Clim. Past Discuss.,
https://doi.org/10.5194/cp-2019-117-SC2, 2020
© Author(s) 2020. This work is distributed under
the Creative Commons Attribution 4.0 License.

Climate of the Past Discussions
Open Access
EGU

Interactive comment on "Lagged variation of moisture conditions in central Asia compared with monsoonal Asia during the last four interglacials" *by* Jia Jia et al.

Jianhui Chen

jhchen@lzu.edu.cn

Received and published: 13 January 2020

We agree with Dr. Ujvari's opinion that it is a better choice to date the chronology with a high-resolution, absolute independent dating method, if there has any select object for our research object. OSL is a good meter to determine the age of last interglacial aeolian sediment, and maybe penultimate interglacial aeolian sediment (Stevens et al., 2018). Our previous study had focused on the Holocene climate variation pattern comparison between Monsoon Asia and East Asia. The OSL data suggested the climate variation pattern of Monsoon Asia was lagging that of East Asia about 3-5 ka (Chen et al., 2016). However, in this study, we focus on the comparison of the last

Printer-friendly version

Discussion paper

four interglacials due to we believe the more objects we study, the closer we get to the truth. On this scale, the OSL dating result commonly presents a wide uncertainties range. Even for last interglacial and penultimate interglacial, the OSL uncertainty range can reach to 5 ka in a professional and excellent OSL study (Stevens et al., 2018), the length of which is similar to the lagging time referred in this paper. Due to the absolute independent dating method present a unignore uncertainty range, in this study, we selected a relatively dating method to further determine the chronology. The DK section had done the OSL and Paleomagnetic dating work in previous studies (Frechen and Dodonov, 1998; Ding et al., 2002). Base on those, we further developed the SPECMAP tuning chronology. We believe the absolute independent dating method combining with the relative dating method can produce a good chronology. Therefore, both two loess sequences were developed chronologies via tuning the particle size of loess to the SPECMAP (and partly NorthGRIP-Greenland) curves in this study. That is a commonly used chronology method for mid-Pleistocene loess (e.g. Sun et al., 2006; Guo et al., 2009; Hao et al., 2012). As you mentioned, this method may lead to a uncertainty range. However, this uncertainty range systemically happened in both two chronologies, it means the uncertain age affect limited on their relative age. And that is very important for our study. The OSL paper (Li et al., 2018) discovered the climate variation between Central Asia and East Asia presented an anti-phase pattern on precession component during the last interglacial. It means the climate change in Central Asia is about 10 ka lagging to East Asia on precession component. Although the length of lagging time is different, considered the uncertainties range of chronology, the result of OSL chronology is not conflicted with our result. According to comments, we will add some published OSL dating data in central Asia to discuss the unparallel variations between these two regions during Last interglacial. Nevertheless, thanks for your comments.

Reference: Chen, F. H., Jia, J., Chen, J.H., Li, G.Q., Zhang, X.J., Xie, H.C., Xia, D.S., Huang, W., and An, C.B.: A persistent Holocene wetting trend in arid central Asia, with wettest conditions in the late Holocene, revealed by multi-proxy analyses of loess-

CC BY

paleosol sequences in Xinjiang, China, Quat. Sci. Rev., 146, 134-146, 2016. Ding, Z.L., Ranov, V., Yang, S.L., Finaev, A., Han, J.M., and Wang, G.A.: The loess record in southern Tajikistan and correlation with Chinese loess, Earth Planet. Sci. Lett., 200, 387-400, 2002. Frechen, M., and Dodonov, A.E.: Loess chronology of the Middle and Upper Pleistocene in Tajikistan, Geol. Rundsch., 87, 2-20, 1998. Guo, Z.T., Berger, A., Yin, Q.Z., and Qin, L.: Strong asymmetry of hemispheric climates during MIS-13 inferred from correlating China loess and Antarctica ice records, Clim. Past, 5, 21-31, https://doi.org/10.5194/cp-5-21-2009, 2009. Hao, Q.Z., Wang, L., Oldfield, F., Peng, S.Z., Qin, L., Song, Y., Xu, B., Qiao, Y.S., Bloemendal, J., and Guo, Z.T.: Delayed build-up of Arctic ice sheets during 400,000-year minima in insolation variability, Nature, 490, 393-396, 2012. Li, G.Q., Chen, F.H., Xia, D.S., Yang, H., Zhang, X.J., Madsen, D., Oldknow, C., Wei, H.T., Rao, Z.G., Qiang, M.R.: A Tianshan Mountains loess-paleosol sequence indicates anti-phase climatic variations in arid central Asia and in East Asia. Earth and Planetary Science Letters, 494, 153-163, 2018. Stevens, T., Buylaert, J.P., Thiel, C., Újvári, G., Yi, S., Murray, A.S., Frechen. M., Lu, H.: Ice-volume-forced erosion of the Chinese Loess Plateau global Quaternary stratotype site. Nature Communications, 9, 983, 2018. Sun, Y.B., Clemens, S.C., An, Z.S., Yu, Z.W.: Astronomical timescale and palaeoclimatic implication of stacked 3.6-Myr monsoon records from the Chinese Loess Plateau. Quaternary Science Reviews, 25, 33-48, 2006. Zhang, J.J., Li, S.H., Sun, J.M., Hao, Q.Z.: Fake age hiatus in a loess section revealed by OSL dating of calcrete nodules. Journal of Asian Earth Sciences, 155, 139-145, 2018.

Interactive comment on Clim. Past Discuss., https://doi.org/10.5194/cp-2019-117, 2019.

CC BY