

Interactive comment on “Buoyant forces promote tidewater glacier iceberg calving through large basal stress concentrations” by Matt Trevers et al.

Anonymous Referee #1

Received and published: 1 December 2018

I'm sorry, but so much of the discussion in the manuscript depends on un-referenced and un-explained "references to previous work" that I think that the manuscript needs to be revised significantly. The specific places where the discussion and explanations are inadequate are listed below.

Other than the expository problem with the manuscript. I find the science compelling and well done. The work is creative and important in the study of iceberg calving mechanisms.

Here's the stuff that needs attention (in my estimation):

I wonder if the title really does justice. . . the paper is about bending moments (viscous and plastic bodies have bending moments too!) generated by geometry changes at the

C1

ice front due to ice/ocean and ice/atmosphere and ice/wave interactions. . . the present title could be misunderstood to represent "same old basal shear stress" stuff. . .

line 13 - would it be more accurate to say "viscous bending moment" (remember you can bend a beam viscously and elastically and viscoelastically) leading to high tensile stress concentration at the bed. . . instead of stresses at the ice-bed interface? Who cares what the stresses are at the interface if the ice is actually in a state of bending induced fracture?

line 29 - Would this be a place to add a reference to Weertman?

line 18 page 2 - The rotation should be indicated as "bottom out". . .

line 8 page 3 - If I were to be pedantic, I would say that a reference should be given for "Stokes equations" (in actuality, Stokes was prolific and probably has many equations associated with his name). Ditto for "Glen's flow law". . . a reference should be given.

line 1 page 4 - Is Cauchy stress the same as deviatoric stress?

line 9 page 5 - Just out of curiosity why are 191 and 644 meters so precisely known as to be significant to the single meter? Can the authors tell us what would happen if the numbers were 192 and 643?

section 3.1 - What is the a priori reason to expect water pressure to be significantly important in the problem? is it for promoting fracture propagation or is it for lubricating the base?

line 4 page 7 - What is "Weertman-like"???? This seems to come in out of the blue. . . Weertman published hundreds of papers in his life, what is referred to here?

line 1 page 9 - Notch-triggered rotation mechanism was shown to be irrelevant under the full School regime". . . Readers will get confused here, because "full School regime" is a weak form of jargon that doesn't really convey the precise ideas (regardless of whether they are published in Schoof. . . my hunch is that the authors have a different

C2

meaning, i.e., an interpretation that they ascribe to the term “full School regime”)

line 12 and 13 page 9 - “Weertman . . . regime”???? Weertman-like stress peak????
What is this, and why the name Weertman???? Seems like citations and explanations are required. The discussion is flawed because it relies on readers having prior knowledge of what a “Weertman regime” is...

I don’t really see the necessity for me to review the manuscript again if the above items are handled by the authors in a revision.

Interactive comment on The Cryosphere Discuss., <https://doi.org/10.5194/tc-2018-212>, 2018.