



The role of seismically-triggered landslides in landscape denudation

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The erosive potential of large earthquakes is now increasingly well recognized on the basis of specific case studies including the 1999 Chi Chi earthquake in Taiwan and the 2008 Wenchuan earthquake in China. Landslide-associated erosion in the Wenchuan region coincides spatially with the highest rates of long-term denudation. When considering earthquake magnitude-frequency statistics, seismically-facilitated landslides can account for most of the total denudation in the Longmenshan. This result is similar to previous conclusions from individual case studies, such as in southern California. Looking globally at seismically active regions, we find an overall trend whereby the repeated occurrence of earthquake-triggered landslides yields a total mass flux (assuming complete removal of landslide material) that is similar to total denudation rates. We suggest that this similarity is not coincidental but rather reflects the important role of seismicity in influencing long-term landscape evolution, both in the spatial distribution and potentially also in the total rates of mass removal from tectonically active mountains. We explore the consequences using a simple model for mass addition and loss associated with earthquakes, including near and far-field post-seismic and isostatic effects.