

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

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Dear authors, This is an extremely interesting study that I would like to see published in Hydrology and Earth System Sciences journal. This manuscript presents an exhaustive and comprehensive spatial and temporal analysis of flood seasonality at European scale through the identification of region with similar characteristics. I really enjoyed reading the paper, which deals with the important and timely issue of notable interest and modernity, especially for the HESS readership. The paper accurately presents the methods and results. I have just a few minor comments/suggestions for the authors to consider.

1. In this manuscript, the authors always refer to flood. As mentioned in section 2

C1

(study area and data), only annual maximum discharge or water level are used to run the statistical analyses. However, it is not always the case that annual maximum values convert to flood. Could the authors clarify this issue and explain how it may affect their findings?

Response: In hydrological practice, floods are commonly defined as the largest observed flow in a given year, and are widely used (flood frequency analysis in the Flood Estimation Handbook). However, by definition, this does not necessary mean that the annual maximum flood always overtops the river banks. A sentence with this detail will be added to the flood definition to avoid possible misinterpretations of the results by readers outside the hydrological community.

2. As stated by reviewer 1, I suggest the authors to more details regarding the correlation between spatiotemporal flood pattern and meteorology.

Response: Linking the observed spatial and temporal patterns of floods in Europe to the meteorology is indeed an important research topic. However, given the variety of meteorological conditions associated to flood generation in Europe we believe that such a detailed analysis is beyond the scope the current study and rather merits a detailed separate study that builds on the results from the current manuscript.

3. The analyses on the mean flood seasonality and temporal flood concentration look very similar to the one recently proposed by the same authors in Blöschl et al. (2017). The authors have to clearly state the differences between the analyses in these two papers. If there are no differences, I recommend them to shorten or remove the results description to give more space to the ones on the characterization of flood spatial patterns.

Response: The paper by Blöschl et al. (2017) focuses on the changes/trends in the timing of floods. A map of the mean flood seasonality was used in that paper to put the observed changes in timing in context. In the current manuscript the mean seasonality is also calculated but the analysis goes more into detail (e.g. separate detailed analysis

C2

of the mean timing and the temporal concentration of the floods around the mean). This detailed analysis cannot be removed as it provides the background information necessary to contextualise the other results presented in the paper.

4. Because of the amount of information and figure (16) it is sometimes difficult to follow the description of the results and grasp the main take-home message. I suggest the authors to summarize and select the main findings and key figures.

Response: The legend in Figure will be amended to detail the information better that Figure 16 is displaying. Additionally, in the final version of the manuscript, we will add a section detailing the main finding.

5. Dots in Figures 1, 2 and 3 are quite difficult to read because of the topographic map used as background. In addition, no legend is provided. I recommend to make cleared figures or remove them if not necessary.

Response: The presence of the maps in Figure 1-3 with the schematic topography in the background is important information, which is necessary for interpretation and spatial and topographic contextualisation of the study. To increase the contrast with the background map we will add borders to the non-overlapping points. Additionally, in final print version the figures will also appear clearer due to the increased resolution.

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