Geophysical Research Abstracts, Vol. 7, 07759, 2005
SRef-ID: 1607-7962/gra/EGU05-A-07759

The Khyex River rapid earth flow, a catastrophic landslide near Prince Rupert, British Columbia, Canada

A. Blais-Stevens (1)**,** J.W. Schwab, B.C (2), and M. Geertsema (3)

(1) Geological Survey of Canada, 601 Booth Street, Ottawa ON Canada K1A 0E8, ablais@nrcan.gc.ca, Fax: (613) 992-0190, Phone: (613) 947-2787

(2) BC Ministry of Forests, P.O. Bag 6000, Smithers BC Canada VOJ 2NO
(3) BC Ministry of Forests, 1011 4th Ave., Prince George, BC Canada V2L 3H9

In the early morning hours of November 28, 2003, a low gradient extremely rapid, liquefaction earth flow occurred on the Khyex River, 35 km east of Prince Rupert, northwest British Columbia, Canada. The earth flow severed a natural gas pipeline of Pacific Northern Gas (PNG) leaving the communities of Prince Rupert and Port Edward without a gas heat supply for a period of 10 days. Consequently, over $300,000 in emergency food and shelter were spent by the City of Prince Rupert. Moreover, costs incurred by PNG exceeded $1M to install a temporary gas line. Plans for permanent repairs are scheduled in 2005.

This event is one of five large destructive earth flows that have occurred in northwest British Columbia over the last 40 years. The earth flow displaced 4.7 M $m^3$of material extending over an area of 32 ha. Material displaced, flowed up and down the river channel for a distance of 1.7 km. It permanently blocked the river and caused flooding upstream for a distance of 10 km. The river has presently been re-routed across the floodplain and is actively cutting a new channel. The landslide is characterized by a steep main scarp, 45 m high by 345 m wide, which consists of glaciomarine sediments coarsening upward to massive sand mantled by rubbly colluvium. The glaciomarine sediments are composed of rhythmically laminated silty clay, which show physical properties similar to sensitive glaciomarine sediments documented in nearby earth flows (e.g., high illite-chlorite and low quartz plagioclase clay mineralogy, low liquid and plastic limits, low salinity levels compared to normal marine conditions).

Morphologically, the landslide consists of a steep main scarp controlled by bedrock of the valley wall and a large depression, situated in the zone of displacement. The depression has now in filled with water creating a pond. Unlike a typical retrogressive spread, the Khyex River landslide has few transverse ridges, prisms, and lacks rotational blocks along the head or lateral scarps. An interesting feature is the abundance of very well-preserved fossils especially the paleo-barnacles (*circa* 11.1k yrs BP) found at the head scarp and in the spoil. The unusual characteristics of the landslide as well as the well-preserved paleo-barnacle unit on the spoil suggest that the landslide began as a retrogressive failure at the riverbank but evolved into a flake-slide where the barnacle-rich unit was rafted intact within the spoil.

Sensitive glaciomarine sediments flank many of the steep fjord valleys of north coast British Columbia occupied by roads, railways, pipelines, and utilities. Thus, common occurrence of earth flows poses a high risk to infrastructure.