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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Have trends changed over time? A study of UK peak flow data and sensitivity to observation period" *by* Adam Griffin et al.

Anonymous Referee #2

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The paper "Have trends changed over time? A study of UK peak flow data and sensitivity to observation period" by A. Griffin et al. analyses the changes in time of the parameter estimates of the Generalized Logistic distribution and flood quantiles for the flood data of the UK Benchmark Network. The authors use two approaches (i.e. fix-width moving window and fixes-start extending window) to investigate the sensitivity of the parameter estimates to record length and to the presence of most extreme events, under both stationarity and non-stationarity assumptions.

The manuscript is well written, the aim of the paper is clearly stated in the introduction and the analyses and the results are presented in an appropriate way. The meth-

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ods/approaches are not particularly new, but the results (especially the maps showing the spatial distribution of the trends in the quantiles and parameters) are of clear scientific and technical interest, given that the detection of flood regime changes is a topic of major concern and relevance.

I would nevertheless suggest to the authors some changes concerning mainly the text and the organization of the paper in the result and conclusion section:

Page 1 – Lines 10-11: from this sentence in the abstract it seems that the aim of the paper is to separate the effects of land-use change from climate change. The UK Benchmark Network is used instead to consider near natural catchments only. I would suggest to the authors to rephrase this sentence.

Page 1 – Line 29: please define NRFA in the text, I see it is defined at page 3 but you mention it two times before in the text.

Page 2 - Lines 8-9: I would clarify in the text that Hall et al. (2014) is a review article. The same at page 4 – lines 8.

Page 2 - Line 30: I haven't fully understood the third listed objective. In my opinion it is unnecessary.

Page 3 - Line 11: please define AMAX in the text

Page 3 - Line 26: please put numbers to the equations

Page 3 - Line 30: I understand the meaning of the sentence but, to be precise, it is not correct to say that T is equivalent to the annual exceedance probability, but rather that they have a one-to-one correspondence according to the given relationship.

Page 4 - Figure 1: It would be helpful to add to this map the locations and the names of the hydrometric stations that are taken as examples later in the manuscript (i.e. the stations of figure 3, 6, 7 and 9). In this way the reader would be able to find also in the maps (e.g. in figure 4) what is discussed at the level of the single station. I would also

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suggest using different (maybe solid) colors because I find the map not easy to read (the blue and green are very similar).

Page 4 - Line 9: The authors state in section 2.1 that the minimum record length is 21 years therefore isn't this sentence unnecessary?

In section 3.1 and (beginning of) section 3.2 of the results (page 4, 5 and 6) the authors mainly describe the moving and extending window approaches, making general considerations and without directly mentioning the results of the study nor the figures. I would suggest revising the organization of these sections (for example by moving the parts that are descriptive of the approaches into the method section) or to refer directly to the figures and results, while describing the analysis. The same applies to section 3.3.1 and 3.3.2 where the authors give definitions of the non-stationary parameters and return periods.

Page 6 - Figure 3: Why don't the authors plot also the line corresponding to the extending-window in panel e (which is instead mentioned at page 7 – lines 19-20)? I would also mention somewhere in the figure caption that the parameter and Q_MED values are plotted in correspondence of the end year of the moving and extending windows.

Page 8 - line 16-17: Why do the authors use different methods for parameter estimation in the stationary and non-stationary case? Please provide some explanation for this choice or use the same method for both.

Page 8 - line 19-24: The authors use a linear regression with time for the shape parameter, but a convincing justification for this choice is not given; they highlight instead its negative implications and limitations (also at page 15 – lines 10-12). Please provide some explanation for the choice of this relationship. In agreement with the comment of the Anonymous Referee #1, I believe it's reasonable to try another expression for k(t) that overcomes the current limitations.

Page 9 – line 6: I was not able to find this exact formulation of the return period in Salas and Obeysekera (2014). Is there an assumption about the condition of non-stationarity (increasing, decreasing or shifting extreme events), as done in Salas and Obeysekera (2014)? Can the authors comment a bit more on this definition?

Page 9 – line 9: If P_Q is the annual exceedance probability, as defined at line7, I believe there is a typing error in the equation. Shouldn't T_Q be equal to 1/P_Q?

Page 11 – lines 19-20: The authors talk about figure 7 and refer to the stationary estimates that are not shown there. Please add them.

Page 12 – lines 6-13: I find figure 8 interesting, but I think its description in these lines is a bit synthetic and could be improved (only 2 panels out of 12 are actually commented).

Page 16 - lines 11-12: I believe that this statement about Q_MED is in contrast to what observed in figure 5, panel a, and what stated at page 9 – lines 23-25.

Section 4: In my opinion the organization of this section can be improved; it is a bit confused at the moment and, as the Anonymous Referee #1 also comments, there is no clear conclusion or take-home-message emerging. I would be appropriate to refer to the initial objectives, stated at page 2 – lines 27-30, and to re-organize this section accordingly, in order to clearly demonstrate how the analyses in the paper have fulfilled the initial objectives.

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