



Post-Seismic Shallow Landslide Triggering: Stress States and Hydrology

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Earthquakes are major drivers of landslides. After shaking has passed, landslide activity remains elevated, eventually returning to baseline landslide activity dictated by climactic forcing. While this phenomenon has been observed worldwide, there has been limited quantitative insight towards describing some of the physical drivers behind this occurrence. We describe the role of shear band propagation and permanent changes in the stress state of the soil mantle in post-seismic landslide activity. This is described through a coupled seismic-hydro-mechanical slope failure model, which quantitatively describes the damaged state of the hillslope from shaking. This model enables quantification of the influence of alterations in the stress-states caused by shaking, decreased triggering precipitation, and shear-induced weakening of soil on post-seismic landslide activity. The results provide new insights on the roles of soil depth, hillslope characteristics as well as climate on increased landslide susceptibility and gradual return to baseline conditions.