

Investigation of Seismic Structural Features and Mechanisms in the Chungpu-Baihe Region, Taiwan

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Strong earthquakes occurred in the area from Chiayi Chungpu to Tainan Baihe in 1941 (Chungpu earthquake, ML7.1) and 1964 (Baihe earthquake, ML6.3). Since there has been no major seismic activity in this area for a long time, the risk of earthquake disasters remains high. Therefore, understanding the current seismic activity in the region is crucial. In 2017 and 2018, two seismic swarms occurred in the Chungpu area, approximately 4 kilometers apart. These swarms were very close to the epicenter of the 1941 Chungpu earthquake, prompting this study to analyze them and investigate their correlation with the 1941 event. The seismic swarms occurred between two major fault traces, the Liuchia-Muchiliao fault and the Chukou fault, both of which dip eastward and exhibit thrust fault characteristics. However, the main focal mechanism of these seismic swarms tends to be strike-slip motion. In 2017, the seismic swarm on the east side showed a left-lateral motion mechanism, while the 2018 swarm on the west side mainly showed a right-lateral motion. Additionally, a significant decrease in shear wave velocity was observed in the region after the 2016 Meinong earthquake, suggesting a potential association with fluid activity or fracture growth. This indicates a potential correlation between stress perturbations, fluid migration, and the reactivation of existing faults, leading to these recent seismic events. We believe that the intermittent swarms, caused by the above factors and the highly fractured structures in the area, are key triggers for the seismic activity observed in this region.

Keywords: Chungpu Earthquake, Swarm, Deep fluid migration, Stress variation