

## References

- [1] H. BLATTER, *Velocity and stress fields in grounded glaciers: a simple algorithm for including deviatoric stress gradients*, *J. Glaciol.*, 41 (1995), pp. 333–344.
- [2] E. BUELER AND J. BROWN, *Shallow shelf approximation as a “sliding law” in a thermodynamically coupled ice sheet model*, *J. Geophys. Res.*, 114 (2009). F03008, doi:10.1029/2008JF001179.
- [3] E. BUELER, J. BROWN, AND C. LINGLE, *Exact solutions to the thermomechanically coupled shallow ice approximation: effective tools for verification*, *J. Glaciol.*, 53 (2007), pp. 499–516.
- [4] E. BUELER, C. S. LINGLE, J. A. KALLEN-BROWN, D. N. COVEY, AND L. N. BOWMAN, *Exact solutions and numerical verification for isothermal ice sheets*, *J. Glaciol.*, 51 (2005), pp. 291–306.
- [5] G. K. C. CLARKE, *Subglacial processes*, *Annu. Rev. Earth Planet. Sci.*, 33 (2005), pp. 247–276.
- [6] G. COGLEY ET AL., *Glossary of Mass-Balance and Related Terms*. IACS Working Group on Mass-balance Terminology and Methods, Draft 3, 10 July, 2009.
- [7] A. C. FOWLER AND D. A. LARSON, *On the flow of polythermal glaciers. I. Model and preliminary analysis*, *Proc. R. Soc. Lond. A*, 363 (1978), pp. 217–242.
- [8] F. GILLET-CHAULET ET AL., *A user-friendly anisotropic flow law for ice-sheet modelling*, *J. Glaciol.*, 51 (2005), pp. 3–14.
- [9] R. GLOWINSKI AND J. RAPPAZ, *Approximation of a nonlinear elliptic problem arising in a non-Newtonian fluid flow model in glaciology*, *M2AN Math. Model. Numer. Anal.*, 37 (2003), pp. 175–186.
- [10] D. L. GOLDSBY AND D. L. KOHLSTEDT, *Superplastic deformation of ice: experimental observations*, *J. Geophys. Res.*, 106 (2001), pp. 11017–11030.
- [11] R. GREVE AND H. BLATTER, *Dynamics of Ice Sheets and Glaciers*, *Advances in Geophysical and Environmental Mechanics and Mathematics*, Springer, 2009.
- [12] P. HALFAR, *On the dynamics of the ice sheets*, *J. Geophys. Res.*, 86 (1981), pp. 11065–11072.
- [13] ———, *On the dynamics of the ice sheets 2*, *J. Geophys. Res.*, 88 (1983), pp. 6043–6051.
- [14] R. C. A. HINDMARSH AND A. J. PAYNE, *Time-step limits for stable solutions of the ice-sheet equation*, *Ann. Glaciol.*, 23 (1996), pp. 74–85.
- [15] R. HOCK, *Glacier melt: a review of processes and their modelling*, *Prog. Phys. Geog.*, 29 (2005), pp. 362–391.
- [16] K. HUTTER, *Theoretical Glaciology*, D. Reidel, 1983.
- [17] P. HUYBRECHTS ET AL., *The EISMINT benchmarks for testing ice-sheet models*, *Ann. Glaciol.*, 23 (1996), pp. 1–12.
- [18] I. JOUGHIN, M. FAHNESTOCK, D. MACAYEAL, J. L. BAMBER, AND P. GOGINENI, *Observation and analysis of ice flow in the largest Greenland ice stream*, *J. Geophys. Res.*, 106 (2001), pp. 34021–34034.
- [19] O. A. LADYZHENSKAYA, *The Mathematical Theory of Viscous Incompressible Flow*, Revised English edition, Gordon and Breach Science Publishers, New York, 1963.
- [20] D. R. MACAYEAL, *Large-scale ice flow over a viscous basal sediment: theory and application to ice stream B, Antarctica*, *J. Geophys. Res.*, 94 (1989), pp. 4071–4087.
- [21] D. R. MACAYEAL AND V. BARCILON, *Ice-shelf response to ice-stream discharge fluctuations: I. Unconfined ice tongues*, *J. Glaciol.*, 34 (1988), pp. 121–127.
- [22] D. R. MACAYEAL, V. ROMMELAERE, P. HUYBRECHTS, C. HULBE, J. DETERMANN, AND C. RITZ, *An ice-shelf model test based on the Ross ice shelf*, *Ann. Glaciol.*, 23 (1996), pp. 46–51.
- [23] M. W. MAHAFFY, *A three-dimensional numerical model of ice sheets: tests on the Barnes Ice Cap, Northwest Territories*, *J. Geophys. Res.*, 81 (1976), pp. 1059–1066.
- [24] D. MAXWELL, M. TRUFFER, S. AVDONIN, AND M. STUEFER, *An iterative scheme for determining glacier velocities and stresses*, *J. Glaciol.*, 54 (2008), pp. 888–898.
- [25] L. W. MORLAND, *Unconfined ice-shelf flow*, in *Dynamics of the West Antarctic ice sheet*, C. J. van der Veen and J. Oerlemans, eds., Kluwer Academic Publishers, 1987, pp. 99–116.
- [26] L. W. MORLAND AND I. R. JOHNSON, *Steady motion of ice sheets*, *J. Glaciol.*, 25 (1980), pp. 229–246.
- [27] K. W. MORTON AND D. F. MAYERS, *Numerical Solutions of Partial Differential Equations: An Introduction*, Cambridge University Press, second ed., 2005.

