

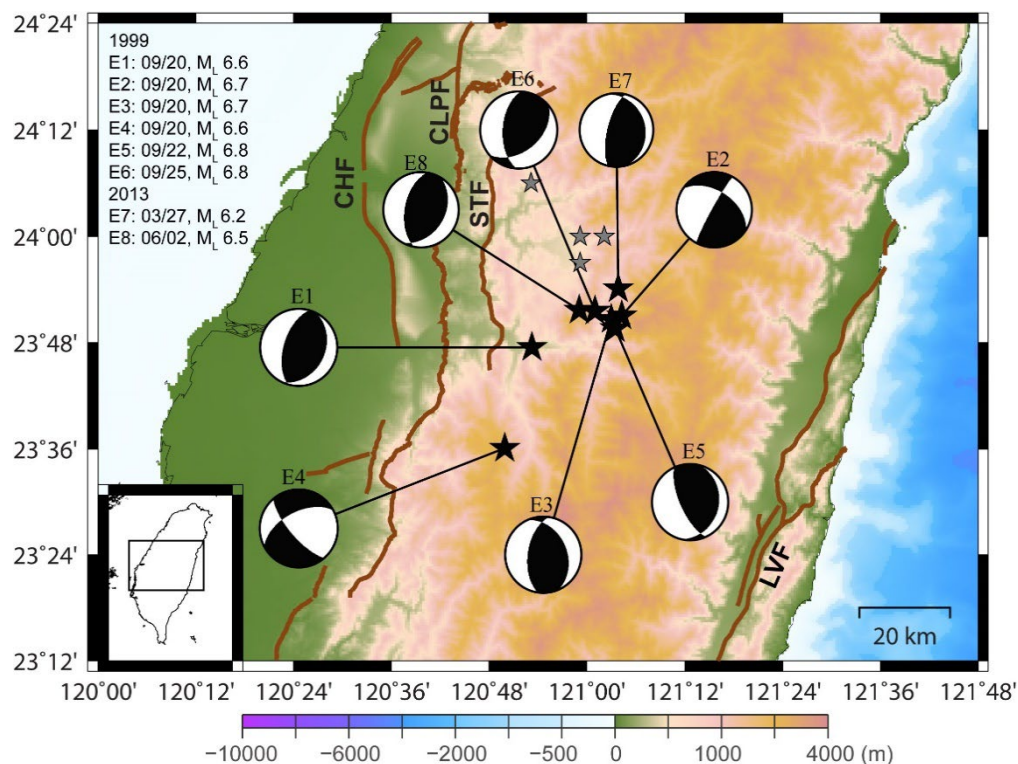
## Source Characteristics of the Six Large Aftershocks of the 1999 Chi-Chi Earthquake: Insight from Strong Ground Motion Simulations

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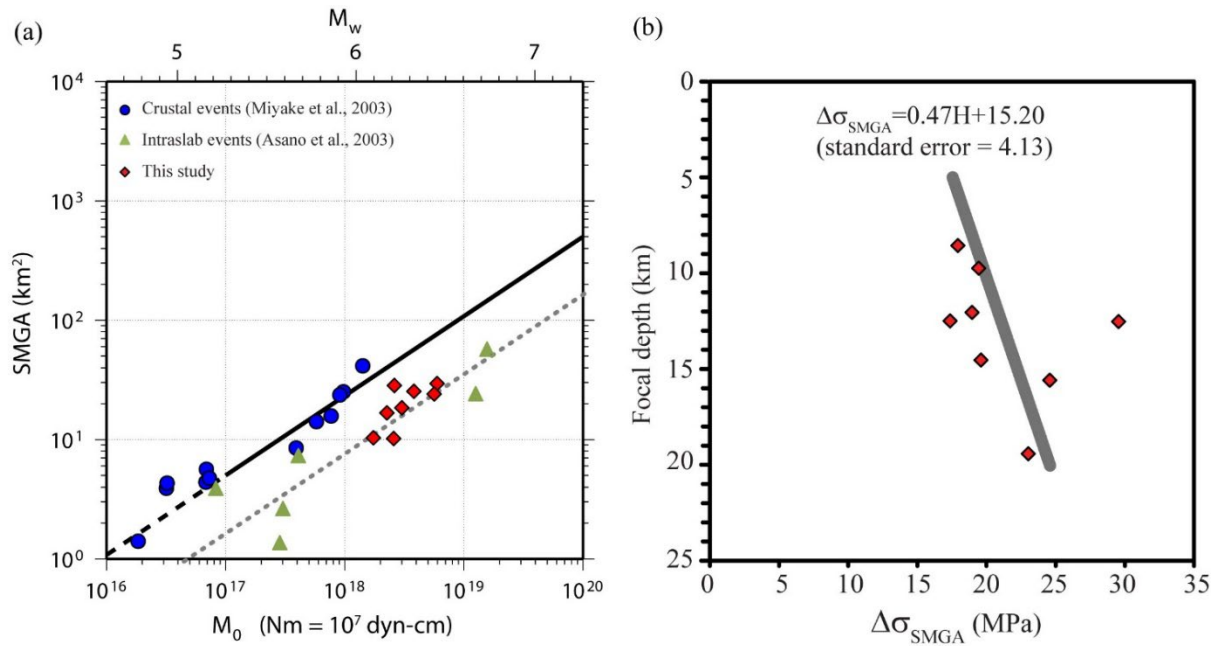
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In Taiwan, the Nantou area is a seismically active region where several moderate events have occurred, causing some disasters during the past century. Following the 1999 Mw 7.6 Chi-Chi earthquake, several events with  $M_w \geq 6.0$  occurred around this region. Here, we applied the strong ground motion simulation with the empirical Green's function method (EGFM) (Irikura, 1986; Miyake et al., 2001, 2003) to investigate the source characteristics for the six moderate blind-fault events that struck the Nantou area in 1999. Combining with the analysis of two Nantou events in 2013 (Wen et al., 2014), the results show that for these Nantou events, a high stress drop and focal-depth dependence were noted, which might be related to the immature buried fault in this area. From the viewpoint of seismic hazard prevention and preparation, future earthquake scenarios that include high stress drop should be applied to more analyses, especially the moderate-to-large events originating from the immature blind faulting.



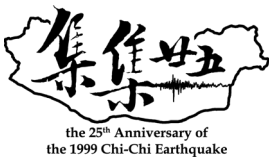
**Figure 1.** Epicenters (black stars) and focal mechanisms for the eight moderate-sized events that struck the Nantou area in 1999 and 2013. The gray stars show the epicenters of the 1916 Nantou earthquake sequence. The active faults (thick lines) identified by Central Geological Survey of Taiwan are also shown. CHF: Changhua fault; CLPF: Chelungpu fault; STF: Shuangtung fault; LVF: Longitudinal Valley fault.



**Figure 2.** (a) The scaling relationship for seismic moment versus SMGA. The diamonds indicate events studied in this paper. Triangles and circles show events from previous studies. The solid line represents the empirical relationship proposed by Somerville et al. (1999), with the dashed lines as the extension for the smaller events. The dotted line shows the relationship, while the stress drop on the combined asperities is five times the value estimated from the empirical relationship of Somerville et al. (1999). (b) Relationship of focal depth versus stress drop on SMGA. The gray line represents the empirical relationship obtained in this study.

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