

This study presents an evaluation of the interaction between slope steepness and antecedent moisture content on several aspects of interrill erosion for three distinct soil types. These aspects are, namely, splash detachment, infiltration, runoff, and soil loss. They are evaluated for three soils from a small watershed in Ethiopia using small-scale lab experiments. Further, the study tests the validity of more traditional erosion models to predict the observed erosion from the lab experiments. It is shown that static parameters that do not consider antecedent conditions or the interaction of various factors are unable to fully represent interrill erosion processes.

In general, the research in and of itself is of good quality and the results appear to be useful from a general erosion process point-of-view. In addition, these results are valuable due to the extreme lack of process understanding and representation ability with respect to soil erosion that currently exists in regions like Ethiopia. There are, however, several aspects of the study that could be clarified and the general quality of the written text must improve significantly before this manuscript can be accepted for publication in HESS. With that, I would recommend that the authors perform major revisions to this manuscript to help improve the quality of the presentation and readability. I present a few general comments in the following that the authors should consider and provide some more detailed/editorial comments at the end of this review.

The number of tables included is overwhelming and excessive! These many smaller tables must be combined into a few larger tables. In addition, some of the less important tables could be moved to the Supplementary Material section. I would suggest merging Tables 2, 4, and 6 together. It also makes sense to put Tables 5 and 7 together and Tables 8 and 9 together. Finally, I suggest putting Tables 11 and 12 together and moving Table 10 to the supplemental information section since it is mostly correlation coefficients and can easily be covered in the main text.

In the Methodology section, there are far too many small subsections. The authors should restructure this section. I suggest the following or something similar should be done. Section 2.1 should be renamed 'Experimental design and treatments'. Sub-section headings 2.2, 2.2.1, 2.2.2, 2.2.3, and 2.2.4 should be removed and these sections simply combined under the new Section 2.1. Sub-section 2.2.5 should be renamed 'Sample collection and analysis'. Sub-sections 2.2.6, 2.2.7, 2.2.8, and 2.2.9 should be removed and these sections combined.

All the text from P6457L11 through P6458L14 should be removed since this is stated in the introduction. The authors can just reference back to these originally stated equations. What definitely must be included, however, is a full description of how these models were fit. This can be tricky especially when the models have multiple parameters to adjust. What influence did the selected fitting procedure and/or selected objective function have on the results presented in this study?

In the first part of the following Minor/Editorial Comments section, I have tried to assist the authors by providing a detailed and thorough list of grammatical errors and suggested corrections in the manuscript's Abstract and Introduction sections. However, it is not possible (nor the role of a reviewer) to provide such a thorough detailed list of grammatical corrections for the entire manuscript. As such, the authors should do a more thorough job proof reading the text to make sure the quality of the grammar is acceptable. It is suggested that the detailed list of corrections given in the following be used as guidelines in this process. In addition, I would recommend that the author consider using a third-party editorial service or writing assistance facilities available at

their institute (Florida International University in particular) to help in improving the quality of this text.

### **Minor/Editorial Comments**

#### *Abstract:*

P6448L5: Change 'The' to 'This'

P6448L9: Change to 'simulated rainfall for a total'

P6448L9: Change 'Rainfall intensity at' to 'Rainfall intensities of'

P6448L13: Here and everywhere: Whenever you talk about 'splash' it is more appropriate to say 'splash detachment'

P6448L14: Change 'washed' to 'the amount of washed'

P6448L15: Change ', and' to 'while the amount of'

P6448L17: Change 'rate' to 'the rate'

P6448L18: Delete 'soil,'

P6448L19: Change 'soil Regosols' to 'Regosol soil'

P6448L19: Change 'was not' to 'were not'

P6448L22: Change 'For' to 'For the'

P6448L25: Change 'the rainfall intensity based model' to 'rainfall intensity based models'

P6448L25: the sentence starting with 'The exponent...' is out of context and needs rewritten to help the reader understand.

