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Unraveling landslide failure mechanisms with seismic signal analysis for enhanced pre-survey understanding

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Table S1 Source of field photos for landslides

Photos	Sources	Announced time
Figure 1(c), (d), (e)	https://thbu4.thb.gov.tw/News_Content_table.aspx?n=5066&s=198478	15:27 on October 18, 2022
Figure 1(f)	https://thbu4.thb.gov.tw/News_Content_table.aspx?n=5066&s=198469	17:41 on October 17, 2022.
Figure 1(g)	https://thbu4.thb.gov.tw/News_Content_table.aspx?n=5066&s=198468	14:46 on October 17, 2022.
Figure 1(h), (i), (j)	https://thbu4.thb.gov.tw/News_Content_table.aspx?n=5066&s=198460	15:52 on October 16, 2022.

Last accessed: 30 October 2024

Table S2 Weighting coefficient for grid-based single force by different signal-to-noise ratio (Chao et al., 2017)

Signal-to-noise ratio (SNR)	Weighting Coefficient
SNR≥5.0	1
4.5≤SNR <5.0	0.8
4.0≤SNR <4.5	0.6
3.0≤SNR <4.0	0.4
SNR<3.0	0.1

Table S3 Seismometers for this research

Stations	Sensor	Maintained institute
LATB, NNSB, YHNB, NACB, HGSD	Trillium 120PH, Trillium 240, STS-2, CMG3TB	Academia Sinica
ENT	Short-period Seismometer Model S-13	Central Weather Administration, Taiwan
V03G	4.5 Hz 3-component-geophone	National Yang-Ming Chiao Tung University

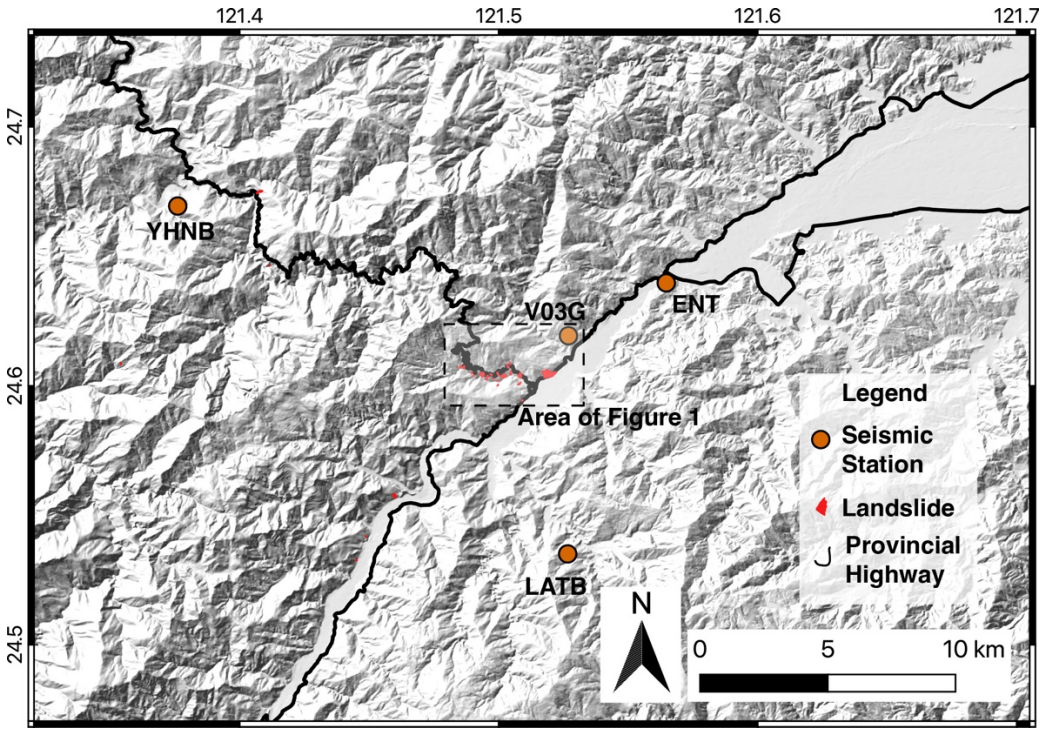

Figure S1 Map of the Landslide distribution triggered by Typhoon Nesat.

Figure S2 Video caption at different moments of the CL. (https://www.youtube.com/watch?v=cNz_Jlid5aI; last accessed: 30 October 2024)

媒體報導台7甲線大面積崩塌，經查證為台7線86.5K~86.9K上方坡地崩塌，該路段已實施緊急性封路

公告期限：112-11-16 18:39

分類	重大新聞
公告日期	111-10-16 18:39
公告單位	第四區養護工程處-交通管理及控制中心
內容	受尼莎颱風外圍環流影響，宜蘭縣大同鄉英士路段二日已降下逾9百毫米超大豪雨，造成台7線86.5K~86.9K上方坡地集水區大量逕流水致土石流崩塌災情，公路總局於(16)日上午動員大型機具進場搶修，原預計今（16）日17時搶通，惟坡地受持續性逕流水沖蝕，位址坡地於下午4時再度滑落大量土石泥流，並新增臨近台7線87.3k、86.7k二處坍方災點，影響增援機具挺進，道路雙向阻斷，3處災點搶災機具仍持續清坍搶修中，惟重現性土石泥流不斷淹沒道路，預估將延至明日中午12時搶通。公路總局呼籲用路人，東北部入秋後好發東北季風降雨，為防範行車風險，行駛山區道路請事先作好行程規劃，有豪雨警訊避免進入山區公路，並請多利用公路總局省道即時路況系統（http://168.thb.gov.tw）並隨時注意收聽廣播訊息。 承辦單位: 獨立山工務段 路況查詢電話：03-9962683

Figure S3 Announcement shown in Chinese of the exact landslide location from the Directorate General of Highways, Taiwan.

