

Geochronology Discuss., referee comment RC1  
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## **Comment on gchron-2021-27**

Alexander Robinson (Referee)

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Referee comment on "Calcite U–Pb dating of altered ancient oceanic crust in the North Pamir, Central Asia" by Johannes Rembe et al., Geochronology Discuss.,  
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The manuscript "Calcite U–Pb dating of altered ancient oceanic crust in the North Pamir, Central Asia" by Rembe et al presents a new application of U–Pb dating of calcite to constrain the age of oceanic crust, applied to addressing questions of the age and lateral continuity of ophiolite belts in the Pamir and Western Kunlun. The manuscript is well written with high quality, well presented data that both introduces a new technique to address the age of oceanic crust (a persistent problem in many orogens) and yields important new information on the tectonic architecture of the Pamir–West Kunlun orogenic belts. In regards to the tectonic portion of the manuscript, I feel that the results of this manuscript will have a significant impact, as the authors have shown that ophiolite belts long considered to be part of a continuous belt are unrelated and of drastically different ages. In regards to the development and application of the calcite dating as applied to oceanic crust, this topic lies a little outside of my expertise (I mostly deal with U–Pb in zircon), the results and analytical techniques appear to be of high quality, and their interpretations of the geologic significance of the ages are well justified.

My only significant comment is that it would be useful to have a regional geologic map (similar to 5a) as the first figure to help the geologic and geographic setting of the samples and study area (maybe move figure 5 to figure 1 and include a slightly large map area).

Finally, in the conclusion I would suggest simply reordering the statements to match the order presented in the discussion, starting with the calcite dating technique (lines 252–254) and geochemical signatures (lines 247–251), then finish with the ages obtained and the tectonic significance (lines 243–246).

I have also made numerous minor suggestions below, but those do not impact the scientific merits of the study and its conclusions. I recommend publishing after minor technical corrections.

Sincerely,

Dr. Alexander Robinson

Minor comments/suggestions:

Abstract:

Line 15: I would suggest rephrasing "poorly investigated" – "poorly understood" perhaps?

Line 17: As one age lies right on the Mississippian-Pensylvanian boundary, the authors may want to use Carboniferous (or early Carboniferous) - The use of Carboniferous is more commonly used throughout the rest of the manuscript.

Line 21: Do you mean late Paleozoic (i.e. the ages obtained)? Or are you referring to the Proto-Tethys subduction?

Introduction:

Line 30: delete comma after "process"

Geologic Background

Line 53: suggest "oceanic lithosphere" after Paleo-Tethys

Line 56-58: The authors set up the dissimilarity in ages between the Oyttag and Kudi sutures, but then only mention the existing geochronology of the Kudi suture – how is the Oyttag suture dissimilar based on existing ages (or are there any)?

Line 62: The sentence "An internal stratigraphy of the volcanic sequence is missing"

seems out of place. Is this important for understanding the age, and if so how?

Line 63: I suggest linking these sentences: "...a product of OFA, and that calcite ages can serve..."

Line 68: reference the map in figure 5

Results:

Line 133: "are overgrown" rather than "is overgrown"

Line 134: I would suggest referencing the labeled (2) and (3) sequence calcite from figure 2 in this sentence.

Line 144: I would suggest "concentration" rather than content; also insert "concentration" (or content) before "...in fissures filling..."

Discussion:

Line 178: insert "ages" after "reproduce". I also suggest "produce" rather than "reproduce"

Line 191: I suggest linking the first two sentences and get rid of "evidently", e.g.: "...have been studied experimentally, which have shown variable physiochemical..."

Line 229: remove comma after "corresponding"

Line 231: remove commas on either side of "subduction related"

Conclusion:

Line 253: remove comma after "show"

Figures: