



Holocene landscape evolution of the Jinlun, Dazhu and Dawu River Basins in the southeastern Taiwan

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The Jinlun, Dazhu and Dawu Rivers are coastal rivers originated from the southeastern side of the Central Range of Taiwan, flowing eastward into the Pacific Ocean. Wide modern valley floors with flights of fluvial terraces in the downstream reaches of the rivers implies that different tectonic uplift rates may occur among these river basins. Our preliminary field observations and C14 dating data show that: (1) The number and height of fluvial terraces are gradually decline from north to south in the study area. The northernmost river, Jinlun River, has the largest number of terraces, followed by the Dazhu River. Meanwhile, the southernmost river, Dawu River, has the least number of terraces, and the height of the terrace scarp is only few meters. (2) As far as individual river basins are concerned, tributaries and fluvial terraces are usually well developed, the slope of channels is gentler and the catchment areas are larger in the northern part of the basins, when comparing with those in the southern part. (3) In the upstream areas of both Jinlun and Dazhu River basins, bedrock strath covered by a thin layer of sediment is usually exposed at the bottom of terraces, and the height of terrace scarp is higher than that in the downstream. However, fill terraces are dominant in the downstream reach of the Jinlun River, and the strath surface of the terraces declines downstream. Alluvial terraces are dominant in the downstream of the Dazhu River. (4) Currently, we obtained one radiocarbon age of 9955-10565yr BP from a terrace in the upstream of Jinlun River.

According to the distribution, number and characteristics of the terraces in the study area, we proposed that tectonic uplifting in the northern study area could be relatively faster than that that in the south. Based on the C14 dating data, we estimated the average uplift rate may exceed 5mm/yr in the downstream of the Jinlun River during the mid- to late-Holocene, while the average uplift rate of the Dawu River may be lower than 1 mm/yr, even negative value. Furthermore, we propose a two-stage evolutionary model of the river basins during the Holocene. (1) Stage one: as the rate of sea-level rise is higher than the uplift rate of land during the late Pleistocene, rapid river aggradation occurred and formed wide river valleys in the downstream areas of the Jinlun, Dazhu and Dawu River basins. (2) Stage two: when sea-level became stable in the mid-Holocene, the rate of uplift was relatively faster than the rate of sea-level rise. Fill terraces in the downstream area of the Jinlun River were formed and strath terraces in the upstream area of the Jinlun and Dazhu Rivers were developed.