Interactive comment on "Particulate macronutrient exports from tropical African montane catchments point to the impoverishment of agricultural soils" *by* Jaqueline Stenfert Kroese et al.

Anonymous Referee #2

Received and published: 6 January 2021

The paper by Stenfert Kroese et al. addresses the impact of land use on particulate carbon and nutrient export from tropical montane catchments in the South-West Mau in Kenya and shows that soil fertility is lost with the conversion from natural forest to cultivated land. This study fills in an important knowledge gap on particulate nutrient export of tropical ecosystems in East Africa. The manuscript is mostly well written and clearly structured. I recommend it for publication in SOIL after some revisions.

My main concern is the way the data is presented. In Figures 4 and 5 and Table 4, concentrations and ratios are presented for each sampling year separately. This might be prone to misinterpretation, as different seasons were sampled for each year. In

Table 5 it is stated that the data are from wet period (2018) and drier period (2019). I think it's necessary to be consistent throughout the manuscript, thus, the same labelling is necessary for Figures 4 and 5 and Table 4. Related to this: While in the results differences between years/seasons are acknowledged, in the discussion the whole seasonality is neglected. Especially the C:N, C:P, and N:P ratios seem to differ during the different seasons. Might this indicate different sediment sources? I think this needs to be addressed shortly in the discussion. Furthermore, the methods section lacks some more details: How where the data stored? Did you use an external datalogger or did the sensor log internally? The stealing of power supply and subsequent data loss is mentioned, but it is not clear how the setup was powered. How long did you let the sediments settle before air drying the aluminum trays?

Specific comments: Introduction p. 2 L52: What is the impact of an increased turbidity in streams? p. 3 L65ff: The presented results are from which ecosystems? All tropical? p. 3 L69: "This is an important knowledge gap" Methods p. 9 L176: Integrating missing discharge data linearly does not seem right, if rainfall data is available discharge can be correlated to rainfall? p. 9 L179/180: Instead of calling it the "drier period of the start of the long rainy season" maybe use "onset of the rainy season" p. 11 L212: organic matter content p. 11 L219: I'm wondering how representative the yearly yields of sediment-associated TC, TN and TP are if you use only data from 3 sampling periods over two years. Or did you relate the C and nutrient yields to the turbidity data? If so, it is not clearly described. p. 11 Data analysis: Which programs did you use for data analysis? Results p. 12 L235: State somewhere in the text that the values between the brackets are the 95% CI. p. 12 L236: Define the catchment runoff coefficient and how you calculated it in the text Figure 3: This is a really nice figure, however, it is not discussed at all in the manuscript. For example, I'm wondering why SSY are a lot higher during the 2019 season compared to the 2018 season in the NF and TTP catchment, although the discharge seems lower. I see that this has been more the focus of recent work by the authors and is not the aim of the present manuscript, however, in my opinion if the data is presented like this in the manuscript it should be

discussed accordingly. p. 15 L286-288: are the reported OM contents mean values over both years? Maybe add these values to a table? p. 17 L324-326: add C and N to the units to avoid confusion: kg C day-1 and kg N day-1. Also for TP in line 328. Section 3.4: Does it make sense to calculate mean annual yields of the sampling periods? How representative are these values? I think this needs to be addressed in the discussion. Discussion p. 19 L359: Do you know how long ago the conversion from forest to agricultural land occurred in your study sites? p. 19 L362: For an easier reading: put the values in the bracket for TC and TN concentrations behind "natural forest catchment". Also add C and N to the units. p. 19 L375: Figure 6 shows no strong correlation between TC and TP for SHA. Be precise that only TTP shows a significant relationship.