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Correction to "Importance of a stochastic distribution of floods and erosion thresholds in the bedrock river incision problem"

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INDEX TERMS: 1815 Hydrology: Erosion and sedimentation; 1824 Hydrology: Geomorphology (1625); 1869 Hydrology: Stochastic processes; 8107 Tectonophysics: Continental neotectonics; 9900 Corrections
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[1] In the paper "Importance of a stochastic distribution of floods and erosion thresholds in the bedrock river incision problem" by Noah P. Snyder, Kelin X. Whipple, Gregory E. Tucker, and Dorothy J. Merritts (*Journal of Geophysical Research, 108*(B2), 2117, doi:10.1029/2001JB001655, 2003), the authors wish to correct several minor errors in equations contained in the published version.

[2] The correct version of equation (1b) is

$$E = k_e\left(\tau_b^a - \tau_c^a\right). \tag{1b}$$

[3] The correct version of equation (10) is

$$S_e \approx \left(\frac{k_u^{1-p}}{k_a^{(1-p)r/h} k_p K_R K_C}\right)^{1/n} A^{-[(m/n)-(1-p)(r/hn)]}. \tag{10}$$

[4] There are several errors in Appendix A. The entire corrected appendix is as follows. A full discussion of the stochastic threshold bedrock channel incision model is given by *Tucker* [2003].

Appendix A: Bedrock Channel Incision Models

[5] The basic postulate is

$$E = k_e(\tau_b - \tau_c)^a \text{or } k_e\left(\tau_b^a - \tau_c^a\right),$$

$$E = KA^m S^n,$$

$$K = K_R K_C K_{\tau c}; n = \beta a; m = \alpha ac(1-b)$$

The basic shear stress model ($\tau_c = 0$) is

$$K_R = k_e k_w^{-\alpha a} k_t^a,$$

$$K_C = k_q^{\alpha a(1-b)},$$

$$K_{\tau c} = 1.$$

Empirical relations are as follows:
Physical parameters

$$k_t = \rho g N^\alpha$$

Discharge-drainage area

$$Q = k_q A^c$$

Width-discharge

$$w = k_w Q^b$$

At-station width-discharge

$$\frac{w}{w_b} = \left(\frac{Q}{Q_b}\right)^s$$

"Bankfull" discharge-runoff

$$Q_b = R_b A.$$

The stochastic threshold model [*Tucker and Bras*, 2000; *Tucker*, 2003] is

$$K_R = k_e k_w^{-\alpha a} k_t^a,$$

$$K_C = \left(\frac{T_r}{T_r + T_b}\right) P^{\gamma_b} R_b^{-\varepsilon_b} \exp\left(-\frac{I}{P}\right)\Gamma(\gamma_b + 1),$$

$$K_{\tau_c} = \frac{\Gamma(\gamma_b + 1, R_c/P) - \left(\frac{R_c}{P}\right)^{\gamma_b}\exp\left(-\frac{R_c}{P}\right)}{\Gamma(\gamma_b + 1)}.$$

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The exponents are

$$\alpha = \frac{3}{5},\ \beta = \frac{7}{10}$$

for the Manning relation, and

$$\gamma_b = \alpha a(1 - s),$$

$$\varepsilon_b = \alpha a(b - s).$$

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