

Interactive comment on “Extreme drought event in AD 1637–1643 in North China: New insight from pollen records in Kaifeng City” by Dexin Liu et al.

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Dear referee,

We are truly grateful to your critical comments and thoughtful suggestions on our manuscript (Extreme drought event in AD 1637–1643 in North China: New insight from pollen records in Kaifeng City. No. cp-2016-122). Based on these comments and suggestions, careful modifications will be made in the revised manuscript. Below you will find our point-by-point responses to your comments.

1. The reviewer’s comment: Page 3 Line 8: “. . .the vicinity of Kaifeng used to be flooded many times.” Line 10: “. . .when it became its capital city.”

The authors’ answer: As suggested by the reviewer, we will rewritten the sentence in

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the revised version.

2. The reviewer's comment: Page 4 Line 19: "In March 2003, the Kaifeng Municipal Archaeological Team. . . ." You referred to a Song Dynasty archaeological layer but did not give the age or clearly state whether it was found at this site or elsewhere. In order to sustain your argument and convince your readers, your explanation need to describe clearly. Line 23: ". . .the Yellow River flood have disturbed Kaifeng City. . ."

The authors' answer: Thanks for your comment. In March 2003, the Kaifeng Municipal Archaeological Team found a Song Dynasty cultural layer (AD 960–1127) in the depth of 10–11.3 m, located in northeast of the JM core about 200 m. We will add this to the revised version. As suggested by the reviewer, we will replace "the flooding of the Yellow River has affected Kaifeng City" by "the Yellow River flood have disturbed Kaifeng City".

3. The reviewer's comment: Page 6 Lines 19–21: "Studies on alluvial pollen suggest. . .in alluvial sedimentary deposits from other regions." The meaning is unclear. The existence of hydrodynamics and taphonomic process are mainly influencing the pollen deposition and pollen preservation. Line 25: "Chenopodiaceae and Asteraceae (including Artemisia) pollen, with relatively thicker pollen extine", in addition to thicker pollen extine, it may also has the higher gravity.

The authors' answer: Thanks for your comment. Studies on alluvial pollen suggested that the existence of hydrodynamics and taphonomic process would have influenced the pollen deposition and its pollen preservation in the alluvial sediment. We will rewrite the sentence to make the statement clearer. As suggested by the reviewer, we will add "higher gravity" to the revised version.

4. The reviewer's comment: Page 7 Line 6: The "intermittent period" are also deposited, just not by flood deposition. It may be better replaced by "there was no flood deposition in study area". Line 18: ". . .with the Yellow River flood. . . , and its higher pollen content of xerophyte and mesoxerophyte plants. . ."

The authors' answer: As suggested by the reviewer, we will rewritten the two sentences in the revised version.

We appreciate your effort, detailed comments, and useful suggestions. We will take up your constructive comments to improve our manuscript.

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