

Clim. Past Discuss., referee comment RC2  
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## Comment on cp-2021-52

Anonymous Referee #2

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Referee comment on "Climate variability and grain production in Scania, 1702–1911" by  
Martin Karl Skoglund, Clim. Past Discuss., <https://doi.org/10.5194/cp-2021-52-RC2>, 2021

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### General comments

The article studies the relationship between climate variability and grain production in Scania (southern Sweden), between 1702 and 1911. The study also claims, in the abstract, that it will shed new light on the climate history of the region by homogenizing the Lund instrumental series. The article, therefore, has several goals and is ambitious. As some of my questions, have been dealt with in the discussion already, I try to focus on some other issues that could improve the manuscript. The manuscript has potential, but the manuscript could use a thorough revision when it comes to structure. In its current form, it is difficult to follow the authors line of thought. Sentence structure is often speculative and results and approaches needs to express intent more clearly.

My initial impression was that the manuscript would be improved if it was written as two separate articles and it would make it easier for the author to focus on grains and climate. The first article could present the homogenization of the Lund series, which then could be used as a background for a more in-depth approach to write the second article, which would compare climate variability and grain production. As it reads now, the meteorological series from Lund is not actually mentioned until page 14, which is followed by an analysis, results and discussion (section 2.3). As such, the manuscript provides new perspectives and approaches, but the manuscripts structure and formulations need to be improved.

The reason for my suggestion to write two articles instead of one article is that I am

unfamiliar with the Lund series. Does it cover the 1753-2020 period (the end period is not mentioned)? What are the gaps (months, years, days?) mentioned on line 386? This section is extremely condensed, and I would prefer if the series was introduced more thoroughly. As it is, there are no references to the series. Also, it reads somewhat peculiar when it is noted that there are series from 'nearby regions' (line 392), mentioning both Uppsala (c. 500km) and Central England time series (c. 1000km), and I wonder if the distance of 500km between Lund and Uppsala, or 1000km between Lund and England could be considered 'nearby'? This is a matter of semantics, however, I think that the series and the correlation deserves a more in-depth discussion than this. Especially considering the results and the correlations in Table 2. The results are interesting. It is intriguing that the correlations during the months May-October, between Lund and Stockholm, Uppsala and Berlin-Dahlem are stronger than those with neighboring Copenhagen (c. 40km). Why is this? Is it a question on instrumental reliability, series validity or climatic factors? Answering this question is not the purpose of this article, but it seems quite central for the analysis and series in general. Moreover, in Figure 6 and 7, the series is extended to 1701 even though this is not mentioned earlier. In summary, the approach is interesting, but it needs more context. Finally, on page two, it is said that the climate in Scania resembles that of England. Why then is the correlation with the Central England time series the lowest of all? What part of the 'relatively mild' (line 33) Scania climate is comparable to England? Also, what is the correlation period analyzed in Table 2, is it the studied period 1753-1922 or 1753-2020? A general description of the climate in Scania, without comparisons to other European regions, could make it clearer.

In section 1.1. There is quite a lot of focus on climate in the 16<sup>th</sup> and 17<sup>th</sup> centuries whereas climate development during the 19<sup>th</sup> century, receives very little space. Maybe Figure 1 could be employed for a more extensive discussion on climatic development? The section could be strengthened by placing focus on the studied period.

Section 1.2. Farming in Scania. The theme is farming and harvesting, but I would like to see more information on harvest dates and threshing, especially as it is of great relevance for the analysis and the clustering (and because Scania seems to differ from other parts of the Nordic countries?). Some of this is already mentioned in the discussion with RC 1. Adding to this discussion, maybe there could be a sentence or to describing the length of the growing season (line 589)?

Section 1.4 mostly seems like a presentation of previous research and I wonder if this could be presented earlier in the manuscript as part of 'previous research', especially the presentation of the research conducted by Edvinsson et al. (2009).

Section 2 'sources and methods' contain a presentation of methods and sources, but it also contains an analysis, which makes the manuscript structure confusing. The homogenization is a result in itself and should (preferably) not be presented in a section called 'sources and methods'.

I think a more classic structural approach of the manuscript (where material, method and analysis are presented in separate sections) could work better and it would improve readability.

### **Specific comments**

The manuscript has a very speculative language. This affects the overall impact and scientific quality of the manuscript. The term 'relative' is used frequently and situations or climatic conditions are often described as 'relative'. A search indicates that the word 'relative' appears 62 times in the manuscript (four times in the abstract) in various contexts to describe a myriad of situations. For example, (line 65) is explained that 'relative peace' dominated in the 1700s compared to previous centuries. I am not familiar with Swedish history, what does this indicate in terms of wars and skirmishes? Is the frequency or magnitude of skirmishes that defines 'relative' peace? However, I do not think this historical overview of the political history of the region is necessary because the author does not return to this subject or its impact on harvests or threshing.

This use of relative continues throughout the manuscript. On page four, the term 'relative' occurs five times. On line 94, 'relative lack of wood' and on line 105 'in their relative specializations', and then on line 115, 'with relatively much...' and later in the same sentence 'saw a relatively large increase'. Finally, in the footnote on page 4 'relatively

abundant’.

