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Behavior and Structure of the Frontal Thrust System (Changhua Fault) in Houli and Tatushan Area, Western Taiwan

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Taiwan is located in a collision zone between the Eurasian continental plate and the Luzon Arc on the Philippine Sea plate. The Tertiary sediments on the continental margin have been strongly folded and faulted due to the collision, since Early Pliocene time; the deformation is still ongoing at high rates. The Changhua fault is the frontal thrust of the collision in central western Taiwan. The active fault zone develops within the Quaternary sediments, which is called the Toukoshan Formation. The formation consists dominantly of fluvial gravel and shallow marine thick sediments in spite of the hanging wall side. While this formation had been deposited on this area, the Changhua fault did not exist, and the present Tatushan Hills were part of the paleo-foreland basin, where the sediment derived from the Central Range were deposited. Hereafter, the upthrown side of the Changhua fault has been uplifted to form the anticline. Since the Quaternary sediments deformed by the Changhua fault faulting in this area had only present stage, the amount of slip-induced convergence deformation by the Changhua fault can be estimated from balancing method in this area. The investigation area is located in the northern Changhua fault and has two east-dipping fault systems run parallel to each other: the Changhua fault in the west and the Sanyi fault in the east. This area can be divided into two distinct segments for geomorphological feature; Tachia and Houli area and Tatushan hill area. The purpose of this study is to clarify the behavior and structure of the present fault system. Concretely, the long-term (recent) slip rate is estimated with the geomorphological investigation, and it 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 and the behavior and of evolution on the fault front are presented. Tachia and

Houli area is in the northern side of Tachia River. We can find a lot of terraces between the Changhua fault and the Sanyi fault. Some terraces are deformed by the west-dipping Yuehmei fault. The area between Yuehmei fault and Changhua fault has been uplifted as the pop-up structure and is found many terraces and secondary west-dipping faults. It is an important point that 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 is in the southern side of Tachia River. There is an anticline which is forming the uplifted Tatushan hills by Changhua fault. The paleo-channel of Tachia River exists on the hill, and its deformation pattern is consistent with the deformed hill surface. In this area the secondary deformation can be found on the anticline. There is Taichung basin, which has not been uplifted, between the Tatushan anticline and Sanyi fault 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.