

Comment on cp-2021-169

Anonymous Referee #1

Referee comment on "A Bayesian approach to historical climatology for the Burgundian Low Countries in the 15th century" by Chantal Camenisch et al., Clim. Past Discuss., <https://doi.org/10.5194/cp-2021-169-RC1>, 2021

General comments

The manuscript is an interesting work on climate reconstructions based on historical documents. It is an original approach from a methodological point of view. The Bayesian approach is an interesting methodology, and an original way to integrate the output of climate models (prior state) with historical data (observation/climate conditional probabilities). In this sense, it seems very appropriate to be published in "Climates of the Past". However, I have some doubts, questions, and suggestions.

Specific comments

- Although the authors include some references on documentary data, it is desirable a more complete and detailed description of data sources (authors, motivations, spatio-temporal coverage, density of information, etc.). Please, include in Figure 1 the cities and/or locations with historical information.
- According to the authors, the reconstruction method is strictly applicable using variables following Gaussian distributions. In fact, Pfister indices use implicitly this hypothesis assuming the symmetry around the 0 value. This may be true in the case of temperatures, but I have doubts on precipitations, where it may be not appropriate to define symmetrical indices (from -3 to +3), due to the non-gaussian character of rainfalls.
- Tables 2 and 3. The assignment of likelihoods to Pfister indices is arbitrary. In the case of Table 2, why 25 to index +1, and 0.30 to index +2, and not the opposite, 0.30 to index +1 and 0.25 to index +2? Indices methodology tries to convert qualitative descriptions into numerical values, and, certainly, some degree of subjectivity is always present. I recognize the effort of this approach to reduce this ambiguity, but this example do not diminish my doubts about this problem.
- In relation to Table 3 and the lack of information, the absence of information it is not equivalent to the absence of climate events (extremes) in the past. It depends on the

nature of data sources, spatio-temporal coverage and resolution (it is possible to find new data sources that compel to refine the reconstructions). Therefore, it is important not only the description of data sources (Point 1), but also the study of their spatio-temporal coverage, that is, their density of information (distribution of reports according spatial and temporal scales).

- How do you calibrate and/or validate your reconstruction? This is the major problem that I see in this manuscript. Criteria on uncertainty and/or error bars are unclear for me. A more detailed description on technical aspects of this methodology would be desirable.
- Finally, I miss an adequate comparison with other reconstructions. In particular, to obtain a clear view of the convenience of this approach, it would be interesting a comparison with the simple reconstruction based on Pfister indices. In addition, it would be desirable to find reconstructions from other proxy data (in particular tree rings), to validate your reconstruction, or, at least, to compare your results with those from other proxy data.