Jour. Geol. Soc. India (2023) 99:148
https://doi.org/10.1007/s12594-023-2279-z

NEWS AND NOTES

Post-seismic Landslide Evolution in Tectonically Active Terrains

Yunus Ali Pulpadan
Dept. of Earth and Environmental Sciences, IISER, Mohali Knowledge City, Sector 81, Mohali, Punjab - 140 306, India
E-mail: *yunusp@iisermohali.ac.in*

Received: 21 November 2022 / Revised form Accepted: 5 December 2022

Major earthquakes in steep orogens can trigger extensive landsliding. Most of the landslide bodies come to rest high on the slopes, but subsequent rainfalls can easily remobilize them. Sharp peaks in landslide rates are systematically observed after major earthquakes, followed by rapid decays to background levels in just several years. The timescale and mechanisms of post-seismic activity in co-seismic landslide areas are poorly known but are critical for predicting cascading sediment hazards from earthquakes. Assessing these hazards from post seismic landslides and what drives their movement in the years following the mainshock has not yet been understood fully, primarily because lack of multitemporal landslide inventories. Investigating the patterns of land sliding in space and in time will provide insight on the earthquake-induced processes controlling landscape evolution in the short and long terms (Fig. 1).

The details on post-seismic processes have long been considered in isolation, but recent earthquake events that happened in Chi-Chi, Taiwan in 1999, Wenchuan, China in 2008 and Gorkha, Nepal in 2015, Hokkoido Iburi in 2018 (Fig. 2), and availability of archived data from remote sensing imageries enhanced our understanding of spatio-temporal evolution of landslides. This talk presents example from these global cases of post-seismic reactivated and new landslides and summarize the potential hazards and temporal evolution of the factors affecting post-seismic landslides in the earthquake affected region.

This improved understanding of slope processes will facilitate the implementation of targeted and more effective risk-mitigation countermeasures, which will contribute to safer post-emergency response efforts, more efficient reconstruction management, and increased resilience of communities and the built environment. More broadly, understanding the processes that act, in particular, over long-time scales, will reveal the way in which earthquakes and rainstorms shape mountain belts, providing us with better tools for identifying signatures of past events in the current landforms, as well as foreseeing future landform evolutions.

Fig.1. Evolutionary stages of landslide hazards in tectonically active areas (Adapated from Fan et al., 2019)

Fig.2. Field images showing the poor vegetation recovery in 2018 Hokkaido Iburi coseismic landslides areas (left panel – photographs dated 02/10/2018; right panel – photographs dated 01/05/2021

"Printed by Aditya Prakash and Published by R.H. Sawkar on behalf of the Geological Society of India, No.30 & 31, 1st Main, 3rd Cross, Byrappa Garden, Kathriguppe, BSK 3rd Stage, Bengaluru -560 085, India and Printed at Aditya Printers, #1, Sri Ramanjaneya Road, Hanumanthnagar, Bengaluru – 560 019, India and Published at the Geological Society of India, No.30 & 31, 1st Main, 3rd Cross, Byrappa Garden, Kathriguppe, BSK 3rd Stage, Bengaluru - 560 085, India – *Editor:* B. Mahabaleswar.