

## ***Interactive comment on “Spatial climate dynamics in the Iberian Peninsula since 15 000 Yr BP” by P. Tarroso et al.***

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Reviewer's comment in italics.

*-Which is the temporal resolution of pollen data? 1000 years? if it is less why to loss this finer time resolution?*

**REPLY:** The 1000 years is a good compromise for such spatial study because it is based on a heterogeneous data-set of times series which have different time resolutions.

*-I can not understand the election of the climatic variables employed in this study. The authors should first clarify the variables (see comments ref 1) and later to argument why they choose such variables. From my point of view probably each place and kind*

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*of pollen taxa should respond in a different way to different variables depending on the area, mainly due to the large spatial climate heterogeneity in the Iberian Peninsula. This means that in one place proxy data can give valuable information on one climatic variable while in other area this could be totally different. A previous evaluation of this would be desirable.*

**REPLY:** Mostly answered in reviewer 1 response. The heterogeneity of Iberian Peninsula is noticeable at climate and vegetation level. Different plant compositions will yield different climate reconstructions. Thus, by using most of the taxa found at the pollen assemblage for which we have modern distributions, we can build these reconstructions and get the past spatial patterns revealing the heterogeneity of the climate. Therefore, is because different pollen sites respond differently that we can have climate reconstructions.

*-The authors state that the main objective of the paper is to define areas within the Iberian Peninsula that share similar climate evolution. For this task they firstly construct the climatic fields and later apply a clustering method for grouping areas with similar time evolution. I can not find the sense of grouping Tjan, Tjul, Pmin in a unique area. Probably it has much sense to make a classification for each climate variable. In fact i can not find the sense of the regions obtained. For example in the south-east of the Iberian Peninsula there is a strain mix of clusters (probably this is connected with the next point). In addition it has no sense that regions that are together and that at annual time scales vary in a similar way present so strong changes at millenian time scales (for example for Tjan)*

**REPLY:** Maybe we misunderstood the point of this question but Tjan, Tjul, Pmin have not been grouped. What we have done is a clustering of the first component of the fPCA in order to depict regions of matches and mismatches since the last glacial period. The clustering is aimed to define, on a statistical basis, where, how and if there are areas where a reconstructed climate variable may show some coherent patterns. This method depicts areas where similar evolutions of the climate represented by those

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three variables occur.

*-Other aspect of the methodology i can not understand is why the final resolution is so fine. What is the sense of this? nicer maps? The effects of the repeated spatial interpolations performed could be quite dangerous, specially when there is some periods (the beginning) with just a few data. If the data purely reconstructed are the 31 points why do not perform the clustering exercises just over this data?. Why not working only with anomalies?. More examples of this can be the reconstructed maps of Figure S-1.*

**REPLY:** As said above in the response to reviewer 1 comments, we will adapt the manuscript to anomalies as suggested. There is no objective reason to choose the spatial resolution of the interpolation in this case. Although maps are in fact nicer, this was not the reason to choose this scale. It was the applicability to biogeographical studies.

*- Regarding the maps of the climate variables, do the authors really think that it is any probability that coastal areas of the Mediterranean were much colder (Tjan) than the North Plateau (most than 10 degrees), or. differences of the anomalies of almost 30 degrees? I think that authors should check the physical consistence of this results because they are almost impossible from a climatic point of view. Other aspect probably related to interpolation is that some times the largest anomalies appear in places where data is scarce, like in the center/west of the Iberian Peninsula or around the Ebro River mouth.*

**REPLY:** Changing the interpolation method as reviewer 1 suggests will certainly affect these maps.

*In summary, apart from the comments of referee 1, the authors first should argument clearly the selection of the climatic variables to reconstruct.*

**REPLY:** We will add this to the revised version.

*Second they should check the physical consistency of the series reconstructed at*

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*places where they have proxy data.*

**REPLY:** This will be revised..

*And if they desire to present full maps of the IP they should indicate the value reconstructed and the error associated to such statistical prediction. Kriging permits to do this and it is the most commonly used in the construction of climate grid data.*

**REPLY:** Uncertainties of the spatial interpolation are shown as the variance. However, with the modification of the interpolation method also these maps will likely change. The multivariate thin plate splines, as suggested by reviewer 1, will be preferred to kriging.

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Interactive comment on Clim. Past Discuss., 10, 3901, 2014.

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