

Interactive comment on “Evaluation of precipitation extremes and floods and comparison between their temporal distributions” by M. Müller et al.

Anonymous Referee #2

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Evaluation of precipitation extremes and floods and comparison between their temporal distributions Muller et al, HESS 2015

Three extremity indices derived based on the concept of return period are used for studying extreme precipitation and flood events. The interannual and seasonal distribution of such extremes are then compared with each other and analyzed. The work is interesting and relevant to the readers of the HESS but the following comments/concerns need to be addressed before being moving to the next step.

Major Comment: There is a big concern regarding the Flood Extremity Index (FEI)

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and the peak discharge data. As stated in the paper, “Return periods were considered without evaluating the possible human impact on peak discharge, which can make the results slightly inaccurate.” (Page 290, Line 12-14). I disagree with the last part of the above statement. Regulation process e.g., by the dams upstream of the observation site can significantly affect the observed flow and also the peak flow at any given site downstream of the dam. In fact, one of the very important usages of dams is for flood protection and control purposes. This can and does significantly affect the peak values measured at the observation site. So, not considering the possible human impacts on peak flow can make the results significantly inaccurate. A “possible” situation where the human effects can explain part of the inconsistencies observed in the results might be the case where, as reported in the paper, the fourth largest EPE that did not produce an EFE in August 1983 (Page 297, Line 2-4: “For example, the fourth largest EPE did not produce an EFE in August 1983; in fact, this EPE resulted in very limited flooding ($C_e = 8\%$, see Fig. 6)”). Authors need to work with unregulated and the natural flow data for their analysis to be accurate and scientifically acceptable, otherwise the comparison results from the weather extremity index and the flood severity index is not accurate and valid, and I would not recommend the work for publication in this case.

Another point is the Expert Team on Climate Change Detection and Indices (ETCCDI) (Klein Tank et al., 2009) has defined different extreme precipitation indices for studying extreme precipitation events. These indices are well established and have been used in many extreme precipitation related research/papers. Authors wisely mention the Zhang et al 2011 work in this regard (Page 284, Line 4) but the questions here are: why authors have not used these established indices – which the scientific community is well aware of and accepted - in their studies of the behavior of extreme precipitation events? How the three proposed indices compare with the ETCCDI extreme precipitation indices? Why one might want to use the new proposed indices as compared to the indices in Klein Tank et al., 2009/ Zhang et al 2011? An addition of a paragraph in the introduction section explaining these questions seems necessary. Klein Tank A. M.G., F. W. Zwiers, and X. Zhang, 2009: Guidelines on analysis of extremes in a changing

climate in support of informed decisions for adaptation, climate data and monitoring, WCDMP-No 72. WMO-TD No 1500, 56pp

The topic is not very clear. It is general and raises questions at the very beginning. For instance, by “Evaluation of precipitation extremes and floods . . . ”, is the paper trying to evaluate, e.g., the relationship between extreme precipitation events and floods, or it is evaluating extreme precipitation events and floods separately against gauge observation and then compares their temporal distribution, or else. Probably use of the word “Studying” would be better than “Evaluation”. The title needs to be modified. The region of study can be also included in the title.

The abstract is a bit long and can be somewhat confusing to the readers. Part of the confusions may come from all the new acronyms and terms: WEI, WAI, FEI, EPEs, APEs, EFEs. I highly recommend shortening the abstract, as well as less use of acronyms, to the extent possible.

Minor Comments: The term “warmer half-years” needs to be defined clearly in the text. Many readers would not know which months in Czech Republic forms the “warmer half-years”. Better to replace this term with the acronyms used in the caption of Figure 7, as MJJASO.

Page 288, Line 15-16: Regarding figure 3, explain where all these points regarding the mean, variance and skewness are coming from.

Page 288, Line 28: “. . . because of its still better performance”. It is worth adding a sentence or two explaining why authors believe the Kaspar et al 2013 methodology outperforms the other methods. For further detailed information, the reader can certainly refer to Kaspar et al 2013.

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