

Review on the manuscript “Sediment history mirrors Pleistocene aridification in the Gobi Desert (Ejina Basin, NW China)”, by Schwamborn et al., journal “Solid Earth”.

General comments.

This is a very interesting work dealing with the interactions between the tectonic and climate dynamics through the study of the sediments of a 200-long core extracted from the Ejina Basin in northwestern China. The manuscript is well written and presents a good state of the art / related literature revision. The methods are considered appropriate, well chosen and explained with high detail and wealthy data. The results are considered good, and thoroughly described and explained. And finally, the discussion presents a good interpretation of them, integrating them with the related literature and reaching valuable conclusions for a better understanding of the palaeogeography and palaeoenvironments of the region. The scientific quality is considered very good for the journal, and for the results themselves, and honestly, I only have some minor comments to this work, which consider that deserves being published.

Abstract.

Ok, very complete despite their synthetic character, and with many data of interest. It summarizes well the manuscript.

Introduction.

This section includes a comprehensive review on the relevance of the study of sediments in this area in relation to the interactions of the tectonics and climate forcing. An appropriate chronological background of the main tectonic events is included together with the dynamics of the sediment transport and accumulation in the area through the main streams, from the origin in the erosion of the main mountain ranges to the formation of the main alluvial fans. With this information, the aim of the paper is well justified. However, I suggest to move the last paragraph (L78-82) to the results section so that the results do not get ahead so soon in the manuscript.

Study area.

The information given in this section is very complete and gives a nice and accurate overall picture of the study area / region. In the first part, i.e. geographical setting, I suggest to include some data regarding to the specific location with latitude/longitude. Regarding to the climate, the data provided are adequate, but I wonder if the authors could add some information regarding to the synoptic climatology of the summer (i.e. the winter anticyclone is mentioned but not what happens in summer).

L101/102: change the “2” in “km²” to superscript.

L105: idem for “14” in “14C”.

L102: “m/s”, better as “m s⁻¹”. Information about wind direction and seasonal changes susceptible to modify precipitation throughout the year?

L114: please, add a hyphen in “ice free”.

L118-126: this comprehensive information about the vegetation may be summarized considering the nature and aims of this paper.

Methods.

The methods selected by the authors are considered appropriate for the study, and its use is well justified. The explanation of each method includes very detailed information. However, it seems to me that some sub-sections (i.e. methods/techniques) are explained with more detail and data than others (compare e.g. mineralogy subsections with pollen analysis or chronostratigraphy). Thus, a more balanced explanation of the methods is recommended. Moreover, in most of the cases, due to the use of many abbreviations, symbols and technical information, those readers not very familiarized with these techniques/and methods, may “be lost” when reading through this section. The information given is considered appropriate, but in the case of the sub-section 3.9

some results are given (L260-266), and I suggest to re-locate them and move to the 'Results section'.

L129: what do the authors mean with "maximum distance"? Could they specify it?

L276-277: change the exponent of the power notation and the numbers of the isotopes (mass number in ^{10}Be and ^{26}Al) to superscript.

L278-280: please, correct the units of the production rates to "atoms (g quartz) $^{-1}$ yr $^{-1}$ ".

L280: "stopped muonic"? Do the authors mean slow muons?

L281: please, format the mass numbers as superscript.

L282: I think that the authors mean an "online calculator" rather than a "tool". But which tool do the authors refer to? CRONUS? Please, clarify it.

L284-285: please format the length and density units to "cm $^{-2}$ ".

L287: this is a result; thus, please move to the 'Results' section.

Results.

The presentation and description of the results is considered good, although possibly, they might be summarized as a slightly shorter extent would benefit the manuscript.

L293: the three units should be mentioned now. Then continue with the description of each one.

L357-359: this is an interpretation, and thus I recommend to move it to the discussion section.

L363, L366, L367: please, change to "cm ka $^{-1}$ ".

L389: this is an interpretation – please, move it to the discussion section.

L421-422: this is an interpretation – please, move it to the discussion section.

L430-431: this is an interpretation – please, move it to the discussion section.

L437-438: this is an interpretation – please, move it to the discussion section.

L439: be careful with the decimal separators – change to point (decimal) instead of commas (thousands million years).

L445-447: this is an interpretation – please, move it to the discussion section.

L450-458: this information may be summarized, and even relocated: either in the 'Methods' section or in the 'Discussion', due to its usefulness for the interpretation or its relevance itself.

5. Discussion.

The interpretation of the results and their explanation in the context of the related literature is very clear and easy to follow. I only have some minor observations:

L526: which is the symbol at the beginning of the line? A typo? "Chenopodiaceae": format it in italics.

L556, L557: please, change "/ka" to "ka $^{-1}$ ".

L616-618: this reasoning is really interesting. I wonder if the authors could support this finding on some data of regional atmospheric palaeocirculation.

L627: what is "MTP": the meaning of this abbreviation has not been presented before.

L629: "CaCO $_3$ ": format the "3" as subscript.

6. Conclusions.

The conclusions summarize well the findings of the manuscript and the tectonic/climatic palaeogeographic interactions. Nothing else to add. Ok.

Figures and tables.

I cannot assess their quality as they are not included together with the manuscript, and wasn't able to see them.