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Effects of nonlinear rheology and anisotropy on the relationship between age and depth at ice divides

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Through numerical modelling using a full-system Stokes the effects of nonlinear rheology and strain-induced anisotropy on the age versus depth relation at ice divides are investigated. We compare our numerical results with analytical approximations commonly employed in age-depth prediction. We also study the possible effects of recrystallisation, divide migration and ice fabric evolution on the flow regime of ice divides. We find that both the rheological index and strain-induced anisotropy profoundly affect the age distribution with depth, and caution must be exercised when estimating age of ice from ice cores with an isotropic age-depth model.