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The Zymoetz River rock avalanche, June 2002, British Columbia, Canada

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Abstract

On June 8, 2002, the Pacific Northern Gas pipeline in the Zymoetz River valley was severed by a large debris flow. The event initiated as a rock avalanche in Glen Falls Creek, a tributary of the Zymoetz River. The rock avalanche involved 1×10^6 m^3 of volcaniclastic bedrock, and travelled through a complex flow path, to finally deposit a large fan in the main Zymoetz River. Approximately half of the debris volume was deposited in the cirque basin at the head of the valley, with the rest deposited in the channel, and the fan.

Examination of the initiation zone showed a very persistent, slightly curved, joint set that forms the main sliding surface for the failed block with a dip of 45°, and dip direction of 300°. A Geographic Information System (GIS) was used to examine the event and allowed for further interpretation of field data. Preliminary dynamic analysis indicates that the event reached velocities of up to 34 m/s.

Comparison of the Zymoetz River rock avalanche (ZRRA) with other similar events from the literature indicates that it exhibited similar mobility and velocities. As evidenced from the literature, these long runout events can cause significant damage, and have the potential to be a very high risk as forestry and recreation activities spread further into remote areas.

Keywords: Rockslide; Rock avalanche; Runout

1. Introduction

Mass movements represent a significant hazard in the Coast Mountains of British Columbia. At approximately 1:30 am on June 8, 2002, the Pacific Northern Gas (PNG) pipeline in the Zymoetz River Valley (also known as Copper River) near Terrace, BC, was broken by a large debris flow that traveled down Glen Falls Creek (local name), a tributary of the Zymoetz River (Fig. 1). The debris flow started after a rock avalanche impacted a cirque basin at the top end of the valley 4.5 km away. The Zymoetz River rock avalanche (ZRRA) is part of a growing number of large mass movements that have occurred in BC in the past 50 years. This includes four recent events occurring in the spring and summer of 2002; the Harold Price, June 23, 2002 (Schwab et al., 2003), Pink Mountain, July, 2003 (Geertsema et al., 2006—this issue-b), McAuley Creek April/May, 2003 (Evans et al., 2003), and a not yet examined event near Kitimat, BC (Geertsema et al., 2006—this issue-a) (Fig. 1). The Howson rock ava-

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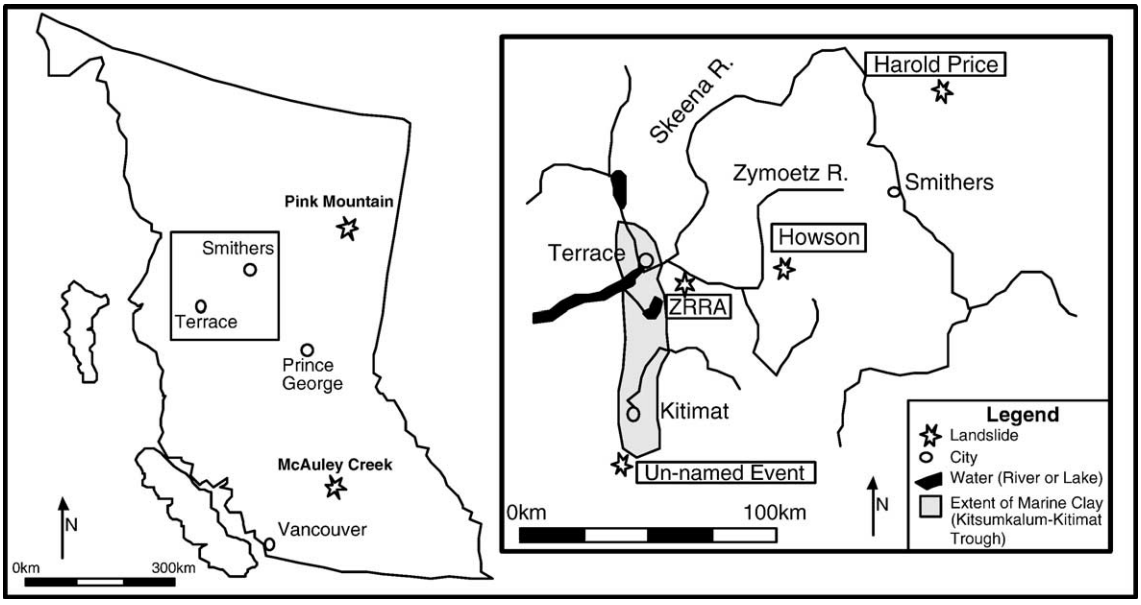

