

Clim. Past Discuss., referee comment RC2
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Comment on cp-2021-57

Anonymous Referee #2

Referee comment on "Unlocking weather observations from the Societas Meteorologica Palatina (1781–1792)" by Duncan Pappert et al., Clim. Past Discuss.,
<https://doi.org/10.5194/cp-2021-57-RC2>, 2021

This study reported the digitizing and compilation of the Societas Meteorologica Palatina (SMP) weather observation, a network of 37 stations across Europe plus a couple in North America and Greenland covering the decade of 1781 and 1792. The quality of the SMP temperature and pressure observation data is then evaluated by using the C3S Quality Control software to identify outliers and visual inspection. The potential of the SMP reconstruction for climate research is demonstrated by two extreme weather events of the reconstructed period. The reconstruction is rigorously done and described in great detail. However, the manuscript, in its current layout, requires major revision before it could be considered for publication in this journal. My specific comments are:

- **The structure of the manuscript is not logically sound.** For example, section 2.1 on "Source material description" and section 3 on "Inventory" could be combined and shortened by removing the repeating or loosely relevant information. Section 2.6 on "Homogenisation" and section 2.7 on "Generation of daily and monthly series" should be parts of the "Data processing (section 2.3)" work. Section 2.7 on "Generation of daily and monthly series" should also be placed before section 2.5 on "Quality control" and section 2.6, since a number of discussions in quality control and homogenization refer to the monthly data.
- **The study could be presented in a more constructive framework and its significance to the broader audience needs to be clearly emphasized.** For example, it would be more informative for the general audience, if the uncertainties and errors of the observations in different stations (section 2.5 on "Quality control") could be categorized by common characteristics, by regions, or even by specific years. In the demonstration of the two extreme weather cases, the reference to the CAP7 weather type lacks necessary explanation and justification.
- The authors should make a clearer distinction between what's available to the public (i.e., the work already done by previous studies) on the *Ephemerides* and what's new from this reconstruction.
- Please explain briefly why temperature and pressure, but not the other weather parameters, are specifically selected for the reconstruction. Could the quality of reconstruction on temperature and pressure be generalized to the other parameters? What implications does it have on the overall potential of the SMP dataset?

- Based on Fig. 5 there are more than 25 stations available in 1785, so please explain why only observations of six stations are presented in Fig. 8. What about the rest of the stations? Did they also record the cold spell in March 1785?

A few technical corrections

- Ln 63, "In a first part" sounds strange to me, please consider use the common notation "In the first part".
- I don't understand the exact meaning of the sentence "Over all, the quality of the temperature and pressure series recovered in this study is relatively high – due in no small part to the standardized thermometers and barometers made available by the SMP" (Ln 184-185).
- Ln 287-288, Fig 5 does not give "which stations were more prolific", but how many stations. Please correct.
- Ln 435-438, the whole sentence reads very confusing and needs clarification. What are "These differences" refer to precisely? What leads to "meaning that average March ..."?