

Comment on soil-2021-13

Anonymous Referee #1

Referee comment on "Impact of freeze-thaw cycles on soil structure and soil hydraulic properties" by Frederic Leuther and Steffen Schlüter, SOIL Discuss.,
<https://doi.org/10.5194/soil-2021-13-RC1>, 2021

The manuscript experimentally investigated the effect of freeze-thaw cycles on the pore structure and hydraulic conductivity of two different soils. The manuscript is well-written, and easy to follow. The experimental materials and setup are clearly described, and the testing results are reasonably analyzed and discussed.

A minor revision is suggested. Several comments are given below.

Line 6: The abstract is relatively long, and some minor details may be deleted to make it concise.

Line 119: Only one thermometer was inserted into one sample, and the measured temperature value was used as a representative for all the samples. Is this reasonable enough?

Line 122&Figure 1(b): When the measured soil temperature was just above 0.5 deg C, frozen part may still exist inside the soil sample (which means the sample was not fully thawed). As a result, this may not represent a full freeze-thaw cycle.

Line 128-129: The subsamples were air dried at room temperature. During this process, the soil structure and pore structure should have changed. Did the authors distinguish this from the soil structure change due to effect of freeze-thaw cycles?

Line 130-131: This sentence is unclear.

Line 210: Was the structure change uniform along the sample's profile? Was the effect of freeze-thaw cycle monotonic with the increasing FTC number? Or, did the measure soil properties show variations (rather than monotonically decrease/increase) with the increasing number of FTC? What are the reasons?

The size and clearness of the figures may be increased for better presentation.

In the discussion part, the detailed description of other researchers' work should be limited. While the analysis and discussion on the authors own findings should be strengthened/highlighted.