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Interactive comment on "Silicon cycled by tropical forest trees: effects of species, elevation and bedrock on Mount Kinabalu, Malaysia" *by* Ryosuke Nakamura et al.

Anonymous Referee #2

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This paper presents a thorough study of the Si concentrations in multiple tree species across an elevation gradient in a tropical forest. It also calculates the annual litterfall associated Si fluxes, based on annual litterfall fluxes and Si concentrations. This is related to Si availability in the soil water.

The authors have done a great job in analysing a large set of tropical trees for Si concentration, and the consequent calculation of associated tree litter Si fluxes is interesting. The study has a strong merit for that, as it is one of the first –and probably the first at this scale – to analyse this potentially interesting component of tropical forest Si cycling.

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That said, in my opinion, the study cannot deliver any strong new information on the effect of elevation or bedrock on the Si cycling by trees. My main concern is that the Si concentration in the leaves, and the associated Si litter flux, could just be a reflection of the Si availability in the soil water. The latter is highest at lowest elevation, and this results in generally higher Si concentrations in biomass. It is well known that all species, even those not accumulating Si but acquiring it passively, will show a higher Si concentration in biomass when availability is higher. The question thus is: why is Si availability higher at lowest elevation? Is it because of higher Biogenic Si concentrations in the soil? Is it because of alterations in soil water source?

The authors cannot provide a response to that with this analysis or dataset. In order to move this study from an interesting local observation, to a study that truly moves knowledge on Si cycling in tropical forest sites, a lot of extra context is needed, e.g. -How much BSi is present in the soils? -Indication of Si concentrations in porewater and Si leaching / import from / to groundwater. -Decomposition experiments with the litter.

Now, it is impossible to assess what the observed changes in Si concentrations in leaves, and associated litterfall Si fluxes, mean in the context of ecosystem Si cycling.

The dataset has large merit in itself, since it is quite unique in analysing tropical tree litterfall Si fluxes in such detail. However, it is difficult to currently make any strong conclusion on interaction between tropical trees and tropical Si cycling based on this study alone. For that, more information on soil Si pools and Si leaching / Si groundwater input is needed.

Still, as a scientist interested in Si cycling, I enjoyed reading this paper and am puzzled by its results. I am therefore hesitant to just indicate that the paper should not be published. Indeed, this paper could be a trigger for future work on the Si cycling in tropical forests. I would therefore recommend that, if possible, authors include some of the suggested information on the local Si biogeochemistry.

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If that is not available, I would recommend authors to focus more on linking plant traits to Si concentrations observed. Is that different between elevations? Can you find an explanation for the large observed differences between species? I think the data are much more suited for that purpose, than for trying to put it in a larger biogeochemical context.

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