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The geochronological timing and alluvium of the tablelands in the Puli Basin, Taiwan

Chia-Han Tseng (1,2), Christopher Lüthgens (3), Sumiko Tsukamoto (4), Tony Reimann (5), Manfred Frechen (4), and Margot Böse (2)

(1) Institute of Earth Sciences, Academia Sinica, Taipei, Taiwan (chtseng@earth.sinica.edu.tw), (2) Institute of Geographical Sciences, Freie Universität Berlin, Berlin, Germany, (3) Institute of Applied Geology, University of Natural Resources and Life Sciences, Vienna, Austria, (4) Leibniz Institute for Applied Geophysics, Section 3: Geochronology and Isotope Hydrology, Hannover, Germany, (5) Soil Geography and Landscape group & Netherlands Centre for Luminescence Dating, Environmental Sciences, Wageningen University, Wageningen, the Netherlands

Tablelands are prominent geomorphic features in the Puli Basin in central Taiwan. Being composed of sediments, they provide clues to understand links between past climatic evolution and tectonic events resulting in the formation of the present-day landforms. To establish a geochronological framework of the tablelands, optically stimulated luminescence dating was applied to obtain burial ages of the tableland deposits. The numerical dating indicate an accumulation phase in the Late Pleistocene to Early Holocene transition. By integrating data from previous studies on topography, sediment characteristics in the study and adjacent areas, huge amounts of alluvium were deposited as alluvial fans in 5–6 thousand years into the Puli Basin based on the results of the luminescence dating. The study area in the Taomi River catchment, an obviously longer precursor of the Taomi River, originating from west of the Yuchih Basin, transported the sediments forming the present-day southern tablelands. During the Pleistocene-Holocene transition, the climate changed to more wet and warmer conditions, so that slope processes might have changed and an increasing transport in the fluvial system was stimulated. Fluvial and fan terraces in other river catchments in Taiwan also indicate a period of increased erosion and fluvial transport at that time. After the deposition of the alluvial fan, an estimated mean incision rate of at least 15 mm/a of the Taomi River reflects local tectonic activities. Fluvial processes controlled by climatic change and accompanied by tectonic activities have created the diverse topography in the Puli Basin.