

SOIL Discuss., referee comment RC2
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Comment on soil-2021-96

Anonymous Referee #2

Referee comment on "An open *Soil Structure Library* based on X-ray CT data" by Ulrich Weller et al., SOIL Discuss., <https://doi.org/10.5194/soil-2021-96-RC2>, 2022

In this paper an online accessible library of soil structure analyses to be used with soil 3D X-ray CT data is introduced. Over the past few decades use of CT to elucidate soil structure has been booming and the authors rightfully point out that standardization of methods used for investigating such soil 3D data is much needed. Very uniquely a system has been set up into which any user could upload a binary soil CT data set, which is then subjected to a set of analyses on a server and results are sent back to the user. A very commendable initiative on its own to get analyses standardized, but moreover also the launch of the online library of soil-CT data holds strong added value to address to date under lighted research questions on soil structure.

This paper is atypical and reads more like a manual at times, yet in my view it forms a valuable contribution to literature as now the Soil Structure Library will be formally introduced to the soil science audience. The text is very well written and accessible in spite of the rather complex and abstract matter dealt with. One comment though, it would have been interesting to see more contemplation on how this Library might help scientists looking into the relation between soil structure and biochemical processes (OM breakdown, anaerobic soil microbial activity, etc.). Ideally the authors elaborate a bit more on such uses in 3. and in doing so may surely make a case for the Library to the currently wide community of soil biologists & biochemists.

Specific comment:

P3 Would it not be meaningful to also by default inquire whether a soil core was repacked or collected undisturbed?

P4 L71 So does this then mean that ROIs cannot be confounded to a selection of

horizontal slices? Not entirely clear

P6 L99 What is intended by 'intensive properties' this requires further explanation

P6 L 106, so n_i is expressed in number of voxels then?

L120-123 the 'medial axes transform' is not offered, and so its brief mention here is only confusing -> suggest to omit these two sentences.

L131-132 this mention of benefits for a certain public domain is redundant for this paper; in fact the power of Dash becomes soon evident when reading through the following lines.

In 2.2.4 it is not clear how to interpret several of the pore metrics as a function of pore diameter $m_{0-3}(d)$: does such a metric represent all pores with local pore diameter $<d$, $>d$ or with d in between to pore size classes -> the latter would be of most interest to users. Please clarify

From the conclusions section it would seem that the actual 3D datasets are also accessible via the Soil Structure Library. Not clear if that is really the case? Please clarify in the manuscript.

Technical corrections:

1st line of the abstract: 'and' between 'physical' and 'biochemical'

P1L21 be consistent x-ray or X-ray

Table 2 needs to be positioned further on after it has been invoked in 2.2

P6 Reference is made to Fig.1 a-d yet such alphabetical numbering was not included in the actual Figure; please add.

P7 L 114 perhaps do repeat the symbol for these soil pore metrics here in the text as well, e.g. for average pore distance.

L155 perhaps better petroleum engineering "science" community?

Caption Fig 3 last sentence : 'represent' not 'represents'

L206 'scientists'