

Mickey Creek detachment failures

Aerial Photos: A27995-98, 99

Location: 64.376367°N, 140.552338°W

DETAILS:

Lipovsky et al. (2006) characterize the failure of more than 70 active-layer detachments within one year of forest fires that burned during the summer of 2004 in the Mickey Creek watershed. The Mickey Creek watershed lies within northwestern sector of the Klondike Plateau in the extensive discontinuous permafrost zone (Heginbottom et al., 1995; Bonnaventure et al., 2012). The presence of black spruce and sphagnum moss suggest that all north-facing and many south-facing slopes are underlain by permafrost. Isolated areas of deciduous trees and steep open grassy areas on south-facing slopes suggest well-drained conditions and a lack of permafrost. Within the area burned, frost probing above the slides on SW facing slopes in late July 2005 revealed frost tables were generally 50-100 cm deep (Lipovsky et al., 2006).

Post-forest fire landslides only occurred where permafrost was present and most failures occurred on north-facing slopes. However, about 25% occurred within the active layer on gentle southwest-facing slopes. For example, the slide on the left in Figure 1 initiated on a 13° slope. Lipovsky et al. (2006) characterize southwest-facing failures as having occurred within loess-rich colluvial deposits commonly consisting of fragments of grey phyllitic bedrock in a matrix of silty loess. As with all the post-fire detachments described by Lipovsky et al (2006), the two failures were initially of shallow depth (10-50 cm) and had a sliding plane within the active layer. Lipovsky (2006) characterized northeast-facing failures in this watershed to be either initiated along the edge of high-level glaciofluvial terraces or within colluvial veneers (fig. 2). Failures along the terraces are characterized to have been composed of 40-50% slightly silty, medium to coarse interstitial sand. In contrast, failures initiated at lower elevations within colluvial veneers over bedrock were composed of a matrix of dark grey, silty coarse sand and coarse fragments of weathered phyllite.

REFERENCES

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- Heginbottom, J.A., Dubreuil, M.A. and Harker, P.T., 1995. National Atlas of Canada (5th edition), Canada. *Permafrost*, Plate 2.1, (MCR 4177). scale 1:7,500,000.
- Lipovsky, P.S., Coates, J., Lewkowicz, A.G. and Trochim, E., 2006. Active-layer detachments following the summer 2004 forest fires near Dawson City, Yukon. *In: Yukon Exploration and Geology 2005*, (eds.), D.S. Emond, G.D. Bradshaw, L.L. Lewis and L.H. Weston (eds.), Yukon Geological Survey, p. 175-194.



Figure 1. Oblique aerial view of two detachments (05PL032 & 05PL100) that occurred on a gentle south- to southwest-facing slope described by Lipovsky et al., 2006.

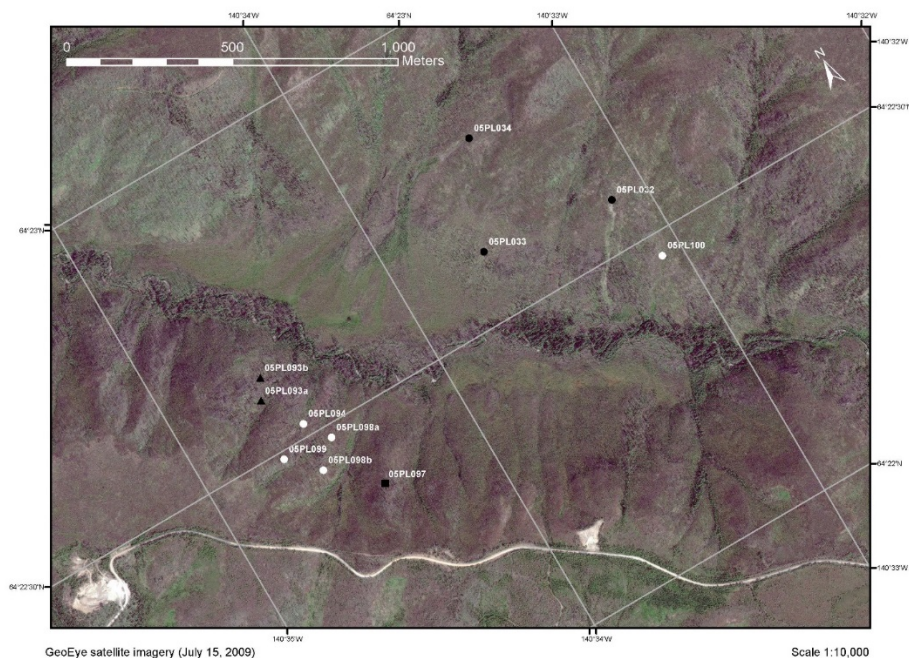


Figure 2. High resolution GeoEye satellite imagery of the lower reach of Mickey Creek area from five years after the forest fire (2009). Note how difficult it is to detect most of the landslide scars, only 4-5 years after they initiated. Black symbols indicate sites that were visited by Lipovsky et al. (2006). Squares denote failures that were classified as having initiated along the edge of high-level Early Pleistocene glaciofluvial terrace deposits. Triangles denote failures within phyllite-rich colluvial veneers. Circles denote failures within loess-rich colluvial veneers.