

Interactive comment on “Nonstationarities in the occurrence rates of flood events in Portuguese watersheds” by A. T. Silva et al.

Anonymous Referee #3

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Summary

The manuscript presents an analysis of flood occurrence rates variability in some watersheds in Portugal. The authors found that these occurrence rates are nonstationary, with implications to the flood frequency models commonly employed in Portugal that rely on stationarity. The overall motivation of the work is scientifically sound, but the manuscript organization, data and some methods are questionable. Therefore I recommend major revisions, listed below.

Comments:

1) Manuscript organization

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The manuscript organization is confusing, with results, methods and introductory information mixed. This issue was also highlighted by the reviewers #1 and #2, and I think that the re-organization proposed by reviewer #1 would improve the manuscript organization.

2) Quality of observations

This topic was also questioned by reviewers #1 and #2, and the quick reply of the authors provides a sound explanation, that should be included in the manuscript.

3) Spatial coverage

The authors only analyzed data from 10 streamflow stations and 4 rainfall stations. Were these the only stations available? This limited number of stations is by far representative of Portugal. If possible, the authors should add more stations (both streamflow and rainfall). If not, they should clearly identify this issue as a drawback in extrapolating the implication of their findings to the country scale: for example in the abstract: lines 16:19 p8610.

4) Threshold definition

Although this selection is very subjective, the authors should also show that it does not affect the results. What is the uncertainty due to the threshold definition? This uncertainty could be taken into account in the bootstrap method, by adding extra POT data derived from different thresholds.

5) Stationary vs. nonstationarities

The main motivation of this work is to show that the occurrences of floods are nonstationary. The authors suggest that would question the academic research related to flood hydrology in Portugal, because it relies on stationarity. I find this generalization misleading since it is only supported by a number of “gray literature” citations (line 1:5 pag 8611). The authors should avoid this type of general statements, and refer to a particular study (or several), pointing what are the deficiencies there, and what benefit

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their findings would bring.

Looking at the time series in figure 6 and comparing with NAO in Figure 7, the nonstationarity found by the authors only shows inter-annual and decadal variability that would be expected due to the relation between NAO and mean precipitation in Portugal. This has been largely studied and documented. What is the novelty of the work? The authors could provide a clear example showing that changing the stationarity assumption to nonstationarity is beneficial in planning/management associated with hydrological extremes.

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