

Referee #2 (Anonymous)

1. General comments: This review paper aims to reconstruct the long-term environmental changes based on pollen record in the Qaidam Basin since the nearly Miocene. Generally, this article is well-written, the authors not only discuss the pollen record, but also link such records to the possible effects of mountain uplifting and atmospheric circulation. In my opinion, this paper can be accepted after minor revisions.

2. Specific comments:

1.1 Line 13 of the Abstract, the “18 Ma” should be “3.6 Ma”?

Response: Because F2 has been deleted from the compiled diagram, 18 Ma should be replaced by 5 Ma.

1.2 Please clarify the expression on lines 16-17 about the role of Tibetan Plateau uplift on the regional environmental evolutions in the Qaidam Basin, because I am a little bit confusion about the sentence “and that the Tibetan Plateau uplift also contributed in contrast to the East Asian summer monsoon”.

Response: Yes, the sentence has been changed (please see lines 27-29, and also the response to Prof. D. Mildenhall (Chapter 2.1)).

1.3 Throughout the text, the authors argued the continuous cooling or drying trend, actually, there are some hiatuses or lack pollen records of their compiled record, For instance of 5-3.6 Ma time span. So, you cannot say continuous cooling. As my view, the trends are more stepwise than continuously!

Response: Yes, such an important question. We noticed the main trends are an overall decrease with some fluctuations (stepwise). However, the trends are foremost and obviously more important than stepwise (please see lines 27-29, and also the third response to the Editor).

1.4 In the discussion section, the authors mentioned continuous uplift of the Tibetan Plateau (Page 1494, line 6), this is also an open question, by now, to my knowledge, there is no independent evidence for supporting such argument.

Response: Yes, the continuous uplift of the Tibetan Plateau by An et al. (2006) is presumed, we only cited it as one opinion. In fact, the tectonics and paleoaltimetry in the Qaidam Basin and the North Tibetan Plateau (also including the Tianshan Mountains) are more complicate than that record (we will delete it if the reviewer still disagrees).

1.5 Also on Page 1494 of lines 17-18, the authors argued that “In the western part of the Qaidam Basin, both lithofacies and pollen counts from the KC-1 core show no direct tectonics occurring between 18–5 Ma” I disagree with this interpretation, it is not easy to infer tectonic events just from pollen record. Otherwise, the tectonic uplifts should be deduced from independent evidence. So, you cannot exclude the possible effect of mountain uplift on the environmental evolution in such an active tectonic region.

Response: Yes, deleted.

1.6 The implications of Figure 5 should be included in the Discussion Section rather than in the Conclusion section. 7. The text miss several published papers concerning with the long-term aridification in the northwestern inland basins of China. For instance: The pollen records of Ma, Y., Li, J., Fan, X., 1998, Chinese Science Bulletins 43, 301–304; Ma, Y., Fang, X., Li, J., Wu, F., Zhang, J., 2004, Science in China (Series D) 34, 107–116 (in Chinese); the enhanced 5.3 Ma aridity supported by the formation of the Taklimakan Desert in the neighboring Tarim Basin (Sun and Liu, 2006, Science), and the 24 Ma aeolian accumulation in the Junggar Basin (Sun et al., 2010, Geology).

Response: Yes, the implication of Fig. 5 (as Fig. 11 in new manuscript) is moved into ‘Discussion section’ (please see lines 387-396), and the related papers are all cited.