Reply to Reviewer 1

The author collected the weather diaries of the Gottfried Kirch family, photographed them all, digitized the data since 1720, briefly processed and analyzed the barometric data, and made a case for the extreme cold winter of 1739-1740. The work is of great significance to historical climatology research in Germany.

I believe that the authors likely have valuable high-resolution (daily-scale) weather observations data that are worthy of a publication. After reading the manuscript, I found that the author's description was relatively simple and there were many ambiguities. Therefore, I suggest that a **major revision** is needed before the official publication.

- In the Chapter 2 & 3, the authors describe in detail the life of the family members, as well as the time periods they each recorded and the tools they used. But unfortunately, I did not get more information about the content of the observations: for example, what were the conditions of the observations, what was the routine of the observations, how many times a day were the observations made, and were they timed? How to ensure the consistency of observation data after the shift of observation position. In-depth descriptions of these elements can increase the scientific validity of the data and allow later users to use the record more confidently.

  Thanks. The revised manuscript adds more details. Yes, we have the time of observation, and we will show a histogram of the times. There are three very strong peaks (morning, noon, evening) and a fourth, somewhat smaller peak in the mid-afternoon. Concerning the shift in observation sites: The data presented in this article start in 1721, so after the mentioned shift. They were presumably all taken at location B. We add a “family tree” figure on the observers (suggestion of reviewer 2) and to this also add the locations.

- In the method section of Chapter 4, the authors' description is rather brief, could they add a more detail description about the process of digitizing the data. How exactly was it extracted and what information was extracted? How does data quality control work: were there any outliers or missing measurements or ambiguous values recorded, and how were they handled if there were? In addition, I suggest that the authors give an example of the digitized results, such as a tabular presentation, which would provide more insight into what the authors did with the data.

  Thanks, we will make this much more clear.

  In terms of digitising, the supplementary material does not only contain all digitised data but it also contains the instructions given to the digitizers (as a separate Tab called “Info” in the spreadsheet). A template was handed to the digitizers (header of Tab “Template”), which was then filled. The digitizers also had the possibility to write comments in the spreadsheet (e.g., when a value was unreadable).

  Temperature data were not further processed. For the pressure data we used the R package dataresqc (Brugnara et al., 2019, Brunet et al., 2020) that was developed in the Copernicus Climate Change Service.

Brugnara, Y., Gilabert, A., Ventura, C., and Hunziker, S.: dataresqc: Quality control tools for climate data developed by the C3S Data Rescue Service, available at: https://github.com/c3s-data-rescue-service/dataresqc, last access: 10 September 2019.

The results of the qc are indicated in the formatted SEF file in the column meta. This indicates which qc test within dataresqc was not fulfilled. No value is excluded.

We will show an additional figure with the tabulated data (spreadsheet) and a figure with an excerpt of the SEF formatted data that includes a case with a QC flag.

- For the results section in Chapter 5, I suggest that the authors have a more detailed description of the data, such as adding a simple statistical description of the observed data (mean, maximum, etc.) in Chapter 5.1; the temporal variation characteristics of the reconstructed series can be analyzed, etc. In addition, the authors can perform some analysis of the trend of temperature and pressure changes within that century based on the available data, etc. In-depth description and use of the data allows the reader to have a more direct feeling of the data and to better promote the dataset.

  Thanks, we add some overview statistics as well as a histogram of all individual pressure data and a time series plot of the monthly mean pressure data.

- At the end of the manuscript, I hope the author can add some discussion to further analyze the value of this data set and look at other possible use of this data set in the future.

  Thanks, we add the comment that this data set will be concatenated with other Berlin series from the 18th century currently under digitisation (Lambert, Jablonski, Gronau, Brand, and others) to generate a more complete Berlin series .

I hope our comments will help the authors, whose work I believe to be of great scholarly value, and look forward to seeing a new manuscript from the authors.