

## Review: Glacier Energy and Mass Balance (GEMB): A model of firn processes for cryosphere research

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The authors have added substantial details regarding methodology and provided clarifications in the manuscript. I feel the manuscript is ready to be published, subject to minor technical corrections, detailed below.

Line 39: Change “km m<sup>-3</sup>” to “kg m<sup>-3</sup>”

Line 114: Change “stand-along” to “stand-alone”

Line 145: I think this should read “horizontal advection or” rather than “horizontal advection of”

Line 159: Change “User” to “Users”

Lines 159-166: I’m still a bit confused about the layering here. Do the minimum and maximum layer thicknesses not apply to the column below the near-surface? Or are the layer thicknesses fixed there? Does the beta parameter apply to maximum thickness below the near-surface, or does it determine a fixed layer depth. What happens if compaction or melt happens in the layers below the near-surface? Please clarify.

Line 236: Add “(T)” after “Temperature”.

Line 243: Change “layer widths” to “layer thickness” to be consistent with previous sections.

Line 258: Suggest changing “is calculated” to “can be calculated” as this is one particular option.

Line 271: I think this should be the “maximum acceptable thermal timestep”? Also, could the authors clarify if this timestep changes by layer and with each GEMB timestep?

Line 297: Change “was measures” to “was measured”.

Line 421: Change to read “compaction rate factors  $c_0$  and  $c_1$ .” for clarity.

Line 444: I believe  $\sigma$  should be defined here.

Line 493: Change “IAMU” to “IMAU”. Also, I don’t think IMAU has been defined in the text yet.

Line 538: Perhaps define shallow as reaching “beyond the 550 kg/m<sup>3</sup> horizon up to the 830 kg/m<sup>3</sup> horizon” for clarity.

Figure 4 caption, last sentence: Change “are show in the top” to “are shown in the top”

Line 557: Change “bilinear” to “bilinearly”.

Line 577: Change “Firn Air Content” to lowercase, remove “the” before “Greenland”.

Figure 8 and 9 caption: Does E/C refer to evaporation/condensation. Suggest defining it in the caption.

Line 641: Place “IMAU-FDM...calibration” in parentheses and change “less cores” to “fewer cores”.

Lines 786-788: I think this is stated incorrectly. Decreasing, not increasing, the size of layers should increase thermal gradients between the atmosphere and surface. Later this is stated correctly at lines 879-881.

831: Are the authors referring to improving near-surface temperatures in models, observations, or both? Also change “glacier surface” to “glacier surfaces”.

841: I noticed “version 1.0” was removed earlier. Should that be done here?

884: This contradicts line 819 where Sturm was indicated to be slightly better.