# Behavior and structure of the active fault system in Houli and Tatushan area, central Taiwan, in late Quaternary time

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Taiwan is an area of active arc-continent collision lying between the Philippine Sea and Eurasian plates. The maximum elevation of the Central Range is around 4000 m. To the south of Taiwan, the Manila trench extends along the subduction zone of the Eurasian plate (South China Sea). This structure is extended to the north, and reaches under the south of Taiwan (Wu et al., 1997) and changes to collision system between the Luzon arc of the Philippine Sea plate and the Eurasian continental margin. The collision has been the most significant tectonic event in the morphotectonic evolution of Taiwan. During the collision, compressional forces first became evident in the northern area of Taiwan and then propagated southward. Several hundred kilometers of crustal shortening were accomplished in only a few million years, the resulting compression leading to the accretion of sedimentary units to create the island of Taiwan (Lee and Wang, 1987). Then, according to Suppe (1984), arc-continent collision has already stopped and changed to the tension in the northernmost of Taiwan. Because the southwestward propagation of the Okinawa trough.

Taiwan is just located on the plate boundary, and the fault system has changed spatial and time wise. Explaining the relation between structure and behavior will provide fundamental understanding on structural history on collision zone.

The investigation area is located in central Taiwan. It is believed that the collision has comprised a fold-and-thrust belt and brought remarkable shortening deformation to the strata in this area. This area can be divided into two distinct segments; Tachia and Houli area and Tatushan hill area.

Shih et al. (1983) and Chang et al. (2002) classified the geomorphic surfaces and identified fault on the basis of air-photo interpretation. However, because the numerical age of the terrace formation is uncertain, they only trace the fault and are not discussing the slip rate. On the other hand, Simoes et al.(2005) measures the age of the sediment by using the OSL dating method, compares with the structural geology obtained by the reflection survey, and discusses the uplift rate and history with the balanced method. However, neither the deformation pattern nor the time variation are enough though uplift rates of dating stratum are clarified.

Therefore, the purpose of this study is to clarify the long-term slip rate associated with the geomorphological investigation and compare with the fault geometry and geological structure to show the fault system. Interpretations of structure on the Houli plateau and the Tatushan hill three dimensional are presented this time.

Tachia and Houli area: We can find lot of terraces. There is a Changhua fault (Tachia fault) in the eastern side, and Sanyi fault and Houli fault run the western rim and they are east-dipping faults. The west-dipping Yuehmei fault between two fault systems has remarkably displaced terraces. The area between Yuehmei fault and Changhua fault has been uplifted as the pop-up structure and is found many terraces and secondary or third-order west-dipping faults. The area between Yuehmei fault and Sanyi fault is on higher terrace and has been uplifted in spite of the footwall side of both faults.

Tatushan hill area: The Tatushan hill is an anticline which is formed by the Changhua fault (Shimizu fault). The paleochannel on Tachia River exists on the hill, and its deformation pattern is consistent with the deformed hill surface. In this area the secondary deformation is found on the anticline structure. The area between the Tatushan anticline and Sanyi fault is Taichung basin which has not been uplifted.

The difference of the feature of the tectonic geomorphology in both areas is probably caused by the difference of the geometry of the detachment fault.