

Interactive comment on “Climate change, vegetation restoration and engineering as a 1 : 2 : 1 explanation for reduction of suspended sediment in southwest China” by X. Ma et al.

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Comments on paper: “Climate change, vegetation restoration and engineering as a 1:2:1 explanation for reduction of suspended sediment in southwest China” by M.X et al. 2013

General Comments The paper is very interesting for readers from interdisciplinary subjects. But It is a significant contribution to the field of sediment research. Compound factors for impacts on all subject: sediment, vegetation, and reservoirs, all factors should be attributed by impact models. This paper illustrated a detailed procedure

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to separate different contributors. I recommend to accept after minor revisions. Comments: 1. The title should be more specific to focus on the study catchment or river basin. Currently, the southwest China indicates too large area as each watershed is unique with various changes in sediment load and different controls from variables.

Answer: So maybe the title can be rewritten as “Climate change, vegetation restoration and engineering as 1:2:1 explanation for reduction of suspended sediment in Nujiang basin, southwest China”

2. “Recombining climate change and land cover change” in Page 9 3.5 should be shifted to the heading like “differentiating the effects of different controls”

Answer: “Differentiating the effects of different controls” is easier to understand the meaning than “Recombining climate change and land cover change”, so we will accept the comment from the referee.

3. SWAT model use MUSLE for soil erosion estimate. MUSLE has a few factors including on rainfall, soil, slope, slope length, vegetation, and soil conservation. It was not clear how soil erodibility or K values and topographical factors or LS values were determined. Please clarify and describe in details how these three factors were determined. For example, soil erodibility (K) needs soil texture, organic matter, and soil infiltration information. How these variables were determined was not clear in the paper.

Answer: When SWAT using MUSLE to estimate the soil erosion, the topographic factor (LSUSLE) is determined by the slope length and the angle of the slope for each HRU (hydrological response unit); and the soil erodibility for soils is taken from soil database which built for the study watershed. The soil erodibility for each soil type was calculated using Williams’s equation (1995) which takes soil texture, organic carbon content into account. Detail information of MUSLE equation can be referred to the Theoretical Documentation of SWAT (Neitsch SL et al., 2009). If it is necessary, this part can be added to 3.3 part (model selection and description).

4. When talking climate change, it also includes especially temperature changes. The paper did not have much information how temperature change affects sediment yields. It is not easy to include temperature in the model as a standalone variable, but it is useful if this can be discussed somewhere in the paper. There are literatures, e.g. Zhu YM et al. in Geomorphology, and Global and Planetary Changes, have detailed investigations on temperature and sediment for a river basin in Yunnan, Jinshajiang, and in the Yangtze River in China.

Answer: This is a very good suggestion. Before when we think of the effect of climate change on SS in the Kejie watershed, we pay less attention to the effect of temperature on SS. We will not try to analyze the sensitivity of SS to temperature increasing in our paper, but we can add a bit more discussion to address the contribution of climate change to SS reduction.

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