

## Controls on hydrologic drought duration in near-natural streamflow in Europe and the USA

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The revised manuscript has considerably improved based upon the comments of the reviewers. The manuscript can be accepted after considering a few minor comments (see below).

I realize that you opted in the first draft of the manuscript for a comparative analysis of the cumulative drought duration distributions (DDCs) in the USA and Europe. I understand your point that differences exist between the characteristics of the two continents and I thank you for elaborating this in your reply (Figure 1). However, I appreciate very much that a combined analysis (illustrated in the first column of the new Figs. 3 and 4) has been added based on stations from both regions (USA and Europe). This provides generic information on top of comparison of the DDCs with the individual controls for the two different regions, which was already in the first manuscript.

In Section 4.2 a paragraph has been added on other drought characteristics than the drought duration. I appreciate that the (standardized) deficit volume is explicitly being mentioned as another one, which is very relevant for the water supply sector. I fully support you that the method used in the paper for the DDCs can be used for the deficit volume. Outcome might be different, in particular depending on the standardisation, but that is beyond the scope of your already comprehensive study.

I welcome that authors share my view that a catchment classification system that adequately discriminates drought duration should include both climate and catchment controls. Representativity of the selected basins (bias to near natural catchments), which, of course, affects the outcome, is the revised version better addressed (e.g. Section 4.2). This also applies to the BFI and the meaning of Elevation and Area (proxies for streamflow dynamics, not specifically for catchment storage processes) as controls on the DDCs.

It is a pity that authors did not accept my suggestion to make two groups along the lines climate-related controls (incl. long-term P, long-term T) and catchment-related controls (Area, Elevation and BFI). I think that it would be easier for the reader to understand the two different controls. I realize that making another grouping would imply substantial work. Hence, I accept the decision of the authors not to revise the grouping.

The authors confirm that climate classification systems, such as Köppen–Geiger, are not often used in drought monitoring and early warning systems to stratify regions with similar hydro-climatic drought properties. A frequent use of these climate classification systems is not required to justify the importance of the paper.

### Minor comments:

- pg. 2, line 3: I suggest to phrase this more general and delete “modeling”;
- pg. 3, line 2: Add at the end of the sentence: “... deficit of water or abnormal temperatures.”;
- pg. 4: line 21: It is good to also address earlier papers. Quote from PhD thesis Anne van Loon (2013): “The first research addressing changes in the drought signal due to propagation through the hydrological cycle was done in Illinois, USA, by Changnon Jr [1987] and Eltahir and Yeh [1999]. The latter were the first to use the word ‘propagation’ in the context of the translation from

meteorological to hydrological drought. The work of Changnon Jr [1987] and Eltahir and Yeh [1999] was continued by Peters [2003] who published a study on the propagation of drought in groundwater. In recent years, drought propagation has been studied by Tallaksen and Van Lanen [2004], Peters et al. [2006], .....

- pg. 9, line 21: okay to leave out DDCs of the entire dataset (Fig. 2a), because you revised the text accordingly by saying "As an example, ....". However, I suggest to add this also in the caption (see comment pg. 31);
- pg. 31, line 2: Add ".....and the USA (right), as an example. b (left) ....."