



EGUsphere, referee comment RC2  
<https://doi.org/10.5194/egusphere-2022-905-RC2>, 2022  
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## **Comment on egusphere-2022-905**

Anonymous Referee #2

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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-RC2>, 2022

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### General comments:

The research motivation and research questions are sound and will be of interest to the broader community. The methods also appear sound, although I worry a bit about the sample size (see comments within). The addition of Si/Ca data for the various plant parts is a nice addition, as that data is fairly scarce in the literature.

Overall this is a robust study that eventually deserves publication. However, it needs more flushing out in terms of motivation for the study and relating the results to what others have found – many of the observations agree with what others have found in other systems, so this needs to be highlighted.

The text needs revision/editing throughout for ease of reading – I suggest a native English speaker help with the sentence structure and grammar throughout. Many of the sentences could use some revision for structure/grammar. I refrain from pointing out where because it was such a common issue.

Detailed comments below:

Section 1

Line 47 – 48: it would be clearer to say “transported...to the shoot with water flow” rather than sap flow.

Line 48: need to clarify that the “increase in Si concentration” occurs in the leave tissue.

Line 53: clarifying these crops are classified as “high” or “active” Si accumulators, as all plants accumulate some amount of Si.

Line 58: point iv is true for all plants, not just high accumulators.

Line 61: this point about Si accumulating w/ plant age and not translocating is not specific to oil palms – this is true for all plants.

Line 65: again, specify “high” or “active” Si-accumulating crops (all plants accumulate some amt of Si so “Si-accumulating” is not a meaningful term). (I make this comment here but it applies throughout paper, including beginning of discussion – I’ll stop making this comment now but I see this issue throughout the paper.)

Lines 65-67: this is a valid research question but it would be helpful to readers unfamiliar with Si literature to first point out that others (Clymans et al. 2011 for ex) has found soil Si depletion with continual plant harvest. Then your question here would make more sense and be more compelling.

Line 71: add more refs to this sentence that plant Si returning to soil again b/c plant-available – many studies highlight this and your argument would be stronger with more refs.

Line 82: How important are oil palms relative to other crops globally and/or Asia? A bit more (1 sentence) motivation on why studying oil palms is important would be helpful.

Section 2.2

Can you add rachis to the diagram of the oil palm parts? (Fig 1)

The frond numbers are confusing – how were those identified? You reference them like they frond 9 was the same on all the trees, but how was that number identified?

Can you clarify your total sample size for each plant part in each plot type (riparian vs. upland)?

Section 2.3.1 : the methods look good, although next time it's best to digest in a flat bottom tube, not a centrifuge tube to make sure material doesn't get stuck in bottom. But with the shaking and centrifuge, I imagine your digestion was complete.

Table 1b: I see some commas where periods should be I believe in the provided values. Also, can you add error terms to the Si concentrations or would it be correct to assume you only measured Si in 1 Frond no 9 in the WD, for example? (again, I'm confused on the sample size).

Fig 2: can you add sample size to legend or figure itself?

## **Discussion**

See comment above re: term "Si accumulator".

Many others have found more Si in leaves relative to other plant parts...maybe have sentence saying that your results correspond to others and add appropriate refs.

Line 347-348: your recommendation here is rationale and supported by the data. However, similar to my comment in the intro, the motivation for this comment is needed for readers unfamiliar with Si literature. Soil Si depletion with continual crop harvests have been observed (e.g. Clymans et al. 2011, Guntzer et al. 2012, Keller et al. (2012) are a few examples) so please highlight for readers that this is an serious issue...you might also want to add that because of that reason, people are now starting to fertilize certain crops with Si (see work by Datnoff I believe).

Line 382: The sentence, "these data suggest that Si cycling is maintained in this system" needs clarification – "Si cycling" is too vague. What you're saying is maintenance of a bio-

available Si supply is maintained in this system. Please revise. (Similar comment for Line 24 in abstract – please revise for precision.)

In general, the discussion is strong, especially the sections on straw management – and economic tradeoffs. It agrees with work by Guntzer et al. (2012) that suggest leaving the straw of crops on fields so I would reference that to show this alignment. (This is a different Guntzer et al. 2012 paper than the one you already reference.) Your conclusions also aligns with work of Carey & Fulweiler 2016 that highlights the importance of Si uptake by agricultural crops so I would also incorporate this agreement into the discussion.

#### References:

Carey, J. C., & Fulweiler, R. W. (2016). Human appropriation of biogenic silicon—the increasing role of agriculture. *Functional Ecology*, *30*(8), 1331-1339.

Clymans, W., Struyf, E., Govers, G., Vandevenne, F., & Conley, D. J. (2011). Anthropogenic impact on amorphous silica pools in temperate soils. *Biogeosciences*, *8*(8), 2281-2293.

Keller, C., Guntzer, F., Barboni, D., Labreuche, J., & Meunier, J. D. (2012). Impact of agriculture on the Si biogeochemical cycle: input from phytolith studies. *Comptes Rendus Geoscience*, *344*(11-12), 739-746.

Guntzer, F., Keller, C., Poulton, P. R., McGrath, S. P., & Meunier, J. D. (2012). Long-term removal of wheat straw decreases soil amorphous silica at Broadbalk, Rothamsted. *Plant and Soil*, *352*(1), 173-184.