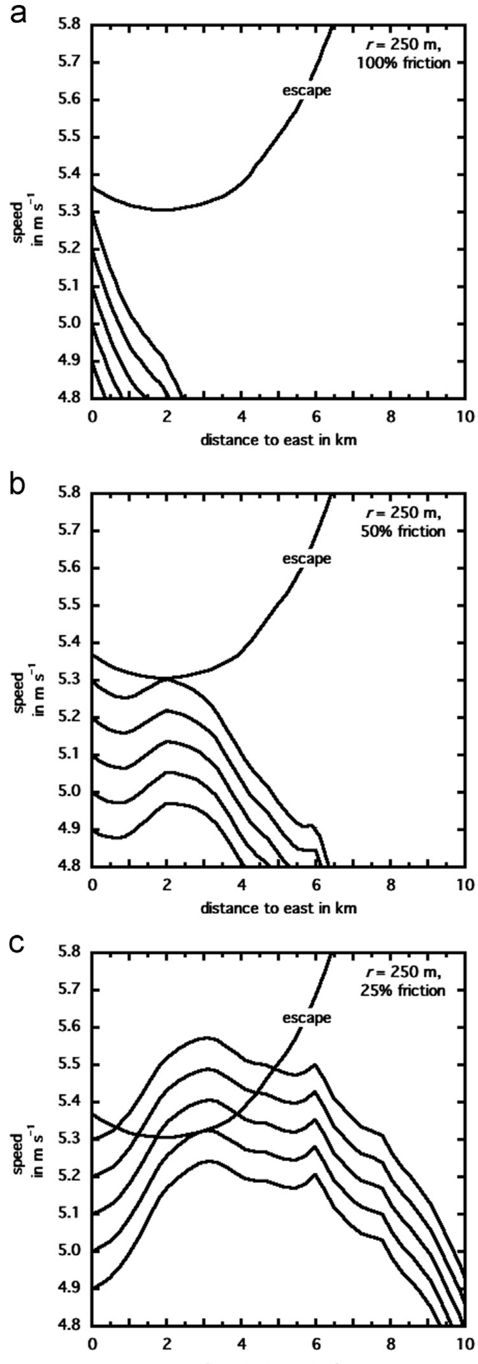

Fig. 10. Variation of boulder speed with eastward distance traveled from the vicinity of Stickney for a 250 m-radius boulder when the regolith friction is (a) 100%, (b) 50%, and (c) 25%, of the amount implied by Eq. (5). Initial boulder speeds are defined by the intersections of the curves with the speed (y) axis.

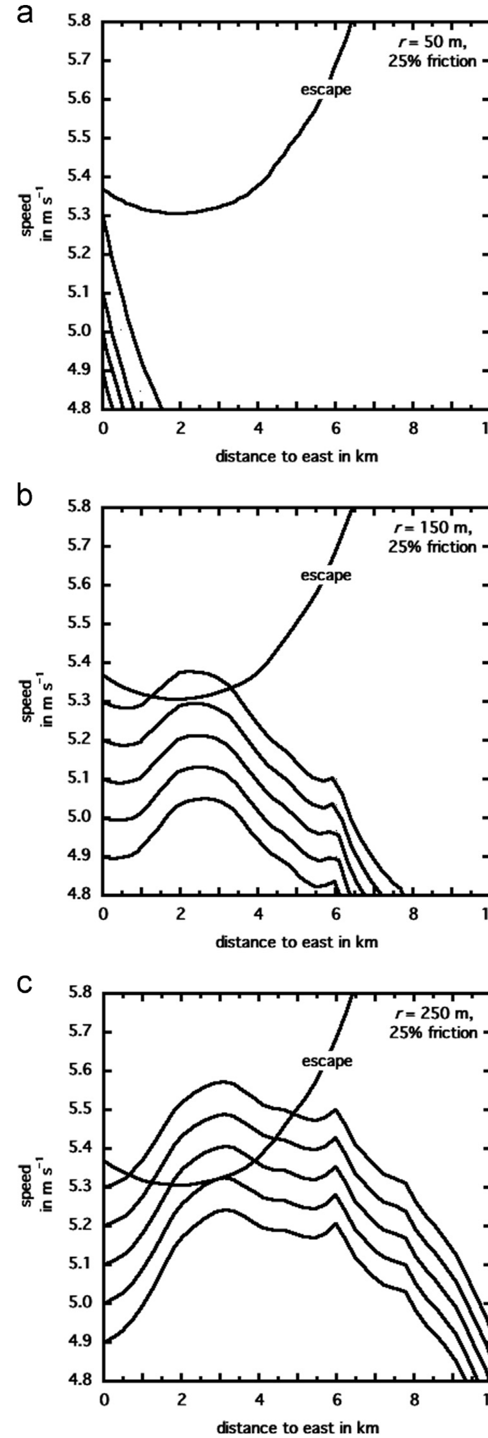

Fig. 11. Variation of boulder speed with eastward distance traveled from the vicinity of Stickney for boulders with radii (a) 50, (b) 150, and (c) 250 m when the regolith friction is 25% of the amount implied by Eq. (5). Initial boulder speeds are defined by the intersections of the curves with the speed (y) axis.

Fig. 10c, but we include it for ease of visual comparison of the parts of Fig. 11. Fig. 11a shows that a 50 m-radius boulder can never escape unless its initial speed is greater than the escape velocity at its starting point. Fig. 11b shows that a 150 m-radius boulder can escape after forming a groove up to about 2.5 km long if its initial speed lies between ~5.22 and 5.37 m s^{-1}. Finally Fig. 11c repeats the finding that increasing the boulder radius to 250 m extends the possibility of forming grooves without terminal boulders that are up to 3 km long for initial speeds between 5.00 and 5.37 m s^{-1}, as long as the frictional resistance is small (e.g., 25% of that implied by Eq. (5)).

We note that Hamelin (2011) treated the motion of blocks ejected at a grazing angle along the surface from Stickney to explore their potential as possible causes of some of Phobos' grooves. His treatment is similar to that used here, in that it accounts for the variation of the gravity vector with position on the surface, but differs in one important respect. Hamelin (2011) took account of the mechanical interactions between ejected blocks and the regolith they displace to form grooves by