

Interactive comment on “Millennial scale variability in high magnitude flooding across Britain” by N. Macdonald

Anonymous Referee #4

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GENERAL COMMENTS

This paper deals with the interesting topic of the spatio-temporal variability of floods in Britain in the past 800 years. Unfortunately, the paper looks as if it had been put together in a rush. There is hardly any description of the methods of data preparation (which I would expect to be the most important part of a data paper) and the writing style is vague throughout the paper, so it is hard for the reader to figure out what has actually been done. The driver section is too descriptive and a rigorous statistical analysis of the flood indices with respect to their drivers needs to be added.

Just presenting data without proper analysis and without saying how they were obtained is just not enough for a paper in the international literature. I believe the author

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can do a much better job with this paper.

I recommend major changes to give the author an opportunity to complete the paper.

DETAILED COMMENTS

Abstract: There should be less motivation and more results in the abstract. Is there anything else that has been learned from the paper apart from some historic floods being greater than recent floods?

P10159 L9 “This paper presents the first coherent large scale national analysis undertaken of historical flood chronologies, ..” This is perhaps a little too strong given the data presented and the more comprehensive studies available in other countries.

The methods are only vaguely described in the manuscript. How can the reader assess what has actually been done in the paper? P10159 L16 has “Historical accounts were collated and augmented onto existing instrumental series“. This will not do for a paper on historical hydrology. If the main contribution of the paper were the data set, then a very detailed description of how it was obtained is needed. What data sources exactly, what uncertainty and how were the data ‘augmented’ (I guess, meaning translated into discharges, as how else could you compare with 90% discharge quantiles, which I suspect the author did). What about stage discharge relationships? I would assume they have changed in the past 800 years.

P10160 L9 I do not understand this sentence.

P10160 L16-27 Indeed, the increase in recording needs to be accounted for. I have a number of problems with Eq. 1. First, what is the basis of coming up with this equation? Is it curve fitting, or any physical justification? Also, the equation is not quite clear to me. FI is calculated for every decade or every year? I guess z does not vary time, but t does, and why would you use t factorial? Second, the author says the records were ADJUSTED (P10160 L22). I suspect the discharges were replaced by the FI rather

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than adjusted. I would think that the equation removes the long term trend. If this is so, the long term trend should not be interpreted in the paper, only time scales shorter than 100 years. So how can recent and historic floods be compared (as stated in the abstract)? Finally, was FI calculated for each station or lumped for regions (Fig. 2 says FI (Britain)), if lumped, how was this done?

P10161 L9 For each location independently or over a region?

P10161 L11-24 This should go to the methods section and the redundancy should be removed. Instead, a much more detailed description of the methods should be given.

P10162 L17 “The potential role of snowmelt as a flood generating mechanism since AD1800 with the Yorkshire Ouse was examined (Macdonald, 2012), the ratio of floods deriving a snowmelt component were found to be consistent, though potential changes in accumulation within the upper catchment may vary (no records exist of snow depth).“ This is one of many examples illustrating that this paper has been put together in a rush. What does the author exactly mean by this?

P10163 I appreciate the value of narratives but, in a quantitative science such as hydrology, it would be good to see how these periods were obtained. I realize “years exceeding the 0.8 percentile of FI are considered to represent flood rich years“ but this does not necessarily imply a flood rich PERIOD. A table may help making the information on this page more accessible to the reader.

P10164 L13 “flooding appears to be synchronous and asynchronous during different phases in comparison to the British series“, Yes, these are the two options, but they are not very informative. The description is a little confusing and I, again, suggest adding a table to help the reader. This appears all quite subjective to me and it would help to be quantitative.

P10166-10167 An analysis of the flood index with respect to potential drivers is a good idea. However, I would like to see a rigorous statistical analysis rather than a narrative

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with some vague mentioning of (presumably) a correlation (P10166 L26).

P10168 “The principal finding of this work is that of the strong correlation between flood-rich phases and solar magnetic activity, indicating a clear driver for flooding patterns across Britain,“ If this is the principal finding, perhaps the one sentence identifying this finding quantitatively on P10166 L26-27 is just not enough.

P10176 What is Flood Indices (Britain) exactly?

P10177 Threshold of what? Figure captions should be self explanatory.

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