

## Steele Creek detachment failures

### DETAILS:

Lipovsky et al. (2006) and Coates (2009) studied the thermal regime of more than 35 active-layer detachments within two years of forest fires that burned during the summer of 2004 in the Steele Creek watershed. The Steele Creek watershed lies within the northwestern sector of the Klondike Plateau and within the extensive discontinuous permafrost zone (Heginbottom et al., 1995; Bonnaventure et al., 2012). Permafrost underlies all but well-drained south-facing slopes (Lipovsky et al., 2006). Coates (2008) determined that the forest fires destroyed the organic mat causing the permafrost table to lower an average of 20 cm. Most of the detachments occurred the same summer as the fires.

The detachments occurred in coarse grained deposits (Coates, 2009). A representative failure was described as being initiated within “sandy gravel and gravelly sands with trace silt and clay” p59 (Coates, 2009). Froese and Jackson (2005) map these initiation zones to be within colluvial blankets and veneers. Lipovsky et al (2006) describe that most failures occurred proximal to convex breaks in slope. Many of the failures ran out onto the subdued terraces that are mapped by Froese and Jackson (2005) as Pleistocene aprons of reworked ice-rich eolian and colluvial aprons regionally known as “muck” overlying Tertiary gravel terraces. Coates (2008) postulated that with fire recurrence intervals in the order of 100 years, post-fire active layer detachments have likely been an important factor in shaping the form of the region’s slopes. Specifically, the gentler gradient and presence of mid-slope breaks observed on permafrost slopes within the region could be due to post-fire ALDS.



**Figure 1.** Post-fire detachment failures on northeast-facing slopes in the Steele Creek watershed.

## REFERENCES AND FURTHER READING

- Coates, J., 2009. The Impact of Forest Fire on Permafrost Slopes Klondike Area, Yukon Territory. Unpublished M.Sc., University of Ottawa, 208 p.
- Froese, D.G. and Jackson, L.E., 2005. Surficial Geology Granville, Yukon Territory,. Geological Survey of Canada, Open File 4587, scale 1:50,000.
- Lipovsky, P.S., Coates, J., Lewkowitz, 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.