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Interactive comment on "Seasonal deposition processes and chronology of a varved Holocene lake sediment record from Lake Chatyr Kol (Kyrgyz Republic)" *by* Julia Kalanke et al.

Anonymous Referee #1

Received and published: 9 February 2020

Manuscript number: gchron-2019-18 Title: Seasonal deposition processes and chronology of a varved Holocene lake sediment record from Lake Chatyr Kol (Kyrgyz Republic)

This manuscript of Kalanke et al. is a very well written, detailed and thoroughly discussed manuscript focused on the geochronology of the sedimentary record of a small lake in the Kyrgyz Republic. The focus on dating of the sediments, the discussion of varve structure and composition, and the combination with radiocarbon, lead-210 and cesium-137 dating makes this manuscript ideally suited for this journal. Furthermore, the authors also discuss the sediment fine structure and try to relate the sediment mi-

crofacies to paleoclimate changes. I enjoyed reading this manuscript, the figures are excellent, and all figures and tables are easy to understand. The size of the article seems appropriate (or slightly shortened) and I have only few comments, so I would recommend considering publication of this manuscript after inclusion of the minor suggestions below.

The only major suggestion would be to include more information and interpretations of the data regarding environmental and climate changes that the lake has experienced during deposition of the sedimentary record. In Lines 54-55 it is specifically stated that the main aim of the projects is a better understanding of Holocene climate in Central Asia, so this should also be included in this paper. It is the only main weakness of the manuscript and the paper would have much more value if more details on the climate changes in the region are included as well. That is why a third focus should be included in line 57, which states something like "3) reconstruction of regional climate changes in Central Asia". The discussion of climate changes could partly be included into chapter 5.1 or within the last chapter of the discussion, to extend what the authors describe very briefly. This could either be added to chapter 5.4 or as a new chapter 5.5.

Specific, minor comments:

Lines 14-17. These first two sentences of the abstract appear to be repetitive and could be combined in shortened form.

Line 44: Typo – "n" to be removed

Lines 53-54: This information should be included into supplements. The aim of these projects is obviously the reconstruction of Holocene climate and so more information on this should be provided in the paper.

Line 62: remove dash

Line 70: delete amounts

Line 133: How long was the in-growth time (check also spelling to change to "in-growth

time"). The term photo peak activity sounds incorrect to me and should be replaced with a more appropriate term. It is the gamma energy that is recorded in the gamma spectrometry.

Line 139: lab-internal – please note which lab, and where these samples were analysed.

Line 167: use a,b,c to refer to each group of laminae more easily and use this instead of "LZ+number" in the references to Fig 4 throughout the text.

Line 204: Add current institute/university of Ms Schwarz within brackets as well.

Line 231: Add picture of homogeneous sediment to Fig 4 as well to see how it compares to the varved intervals. In particular, this is useful to show the faint, discontinuous laminae in the uppermost cm.

Lines 269-270: Is this assumption justified? +/- 40 years BP uncertainty could be higher or lower? Why is it not possible to more precise that this? On the basis of the data presented, I would be surprised if the error is as high as 40 years?

Line 386: change to effect

Line 491 (data availability statement): Please add the data into this database during the review process, so you can include the doi of the dataset in this statement. I think it is very important to add the doi to the final paper, so the future reader can access the datasets easily.

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