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Interactive comment on "Relationship between climate, environment, and anthropogenic activities in coastal North China recorded by speleothem δ^{18}O and δ^{13}C ratios in the last 1 ka" *by* Qing Wang et al.

Anonymous Referee #2

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In their manuscript, Wang et al. tried to use oxygen and carbon stable isotope records in a stalagmite sample from Kaiyuan Cave to address the relationship between climate, environment and human activities. However, the manuscript was very poorly written and some parts are even unreadable (e.g., lines 25-30 in abstract and lines 23-25 in section 4.3). There are numerous grammar mistakes and redundancies in the writing (e.g., the first two paragraphs in section 3). Moreover, the authors often made awkward statements without reasoning. It is difficult for me to recommend its publication in Climate of the Past. Following I provide a few major comments and minor issues, and

hope they would be helpful in authors' resubmission and future research.

Major issues: 1. I am surprised that the current manuscript has a significant overlap with their previous paper published in Climate of the Past (Wang et al., 2016, 12, 871-881), although the authors did include new datasets (e.g., 2 more U/Th dates, d13C data) in this manuscript. Some paragraphs were even simply copied from the previous one (e.g., in introduction, background, ...). This is typically unacceptable in scientific journals.

2. The age model the authors constructed for the sample is not reliable. How could it be possible to assign a specific calendar year to a laminar, particularly given the slow growth rate and relatively large U/Th age error bar? Some U/Th dates were randomly thrown away, without careful reasoning.

3. The authors really need to learn how to scientifically present their data. They need to add errors when present measurement data. Significant figures also need to be considered.

4. Section 4, it would be beneficial to show pictures of sample KY1, its lamina and micro-sampling locations.

5. In section 4.1, why not re-measure the subsamples if the authenticity of the sample is uncertain?

6. In section 4.2, it seems very odd to exclude the U-Th age at 45mm from the age model.

7. In section 4.3, the authors observe a quite interesting feature that "The UAT and So-fular Caves, affected by the maritime westerly wind, showed the latest δ18O mutation time; the Wanxiang and Spannagel Caves, nearly unaffected by the ocean, showed the earliest time; and the Kaiyuan Cave, affected by the East Asian Monsoon, fell in between." What's the possible mechanism behind this phenomenon?

8. In section 4.3, the relationship between solar activity and δ18O were not sufficiently

discussed. The authors argued changes in $\delta18O$ are corresponding to the variations in solar radiation (although I would argue it is not visually convincing). However, the authors did not explain why the changes of $\delta18O$ lags the changes of solar radiation and why the changes of $\delta18O$ respond to solar changes differently before, during and after LIA. These statements are very subjective.

9. In section 4.4, the authors argue that the variations of speleothem $\delta13C$ is controlled by the changes of proportion of C3- vs C4-, bio-productivity and the water-rock interaction. First, how to quantify the water-rock interaction? by time? Second, why the low $\delta13C$ values before 1482AD necessarily "indicate a lower proportion of C3- versus C4-plants, lower bio-productivity, and less water-rock interaction" (page 9 line 10)? Third, "This behavior results in higher proportions of C3- versus C4-plants and increased bio-productivity." (page 10 line 33), which according to the authors will decrease the speleothem $\delta13C$ values, contradicting to the increase trend of $\delta13C$ values between 1480-1744 AD.

10. In section 4.3 and 4.4, the relationship between the ancient Chinese dynasties and stable isotopes are very weak.

Minor issues:

Page 1 line 19, what does "smoother" mean here?

Page 2 line 25, the authors stated "The areas of eastern and northern China influenced by the southeast monsoon are likely to be warm, but not as warm as the areas of southwestern China that are influenced by the southwest Monsoon (Tan, 2007)". But when did it happen? MWP or LIA, or both?

Page 2 line 28, what does it mean "dry to wet to dry"?

Page 2 line 30, "Sever studies (Tan et al., 2003)." Incomplete sentence.

Page 4 line 15, "KY1 had uranium concentrations ranging from 704 to 5147 ppt". These are in fact thorium concentrations.

Page 4 line 18, figure 4 appears earlier than figure 3.

Page 5 line 18, not correct to have so many digits for isotope values. Same problem appears throughout the paper.

Page 7 line 16, "Comparing the $\delta18O$ value curve to contemporaneous records of Swiss Alpine glaciation (Holzhauser et al., 2005) showed no obvious correlation (Fig. 7C)." Then what's the point to mention here?

Page 10 line 20, a clear definition is needed here for the "drought/waterlog index cumulative departure curve".

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