from the supplement should be Moved back to the main text?

On page 6 in line 3 you the text says “Sample quantity allowed only for two treatments for qualitative analysis” Why are just two treatments for qualitative analysis allowed.

C2

Where there not good enough or to less soil samples? Also on page 11 & 12 in line 20 respectively 13 there was written “data not shown” but for us it was not clear why there are not shown and why you have to state that. If the data are important could you put the data in the supplement?

Table 1: The last column shows “a” but we do not understand why. For table 2 & 3 a line between each soil type would help to read the table. It would also be nice to clarify in the tables itself what the values in parenthesis mean (standard error). The figure 1 was for us quite unclear. We could not make sense of the position in the plant sample dots. Does the position represent on which side they were taken?

Why there are green dots in the Sodic Solonchaks could be stated in the text. However, for us it was not clear. As we wrote above, the experimental set up was mixed with the rest of the text. Not all profiles have the same depth, but this different depth is not represented in the figure. Also in the figure 3 it was for us not that clear why the depth is not the same as in the profiles. In figure 5 a little mistake has slipped in. The y-axis should be PC2 instead of PC1. There we also wondered why the grey dots are not considered as they are quite a lot.

In the conclusion we would also appreciate an outlook for future studies. What would be important to look at?

Some minor comments: - Strange starting sentence of the introduction “... soils... important...” → why do they get more important. They will get more frequent and just to study them will get more important. Maybe “twice as” could be a nicer starting sentence, clearer and nicer as input - Page 3/ line 42 → it is a german sentence; “To date, these soils cover already an area...” do you need “already”? - Page 6/ line 26 → units are at two lines - Page 6/ line 33 → it is written Sect. 2.5, but chapters are not numbered - Page 9/ line 30 ...very broad, peak broadening is related... →you might make two sentences? - Page 15/ line 19 This let's... → informal english

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