

# ***Interactive comment on “Environmental dynamics since the last glacial in arid Central Asia: evidence from grain size distribution and magnetic properties of loess from the Ili Valley, western China” by Yue Li et al.***

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General Comments: Many studies deal with the correspondence between loess deposits and climate circulation but the causal relations are indeed poorly understood. Previously, the attention has been drawn to competing circulation systems of westerlies and monsoons. Thus, relations are indeed best studied in a region where different systems could have been present at times. Consequently, the studied region is favorably situated for this timely research. A most interesting result is the importance of precipitation on the loess depositional signal. Until now most attention has been paid

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to temperature variability that of course also impacts the wind circulation. It seems by this study that resulting oscillations in loess deposition show a complex pattern. And this may be the reason for the fact that the oscillating loess signals in C. Asia and the NE Tibetan Plateau are not that simply correlated with D-O-events or H-events. The paper is well written, designed and archived.

Minor comments -l 343-359: Two different explanations are claimed for the origin of the fine-grained endmember 3 (c. 18.9  $\mu\text{m}$ ). The main difference seems to be, if I understand well, that one hypothesis invokes high-suspension transport while in the other one surface winds are involved. However, both hypotheses interpret that this component is the result of background loess supply (as confirmed in lines 389-395) as previously demonstrated by Prins et al (2007), Vriend et al (2011) and Zhang et al (1999). It is not realistic to separate the grain-size fractions of 2-8  $\mu\text{m}$  (transported by westerlies) and 8-15  $\mu\text{m}$  (=EM3, transported at low altitude) as the authors seem to do. Both components react jointly constituting background loess supplied by westerlies as described by e.g. Prins et al. (2007). -l 441-447: If the Ili valley is sheltered from northeastern wind, as the authors claim, what is then the source area for the EM1 and EM2 fractions? There is no apparent difference between these coarse-grained fractions on the CLP, N Tibet Plateau and in the Ili valley where a distinct supply is clear from the northeast under the influence of the Siberian High. -l 454-456: Explain better how the 'cyclonic storms' originated by protrusion of the Arctic polar front, rather than by other circulation patterns. -l 476: The interesting absence of correlation between the observed grain-size signals and N Atlantic abrupt events is not only found in the Ili valley but also previously in Tadjikistan and the NE Tibet Plateau (Vandenberghe et al. 2006). -l 483-484: This sentence is not clear: is 'which' referring to the conclusions by the authors or by Vandenberghe et al.? It is not clear therefore what really is contradicting.

Technical comments: L 123: 'more reliable' than what? L139: insert 'were' between 'S1)' and 'then'; Figure 1 is too small. L 182: remove 'are'; L 317: 'shorter' than what?

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L 513: remove 'can' or 'may'. I suggest to shorten the title a bit.

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