Climate
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Discussions

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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.

Anonymous Referee #1

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The paper presented by Liu et al. aims at the identification of the "Chong Zhen drought" event in a fluvial section near Kaifeng City, China. Although the topic of extreme climate events (i.e. droughts) and its influence on the society is of high scientific interest, the manuscript does not significantly contribute to this discussion. The manuscript lacks a clear focus and has little further implications. In this review, I will focus on the stratigraphic and sedimentological aspects of the manuscripts as these issues are within my expertise.

General comments:

1 Fluvial setting is not convincing, missing age control

The authors have chosen a fluvial setting in order to characterize a relatively short-lived drought event (AD 1637-1649). I would be very skeptical to extract detailed information

from such a fluvial setting as it is by nature very fragmentary and in no way continuous. Therefore, it is – in my view - almost impossible to attribute a certain depth section to this drought phase of 6 years. And if it was a drought phase, what kind of sediment would have been deposited during this climate period? I would expect little to no deposition or even erosion during dry conditions. This is also the case for the time period between the flood events of AD 1642 and AD 1841, where no sediment was deposited. For these reasons, this fluvial setting is not a suitable archive for a detailed paleoenvironmental reconstruction.

2. Grain size wavelet analysis

The authors measured the grain size of the deposits and the first thing they present is a wavelet analysis of the grain size data (i.e. Fig. 2). I would suggest that the authors first present the grain size data and then do further analysis on the grain size data. However, I highly question the use of wavelet analysis in a depth scale. Wavelet analysis gives information about potential underlying periodicities and this most useful in a time scale. Why should there be any cycles in a depth scale. It would imply that all flood events are equal-thick and the deposits have a similar grain size evolution. That is not what I would expect. Also in the text, the authors mention the 3m cycles, but the exact length of the two cycles is either 2.2m or 3.8m (see Page 4, Line 16). So this is not very convincing for a stable 3m cycle. Furthermore, what would be the interpretation of the 1m cycle (Page 4, Line 17)? Instead of the wavelet analysis, the study needs a detailed sedimentological description together with the grain size analysis showing the grading of the different intervals that can be related to flood or flood pulses.

Specific comments:

Page 4, Line 6: Use the up-to-date version of CALIB 7 and IntCal13

Figure 5: The grey marked interval is NOT the Chong Zhen drought according to Fig. 3 (here this depth interval is labeled as the Yellow River flood in AD 1642)!!

For all these reasons, I do not recommend the manuscript at this stage.

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Discussion paper