**Climate
of the Past
Discussions**

Interactive comment on "Continental atmospheric circulation over Europe during the Little Ice Age inferred from grape harvest dates" *by* P. Yiou et al.

Anonymous Referee #1

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General Comments

The paper describes the use of grape harvest data to reconstruct atmospheric circulation during the Little Ice Age. The approach is interesting, as are the conclusions that blocking situations were more likely in summer. However, the reconstruction approach is very indirect and an end-to-end error assessment is not done or not possible. In see this paper more as a stimulation of the discussion how historical proxies can be used quantitatively in paleoclimatology, but I have little faith in the outcome. Reconstruciton the frequency of synoptic types based on annually resolved data is obviously extremely difficult.

Specific comments

p. 3027, l. 13: "Breakpoints could be documented". But what was then done?

p. 3028, Eq. 1: As I understand it, there are many ways or trajectories to arrive at F* for a given harvest date. The "inversion" of the model gives some kind of a best fit, but how good is it? It might be instructive to use some sort of Mone Carlo approach - using weather generators or even just using some climate model control run data to actually check how these different trajectories then in the end compare in terms of seasonal means. And of course it would be even more interesting to see how they compare in terms of blocking frequency.

p. 3028, Eq. 1: It would be good to show the sensitivity of the model to temperatures graphically. The authors are looking at blocking situations in summer, which often are accompanied by heatwaves. RF in Eq. 1 gets very small for heatwaves. Does this make the model more senstitive to heatwaves (viz. blockings)?

p. 3028, l. 8: Is t0 (15 March) assumed to be time independent; i.e., the same today than in the Little Ice Age. Can this be justified given all the work on spring phenology?

p. 3031, l. 2: How much do the correlations between different vineyards in the same region tell about the agreement of temperature reconstructions? These correlations only make sense to me if compared with the same correlations of the harvest dates.

p. 3032, l. 8: I do not quite see what is done here. Percentiles of what? Does a quantification of the uncertainty of the gradient not require assumptions of the covariances of the errors?

p. 3032, l. 12: The correlations are quite low, they refer to the instrumental period (part of which is the calibration period), and they do not refer to the final product (atmospheric circulation).

p. 3034, l. 23: Why do you not directly compare your reconstruction with those of Küttel and Luterbacher?

p. 3034, l. 2: Maybe I am missing something here, but how do you come from the

monthly mean gradients to a threshold for sampling individual days? Similar as above, the computation of the circulation patterns could be done in a Monte Carlo-type approach to give an idea of the uncertainty. The gradients themselves have already no skill, but now you go one step further and do not quantify the errors anymore.

Technical comments

p. 3026, l. 11: Should this be "seven" rather than "eight"?

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