

Comment on **essd-2021-460**

Anonymous Referee #2

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-RC2>, 2022

As one of the key tracers of hydroclimate change, precipitation isotopes have very important research significance. According to the current situation of less observational data, the authors used iGCMs to obtain high-resolution precipitation isotope data over the past 148 years, which will provide important data support for the study of precipitation isotopes and hydroclimate change. I think this research is meaningful, but there are still some problems in the article, I think it needs to be further elaborated before accepting publication.

- There is a problem with regional division. For example, Yunnan Province is a typical southwestern region of China, and its climate is dominantly influenced by the Indian summer monsoon, which is different from the region of southeastern China where is mainly influenced the East Asian summer monsoon. How can it be divided into southeastern regions? Generally, the Indian summer monsoon precipitation oxygen isotope values during JJAS are lower than the East Asian summer monsoon rainfall. I don't think current regional division is scientific.
- There are some GNIP stations with long-term precipitation isotope monitoring data, which can be used to compare long-term changes with the simulation results, such as the Hong Kong station. I suggest that the authors can compare the Hong Kong station and other stations with 8-10 years of monitoring data with the simulated isotope records. This comparison can be used to verify the reliability of the simulation.
- At present, the altitudes of each monitoring site vary greatly. When the author uses the monitoring data of each site for spatial analysis and compares them with the simulation results, did the author consider the effect of altitude on precipitation isotopes to calibrate? For example, according to the relationship between altitude and precipitation isotopes at each site or the large region scale, first calibrate the precipitation isotope data of all stations to the same altitude, and then compare it with the simulated data. Because the simulation precipitation isotope results are at the same altitude, if no calibration is performed, the spatial comparison of the simulated and monitored precipitation isotope data will inevitably not be the real results. In the current manuscript, it seems that the author has not calibrated, and it is suggested that the author add relevant correction processes or solutions.