Hydrology and Earth System Sciences Discussions

Interactive comment on "Spatial and temporal variability of rainfall erosivity factor for Switzerland" *by* K. Meusburger et al.

Anonymous Referee #3

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General comments: The topic analysed in this study is significant and of high international relevance. Erosion poses a major environmental thread considering population growth, climate change and with that the increasing need for sustainable land use. Mapping of erosion risk can help to set up measures to prevent erosion, in addition the authors relate their results with geographical characteristics like snow cover and, by comments, vegetation cover, making their results more accurate. The authors analyse the spatial and temporal variability of rainfall erosivity in Switzerland. They are fortunate to have access to a dense data base with high time resolution records. The methods and ideas are not new. However, they update previous information on the topic, which involves novelty. The presentation is clear and well structured. As commented by the other reviewer, the description and discussion of the scientific methods, especially the

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spatial modelling, is not sufficient. More information about the multiple regression is needed. It is surprising that multiple regression alone give better results than by the addition of residuals for correction. This fact may indicate that multiple regression could capture better the general pattern but still rainfall erosivity shows high at-site variability being this the reason why local spatial modelling methods fit better in its representation. The authors should discuss it more in deep. I recommend quantifying the uncertainty of the spatial model by standard error maps. Overall, the manuscript has a good potential but requires minor revision to reach a quality for publication in HESS. More details are given below.

Spatial modelling: Please, provide which procedure are using: Ordinary Least Square (OLS) or Generalised Least Square (GLS). Second one is an extension of the OLS regression, which allows for autocorrelation in the dependent variable. When dealing with spatial variables, it is common assumption that the observations are autocorrelated. The existence of autocorrelation in the residuals violates one of the main assumptions of OLS, thus making this technique not suitable for variables with geographical imprint. This problem can be solved by using alternative regression techniques that account explicitly for spatial autocorrelation, such as GLS, which are included in the R statistic software.

Provide validation statistics and/or standard error map to know the reliability of the spatial modelling.

Temporal variability: How do you calculate the rainfall erosivity regimes? Further information is necessary

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