



## **The complex response of river systems in the Mawuku River (Taiyuan Basin) of eastern Taiwan**

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Mawuku River is located in the Taiyuan Basin of the southern Coastal Range, eastern Taiwan, where the basin is actively uplifting. It has two major tributaries consist of Bei Xi (North River) and Nan Xi (South River), the entire basin features significant incised meander and a series of amphitheater terraces.

Combined our field survey results and radiocarbon dates, we found: (1) Eight flights of terrace surfaces can be clearly defined in the Mawuku river and most of these are strath terraces. Relative height of the terraces ranged from 3 to 80 meters. Most of the sediment thicknesses are generally less than 10 meters. In a few places, it can reach around 20 meters. (2) The fluvial terraces of North River were formed by episodic incision. In contrast, South River has an aggradation event in 7200yr BP, and then followed by the episodic incision. Terraces in the two tributaries could not to directly correlate. (3) The average bedrock incision rate of North River and South River is about 4 to 6 mm/yr, all the river terraces were formed during the Holocene, and the initiating time of river incision should be very close. (4) Incision rate derived from regression between terrace height and age was good with R-square  $\sim 0.88$ , indicating constant incision through time. Extrapolating the incision rate model, we found that the confluence of the two tributaries should be lower than the modern river bed at that location. Possibly indicating the incision has not caught up with the uplift in the lower tributary. (5) Igneous rock and limestone formed the most prominent knickpoint near the rivermouth. This knickpoint hindered the propagation of base level change signal and isolated the upstream from the downstream from this knickpoint.

Mawuku River is the typical and interesting case for the complex response of river systems. The two tributaries probably had the similar geomorphic surface before the early Holocene, and incision started from the climatic fluctuation of early Holocene. Although there are similar bedrock, tectonic and paleo-climatic setting, and the same base level to formed terraces, two tributaries developed different models of the fluvial terraces. Therefore, two tributaries have different geomorphic threshold and sensitivity for the same environmental stimulation.