- [28] J. F. NYE, *A flow model for the polar caps of Mars*, J. Glaciol., 46 (2000), pp. 438–444.
- [29] J. F. NYE, W. B. DURHAM, P. M. SCHENK, AND J. M. MOORE, *The instability of a South Polar Cap on Mars composed of carbon dioxide*, Icarus, 144 (2000), pp. 449–455.
- [30] F. PATTYN, *A new three-dimensional higher-order thermomechanical ice sheet model: Basic sensitivity, ice stream development, and ice flow across subglacial lakes*, J. Geophys. Res., 108 (2003), pp. EPM 4–1. CiteID 2382.
- [31] A. PAYNE ET AL., *Results from the EISMINT model intercomparison: the effects of thermomechanical coupling*, J. Glaciol., 153 (2000), pp. 227–238.
- [32] W. R. PELTIER, *Postglacial variations in the level of the sea: Implications for climate dynamics and solid-earth geophysics*, Rev. Geophys., 36 (1998), pp. 603–689.
- [33] D. POLLARD AND R. M. DECONTO, *A coupled ice-sheet/ice-shelf/sediment model applied to a marine-margin flowline: Forced and unforced variations*, in International Association of Sedimentologists Special Publication, M. Hambrey et al., eds., vol. 39, Wiley-Blackwell, 2007. in press.
- [34] A. POST AND E. R. LACHAPPELLE, *Glacier Ice*, University of Washington Press and International Glaciological Society, revised ed., 2000.
- [35] A. PRALONG AND M. FUNK, *Dynamic damage model of crevasse opening and application to glacier calving*, J. Geophys. Res., 110 (2005).
- [36] C. F. RAYMOND, *Energy balance of ice streams*, J. Glaciol., 46 (2000), pp. 665–647.
- [37] C. SCHOOF, *A variational approach to ice stream flow*, J. Fluid Mech., 556 (2006), pp. 227–251.
- [38] ———, *Marine ice-sheet dynamics. Part 1. The case of rapid sliding*, J. Fluid Mech., 573 (2007), pp. 27–55.
- [39] C. SCHOOF AND R. HINDMARSH, *Thin-film flows with wall slip: an asymptotic analysis of higher order glacier flow models*, Quart. J. Mech. Appl. Math., 63 (2010), pp. 73–114.
- [40] C. SCHOOF, R. HINDMARSH, AND F. PATTYN, *Marine Ice Sheet Model Intercomparison Project*. <http://homepages.ulb.ac.be/~fpattyn/mismip/>, 2008.
- [41] T. THORSTEINSSON, *An analytical approach to deformation of anisotropic ice-crystal aggregates*, J. Glaciol., 47 (2001), pp. 507–516.
- [42] M. TRUFFER AND K. A. ECHELMEYER, *Of isbrae and ice streams*, Ann. Glaciol., 36 (2003), pp. 66–72.
- [43] C. J. VAN DER VEEN, *Response of a marine ice sheet to changes at the grounding line*, Quat. Res., 24 (1985), pp. 257–267.
- [44] ———, *Fundamentals of Glacier Dynamics*, Balkema, 1999.
- [45] M. WEIS, R. GREVE, AND K. HUTTER, *Theory of shallow ice shelves*, Continuum Mech. Thermodyn., 11 (1999), pp. 15–50.