This manuscript mainly analyzes seismic signals generated by three debris flows and infrared imagery, with a focus on one event, in two catchments in Wenchuan, China. The study provides valuable seismic data that enrich the existing database of debris flow signals. The authors employ basic signal processing techniques, including short-time Fourier transform (STFT), power spectral density (PSD), and cross-correlation, to analyze these data. However, the novelty of the manuscript is questionable, as it offers limited new insights compared to previous studies, appearing more like a case study.

Additionally, I am skeptical about the reliability of the simple method used to calculate the "compensation function" for high-frequency signals (1-50 Hz). Although I am not an expert in seismic signal propagation modeling, using such simplistic input parameters and formulas for time-domain compensation seems problematic. Furthermore, I recommend the authors clarify whether they have removed the instrumental response from the signals before deriving debris flow characteristics from absolute amplitude. The spectral plots suggest significant suppression at both high and low frequencies, which raises concerns about data processing.

Below are my detailed comments:

**Title**: This manuscript does not accurately reflect real-time seismic signal analysis, as the signals were not transmitted or processed in real time. Consider revising it accordingly.

**Abstract**: If this manuscript is a case study, the abstract should emphasize specific case details.

**L44**: Similarly, this study does not involve real-time seismic signal analysis.

**L65**: The connection between this sentence and debris flow monitoring/early warning is unclear. It appears abrupt.

**L66-67**: Clarify whether "these systems" refer to debris flow early warning systems? Real-time rainfall monitoring is not a technical challenge, so the statement seems vague.

**L75-78**: Reassess the logic of this sentence, as there is no clear cause-and-effect relationship.

**L79-87**: The logic of this paragraph is unclear. It is difficult to discern the authors' intended message.

**L122-129**: The authors discuss seismic instrument installation and related challenges to highlight limitations of debris flow monitoring. While these are valid points, they

seem irrelevant to the main topic. Since the manuscript does not address these issues further, the introduction lacks clear motivation.

**L148-149**: Add relevant references for this statement.

**L150-152**: What is the debris flow frequency in the study area?

**Table 1**: Missing key parameters of seismic instruments, such as corner frequency. Are the instruments three-component? Were instrumental responses processed in the analysis? Are these signals transmitted in real time, and can the deployment sites connect to a wireless network?

**L233-237**: How did the authors remove instrumental effects? Without removing the instrumental response, analyzing absolute signal amplitude is meaningless.

**L249-281**: The introduction of STFT, cross-correlation, and PSD is overly detailed, given that these are basic signal processing methods. Consider summarizing this section and citing relevant specialized literature instead.

**L283-284**: Revise this sentence to discuss existing studies that use PSD to evaluate debris flow dynamics.

**Formulas 6 and 7**: Equation 6 appears to account for signal attenuation. If so, why is Equation 7 necessary? Clarify whether there is overlap or redundancy between these two equations.

**Formula 8**: Clarify the derivation process and include references. Why is $\sigma=0.02\sigma=0.02$? Provide a basis or justification for this value.

**L303-304**: Explain why Formula 8 performs better for high-frequency signals. What underlying principles support this?

**L312**: Specify the preprocessing steps—do they involve removing instrument response, filtering, or other methods?

**L320-322**: How do the authors address the influence of variations in debris flow characteristics on seismic signals?

**L322-325**: Elaborate on the input parameters used to calculate the signal-to-noise ratio (SNR).

**L336**: Does "maximum rainfall" refer only to the day of the debris flow event? If similar maximum or cumulative rainfall occurred on other days, did debris flows also occur? Clarify.

**L349-395**: The use of Formulas 7 and 8 to account for signal attenuation raises concerns. Although I am not an expert in seismic wave propagation modeling, the reliance on simplified epicentral distances and attenuation coefficients for high-frequency signals (1-50 Hz) seems questionable. Compensating for attenuation using these simplified formulas, especially with generalized seismic ground velocity model, undermines confidence in the results.

If the authors had used these parameters to derive the PSD of the raw signal, the approach might be more acceptable. Furthermore, clarify the motivation for recovering the absolute amplitude of the original signal! Does the analysis explicitly require it? This rationale is unclear in the manuscript.

**Figure 5**: The seismic instrument appears to suppress signals below 4.5 Hz and above 45 Hz. However, debris flow fronts often exhibit strong signals in the 1-5 Hz range. Reassess whether the instrument response was removed prior to analyzing absolute amplitude.

**L449-451**: How do the authors account for waveform propagation path effects? Using simplified Formulas 7 and 8 to compensate for signal attenuation does not adequately address significant path effects.

**L467-470**: This contradicts earlier claims. If the authors find Formulas 7 and 8 effective for attenuation compensation, why attribute signal differences to path effects here? Clarify this inconsistency.

**L508**: A debris flow velocity of 38.3 m/s is unusually high. Verify this value against typical debris flow velocities to ensure accuracy.

**L518-527**: The authors use Manning's formula to validate velocity estimates from signal cross-correlation. However, why was this approach not applied to verify the unexpected velocity of 38.3 m/s? Failing to address such anomalies weakens the reliability of the cross-correlation results.

**L679-680**: Why not compare the simulated PSD for the event (with the estimated velocity of 38.3 m/s) against the measured PSD? A large discrepancy would cast doubt on the validity of the results.

**Figure 12**: The measured and simulated PSD amplitudes show significant differences (compare Figures 12a and 12b). Address these discrepancies and their implications for the analysis.