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Lithological control of drainage basins development post LGM and oscillating climate condition

Shyh-Jeng Chyi[1], **Jia-Hong Chen**[1], Jiun-Yee Yen[2], Lih-Der Ho[1], Chia-Hung Jen[1], Christopher Lüthgens[3], Ting-Yu Wu[4], Ting-Yi Chang[5], I-Chin Yen[6], and Cheng-Hao Lu[7]

[1]Department of Geography, National Kaohsiung Normal University, Kaohsiung, Taiwan
[2]Department of Natural Resources and Environmental Studies, National Dong Hwa University, Hualien, Taiwan
[3]Institute of Applied Geology, University of Natural Resources and Life Sciences, Vienna, Austria
[4]Central Geological Survey, MOEA, Taiwan
[5]Department of Geosciences, National Taiwan University, Taipei, Taiwan
[6]YIC Geological Office, Penghu, Taiwan
[7]Department of Tourism and Leisure, National Penghu University, Penghu, Taiwan

Compare to rivers originated from western Taiwan flowing westward, rivers originated from the southeastern side of the Central Range and the eastern side of the Coastal Range flow eastward directly into the Pacific Ocean and form very narrow alluvial plains or coastal plains immediately next to the mountain front. Based on the field evidences and mapping from field and high-res DTM, we classified these river basins into two types.

The geomorphic features of the first type are remarkably wide valley plain with flights of fill terrace and relatively narrow active channel in the downstream area. The radiocarbon dates of terrace sediments indicate that large-scale aggradation took place before 7ka, and formed fill terraces with the largest relative height of around 50 meters relative to the modern channel bed in the mid to late Holocene. We proposed the landscape evolutionary history for the first type of river basins is that significant river aggradation caused by rapid sea-level rise in estuary during the late Pleistocene to the early Holocene, followed by continuous and slow uplift or the relative sea-level falling that induced a long term basin-wide river incision.

The geomorphic features of the second type of the river basins are those that the knickpoint developed in the igneous rock gorge near the river mouth and often formed incised meander and unpaired rock terraces in its upstream area. The radiocarbon dates of terrace sediments indicate the average bedrock incision rate of upstream area is noticeably lower than the rate near the coast/river mouth area. For the second type river basins, we proposed that the climate turns warm and wet since the end of the last glacial period and the retreat of knickpoint in the igneous rock gorge exert the primary influence on terrace formation in the upper reaches, and the relative sea

level falling is the main control on the terrace formation in the coastal area. In addition to those, the terraces of the main tributaries of the second type river basins which reveal the different cut-and-fill histories might be the results of complex response of sub-drainage systems to the multiple controls.

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