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Correction to Variations of Ice Bed Coupling Beneath and Beyond Ice Streams: The Force Balance

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Correction to “Variations of ice bed coupling beneath and beyond ice streams: The force balance”

T. Hughes

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[1] In the paper “Variations of ice bed coupling beneath and beyond ice streams: The force balance” by T. Hughes (*Journal of Geophysical Research*, 114, B01410, doi:10.1029/2008JB005714, 2009), Table 1 and Figure A1 are corrected and the following text corrections.

[2] In Figure 3 caption, change $1 < \phi < 0$ to $1 > \phi > 0$.

[3] At the end of paragraph 27, change $\phi_I = w_F/w_I = P^* w_I/P_I$ to $\phi = w_F/w_I = P^* w/P_I$.

[4] Rebreak first two rows of equations in paragraph 66 as follows:

$$F_R = 2\tau_S h_I \Delta x = F_G = (B'E'F'G' - BEFG)w_I$$

$$2\tau_S (h_I/w_I) \Delta x = B'E'F'G' - BEFG = \Delta(BEFG) = \rho_I g \Delta [h_I^2 \phi (1 - \phi)]$$

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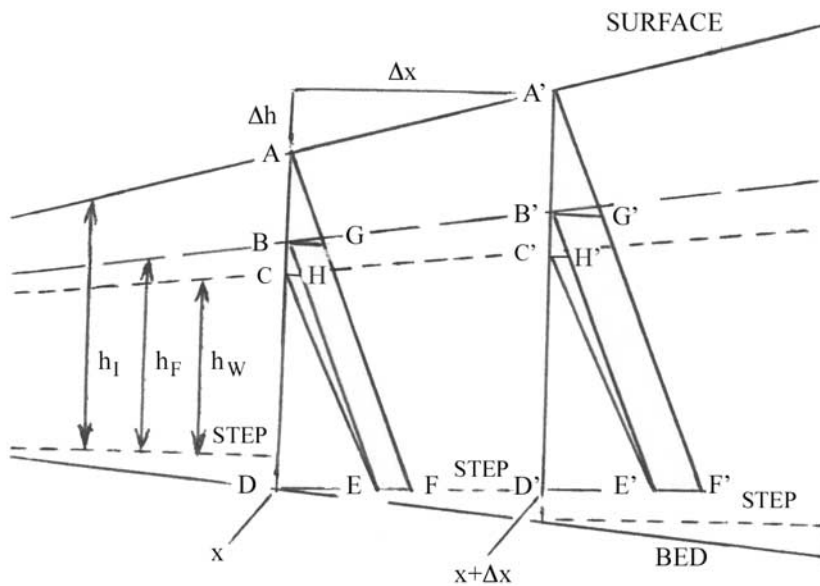


Figure A1. Gravitational forces along x represented geometrically.

Table 1. Kinematic Stresses Linked to Floating Fraction $\phi = w_F/w_I$ of Ice and Longitudinal Gravitational Forces Numbered in Figure 7 for the Geometrical Force Balance

Effective Stress	Formula	Equation Number in Text
Basal water pressure at x , from gravity force 3	$P_W^* = \rho_W g h_W$	(3)
Ice overburden pressure at x , from gravity force (1 + 2 + 3 + 4)	$P_I = \rho_I g h_I$	(2)
Upslope tensile stress at x , from gravity force 4	$\sigma_T = \bar{P}_I (1 - \rho_I/\rho_W) \phi^2$	(17)
Downslope water pressure stress at x , from gravity force 3	$\sigma_W = \bar{P}_I (\rho_I/\rho_W) \phi^2$	(16)
Upslope flotation stress at x from gravity force (3 + 4)	$\sigma_F = \sigma_T + \sigma_W = \bar{P}_I \phi^2$	(15)
Longitudinal force balance at x from gravity force [(5 + 6 + 7 + 8) - (1 + 2 + 3 + 4)]	$P_I \alpha = \partial(\sigma_F h_I)/\partial x + \tau_O + 2\tau_S (h_I/w_I)$	(33)
Flotation force gradient at x from gravity force [(7 + 8) - (3 + 4)]	$\partial(\sigma_F h_I)/\partial x = P_I \phi (\phi \alpha_I + h_I \partial \phi / \partial x)$	(32)
Basal shear stress at x from gravity force (5-1)	$\tau_O = P_I (1 - \phi)^2 \alpha - P_I h_I (1 - \phi) \partial \phi / \partial x$	(28)
Side shear stress at x from gravity force (6-2)	$\tau_S = P_I (w_I/h_I) \phi (1 - \phi) \alpha + \bar{P}_I w_I (1 - 2\phi) \partial \phi / \partial x$	(29)
Average downslope basal shear stress to x from gravity force 1	$\bar{\tau}_O = \bar{P}_I w_I h_I (1 - \phi)^2 / (w_I x + A_R)$	(21)
Average downslope side shear stress to x from gravity force 2	$\bar{\tau}_S = P_I w_I h_I \phi (1 - \phi) / (2\bar{h}_I x + 2L_S \bar{h}_S + C_R \bar{h}_R)$	(22)
Downslope compressive stress at x due to $\bar{\tau}_O$ and $\bar{\tau}_S$ along x and σ_W at $x = 0$	$\sigma_C = \bar{P}_I - \sigma_T = \bar{P}_I - \bar{P}_I (1 - \rho_I/\rho_W) \phi^2$	(18)
First-order floating fraction of ice at x	$\phi = h_O/h_I$	(24)