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ENTRAINMENT OF DEBRIS IN ROCK AVALANCHES; AN ANALYSIS OF A LONG RUN-OUT MECHANISM

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SUPPLEMENTARY FIGURES

Figure 1
Damage to homes at the site of the 1903 Frank Slide. Destruction caused by mud expelled from valley bottom by impact of rock avalanche debris. The main deposit is seen in the background, obscured by dust or smoke (Glenbow Archives, Calgary, Alberta; Photograph NA-3437-5).

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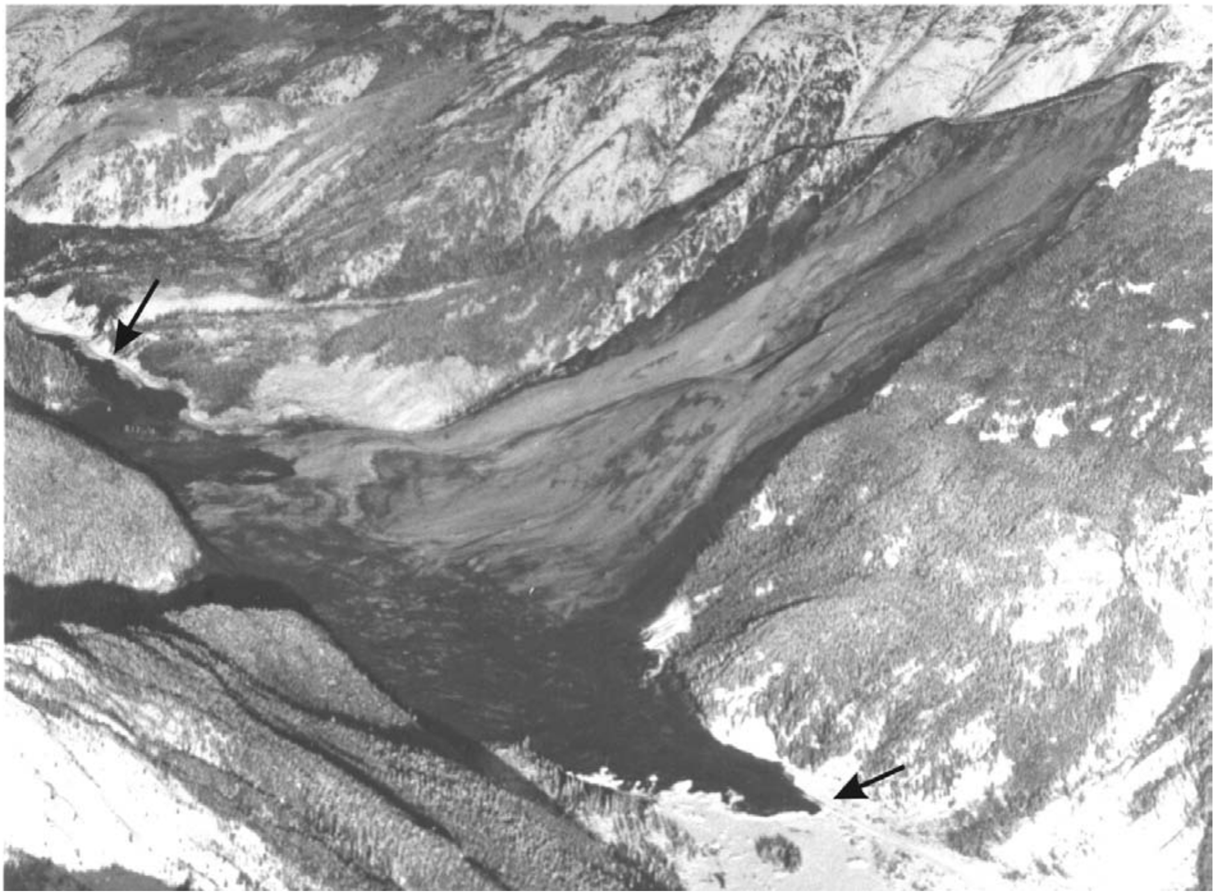

Figure 2
Mud, consisting of liquefied alluvium, was expelled laterally (arrows) from the deposit margins of the 1964 Hope rock avalanche in southwestern British Columbia, Canada. The western (upper) debris tongue traveled more than 10 km down the valley (Mathews and McTaggart, 1978).

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Figure 3
A rock slide-debris avalanche caused by mining induced subsidence in limestone, Iryan Jaya, Indonesia. Note light-coloured rock fragments, distinct from brown-coloured entrained colluvium (Photo, O.Hungr).