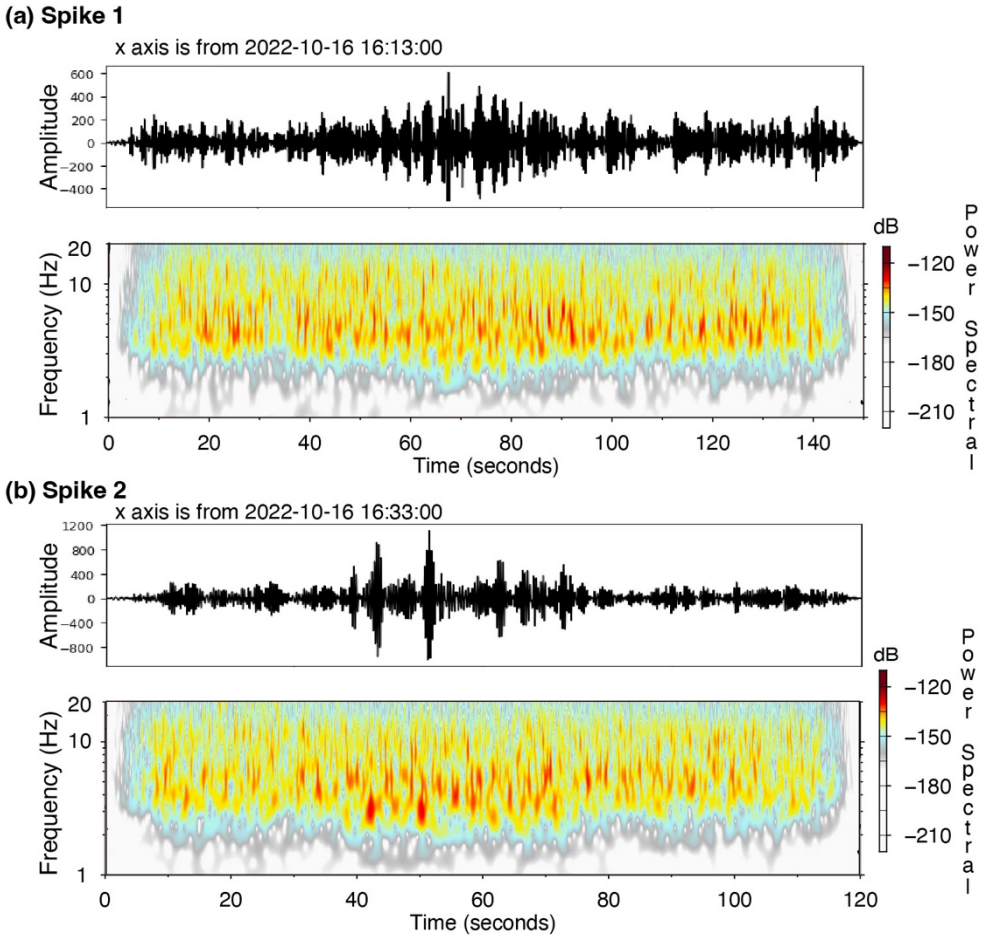

Figure S4 Spectrograms and waveforms of (a) spike 1 and (b) spike 2.