Fig. 1. Location map of the Zymoetz River Rock Avalanche, and five other large rock avalanches that have occurred in British Columbia in the past 4 years.

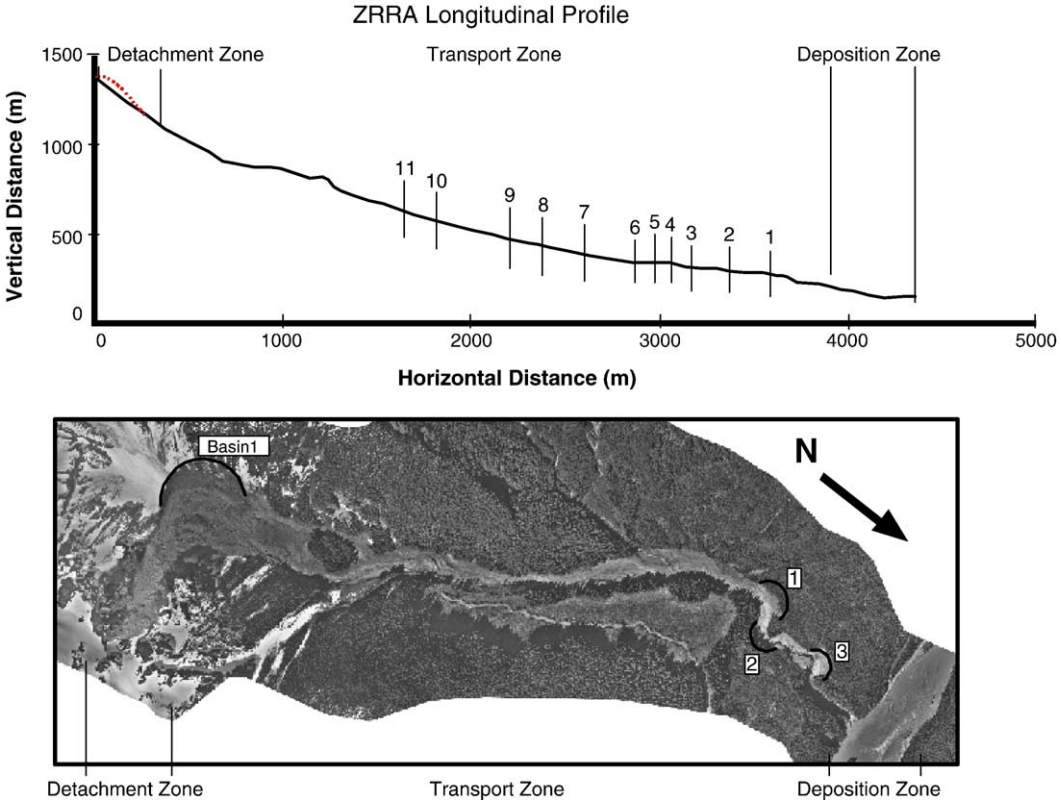

Fig. 2. Aerial photograph and longitudinal profile of the ZRRA. The longitudinal profile is divided into the detachment, transport, and deposition zones. The numbers on the long profile show the locations of the cross-sections through the channel (see Fig. 13). The detached mass is outlined by the dashed line in the detachment zone. The curves used for velocity calculations are marked on the aerial photo (Table 1).