Comment on essd-2021-460
Liheng Wang (Referee)

Referee comment on "A 148-year precipitation oxygen isoscape for China generated based on data fusion and bias correction of iGCMs simulations" by Jiacheng Chen et al., Earth Syst. Sci. Data Discuss., https://doi.org/10.5194/essd-2021-460-RC1, 2022

The stable isotope composition of water is a very useful tracer to elucidate its formation history and cycle. The precipitation is an essential input for the hydrological cycle but it is very difficult to obtain continuous temporal and spatial variations of precipitation isotopes. This paper provides a high-resolution precipitation oxygen distribution in China based on IAEA long-term data and other datasets. These results will be of significant interest to the scientific community, particularly in hydrology. Overall, this review paper is scientifically robust given the available datasets. It is also reasonably written and well organized. I think the paper suits the reader of this journal and can be accepted for publication. I have some major comments and several minor comments for the authors to consider.

Major:

- The topic of this paper is very interesting, in my opinion, it upgrades the data from a sparse point scale to a continuous regional area scale. I suggest that authors highlight this in the introduction section, and be more explicit about the meaning of the paper, which will help arouse the reader's interest and facilitate its further spread.
- As we know, isotopic composition in precipitation also varies dramatically over time. Therefore, I think the temporal resolution is also important. What do you think about this? I think authors should state or discuss clearly the time resolution.

Minor:

Line 25: investigated —> shown?


Line 63 watershed —> catchment

Figure 1 the unit (m) should be added to the legend.

IAEA also provided long-term data in Haikou, why isn’t it being used in your paper?

Line 96 There are many types of averages, are you using a monthly precipitation amount weighted average here?
Line 102: What is *surface condition*? Would you like to give more information?

Line 219: Figure 3. I think the NW result is bad too. It should be discussed in detail.

Figure 5–8: What are SPR, SUM, AUT, and WIN? Jan–Mar is SPR? Authors should clearly indicate the months covered by each season. Table 2 also should be clearly mentioned.

Line 315–319: Author should add some references to prove your point.

Line 338–40: You discussed TP again, why not move to Line 302?

Line 346: It's better to start a new paragraph so that it can be read more clearly.
Line 352-354: It's hard to see a significant trend.

Figure 9 Need to add y-axis labels.

Figure 10 I think it's very unclear to discuss why it is divided into these stages according to Figure 10. Based on methods? Or data? Authors should state it clearly.