

Authors' response to referee comments by Holger Stüinitz (Referee #2)

Dear Editor,

Please find below the response on behalf of all authors to the comments posted by Holger Stüinitz (Referee #2) on our manuscript "Epidote dissolution-precipitation during viscous granular flow: a micro-chemical and isotope study" (MS id: egosphere-2022-311).

To make the response easier to read and to assess, we have posted our own comments next to/below each comment in the PDF review file posted by the Referee.

We thank Holger Stüinitz for his constructive feedback, and hope that you will find this response and the revised manuscript satisfactory.

Yours sincerely,

Veronica Peverelli, on behalf of all authors



## Comment on egusphere-2022-311

Holger Stunitz (Referee)


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Referee comment on "Epidote dissolution–precipitation during viscous granular flow: a micro-chemical and isotope study" by Veronica Peverelli et al., EGUsphere,  
<https://doi.org/10.5194/egusphere-2022-311-RC2>, 2022

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Comments on the manuscript: «Epidote dissolution–precipitation during viscous granular flow: a micro-chemical and isotope study» by Peverelli et al.

The manuscript describes observations and geochemical data of a deformed vein in granitoid rocks. The data and observations are of good quality and are presented in a clear and concise way. The material is novel and original and of great importance for the inference of deformation processes in granitoids and other plagioclase-bearing rocks. I have not checked the geochemical details and isotopic parts, as these are not my field of expertise. However, the arguments presented make a lot of sense to me. From my point of view, the manuscript should be published after minor revisions. Some points in detail are listed below, some points are only suggestions:

Line 17: "Recrystallization" instead of "This"  <sup>1</sup>

Line 20: «ones» instead of «one»  <sup>2</sup>


Line 34: "... and strain rates" (not only temperature). "Interpretations" instead of "interpretation".  <sup>3</sup>

# Summary of Comments on egusphere-2022-311-RC2\_VP.pdf


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 Number: 1      Author: Veronica Peverelli      Subject: Sticky Note      Date: 7/22/2022 5:48:10 PM  
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 Number: 2      Author: Veronica Peverelli      Subject: Sticky Note      Date: 7/22/2022 5:48:16 PM  
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 Number: 3      Author: Veronica Peverelli      Subject: Sticky Note      Date: 7/22/2022 5:49:17 PM  
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Line 35: "modal amount" instead of "relative abundance"  1


Line 42: "in the presence of a fluid dissolved material may precipitate..." (the fluid does not have to circulate)  2

Line 60: I suggest to use "epidote group minerals" here, because clinozoisite, zoisite and epidote, etc. form a considerably larger group of minerals than just epidote, and they all seem to behave in the same way mechanically in terms of crystal plasticity, i.e., they are very strong. Perhaps you want to insert a sentence to make this point.  3

Line 70: "polymetamorphic" instead of "polycyclic"?  4

Line 100: "yielded" instead of "returned"  5


Line 101: insert paragraph break  6

Line 136: in the table, is there any reason, why "SGR + dislocation glide" should be different from "dislocation glide + SGR"? If not, please use the same word order.  7

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Number: 3	Author: Veronica Peverelli	Subject: Sticky Note	Date: 7/22/2022 5:54:38 PM
Agreed: rephrased and the divided sentence to make the point			
Number: 4	Author: Veronica Peverelli	Subject: Sticky Note	Date: 7/22/2022 5:55:16 PM
Indeed. Done			
Number: 5	Author: Veronica Peverelli	Subject: Sticky Note	Date: 7/22/2022 5:55:56 PM
Sentence removed following comments of R1 and MKS			
Number: 6	Author: Veronica Peverelli	Subject: Sticky Note	Date: 7/22/2022 5:57:57 PM
Done			
Number: 7	Author: Veronica Peverelli	Subject: Sticky Note	Date: 8/5/2022 7:46:33 AM
It was meant to indicate which is dominant and which is minor, but I should have specified it in the caption. This column has been removed following R1's comments, and the recrystallization mechanisms are described directly in the text			

Lines 249-253: fluid inclusions are not visible in the figures – you are referring to fluid inclusions inside qtz grains, but are epidote grains also included in qtz grains? Probably not (?), but the sentence indicates this. Please clarify.  1





Line 255: the microstructure appears completely recrystallized – is it possible to identify unrecrystallized qtz grains at all?  2


Fig. 12: the CL contrast is difficult to see – can perhaps both images (BSE and CL) be shown separately and next to each other?  3


Line 386: perhaps better: “location”? In addition, “dynamic granular fluid pump” is not really a scientific term but rather a sort of a “buzz word” to sound fancy. I would avoid such terms. The reference is appropriate, of course, but something like “cavitation as nucleation sites” would be a more neutral descriptive term.  4


Lines 394-401: there is circumstantial evidence for grain boundary processes involving grain boundary sliding and solution precipitation in plastically deformed qtz (dislocation creep) in Nègre et al. 2021 and Pongrac et al. 2022 based on experiments and in analogy to wet ice dislocation creep.  5


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- Number: 1 Author: Veronica Peverelli Subject: Sticky Note Date: 7/22/2022 5:59:57 PM  
Added panels to Fig. 6 showing epidote and fluid inclusions in quartz grains
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- Number: 2 Author: Veronica Peverelli Subject: Sticky Note Date: 8/5/2022 7:48:17 AM  
Unrecrystallized grains are minor; panels have been added to Fig. 5 showing relicts
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- Number: 3 Author: Veronica Peverelli Subject: Sticky Note Date: 7/22/2022 6:06:19 PM  
Done
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- Number: 4 Author: Veronica Peverelli Subject: Sticky Note Date: 8/5/2022 7:49:07 AM  
Done and rephrased. The alternative phrase "dynamic granular fluid pump" is now in parentheses close to the reference to Fusseis et al. 2009
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- Number: 5 Author: Veronica Peverelli Subject: Sticky Note Date: 7/22/2022 6:14:46 PM  
Added references

Lines 421-423: the compositions are not identical. Better: "the epidote B composition represents a narrower range of the compositional spectrum of epidote A" or something like this.  <sup>1</sup>

Line 431: "difference" instead of "heterogeneity"?  <sup>2</sup>

Line 453: again "granular fluid pump" could be replaced by descriptive terms like "combined grain boundary sliding, cavitation, and nucleation" or so.  <sup>3</sup>

Line 489: admittedly, it is a somewhat obscure reference, but Stunitz 1993 describes crystal plastic deformation (or better: the absence thereof) in clinozoisite.  <sup>4</sup>

If there are any questions, the authors may contact me.


Best regards

Holger Stunitz




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 Number: 1      Author: Veronica Peverelli      Subject: Sticky Note      Date: 7/22/2022 6:19:17 PM  
Rephrase following the suggestion


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 Number: 2      Author: Veronica Peverelli      Subject: Sticky Note      Date: 7/22/2022 6:20:07 PM  
Done

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 Number: 3      Author: Veronica Peverelli      Subject: Sticky Note      Date: 7/22/2022 6:21:11 PM  
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 Number: 4      Author: Veronica Peverelli      Subject: Sticky Note      Date: 7/22/2022 6:28:50 PM  
Rephrased to take this comment into account

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