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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.

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We are truly grateful to Dr. Chu Chunjie for his interest in this manuscript and for sharing the critical comments and thoughtful suggestions. In the following, we sketch how we plan to address the two issues brought out by Dr. Chu Chunjie in the revision.

1. Wavelet analysis is an effective tool to analyze the periodical change of time series data. Space-frequency analysis, which is transformed by time-frequency analysis of wavelet, was used to reveal the sequence characteristics and sedimentary cycles of strata in different temporal and spatial scales. With the development of sequence stratigraphy, geologists have applied wavelet analysis to sedimentary cycle division of well logging curve since 1980s (Goldhammer et al., 1990, 1993; Deng, 2009; Zhao et al., 2009; Wang et al., 2013). As Dr. Chu suggested, the conclusion obtained from

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Discussion paper

wavelet analysis in the time scale instead of in the depth scale is more reliable. However, sedimentary strata embodied rich environmental information about the sedimentary events and their profile properties varied from time to time, so that the extracted information along the vertical profile can be taken as another form of time information. Therefore, wavelet analysis of sediment grain size in the depth scale was carried out in this paper.

Main references as follows: Deng, H.: Discussion on problems of applying high resolution sequence stratigraphy, J. Palaeogeogr., 11(5), 471âĂŠ480, doi: 10.7605/gdlxb.2009.05.001, 2009. Goldhammer, R. K., Dunn, P. A., and Hardie, L. A.: Depositional cycles, composite sea-level changes, cycle stacking patterns, and the hierarchy of stratigraphic forcing: examples from Alpine Triassic platform carbonates, Geol. Soc. Am. Bull., 102(5), 535-562, doi: 10.1130/0016-7606(1990)102<0535:DCCSLC>2.3.CO;2, 1990. Goldhammer, R. K., Lehmann, P. J., and Dunn, P. A.: The origin of high-frequency platform carbonate cycles and third-order sequences (Lower Ordovician El Paso Gp, west Texas): constraints from outcrop data and stratigraphic modeling, J. Sediment. Petrol., 63(3), 318-359, doi: 10.1306/D4267AFA-2B26-11D7-8648000102 C1865D, 1993. Wang, G., Xu, J., Yang, N., Lai, J., and Zhao, X.: Using wavelet frequency analysis to divide sedimentary sequence cycles and isochronous correlation, Geol. J. Chin. Univ., 19(1), 70âĂŠ77, 2013. Zhao W, Qiu L, Jiang Z, and Chen Y.: Application of wavelet analysis in high-resolution sequence unit division, J. Chin. Univ. Petrol. (Ed. Nat. Sci.), 33(2), 18âĂŠ22, doi: 10.3321/j.issn:1673-5005.2009.02.004, 2009.

2. As suggested by Dr. Chu Chunjie, wavelet variance analysis of the sand-clay ratio of the JM core will be provided to present the accurate scales in the revised manuscript.

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