

Interactive comment on “Strong summer monsoon during the cool MIS-13” by Q. Z. Yin and Z. T. Guo

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We have appreciated the constructive comments of J. Vandenberghe and of the other anonymous referee. We are very happy to answer and discuss their comments as following:

1. For J. Vandenberghe’s comments

Comment 1: We appreciate referee’s suggestion to more clearly discriminate the effects of temperature and precipitation on the discussed climate extreme S5-1. Consequently, the relevant discussion has been strengthened in the revised manuscript (P4, lines 12 -18.). Although chemical weathering of loess is largely dependent of the monsoon precipitation, earlier attempt of quantitative estimates (Guo et al., 1998) based on a commonly accepted method showed that the temperature increased by 4-6 °C compared to the present-day conditions. This is also consistent with most of the modern observations that enhanced strength of the summer monsoon could lead to

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more rainfall and higher summer temperature in northern China. After these revisions, the main focus of our short-note on a monsoon strong-extreme (with increased T and P) in correspondence to a period with a larger-than-average interglacial ice-volume is clearer. The most interesting aspect is that global ice-volume and insolation changes, the two main factors invoked in earlier studies to explain the orbital-scale variations of the monsoon climate in China, are not directly valid for the MIS-13 soil. We agree with the reviewer that the loess record and the ocean and ice records are not providing the same information. The ocean at least is giving a worldwide information on the ice volume and therefore of the global temperature. It was not expected to find in a rather cool interglacial (shown by the ocean and ice curves), an intense monsoonal precipitation and humidity (as shown by the loess record). The curves are shown together to stress that the phenomena occur at the same time. Nevertheless, we have followed the remark of the reviewer by stressing even more the climatic interpretation of the loess-soil sequences. We have added (i) in Line 12 of Page 4 "Based on paleopedological and geochemical data of three loess sections, Guo et al.(1998) estimate an approximate increase of at least 4-6 °C for the annual mean temperature and an increase of 200-300 mm for the annual rainfall for the S5-1 soil in comparison with the modern conditions" and (ii) in Line 18 of Page 4 "These results show that S5-1 soil has undergone the most intense pedogenesis (Figure 1) and represents the greatest humidity of the past 2.5 Ma and a climatic conditions at least as warm as those during the interglacials younger than the MBE".

Comment 2: The referee suggested to mention some important data showing rather warmer-than-average conditions during the MIS-13 from the other regions. This has been done in the revised manuscript (Page 5, Paragraph 3). However, we keep this kind of review as short as possible because our discussions aimed at emphasizing the unusual strengthened monsoon circulation.

Comment 3: Following the suggestion of the referee, some other representative data from the loess sequences in China were added in the revised manuscript to strengthen

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the discussions, such as the magnetic susceptibility data of Kukla (1987) and the grain-size data of Vandenberghe et al. (1997). We fully agree with the review that there are other proxy data available for our statements. However we didn't know to which extend our paper in *Climate of the Past* must be allowed to be a review type rather than a short notice stressing that the loess shows an exceptional strong summer monsoon in a worldwide icy - rather cool interglacial.

2. For the anonymous referee's comments:

Comment 1: We fully agree that there is a substantial literature base for Quaternary East Asia climate. However, our purpose here is to stress the strong East Asian summer monsoon during the relatively cool MIS-13. Therefore, only the most representative literatures have been chosen.

Comment 2: About the available materials related to climate of East Asia we agree that there are many curves which could be used for discussion. But here again we recall that we are only interested by what happened during MIS-13. This is why we have added a few more curves in particular those from Kukla (1987) and Vandenberghe et al. (1997).

In sum, we are happy to see that the reviewer acknowledge that we have a core of a case. This was exactly the purpose of our short note to stress the occurrence of an exceptional monsoon in China during a relatively cool MIS-13. We have already submitted one paper starting to discuss the physical processes which are responsible for this kind of happening, and will continue to investigate this problem.

Interactive comment on *Clim. Past Discuss.*, 3, 1119, 2007.

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