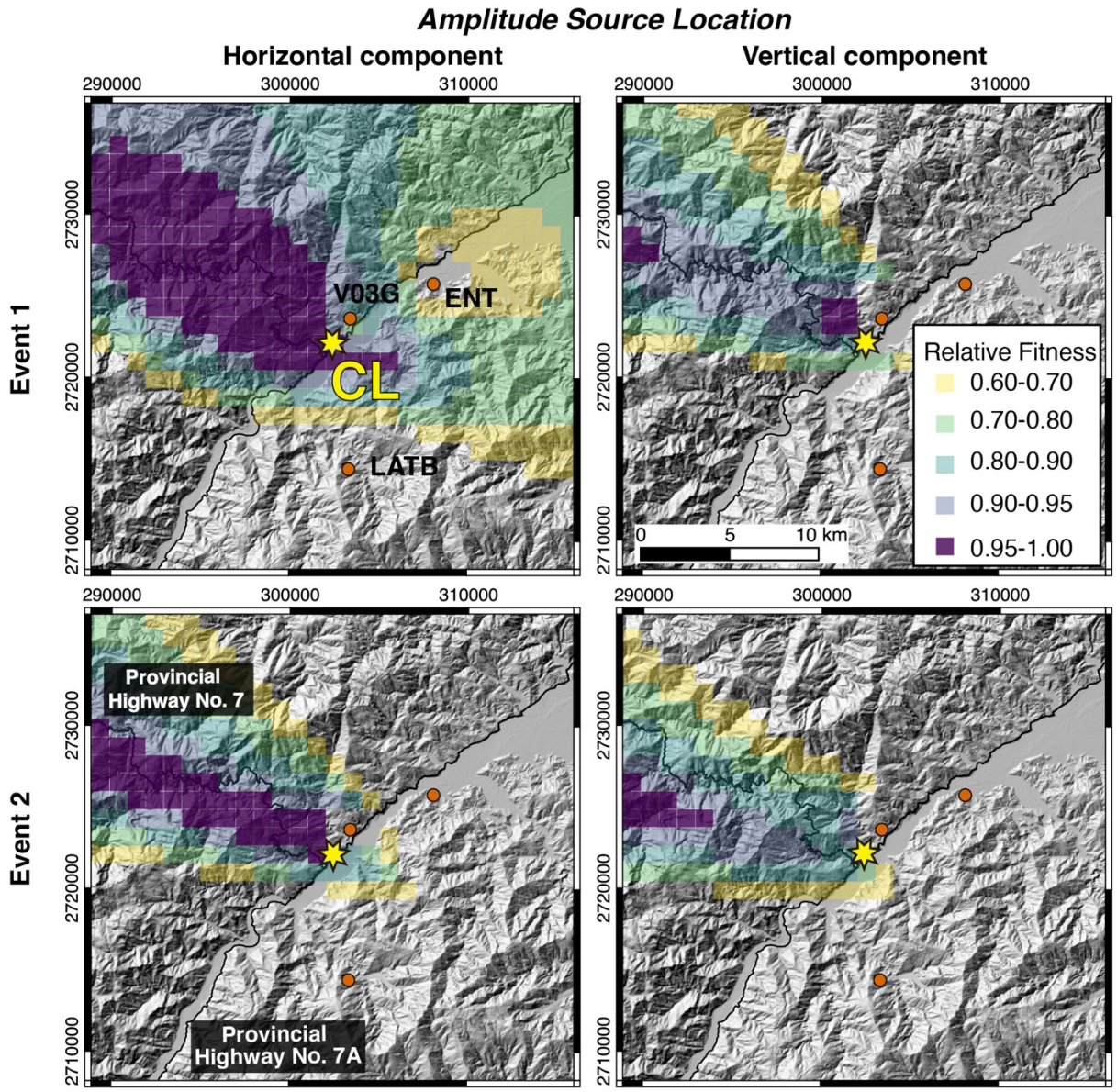

Figure S5 Location determination by amplitude source location of horizontal and vertical components data for Event 1 and Event 2.

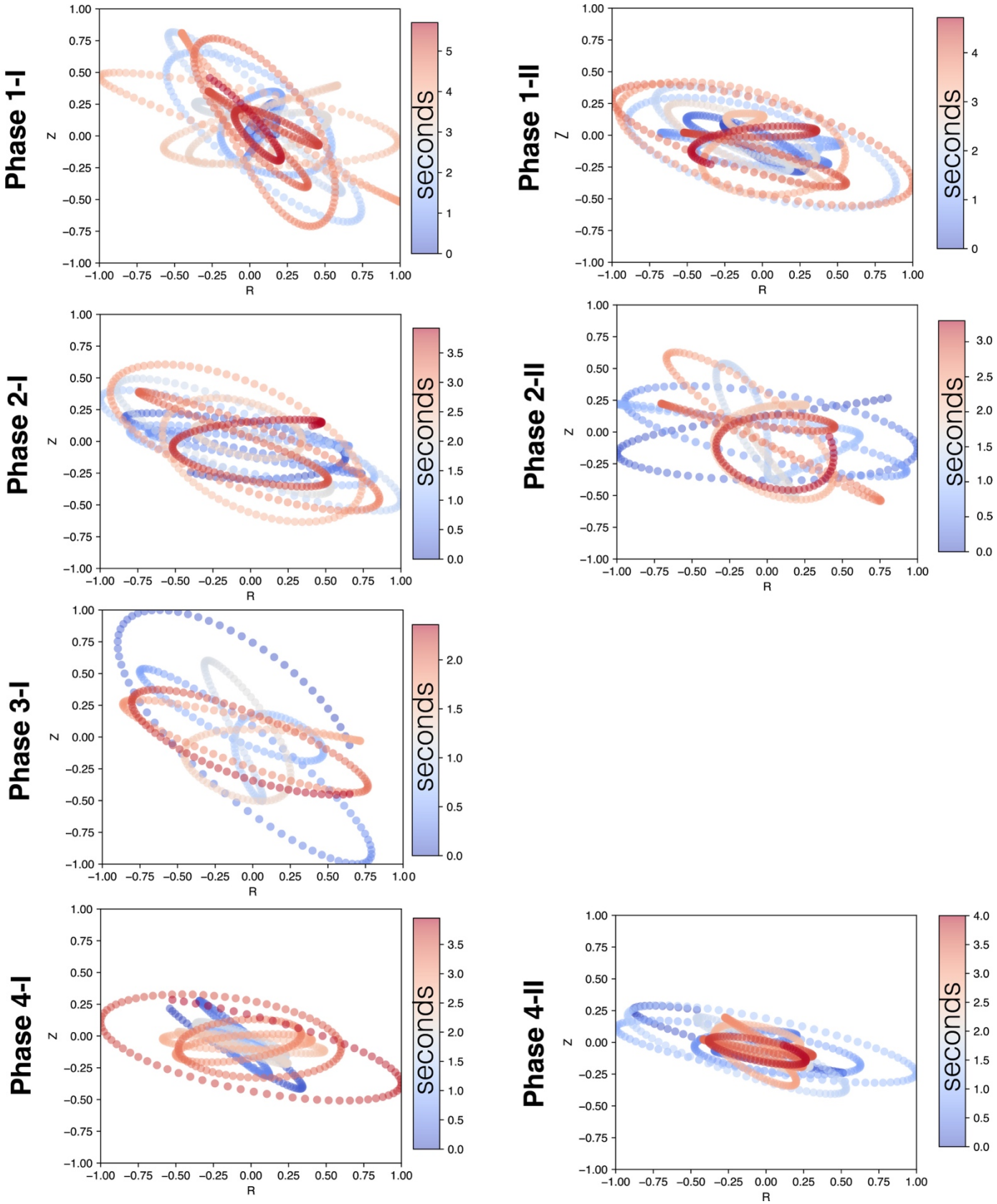

Figure S6 Particle motion of Event 1 for different sliding phases with vertical (Z) and radial(R) components.

