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Interactive comment on "Post-Pliocene establishment of the present monsoonal climate in SW China: evidence from the late Pliocene Longmen megaflora" *by* T. Su et al.

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We thank Dr. Teodoridis very much for many constructive comments on our manuscript. We have listed the full point-to-point response as below:

(1) General comments: Minor revision. I have added some my notes in the text. a) it helps to make Coexistence Analysis for the studied flora of Longmen and than interpret the LMA, CLAMP, CA results together to corroborate the given statement about climate change during Late Pliocene (late Miocene) to Recent period. The published CA datasets from the studied areas are not complete mainly MAT and MAP is presented which does not allow to better verification of the presented climate changes. b)

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there is no explanation for taxa figured in supplementary plates. The flora seems to be perfectly preserved and taxonomical study (and/or CA) should be done. c) check the results of CLAMP (I made manually my own analysis based on the presented datasets in the MS and have obtained slightly lower estimates). Identical MAT results from LMA and CLAMP is interesting, but not so typical. d) published "n" number of woody dicots.

Response: a) CA is an important and widely used method for paleoclimate reconstructions. In this method, each taxon should be identified firstly, and the climate interval of nearest living relative(s) for each taxon in the flora is the calculated climate condition for the flora. It is difficult to use CA in the Longmen flora, because only few taxa in this flora could be identified to genus level (Supplementary Plates I-III). Herein, both LMA and CLAMP were applied simply because both methods have been successfully applied to paleoclimate reconstructions of many Cenozoic floras. b) As we mentioned above, the poor preservation condition of many specimens in the Longmen flora makes it difficult to determine their systematic positions and the use of CA. c) We used the updated CLAMP dataset, namely PhysgAsia1 to calculate paleoclimate of the Longmen flora. This dataset was proved to be the suitable for paleoclimate reconstructions of Chinese paleofloras under the monsoon climate (Jacques, 2011b). There are several datasets for CLAMP, slightly different values would be obtained by using other datasets such as Physg3arc (http://clamp.ibcas.ac.cn/Clampset2.html). d) Twenty two morphotypes in the Longmen flora were used for paleoclimate reconstruction. We have explained it in MATERIALS (page 1680, line 17).

(2) Comment: page 1677, line 1. Add 'the' in front of 'Yongping County'.

Response: Because Yongping is a county, we'd prefer not to add 'the' here.

(3) Comment: page 1677, lines 12-13. Are the CA proxies from the studied area or from the close area? The statement seems to be so general. You should to specify the area, which were the source for CA.

Response: In the revised manuscript, we will add the sentence 'on the late Pliocene

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floras in western Yunnan' in front of 'based on the coexistence approach (CA)'.

(4) Comment: Page 1678, lines 28-29. Re-write, it builds coexistence interval for each climatic parameter based on those of the nearest living relatives of each taxon in the flora.

Response: We will replace 'The principle of CA is based on the climate interval of the nearest living relatives of each taxon in the flora' by 'The principle of CA is based on the coexistence interval for each climate parameter of the nearest living relatives of each taxon in the flora'.

(5) Comment: Page 1679, line 14. From which area (see my note above)

Response: We will add 'in late Pliocene floras of western Yunnan' after 'by the taxon based Co-existence Approach'.

(6) Comment: page 1680, line 18. Plates include 25 figures, it does not correspond to 22 morphotypes. It necessary to add some explanation to plates, some figures leaves/leaflets should be fuse to one morphotype. e.g., Plate I (1-C)

Response: Yes, we will add the explanation to each figure to illustrate the systematic assignment/number of morphotype and specimen number.

(7) Comment: page 1683, line 4. Please add the value of "n" (total number of woody dicots), it is impossible to verify the SE for MAT.

Response: We will rephrase the sentence by 'the proportion of untoothed leaf taxa in 22 woody dicotyledonous species'.

(8) Comment: page 1683, line 19. Please be exact in 3-DRY, 3-WET or 3DRY, 3WET use in the MS.

Response: We will check throughout the manuscript to uniform 3DRY and 3WET.

(9) Comment: page 1683, line 22. Replace 'cm' by 'mm'

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Response: Yes, we will change it.

(10) Comment: Page 1684, line 7. It is an almost miracle to obtain same MAT estimates for CLAMP and LMA.

Response: Yes, this is the result we calculated based on leaf scores.

(11) Comment: Page 1684, line 21. Are you sure, that this phenomena is not also linked with significant decrease of CMMT parameter. Can you give me some example from recent?

Response: We will add one paragraph to explain why CMMT stays quite similar. Please check the Response 13# in details.

(12) Comment: Page 1684, lines 23-24. Be more exact and explain which plant elements and results of micopalaeobotanical and sedimentological analysis were supported your previous statement about increase of altitudes in W Yunnan, while WMMT is decreasing and CMMT is balanced compared those from late Pliocene and today. Basin analysis is very vague term.

