

Interactive comment on “Holocene erosion triggered by climate change on the central Loess Plateau of China” by Gang Liu et al.

Gang Liu et al.

gliu@foxmail.com

Received and published: 24 December 2016

Dear editor and reviewers,

We would like to thank you for the many useful comments related to our manuscript ID se-2016-142 entitled "Holocene erosion triggered by climate change on the central Loess Plateau of China". We have carefully considered all the points and have revised our manuscript accordingly. A more complete explanation of the changes in response to the suggestions of the reviewer is listed below. We hope that these changes now make the manuscript publishable. If you have any additional comments, we are willing to consider revision in the further.

For your convenience, in responding to the comments we have first repeated the comment denoted and then made our response.

C1

1. This paper studies a relevant topic in the Loess Plateau of China: the variability of soil erosion during the last few thousand years, particularly in relation to changes in precipitation. The methods used are novel and the results provide good information on spatial and temporal variability of soil erosion. Nevertheless, there are some problems because the authors consider only two soil profiles as representative of a large study area. The authors do not explain which are the geomorphic factors that caused soil accumulation: Wind? Partially wind and overland flow? Mainly overland flow? Some kind of mass movement? The prevailing sediment transport and deposition process conditions very much the results, and this should be explained by the authors.

Response: Thanks for your valuable suggestion. Although the Loess Plateau of China was a large area, this study focused on its central part, where the soil accumulation process was similar and the erosion rate was different. Moreover, aeolian dust accumulation and soil erosion by overland flow, being the prevailing surface processes, have been forming the landscape of the Chinese Loess Plateau for the past 2.6 million years. However, the soil accumulation of the two research sites was seldom affected by mass movement, because the landform of two sites belongs to the tableland.

2. The authors also need to supply information on the material that has been dated with ^{14}C : have they directly used the soil carbon content? Concentrated pollen?

Response: The ^{14}C dates was obtained in the humin fraction which should be considered as the minimum age of the SOM. This had been explained in the manuscript (page 4, line 13-15).

3. The authors dominate very well the laboratory techniques used, although some geomorphological perspective would be interesting. It is not clear the reason why the authors selected a 2 m profile and no other depth.

Response: This manuscript focused on the time range of the Holocene. According to the results of other research (Ding et al., 1999; Zhou et al., 1994) the time range of 2 m profile in study area is about 10 ka. So, a 2-m profile was selected.

C2

References: Ding ZL, Sun JM, Rutter NW, Rokosh D, Liu TS. 1999. Changes in sand content of loess deposits along a north-south transect of the Chinese Loess Plateau and the implications for desert variations. *Quaternary Research* 52, 56-62. Zhou WJ, An ZS, Head MJ. 1994. Stratigraphic division of Holocene loess in China. *Radiocarbon* 36, 37-46.

4. Why did you consider stationary the relationships between precipitation and erosion rates?

Response: Obviously, the relationship between erosion and precipitation was not stationary, and it was affected by soil, topography, vegetation, and human activity. However, it is hard to get the historical data of all these factors. Even though the unstationary relationship between precipitation and erosion rates was established, it is hardly to be used to predict erosion rates without the correct input data of other factors. In this study, the only way to solve this problem was to use statistical and stationary relationships.

5. At the beginning of page 6: please, write "implemented".

Response: It was revised according.

Interactive comment on *Solid Earth Discuss.*, doi:10.5194/se-2016-142, 2016.