

# A near real-time landquake monitoring system (NRLMS) using the broadband seismic network

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Landquakes such as rockfalls, landslides and rock avalanches are one of the most deadly kinds of natural disasters. In active mountain belts, such gravity-driven events dominate erosion dynamics that strongly depend on the occurrence of extreme rainfall or high seismicity. Recent studies have demonstrated that seismological monitoring is also an effective technique to detect landquake events. Based on the real-time broadband data in Taiwan, we have developed a near real-time landquake monitoring system (NRLMS), which is a fully automatic process based on waveform inversion that yields source information (e.g., location and force mechanism) and identifies the landquake source by examining waveform fitness for different types of source mechanisms. Starting in 2015 and supported by the Ministry of Science and Technology (MOST) of Taiwan, the NRLMS has been continuously monitoring landquake activity in Taiwan, which provides a complete landquake catalog for the comprehensive landtoring (landquake monitoring) laboratory (CoLLab, <http://140.112.57.117/main.html>). In practice, certain levels of station coverage (station gap <math>< 180^\circ</math>), signal-to-noise ratio (SNR 5.0), and a threshold of event size (volume >  $\sim 10^6 \text{ m}^3$  and area >  $\sim 0.20 \text{ km}^2$ ) are required to ensure good performance (fitness > 0.6 for successful source identification) of the system. The NRLMS can be readily implemented in other places in the world with real-time seismic networks and high landquake activities.

Keywords: landquake, broadband data, near real-time landquake monitoring system (NRLMS), comprehensive landtoring laboratory (CoLLab)

