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The origins of high altitude ponds in the Central Range of Taiwan, Baishi, Wanli, and Tunlu ponds as examples

Shyhjeng Chyi, Lih-Der Ho, Jia-Hong Chen, and Yuan-Yu Fan
National Kaohsiung Normal University, Geography, Kaohsiung, Taiwan (chyisj@gmail.com)

Baishi, Wanli and Tunlu ponds are famous high mountain ponds in the Central Range of Taiwan at the height of about 2,750 to 2,850 m above the sea level. Previous researchers proposed several possible causes of these ponds, such as formed by the Pleistocene glaciers, deep-seated landslide, normal faulting, or relict depressions on the highest peneplain. Because the height of ponds is about 500 meters lower than the equilibrium line altitudes (ELAs) of Last Glacial Maximum (LGM) in Taiwan and the height of the headwaters of the ponds are lower than the ELAs of LGM, the ponds are less likely to be the cirques of the glaciers. Our field surveys showed that landslide is the most likely cause of these ponds.

Wanli pond is a landslide dammed pond in the uppermost drainage basin area that has not been affected by the recent rejuvenation. The formation time was estimated at around 500 years ago according to the 14C ages of two pieces of wood sampled at the trenched fan apex in the upstream of the pond.

From the age dating results and field evidences, we proposed that the formation of the Tunlu pond were: a large landslide collapsed about 2,350 years ago and formed the a big pond basin. Then another landslide occurred at about 500 years ago, dumped almost all the colluvium into the main pond basin and formed the Tunlu pond.

The origin of Baishi pond is similar to Tunlu pond. Baishi pond was formed on the depression near the head of the ancient complex landslides, but the age of the pond is still unknown.

However, as those landslides may be trigger by the deep-seated normal fault structure, or by frequent typhoons which may be induced by climate changes during the Little Ice Age, more evidences are needed to clarify the debate.