MISMIP+ SUBMISSION

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1. Model name: STREAMICE (package of MITgcm)

Goldberg, D. N. and Heimbach, P.: Parameter and state estimation with a time-dependent adjoint marine ice sheet model, The Cryosphere, 7, 1659-1678, https://doi.org/10.5194/tc-7-1659-2013, 2013.

2. Repository:

https://github.com/MITgcm/MITgcm/tree/master/pkg/streamice

(Documentation pending GitHub approval, but will be available at https://mitgcm.readthedocs.io/en/latest/)

3. Uses L1L2 approximation of Goldberg (2011), JoG, doi:10.3189/002214311795306763.

A = 2.0392e-17

4. Sliding law:

$$\tau_{nt_i} = \frac{\beta^2 {u_b}^{1/m} \alpha^2 N}{[\beta^{2m} u_b + (\alpha^2 N)^m]^{1/m}} {u_b}^{-1} u_{ti}$$

with $\beta^2 = 10^4$ Pa $m^{-1/3}$ $a^{1/3}$

5. Space discretization: Finite element, with bilinear rectangular elements, regular grid. A front-advance scheme based on Albrecht et al (2011, Cryosphere) is used.

6. Time discretization: 2nd order upwind with flux limiter, $\Delta t < \Delta x / \max(2|u|)$

7. Grounding line: A "grounding factor" is determined in each cell, equal to 1 when thickness is larger than 5m above floatation and 0 when thickness is thinner than 5m below floatation, and varying smoothly with a half-sine dependence in between. Basal traction (prefactor of velocity in sliding law) is scaled by this grounding factor. No modification of driving stress is done.

Values provided as "grounding line" values are cell-centered from cells which have grounding factor > 0.5 bordered by at least one cell with grounding factor < 0.5

8. MISMIP3D: N/A