

Clim. Past Discuss., referee comment RC1
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Comment on cp-2021-108

Anonymous Referee #1

Referee comment on "Low-latitude climate change linked to high-latitude glaciation during the Late Paleozoic Ice Age: evidence from the terrigenous detrital kaolinite" by Peixin Zhang et al., Clim. Past Discuss., <https://doi.org/10.5194/cp-2021-108-RC1>, 2021

Title: Low-latitude climate change linked to high-latitude glaciation during the Late Paleozoic Ice Age: evidence from the terrigenous detrital kaolinite
Author(s): Peixin Zhang, Jing Lu, Minfang Yang, Longyi Shao, Ziwei Wang, and Jason Hilton
MS No.: cp-2021-108

Recommendation: Rejected

The paper is well written and presents interesting results concerning past climate conditions for North China. However I identified a fundamental issue requiring clarification. Indeed the authors investigate local climate conditions **without presenting and discussing the geological setting of the area**. In the absence of data highlighting the geological evolution of this site, most of statements presented in the discussion (4.2) remain too speculative to support authors' conclusions. I encourage the authors to resubmit their article after significant rewriting of the manuscript, with a full description of the continental environment and its temporal evolution (which explains why I recommend "rejected" rather than "major revision").

In addition here is a list a suggestions to improve the manuscript

- One major issue is the determination of the paleolatitude of the site through time with good precision. In principle, local paleomagnetic data could decide this issue because from them paleolatitude can be estimated. Moreover, authors used a unique reconstruction (Blakey 2011) for a period extending over 30 myr (300-270Ma) without discussing most recent reconstructions with finer time slices (for details, see <https://www.earthbyte.org/category/resources/data-models/paleogeography/>). Because the hydrological cycle (thus the weathering) depends on the Hadley cell in low latitudes this point must be solved in order to discuss the accuracy of findings in term of Earth's climate.

- lines 195-200: the time-correlation deserves more attention. Based on the fig.9, the atmospheric $p\text{CO}_2$ for S-II and S-IV overcomes the one for S-3 while this state appears as "warm and humid".