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Inventory of landslides triggered by the 20 April 2013 Mw 6.6 Lushan earthquake of China

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On April 20, 2013, a strong earthquake with Mw 6.6 occurred at Lushan County, Sichuan Province of China. As to 14:30 (Beijing Time) of April 24, this earthquake caused 196 deaths, 21 missing, and 11,470 injuries. Its epicenter located at about only 80 km southwest of the epicenter of the 2008 Wenchuan earthquake. A large number of landslides were triggered by the earthquake. The main types of the landslides include rock falls, rock slides, and soil falls. Also, a few of deep-seated landslides and large-scale rock avalanches were triggered. Aerial photographs in very high resolutions and satellite images in high resolutions taken after the earthquake, and satellite images pre-earthquake were collected. Then, landslide inventory mapping related to the earthquake was carried out based on these aerial photographs and satellite images pre- and post- earthquake, and selecting verified by filed investigations. Based on aerial photographs in very high resolutions (0.2 m and 0.6 m), a total of 14,580 landslides were delineated. In areas lack of aerial photographs covering, I mapped 7,948 more landslides based on high-resolution satellite images (Rapideye in 5 m resolution, ZY3 images including panchromatic images in 2.1 m resolution and multi-spectral images in 5.8 m resolution). All the 22,538 landslides were identified as the Lushan earthquake-triggered landslides by comparing with pre-earthquake satellite images. The 22,538 landslides, with a horizontal projection area of 18.88 km^2 and an estimated total volume of 0.04 km^3, were distributed in a nearly oval area about 5,400 km^2. Compared to the 2008 Wenchuan earthquake-triggered landslides (197,481 landslides, with a horizontal projection area of 1,160 km^2 and total volume of 6 km^3, and were distributed in an area about 100,000 km^2, reference to "Chong Xu, et al., 2014. Three (nearly) complete inventories of landslides triggered by the May 12, 2008 Wenchuan Mw 7.9 earthquake of China and their spatial distribution statistical analysis. *Landslides*. doi: 10.1007/s10346-013-0404-6" and "Chong Xu, 2013. Correlations of earthquake-triggered landslides volume and seismogenic fault: A case study of the 12 May 2008 Wenchuan earthquake, China. *International Symposium & 9th Asian Regional Conference of IAEG*, Beijing. 93-98"), the landslides triggered by the Lushan earthquake account for about 1/9 in landslide number, 1/60 in landslide area, 1/150 in landslide volume, and 1/20 in landslide distribution area related to the 2008 Wenchuan event. It is rarely there are overlapped earthquake struck areas related to two major earthquake events in relatively a short interval (several years), especially, both of them triggered a larger number of landslides in some areas. The detailed inventories of landslides triggered by the 2013 Lushan earthquake and the 2008 Wenchuan earthquake are very essential and important for subsequent studies including spatial distribution analysis and spatial prediction of earthquake-triggered landslides, geomorphic evolution, and landslide mitigation in regions affected by multi-earthquake events.

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