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Interpretation on seismogenic structures in Chiayi area, southern Taiwan

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Taiwan has long been known tectonically active due to its on-going arc-continent collision occurring in between Eurasian and Philippine Sea plates. Its internal processes are highly interested by geoscientists since many mechanical behaviors therein are geological material dependent and remained unknown. Also under such a stress unevenly distributed area, earthquakes and active tectonics are inherent threats to the well-being of human living around. To help solve scientific but pragmatic problems mentioned above, a crustal scale while explicit structural model is needed. In the upper crust many geodynamic models have been proposed, such as the model described as thin-skinned bulldozer which is also the most commonly used one. It is established by a number of data sources, including surface geology, bore-holes in the upper crust, geophysical exploration, and seismicity observation. A shallow earthquake Rueili (M6.2) has occurred on 17th July 1998 within this upper system. It becomes less clear when the depth goes deeper than the major decollement because reliable data sources become limited. However, earthquake clusters still quite often occur. Fortunately the dense array deployed in Taiwan makes us capable to have reliable focal solutions and locations, which can assist the interpretation of the structures in the lower crust. This study choose Chiayi system to analyze local structural framework under general decollement. It is located in the immediate south of the Taichung system in which a large earthquake, namely Chi-Chi, just happened in 1999. Tearing this two systems is the Meishan fault, which has historically generated a large earthquake (M7.1) in 1906. Recently on 22nd November 2017 its eastern extension generated a M5.5 earthquake under the decollement. On the other hand, to the south of Chiayi another M5 earthquake occurred on 24th May 2017 also in lower crust, which may reveal information of the southern boundary of Chiayi system. Combining these newly learned data, we revise the structural framework, especially for lower crust deformation in the study area.