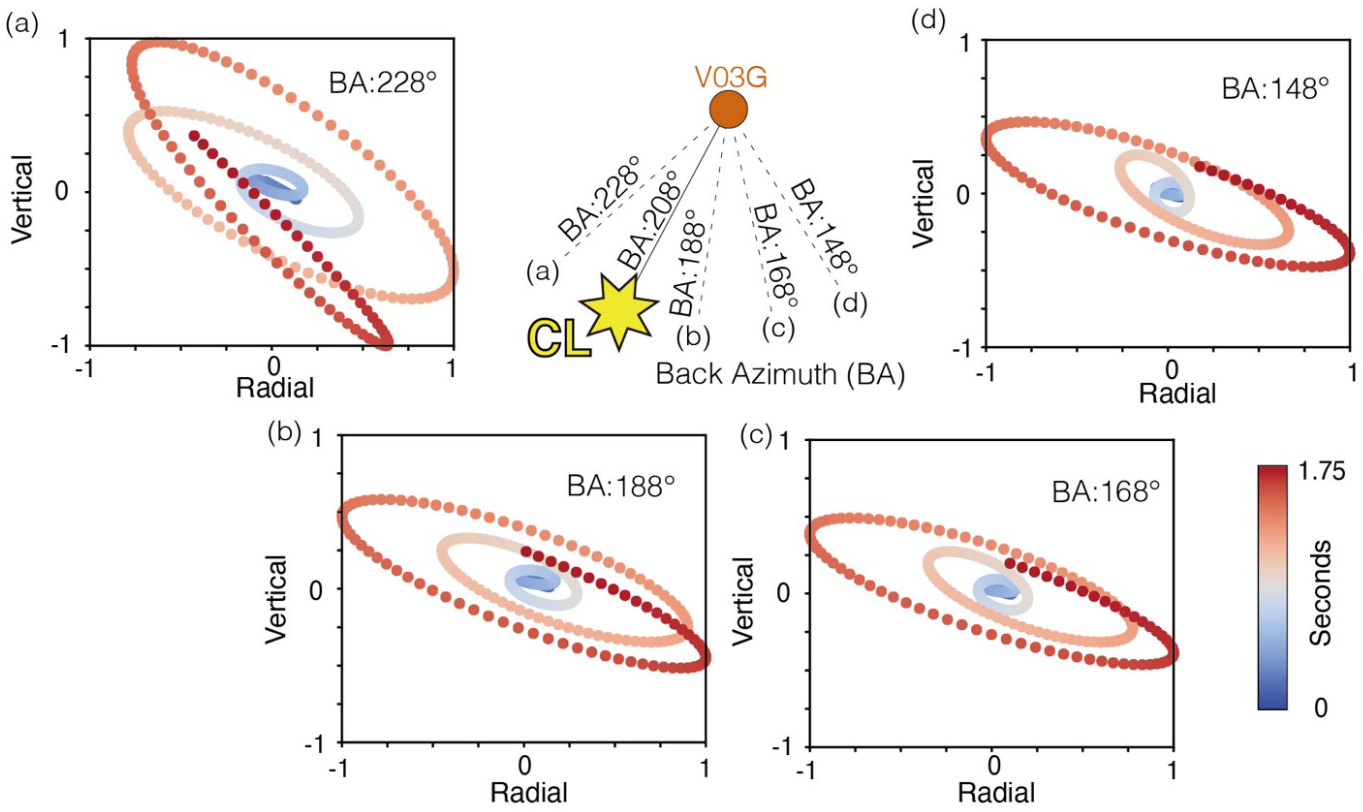

Figure S7 Particle motion of Event 2 rotating different back azimuths to radial components. (a) 228°, (b) 188°, (c) 168°, and (d) 148°.

