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Hydrology and Earth System Sciences Discussions

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

K. Meusburger et al.

katrin.meusburger@unibas.ch

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Thanks to the anonymous Reviewer. We think he/she addresses some good points that need consideration and will help to improve the paper.

1) A Mann-Kendall test has been applied to detect a monotonic trend in rainfall erosivity. However, climatic changes often do no exhibit monotonic trends but rather abrupt changes (which could for instance be associated to changes in NAO). I suggest the authors to look for such abrupt changes by carrying out break-point statistical tests such as a Buishand range test,

=>Prior to the analysis we thought about the possibility to use Buishand range or the

Pettitt test, which are both sensitive to breaks in the middle of a time series (Hawkins, 1977). Maybe the ranking approach of the Pettitt test is more suitable as it should be less sensitive to outliers (and data variability). So far we did not apply any breakpoint analysis because we thought that the length of the time series considering the high variability of the data is too short to produce reliable results. More input and suggestions regarding the breakpoint analysis would be much appreciated.

2) more information on the regression model is needed (eq 4). How were the predictors selected? Was it forward or backward modeling? what were the thresholds for inclusion of a variable into the model ? What is the partial R2 value for each of the variables? Now only an overall model explanatory value is provided but not the relative contribution of each variable. =>We agree with the reviewer and will provide more details on the regression procedure in the revised version.

It should also be indicated how normalised precipitation and topography values were calculated. =>The covariates were normalized using standard score (line 143). Is an equation needed?

Especially for elevation I doubt whether it is normally distributed across the entire country? =>Elevation is normally distributed for the (point) model data set not for the entire country (raster data set). Normal distribution of the raster dataset which is not used for the regression model setup is not needed.

It is rather surprising to note that an adjusted model that incorporates the residuals of the regression model performs worse than the regression model itself. How does this come? This needs more clarification. =>The main reason for this is probably that the regression model itself performs quite well. And the smoothing of the residues by kriging introduces noise to the signal. Also Hengl et al (Geoderma, 2004) suggest to exclusively work with a regression model if its performance is good. Another reason might be that the stratified data split had an effect. We will test the robustness of the regression model with different datasets, even though this is critical with respect to the

data clusters. We will add some discussion on this point.

3) why is the temporal variablility of rainfall erosivity analysed per biogeographic region when only one biogeographic region has shown to be important for understanding the spatial variability in R-values (ie Valais). Why not analysing temporal variability for different altitudenal classes? One could argue that changes in temperature influences the freezing level and thus the amount of rainfall precipitation instead of snow at various altitudes? =>This is a good point. The classification is still a remainder of the exploratory data analysis. Indeed elevation classes are more meaningful. We will switch to elevation classes in the next version.

4) at some points more references to international literature might be useful. For instance, when discussing that most erosion is expected in May on agricultural land, no reference is provided although it has been shown for other regions in temperate Europe. =>We will try to introduce more references to the international literature in the revised version.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 8, 8291, 2011.