#### *Introduction:*

P6449L3: Delete 'its'

P6449L10: Insert 'including' after 'land'

P6449L11: Change 'which means to' to 'and'

P6449L12: Delete 'an'

P6449L13: Delete 'it needs'

P6449L14: Change 'quantifying' to 'quantification of'

P6449L15: This statement about the Alemaya watershed comes out of place. Consider a better introduction here.

P6449L17: Change 'turn to' to 'turn'

P6449L20: Change 'resistant' to 'resistance'

P6449L27: Delete comma after 'and'

P6449L28: Consider changing 'affects' to 'influences'

P6450L3: Change 'those factors on' to 'these factors on the'

P6450L5: Change 'varies' to 'vary'

P6450L6: Change 'interaction' to 'interacting'?

P6450L7: Change '(Meyer, 1981; Foster, 1982)' to 'Meyer (1981) and Foster (1982)'

P6450L9: Change 'mainly' to 'can be'

P6450L11: Make *b* italics

P6450L12: Change 'fraction. And the exponent, *b*,' to 'such that the exponent'

P6450L16: Here and everywhere: are you sure you mean by definition and not equals?

P6450L17: Here and everywhere: I think the common way to write this is 'where' with a lower case *w* and no punctuation. Please check this and be consistent.

P6450L20: Here and everywhere: It is more common to give the full name or term then the abbreviation. Here, for example, it should be 'Water Erosion Prediction Project (WEPP)'

P6450L22: Delete 'that was' and change the second 'was' to 'were'  
P6450L26: Add period after 'dimensionless'  
P6451L4: The  $P$  should be  $p$ ? Also, should this be a fitted exponent, too?  
P6451L7: Change 'the proposed model that give' to 'proposed models that give'  
P6451L8: Delete 'as Eqs. (1), (2), and (3)'  
P6451L9: Change ', which' to '. This'  
P6451L10: Change 'and' to 'but'  
P6451L10: Change 'the' to 'this'  
P6451L16: Change 'researcher' to researchers'  
P6451L22: Change 'relationship on' to relationships for'  
P6452L1: Change 'data were' to 'data used in that study were'  
P6452L2: Use % throughout.  
P6452L5: Add a period.  
P6452L7: Change 'assumed' to 'assume'. Be careful of shifting the tense of your verbs throughout.  
P6452L8: The sentence starting with 'The relationship...' is poorly written as needs improved.  
P6452L13: Change 'steepness' to 'steepness. This is because'  
P6452L14: Change 'in interrill' to 'in the interrill'  
P6452L17: Change 'are also' to 'which are?'  
P6452L20: Rewrite sentence to read 'Erosion is often less on slopes steeper than this.'  
P6452L22: The first sentence of this paragraph is far too long and must be split into 2 or 3 sentences.  
P6453L1: Insert 'is often' before 'less'  
P6453L4: Change 'very little research work' to 'lack of research'  
P6453L7: This should be (2) and the following (3)  
P6453L10: Change 'that slope' to 'that the slope'

*Rest of the text:*

P6453L15: Change 'The study area, Alemaya, is' to 'This study consists of a lab-based soil erosion experiment on soil found in the Alemaya watershed'  
P6453L22: Remove semicolon after 'that'. Please be careful through out with the excessive and often incorrect use of punctuations. For example, many commas could (and should) be removed.  
P6454L2: Change 'In this study' to 'The' and remove the words 'was' and '. The equipment'. Finally, put a colon after the word units on the next line and remove the comma after 'simulator'.  
P6454L8: Remove 'that varied in texture were taken' and 'These soil materials' on the next line.  
P6454L12: Have you introduced these abbreviations before? You should make it clear in the text which is Soil A, B, and C. Also, is anything gained by these generic abbreviations? Why not consider using the soil names or textural classes (which inherently contain more information) to refer to the soils throughout? Regardless, pick a convention, introduce it and use it consistently.  
P6454L16: Change 'a 90' to '90'  
P6454L25: Change 'Eventhuogh' to 'Regardless'  
P6455L2: Remove semicolon and change ' has' to 'have'  
P6455L4: Remove 'used for experiment'  
P6455L9: Change 'wash, and Drainage outlet' to 'wash. Drainage outlets'  
P6455L15: Here and throughout, why not use a % sign?  
P6455L15: Remove 'that' and change 'pan, and' to 'pan.'  
P6455L19: Change 'for total' to 'for a total'

