Forecasting post-earthquake rockfall activity

Michael J. Olsen[1], Chris Massey[2], Ben Leshchinsky[1], Joseph Wartman[1], Andrew Senogles[1]

[1] Oregon State University, 101 Kearney Hall, Corvallis, OR 97333, USA, (michael.olsen@oregonstate.edu; ben.leshchinsky@oregonstate.edu; wartman@uw.edu; senoglea@oregonstate.edu)
[2] GNS Science, 101 Kearney Hall, Corvallis, OR 97333, USA, (C.Massey@gns.cri.nz)

Key words: *lidar; rockslope; monitoring; erosion; earthquakes*

ABSTRACT

Important infrastructure such as highways or railways traverse unstable terrain in many mountainous and scenic parts of the world. Rockfalls and landslides result in frequent maintenance needs, system unreliability due to frequent closures and restrictions, and safety hazards. Seismic activity significantly amplifies these negative economic and community impacts by generating large rockfalls and landslides as well as weakening the terrain. This paper interrogates a rich database of repeat terrestrial lidar scans collected during the Canterbury New Zealand Earthquake Sequence to document geomorphic processes as well as quantify rockfall activity rates through time. Changes in the activity rate (spatial distribution) and failure depths (size) were observed based on the Rockfall Activity Index (RAI) morphological classification. Forecasting models can be developed from these relationships that can be utilized by transportation agencies to estimate increased maintenance needs for debris removal to minimize road closures from rockfalls after seismic events.

This contribution was selected by the Scientific Committee for publication as an extended paper in the Journal of Applied Geodesy https://www.degruyter.com/journal/key/jag/html