

Insights on the co-seismic responses of a deep-seated landslide by monitoring

*Ning MA¹, Gonghui WANG, Toshitaka KAMAI, Issei DOI

1. Disaster Prevention Research Institute, Kyoto University

In recent years, earthquakes have triggered numerous landslides. To prevent or at least to mitigate this kind of geohazards, great efforts had been paid to the study on understanding the properties of co-seismic landslides. By now, the co-seismic site responses on landslides had been analyzed by means of various methods and evidences showed that the seismic responses of landslide can be affected by various factors especially in those deep-seated landslides, where the geological and slope structural conditions can be more complicated. However our understanding on the co-seismic response of deep-seated landslides is still very poor. Thus to better understand this issue, we then performed long-term seismic monitoring with five high-sensitivity seismometers on different locations of an old deep-seated landslide on Azue area, Tokushima prefecture, which were reactivated by heavily rainfall. By using these records, we analyzed the site responses, especially the amplification effects. The amplifications on the location of talus area present peak values in high frequency toward to azimuth obviously; however multiple amplified peaks of these with wide azimuth bands emerge on block B of the landslide. Differing from former results, one evident peak appears in low frequency on block A of the landslide. In addition, the amplifications on bedrock outside of the landslide area show relatively small values in frequency bands and distribute in wide azimuth bands. Meanwhile, The predominant peak values maintain stably in a narrow frequency band on talus area in different periods in approximated one year but they scatter in different frequency bands on blocks of landslide around the same periods.

Above all, due to the contamination from complex geological settings and/or ground water level, or other reasons probably, the seismic energy redistributes in landslide mass, which incorporates more complicated amplification effects rather than deposit areas or bedrock. Finally, multidisciplinary approaches will be adopted for analyzing the co-seismic responses on this landslide in the future.

Keywords: deep-seated landslide, co-seismic site response, monitoring

