

Dear Prof. Keegan,

Thank you for accepting the manuscript and your time through the review process. We have gone through the manuscript and supplementary material and made all the corrections highlighted in your report, which we include here for completeness:

- L16: do not remove 'is' from this first sentence
- L43-44: this is a sentence fragment that needs to be fixed – consider just removing 'While'
- L53: missing a word after 'by' here
- L115: add 'by' before the references or place them in parentheses; only the reference year needs to be put in parentheses for the Azuma and Goto-Azuma reference: '(1996)'
- L122: either 'grains' should be singular or 'grain's'
- L125: either remove 'to' or change it to 'the'
- L245: this sentence is unclear. Do you mean '...which act as two bounds that the true grain...'?
- L284: remove period after 'Equations'
- L314: check to make sure you aren't missing text here. If not, remove the hanging 'We'
- L375: 'infront' should be two words
- L379: should be 'implicitly'
- L384: need 'in' before 'the natural world'
- L402: 'of' before 'samples'
- L429: remove the extra 'surface' before 'create'
- L438: add 'that' or 'and' before 'extends'
- L473: add 'is' to the second sentence: 'The exception is...'
- L476: use in-text referencing here 'following Rathmann and Lilien (2021)'
- L477: use in-text referencing here: 'in Placidi and others (2010)'
- L498: 'this rheology' repeated twice here
- L536: 'grain's'
- L558: remove 'a' from Section 6.4 title
- L578: 'does' should be 'do'
- L594: 'where' should be 'were'
- L623: consider including the non-linear orthotropic acronym here '(NLO)', and use the acronym in subsequent references in this section (L626)
- L626: fix 'is it is'
- L632: remove the extra space before the comma; remove the period after 'Table'; add a comma after 'Table 2'
- L634: fix the section reference here
- L643: again consider including the non-linear orthotropic acronym here '(NLO)', and use the acronym in subsequent references in this section (Lines 651, 652, 654)
- L653: add 'is' after 'there'
- L657: define the VPSC acronym at its first use here
- L674: add 'that' after 'Now'
- L691: 'is' should be 'are'
- Supplement:
- L3: 'these' should be 'there'
- L20: 'the effect of the lattice rotation of stress,'
- L27: 'he' should be 'the'
- L33: add 'is' before 'no'
- L38-39: there are three uses of 'only' in this sentence, remove some for clarity

- Figure captions:
- Fig. S5: remove 'value' from 'value values'
- Fig. S7: remove 'value' from 'value values'
- Fig. S8: 'grain's'; remove 'value' from 'value values'
- Fig. S9: 'grain's'; remove 'value' from 'value values'
- Fig. S10: remove 'value' from 'value values'

We have also updated the code repository which reproduces the figures in the paper, so that it produces the updated figures for the revision (solely changes in the legend), as this was not done with the revision. Please find the final manuscript, supplement and tracked changes included.

Yours sincerely,

Daniel Richards