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# Spatial distribution of coseismic landslides around a UNESCO World Heritage Site: a case of the 2017 Jiuzhaigou earthquake

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The Silk Road land transport corridor generally overlap with Alpine-Humalayan seismic zone and a number of UNESCO World Heritage Sites distribute in the region of Silk Road. Ground failure and other earthquake-related hazards, especially coseismic landslides bring great challenges to the safety of these UNESCO World Heritage Sites. Jiuzhaigou National Park, located in northwest plateau of Sichuan Province, is a UNESCO World Heritage Site, and one of the most popular scenic areas in China. On August 8, 2017, a $M_w$ 6.5 earthquake occurred 5 km to the west of a major scenic area, causing 25 deaths and injuring 525, and the Park was seriously affected. By using visual interpretation and field investigation, an inventory map integrated by 2212 earthquake-triggered landslides covering an area of approximately 11.8 $km^2$ was developed. These were mainly shallow landslides and rock falls. Results demonstrated that landslides exhibited a close spatial correlation with seismogenic faults. More than 85% of the landslides occurred at elevations ranging from 2200 to 3700 m asl, but few landslides occurred above 3700 m asl. Local topographic relief showed a stronger correlation in relation to other topographic factors for landslide distribution. The study area is dominated by slopes ranging from 10˚∼40˚, but slopes in 20˚∼50˚ were the most susceptible to landslides, as they account for 85.5% of the total number of coseismic landslides. Highest landslide density occurred on slopes with aspects nearly vertical to the orientation of the seismogenic fault slip. Additionally, the back-slope direction, thin-ridge amplification and synergetic effects of seismogenic faults and topography on the distribution of landslides triggered by this earthquake were satisfactorily demonstrated. It is hoped that the data and results of this study will lead toward a more comprehensive understanding of buried-rupture earthquake triggered landslides. Given the impact of the Jiuzhaigou earthquake on the National Park, it is necessary to introduce disaster risk management strategies in all UNESCO World Heritage Sites to raise awareness and preparedness of visitors and inhabitants of the surrounding areas to prevent potential disasters.