P6456L3: Remove 'from splash collector and runoff, and wash collector respectively'

P6456L4: Remove semicolon

P6456L6: Change 'sand sized' to 'sand-sized'

P6456L9: Remove 'times'

P6456L11: Change 'strength were measured in each post' to 'strengths were measured after each'

P6456L12: Delete 'various researchers such as'

P6456L14: What equation?

P6456L20: Change 'the standard procedures, and means were separated by' to 'standard procedures and means were separated'

P6457L8: Remove 'while the other'

P6457L9: Change 'is rainfall' to 'is a rainfall'

P6458L17-19: Move these into the Methodology section.

P6458L26: Remove 'at a significance level of'.

P6459L5: By 'Numerically' do you mean 'The total amount of splash detachment'? Numerically is probably not the word you mean here.

P6459L20: Remove 'Close observation of Table 3 indicate that' and end this sentence with '(Table 3)'. This is a much nicer way to reference a table.

P6459L28: Change 'had' to 'have'

P6460L3: Remove 'at'

P6460L5: Remove comma before 'and' and change 'values' to 'value'

P6460L10: Put % sign behind both numbers (here and everywhere)

P6460L12: Change 'slopes, steepness greater than 33%' to 'slopes (greater than 33%).'

P6460L19: Change 'wet' to 'under wet conditions' or similar. Make this correction throughout the rest of the text. The reference to Soil B-wet has not been introduced and is confusing.

P6460L26: Change 'strength, the' to 'strength. The'

P6460L27: Change 'Different' to 'Differences'

P6461L2: Change 'possibly' to 'likely'

P6461L6: Again (and throughout): consider 'likely' instead of 'possibly'

P6461L11: Delete 'Here'

P6461L12: Rewrite the sentence starting with 'Runoff rate...'. Probably would be clarified using a different soil naming convention (see previous comments)

P6461L19: Delete 'that reduce the amount of runoff; in this study'

P6461L20: Remove 'soil' after 'C' (do this everywhere!)

P6461L21: Remove 'particles than the others'

P6461L23: Change to 'effects'

P6461L25: Change 'was might be due to' to 'is'

P6461L26: Why is it 'high sand particle' and not high percentage sand?

P6461L28: What capacity rate?

P6462L1: Here and everywhere: instead of 'at  $p=0.0001$ ' or all these different p values you report, just define what a p value that is highly significant in the methodology section. For example, add a sentence like: 'In this study, all relations with  $p<0.05$  are considered as significant.' I would add this around P6457L1. Then you can remove all this different p values in the rest of the text (which are presented incorrectly!!)

P6462L1-5: This is confusing. How is there a significant effect in the first sentence and then it is not in the third? Rewrite and be clear.

P6462L7: Here and everywhere: I think you are not using word 'numerically' in an appropriate manner. I think you can just remove it everywhere to avoid the issue.

P6462L20: Change 'high runoff rate was observed on wet' to 'a high runoff rate was observed on the wet'

P6462L28: Delete sentence starting with 'For Soil B...'

P6463L8: Delete first 'and'

P6463L9: Delete 'at the probability levels of  $p < 0.0001$ ' and see previous comments regarding defining a significance level throughout.

P6463L10: Here and throughout: it should be 'significance' test

P6463L16: Change to 'an average' (this comment applies to many places in this manuscript where the word 'a' or 'an' has been omitted)

P6463L18: Change 'highly' to 'more'

P6463L22: Put 'an' in front of both 'initially'

P6464L10: For slope steeper than 25%? Really you only show this for slopes at 45%. Here and throughout, I would avoid the speculation to all slopes higher than 25%.

