

Interactive comment on “Provenance changes of eolian dust at Lingtai section in the Chinese” by Y. Isozaki et al.

Anonymous Referee #2

Received and published: 23 June 2008

This paper presents results of a study on long-term provenance change for a loess sequence at Lingtai in northern China using Electron Spin Resonance (ESR) signal intensity and Crystallinity Index (CI) of quartz. The authors have shown in their previous publications that the ESR signal intensity and CI of quartz vary with major deserts across northern East Asia. Hence a combination of the two parameters may be used as a tool for fingerprinting provenance of fine silts in the desert-loess systems. Here the authors employed this source tracing technique to investigate the provenance change for the eolian dust accumulated during the last 7 Ma. Variation in provenance is an important issue in loess study as it may have some bearing for the processes such as regional tectonic activity and atmospheric circulation changes. However, identification of the past suppliers for a few million years old dust is intrinsically difficult due to the

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uncertainty in the formation age of the potential source areas. The data shown in Fig 3 do suggest temporal variations in the property of the fine fraction quartz for the studied samples. However, readers may only agree with the broad trend of the changes. I am concerned with the large error bars associated with the data. There is no sufficient account for the factors that control the precision of the data. The authors established the provenance of the samples according to their positions in the plot of the ESR signal intensity versus CI. In principle, this approach is justifiable. However, it becomes less convincing when they linked a certain part of the data to specific sources (Fig 4b-h and Fig 5). I am particularly concerned with the derivation of the end members and subsequent association with the potential sources; there are cases where too few data points were involved for the calculation. It is a step forward that the authors attempted to link the desert sediments with the rocks exposed in the surrounding areas and further to the regional tectonics. However, the relationship between the rock types and desert sediments may be more complicated than they described, and so is the effect of tectonic activity. The paper is written with a great deal of details. This may be useful for readers to understand the technique. But I would suggest the authors to shorten the text. Overall, the paper provides valuable data which point to clear changes in source material for loess at Lingtai over the last 7 Ma. It may be considered for publication in *Climate of the Past* provided the authors are willing to clarify the causes of the large uncertainties in the data and the validity of their approach in the derivation of the end members.

Minor points:

An, Z. S., John, E. K., Warren, L. P., and Stephen, C. P. should read: An, Z. S., Kutzbach, J. E., Prell, W. L. and Porter, S. C. Sun, D. H., John, S., An, Z., Cheng, M., and Yue, L. should read: Sun, D. H., Shaw, J., An, Z., Cheng, M., and Yue, L.

Interactive comment on *Clim. Past Discuss.*, 4, 335, 2008.

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