Exposure dating of the giant fossil landslide in the upper reaches of the Yellow River, China

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Abstract: The upper reaches of the Yellow River is located in the transition zone between the Tibetan Plateau and the Loess Plateau, of which a large area is covered by extensive loess deposits. The Tibetan Plateau uplift has resulted in a high geomorphic activity. One landslide inventory of this region is compiled, which includes about 100 giant ancient landslides. Furthermore, their positions, boundaries, area, volume and so on are managed in geographic information system (GIS). The determinations of those giant ancient ages are an important step towards understanding the causes, frequency, hazards, the earth surface uplift and landscape-lowering rate. Development of OSL techniques has provided another alternative means of dating landslide and colluvial sediment. There are many challenges and some problems of luminescence dating of landslide and colluvial deposits because of the insufficiently bleached sediments condition. There are also some controversial issues existing in present studies of landslide dating by using Cosmic Ray Exposure (CRE) method. The study use the landslide pond sediments and the dammed lake deposits to dating the giant ancient landslide using OSL techniques, the surface of landslide scarp and boulders to dating the giant ancient landslide using CRE. The two dating results based on different datable landslide elements were be cross-validated using the typical giant ancient landslides in the upper reaches of the Yellow River, China.

Keywords: Giant fossil landslide; cosmogenic nuclides chronology; luminescence dating, the upper reaches of the Yellow River