

The work of the manuscript CP-2024-2 is an excellent effort to integrate historical climate information with variables from social dimension.

The reviewer has no questions of detail about the work, methods and data, or the results.

**RESPONSE:** We would like to thank the anonymous referee #2 for evaluation of our paper and raising several critical comments, which we are trying to answer below.

The work could be published after addressing two minor issues:

**1) General question:**

The work focuses on cereal price fluctuations to identify climatic factors and their degree of incidence. Please can you explain if there are already works based on the cereal production variable in your study area. Can you comment/justify why you prefer use of market prices of different cereals to identify climatic factors incidence, instead use of cereal production information and statistics?

**RESPONSE:** We believe that the third paragraph of Introduction (lines 43–52) gives sufficient information about “works based on the cereal production variable in our study area”. Concerning of the second part of the comment, grain prices are only one preserved information reflecting (although indirectly) grain production in long time series, standardly used for comparison with climate variables. Own farmers did not kept records about amount of production even in the second half of the 19th century. Also state administration did not collected information about agricultural production. It means that only some data about production coming from some farming bodies like nobility, church or towns, that have been owners of large fields, are available for the period analysed in our study. But such data can be only hardly used because they are rather epizodic and biased by other factors like changing areas of sowing or arable land (e.g., its renting or sale), variable proportions of individual cereals sown and systems of farming (e.g., three-field system or alternating).

Are there works already published about cereal production? Are these investigations ongoing? If not, can you give a brief summary of the availability of this type of information in documentary sources, and assess whether it would be possible to carry out a research such as the one you propose in this manuscript?

**RESPONSE:** There are no works about cereal production and such investigations are not provided in the Czech Republic. Grain production in the studied period was not primarily evaluated and was not long-term monitored. Reports of grain accounts and threshing registers giving information how much grain has been harvested and how much threshed have a torso-like character from the spatiotemporal point of view.

I consider this series of questions timely since to establish the incidence of the climate and its extreme meteorological events, its relationship with agricultural production data seems more consistent. Documentary sources can provide these values in time series, whether in statistics from government administrations, private documentation of farming families or, perhaps most valid in many regions, fiscal and ecclesiastical tithe records.

**RESPONSE:** As reported in two preceding points, sources continually recording production of agricultural crops on the state, land or regional levels do not exist in the Czech Lands for the period analysed (i.e., 1725–1824), i.e., no such long-term series are available. Concerning of tithe records, their majority is limited only to the establishing of norm (i.e. they determined how much individual peasants should pay, not how much they actually paid), but recording of really passed grain is rather rare and not available in any long-term time interval.

Summarising our responses to three preceding reviewer’s points together, we understand well and appreciate his/her interest in obtaining other documentary sources giving information

about quantitative grain production in the Czech Lands. As follows from our responses, such data – if exists – suffer by great spatiotemporal inhomogeneity and it is very difficult to create any other utilisable time series. Because grain prices are only one source kept consistently for longer time, we used such newly created series of grain-prices for investigation of relationships with selected climate variables in our article. Being concentrated only on the use of this particular type of grain-related characteristics, we do not consider as necessary to discuss in the paper other potential sources related to any other characteristics of cereal production, which are clearly out of the scope of our manuscript.

## **2) Specific question on methodological aspects:**

The co-authors demonstrate extensive knowledge and availability of previous materials, organized in databases. On the other hand, in the manuscript it is difficult to identify the information used to generate a series of data that are evidently reconstructed on temperature, precipitation and PSDI. They appear in figure 7, page 12.

**RESPONSE:** We reported corresponding series used in Fig. 7 in Section 2.3 Meteorological data. Here we give also corresponding citations of papers, in which reported series were characterised in a great detail, including basic data sources, i.e., readers interested in more details may look on these papers. But to follow this comment, we did corresponding changes in Section 3.3 as follows: “This includes the monthly temperature series for Central Europe, compiled from documentary-based temperature indices of Germany, Switzerland, and the Czech Lands in 1500–1854 and measured temperature series of 11 meteorological stations in Central Europe from 1760 onwards (Dobrovolný et al., 2010), which is fully representative for Bohemia (*cf.* Brázdil et al., 2022a). The seasonal precipitation series for the Czech Lands were derived from documentary-based precipitation indices for 1501–1854 and mean areal precipitation totals of the Czech Republic from 1804 onwards (Dobrovolný et al., 2015).”

The provenance of instrumental sources can be understood for the early instrumental period, approximately 1780-1825. On the other hand, the origin of the information on the same variables for the period 1720s-1780s or later is not identified. If indexes or previous materials are already available, it would be interesting for the public to briefly know their origin, characteristics and bibliographical references.

**RESPONSE:** We believe that our response to the preceding point can be understood also as our response to this particular point. To explain documentary sources that have been used for creation of corresponding temperature/precipitation index series is really out of the scope of our study, do not bringing any necessary information for fulling of the main aims of our paper.