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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 #1

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Main comments : This paper brings some new informations regarding the Si content of different tropical species, on the Si concentration in litterfall in eight plots sampled at three dates and on Si concentration in soil (0-10 cm depth horizon) obtained through water extraction, in these eight plots for one date. These 8 plots are located at 4 different elevations (700, 1700, 2700 and 3100 m). For each elevation plots are placed on different bedrocks, i.e., acidic sediment and ultrabasic igneous rock; except for 3100 m where sediment bedrock was replaced by granite. These situations lead to strong differences between ecosystems (structure, vegetation composition, production rate, littefall, litter decomposition, soil fertility. . .) previously published in Kitayama and Aiba 2002. For examples, wood biomass ranged from 3.5 to 43.3 Kg.m-2, leaf biomass

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Discussion paper

varied between 0.17 to 0.56 kg.m-2 and leaf litterfall between 121 to 1113 g.m-2.yr-1, litter decomposition constant ranged between 0.44 and 1.69 yr-1 and pH water ranged from 3.4 to 5.4. These data from Kitayama and Aiba (2002) in a tropical ecosystem are exceptional. So you have different ecosystems with very contrasting production and recycling rates (as well as floristic composition).

INTRODUCTION I am not convinced by the hypotheses presented in the introduction which are based on indirect factors. The total Si concentration of a rock type is not a determining factor of the flux of Si in the soil and the soil can act indirectly via its fertility on the biological cycle of the Si. The elevation is an indirect factor which can affect various components of the recycling of an element via the production and the decomposition of litters notably. To use indirect variables strongly limits the interpretations. Beyond elevation and rock type, the differences of production and of litter decomposition rate of these 8 ecosystems seem to be fundamental and direct factors affecting the concentrations of Si in leaves. The hypothesis of this article could be for example that the influence of the recycling rate of Si by the stand on the Si concentration in leaves in the long term. See the paper of Cornelis and Delvaux (2016) which is cited in this manuscript.

METHOD Tropical ecosystems are complex. In consequence, you have to well describe the ecosystems (see Tab 1 Kitayama and Aiba 2002), with matter stocks and fluxes. Specify whether they are affected by forest management and understory vegetation. Describe soil and their properties. Justify that you measures only Si concentrations in the samples collected at three dates (April 1997, May and August 1998) and during two weeks while the annual concentration was aimed. What are the limits of detection and uncertainties of our measurement devices? Soil description was absence.

RESULTS The original results of the Si concentrations in leaves are not enough valorized (except figure 2 which is a global figure). For example add the values of Si concentration for each species in the table S1.

DISCUSSION I suggest to rework a part of the discussion by dealing with the relations between direct factors such as litter production, litter decomposition, Si recycling, and Si concentration in leaves.

In conclusion, in the current state, this manuscript is not publishable in Biogeosciences because the research question is not enough relevant and not supported by an adequate device of observation allowing to conclude (three factors: species, elevation, bedrock and 2 indirect factors on the cycle of Si). However, the set of data stemming from this article could be better exploited by associating the data on the production and the decomposition of litters published in Kitayama and Aiba (2002).

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