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Interactive comment on "The first luminescence dating of Tibetan glacier basal sediment" *by* Zhu Zhang et al.

Anonymous Referee #1

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The manuscript by Zhang et al. provides interesting and new data which justify publication in The Cryosphere. It is relatively well structured and well written. However, English wording is partly not sufficient and some language editing will be required (for example in lines 15: "... interpretation this information ...", "... highland over the world ...", line 21 "its sounding regions."). There are three major deficiencies which need to be addressed before publication:

1) The implications of the Kesang Cave record for the reliability of the Guliya ice core chronology are barely touched in the manuscript. The issue is mentioned but not explained in detail. Unexperienced readers will not understand the point. So, why is Kesang Cave and also the new study supporting the opinion that the Guliya ice core chronology is not correct. What is the evidence from Kesang Cave? This is not explained in sufficient way.

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Discussion paper

2) The authors state that the Chongce ice cap is not older than 42 ka. They also argue that this age is much younger than those assumed for the lower parts of the Guliya ice cores. However, what are the paleoclimatic implications of their findings for the Chongce ice cap? Are the new data evidence for an ice-free region in the Chongce region in Marine Isotope Stage (MIS) 3? If so, what are the implications for the snow and ice accumulation rate at Chongce since the establishment of the ice cap sometime in MIS 3 or later? What does the statement that Chongce subglacial sediments are much younger than Guliya basal ice imply? Are the two ice caps comparable in terms of altitude, exposure, underlying relief, etc.?).

3) The authors state that the bottom sediments beneath Chongce ice cap are a combination of sediment and ice. What is the evidence that the base of the ice cap was actually reached? Are the sediments possibly representing a higher concentration of sediments within the ice but not necessarily basal sediments? The authors do not state that bedrock was drilled.

Minor comments:

Are lines 9-14 on page 2 relevant? They could be removed. Page 2, line 26: ice or water content? make clear Page 3, line 20: what is “obvious”? Page 3, line 20: what are the dots in the unit here? Page 4, line 9: What is the result if the first case is assumed? Explain the age result for this scenario too. Page 4, lines 11-12: how is the study of Takeuchi et al. related with the new study here? Page 6, line 17: abbreviation should be probably “Geochron.” Page 7, line 7: no issue numbers Page 7, line 30: no capitalized letters if not for names or at beginning of sentence

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