Geophysical Research Abstracts
Vol. 19, EGU2017-6724, 2017
EGU General Assembly 2017

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Rapid strain accommodation across the fold-and-thrust belt in SW Taiwan are revealed by the Continuous GPS. The previous block model based on GPS measurement suggested a high seismic risk in SW Taiwan. However, a clear evidence of multiple fault slip along a fold-and-thrust belt at 5-10 km depth was triggered by the 2016 Mw Meinong earthquake at 15-20 km depth. The surface coseismic deformation is mainly controlled by a structure related to the shallow detachment at around 5-10 km depth, which a proposed duplex in a region of high pressure and high interseismic uplift rate might be sensitive to stress perturbations induced by moderate lower crustal earthquake. It is surprising to notice that the footwall of Longchuan reverse fault demonstrates a high uplift rate of ∼20-30 mm/yr in interseismic period. This anomalous deformation rate might part be related with a ramp duplex located in the footwall and the triggered slip of moderate earthquake in nearby area. In addition, the widespread soft sediments and mudstone resulting in plastic deformation in the Kaoshiung-Pingtung area could be the main reason that there is active crustal deformation but low seismic activity in the area. In this study, we use multi-blocks model to study the interseismic deformation of southwestern Taiwan. The multi-blocks model can well resolve and explain more than 90% of the interseismic GPS data. It is found that Hsinhua Fault is a right-lateral strike-slip fault with creeping rate of 10 mm/yr. The Meishan Fault is also a right-lateral strike-slip fault with slip rate of only 2∼3 mm/yr. The Chaochou Fault is a left-lateral strike-slip fault with small slip rate of about 6∼8 mm/yr. Although the fault geometry of Zuozhen Fault is not well resolved, we can still obtain a left-lateral fault slip rate of about 12 mm/yr. The Chishan Fault is a thrust fault with minor strike-slip component, dips 55° [U+FF5E] 60°E. The results of multi-block models indicate a different tectonic motion on both sides of the Chishan Fault. In the eastern side, there could be a décollement at depth of 8∼10 km, different from that in the Chiayi-Tainan area. In contrast, the tectonic escape of western block may be enhanced due to the compression from thrust movement of Chishan Fault and lateral motion by Hsinhua Fault and Zuozhen Fault. The Fengshan transform fault zone (FTFZ) is not a major seismogenic structure in the Kaoshiung-Pingtung area, as the seismic activity is quite low and its impact on the strain accumulation is not significant. The observed velocity changes at the eastern side of Chishan Fault may come from the slip on the faults and folds extending from the basal décollement, and tectonic escape occurs only in the offshore area with thick sediments. With the highest fault slip rate in southwestern Taiwan, the JMLF can produce a major earthquake with maximum magnitude of 7.3 and 7.6 for 100 and 300 years period, respectively.