**Referee comment to:**

Journal: HESS

Title: Modeling postfire water erosion mitigation strategies

Author(s): M.C. Rulli et al.

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**General comments:**

This paper presents a modeling study on postfire erosion rates and mitigation strategies for the Rio Mannu river basin in Sardinia, Italy. The RUSLE model was used to model 6 scenarios including natural and post fire conditions as well as different erosion mitigation measures. This is an interesting study which is well placed in HESS. However it should be revised regarding the following general comments:

1. The abstract is very brief. It should at least be mentioned that the modeling results were validated using measured data on erosion rates from the literature. In addition the main simulation results should be summarized.
2. The introduction is rather long. It should be shortened a bit and focused on the scope of the paper.
3. Chapter 2 (study area) and 4 (study scenarios) should be sub-chapters of “Material and Methods”. Chapter 3 which is currently named “material and methods” should be a sub-chapter of a superordinate “material and methods”-chapter and the title should be adapted to the content of the sub-chapter dealing with the model description. In addition the approach to validate the modeling results should be explained in “material and methods”.
4. The discussion chapter 6 currently contains the validation of the modeling results. I suggest moving the paragraphs related to model validation to the results section and focus the discussion on the evaluation of the results In addition, information on the uncertainty range of the modeling results would be very helpful.
5. My main criticism refers to the parameterization of the model. Sometimes it is not clear why specific model parameters were chosen. Please see specific comments. In addition it would be interesting to discuss the appropriateness of the model parameters in the discussion section.
6. The language of the paper reads well. However the present version contains many grammatical and typing errors. I thus recommend to let the paper proofread by a native speaker.

**Specific comments:**

- Page10878, line 17-19: Please add 1-2 sentences on the main results of the model study.
- Page 10882, line 22 and 26: In line 22 it is mentioned that the model developed by Rulli and Rosso was used for “disturbed conditions”. Please indicate if the model was used for postfire predictions and if it was already used in similar regions.

Is the model based on the RUSLE mentioned in line 26, which was used for this study, the same model mentioned in line 22? If yes please add the reference of Rulli and Rosso.

- Page 10883, chapter 2: should be moved to “material and methods”
- Page 10884, line 2: mention the soil loss measurements displayed in Figure 1
- Page 10884: the actual chapter 3 should be a sub-chapter of “material and methods” and should receive a new title related to the model, which is introduced in the chapter.
- Page 10884, line 4-5: I suggest moving the short description of the scenarios to the objectives on Page 10882, line 29. This information would be more useful in this earlier section.
- Page 10884, line 7: Please add a reference behind “Sardinian river basin”
- Page 10884, line 7-13: In my opinion the sentence on the applicability of the RUSLE for this study should be rather moved to the introduction or to the discussion section. It should not be part of “material and methods”.
- Page 10884, line 25: Please add a reference for the Fournier method.
- Page 10885, line 6-7: An hourly resolution of rainfall data seems very coarse to me, although I learned that it is the correct aggregation of precipitation data when the Fournier method is used. It would be interesting to discuss the influence of this method on the results in the discussion section.
- Page 10886, line 10-13: The mentioned parameters are meaningless since no equation is given.
- Page 10886, chapter 4: should be a sub-chapter of “material and methods”
- Page 10886, line 21: Is there a better term for “soil use”? It seems to be not an adequate term to distinguish between “natural and burned” $\rightarrow$ i.e. soil condition
- Page 10887, line 24: Please explain why this C factor was chosen. It is not clear from listing the highly variable literature values.
- Page 10888, line 11-13: Please explain why different mulching materials were assumed on gentle and steep slopes.
- Chapters 2-4 (material and methods): I miss a description of the validation approach in the “material and methods” chapter.
- Page 10889, line 19: Better term for “soil use”?
- Page 10891, chapter 6: The validation of the model results are presented in the discussion chapter. In my opinion the paragraphs of the discussion related to the validation of the model results should be moved to the results chapter. The discussion should only deal with the discussion of the results and the appropriateness of the model parameters. In addition it would be very interesting to discuss the uncertainty range of the modeling results.
- Page 10896, chapter 7: I suggest shortening and focusing the conclusions section.
- Page 10905, Table 2: The term “soil use” is unclear in the context of the table.

**Technical corrections:**

- Page 10878, line 9: add “a” before “rehabilitation method”
- Page 10879, line 1-4: check wording
- Page 10879, line 4: “results” → “result”
- Page 10879, line 13: “condition” → “conditions”
- Page 10880, line 28: add “as” before “one”
- Page 10881, line 25: add “the” before “road”
- Page 10882, line 22: “scales” → “scale”
- Page 10882, line 22: add “A” before “fully”
- Page 10882, line 23: “the both” → “both the”
- Page 10882, line 24: “dynamic” → “dynamics”
- Page 10882, line 24: “parameters” → “parameter”
- Page 10883, line 13: add “and” between “substrates” and “carbonate”
- Page 10883, line 13: add “the” before “year 2009”
- Page 10884, line 14: add “A” before “digital”
- Page 10884, line 12: add “rates” behind “erosion”
- Page 10884, line 17: add “the” before “RUSLE”
- Page 10885, line 17: add “such” before “as”
- Page 10886, line 2: add “the” before “pedological”
- Page 10886, line 19: “one scenario” → “of the scenarios”
- Page 10887, line 26: add “a” before “fertility class”
- Page 10888, line 27: “factor” → “factors”
- Page 10890, line 7: “reach” → “reaches”
- Page 10890, line 7: “values” → “rates”
- Page 10891, line 11: “tahn” → “than”
- Page 10894, line 16: “increasing” → “increase”
- Page 10895, line 28: “shows” → “show”
- Page 10896, line 12: add “the” before “area”
- Page 10897, line 8: “dynamic” → “dynamics”
- Page 10897, line 13: add “of” before “bare”

- Page 10911, Figure 1: Mention the soil loss measurements in the Figure caption. In addition please add a scale bar and a north point to the figure of the Rio Mannu watershed.
- Page 10912, Figure 2: Please provide a detailed figure caption. In particular, mention figures b to c, since these are no RUSLE factors.
- Page 10916, Figure 6: Please provide a more detailed figure caption.