

Interactive comment on “A Universal Multifractal Approach to Assessment of Spatiotemporal Extreme Precipitation over the Loess Plateau of China” by Jianjun Zhang et al.

Anonymous Referee #1

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In the manuscript “A Universal Multifractal Approach to Assessment of Spatiotemporal Extreme Precipitation over the Loess Plateau of China”. The authors try to proposal approach to identify the extreme precipitation events (EP), which is vital to the formation of soil erosion, and thereby to assess the spatiotemporal characteristics of the EP in the Loess Plateau (LP) during long term of 1961-2015. The study is interesting because providing new understanding about the spatiotemporal characteristics of EP in the LP. Meanwhile, the results are useful and contribute to the risk management (such as the soil erosion) in the LP. In my view, the MS may be suitable to be published in Hydrology

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and Earth System Sciences after minor revision.

General comments: The paper is well written and the results are well presented. Bibliography very exhaustive. The analyzed dataset is interesting and the results can be useful to improve the knowledge of spatiotemporal characteristics of EP and could be potentially useful for risk management. The results show that the approach integrating the universal multifractal approach and segmentation algorithm based on parametric statistical method can be used to identify the EP events. Then, giving a detailed description about the spatiotemporal characteristics of EP. What's more, the rationality of EP results is explained and verified through the relationship between EP with the spatial characteristics of soil erosion. Therefore, the presented results are robust and add new knowledge on those relevant eco-hydrologic study and management.

Major comments: 1. Please explain the calculation of each indices of extreme precipitation in detail. It can help the readers to understand the meaning of the indices. Such as how to calculate the MEP?

2. L319-326: Please strengthen this paragraph. How do you get the condition about the recovery of vegetation from the EP intensity?

Specific comments 1. There is a lack of the specific meaning of EPT (threshold of extreme precipitation), please briefly explain it in the "Introduction".

2. Please include all the indices used in your study in Table 1. Such as EPS.

3. What is the difference of EPS and EPSI?

4. L 19: Please replace "scare" with "scarce".

5. L148: What is the specific criterion of "approximately equal" in the selection of EPT?

6. L159: Please explain the specific meaning of "n" in the equation.

7. L165: Is the PF represents EPF? Please illustrate the equation in detail.

8. L195: Why the missing data were replaced by a value of 0 in your paper?
9. L208: Please delete “from” after “50 mm/d”.
10. L212: Please unify the unit of MEP between the manuscript (mm/y) and the Fig. 3 (mm/a).
11. L214-215: What do you mean “the annual EPF ranged from 1.0 to 2.1”?
12. L316-L306: What do you mean “The streamflow was 2.41/25.6 times of the mean annual streamflow from 2002 to 2011”? What is the meaning of “/” in your manuscript?
13. L317-318: Please explain “Therefore, it can be inferred that the EPF obtained in this study, about twice a year on average, is rational” in detail. What do you mean “twice a year”?
14. L336-338: Why 50 mm/d and 25 mm/d are the suitable threshold for the Southeast and Northwestern of LP, respectively?
15. L358: Please add “the reason” between “may” and “why”
16. Fig. 3: Please correct the title of the figure. There are 6 subfigures (a-f) in the figure 3. However, only 5 subfigures (a-e) are listed and explained in the title.

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