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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"

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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 $1 < \varphi < 0$ to $1 > \varphi > 0$.

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

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

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

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

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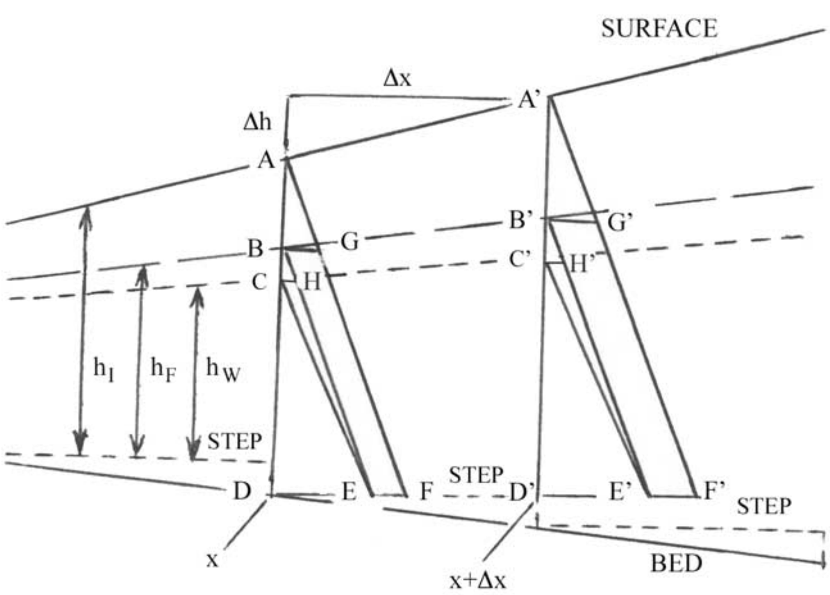

Figure A1. Gravitational forces along *x* represented geometrically.

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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	$\sigma_T = \overline{P}_I(1 - \rho_I/\rho_W)\phi^2$	(17)
Downslope water pressure stress at x, from gravity force 3	$\sigma_W = \overline{P}_I(\rho_I/\rho_W)\phi^2$	(16)
Upslope flotation stress at x from gravity force (3 + 4)	$\sigma_F = \sigma_T + \sigma_W = \overline{P}_I\phi^2$	(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)	$\tau_S = P_I(w_I/h_I)\phi(1 - \phi)\alpha + \overline{P}_I w_I(1 - 2\phi)\partial\phi/\partial x$	(29)
Average downslope basal shear stress to x from gravity force 1	$\overline{\tau}_O = \overline{P}_I w_I h_I(1 - \phi)^2/(w_I x + A_R)$	(21)
Average downslope side shear stress to x from gravity force 2	$\overline{\tau}_S = P_I w_I h_I\phi(1 - \phi)/\left(2\overline{h}_I x + 2L_S\overline{h}_S + C_R\overline{h}_R\right)$	(22)
Downslope compressive stress at x due to $\overline{\tau}_O$ and $\overline{\tau}_S$ along x and σ_W at $x = 0$	$\sigma_C = \overline{P}_I - \sigma_T = \overline{P}_I - \overline{P}_I(1 - \rho_I/\rho_W)\phi^2$	(18)
First-order floating fraction of ice at x	$\phi = h_O/h_I$	(24)