Solid Earth Discussions

Solid Earth Discuss., community comment CC1
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Reply on RC1

Lefan zhan

Community comment on "Strain localized deformation variation of a small-scale ductile shear zone" by Lefan Zhan et al., Solid Earth Discuss., https://doi.org/10.5194/se-2022-2-CC1, 2022

Thank you for the careful and critical revision of our manuscript from Referee #1. The comments and suggestions will greatly improve the manuscript. Below, we primarily respond to the comments before the close of open discussion and will have further detailed revision and response as soon as possible.

Response to two main questions and remarks raised from Referee #1 as follows:
1. About the proposed aims and conditions of granodiorite formation: The main proposed aims are discussing the processes of conditions of variation deformation, mineral composition, and fabric transition accompanied by a significant grain-size reduction and progressive phase mixing of minerals with increasing strain of the small-scale shear zones. The outcrop-scale structure, microstructure and EBSD textures are focus on the topic. The host rocks developed small-scale shear zones preserve its magmatic texture and are called unfoliated granitic rocks in our work we have the dated ages by zircon U-Pb dating, which compare the foliated granitic rocks in the GLG-SZ, they have the same ages of 110-120 Ma, however, the foliated granitic rocks in the GLG-SZ also have another group ages of ca. 20 Ma from the zircon rims. Therefore, we suggest that the small-scale shear zones can related the foliated rocks in the GLG-SZ. By the deformed structure and analyzed data e.g., EBSD and geothermometer, it can prove that the ductile deformation of the small-scale shear zone was initiated by the temperature-controlled rheological weakening and expend by fluid-assisted mechanism during increasing deformation and exhumation. We think that it’s useful and meaningful for exploring the deformation of the pluton controlled by the continental-scale strike-slip shear zone in the middle crust. To make the significance of our manuscript clearer, we will further consider revised some contents in the discussion and introduction.
2. About the EBSD datasets: The EBSD datasets are from the same sample, and we will strengthen this point in revised version. The point that one-point-per-grain pole figures are statistically meaningful is right, but we don’t separate the grain in the aggregates and the grain in the matrix, what we get is the dominant orientation of minerals in the Zone A, Zone B or Zone C. A large number of grains in the matrix will have a bad influence for it. Thus, we choose the one-point-per-pixel pole figures, and the deviation could be tolerated. With regard to the term ‘negative/positive’, we will change it to make the meaning clearer.
We considered used the grain sizes from the EBSD dataset. However, because of the imitated premise and range of grain size data obtained from EBSD maps. Thus, we think the grain sizes can be counted by manual operation may be more appropriate and also useful. Additionally, the detector distance is not the distance between sample and

detector, but the distance between the working position and initial position of detector.
3. Detail comments: Some detail comments will be very helpful for our manuscript, and we will revise carefully. It is appreciated your suggestions and feedback in the open discussion. Thank you for your careful review and constructive advice.