Response: We will rephrase the sentence 'During the late Pliocene, the altitude of western Yunnan might not have been as high as the present day, an interpretation that is supported by prior evidence from plant fossils (Kou et al., 2006; Xie et al., 2012), testate amoebae (Yang et al., 2006), and basin analysis (Fan et al., 2006).' by 'Previous studies based on both palynological data (Kou et al., 2006) and plant megafossils (Xie et al., 2012) also concluded a similar pattern of temperature and supported that, the altitude of western Yunnan during the late Pliocene might not have been as high as the present day. This conclusion is proved by other evidences, such as testate amoebae (Yang et al., 2006), and sedimentological analysis (Xie et al., 2012).'

(13) Comment: Page 1684, line 25. What about CMMT parameter ?

Response: We will add one paragraph to explain why is the similarity of CMMT between the late Pliocene and nowadays: On the contrary, CMMT stayed similar between the

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late Pliocene and the present day. During the Late Pliocene, even the increase of altitude could decrease the temperature, and the winter monsoon brings the cold airflow from Siberia; however, CMMT happens in the dry winter with less cloud, and the land surface absorb more heat energy from the solar radiation. Consequently, the solar radiation compensates for the decrease of temperature caused by both a higher altitude and cold airflow from Siberia in winter. If the winter of the present day in Yongping was wet, there should be a lower CMMT. Guilin city, being at a lower altitude with a similar latitude to Yongping, experiences a wetter winter with 3DRY in 183.6 mm. CMMT in Guilin is 7.8 °C nowadays, comparing to 8.2 °C in Yongping (China Meteorological Data Sharing Service System(CMDSSS), http://cdc.cma.gov.cn).

(14) Comment: Page 1685, line 9. Do you mean use of LMA, CLAMP, CA ?

Response: Yes, we will use 'different approaches' instead of 'independent approaches'.

(15) Comment: Page 1685, lines 9-10. See value of CMMT for Wanbao (Yuanmou), there is no results of WMMT and CMMT from CA for Yangyi and Longling !!! better higher MAT.

Response: We will add one sentence to explain why the climate history in Wanbao is different: 'One exception is the late Pliocene Wanbao flora in central Yunnan: a cooler climate during the late Pliocene was proposed, which might be due to the local tectonic change, forming a dry-hot valley nowadays (Yao et al., 2012)'. Besides, based on the results from previous references, WMMT and CMMT were not available for Yangyi and Longling floras (Xu et al., 2004; Kou et al., 2006).

(16) Comment: Page 1685, line 11. Which parameters?

Response: We will replace 'higher temperature' by 'higher MAT and WMMT'.

(17) Comment: Page 1685, lines 21-23. It does not correspond to your results of Longmen and Wanbao floras see CMMT !

Response: We will add one sentence to explain why the climate history is different in

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Wanbao. Please check it in Response 15#.

(18) Comment: Page 1686, lines 12-15. It has not general validity. I have know many sites for Europe where MAP intervals are not so wide. There is also general problem with MAP estimates in CLAMP and "compatibly" of MAP (CA) and 3-WET, 3-DRY as well as MMaP, MMiP.

Response: Yes, it might be the case for Europe floras; however, in previous studies, precipitation intervals are wide for the late Pliocene floras in Yunnan (Supplementary Table 1). We will add 'in previous studies with focuses on paleoclimate reconstructions of the late Pliocene floras in western Yunnan' after 'because the precipitation co-existence intervals in CA are wide'.

(19) Comment: Page 1686, line 20. What does 'vital' mean?

Response: We will use 'an important role' instead in the revised manuscript.

(20) Comment: Page 1688, lines 22-23. It is very general statement, give more details here.

Response: We will add "As temperature related parameters are concerned, MAT and CMMT decreased slightly, and WMMT decreased significantly from the late Pliocene to nowadays. All precipitation related parameters are much lower at present than these during the late Pliocene'.

(21) Comment: Page 1696, Table 2. You should explain LMA, CLAMP and add here references such for LMA sensu Su et al. 2010, CLAMP sensu XXX. The standard error of MAT was estimated by following Miller et al. (2006). Add altitudes of modern weather stations. Delete "The standard error of LMA was estimated by following Miller et al. (2006)"

Response: Yes, we will revise all of them by following these suggestions.

(22) Comment: Page 1698, Fig. 2. You have to explain different colors in the map, just

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give info in caption and delete the color rectangles which are not visible in the map. Also information to color arrows has to be given there is no sense for color arrow, blue and red ones should misinterpret the "temperature" of the monsoons.

Response: Yes, we will modify the map with arrows in white color and used histogram instead of color rectangles to show different altitudes.

(23) Comment: Page 1699, Fig. 3. Add "and partly table 2".

Response: Yes, we will add it.

(24) Comment: Page 1701, Fig. A2. Are error bars represented the CA estimates? Please add this info into Figure A2.

Response: Error bars did not represent the CA estimates. In Fig. A2, we have noted that all values of Neogene floras are from LMA and CLAMP.

Interactive comment on Clim. Past Discuss., 9, 1675, 2013.