

Interactive comment on “Spatiotemporal clustering of flash floods in a changing climate (China, 1950–2015)” by Nan Wang et al.

Anonymous Referee #2

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This work focuses on spatiotemporal cluster analysis of flash flood disasters in China with the overall goal, as claimed by the authors, to identify and characterize spatiotemporal dependencies of flash flood related disasters. The scientific objectives of the manuscript are highly relevant to the scope of this journal and of interest to its readership. However, in my opinion, the current version of the manuscript does not succeed to deliver scientific findings in a clear and convincing way. I provide below my major and minor comments that will hopefully help the authors to improve their work.

Major comments:

1. How can we be sure that part of the findings is not related to the way the database was constructed? For example, can the duration of clusters shown as boxplots in Figure 9 be a result of infrequent records before 1970?

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2. More effort needs to be done to link findings on the clusters with the physical meaning of flash flood related properties or occurrence. P19,L385 authors state “The most significant cluster resulting from the yearly model was detected in 1975”, so what does this mean exactly? You need to improve a lot the interpretation of results in the current manuscript and help the reader understand what the different findings actually mean. Otherwise the work will remain predominantly a cluster analysis with little information on the characteristics of the actual hazard.

3. As a follow up of previous point, you present a number of findings (in terms of cluster attributes etc) that add more confusion than clarity. Cluster characteristics for different temporal thresholds of 1,3,5 yrs or monthly models etc are provided but interpretation/significance of each of those is not clearly delivered.

4. P16,L345 “these newly detected clusters can be due to the intensification of the extreme rainfall. . .”. This can potentially be a very interesting point, but more work is needed to justify this. You would have to actually look at the precipitation record in the area and do an event-based analysis to find whether indeed extreme storm event are more frequent.

5. Definitions/explanation of certain terms and approaches is required. How is the term “repeated clusters” defined? How is “their relative occurrence (similarly to the concept of return period. . .)” determined?

6. How do you define “impact” in the context of events selected? I assume that impact is somehow related to exposure and therefore all the events analyzed are related to areas where there is exposure. So this does not mean that in areas not shown on your map, there were no flash flood events occurring. I think this should be clarified to highlight once again that the analysis is highly related to the existing database.

7. Conclusions: need to be improved to provide more quantitative information on the overall findings. For example, elaborate more on what you found on the repeated occurrence per catchment.

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Minor comments:

1. For Figure 1 and other similar figures: results for the islands are not visible at all. Also what does the dash line represents? My understanding is that certain island territories are under dispute among several countries so I would suggest caution on how you represent those.
2. Fig.4: a legend to explain colors is missing.

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