Recent discovery of a unique Paleolithic industry from the Yumidong Cave site in the Three Gorges region of Yangtze River, southwest China

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Abstract

The Three Gorges of Yangtze River, southwest China, abundant in human and faunal fossils, and lithic artifacts, represents an important site complex for understanding hominin dispersion and adaptations during the Pleistocene. The Yumidong Cave is a newly-discovered Paleolithic site in this region which yielded a large number of animal fossils and lithic artifacts. U–Th dating in conjunction with biostratigraphic analysis indicated that the archaeological remains were deposited during a long sequence from ca. 400 to 8 ka (Middle Pleistocene to Holocene). Lithic technological analysis indicated an original material shaped on massive limestone blocks with chaîne opératoire consisted of selection, shaping and retouching. The volumetric structures of selected blanks are regrouped into three categories: structures with bevel(s), trihedral structure and convergent ones. The outline of cutting-edge is predominated by denticulate ones, followed by saw-like ones, rostrum, convergent with a denticulate edge and beaked ones. Despite showing nothing in common with Europe, Africa, the Near East and even the Indian Subcontinent and northern China, the lithic assemblage of the Yumidong Cave exhibits a strong coherence and presents more similarity to mainland Southeast Asia with heavy, angular and massive stone tools made on pebble, cobble and without the Levallois, Discoid, and blade/bladelet phenomenon. The lithic assemblage of Yumidong Cave may represent material clues of a potential local technological center of origin in unique technical world of Central-South China and its uniqueness would be understandable as the result of a successful adaptation of hominids to a specific environment. Yumidong lithic material deconstructs the existing paradigm for a long period of time and presents new ideas and new facts for the technic evolution in South China.

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1. Introduction

The Three Gorges region of the Yangtze River, southwest China, is well known for many discoveries of unique fossilines, faunal remains and various lithic artifacts that contribute to reopening the scientific dialogue about hominin dispersion and adaptations during the Pleistocene (Pei et al., 2013). Chinese Paleolithic research in the Three Gorges region demonstrates the importance of this area situated between the upper and middle reaches of the Yangtze River for the study of faunal dispersal and environmental change. In particular, the *Ailuropoda–*Stegodon faunal complex, representative of a subtropical forest environment, has received much attention. It was commonly accepted that the Qinling Mountain Range — Huai River Line in central China was the dividing line between the subtropical *Gigantopithecus* fauna of the

http://dx.doi.org/10.1016/j.quaint.2014.11.048
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Plio-Pleistocene and the Ailuropoda–Stegodon complex of the Middle to Late Pleistocene of South China and the Palearctic, temperate Nihewan fauna of North China (Aigner, 1981; Han and Xu, 1989).

During the past few decades, a large number of Paleolithic open-air sites (Yandunbao, Gaojiazhen, Fanjiahe, Ranjialukou, Chibaling, Jingshuiwan, Zaoziping) and cave sites (Zhongjiawan, Xinglongdong, Migongdong, Dashidong, etc.) were discovered, mapped and excavated along the Yangtze River. The lithic artifacts, animal fossils and some human remains were recovered and changed our knowledge of the prehistoric data. These findings include: Zhongjiawan Cave in Changyang County yielding one hominin upper jaw fragment and one lower premolar (Chia, 1957); Sunjiadong Cave in Zigui County with some mammalian fossils and lithic artifacts collected from the sediments (Dong, 1998); Xinglongdong Cave in Fengjie County dated between 118 ± 7 ka and 154 ± 9 ka with hominin fossils, archaeological and paleontological remains associated (Huang and Xu, 2002; Gao et al., 2004); Dashidong Cave in Wushan County with bone and teeth of an Homo sapiens and stone tools from the Late Pleistocene to Holocene (Guangbiao Wei et al., submitted for publication); Migongdong Cave in Wushan County where two partial modern H. sapiens fossil bones, fauna and stone tools dated to 13,150 ± 190 BP were recovered (Huang et al., 2000).

Yumidong Cave represents a new discovery of a Paleolithic site in the Three Gorges Region of the Yangtze River. During excavation from 2011 to 2013, about 3000 mammalian fossils and more than 3000 lithic artifacts collected from the sediments (Dong, 1998); Xinglongdong Cave in Fengjie County dated between 118 ± 7 ka and 154 ± 9 ka with hominin fossils, archaeological and paleontological remains associated (Huang and Xu, 2002; Gao et al., 2004); Dashidong Cave in Wushan County with bone and teeth of an Homo sapiens and stone tools from the Late Pleistocene to Holocene (Guangbiao Wei et al., submitted for publication); Migongdong Cave in Wushan County where two partial modern H. sapiens fossil bones, fauna and stone tools dated to 13,150 ± 190 BP were recovered (Huang et al., 2000).

Yumidong Cave site background

2. Location and geological setting of the site

The Paleolithic site of Yumidong Cave is located in Xiaoying Village, Miaoyu Town, Wushan County of Chongqing Municipality (30°50'44.4"N, 109°38'09.2"E) (Fig. 1). It is situated to the south of the Yangtze River, in the hinterland of the Three Gorges, and 1100 m above sea level. This site is about 4 km southwest of the Longgupo site and the dissolution basin of Miaoyu which is situated on the west end of the Wushan Mountains.

The Yumidong site is a horizontal karst cave formed in the bedded limestone of the Triassic Jialingjiang Formation. It faces southwest, opening onto an esplanade. A vertical skylight of 3 m in diameter developed 30 m from the entrance, providing favorable air circulation and light (Fig. 2).

The Yumidong site was discovered in autumn 2004. The deposits were extensively distributed and well preserved in the cave. Preliminary investigation indicated that the sediments yielding Paleolithic remains were deposited during the Middle and Late Pleistocene. The lithic assemblage of Yumidong Cave exhibits a salient technological feature as yet unknown in any other sites in central, western and southern China. In this regional context, abundant in prehistoric remains and extremely interesting for research on hominin occupation and cultural adaptations, the Yumidong Cave site will enrich current discussion about the originality of Paleolithic technology from the Three Gorges region, essentially considered to be an “Oldowan-like industry” (Mode1) comprised of cores, whole flakes, fragments, and chunks as well as a low percentage of retouched tools (Pei et al., 2013). Given that both archaic and modern H. sapiens identified in some of the regional cave deposits are likely the hominins responsible for the production of the lithic artifacts, the discovery of Yumidong Cave would raise new questions for their implications in technological patterning in South China. Yumidong Cave, which provides a long archaeological sequence with the association of lithic artifacts and animal remains, offers the possibility to discuss technical evolution with regard to environmental determinism from the Middle to Late Pleistocene. Yumidong data will also enrich the Chinese Paleolithic record and contribute to paleoanthropological debates across broader regional and/or temporal facies.
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