

Interactive comment on “The sharp decline of East Asian summer monsoon at mid-Holocene indicated by the lake-wetland transition in the Sanjiang Plain, northeastern China” by Z. Q. Zhang et al.

Z. Q. Zhang et al.

wangguoping@iga.ac.cn

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Dear Referee #2,

We appreciate all your comments and suggestions for our MS. Most of them are very constructive and helpful to improve the MS, and we are grateful to revise the MS according to your suggestions. While among your comments, some technical and scientific deficiencies which you proposed are not fully correct and need further debates. The detailed point-to-point responses are given as follows.

C2390

1. Response to the technical problem:

The method the referee suggested is definitely reasonable for the common samples, while for the peat samples it is actually incorrect and unfeasible. As we all know the peat deposits are mostly composed by plant residues which are characterized by much larger size (up to several centimeters) comparing the naturally inorganic deposits. So, if we performed the grain-size analysis with the bulk sample, the grain-size distributions of the natural deposits should be covered by the signals of the plant residues, and such a result has no meaning for scientific studies. Here we used the peat ash for grain-size analysis aiming to avoid the influences from the plant residues. It is true that much higher temperatures (>700°C) may lead to sintering the sample, while 550°C for 2 hrs has been demonstrated to be suitable for eliminating the large plant residues without sintering. Such a method was initially proposed by Yu et al. (2006) for peat grain-size analysis for Hongyuan Peatland in central China, and it has also been demonstrated to be feasible in Peatlands in Sanjiang Plain (Zhang et al. 2014). So, the method was employed in the present study.

2. Response to the criteria used to identify the mud layers as lake deposits:

We agree the referee's comments on lithological descriptions, and more detailed information will be added in revised MS.

The Referee #2 rose an important question about which criteria used to identify the mud layers as lake deposits. There are three aspects about the issue:

1) The mud section is characterized by a few clear horizontal beddings, such characters can only appear in a still-water environment in lakes or ponds. While in river flood plains, although the mud accumulations may also appear, the horizontal beddings are rare because of the relative strong hydrodynamics. In revised version of the MS, the photo of the studied core will be added to provide some detailed information about the sedimentary processes to readers who are not familiar with this region.

C2391

2) The wetlands where the studied core situated is a typical dish-like depression, where the pattern of the peat basal depths is characterized by a generally increasing trend from margin areas to the center. Such a character corresponds well to the topographic feature of a lake rather than a river.

3) The lower part of the studied core is characterized by the blackish mud with a much lower content of sand proportion, indicating a still-water environment. Additionally, the grain-size analysis shows the gyttja is highlighted by the C2 ranging 2.0-13.6 μm (Fig. 5), which has been demonstrated to be the offshore suspension component in modern lakes in northern China (Xiao et al. 2013).

So, with the three criteria above we can identify the mud layers to be deposited in lakes rather than flood plains.

3. Response to the topographic setting in the Sanjiang Plain

It is true that the Sanjiang Plain is confined and crossed by perennial endorheic rivers today. While during the last ice age, a great number of dish-like depressions (Paleo-pingo lakes) were formed with the glacially eroding processes. Such a topographic setting in the Sanjiang Plain has been well studied by Song et al. (1988). Please see the supplement file.

4. Response to the East Asian monsoon climate in the Sanjiang Plain

Just as the referee proposed, the climate in the Sanjiang Plain is influenced by both the East Asian monsoon and the Westerlies. In the present study, we integrate the climate normal for the period 1957-2000 at six meteorological stations in the Sanjiang Plain. The rough coincidence of the precipitation maximum and warmest temperature indicates the regional climate is largely controlled by the East Asian summer monsoon. And such monsoon dominant climate during the Holocene has been well demonstrated in a large number of papers. Anyhow, we appreciate the referee's comments and more detailed descriptions will be added in the revised version of the MS.

C2392

Please also note the supplement to this comment:

<http://www.clim-past-discuss.net/10/C2390/2015/cpd-10-C2390-2015-supplement.pdf>

Interactive comment on *Clim. Past Discuss.*, 10, 4595, 2014.

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