

## ***Interactive comment on “Reconstruction of rainfall in Zafra (southwest Spain) from 1750 to 1840 from documentary sources” by M. I. Fernández-Fernández et al.***

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We thank the reviewer comments. However, we are in total disagreement with them. His/her criticisms are based on (i) the use of a non-standard methodology and (ii) lack of understanding of the underlying dynamics as well as comparisons with similar information. We would like to clarify the following points:

1) One can not use an overlapping period with instrumental data in our article. Extremadura is a peripheral region in Spain and the first systematic weather readings were made around 1860, more than twenty years after the end of the period studied in our manuscript. Therefore, it is impossible to use the standard methodology proposed

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by the referee. In fact, this problem is not new in historical climatology and there are several papers in the literature presenting reconstructions (or estimations, if the referee prefers that word) of different meteorological variables, especially rainfall (for example, Rodrigo et al., 1995, and Gimmi et al., 2007). We do not understand how the referee forgot this important and fundamental fact.

2) Probably we have not explained well our methodology in the manuscript. It is very difficult to obtain indices of meteorological variables from documentary sources. We have made a tremendous effort retrieving thousands of continuous qualitative weather reports. Not all these reports provide explicit information on the number of weekly rainy days. Therefore, we can only know if the week was dry, rainy or very rainy. We tried to reflect this fact on a precipitation index. To make a reconstruction exercise, we have adjusted the distribution function of our index to the rainfall distribution function of Zafra over the period in which instrumental data are reliable (1960-1990). We know that this idea may have important disadvantages, but similar ideas have been used in other studies of historical climatology as was aforementioned. We think that our work is more serious than "compare apples with pears".

3) We do not understand that the referee says in his/her report that our manuscript "gives not enough interpretation about the underlying dynamics and comparison with other areas and periods with similar palaeo information". We have compared our results with reconstructions of SLP fields and reconstructions of the NAO index. We believe, therefore, we have not forgotten the dynamics. We have also compared our results with other sources of information related with the study area. Of course, we could not compare our results at weekly (or even monthly) time scale since many of the reconstructions are only available on a seasonal or annual time scale.

4) Finally, we would note that several studies have highlighted the lack of proxies in SW Europe in comparison with the rest of Europe (for example, Trigo et al., 2009). We therefore believe that this exercise that we have done is of particular interest because of its time resolution, nearly observational features (not based in extreme weather re-

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ports) and its continuity.

Therefore, we ask the referee to reconsider his/her report and allow us to make a new version of the manuscript where we will improve our explanations and the aspects highlighted by the referee.

#### References

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