



EGUsphere, referee comment RC1
<https://doi.org/10.5194/egusphere-2022-905-RC1>, 2022
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Comment on egusphere-2022-905

Anonymous Referee #1

Referee comment on "Estimating oil-palm Si storage, Si return to soils, and Si losses through harvest in smallholder oil-palm plantations of Sumatra, Indonesia" by Britta Greenshields et al., EGU sphere, <https://doi.org/10.5194/egusphere-2022-905-RC1>, 2022

It is my great pleasure to review the manuscript (egusphere-2022-905) entitled by 'Estimating oil-palm Si storage, Si return to soils and Si losses through harvest in smallholder oil-palm plantations of Sumatra, Indonesia'.

The authors present a manuscript that provides interesting data supporting some hypotheses raised during the last years: first, that the contribution of crop in soil Si bioavailability and Si uptake of crop; second, that authors point at some interesting findings regarding their Si flux via driving various Si distribution in plant. The experimental work has been well performed. It consisted of experimental analysis that yielded some interesting data. It is in general nicely documented by the authors, but some parts are not well introduced and discussed. It is a bit strange on missing the data from soils, while it may be improved by introducing recent findings from soils. Overall, I support publication of this work. Yet I have some comments to be considered before further publication.

In Abstract,

at line 15, to revise 'raised' to 'raise'; to revise 'if' to 'as'; in fact, high Si concentrations

Oil-palm has been by Munevar and Romero (2015), suggesting a high Si accumulator.

At line 20, Revise 'by NaCO₃ extraction' to 'using NaCO₃ extraction'; to revise 'are needed' to 'were';

At line 35, [more Si can be returned to soils through pruned palm fronds than is lost

35 through fruit-bunch harvest....] is not right as it is hard to understand. Should be rephased.

In addition, Abstract should be shortened and precise a bit to highlight the key significance and findings;

In introduction,

In introduction session, I encourage that authors carefully consider the previous studies on straw return regarding its silicon recycling and silicon uptake; what have it done? what should be considered on the Si status under the management of their return in cropland; next step to point at What is its existing gap in oil cultivation? Indeed, it is true that it is not well-investigated on the Si flux of oil palm. This is a key challenge, especially that their respective return on Si biological cycle is largely active in the highly weathered soil where oil palm grows. This needs to a better estimate on Si distribution in oil palm, bettering predicating their management in future. Indeed, crop straw return has gained increasing attention in recent years due to its importance as an approach to supply soil biogenic and plant available silicon (Si) for mitigating agricultural desilication due to its importance as nutrient for many plants. Recent research, for instance, has demonstrated that biological processes, such as plant-Si-uptake, phytolith production and recycling of phytoliths in soil, are important regulators of the Si cycle in the soil-plant ecosystems (Li et al., 2020, *Geoderma* 368, 114308; Puppe, et al., *Geoderma* 403 (2021): 115187, and so on). Returning their phytoliths into soil thus boosts the biological recycling of Si in agroecosystem, sustaining its health development, especially in highly weathered soils (Li and Delvaux 2019, *GCB Bioenergy* 11 (11), 1264-1282). But this effect is less studied in oil-palm plantations, as it is limited on a better understanding of Si distribution in oil palm.

At line 145, 'The procedure was conducted on two replicate samples' , did each sample have two replicates? Why not three replicates? *DeMaster* technique using 1% Na₂CO₃ can underestimate amorphous silica (i.e., phytogenic silicon, phytolith; Meunier et al., 2014; Li et al., 2019; Puppe, et al.,2019). Author should refer this issue, as this directly impact the Si content in the analyzed plant tissue and then its budget.; Also a bit strange is that soil data is missing in this section.

At line 260-265, these sentence look much more discussion than results.

In conclusion,

To add 'that' before 'mean Si concentration increases with leaf age'; what do you mean 'In fact, Si availability

could suffice for a second generation of oil-palm plantations'? is it soil Si availability? If yes, could authors offer these data referring soil analysis?

I am not native English speaker but still found some grammatic errors in this manuscript, but I feel that it will be better to improve its English a bit. Personally, it also needs to enhance its readily for reader, to concentrate its key finding and significance to be highlighted.

Please also note the supplement to this comment:

<https://egusphere.copernicus.org/preprints/2022/egusphere-2022-905/egusphere-2022-905-RC1-supplement.pdf>