Development of Strike-Slip Fault Related to the Mud Diapirism in SW Taiwan

*Kuo-En Ching[1], Yu-Tsung Lo[2], Song-Chuen Chen[3], Ruey-Juin Rau[1]

1. National Cheng Kung University, 2. National Central University, 3. Central Geological Survey

Tectonic escape theory has been applied to the tectonic development explanation in SW Taiwan. Following the lateral extrusion of tectonic blocks, the major strike-slip faults was generated as the block boundaries. The approximately 45-km-long N-S-striking Kaoping fault has been proposed as one of the major strike-slip fault in SW Taiwan. Although the slip rate of approximately 10-15 mm/yr was derived based on the geodetic data, no geological evidence proofs the existence of Kaoping fault so far. In addition, rather than the tectonic escape theory, the mud diapirism has also been proposed to explain the development of tectonics in SW Taiwan in recent studies. Based on this school, it is easy to understand why the material motions in upper crust and upper mantle are different and to understand why the seismic rate is extremely lower than derived earthquake potential in SW Taiwan. However, whether the vertical motion caused by mud diapirism has possibility to derive the strike-slip faulting? The 13-year surface displacements derived from GNSS and leveling measurements and seismic reflection profiles in an island off SW Taiwan has indicated that the active mud diapirism would cause the active strike-slip faulting. Therefore, the existence of Kaoping fault is possible if the mud diapir location is the same as the Kaoping fault. The recent distribution of residual Bouguer gravity anomaly in SW Taiwan indicates that a series of positive gravity anomalies align along the possible location of Kaoping fault. The confidential seismic reflection profiles from oil company also indicate that the N-S trending mud diapir located beneath the Kaoping fault. Therefore, we proposed the initial development of Kaoping fault is related to the activity of the mud diapirism in this study. In other words, even though a high slip rate of approximately 10-15 mm/yr was inferred on the Kaoping fault, the earthquake potential of this fault is not as high as what we expected.

Keywords: strike-slip fault, mud diapir, GPS velocity field

