

The Cryosphere Discuss., community comment CC1  
<https://doi.org/10.5194/tc-2021-382-CC1>, 2022  
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## Comment on tc-2021-382

Nicholas Rathmann

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Community comment on "Ultrasonic and seismic constraints on crystallographic preferred orientations of the Priestley Glacier shear margin, Antarctica" by Franz Lutz et al., The Cryosphere Discuss., <https://doi.org/10.5194/tc-2021-382-CC1>, 2022

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Dear authors,

Thank you for the opportunity to read this preprint of your work. I'm very intrigued by your methodology, which has made me think a lot about future practical applications. Please find below a few comments that you may (or may not) consider useful for the final version of your manuscript.

- 1) L23-25: I would suggest writing "can affect", since basal friction might also exert important resistance (unlike over e.g. ice shelves). At least from a modeling perspective, it is not yet clear (to me) how little basal resistance is needed before shear margins significantly affect the character of ice-stream flow.
- 2) Page 7 between eqn. (1) and (2): Maybe it would be useful to explicitly state that you, therefore, are considering a homogeneous, constant-fabric slab/layer (unless I misunderstood)?
- 3) Discussion section: I would be very interested in a discussion that also treats (possibly briefly) how your VSP method might be applied to regions where a vertical preferred direction CPO is expected. Is it correctly understood that in order to get the largest P and S phase-velocity variations, you would have to sample in a plane perpendicular to the CPO plane-of-isotropy (horizontal plane), and hence consider very wide angle experiments at the surface?
- 4) Discussion section: I wonder whether you have thought about (or possibly modelled?) what kind of ultrasound sampling scheme could be adopted if the (approximate) CPO is not known a priori? That is, what set of sampling directions would I need to consider to make an unambiguous estimate of the CPO using your method without knowing the plane that the single maximum is in?

Kind regards, Nicholas Rathmann