Referees 2: Anonymous Referee

This manuscript presents a well dated speleothem isotope record from southern China, covering the period from 79.0 to 75.7 kyr BP. The high uranium concentration and low detritus thorium contamination ensure the high-precision chronology for this record and highlight the determination of the transition age of the CIS 21.

Response. We thank reviewer for the appreciation.

However, the authors only briefly mentioned that this record confirms the previous comparisons and potential linkages with high-latitude climate changes and there is no more discussion on the climate changes and its scientific significance during this period in the manuscript. This makes the manuscript a report on the results, but not a research article. So, it may be more suitable for journal of "Scientific Reports" or "Quaternary Geochronology", and the title should be changed to "Improved chronology of Chinese interstadial 21", or something like that.

Response. We agree with the reviewer that the paper is mainly focused on improved chronology of CIS 21 and needs added scientific significance. We have carried out a comprehensive revision of the manuscript in almost all sections particularly discussions. Owing to its robust age control and sub-decadally resolved replicate $\delta^{18}O$ time series, our record is the first in Asian monsoon realm to capture CIS 21 'rebound event' and its sub-structure. Early stage of this rebound event is characterized with three centennial-scale increased monsoon events that are concurrent with increased temperature peaks in Greenland ice cores. The later stage is marked with decreased monsoon activity consistent with its counterpart in Greenland. This synchronous multi-decadal to centennial scale variability indicates a large-scale climatic footprint of the NH high latitudes on the ASM domain probably through westerlies. Apart from divulging detailed ASM history from 79-75 kyr BP, our high resolution record allows us to constraint the timing of CIS 21 which can be used for chronological refinement in ice-core records.

We thank anonymous reviewer's critical review that helped us improve our manuscript significantly. Therefore, we believe that the revised manuscript is suitable for the journal 'Climate of the Past'. Further, the title has been modified as suggested by the reviewer.

The authors used the RAMPFIT to determine the transition, and then the termination of CIS 21. It was suggested that the termination of CIS 21 occurred at the mid-point of the transition. As seen from figure 6, the speleothem $\delta^{18}O$ persistently increased from 77.0 kyr BP to 75.7 ka BP, implying the transition could be defined as from 77.0 to 75.7 ka BP, albeit there are some high-frequent oscillations. Is this caused by the selection of time period for RAMPFIT analyzing, or it is the real output of RAMPFIT analysis for the whole record?

Response. Yes, it is difficult to define the transitional process by just using our record, featured with high-frequent oscillations. During the transition from the CIS 21 to the CS 21, both Shanbao and Dongge records display a large change of 2‰ in $\delta^{18}O$ (Fig. R1).This 2‰ shift in stalagmite $\delta^{18}O$ can be used as a criterion for transition from the strong monsoon CIS 21 event to weak monsoon CS21 event. After 77.0 kyr BP, Sanxing record shows an abrupt 400-yr $\delta^{18}O$ increase of 2.0‰, indicating a major climatic shift from the strong monsoon CIS 21 event to weak monsoon CS21 event (Fig. R1). In order to estimate the exact ending time of strong monsoon CIS 21 event, a statistical regression approach RAMPFIT (Mudelsee, 2000) was employed from 77.1 kyr BP to 76.3 kry BP. The statistically-calculated ramps are depicted in Figure R1. The duration of the transition at the end of the CIS 21 is determined to be from 77.0±0.2 to 76.6±0.2 kyr BP. The mid-point of this transition is 76.8±0.2 kyr BP.

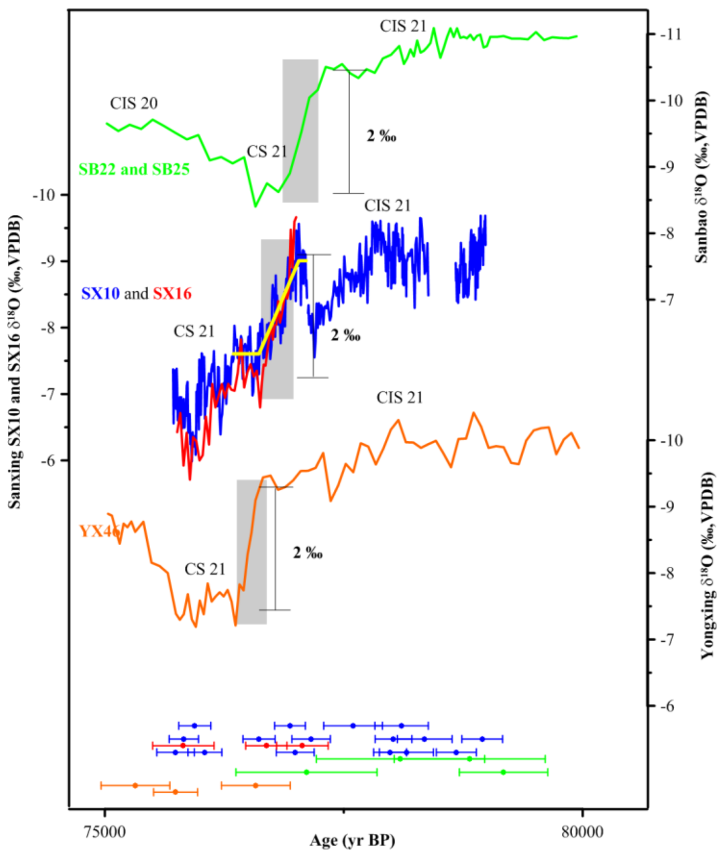

Fig. R1 Comparison of δ^{18}O time series of stalagmites SX10 (blue) and SX16 (red) with Sanbao SB22 and SB25 (green) (Wang et al., 2008), and Yongxing YX46 (orange) (Chen et al., 2016). CIS 21-20 and CS21-20 are the millennial-scale strong and weak monsoon events in China, respectively. Vertical bars denote the transition of CIS 21 termination. Yellow polyline is the ramp (Mudelsee, 2000) of SX 10 δ^{18}O record. ^{230}Th ages and errors are color-coded by stalagmite.

Typo, page 8 line 14, a 1.2-yr-long warming interval, the 1.2-yr should be '1.2 kyr'

Response: The typographical error has been corrected in the revised verison.

References:

Wang, Y., Cheng, H., Edwards, R.L., Kong, X., Shao, X., Chen, S., Wu, J., Jiang, X., and An, Z.: Millennial-and orbital-scale changes in the East Asian monsoon over the past 224,000 years, Nature, 451, 1090-1093, 2008.

Chen, S.T., Wang, Y.J., Cheng, H., Edwards, R.L., Wang, X.F., Kong, X.G., and Liu, D.B.: Strong coupling of Asian Monsoon and Antarctic climates on sub-orbital timescales, Sci. Rep., 6, 32995, doi: 10.1038/srep32995, 2016.

Mudelsee, M.: Ramp function regression: A tool for quantifying climate transitions, Comput. Geosci., 26, 293-307, 2000.