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Hydrology and Earth System Sciences
Discussions

Interactive comment on "A systematic assessment of uncertainties in large scale soil loss estimation from different representations of USLE input factors – A case study for Kenya and Uganda" *by* Christoph Schürz et al.

Anonymous Referee #1

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An interesting article proposing interesting aspects in USLE modelling: a) uncertainties b) comparison of factors c) validation.

However, there are issues that authors should face in order to improve the quality and proposing it for publication. An important issue is that authors did not propose 'solutions'. They did the 756 USLE simulations but they should also propose which is the most representative one per factor. For example , which is the best method for the R-factor?

Authors propose new approaches to check the plausibility of large scale assessments based on Bosco et al., 2014. This study has neither been peer reviewed nor published. So, I would suggest using published literature studies for such statements.

In a similar study, Estrada-Carmona et al (2017) made a global sensitivity analysis of USLE input factors. Please compare the results of your study with the ones of this study.

The most recent study that I found in East Africa is the one of Fenta et al., 2019 Science of the Total Env. How your results compare with their results?

Soil losses estimates wit USLE are long-term averages. You cannot compare the long-term findings against short-term findings in plot experiments.

Authors made a classification of soil erosion rates. The tolerable soil erosion rate cannot be justified according to literature findings as the soil formation rates are low. This means that sustainable soil erosion rates are lower than 1-2 t per ha per year. In addition to this, authors present some really extreme mean annual soil loss rates > 200 -1,500 t ha-1 yr-1. This means that at least 2 cm of soil is lost every year. This maybe the case for very limited areas; otherwise we risk to lose completely our soils in 50 years. This means that some of the estimated combinations are not realistic. You should not be driven by the modelling outputs but somehow use also the common logic (you cannot lose 1m of soil in 50 years).

Title: I would replace the word 'representations' with 'applications'

P4 L15-24: This paragraph is not needed.

Fig. 3: attention in the measurement unit of soil erosion. It is better to use t ha-1 a-1. If you want to keep your proposed unit , then please put in parenthesis (ha a)

Fig 7. It should be applications and not realizations.

P23 end of the page and P24 beginning of the page: I would propose that some ap-

plications of the factors can be excluded. For example, the NDVI application is known to have very low C-factor results and it is known to have incorporated some problems. The same applies for R-factor. For example the methods of Lo and Fournier are based on rainfall amount and do not incorporate the rainfall intensity.

P19 the same as above. Are values of K-factor 0.088 acceptable? Can be compared to other findings in the literature?

P20 L1-10: The same as above. Can you prove that values of C-factor 0.03 are acceptable in agricultural areas?

5.2 section. It is not proper to have a section with question.

P25 L30-34: Is It possible to validate large scale models with Google Earth? Google Earth can potentially verify permanent erosion characteristics (e.g. gully erosion) and not rill and sheet erosion. The plausibility of large scale studies can be verified with model applications at regional or local

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