Interactive comment on "A linear algorithm for solving non-linear isothermal ice-shelf equations" by A. Sargent and J. L. Fastook

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We thank both referees for their constructive reviews and, most importantly, for pointing out the critical issue that the method is not applicable for general two-dimensional ice shelf flow. This correction is explicitely stated in the revised paper.

1D case. We agree with Dr. Cornford that writing 1D SSA model as a system of two linear equations is not new and we added a reference to Schoof's 2007 paper. However, in Schoof's paper 1D SSA model has been used to derive the boundary conditions and not to solve the ice shelf equations. To solve the model, Schoof used the traditional nonlinear equations on velocity and solved them using Newton's method. We have not seen these linear equations being used to solve the MM problem in other papers either.

2D case. We agree with both referees that the incompressibility equation used in this paper is not valid for general ice shelves and, consequently, the method cannot be used to solve the general ice shelves. However, as referees pointed out, the method can be used to solve the diagnostic equation of steady state ice-shelf with small ice thickness gradients or ice shelves where the ice thickness gradient is perpendicular to the velocity field. We made corresponding changes in the abstract, introduction, conclusion, and the text of the paper reflecting this correction.

Presentation. Paragraph 1 is rewritten, and wrong spelling of 'Furier' in line 12 is corrected.

Thank you.