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Figure 4
The Zymoetz rock slide-debris avalanche which took place in the spring, 2002 near Terrace, northern British Columbia, Canada. The initial rock slide, seen above the centre of the photo, triggered a flow of liquefied debris that reached as far as the Skeena River, building a temporary fan. (Photo, S.G.Evans)

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Figure 5
Overall view of the Eagle Pass rock slide-debris avalanche, taken in August, 2003. (Photo, O.Hungr)

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Figure 6
Eagle Pass, coarse fragmented rock deposits on the bench below the source area. The largest boulders are several metres in diameter. (Photo, D.Ayotte).

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Figure 7
Nomash River, overall view (Photo, D.Ayotte).

Figure 8
Nomash River, eroded scarp in the colluvial apron beneath the source area. Maximum erosion depth at this location is approximately 8m. A similar scarp on the opposite side of the slide path is partly covered by debris. (Photo, O.Hungr)

Figure 9
Nomash River, path curvature at approximately 750 m distance from the slide crown. The maximum runup at this location corresponds to a velocity of 22.m/s (see Equation 2). (Photo, O.Hungr)

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Figure 10
Nomash River, coarse rock fragments at approximately 1000 m distance from the slide crown. This is near the distal limits of the bulk of the coarse rock deposits. Note person for scale. (Photo, D. Ayotte)

Figure 11
Nomash River, fine-grained debris at approximately 1300 m distance from the slide crown. The deposit is approximately 200 m wide at this location. (Photo, O.Hungr)

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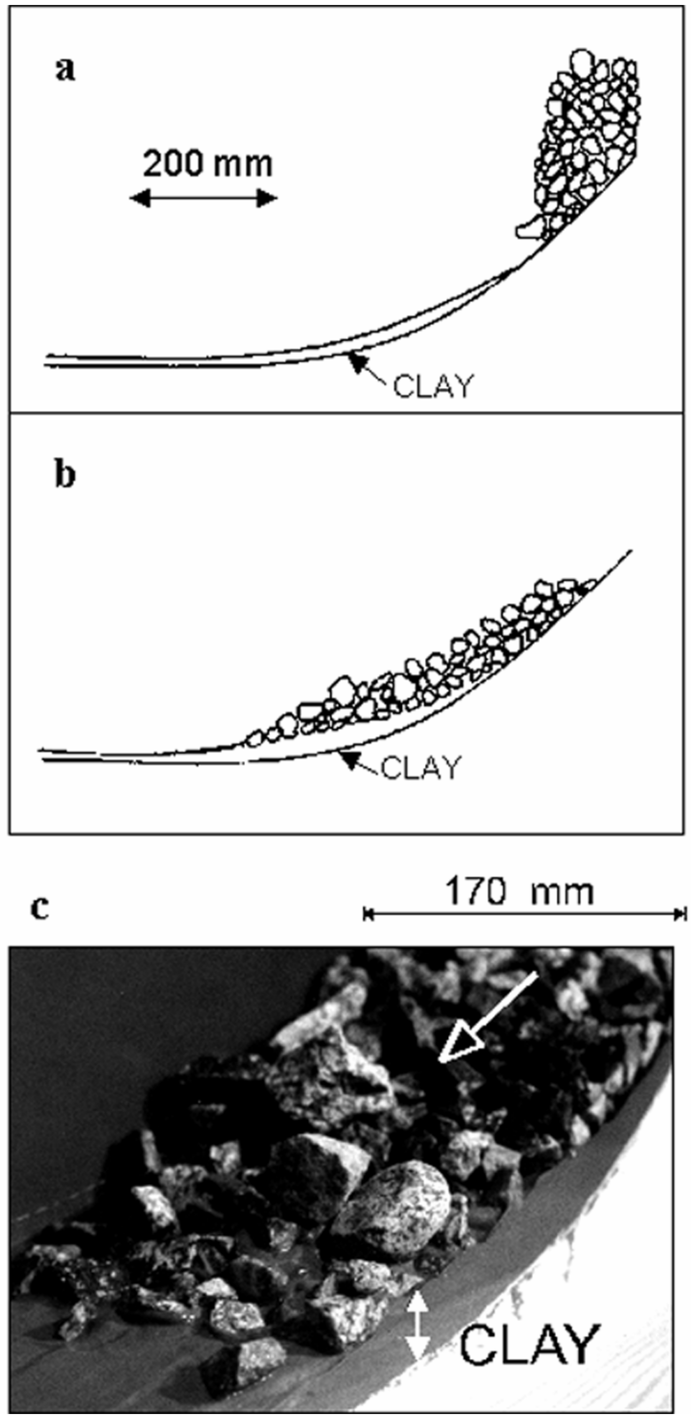

Figure 12
A scaled drawing of a physical model of liquefaction and entrainment of saturated substrate from the path of a rock slide. The substrate model material is a clayey silt, placed at a water content near the Liquid Limit. The rock material is medium to coarse gravel. a) beginning of experiment, b) end of experiment, c) close up of the rock mass front, showing over-riding and partial displacement of the substrate.