P6464L12: Change 'decreased' to 'decrease'

P6464L13: Delete 'to be observed'

P6464L14: Delete 'at 45% than at 25%' as this is implied earlier.

P6464L16: Delete 'level of'

P6464L19 'rate of increment'? This does not make sense. Re-write.

P6464L23: Change to 'the air-dry treatment'

P6464L27: 'availability of high runoff rate'? This does not make sense. Re-write.

P6465L4: Change to 'more detached'

P6465L7: Here and elsewhere: Change 'than at' to 'relative to'. This is because you are talking about something compared to something else.

P6465L10 'the probably reason for this soil'? This statement sounds awkward.

P6465L18: Delete 'than at 25%' and 'at 45% than at 25%'

P6465L20: Change 'was to 'were'

P6465L29-P6466L6: This section is confusing and needs rewritten. You have not introduced these percentages well nor labeled them with % signs.

P6466L5: Here and elsewhere: Delete the r and p values as you have them listed in the main text. Just reference the table (which should move to supplemental material).

P6466L16:  
Delete sentence starting with 'Correlation coefficients...'

P6466L20: Change to 'decrease'

P6466L26: Here and everywhere: it should read either 'significant difference' or 'significantly different' as appropriate per sentence construction. Fix these!

P6467L2: Change to 'the highest'

P6467L3: Delete sentence starting with 'For Soil A...'

P6467L9: Change to 'rather than'

P6467L14: again, remove 'numerically' as it is implied.

P6467L17: Be aware of the significant figures on your percentages. Are you sure there are 2 decimal places?

P6467L24: Change 'has somewhat relations with' to 'is somewhat related to'

P6468L18: Rename this subsection to reflect it is the section where you are applying the models.

P6468L19-24: This section will improve if you reference the equation numbers (see previous comments). Currently it is poorly written.

P6468L26: Delete 'although most b-values were between 0.95 and 1.75'

P6468L27: Delete 'to'

P6469L5: Change 'The author reported that' to 'Reported'

P6469L9: Change 'transport; for soil A, the result' to 'transport. For Soil A, the results'. Note here and everywhere you need to be consistent with either Soil A or soil A in your naming.

P6469L20: again, remove 'numerically' as it is implied.

P6469L21: change to 'depending'

P6469L29: Change 'a coefficient' to 'coefficients of'

P6470L1: again, remove 'numerically' as it is implied.

P6470L8: Delete this sub-section heading (3.6) as it is not needed.

P6470L18: Change 'Especially, these models (model V and IV) are well' to 'These models are especially well'

P6471L3: Change 'indicated' to 'indicates'. Be careful of verb tenses.

P6471L4: Change 'least' to 'lowest'

P6471L5: Delete 'except for Soil bat 45% increase in moisture content reduced erodibility of soils'

P6471L8: Delete 'almost'

P6471L16: change 'than for' to 'relative to'

P6471L21: Change 'soil not mean that' to 'soil does not mean'

P6471L24-25: It should either be 'soils were' or 'soil was'. Pick a convention and use it consistently.

P6472L1: Delete 'works have'

P6472L8: Change 'thereof' to 'thereafter'

P6472L13: Put parenthesis around citation data and change 'decreased' to 'decrease'

P6472L22: Remove 'set for'

P6472L24: Perhaps 'independently' is more correct than 'unconnectedly' here?

P6472L29: I think you want to structure this as 'limiting conditions'. Consider it here and throughout.

P6473L5: Delete 'and poor correlation coefficient was obtained for Soil C'

P6473L11-13: Consider the following rewrite: 'In general, the effect is positive for low slopes. For steeper slopes, the effect can be either positive or negative depending on the soil type and the actual processes taking place.'

P6473L13: Change 'limiting condition slope' to 'slope as a limiting condition'

P6473L14: Consider the following rewrite for the sentence starting with 'However':  
'However, for transport limiting conditions, soils that have high infiltration capacity (such as Soil B) may have negative effects of slope steepness.'

Figure 1: This figure needs cleaned up. It is unclear in the legend which line is which treatment.