

## ***Interactive comment on “Future hot-spots for hydro-hazards in Great Britain: a probabilistic assessment” by Lila Collet et al.***

**Anonymous Referee #2**

Received and published: 21 August 2018

**Overall Quality:** This was a well-prepared manuscript where the researchers presented a novel approach for identifying future floods and droughts in terms of increasing magnitude, frequency, seasonality, as well as overall duration. The research is important as future predictions of floods / droughts have significant meteorological / hydrological implications across various scales of society, especially in a country that has been identified where these extremes are likely to become more common and more management options are needed to address and, potentially, ameliorate these issues.

The researcher's methodology was sound while providing evidence to prove the choice of methodology was not only robust, but scientifically valid. The overall presentation of results are clearly, and concisely stated. Aside from several typographical and grammatical issues, in addition to a few clarifying comments, minor changes are necessary.

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### **Specific Comments:**

Page 2 Within the second paragraph, the researchers mention a few examples of uncertainties associated with climate models. It might be best for the researchers to make note that these are only a few examples, and do not constitute the whole of uncertainties surrounded by climate change. The inability to infinitesimally measure climate variables (sensitive dependence on initial conditions) and the concept of chaos theory are two other major factors, for example.

At the end of the second paragraph, are both meteorological and hydrologic drought increasing? Or is only one increasing across the country while the other is largest in the north and west?

Page 4

At the end of paragraph 3, there is no mention as to the impact of snowmelt. Did the researchers account for snowmelt and its potential impacts on the results? This could have influences based on the results discussed later at the top of page 12.

Page 11

Perhaps I am not thinking correctly, but what does the fact that Great Britain is an island have anything to do with the results that were achieved? Does this imply you would expect different results from inland countries, or similar results might be seen at Australia? Could potential changing global weather patterns, such as changes in the North Atlantic Drift (which could help to explain why the Western / Southwestern regions of Great Britain see the largest changes in terms of rationality) also be a cause?

Furthermore, could the soil have anything to do with the observed findings?

Page 14

Not a major issue overall, but something that I found myself struggling with: the color of the figures for time of year may benefit from a slight change (Figures 8 and 9). For

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example, the shift from November to December is rather drastic, and the orange-ish red-ish color constantly made me think this represented 'summer'.

#### Page 15

After reading through the discussion, were there any indications as to why some of the spatial variability were so extreme? For example, the middle plot-point in Figure 8b shows a mean day of year near May-June, whereas very close next to it, we are back to end of autumn / beginning of winter. Yet, for the 90th percentile (8c), this shifts to be more in-line with the general region (yet there is another example of early-summer surrounding by late-autumn in the northeast of 8c).

#### Page 16

The implications are well-discussed, but there was no mention of the potential impacts of urbanization on the hydrology?

Technical Corrections:

#### Page 1

Line 9: In the abstract, should this read "Hydrological extremes, floods, and droughts" instead of "hydrological extremes, floods and droughts"?

Line 16: Should there be an apostrophe between 2080 and s (i.e., 2080's)?

Line 21: I would move the fact that this research is novel to the beginning of the abstract to give it more impact early on in the read. Afterwards, expand briefly on why/how it is transferable to new databases, and why that is important? Are not many methods transferrable, or does this add to the validity/impact of the method?

Line 23: See comment about line 16 (page 1). Furthermore, should your first sentence in the abstract and introduction be exactly the same?

Line 24: "UK" has not been previously defined, please make sure you explicitly mention

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"United Kingdom" before using the acronym.

Line 28: Change "impact of the recent 2011/12 drought was" to "impact of the drought of 2011/12 was..."

#### Page 2

Line 11: Change "with strongest increases in" to "with the strongest increases in"

Line 18: There is an extra period at the end of the sentence / paragraph.

Line 27: Change "dry spells" to "drought periods".

#### Page 3

Line 4: Change "However, general floods and droughts are considered independently" to "However, floods and droughts are generally considered independent"

Line 27: See comment about line 16 (page 1). This also appears throughout the rest of the text, please ensure all are accounted for. Or, potentially, since there is a pseudonym for the 1961-1990 period of 'baseline', could there be one for the 2069-2098 period, perhaps simply the 'future'?

#### Page 5

Line 5: There is a typographical error associated with the " 50th ".

#### Page 20

Line 2: In-text, this citation is from 2012 yet here, it is 2002?

Please also note the supplement to this comment:

<https://www.hydrol-earth-syst-sci-discuss.net/hess-2018-274/hess-2018-274-RC2-supplement.pdf>

274, 2018.

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