

## ***Interactive comment on “Transport and retention of phosphorus in surface water in an urban slum area” by P. M. Nyenje et al.***

### **Anonymous Referee #1**

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The authors present a study that is potentially interesting for a wide audience. Unfortunately, the paper lacks some substantial data in support of the argumentation. The text is also repeatedly unclear in its meaning. The major comments are first presented.

The paper lacks proper data about the sediment chemistry and its interpretation. The text is generally unclear about sorption versus precipitation/dissolution control on PO<sub>4</sub>, partly due to lack of data and partly due to sound interpretation. A first shortcoming is that no data about the carbonate content of the sediments is presented, which might be estimated from the 0.43 M HNO<sub>3</sub> extraction or not. From such data, sorption intensities for PO<sub>4</sub> may be estimated using literature values. This could make it plausible or not whether sorption to Ca-carbonates is important. Second, no aqueous speciation is performed using the water analyses so nothing is proven with respect to the likelihood

C5431

of Ca-phosphate dissolution or precipitation. Third, ratios between PO<sub>4</sub> extracted and Fe, Al or Mn should be inferred and whether these can be interpreted as Fe-hydroxy-phosphates, etc. or sorption to oxides. Here, notice should be made about literature data on sorption capacities. Last, ratios between organic carbon and organic P should be calculated and compared to literature values. Without addressing the above issues in a quantitative way, a meagre investigation remains that is not suitable for publication. Additionally, the authors claim to present a first study about P chemistry for unsewered settlements. How does the study of Chua et al. (as cited) refer to it. And it would be interesting to discuss the differences and similarities with P studies in sewerred, urban areas or agricultural areas. What are differences or similarities with respect to speciation, flux, load, and concentrations?

The text is repeatedly unclear in its meaning. Below is a listing of sentences that are unclear or otherwise incorrect.

p.1/l.17-18 transport to what and wherein? p.1/l.25-27 proof? p.2/l.4 meaning of "strong flush" p.2/l.7 what is slowly? p.2/l.20 on the one hand: where is on the other hand? p.3/l.14-17 sentence too long and unclear. ion exchange between which species? p.3/l.26-29 contribution to what? discharge → load or flux p.4/l.18 what is the buffer against pollutants within the context presented p.4/l.20 degradation → deterioration p.4/l.23 survival due to eutrophication? p.4/l.27 spring water aquifers? p.5/l.26 why has SO<sub>4</sub> and total-N not been measured? these compounds are crucial within the context presented. p.6/l.22-30 this procedure is somewhat clumsy and I wonder about the error in SS, when subtracting two values from each other p.7/l.31 (and p.8/l.6-7) was IP really measured or just calculated as sum of Ca-P and Fe/Al-P. The latter appears to me. p.7/l.32 when and where were the samples dried? Immediately after sampling in Uganda, or in the Netherlands. What might be the implication of shifts in the speciation due to e.g. reductive dissolution of Fe-oxides. Can this be excluded? p.8/l.14 these P concentrations are huge. What were the remaining concentrations in the incubations and how do they compare to the field data? p.9/l.7 and further these concentrations

C5432

are no background concentration that refer to a natural condition p.9/l.10+15 notice that Ca is about the same. Calculate saturation state with respect to carbonates, etc. from the data. p.9/l.17 low Fe and Mn does not mean not strongly reducing. Under sulphide conditions, Fe and Mn are rather insoluble but it is strongly reducing. p.9/l.27 very flashy response meaning? and of course baseflows are relatively constant p.10/l.14-16 clumsy phrasing p.11/l.12 what is a sandy clay loam? p.11/l.15 what about Al or Si as major cations? Remark that it holds for the 0.43 M HNO<sub>3</sub> extraction. p.12/l.5-10 text unclear p.12/l.28-30 scientifically meaningless sentence p.14/l.2 remarkable conclusion when you fear that you have missed the real peaks p.14/l.20 to p.15/l.9 this interpretation is not sound at all p.15/l.10-16 the two concluding findings seem conflicting to me p.15/l.18-20 vague and not truly supported by the data

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C5433