

Geomorphologic method of detection of landslide dam

Shunji Yokoyama[1]; Masanori Murai[2]

[1] Sci., Kochi Univ.; [2] KGE

An attainable goal of this study is to infer geomorphological, geological and hydrogeological conditions for stability of landslide dam from observations of unbroken dams. Even if landslide mass completely buries in river valley, in many cases, it soon washout, and the valley-floor results in recovery of width and slope. However, in the river valleys dammed by landslide mass during a long time, the general features of fluvial system are reformed and any fluvial system anomalies being local abnormal landform generates. The fluvial system anomalies becoming a key of detection of landslide dam are fluvial system anomaly, channel width anomaly, valley-floor width anomaly, longitudinal projected profile anomaly, or sinuosity anomaly.

When landslide mass dams up a river, the upper river basin fills with water and channel width becomes wide. This is channel width anomaly caused by landslide-damming of a river. Lake formed by damming of the landslide mass is filling up with the passage of time, resulting in formation of depositional lowland and thereafter of accumulation terrace. Because of the sedimentation the valley-floor raises and widens.

If water doesn't drain appropriately from the lake, it is possible that the dam may collapse by overflow. The Aoki Lake of natural dam-lake in Nagano Prefecture reversely streams and drains to the upper river basin and over the divide in river, and to the lower river basin, origin of the Hime-kawa River follows spring water which comes out from the bottom of the landslide dam. However, in many cases, channel detours and turns around the toe of landslide mass, and runs along lateral gorge in boundary between the toe and valley wall. This is a turning anomaly, suggesting that landslide mass has progressed and emplaced on valley-floor.

Noteworthy characteristics of landslide dam is to build, at the same time, two different valley-floor width anomalies with widening of valley-floor in the upper river basin and constricted channel across the emplaced landslide. The another geomorphological feature is a longitudinal projected profile anomaly characterized by convex knick point between the gentle area in the upper river basin and the stricture gorge and concave knick point between the stricture gorge and original slope in the lower.

Along the stricture gorge, fall, cascade and shoot generate by recovery of erosion, and checkdam which dissipates flow energy, valley-floor fixed work which prevents scour and so on are constructed. These constructions are also a key of detection of landslide dam. In the Inokubo Landslide, brook incising through the toe of landslide mass meanders with large sinuosity. This sinuosity anomaly is also caused by recovery of erosion.