



## **Consistent C3 plant habitat of hominins during 400–300 ka at the Longyadong Cave site (Luonan Basin, central China) revealed by stable carbon isotope analyses of loess deposits**

Hongyan Zhang (1), Huayu Lu (1), and Shejiang Wang (2)

(1) School of Geographic and Oceanographic Sciences, Nanjing University, Nanjing, China (hongyan@nju.edu.cn), (2) Joint Laboratory of Human Evolution and Archaeometry, Institute of Vertebrate Paleontology and Paleoanthropology, Chinese Academy of Sciences, Beijing, China

The proportions of woody and grassland taxa in terrestrial ecosystems played an important role in the origin and evolution of early Palaeolithic hominins. However the influence of ecosystem changes on hominin behavior and adaptations in Asia has not been studied in detail. Hominins have exploited the Luonan Basin in the Eastern Qinling Mountains, central China, since the early Paleolithic. Dated sites, consisting of alternating loess and soil deposits with in situ artefacts, are common in the region, and provide a detailed record of Early to Middle Pleistocene hominin environments. Here, we present the results of measurements of the stable carbon isotopic composition of soil organic matter ( $\delta^{13}\text{C}$ ) in the loess-paleosol sequences from the Longyadong Cave site. Our analyses of  $\delta^{13}\text{C}$  show that for at least 400 ka the Longyadong Cave site and its surroundings were dominated by C3 woody plants, whereas the nearby Liuwan site was dominated by C4 and C3 mixed grassland or woody grassland vegetation. These findings demonstrate that between 400 and 300 ka in the Luonan Basin, hominins occupied a habitat consisting of a mosaic of grassland and woodland/forest. Although the vegetation of the region changed in response to the glacial-interglacial climatic cycles, patches of woody vegetation in landscapes such as at Longyadong Cave site persisted continuously. Such environments seem to have been favored by hominins living in the Luonan Basin, possibly because they provided a diverse range of food resources during both glacial and interglacial intervals of the Middle Pleistocene, when most of northern China was experiencing an increasing trend of drying and cooling and steppe environments were expanding. Thus, the Luonan Basin would have served as a refugium for hominin occupation in China during the Middle Pleistocene.