

Earth Syst. Sci. Data Discuss., referee comment RC1
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Comment on **essd-2022-118**

Anonymous Referee #1

Referee comment on "Holocene spatiotemporal millet agricultural patterns in northern China: a dataset of archaeobotanical macroremains" by Keyang He et al., Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2022-118-RC1>, 2022

The essay on the development of millet cultivation in China includes an interesting and large collection of data well suited for publication.

On the other hand, there are some critical points still to solve:

The temporal-quantitative evaluation is not comprehensible if the authors do not disclose how many sites (features, samples) they have per region and per time slice or archaeological culture. Only then is it clear whether the quantitative changes are not artifacts. According to page 4, they have 487 flotation results (are these samples?) from 349 sites. That is, less than 2 samples per site on average? Maybe also a few sites (which epochs) with many samples? Therefore, the representativeness of the data is not clear. What about the earliest time slice (e.g. Fig. 5 above): is there nothing investigated, or is it investigated, but nothing found?

An image of selected macro-remains and phytoliths of the millets is missing. What are the criteria to distinguish the millets on the basis of their phytoliths? Is this possible? In any case, the comparison of grain numbers and phytoliths is not useful. If there has not been threshing and dehusking within the village, phytoliths will be hardly found on site.

Important would still be the climate discussion: around 6000 BP there is a climate deterioration in Central Europe, what it's like in China? The authors write warm/humid. How can they read this from the pollen data?

Absolutely necessary is a chronology table, broken down by regions and millennia (better centuries), otherwise the arguments and data are not understandable. And it would be important to have a brief summary of what characterizes these archaeological cultures

about which they are writing, see also Fig. 1. Are these comparable settlement types and types of findings?

That more existing 14C data of settlements means an increase in population is an old idea but not convincing. The amount of 14C data depends among others on how much money the archaeologists spend on it. It is enough argument that there are more sites. But for that you would have to know whether the fewer, older sites are just as easy to find. If they have left fewer traces (e.g. block construction of houses, no pits), then you will also find less. Are all epochs sampled and examined equally (see above?).

There is also a lack of inclusion of other crops. For example, a change from dry to wet rice cultivation from the Neolithic to the Bronze Age can be expected, etc. This would clearly substantiate the author's thesis of increasing effectiveness. In addition, the archaeological background would be interesting, what do we know: settlement concentration? Which raw materials? Already metal? Trade?

There is something strange with nitrogen and loess on p. 15 below. The black soils from loess have been the most fertile soils ever, which probably did not have to be fertilized for the first 1-2 millennia.

In the case of bar charts, the dashed lines must be removed or consistently applied to everything. Mathematically, they are strange, because these are different times and data sets. Why are some bars missing in the charts? The number of the figures has to be checked.

Something important for the calculations is the differentiation of mass finds (charred storage finds) versus normal settlement waste. If such mass finds, which are singular events, are included in the calculations, they confuse the results, e.g. by pretending an "increase".

There are also many repetitions of the same and the text could be significantly tightened.

As for the data tables (Excel):

They are not understandable for people not involved in the project.

The feature numbers, sample numbers and sample volumes investigated per site are lacking.

Are all items preserved charred?

The order of the data is unclear.

The archaeological period and the publication per site are lacking.

Conclusion: This is an interesting and big dataset which should be published, but with major revision of the paper and the Excel (data) table.