

Dear Reviewer 4:

Thank you very much for your time involved in reviewing the manuscript and your very useful comments. This feedback greatly improved the quality of our paper and made this article more rigorous.

SOM is closely related to the hot issue like climate change mitigation and sustainable agriculture development. In this study, the author aimed to mapped the spatial distributions of SOM in Northeast of China by random forest (RF) and evaluated the effects of the interaction of soil properties, land use and straw return on SOM spatial-temporal variation. Generally, the author reported a very interesting and valuable study. The manuscript is well organized and presented. The introduction provide sufficient background and the research design appropriate. The conclusions they reported can also well supported by the results. And I think the study is interest and valuable to the readers. However, there still some minor issues need deal with before the manuscript could be accepted for publication in Soil. Therefore I would like to suggest acceptance after minor modification. The detailed comment is as follow:

Line 26, you can only say SOM instead of SOM/SOC.

Thank you for your comment. We have revised it.

Line 52-53, please revise this sentence since it is confused. You can consider replace it with several simple sentence to make it more clear to the readers.

Thank you for your comment. We have revised this sentence as follows:

“In the study, the overall objective was to take a typical black soil area as a case to quantify the relationship between SOM accumulation and straw return on a regional scale. This study area has a long-term straw return background.”

I would like suggest the author to explain the differences between GE and RF for quantifying the relative importance.

Thank you for your comment. We have added this information in the section 3.3

Line 105, I would like suggest the authors to provide more detailed and essential information of RF method.

Thank you for the detailed comment. We have added more essential information about the RF method: “The RF model combines the predictions of all the individual trees, either by taking the majority vote in the case of classification or averaging the outputs in the case of regression. This approach helps to smooth out the noise in the data and produce more accurate predictions. It includes the number of trees (ntree) and the number of variables available for selection in each split (mtry).”

The caption for the figures such as figure 4 need modification to make it more logical and grammar correct

Thank you for your comment. We have focused the captions for figures and made some revisions.

For the part of 3.5.1, it more like the Effects of soil types under the different the straw return on SOM variation

Thank you for your comment. This section investigates the impact of straw return on soil organic matter (SOM) and its correlation with soil type. Various crop residue cover under different soil types were analyzed to determine their effects on SOM. The results confirm that the impact of straw return on SOM is indeed related to soil type, but this is largely due to the initial amount of SOM in the soil. Therefore, the study ultimately explores the effects of straw return on SOM variation under different soil types.

Line 248-249, please modify this sentence

Thank you for your time. We have revised it.

Line 243, please revise this sentence

Thank you for your time. We have revised it.

I would like suggest the authors to introduce the meaning and value of their study more clearly in the end of Conclusion.

Thank you for your comment. We have introduced the meaning and value of this study more clearly in the end of conclusion: “The study revealed that straw return is beneficial to carbon sink in farmland and is a better way to prevent a carbon source caused by the conservation of paddy field to dryland, which can contribute to the development of strategies to ensure the sustainability of agricultural soils.”

It should be better if the authors could provide more reasons for the ST variation of SOM in the survey region.

Thank you for your comment. We have provided the reasons for the ST variation of SOM in the survey region in Section 2.1: “The study area was located in a black soil region. However, the soil in this region was threatened by land degradation. In view of this, a research base was established in Lishu County, Jilin Province, China, in 2007, and the straw return technology was popularized continually.”