

## ***Interactive comment on “Clay mineralogical evidence for mid-latitude terrestrial climate change from the latest Cretaceous through the earliest Paleogene in the Songliao Basin, NE China” by Yuan Gao et al.***

**Anonymous Referee #1**

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This manuscript reported the result from the SK-1n core. Authors tried to interpret the paleoclimate change using the clay mineral information. This is very important since the numerous data and the interprets from the oceanic sediments, but the study from the continent is very rare. The constraints are the difficult to obtain the complete and continuous samples. The SK-1n carried in a long-lived lake across late cretaceous to paleogene and satisfied the study of paleoclimate. It is of course very important and is consistent to the air of the journal. I recommend the accept of this mauncript.

I have some suggestion for this manuscript, the detail is following.

C1

The methodology is right, but the reviewer is still worrying. The clay mineral was separated from the mudstone without the effect from diagenetic. This also means that the clay mineral was formed on continent, but we have not the idea about the weathering durations. I think authors might need to clarify how theses clay mineral can record the response from climate? It is nor like benthic foraminifera doing.

The description of results is too simple and fail to give the necessary details. Such as the detail of the zone I to VIII. And the overall trends need to be clarified systematically.

Line 202: crystallinity index of smectite and illite was calculated from a FWHM, the relation of CI and contents of mineral show a positive correlation, this might be misunderstood. The lower content of the clay mineral, the peak will be very weak and FWHM might be abnormal wider than the higher content ones.

Though the origin of the parent rock was deduced, it is too simple more support might be summarized from the published references. Line 261 “mafic volcanic”was mentioned, how the weathering of mafic volcanic produce smectite and illite? Illite was referred to the product of the physical weathering, but some reference suggested that illite was the strong chemical weathering of muscovite (muscovite was thought to be chemical stable mineral and widely spread in sandtone and mudstone)? Hence, the authors might think again about the physical weathering and chemical weathering of the clay minerals. Line 417-419, mentioned the chemical weathering origin of the illite.

Then, the trends from clay mineral might be delayed to some extents since its weathering from parent rock on the continental. Do authors find some abnormal trend might be affected by clay minerals?

The conclusion remark is not well documented. Lines 432-439 may be deleted since it is the repetition of the results.

Please also note the supplement to this comment:  
<https://www.clim-past-discuss.net/cp-2020-36/cp-2020-36-RC1-supplement.pdf>

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