

This study analyzed the structure of a peat material before and after freezing by investigating looking at the air-filled pore using X-ray μ -CT. Many scholars have studied the effects of freeze-thaw cycles on soil structure, and this study only focused on before and after freezing. Although the thesis of the study can attract our insights to read the paper, lots of questions still have not resolved clearly. Some suggestions should be useful to improve this manuscript.

1. Author seems to use only two samples for the experiment. Is the sample number enough to support the conclusion of the study?
2. Second, some methodological details are missing. Essential information about methods and materials is crucial for readers to evaluate the results. The description of the experimental process is not clear enough. What is the basis of freezing and thawing temperature selection? What container is the sample placed in when scanning? (line 121: a transparent plastic tube; line 137: were mounted and waxed on a glass rod)
3. Another major issue, the experimental procedure was not described in detail. This study only paid attention to air-filled pores, how to determine that the changes in soil structure before and after freezing are not the result of water change or migration.
4. What is the purpose of sub-images of the 3D images. This information is present in Figs. 3 and 4, which only slightly enlarged in the sub-images.
5. As for the results, we found that the upper and lower characteristic pores of the sample were relatively corresponding before and after freezing. Why did the middle part change so much.
6. The manuscript needs a major editorial revision to improve the writing quality. I can see some grammar mistakes, improper words, though I'm not a native speaker.

For example lines 30-34 “Theoretical calculation of the consequences of the increase in the specific volume of water by 8.7 % when it turns from liquid to solid because of freezing led to the creation of a pore volume in the organic matrix which remains saturated by water when returning to room temperature and consequently to the desaturation of the largest pores of the organic matrix as well as the finest tubular pores which were water-filled before freezing.”

Lines 129-130 “X-ray u-CT was performed for the sub-samples 4x4x7 cm in volume cut between 30 and 37 cm depth using a micro X-ray u-CT device Nanotom 180NF (GE Phoenix-ray, Wunstorf, Germany).” Suggest reorganizing the language.