

# ***Interactive comment on “Spatial Patterns and Characteristics of Flood Seasonality in Europe” by Julia Hall and Günter Blöschl***

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This is a very well-written and interesting paper that covers a lot of different aspects of flood seasonality across the European continent. The beauty of the study lies in its large spatial scale and the large number of different aspects that the authors consider. Another aspect of novelty relates to the distribution of flood seasonality, as up until today the mean date has been in focus, which can be misleading in the context of flood generating mechanisms.

As – in my eyes – there are no serious issues that can be addressed, I would like to highlight some more general suggestions for improvement. What I miss a bit is a more pronounced link of the results presented to the meteorology. I think it would

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make the paper even better if the authors tried to link their observations to dominant precipitation patterns and/or weather situations across Europe. The authors highlight the strong influence of the flood timing to geographical location and, indeed, some aspects have been addressed in the discussion and conclusions (Page 25 Line 26 to Page 26 Line 11). However, some more information on the dominating weather/climate processes would contribute even more to the goal of “advancing the understanding of geographical and climate sensitivity of annual maximum floods (...) across Europe” (Page 26 Line 24-25). At this stage, I find the related section a tad too short, especially when considering the efforts behind all the different analyses presented.

Having mentioned the link to meteorology above, facing a warming climate, it may be interesting to shortly address how the flood seasonality may change in the next decades across the clusters and what this could mean from a disaster risk perspective, i.e. “better flood estimation and forecasts” as the authors state. There are some obvious changes with increasing temperature such as earlier spring floods in mountainous catchments, but maybe there are some aspects the authors can address for Europe of which the reader may not be instantaneously aware of. This could be a short paragraph.

What I would also recommend is for example to add some aspects on the applicability of the results in practise. The authors mention better flood estimation and forecasts but I think it may be good to add a few sentences that are a bit more specific.

Further comments:

- Page 6 Line 9: Can you be a bit more quantitative and mention how small the differences of the R-Value are considering shorter and longer observation records?
- As the number of gauges considered vary in the different analyses, it may be helpful to add the number of gauges considered in a short sentence to the figure caption (“n of m stations were considered” for instance)

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- Page 11, L 10-11: Can you try to explain why you are facing the phenomenon of an unclear distinction in these transitional areas? Explanation on the phenomenon is given for mountainous areas thereafter but it would be important to find some explanation also for the other less distinct areas

- Page 11 Line 18-20. For the sites with low R-values but no uniformity (assuming skewed or bimodal distributions), have you looked into the actual distributions for confirmation?

Minor comments:

- Page 1 Line 10 I suggest "at continental scale"

- On page 2, figure 1 is mentioned in line 5 but at this point it is not mentioned yet that 4105 of the 5565 gauges are analysed. This is a bit misleading as the figure says 4105 gauges. I would recommend reordering the text so that the reader already knows about the 4105 gauges (i.e. cleaned database) when the text refers to figure 1

- Page 2 Line 24 I suggest "at continental scale"

- Page 2 Line 30 I suggest for better readability "(...)" characteristics, and are followed (...)"

- Page 3 Line 18/19 I would reorder and first mention figure 2a and then figure 3

- Page 14 Line 4 "Figure 8 depicts"

- Page 20, Line 11: "Figure 14 shows the (...)"

- Figure 9 is not referenced in the text

Comments on figures:

The figures are of very high quality in general, but I hope that the resolution of the figures will be higher in the final paper as it is not ideal (too low) in the discussion paper.

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- In general, many figures refer to the colours for the mean timing of floods as presented in Figure 4a (e.g. Figure 6). If possible, you may consider adding the colour circle to each figure for example as a bar legend below. I think it would improve the readability
- Figure 1. You may consider using darker cycles (black) or dots as the spatial distribution in some regions (e.g. Scandinavia) is a bit difficult to detect
- Figure 8b. No idea if this is possible, but can the European boundaries added to the bottom of the plot, which would be really nice?
- Figure 9. You may consider making all text black as it is difficult to read with brighter colours, especially when printing it (same for figure 11, 12, 13, 15)
- Figure 9, 11, 12: maybe you can explain "n" in the caption

Sincerely yours,

Korbinian Breinl (Uppsala University, Sweden)

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