Optically stimulated luminescence (OSL) dating using quartz extracted from loess as archeo-sediments of Paleolithic site

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Datasets for a chronological framework of the Upper Paleolithic era in Nihewan Basin, northern China remain insufficient. Our team conducted optically stimulated luminescence (OSL) dating using fine quartz at Youfang site, and Loc. 73012 and Loc. 72117 of Hutouliang for additional dating studies. For this study, OSL dating was performed on loess as archeo-sediments from Erdaoliang site. Two samples were taken: one above the cultural layer (sample 1) and one below the cultural layer (sample 2).
Using the single aliquot regenerative-dose (SAR) protocol for course quartz (ca. 100 μm) extracted from loess of archeo-sediments, OSL dating was conducted. The OSL measurements were taken using an OSL reader (NRL-99-OSTL2-KU; Neoark Corp.). The value of paleodoses and their error were estimated using bootstrap method. Paleodoses of two samples were calculated using the central age model. The overdispersion (OD) values of sample 1 and sample 2 were, respectively, 24% and 12%. A sedimentary sample with OD of less than 20% was fully bleached as described by Olley *et al.* (2004). It is assumed that sample 1 was not well bleached. Therefore, the paleodose of sample 1 was obtained using the finite mixture age model. The main component contains a plurality (47%) of aliquots. OSL ages were found, respectively, as 19.0±0.98 ka for sample 1 and 23.9±1.2 ka for sample 2. The radiocarbon age obtained at this site was 18,085±235 yBP (no calibration). These OSL ages in this study are stratigraphically coherent.

Reference: Olley *et al.*, sedimentary Geology, 169: 175-189, 2004.

Keywords: OSL dating, archeo-sediment, Loess, quartz

