

# Investigating feedbacks between basal sliding, frictional melting, and longitudinal-stress transmission

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Feedbacks between basal sliding, frictional melting, and longitudinal-stress transmission may allow for upstream migration of a slow-to-fast sliding transition, such as that occurring near and upstream from the ice stream onsets (i.e. along tributaries). We use an appropriate 2-dimensional, thermomechanical flowband model to explore the potential for such feedbacks along an idealized ice stream tributary and onset region. Sliding takes place through deformation of a basal layer with linear or power-law viscous (approximating plastic) rheology, the shear strength of which is a function of the basal melting rate. We explore the sensitivity of positive feedbacks to a number of parameters including lateral drag and drainage of basal meltwater.