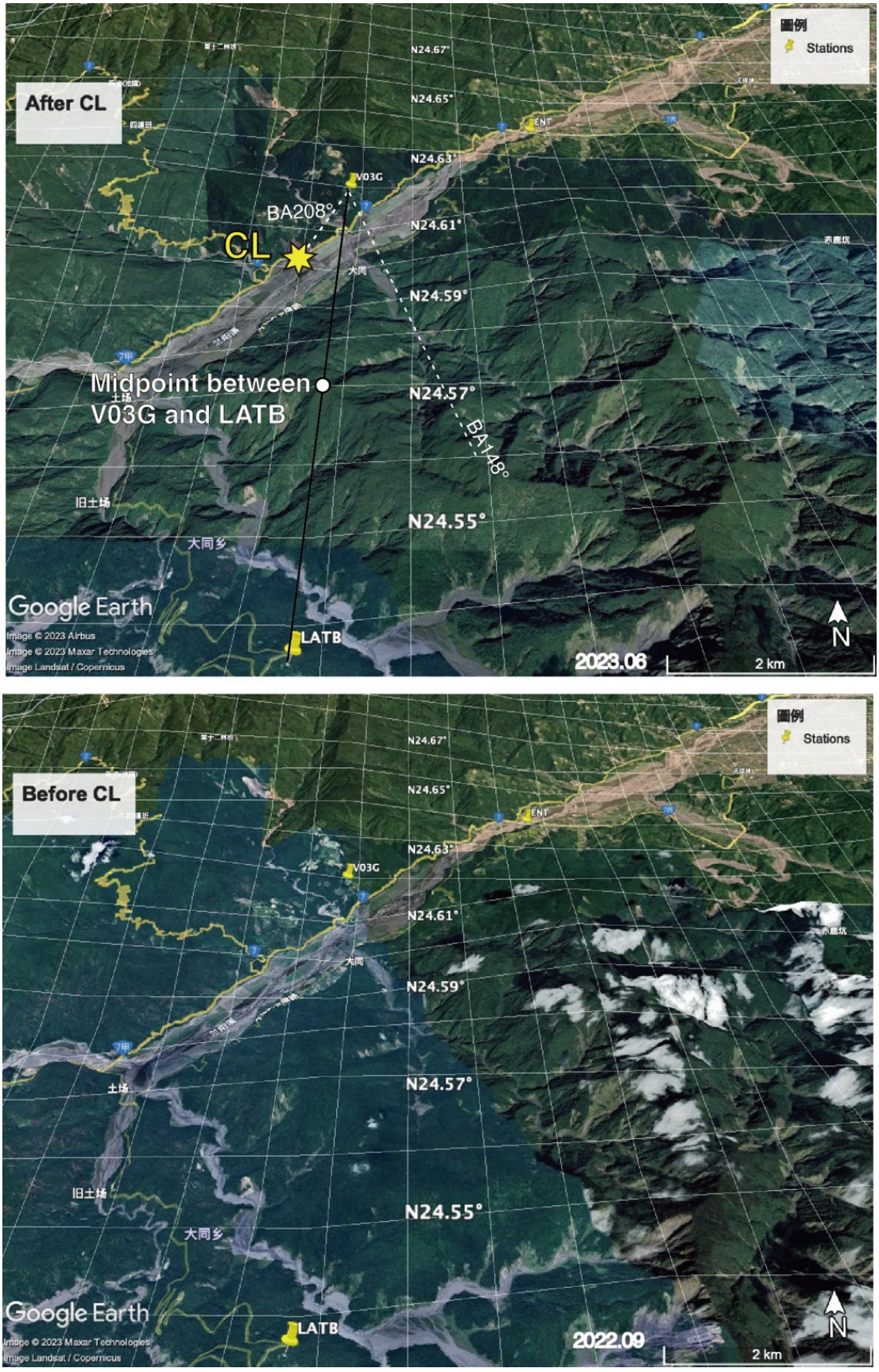

Figure S8 Satellite image before and after the CL.