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Spatial and temporal analysis of a landslide catalog from 1996 to 2017

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The spatial and temporal distribution of landslides provides valuable insights into the landslide risk assessment. In this work, we compiled a landslide catalog from 1996 to 2017 based on existing records, yearbooks, archives and field work in Shaanxi Province, China. The statistical analyses demonstrated that the cumulative frequency of the annual number of landslides can be well described by a simple power-law function. Most landslides occurred from July to October. The relationship between the cumulative frequency and time interval between landslide events could be well fitted by an exponential regression. The cumulative frequency of the number of landslides could be approximated by the power-law function. Moreover, many landslides cause deaths, and the number of fatalities is related to the number of landslides each month. Moreover, the cumulative frequency is significantly correlated with the number of fatalities and exhibits a power-law relationship. Furthermore, obvious differences are observed in the type and density of landslides between the Loess Plateau and Qinba Mountains. The majority of landslides occur in close proximity to rivers and faults and are concentrated at elevations from 600-900 m. In addition, the landslide frequency increases as the annual rainfall levels increase over a large spatial scale, and the monthly distribution of landslides presents a significant association with precipitation levels. This study provides a powerful method of understanding the spatiotemporal distribution of landslides via a rare landslide catalog, which is important for engineering design and planning and risk management.