EGUsphere, referee comment RC1
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Comment on egusphere-2022-728

Anonymous Referee #1

Referee comment on "Effect of rare earth oxide labeling and sieving methods on aggregate turnover and carbon dynamics" by Yike Wang et al., EGUsphere, https://doi.org/10.5194/egusphere-2022-728-RC1, 2022

This manuscript from Wang et al. aims at elucidating the effect of rare earth oxide labeling and sieving methods on aggregate turnover and carbon dynamics. To reach their objectives, they conducted labelling and incubation experimentations with dry or wet sieving methods. SOC fractions (DOC, fPOM, MBC and HF) were detected and their relationship with aggregate dynamics were analyzed herein.

Indeed, little researches have reported the effects of labelling and sieving processes on SOC fractions, it is interesting to investigate the discrepancy caused by various methods. But in my view, authors do not provide a clear response to the topic, the research questions are not well stated in the introduction and the findings are not fully discussed in the discussion part. Besides, I doubt the calculation on aggregate turnover rate, which is different from the calculation proposed by De Gryze et al. and Peng et al. For these reasons, I do not recommend the publication of the article in SOIL.

Introduction

The title focused on two factors, namely labelling processes and sieving methods, to aggregate turnover and SOC. Insufficient statements on the importance of these two factors are provided, instead, authors illustrated more the interaction between SOC and soil structure.

Materials and methods

L80 More details on the investigated soil should be provided, such as the initial SOC content, sand/clay/silt content, bulk density etc.

L90-100 Four oxides were used for labelling, but only 3 aggregate fractions were used? So which three oxides you used herein? How to get the recombined soil columns? The soil content and bulk density of these recombined columns? How many soil columns in total? More detailed information is needed.

L120 What do you mean by "regularly"? Every two days?

L125 How much soil is used for dry/wet sieving and SOC fraction detection, respectively?

L175 How to calculate the aggregate turnover?

Results

L190 Since the results and discussion parts are separated herein, no reference should be included in results part.

L200 Please explain the meaning of "unaffected carbon pools".

L210 It will be easier for readers to follow when 0.25- to 2-, 0.053- to 0.25-, and <0.053-mm are replaced by 0.25-2 mm, 0.053-0.25 mm and <0.053 mm.

L265 I doubt the calculation on aggregate turnover. Take turnover rate of 0.25-2 mm at 7 days as an example, 0.75=(4.58+0.68)/7, it seems that the formation processes are not taken into consideration, which is different from the calculation proposed by De Gryze et al. and Peng et al..

L270 According to Fig.5, the breakdown and formation of dry sieving aggregates occurred not only the first week.

L275 Transformation pathways in Fig. 6 are much smaller than published data. Why? No further discussion are displayed.

L300 There are two “Wet-MBC” in Fig.7a? To present the same SOC fraction, authors used the same color in a, while used the same shape in b, please keep them uniformed.

Discussion

There are lots of repetition of results. No highlights were proposed and discussed here. For section 4.2, lots of publications have proved it, there is no need to discuss again. For section 4.4, the relationship between SOC and aggregate are analyzed, which should be displayed in results rather than discussion part.

Conclusion

It is abstract, not conclusion. The main findings/conclusions, rather than results, are supposed to be included here.