

Interactive comment on “Formulation, calibration and validation of the DAIS model (version 1), a simple Antarctic Ice Sheet model sensitive to variations of sea level and ocean subsurface temperature” by G. Shaffer

D. Goldberg (Editor)

dngoldberg@gmail.com

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This is not a decision, but simply a comment on the initial 2 referee comments in the discussion to aid the author in his revisions.

Both referees agree the manuscript is well written and easy to follow. Each points out minor grammatical issues which should be addressed. Dr Briggs suggests a number of rephrasings, which the author can choose to adopt.

The author should take the comments of the Anonymous Referee seriously, and I am

C922

in agreement with the majority of the comments. In particular:

- 1) the suggestion that the author give more detail about why such a simplified approach is preferable to a slightly more complex model
- 2) The suggestion of using an ensemble approach to understand the importance of more parameters than the two examined. The author must show the utility of such a simplified approach, as contributions to this journal must constitute innovative modelling approaches; such an application might do so, as large ensembles would not be as feasible with nonzero-dimensional models.
- 3) The anonymous reviewer has made a good suggestion regarding lag of bedrock adjustment. I think with a little effort this can be implemented without resolving a single spatial dimension.

In addition, the referees did not comment on this (though it may have been implied by referee #1), but your construction of buttressing, and the loss thereof, is a bit strange. Taken at face value you have an axisymmetric ice shelf extending from an axisymmetric ice sheet – and this can only exert backstress (i.e. affect S , your grounding line ice speed) by exerting "hoop" stress, which depends on ice sheet radius but I doubt is significant for reasonable curvatures, ice shelf thicknesses, and ice shelf velocities. If, on the other hand, you are intending this to be a gross approximation for a number of embayed ice shelves (i.e. Filchner, Ronne, Ross, Amery), the backstresses of which would respond strongly to high melt rates, you should be more clear on this.

I agree more explanation should be given on how the DCESS ocean model calculates ocean temperatures – particularly since it is the continental shelf waters that are in contact with ice shelves.

Interactive comment on Geosci. Model Dev. Discuss., 7, 1791, 2014.

C923