

Interactive comment on “Controls on hydrologic drought duration in near-natural streamflow in Europe and the USA” by E. Tijdeman et al.

Anonymous Referee #1

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The manuscript covers the catchment and climate controls on the drought duration in near-natural catchments. The topic is of great interest and I think the authors provide a nice overview of the difference between different catchments in Europe and the US. The manuscript is well written, however I have some comments that need to be addressed before publication.

Major comments

The authors aim to provide a global assessment of the control on the drought duration using near-natural catchments. However, they only use data from Europe and the US. I understand that the authors are limited by the data availability and that a real global analysis might be difficult to perform. This in itself is not a real problem. I think the authors could do a better job on generalizing the conclusions. At the moment

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they separate the two continents in all analysis, while I think the manuscript might be helped by a better comparison between the two continents. Why not use one analysis and pool all catchments for a specific climate or BFI and perform the analysis on the combined data. If the goal is to find the impact of climate on the drought duration, I think it would be better to group catchments with that climate, independent of their geographical location. This would strengthen the analysis and make it more general and hence also more applicable to other catchments on other continents.

Linked to the previous comment, I miss one reference to analyse the differences between the drought durations. For each continent a separate reference is used. This does not allow the reader to compare similar climate, BFI or other controls that are located in different continents. I think, that for example Figure 3, would benefit from 1 reference so that I can compare similar KG, AI or other indicators directly.

Although information on the uncertainty is mentioned in the discussion, I do miss that information in the Figures or in a table. I think the manuscript would be strengthened if this information is provided so that the reader can see how significant the difference between KG or AI are instead of just providing the ensemble mean for the class. The authors mention that the obtained results might help in understanding the catchment behaviour in drought conditions. However, I'm not convinced that only information on the drought duration of the long droughts would provide sufficient information. As stated by the authors they leave out the information on the frequency of drought with this analysis. I'm aware that this would require some work, but I was wondering if the authors could not add information on the intermittency of the events (the time between drought events). If this information is provided the reader would also know if the long drought tend to follow one another or that a long drought is always an isolated and rare event. Maybe this is beyond the scope of the paper, but I was wondering if the authors have any ideas regarding this question.

Finally, how could the obtained results be used in an early warning system, like mentioned in the abstract? Maybe this could be discussed in the Discussion. I think if the authors

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can show how to use the obtained results can be used in these systems; it would increase the social relevance of the paper.

Minor comments

Page 12878 Line 5-6 "currently lacking is a large-scale evaluation of the relation between climate and hydrologic drought characteristics", I do not agree. Multiple studies have tried to tackle this topic and the first author is part of some of these studies.

Page 12879 Line 7-9 Add reference

Page 12881 Line 10-12 Similar statement to Page 12880 Line 24-26 Maybe remove the reference on Page 12881

Page 12884 Line 9 Why is the Koeppen classification from Kottek (derived from global forcing data) and not compute the KG class based on the local catchment forcing? This would remove potential problems with the global data compared to the local conditions.

Page 12889 Line 3-5 Why could the difference in the DDC for both E climates not be related to the topography. In the US the topography in the E climate is rather flat while in Europe this is not necessarily the case.

Figure 3 I miss a proper caption. You need the main manuscript to understand the Figure. I think the reader would benefit if a longer caption would be provided to inform the reader on all the complex figures and information that is provided in Figure 3

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