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Insights into active structures of the southeastern Central Range in Taiwan: Implications from geomorphic analyses

S.-H. Wang (1), C.-P. Chang (1,2), J.-H. Hung (1), and C.-C. Kang (1)

(1) Department of Earth Sciences and Institute of Geophysics, National Central University, Chungli, Taiwan, (2) Center for Space and Remote Sensing Research, National Central University, Chungli, Taiwan

Situated at the boundary between the Eurasian plate and the Philippine Sea plate, Taiwan is the product of arc-continent collision. Owing to oblique collision, the Taiwan orogenic belt began to build from the north and continues propagating southward at a rate of 60-90 mm/yr. As a consequence, northern Taiwan has been proved as mature colliding status, achieving a topographic steady state; while the colliding event has just occurred in southern Taiwan. Southeast Taiwan has been considered to be located in the transition zone between initial collision and mature collision. Studying active structures in this region helps recognize the process and characteristics of tectonic activities.

In this study, we mapped series of fluvial terraces along several rivers in the southeastern Central Range in order to identify the active tectonics in this region. For most drainage basins, we found that terraces distributed in northern part indeed have higher elevations and more levels than those scattered in southern part. This pattern of distribution might indicate a longer time-span of uplift toward the north. Triangular facets of this area were also plotted to better understand the process of tectonic uplift. We marked the apexes of the triangular facets and calculated the elevation for each point. We revealed that as going northward, the features get higher and have more levels. The result is similar to what we observed from the fluvial terraces, indicating a longer duration of uplift. Based on these observations, we infer that the tectonic activity increases from south to north in this region. We further conclude the characteristics as a consequence of southward propagation of the Taiwan orogen, resulted from the oblique geometry of collision.