Geophysical Research Abstracts
Vol. 14, EGU2012-5147, 2012
EGU General Assembly 2012

Emplacement of rock avalanche material across saturated sediments, Southern Alp, New Zealand

A. Dufresne (1), T. R. Davies (2), and M. J. McSaveney (3)

(1) Institute of Geological Sciences, Geology, Albert-Ludwigs-Universität. Freiburg, Germany, (2) Department of Geological Sciences, Canterbury University, Christchurch, New Zealand, (3) GNS Science, Wellington, New Zealand

The spreading of material from slope failure events is not only influenced by the volume and nature of the source material and the local topography, but also by the materials encountered in the runout path. In this study, evidence of complex interactions between rock avalanche and sedimentary runout path material were investigated at the 45 x 106 m3 long-runout (L: 4.8 km) Round Top rock avalanche deposit, New Zealand. It was sourced within myolinitic schists of the active strike-slip Alpine Fault. The narrow and in–failure-direction elongate source scarp is deep-seated, indicating slope failure was triggered by strong seismic activity. The most striking morphological deposit features are longitudinal ridges aligned radially to source. Trenching and geophysical surveys show bulldozed and sheared substrate material at ridge termini and laterally displaced sedimentary strata. The substrate failed at a minimum depth of 3 m indicating a ploughing motion of the ridges into the saturated material below. Internal avalanche compression features suggest deceleration behind the bulldozed substrate obstacle. Contorted fabric in material ahead of the ridge document substrate disruption by the overriding avalanche material deposited as the next down-motion hummock. Comparison with rock avalanches of similar volume but different emplacement environments places Round Top between longer runout avalanches emplaced over e.g. playa lake sediments and those with shorter travel distances, whose runout was apparently retarded by topographic obstacles or that entrained high-friction debris. These empirical observations indicate the importance of runout path materials on tentative trends in rock avalanche emplacement dynamics and runout behaviour.