Wet bulb temperature is of great significance for the study of global or regional extreme heat events and humid heat, and this study realizes the calculation and homogenization of wet bulb temperatures at 1834 sites in a global long-term sequence, which is very meaningful work. Overall, this manuscript is clear and well-written and presents interesting research, but some concerns need to address before acceptance and publication. (Minor revision)

- Figure S2 is difficult for readers to distinguish different zones. I suggest using different colors and symbols to distinguish different zones.
- As mentioned by the author, the air temperature, specific humidity, and surface pressure data of each site are reanalysis meteorological data of the nearest grid point directly extracted, but the spatial resolution of NCEP-DOE data is relatively low. When using the nearest neighbor algorithm to extract the temperature, humidity, and surface pressure data of multiple adjacent sites may be the same. Will this affect WBT calculation? If the bilinear interpolation algorithm is used for extraction, does the result of WBT change greatly?
- Line 168: How is the initial daily maximum WBT calculated? The time resolution of NCEP-DOE reanalysis data is 6h instead of 1h. More detailed description is required here.
- More detailed description of Figure 4 (a) is helpful for readers to compare the results before and after homogenization. In addition, “Before homogenization” should be “Before homogenization” in Figure 4 (a).
- Line 243: What does higher SNHT value represent?
- In Lines 264-265: The WBT is calculated site by site and day by day. The statistical results do show that there are many missing data of WBT in the HadISD-Humidity data, but the author believes that HadISD-Humidity has relatively low accuracy and higher uncertainties. From my understanding, the existing description is not enough to prove that HadISD-Humidity has relatively low accuracy and larger uncertainties.
As described by the author, the results of HadISD-Humidity and HiTiSEA are overestimated or underestimated, and the author uses HadISD-Humidity and HiTiSEA data to compare and analyze the results of GSDM-WBT, then the verification results do not represent the true accuracy of GSDM-WBT, but only the relative accuracy.