

Interactive comment on “Spatiotemporal patterns and driving factors of flood disaster in China” by Pan Hu et al.

Anonymous Referee #2

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The manuscript by Hu et al. investigates changes of flood disasters in China using statistical disasters data and also hourly rainfall data at 2420 stations during 1984-2007. The spatiotemporal pattern of rainstorm-related flood disasters was analyzed with respect to trends. They also use GeoDetector method to analyze the driving factors behind flood disasters and the trend during 1984-2007. The work is original and is conducted a systematic way by assessing the trend of the flood disasters in both temporal and special characters. It gets some interesting results but it looks more like a report of flood disaster. The investigation on the driving factors of flood disaster is a bit weak and lacks a more scientific and theoretical method. I have some comments listed below. Further, I highlight some typos and possible inaccuracies. I hope my suggestions can help the authors to further improve the paper.

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Specific comments: L 148-150: “this current study is theoretically and scientifically significant in development of human knowledge of flood disasters in a changing environment at regional and global scales ”: the study did some analysis on the spatial distribution of flood disasters and its trend during 1984-2017, but I can’t see much from the work which is “theoretically significant in development of the knowledge of flood disasters in a changing environment . . .”.

In general, the study lacks a more scientific and theoretical method to investigate the driving factors of flood disasters. Some part of the results is missing a clarification on “why is it”.

L 218 and L 235: h denotes the band width in equation 1 and is the stratum in equation 2. Do those ‘ h ’ represent the same thing? If not, should avoid use the same label in the manuscript.

Fig 3: First, the watershed division is missing in the subfigures on the left side pane. Second, the subfigures in the right pane are not clear. It will be appreciate that authors add a table to clarify those numbers of missing rate.

L 256-279: A table will be appreciated for the station numbers with respect to the change trend during L 256 -279.

L264: “rainfall duration” is firstly mentioned here in the paper and this term used as an important index in analysis, which needs a clear definition in the manuscript.

L266-270: “When it comes to spatial pattern of trends in rainfall duration, lengthening rainfall duration was found mainly in southern China and in the lower Yellow River basin, and in the Huai River basin as well. Shortening rainfall duration was observed mainly in the lower Yangtze River basin and northeastern China.” : It would be great that authors can add a bit explanation on why it is?

L283: “We used a range of spatial interpolation methods in spatial interpolation analysis . . .” : can remove the first “spatial”.

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L283: "(figures now shown here)"? where are the figures? Or do you mean "not shown here"?

L293-298: "While, shrunk regions with less rainstorm amount were found in northwestern China during 1991-2000. Meanwhile, regions with larger rainstorm amount during 1991-2000 were found mainly in the middle and lower Yangtze River basin and also in the Pearl River basin. However, regions with larger rainstorm amount during 2001-2007 were found mainly in the Pearl River basin. These results may imply amplification of droughts across China over the time with higher drought risks" I don't understand what the authors try to interpret in this part. It is not clear. Do you mean the "shrunk region with less rainstorm amount" and "larger rainstorm amount in some river basin" imply 'droughts' or "higher drought risk" in China? I don't agree with it.

L302-305: What do you mean here? "shrinking region with longer duration" imply "higher intense precipitation"? I think "longer rainstorm duration together with higher intense precipitation at the same region" will imply "higher probability of flood or flood disaster". Actually, it would be interest to overlay the plots from the left side pane and the plots from the right side pane in the figure 5. Find out the regions/counties where have both "increase of cumulative rainfall" and "shortening rainstorm duration", those regions/counties could have the "higher probability of flood disaster".

L328-331: There is a repeat sentence. Please remove "It can be seen from Fig. 7 that Three time intervals with higher flood frequency were analyzed to calculate the annual average frequency, mortality (per million people), the flood-affected rate (%) and the economic loss per capita (unit: RMB converted into 2007 price) (Figs. 7, 8)"

L334: "While, higher flood frequency during 1991-2000 was significantly higher than that during 1984-1990." In the whole China? In northeastern China?

L 334-339: "While, higher flood frequency during 1991-2000 was significantly higher than that 335 during 1984-1990" . . . "Comparatively, reduced flood frequency can be found in northern and northeastern China during 1991-2000 when compared to that

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during 1984-1990". It seems a bit contradictory.

L339-341: Can authors clarify a bit on why there is a larger flood frequency during 1991-2000 than 1984-1990? Is the dam impact included in the data for the flood frequency analysis? There were certainly more dam regulation after 90th than before in China.

L364: remove "(...)"

L390: This is still a part of results instead of discussion.

Fig 9: "duration of counties"? Please rewrite the caption. Also it would be nice to add the watershed division in the figure.

Fig 10: What do the labels mean, for example, ELE, SLP, etc. The figure should be read as stand alone.

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