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Comment on hess-2021-225

Anonymous Referee #2

Referee comment on "Evaluating and developing a model of specific degradation using geospatial analysis for sediment erosion management in South Korea" by Woochul Kang and Pierre Y. Julien, Hydrol. Earth Syst. Sci. Discuss.,
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The research deals about evaluating specific degradation and sediment yield in South Korea. The procedure is a composed by different stages that considers: 1) analysing measurements of sediment yield from 62 streams/rivers and 14 reservoirs, 2) developing a regression / tree mining model for sediment yield in 47 up-streams catchments, 3) using RUSLE with mapping variables to validate the model, 4) using 16 ungauged watersheds to validate empirical data, and, 5) remote sensing is used for spatial variables.

We founded the subject of the article interesting, but in general the manuscript is a little confusing on how the procedures are adopted. We had a more clear understanding looking back to the article Kang et al., 2019 where a similar research is conducted and explained in a more fluid behave. We think that the use of methodologies adopted should be follow a more linear explication of the procedures, we are a bit perplexed about the question of spatial resolution that can be interesting but that is to much in evidence in discussions. Some concerns are on the material and methods not really clear or reported from previous article where better explained (e.g. the use of TE, trap efficiency in in defining SD, specific degradation, questionable dealing on both the catchment and the reservoir; use and description of the Modified Einstein Procedure - MEP). In general, our opinion is that the manuscript could be reconsidered for the publication in HEES Journal after a new submission.

ABSTRACT

L19. "significant parameters:": the term significant, should have a statistical meaning. We think the abstract it is a bit confusing when showing the procedures and the results should be more concise.

INTRODUCTION

L32-41 We are not sure that a pedagogic description of the erosion terms is necessary. In general, the introduction must give a larger spectrum of the state of the art that is much

wide than that here showed.

MATERIAL AND METHODS

L79-81. "When water enters a reservoir, the flow velocity decreases, flow depth increases, and sedimentation occurs as a result of the overall decreased transport capacity of the stream.": it is true but, over a pedagogic approach, here not demanded, scientifically thinking, it is a bit more complex.

L84 sediment deposition rate (δ in $m^3 \cdot km^{-2} \cdot yr^{-1}$): in this form is not appropriate to call it like this, it is more an erosion/denudation rate in the end ($m \cdot yr^{-1}$) (i.e., metres over the catchment surface in a period)

L85: field measurements: this is maybe more a continuous monitoring of the dams

L89 impoundment: not sure it is the right term for that

Equations 1 and 2: x: not adapted mathematical notation

Equation 2 (Specific Degradation): δ is the trap efficiency (%): we suppose this is more a fraction than a percentage. If using the term TE, the term Specific Degradation is questionable because is the part of sediment captured by the dam while the degradation of the surface catchment refers to the whole sediment eroded.

Caption Figure2: maybe add that are average values

L100. The Modified Einstein Procedure (MEP) should be at least briefly described and why the author choose this procedure (maybe suitable to this kind of data or study site etc.)

L111-190. We suggest to better structure this part to give a more clear presentation of the models, it is a little bit confusing and sometimes not enough well in details for equations. Additionally, some terms are not clear, W versus WW for instance (Eq. 13, 14, 16, 17) or the eq. 15 itself.

Results

Is a bit confusing the part of models, showing a sort of evolution of previous models; we think a better structured explication should help.

L250-255. The use of SDR from the literature as in figure 8 is in general allowed, but should pay attention to the specific condition of the reservoirs, being the SDR very dependent on the specific vegetation of the soil (as also observed in this research) and connectivity condition of the reservoirs.

Discussion

Here, we talk about processes (eroding land surface) and a methodological issue, spatial resolution. We are not sure a methodological issue is important, as it is not the core of this paper, while the process has a limited discussion.

Conclusion

All the main finding are evoked, maybe a more synthetic or better structured presentation should help.