

Mid- to Late Pleistocene Fluvial Incision History in the Active Mountain Belt of Taiwan

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The Central Range of Taiwan has been argued to be in a topographic steady state on the basis of the relatively constant width and height of the mountain range where the influx of material is balanced by erosion. In this paper, we aim to examine the idea that the Central Range is punctuated by episodic events that perturb the steady state landscape. In the upstream Dahan River catchment at northern side of the Central Range, we analyze the low relief remnants in higher elevations. These low relief remnants are surrounded by convex slope breaks intersecting with bedrock rivers at knickpoints on their channels. The knickpoints at the edge of the low relief remnants are not controlled by lithology, indicating the low relief surfaces are eroding slowly by fluvial systems. Bedrock rivers above the knickpoints seem to have retained the profiles at the time of pre-uplift stage, which exhibit low normalized channel steepness values, implying the remnant surfaces have gradually developed before uplift of the terrain. Field work suggests that the low relief surfaces are undulating with slope less than 30° and have few landslide scars. This shows a sharp contrast with the deeply incised, high-relief landscape that dominated by fluvial incision and by landslide-dominated hillslopes adjacent to the low relief topography. We also observed another two stages of dissection of the landscape by two episodic events that triggered fluvial incisions. We applied terrestrial cosmogenic nuclide dating to constrain ages of the low relief surfaces and

possible timings of fluvial incisions from a series of exposure ages of ridge-top bedrock, boulders on ancient deep-seated landslide deposits, and abandoned fluvial deposits. In summary, our results suggests that the mountain range around upstream Dahan River catchment is in an imperfect topographic steady state and have apparently been punctuated by at least three transient events in Mid- to Late Pleistocene.