

Symbol	Definition	Value	Unit
$H$	glacier thickness		m
$t$	time		yr
$W$	glacier width		m
$x$	along-glacier coordinate		m
$U$	velocity		$\text{m yr}^{-1}$
$B$	mass balance		$\text{m yr}^{-1}$
$\nu$	viscosity		$\text{Pa yr}$
$D$	depth below sea level		m
$s$	surface elevation		m
$d_b$	depth of basal crevasses		m
$d_s$	depth of surface crevasses		m
$R_{xx}$	tensile deviatoric stress		Pa
$\dot{\epsilon}_{xx}$	longitudinal strain rate		$\text{m yr}^{-2}$
$Q_L$	lateral ice flux		$\text{m yr}^{-1}$
$a$	surface mass balance (SMB)		$\text{m yr}^{-1}$
$s_0$	transition height for SMB	1600	m
$g$	gravitational acceleration	9.8	$\text{m yr}^{-1}$
$\rho_i$	ice density	900	$\text{kg m}^{-3}$
$\rho_s$	ocean water density	1028	$\text{kg m}^{-3}$
$\rho_w$	fresh water density	1000	$\text{kg m}^{-3}$
$m$	sliding exponent	3	
$n$	Glen's flow law exponent	3	
$A$	rate factor taken from Cuffey and Paterson (2010)	$A(-20^\circ\text{C}) -$ $A(-5^\circ\text{C})$	$\text{yr}^{-1} \text{Pa}^{-3}$
$A_s$	basal resistance parameter	120	$\text{Pa m}^{-2}/\text{m s}^{-1}/\text{m}$
$E$	lateral enhancement	10	
$dx$	grid size	250–300	m
$dt$	time step	0.005	yr

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Perturbation parameters with their initial LIA values

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$m$	submarine melt rate	175	$\text{m yr}^{-1}$
$d_w$	crevasse water depth	160	m
$G_l$	lower SMB gradient	0.0011	$\text{m yr}^{-1}$
$G_u$	upper SMB gradient	-0.002	$\text{m yr}^{-1}$
$a_0$	maximal SMB	0.64	$\text{m w.e. yr}^{-1}$
$f_i$	sea ice buttressing factor	1	

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