Abstract: Landslide is an active process in the northwest part of the Loess Plateau since Late Pleistocene, especially since Holocene. Linxia Basin locates in the transition point of the Tibetan Plateau, Loess Plateau and Qinling Mountains. Geological hazard is a big problem in Linxia Basin. We selected Baxie River Catchment as the target area in this study, where the famous 1983 Saleshan landslide killed more than two hundred lives. Former landslide survey in the Baxie river catchment found 224 landslides in the area of 432 square kilometers (Liu et al, 1986; Cao et al, 1990; Zhao et al, 2015). The spatial occurring intensity is so large that all the north bank of the Baxieriver is covered by landslides. Most of the landslides have more than one sliding process. In this study, the author carried on detailed landslide survey of Baxie river catchment, recognized the multi-sliding processes of typical landslides. The landslides in Baxie river catchment can be divided into four types: deep-seated pressure-fracture loess-mudstone slide, deep-seated slippage loess-mudstone slide, medium and shallow creep loess-mudstone slide, and loess collapse. Shangzheng landslide is a typical deep-seated pressure-fracture loess-mudstone landslide. There three terraces in the landslide depositing area, indicating three phases of sliding. The radio-carbon dating of Shangzheng landslide show three sliding events occurred in 33kaBP, 5-7kaBP, and 160aBP. Together with the 2014 sliding event, Shangzheng landslide havetotally four sliding phases in history (Li et al, 2018a, b). The authors also studied several other landslides (Fig. 1). 14C and OSL techniques were used to date the landslide related materials collected in Baxie River catchment. Samples for 14C dating were from two types of materials: landslide buried animal and plant relics and organic-rich deposits formed in the short-term waterbody in landslide depression areas. OSL samples were from four types of materials: (1) chaotic sediments formed in the landslide processes; (2) sediments formed in the short-term waterbody in the landslide depression areas; (3) lowest part of landslide deposits; and (4) materials in the sliding surface. The ages of the above materials can all be regarded as the timing of landslide processes. The dating results show there are five periods with relatively intense landslide activity since late Pleistocene: 100-63kaBP, 45.2-41.5kaBP, 33.3-28.2kaBP, 22.5-15.2kaBP and 10.4-0.2kaBP, respectively. Among the five periods, 45.2-41.5kaBP and 10.4-0.2kaBP have higher landslide intensity (Fig. 2).

Fig. 1. Landslide distribution and sampling sites of Baxie river catchment.
Key words: landslide, Late Pleistocene, geological dating, loess, Linxia Basin

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References


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