

Interactive comment on “Sediment history mirrors Pleistocene aridification in the Gobi Desert (Ejina Basin, NW China)” by Georg Schwamborn et al.

Anonymous Referee #2

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The paper presents new data from a >200 m core, taken from the Heihe fan in the Ejina Basin. The results are integrated into the regional climatic and tectonic history. Overall, the data are a rich contribution to the regional datasets, and the paper is well worth publishing in Solid Earth. Some edits are needed to improve the paper: Someone needs to go over the English language of the paper and smooth it out. It's far better than I can manage in a second language, but it needs work. Many phrases are too clumsy, e.g. “reconstructing the main transitional modes of water availability. . .” – from the Abstract. The methods and results sections are very thorough. Figure 1 needs a better image for part B, and a better representation of the major faults in the area. Some poorly-defined faults are sketched, but major and well-understood faults in the Heli Shan and the northern Qilian Shan are left out. Use a better color scale for

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the regional topography. Everything looks much the same in the crucial range. Adding a satellite image will help; the fan is beautiful on GoogleEarth, so it is poor that you can't even see it on a figure for the paper. Part A should be replaced by a map closer to the study area – cut out the regions beyond 30-50 N and 80-110 E, and replace by a more detailed map. Figure 1 really is bad. . . Add more description of the lower contact with the Red Clay Formation. As noted in the text, the age of this unit is not well known, with published estimates ranging from Neogene to Cretaceous. But, this study describes intercalation at the base of the core; if correct, this implies a rapid but gradational transition from conditions at the top of the Red Clay to the undoubted Quaternary units. With this relationship, the Red Clay cannot be Cretaceous – at least in the study area. This is an important finding with much more importance than the authors seem to realise. Therefore it is important that they increase the amount of description and discussion of this crucially important part of the section. A change in sediment type and provenance is linked to “opening” of the Heli Shan, about 1 Ma. Again, more description and discussion is needed here. It's as though the authors have latched on to a tectonic argument, but they are not entirely clear what it means. This means that in turn the readers of this paper cannot be sure what is going on. A schematic figure would help. Careful with “tectonic pulses” – these are commonly based on interpretations of the stratigraphy, so if the stratigraphy is used to define a tectonic pulse, and the tectonic pulse is used to explain the change in stratigraphy, there is perfect circular reasoning. I don't think Wang et al (2017) found any evidence for a Pleistocene stepwise uplift in the region – where did this claim come from? The faults on the fan drawn in Rudersdorf et al (2017), reproduced here, are not credible: faults are shown right along the two major streams on the fan surface, there is no evidence for these structures. Once these things are tidied up, the paper will be a very useful contribution to the regional literature.

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