Relative is a subjective term and should be avoided as it in a scientific investigation provides no actual perspective of change, magnitude or proportions. For instance, what does a ‘relative lack of wood’, indicate or describe? Is it an indication of amount of wood, distance to wood (as in a forest), lacked access to firewood? And on line 85 (page 3) it is explained that the 1810s and 1840s were ‘relatively cold’, relative to what place and period? Relative to the 1600s? Was it colder all year round, was only the summers colder or was the 1810s colder than previous/later periods (decades) or what is just cold in comparison to warmer periods (decades)? Even in the results (line 464) it is said that the analysis shows ‘relatively large negative associations’ and Figure 13 includes an analysis of ‘relatively wet years’. How wet is a ‘relatively’ wet year, is it possible to quantify and explain this in the text? Is a ‘relatively wet year’ wetter than ‘normal’ years, and if so, how much?

Finally, describing things as being ‘relative’ are vague and it raises a lot of questions. I think that rewriting and rephrasing many of the vague sentences would greatly improve the manuscript and make it easier to evaluate the content. The results would also stand out more clearly.

## **Technical comments**

Line 14. In the abstract it says that new cultivars were being ‘imported’ at the end of the period from other parts of Europe. This is not discussed in the manuscript. Did the import start at the end of the 19<sup>th</sup> century or were new cultivars in use all across Scania by the end of the studied period? Why were they imported, was it caused by changes in climate, demand or other issues? As I read the article, there already seemed to be an extremely diversified variation of grains, but the new cultivars are just one variant of autumn-wheat and autumn rye? The questions are rhetoric but stems from how the subject is approached and the changes that occurred in the later part of the investigated period.

Line 121. It says that wheat-varieties (plural) will be included in the 1865-1911 period, but there is only one type (Autumn-wheat) mentioned in Figures 11, 12 and 13. In Figure 13 the caption reads 'during relatively wet years', but the figure only shows different periods, not years.

Line 132-135. I think this comparison of soils is unnecessary.

Line 156. Is this 'however-sentence' suggesting that black oat varieties were grown in Scania or just in neighboring provinces? In the previous sentence it was already stated that it is uncertain (remove 'more' in 'more uncertain' as there are no different levels of uncertainty).

Line 168 (section 1.4), it is concluded that the diversity of grain varieties "testifies to a relatively flexible farming system in terms of sowing and harvest dates as well as the ability to produce under differing agrometeorological conditions, not least during colder and wetter periods". Could the author please elaborate and explain how a large variety of grains give indications about farming systems and capability of adapting to different agrometeorological conditions? This subject almost seem like an article in itself (I do not think that the existence of different varieties is proof of different systems, we can assume, but it is still just an assumption), but if there is more information, please elaborate. For example, are successfull harvests seen, by the author, as an indication of adaptation?

Line 333. The figure could be improved. It reads that the figure reveal that all clusters are in Hjärnarp and Toastarp. However, looking at the figure, I cannot see the mentioned places.

Line 358. Says that there are four clusters. Should be three? I guess it is the same in Figure 2 caption.

Lines 459. The text has references to clusters in Figure 9. There are, however, no clusters mentioned in the figure caption and it is a bit confusing to understand what is indicated. The figure caption explains that the figure shows grain and temperature/hydroclimatic indicators, where are the clusters? A similar reference to clusters and Figure 10 is found in lines 467-468.

Line 466. The authors says that spring and autumn gives 'almost no statistically significant results', but values are not presented. This was also mentioned by the first RC

Line 460. Could r-values be included so that the reader could understand the difference between 'slight negative values' and 'relatively weak'? This would help to follow the author's line of thought.

Line 521. This sentence seems to suggest that a correlation of 0.31 is high, as in strong? In the manuscript it states that it is 'quite high' (quite is again a relative term), but is 0.31 high in comparison to other studies, results or years? If correlation is 0.31 then it is low. Please elaborate on this subject and clarify what is meant.

Line 533. What does 'this trend' refer too? Was the shift towards wheat reinforced by new

variations of autumn rye? Please elaborate or improve sentence.

Line 552. The first sentence reads that grain production was 'mainly constrained by precipitation', but the next sentence reads 'However, instead of focusing on just temperature...'. This is a bit confusing. Should it be 'Instead of focusing on precipitation...'?

Line 556. What argument is referred too? The dominating role of precipitation? Is this an argument or a result of previous studies?

Line 558. What period is here referred too? The late 19<sup>th</sup> century (line 556) or the study-period? This is needed to follow the line of thought without having to read all other studies.

Line 606. The sentence after the parenthesis is very speculative. "A relatively... probably... to some extent."

Line 646. What does 'total production' refer to?

Line 652. What is considered as the pre-industrial period in Scania? This historical term

appears twice in the manuscript, but I do not know when the industrial period started in Southern Sweden or how it relates to the agrarian revolution (Line 60). Is the import of new cultivars (line 14) part of the agrarian revolution or the industrial revolution?

Caption in Figure 6 and 7. A technicality, but I would rather see the sources for this figure included in the captions instead of referring to the footnote in Table 2.