

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

Anonymous Referee #1

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In this paper, authors deal with the use of a set of indexes to investigate the link between extreme precipitation and flood events. These indexes account for events return period at point locations and for aerial extension of events, by means of spatial average. They also consider the seasonality of precipitation events, by including seasonal abnormality as a case of extremity. The indexes are applied in Czech Republic as a case study.

According to my opinion, the main topic of the paper is scientifically relevant. This is the definition of objective numerical tools to measure the link between extreme precipitations and floods. The inclusion of seasonality is particularly interesting. However,

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paper structure and theories and results presentation need some improvements before publication in HESS. Authors should also clarify some of their theoretical assumptions. In view of my points below, I suggest to reconsider this paper after these revisions.

As a first point, I think the purpose of this work should be better clarified. Is it the definition of the three indexes (WEI, WAI, FEI)? The first two lines of the Abstract and lines 8–10 page 285 suggest this. Nevertheless, the first lines of the conclusions seem to focus on a different topic (i.e., the importance of the spatial extent, duration and temporal concentration of precipitation events in comparison with floods events). If the definition of these indexes is your main aim, then I think the title should be changed to stress in a better way this. Wider discussions could be also useful to define pros and cons of these indexes with respect to the existing literature. Is your purpose to use these indexes to characterize the link between extreme precipitations and floods? In this second case, the analysis could be enhanced, as a theoretical (or empirical) relation between indexes should be developed.

A second point is about paper style, that is sometimes rather poor in details, according to my opinion. I think this makes it difficult to understand some of its Sections. As a mere example, in the first three lines of the abstract, what does “analogous” mean in such a context? What do you mean with extremity? Which variable are you considering when mentioning “return periods at individual sites”? As a second example, at line 24 page 283 authors say that “The concept of intensity seems to be the more promising for our purposes”. At this point, purposes have not been discussed yet. Again (line 3–4 page 284): “The standard approach to the evaluation of precipitation intensity is to search data series from individual gauges using commonly accepted indices”. What do you mean with “commonly accepted indices” in this context? The same can be said at line 29 (page 284): what do you mean with “a more-inclusive concept of rarity”? I suggest the authors to revise the manuscript to improve these points. A final example is the expression “warmer half-years”. This is probably familiar to some readers, but I would recommend the authors to change it with a clear reference to months and/or

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seasons. I will suggest additional improvements of this kind in the list at the end of the revision.

MINOR COMMENTS

- I would suggest authors to shorten lines 10-22 in the abstract. In this part, authors should provide a “concise and complete summary” of their paper, as requested by HESS guidelines. I think it would be better to focus on general results (i.e. those results that could be of interest for a wider public) rather than providing a very detailed description of area-specific results;
- Line 10-11 page 283: I think this statement is unclear. What do you mean with “we need to recognize various aspects of the relationship between extreme precipitation and flooding events”? In view of your work, I suggest “we need to define quantitative indexes to investigate the coupling between extreme precipitation and flooding events”.
- Lines 13-15 page 283: Since extremity is so important in the paper, I would suggest moving this paragraph at the beginning of the Introduction: at current line 4 page 283 the word "extremity" has been already mentioned, but I think it would benefit from a previous definition, that you actually give here;
- Line 24 page 283: please consider replacing “more” with “most”;
- Line 27-28 page 284: Please clarify what do you mean with being prone to extreme events;
- Line 24 page 285: I think you could discuss in a wider way why you chose 5 days as the maximum length of a precipitation event. You mention at lines 21-23 page 287 that 5 days “appears to be appropriate for the Czech Republic but could be slightly higher if the method were applied to a larger area”. I suggest you to provide a quantitative discussion (maybe, a sensitivity analysis). Moreover, can the method be used for sub-daily durations? I suggest authors to elaborate on this;
- Line 10-11 page 288: Does this definition include very low precipitation events (that

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actually are significantly different from seasonally normal conditions)?;

- Line 21 – 24 page 292: This statement is not clear to me. Could you please consider rephrasing?
- Line 14-15 page 293: it is not clear to me why the results mentioned at lines 11-14 should “indicate that the proposed indices reasonably reflect the extremity of the studied phenomena”. The association between EPE and EFE or APE and EFE is not complete, as you point out at page 297;
- Page 294: Please consider replacing such a detailed description of site-specific results with a more in depth comparison between WEI, WAI and FEI values and associated weather and/or hydrological metadata for a restricted subset of events;

Generally speaking, Figures are of high quality. I suggest replacing Figure 6 with a Table. At this stage, words in that picture are difficult to be read.

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