Comment on essd-2022-200
Anonymous Referee #3

Referee comment on "A dataset of standard precipitation index reconstructed from multi-proxies over Asia for the past 300 years" by Yang Liu et al., Earth Syst. Sci. Data Discuss., https://doi.org/10.5194/essd-2022-200-RC3, 2022

General comments

This paper combines a vast amount of paleoclimate information consisting of different proxies such as tree rings and documentary materials to reconstruct annual and rainy season precipitation across Asia in a grid of 2.5 degrees over the past 300 years. Reconstructions of precipitation in such a wide area has been done several times in the past, but in this paper, not only new data that has not been reflected in previous studies has been added, but also a method called GLDD, which is a new method of sorting proxy data, is effectively used, and a very accurate reconstruction is realized. Therefore, the usefulness of the obtained data set is very large.

On the other hand, with regard to the evaluation of the results of this paper and future issues, several points that should be added or improved were recognized as follows.

1) GLDD is considered a very good proxy sorting method. In fact, this method can be used to reconstruct paleoclimate fairly accurately even in areas where proxy data is not present, such as the eastern part of the Caspian Sea. This means that, in some places, the "searching region" of the grid is very large. In order to help readers better understand the effectiveness of GLDD, it would be good to have a map showing the size of the "searching region" for each grid.

2) In Figs. 5 ~ 8, the accuracy of the SPI reconstruction results in eastern China is very high. This is clearly because DWI is mainly used in eastern China. Using DWI is very important. However, unlike tree rings, the quality and quantity of the documentary material on which the DWI is based has been greatly improving as the times become newer, and from the 20th century, meteorological observation data itself should be included in the documentary materials. Since the calculations in Figs. 5 ~ 8 are based on the comparison of meteorological observation data and proxy data from 1948 CE, it is
obvious that the SPI reconstruction accuracy will be higher in areas where DWI is used as a proxy than in areas where only tree rings are used, and it may not reflect the actual reconstruction accuracy of the SPI from 200 years ago or 300 years ago. There needs to be a mention of that possibility. In the same sense, since the observation and reconstruction data included in Fig. 10 are both affected by the meteorological observation data, it is obvious that the two coincide.

3) In this paper, calculations excluding tree-ring data that show negative correlations with precipitation are performed in Figs 5 and 7. In arid regions, there should be certainly a positive correlation between precipitation and tree ring width, but in humid regions, there is usually a negative relationship of precipitation with temperature and/or solar radiation, so it is rather common for there to be a negative correlation between precipitation and tree ring width. In fact, as shown in Figs 6 and 8, results using tree ring data that show negative correlations with precipitation are much better than excluding it. In other words, I do not understand the meaning of calculating Figs. 5 and 7.

4) In this paper, the accuracy of the reconstruction of SPI in eastern China was improved by using DWI based on document materials. This is a very good thing, but there are a lot of documents related to weather since 1700 CE in Japan and elsewhere. In this paper, authors also use the oxygen isotope ratio of tree rings, which are highly correlated with precipitation. Since the data on the oxygen isotope ratio of tree rings has increased rapidly in recent years, it is expected that the results of this study will be further improved if calculations based on GLDD are performed by incorporating such document materials from other regions and data on the tree ring oxygen isotope ratio. It might be good to have such a comment in the text.

 spécifique comments

Lines 95-101: In this paper, authors utilize raw tree-ring data, instead of using published tree ring chronologies, and process them according to author’s own method. However, the reader cannot judge the effect of the data processing on the results. I would appreciate it if authors discuss in some way whether or not there is an impact from the processing of data?

Line 174: What is the specific reason for the decision to limit the number of proxies used for calculations to 5?

Lines 177-178: 1942 and 1943 are mistakes for 1742 and 1743.
Figure 9: In this figure, the meaning of indicating the area where the correlation coefficient is negative can be understood. But the meaning of classifying the area where the correlation coefficient is positive by the p-value is difficult to understand. In fact, India's low p-values only mean that the period of meteorological observations there is long before 1948 CE, and I don't think it is relevant to the discussion in this figure.