

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

**A. T. Silva et al.**

artur.tiago.silva@ist.utl.pt

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We thank the referee’s valuable insights and comments. Below are our comments on the two issues raised by the referee.

### **Comment on data origin and data selection criteria**

We understand the reviewer’s concerns on the data origin and quality, and we will provide an explanation on that in the revised and restructured version of the manuscript. The 10 samples used in our work were selected based on two main criteria: 1) the rivers must have no significant regulation that could influence the watershed’s response to floods, and 2) the data series should span over a sufficiently long time (at least 30

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years). As rightly pointed out by the referee, long series of mean daily flow and daily precipitation are not abundant and usually have missing data, and if these gaps are such that they cannot be filled in using corroborated methods, the series cannot be used in the analysis. That is what we did in our work, thus resulting in 10 gauging stations for the analysis. The availability of long and continuous mean daily flow samples in unregulated rivers is particularly scarce in southern Portugal. One of the authors has worked on strategic plans for several river basins in Portuguese regions, including the plan for the Algarve (Portugal’s southernmost region), and thus has gathered extensive knowledge on the availability and quality of streamflow data records in the country. This experience, although it should not be mentioned in the context of a scientific paper, was certainly a vantage point to select data for the analysis.

### **Comment on the NAO**

Regarding the reviewer’s comment on using the NAO index to ascertain the possible climatological influences on flood occurrence rates, we remind that this manuscript reports an exploratory analysis which requires further detailing in future research. The preliminary connection between the NAO index and flood occurrences, as reported in our manuscript, follows a personal suggestion by a climate researcher who had previously studied the influence of the NAO index on Portuguese climate, since NAO links to droughts and monthly/seasonal rainfall and runoff depths, in the Iberian Peninsula, have been extensively reported in previous studies (e.g. Corte-Real et al., 1998; Trigo et al., 2002b, 2004, 2005; Moran-Tejeda et al., 2011). To our knowledge, while there are numerous studies linking the NAO to streamflow and precipitation in Western Iberia, there is no study linking the NAO to the occurrence rates of extreme events. In our understanding, our results, though qualitative, do not oppose those previous studies, offer a new perspective, and hence they merit communication. We would like to keep our preliminary analysis in the revised version of the manuscript. We appreciate the suggestions of the reviewer regarding other climatic indexes (the Scandinavian pattern, the East Atlantic pattern and the East Atlantic/Western Russia pattern) and we

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will consider them in future research

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