

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

Anonymous Referee #2

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The paper analyses a reconstruction of the winter-mean precipitation over Europe for the last 500 years. Focus is on precipitation extremes as they appear in return values and return periods. The overall conclusion is that both extreme wet and extreme dry winters occurred less frequently in the previous centuries when compared to the period 1951-2000.

The topic is important and the paper contains some interesting results. I do, however, have some serious concerns that should be addressed before the paper can be accepted for publication.

1) My basic worry is that the less frequent extremes in the past is an artefact produced

by the reconstruction. The paper mentions this possibility in the Discussion but I find it far from sufficient. What is the effect of the reduced number of proxies when going back in time? What is the effect of the "reduced temporal variability of the predictors"? These questions should be seriously addressed. It must be possible to address these questions by repeating the reconstruction with different subsets of proxies.

2) The focus on return periods and values make the paper hard to follow. Presentation of some precipitation time-series would help. I also think that it would help the understanding if the authors would present some probability distributions for the precipitation in the different sub-periods. This would give a much better feeling for what is going on than just presenting the extremes.

3) I am confused about the arguments on page 163 leading to the conclusion in line 24 "To sum up ..". How can such a conclusion be drawn from the few winters shown in Fig. 1. If the authors want to include this analysis they have to superpose many modern as well as reconstructed winters which were dry in the region under consideration.

4) The same concern goes for the arguments about the circulation on page 167 and 168. From the few examples given I find it very speculative to conclude that historical patterns are consistent with present day relationships.

5) The Discussion seems not very well organised. It is not clear to me what circulation pattern that would drive reduced extremes in the precipitation almost everywhere in Europe.

6) More details should be given about the Monte Carlo test (p162,15). Are the winters independent?

To summarise I find the arguments presented in this paper rather sloppy and I can not recommend that it is published in its present form.

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