

## ***Interactive comment on “Are the effects of vegetation and soil changes as important as climate change impacts on hydrological processes?” by Kabir Rasouli et al.***

### **Anonymous Referee #1**

Received and published: 1 July 2019

This paper presents a study of changes to hydrological processes under shifting climate, soils and vegetation. The paper is very interesting and the manuscript presents a novel, challenging and important study. However, the current presentation of the work makes it very difficult to really understand what is being said and follow the (complex) findings of the work. I have made some suggestions for the authors to consider on how to organize the presentation that may assist the reader to better follow, understand, and derive a meaningful message from this work.

The Introduction is not well organized and I suggest rewriting and reorganizing it to develop the argument on why this study is necessary, and why it is important. For

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example, the very first line of the Introduction discusses the French Alps. Is the paper about the Alps? I don't think it is. The rest of this paragraph is devoted to a somewhat rambling discussion on vegetation and soil changes that may shift under climate change. Methods (i.e. descriptions of scenarios) are scattered throughout this paragraph, and also through various sections of the Introduction. These should be moved to the Methods section.

The last sentence in the first paragraph (line 49) of the paper “Vegetation changes can alter soil properties.” is out of place and probably belongs in the first sentence of a paragraph on this topic.

Second paragraph (line 50), suggest moving the second sentence as the opening sentence of the paragraph. This paragraph also jumps around a lot, and needs reorganizing.

Third paragraph of the paper (line 61) is disjointed. Can you incorporate these ideas into the paragraphs above?

Fourth paragraph, this part of the paper you are trying to make an argument for why you use the delta method on your historical observations, but it isn't clear. You talk about noise (line 70). What do you mean by this? This whole argument needs to be clearer and emerge from an explanation of what you have done. Right now it seems out of place.

Line 80, fifth paragraph. This is a strange paragraph. Of course, there have been lots of studies on climate change on hydrology and on mountain hydrology. Is it necessary? Are you planning on summing up all of the results in the field? I think you want to make the argument that lots of these studies have been done but most are missing the vegetation / soil / land surface change component. Perhaps rethink this approach and place your argument in that context.

Line 90-115. These are almost methods to me. I don't think this text belongs in the

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Introduction section.

Because you gloss over some things, the paper is difficult to follow. For example, you don't really describe the model so all the figures are tough to follow. What is "drift in"? You show this in the figures but it isn't explained (or I missed it). I think this is because you have not really described the model in the paper. I think you need to describe some bare minimum so the reader can follow your results.

Figure 1. Should this be Figure 1? I think this figure belongs in methods, not in the Intro.

Line 132. You barely describe the data input used to parameterize the model. I think you need some more detail here on what you did. Or, perhaps these sections need reorganizing so it is more clear what was done.

Line 146. What do you mean by "allow differentiation"?

Line 150. This sentence starting with These CHRM models... is unnecessary and can be removed.

Line 154. HRU have different sizes. This is an awkward sentence. Is it necessary?

Line 156-164. This is a really important section to be clear, and it is not. I don't understand what you did, how you modified the HRUs for each scenario, and that is kind of the main point of the paper. I would suggest rewriting this paragraph.

Line 170. Global climate models

Line 176. You start using your notation before you have explained it.

Section 2.1 and end of Section 2.4. I would strongly suggest you rethink how you are notating the paper's findings. You use so many acronyms that make it really difficult to read the paper. Could you think about using actual words for these acronyms? Perhaps Wolf, Marmot and Reynolds for the study sites? The same comment applies for your scenarios. You also use groups in two ways (I think). So, now you have a, b, c in the

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figures. On top of the CVS\_ /CSV, etc notation. It is a complex study to follow to begin with, so you need to make it easier for the reader (and the reviewers!) to follow.

Line 208 each other's effects. You use this personification a few times in the paper and it is odd.

Figure 2, I think you have the space here to just label the three sites in the Figure.

Discussion, first paragraph, is too long. Break it up to make it easier to digest/understand/follow.

Line 491, "...such as RME where changes are complex and nonlinear..."

Table 3, needs to be organized. Can you add in lines/cells?

General

I don't think you make the argument well for changing soils under climate change. This is an important argument to make strongly to support the need for the level of detail in the results. Suggest looking carefully at this.

The initial paragraph of the paper, and some sections of the paper (Discussion, paragraph 1, line 478-509!) have extremely long paragraphs. These should be shorted and broken up. Try to think about the main point you want to make in a paragraph, and let that lead your writing.

Would you consider using a first person voice for this text? I wonder if it might help with some of the awkwardness of the text.

This paper is really long. Suggest to think about all the figures, tables, and the results section (which is ~15 pages) and see where you could reduce the text? Think about each sentence you use and ask yourself if the reader needs to know this information? Why is it important? Can I be more clear? What could be moved to a Supplement section?

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I am happy to review this paper again and get to some of the details once the paper has been reorganized and these comments addressed.

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