

Interactive comment on “The European 2015 drought from a hydrological perspective” by G. Laaha et al.

Anonymous Referee #2

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The manuscript describes the 2015 streamflow drought event relative to the 2003 event based on observed low flow conditions derived over a set of stations. Results are compared also with the corresponding 2015 meteorological drought event analysed in detail in a companion work. I find that the analysis presented provides limited advances for a better understanding of hydrological drought processes and many parts of the manuscript are too qualitative and descriptive. My major concerns are: 1) The influence of antecedent moisture conditions on drought developments is interesting and novel aspect, maybe the most relevant in the work. However it is analysed only on two stations. I suggest the authors to extend this investigation on the whole set of data to derive their conclusions in a more robust manner and spatially over the domain. The use of cluster analysis (or similar more objective techniques) to group stations with similar hydro-meteorological response may be an option. More details on the charac-

C1

teristics of antecedent moisture conditions, for instance timing and magnitude of antecedent precipitation that may reduce the probability of subsequent extreme drought events, would be relevant as well in view of an enhanced predictability and monitoring of low flow conditions. 2) Section 5.2 is too descriptive and qualitative, and it does not add relevant new knowledge. Furthermore, it suffers of a poor methodological approach. There have been developed automated research algorithms to collect events and information from web and media in a systematic manner. I suggest the authors to implement such methods or to remove completely this section. 3) Description of methods needs to be improved. In particular it is not specified what time series is used to derive fitting functions and return periods. I suppose the reference period, but this should be better clarified.

In the comparison with meteorological droughts the following references may be relevant. Bachmair et al., 2016 (<http://onlinelibrary.wiley.com/doi/10.1002/wat2.1154/full>) an Loon and Laaha, 2015 (<http://www.sciencedirect.com/science/article/pii/S0022169414008543>). Barker et al., 2016 (<http://www.hydrol-earth-syst-sci.net/20/2483/2016/>),

Minor comments: Page 1, line 29: please, consider to remove “in this second paper” Page 1, line 30: stream gauge stations instead of records? Page 2, line 11: please, add the relevant references to support this sentence Page 2, line 16: “Droughts... to analyse”, too vague, consider to rephrase or remove. Page 2, line 19-20: This concept needs to be better expressed. Page 3, line 1: move the reference to the end of the sentence. Page 3, line 8: please do not abbreviate South, North, East and West throughout the manuscript. Such abbreviation is not a standard. Page 5 lines 9-13: this information is not relevant for this work, consider removing it. Page 5, line 15: the 2013 is also compared to the 2003 event, this should be clarified. Page 5 lines 20-25: I would suggest to synthesize this content and move to the next sections for a better organization of the text and to avoid redundancy. Are the low-flow indices calculated for the 2015, 2003 and reference period? Please, clarify. Page 6, line 18: how do you

C2

define “totally recovered”, please clarify. Page 6, Section 3.2. Please clarify on what time series you estimate the fitting functions to derive return periods for reference period, 2015 and 2003. Why did you use such fitting functions instead of generalized extreme value or pareto distribution? Page 7 line 21: contrasting response instead of dipole? Page 7, line 23: the patten discussed seems not including North-Austria. Maybe, because the graphical representation is not very clear in colours and symbols. I strongly suggest improving figures with maps by showing more contrasted colours. Page 7, line 26: the 2015 drought-affected area? Clarify Page 8, line 10: Please, clarify. Page 9, line 3-4: Consider to remove winter plots from the graph, they do not add relevant information. Page 9, line 13: low flow threshold? I understood that you were looking at the minimum flows here. Please clarify. Page 10 Section 4.5 please, rephrase without using bullet points. Page 14 line 7: the extreme is most extreme... please rephrase. Page 14 line 25: add “streamflow” to drought. Page 15, line 10-11. Is there any additional drought self-propagation mechanism linked to land-atmosphere interactions that could contribute in explaining these processes? Dry soils may lead to lower probability of precipitation and thus cause intensified droughts. See for instance Seneviratne et al. 2010 (Earth-Science Reviews 99 (2010) 125–161). Page 15 lines 20-33. This text is very speculative and not related to the work presented, please consider removing it.

Please also note the supplement to this comment:

<http://www.hydrol-earth-syst-sci-discuss.net/hess-2016-366/hess-2016-366-RC2-supplement.pdf>

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., doi:10.5194/hess-2016-366, 2016.