

Reviewer comments.

Having read the manuscript and the two previous reviewers' comments I feel that the author made the necessary changes requested by the reviewers and editor. I believe that the clarity of the manuscript has been much improved. This improvement was required to ensure readers understood the experimental process suggested by the author which could be followed using the program and equations within.

However, I do have some minor corrections that if applied I believe would improve the manuscript. I leave whether they are done or not to the discretion of the editor and author.

Line 9: *obtain the maximum geologically relevant information.*

Could this be clarified, does this sentence mean the most relevant information or the largest amount of relevant information?

Line 110: *This calculation requires additional measurements of the polished grain surface: length (L_p) and width (W_p) of the polished face.*

If the grinding depth is assumed to be the amount of crystal removed and the crystal is assumed to have been polished parallel to the c-axis then the grain surface does not need to be measured and can be calculated from the assumed geometry.

This can be done for both the ellipsoid and the tetragonal prism.

I think this could lead to improvements to the manuscript in three ways.

Firstly, as the author themselves appears to state, it is often difficult to differentiate faces from crystal exteriors using light microscopy. This would reduce the burden on the experimentalist and speed up the process of measuring crystal sizes which is a significant time sink.

Secondly, because it is often indistinguishable, then calculating these values from a grinding depth which is used anyway, would increase the accuracy of the resultant model.

Unless, this measurement is in fact being used to account for the fact that the model geometries might not match with the actual geometries in the crystal in reality. In which case this should be stated.

Thirdly it might mean that in Figure 1, the measurements of L_p and W_p could be removed from the figure, and make it easier to read.

Line 206: *For the most symmetric grains...*

Here I would suggest replacing symmetric with equidimensional or equant. As crystals could be equant but not symmetric, such as would be the case with tetragonal prisms with a single termination. This would lead to changes in lines 213 and figure captions 2 and 3.

Figure 2: Do the the 'least symmetric' grains which pass the requirement of $F_t > 0.5$ have quite variable shapes? I think it would be nice if those shapes were added as a 3D mini drawing to the graphs. This might help contextualise the 'least symmetric' data.

Figure 3: In the caption it is written that a) is for equant crystals and that section b) is for minimally equant crystals – could it also be put on the figure? Again, maybe as shape drawings?

I also think that there are several assumptions that underlie the method that are not explicitly stated, or perhaps I have missed them. This list is not exhaustive but some might be:

- a) That the spheres used for measuring grinding depth and the zircon crystals are at the same depth under the epoxy surface
- b) That the zircon crystal is not at an angle to the polishing surface
- c) That the crystals have homogenous parent isotope concentrations
- d) That the polynomial coefficients used to calculate F_t from SA/V are used while perhaps actually deviating from the geometries which they were defined from (this assumption was highlighted by reviewer 2 and the author addresses it in Lines 137-140)

My personal preference is for assumptions like these, whether they are likely to cause inaccuracies or not, to be focussed in one area of the method section.