**Climate
of the Past**

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Discussions

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Interactive comment on "New insights into the reconstructed temperature in Portugal over the last 400 years" *by* J. A. Santos et al.

Anonymous Referee #2

Santos et al try to present the consistence/inconsistency of Portuguese palaoclimatic data from 4 different sources including reconstructed European grid based seasonal temperature of Luterbacher et al (2004)/Xoplaki et al. (2005), local repeated borehole temperature observation from one site in Portugal, palaeoclimate simulation and their signature in these boreholes and finally documentary based indices from documentary sources from the late Maunder minimum. Noting that the gridded reconstructions are not consistent with the other results, they propose a new reconstruction based on a two-stage calibration procedure using information from these sources, and compare the obtained results with a new derived series. Although this is an interesting approach, conclusions and interpretations are not supported by scientific evidence, parts are misleading and need reconsideration

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Interactive Discussion

Discussion Paper

1) The argue, that the Luterbacher et al. and Xoplaki et al. data are not in agreement with the authors data, is confusing and not supported by this kind of analysis. First, it is striking that the 20th century grid point data close to Lisbon from New et al./instrumental series are in very good agreement with each other (not surprisingly), but not with the simulations and the other paleo evidence presented by the authors. There is a clear bias, also in terms of variability and trend. What are the reasons for this different behaviour? For Luterbacher et al and Xoplaki et al. New et al. 2000 data have been use to calibrate the statistical model within the 20th century. Meteorological station information and LMM indexed data from Lisbon have been included in the reconstructions. Luterbacher et al. and Xoplaki et al. reported on uncertainties based on unresolved variability in the statistical calibration. The uncertainties have been shown for the European annual average and are (30year filtered) larger than $0.5°C$ around 1600. Assuming the uncertainties are similar at European scale and for the gridpoint close to Lisbon (clearly smaller during the LMM as indexed series from Lisbon have been used as predictor) then the simulations and the other palaeo evidence would certainly be within the 2 standard errors of the filtered time series around the Luterbacher et al. 2004 reconstruction. Plotting in addition also the uncertainties of the authors data (see major point below), then there is no support of the conclusions and criticism related to the Luterbacher et al. reconstruction.

2) Importantly, it is commonly practise to present uncertainties for new quantitative reconstructions. Can I please ask the authors to show results including those by clearly providing evidence on how the uncertainties have been calculated both statistically for the different types of data and if possibly also applying expert judgements?

3) In order to show the full spread of paleo climate simulations I suggest to show also the new IPCC AR5 paleo GCM runs, selecting one or two gridpoints around the area of interest. Two simulations from the same model are not fully appropriate for this kind of analysis. Related to this point concerns the Fig 2b and corresponding text: The match between the profiles and the paleo simulations could be by chance, therefore

more model outputs would be necessary to get an idea of the full spread from paleo simulations.

4) I agree with the other reviewer that the method for re-calibration process and the underlying assumptions are not clear and need more explanations.

5) The 20th century gridded data presented in Luterbacher et al and Xoplaki et al. are not from Mitchell and Jones, but from New et al. 2000, J. Climate

6) The summary and conclusions part are too long and include many repetitions. This part needs to be shortened and rewritten taking into account the new analysis from the reviews

7) The abstracts mentions twice 'attributed'. The study clearly does not deal with attribution. Therefore this should be reformulated.

8) The argumentation for this kind of paleo study in the introduction needs more convincing evidence

9) It would be nice if the time series could be updated to 2014

10) The whole paper needs a English check

Interactive comment on Clim. Past Discuss., 11, 1, 2015.