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Hydrology and Earth System Sciences Discussions

Interactive comment on "Regionalization of patterns of flow intermittence from gauging station records" *by* T. H. Snelder et al.

Anonymous Referee #2

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Review of manuscript titled "Regionalization of patterns of flow intermittence from gauging station records" by Ton Snelder et al.

This manuscript presents the findings of a study testing for spatial variation in intermittent flow regimes in France using two separate tests based on different flow metrics describing zero flow, in conjunction with exploratory modeling to determine the association of different intermittent flow regimes with several environmental variables. I found this paper to be an interesting contribution and expect that the content will be useful for both managers and researchers of intermittent streams. I am not an experienced in hydrological analysis and interpretation, yet I found the level of detail of the methods and much of the interpretation understandable, which is a positive for this paper. I have provided suggestions or points for clarification below that are intended to help the

authors to improve the manuscript.

Key comments:

1. P1517, L1-5. My query with removing gaps in the hydrological record is whether these gaps are associated with zero flow periods. In my experience, sometimes gaps (i.e. missing data) clearly occur during periods of zero flow, which can be identified by zero flows in the days preceding and/ or following the missing data, in conjunction with the absence of runoff during the same period. I wonder if removing these years from the analysis may be therefore underestimating the frequency and duration of zero flows, which has some implications for the key findings of this paper.

2. P1529, L3-13. How do these relationships between environmental variables and each flow regime class compare with other flow regime classifications in other parts of the world (e.g. Kennard et al. 2010)? Are there any comparable relationships across different areas? Based on my experience, I suspect that these relationships between environmental variables and flow regime variation are quite consistent with similar studies. These similarities (and unique aspects) could be used to strengthen the paper by making general statements about the climates and catchment characteristics where intermittent flow regimes occur. 3. This study identified that there are three hydrologically distinct intermittent flow regime classes (e.g. Figure 2) in France. Coming from a more ecological versus hydrological background, this is an important point, because different forms of intermittent flow regimes contribute to different ecosystem (in terms of structure and function). Although it is not the main point of this paper, I wonder if including some plots summarizing the key hydrological characteristics of each of the four flow classes presented in Figure 2 would be useful to emphasise that there is substantial variation in intermittent flow regimes. Kennard et al. 2010 present a useful example. There could also be potential to incorporate this variation into the Discussion section to broaden the scope of this paper. For example, if we can get a grasp of how different the intermittent flow regimes are, we can then compare this to ecological studies testing for differences in ecological characteristics across different flow regimes. By verifying that

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the different intermittent flow regimes have some ecological validity (could be based on published information; I am not suggesting that new data be collected to verify this), however this would give some support to the current hydrological classification if there is concordance with ecological patterns.

Specific comments: P1512, L3. Could an extra sentence be added here to describe why/ how the previous sentence is important? As an ecologist, variation in flow regime intermittency is becoming consistently associated with patterns and variation in biodiversity and ecosystem functioning in rivers. Emphasising why understanding spatial variation in flow intermittency in the Abstract may engage a broader readership.

P1513, L5. Suggest changing “estimates” to “predictions” to strengthen this key point.

P1513, L9. Larned et al. 2010b is cited before Larned et al. 2010a (first cited P1514, L4).

P1515, L15. Check citation for Olden et al. 2011. The date should be 2012.

Olden, J.D., Kennard, M.J. & Pusey, B.J. (2012) A framework for hydrologic classification with a review of methodologies and applications in ecohydrology. Ecohydrology, 5, 503-518.

P1529, L25. Could the low frequencies of zero-flow periods also be influenced by surface-groundwater connectivity, regardless of catchment size? This connectivity is to some extent determined by catchment geology.

P1530, L20-23. This is a style issue which may be acceptable for this journal, but it is rare for direct reference to be made to material presented in the Results section, in the Discussion section

P1533, L23. Check the citation to Acuña et al. 2005. The journal name is incorrect and should be Journal of the North American Benthological Society

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 10, 1511, 2013.