

Interactive comment on “On the variability of return periods of European winter precipitation extremes over the last five centuries” by A. Pauling and H. Paeth

J. Guiot (Editor)

guiot@cerege.fr

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Dear colleagues

Your paper has been read by two reviewers and both find some interesting points in it. Nevertheless before publication in CP, some major points need to be taken into account.

The most important point for both reviewers, and I agree with them, is that less frequent extremes in the past could be an artefact of the reconstruction. It is difficult to ignore the fact that good proxies are less and less abundant when we go back to the older periods. The analysis uses the CRU dataset for the 20th century and the proxy reconstructions

before. The minimum should be to prove in the 20th century that reconstructions and CRU gives similar results.

Another important point is the lack of information given as well on the time-series (it could be easily done for the four areas) and on the gamma parameters (for the same areas). Both reviewers are bothered by that. Rev#1 insists on the fact that there is large uncertainties associated with the gamma model fitted on short series. Moreover, these gamma models are not necessarily appropriate on the extremes of the distribution (this is largely known in the literature devoted on extreme analysis): in this case two approaches are often taken in such analyses: GEV and Pareto. Then the uncertainties on the parameters and the lack of good fit on the extremes can become problematic for RV and RP estimates. It is crucial to prove that gamma models correctly fit both queues of the probability distributions.

Rev#2 find also very speculative to conclude from the few examples given that historical patterns are consistent with present day relationships. In general the discussion is not easy to follow. It should be re-organized 1) on advantages and limitations of the approach and 2) on climatological implications of the results.

I hope that you will be able to take into account these points and also minor ones detailed in both reviews. You are invited to re-submit an improved version of your paper. Thank you for your interest in CP. Best regards J. Guiot

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