

## Kinematic Analysis of the 8 February 2025 Junlian County Landslide, Sichuan Province, China, from Seismic Records: Postprint

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**Date:** 2025-08-20T00:00:00+00:00

### Abstract

At approximately 11:50 Beijing time on February 8, 2025, a sudden landslide occurred at Gaojiaping, Jinping Village, Mu' ai Town, Junlian County, Yibin City, Sichuan, causing severe casualties and property damage. To investigate the landslide movement process, an analysis was conducted on the seismic records generated by the landslide. The seismic signals triggered by this landslide were clearly recorded by five nearby seismic stations with a slight delay relative to the landslide occurrence time. Each station recorded two segments of anomalous event signals distinctly different from background noise, with a total duration of 99 s and a frequency distribution of 0.1 Hz-10.0 Hz. Through detailed analysis integrating the landslide geological environment and topographic relief characteristics along the movement path, the following conclusions were obtained: (1) By integrating landslide signal characteristics and station distribution, it is determined that this landslide involved two main sliding processes, and their initiation times and durations were determined respectively. (2) Based on the formation mechanism of landslide long- and short-period signals, and integrating signal characteristics in different frequency bands as well as topographic constraints, the first main sliding process was subdivided into four stages, while the second main sliding process was broadly divided into three stages. This study provides scientific reference for deepening understanding of the disaster-causing process of the Gaojiaping landslide in Junlian County and enhancing subsequent landslide disaster prevention.

## Full Text

### Preamble

#### Analysis of the Landslide Movement Process in Junlian County, Yibin City, Sichuan Province on February 8, 2025, Based on Seismic Records

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### Abstract

At approximately 11:50 AM Beijing Time on February 8, 2025, a sudden landslide occurred at Gaojiaping in Jinping Village, Mu' ai Town, Junlian County, Yibin City, Sichuan Province, causing severe casualties and property damage. To investigate the landslide's movement process, we analyzed the seismic records generated by the event. The seismic signals triggered by this landslide were clearly recorded by five nearby seismic stations, arriving slightly later than the actual landslide occurrence. Each station recorded two distinct anomalous events clearly distinguishable from background noise, with a total duration of 99 seconds and frequency distribution ranging from 0.1 Hz to 10.0 Hz. Through detailed analysis combining the landslide's geological environment and topographic characteristics along its movement path, we reached the following conclusions: (1) Based on the characteristics of the landslide signals and the distribution of seismic stations, we determined that the landslide involved two main sliding processes and identified their respective initiation times and durations. (2) Based on the formation mechanisms of long- and short-period signals from landslides, combined with the signal characteristics across different frequency bands and topographic constraints, we subdivided the first main sliding process into four stages and the second main sliding process into three stages. This study provides a scientific reference for deepening our understanding of the disaster process of the Gaojiaping landslide in Junlian County and for improving future landslide disaster prevention.

**Keywords:** Junlian County Gaojiaping Landslide; Seismic Network; Signal Characteristics; Movement Process Analysis

*Note: Figure translations are in progress. See original paper for figures.*

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