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The accuracy of references in the text and in this list is the responsibility of the author, to whom queries should be addressed.

ERRATUM

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The author has drawn attention to the incorrect order of text in col. 2, p. 187 and col. 1, p. 188. The correct order of text should be

Finally, having noted that water levels in boreholes fluctuate widely over a range of time-scales, it is important to recognize that in the model results presented here it is assumed that the piezometric surface is effectively steady-state. The simulations do not include the effects of temporal variations in basal water pressures. However, field observations have shown that sliding velocities respond quickly to variations in basal water pressures over time-scales ranging from hours to seasons (e.g. Boulton and Vivian, 1973; Hodge, 1976), and this lends support to the model assumption that sliding velocities reflect current water-pressure conditions, rather than some complex, integrated response to conditions over a longer time-scale. Thus, it seems reasonable to assume that the piezometric surface is steady-state for this initial sensitivity analysis.

SENSITIVITY TO VARIATIONS IN BASAL FRICTION

Another major assumption of the simulations presented so far is that k, the friction factor in the sliding law, inversely related to bed roughness and debris concentration, is uniform across the glacier section. However, there may be important cross-sectional variations in the friction factor: one might expect effective roughness at the margins of many glaciers to be anomalously high because of relatively high concentrations of basal and englacial debris from subglacial and subaerial sources (Kamb and others, 1976; Engelhardt and others, 1978; Hallet, 1981). Although it is not clear exactly how to treat this problem quantitatively (Hallet, 1981), it is mathematically convenient to let k scale with N^{p} towards the edge of the glacier (above the piezometric surface) so that spatial variations in the product of k and N^{-p} vanish (equivalent to using a Weertman-type sliding law in the marginal zone (Weertman, 1964)). As k is inversely proportional to effective roughness, and decreases in the marginal zone, this adjustment accords with the expectation that the effective roughness at the margins of glaciers is relatively high. Simulations with this assumption will be referred to here as simulations which use an adjusted sliding law.

The tests of possible combinations of m and p were repeated with the adjusted sliding law and showed again that high values of m do not result in low marginal sliding velocities (Fig. 6). However, with $m = 1$ and $p = 1$, marginal velocities are low, and with increasing p the basal-velocity distribution becomes more peaked towards the center of the glacier and includes negligible velocities towards the glacier margin. It is important to note that with the adjusted sliding-law velocity reversals no longer occur close to the glacier margin, and the complete flow field looks similar to the empirical data (cf. Figs 1 and 7). With variable piezometric heights (Fig. 8), the model again predicts that relative marginal velocities increase as the piezometric surface is lowered relative to the glacier surface, and only in a case where the piezometric surface is nearly high enough to float the center of the glacier does the model predict low relative marginal velocities.