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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Influencing factors and their interactions of water erosion based on yearly and monthly scale analysis: A case study in the Yellow River basin of China" *by* T. Hua et al.

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1. Introduction Lines 38-54 There is a problem with the connection between the sentences, and further revisions are needed. In particularly, it is necessary to further supplement the work of scholars in studying the impact factors of soil erosion.

Answer: We have modified the original sentences to make the logic of the statement more coherent. Besides that, we added some expression about the work of scholars in studying the impact factors of soil erosion, especially rainfall, topography and vegetation (please see Lines 43-60 of the manuscript).

2. Lines 94,99 Reference should be supplemented.

Answer: We have already supplemented the references (please see Lines 110-116 of the manuscript).

3. Table S2: Need to be explain the meaning of some parameters in the table such as BS, BW.

Answer: Thank you for your comments. These abbreviations represent different kÓğppen climate zones. We have already added a note to Table S2 (please see Lines 20-22 of the supplement).

4. 2.2 Data and processing. The geographical detector method was introduced, but there is a lack of expression on how to apply the geographical detector method specifically to this study. Please provide additional explanation.

Answer: Thank you very much for pointing out the shortcomings of our manuscript. For the overall integrity of the manuscript, we have added some expression on how to apply the geographical detector method to this work (please see Lines 200-204 of the manuscript).

5. Lines 198-207: Need to supplement the unit for the result.

Answer: We have already supplemented these units (please see Lines 221-231 of the manuscript).

6. Result: For some of the results, consider whether to use the moving average method to reprocess results to reduce some change factors and the uncertainty of the results.

Answer: Thank you for your suggestion. For long-term continuous sequence data, the moving average method has the advantage of eliminating occasional fluctuations. However, specific to this study, we studied the monthly scale study of five years (1995, 2000, 2005, 2010, 2015), the essence of which is still not continuous data of long time series. Accordingly, the recursive operation in the moving average method is not well

applied to the monthly scale study of this work. In summary, we did not use the moving average method.

7. Discussion: Soil erosion in the Yellow River Basin (Loess Plateau) is a hot topic of research. Authors need to compare their soil erosion assessment results with previous results.

Answer: We searched the literature in several databases and found that there is less research on soil erosion in the whole Yellow River Basin as the study area, mostly concentrated in a small basin within the Yellow River Basin or the Loess Plateau. Considering the applicability of the scale of the data and methods, this makes the comparison of the result of soil erosion difficult. We finally chose to compare the results of a Chinese literature study (Li et al., 2010). The relative values of the spatial distribution of soil erosion are consistent with our calculations. Considering that our research focuses on the impact of environmental factors on soil erosion, the data input required by Geographical detector needs to be reclassified. In other words, we need to ensure that the relative value of the results is accurate, and there is no strict requirement for the absolute value of the data and the assessment results. In addition, the RUSLE model is an effective tool for rapid assessment of soil erosion. And using the detailed surface information provided by remote sensing, the RUSLE model has successfully been applied to a variety of spatial scale assessments of soil erosion, from the plot scale to the global scale (Thiam, 2003; Vrieling, 2006; Van der kniff, 1999; Van der kniff, 2000; Borrelli et al., 2013). We think the result of soil erosion is reliable.

8. Discussion: The author seems to be comparing the effects of two single factors and the effects of interactions, and whether the interaction between the two factors is enhanced or weakened compared to the original two separate effects.

Answer: Thank you for your helpful suggestion and we have added the expression and 4 figures about the comparison between the interaction of two factors and effect of single factor (please see Lines 275-281, 308-315 of the manuscript, and Lines 4-16 of

the supplement). And we found that in most cases the two-factor interaction exhibits a nonlinearly enhanced state.

9. Discussion 4.2 The direction of model improvement: The author needs to summarize what improvements have been made to the RUSLE model by scholars in the past literature, and then combine authors' research results to point out the potential model improvement direction. Answer: Thank you for your helpful suggestion and we have added the expression about what improvements have been made to RUSLE model by scholars, especially the correlation of factors (please see Lines 385-398, 400-404 of the manuscript).

Please also note the supplement to this comment:
https://www.nat-hazards-earth-syst-sci-discuss.net/nhess-2019-122/nhess-2019-122-AC3-supplement.zip

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