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Preliminary taphonomic analyses on the mammalian remains from Wulanmulun Paleolithic site, Nei Mongol, China



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ABSTRACT

Nearly three thousand specimens of mammalian remains were unearthed from Wulanmulun Paleolithic site in Ordos, Nei Mongol, during 2010–2012 rescue excavations. The majority of the remains belong to medium and large sized hoofed mammals, particularly woolly rhinoceros. The materials are mostly fragmental and associated with thousands of stone artifacts. Taphonomic analyses show that the remains were subjected to little alluvial transportation but some weathering before burial. Only two kinds of bone tools, antler hammers and shaft points, were identified. The cut marks on the bones showed that the animals were mostly hunted and butchered on the spot rather than scavenged. The prey were likely lured or driven into the site and trapped in the muddy alluvial deposits and butchered near or after their death. The site is more probably a trap for hunting large animals and a follow-up butchery shop.

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1. Introduction

Paleolithic evidence in Ordos region have been noticed since the discovery of the Salawusu (formerly spelled as Sjara-osso-gol) Site and Shuidonggou (previously spelled as “Choei-Tong-Keou”) Late Paleolithic Site in southern Ordos Plateau discovered by Licent and Teilhard de Chardin (Teilhard de Chardin and Licent, 1924; Boule et al., 1928). A series follow-up investigations and excavations were carried out at these two sites, which resulted in the collections of large quantity of Paleolithic materials (Wu et al., 1999; Gao et al., 2013). Some Paleolithic evidence was reported from other areas of Ordos. Although about 68 Paleolithic localities were found in Jungar Banner during the investigations from 1958 to 1959, the materials were all from reworked layers (Zhang, 1960). A new Paleolithic site was discovered in 2010 in Kangbashi District of Ordos Municipality during the construction of a landscape park on both banks of the Wulanmulun River (Hou et al., 2012). Thousands of pieces of artifacts and mammal bones and some fireplaces have been unearthed *in situ* since 2010. A small number of mammal bones are well preserved, but most of the bones are fractured and

distributed in all cultural layers. Here, we report the taphonomic analyses of the mammalian remains associated with Paleolithic artifacts from the Wulanmulun Site and try to interpret behavior of prehistory Wulanmulun human based on taphonomic evidence.

2. Regional setting

Wulanmulun Site is located on the left bank of the Wulanmulun River in Kangbashi District of Ordos Municipality in Nei Mongol Autonomous Region. The Paleolithic layers are developed in the Upper Pleistocene deposits along the gullies of Cretaceous red sandstone. They appear as grayish green interbedded with red lacustrine-fluvial delta deposits and they are covered by thick shallow lacustrine and aeolian sand deposits of the Holocene (Fig. 1). Three Paleolithic localities have been discovered at the site. Locality 1 (GPS: 39°35′8.90″N; 109°45′39.81″E; 1282 m) is the first discovered one and the most important one. Four excavations were conducted at the locality and a large amount of Paleolithic materials were collected. Locality 2 (GPS: 39°35′9.95″N; 109°45′38.11″E) is about 50 m northwest of Locality 1 and Locality 3 (GPS: 39°35′12.69″N; 109°45′34.41″E) about 170 m northwest of Locality 1. Locality 2 was excavated in 2011 in limited scale and a small number of stone artifacts and animal fossils were unearthed.

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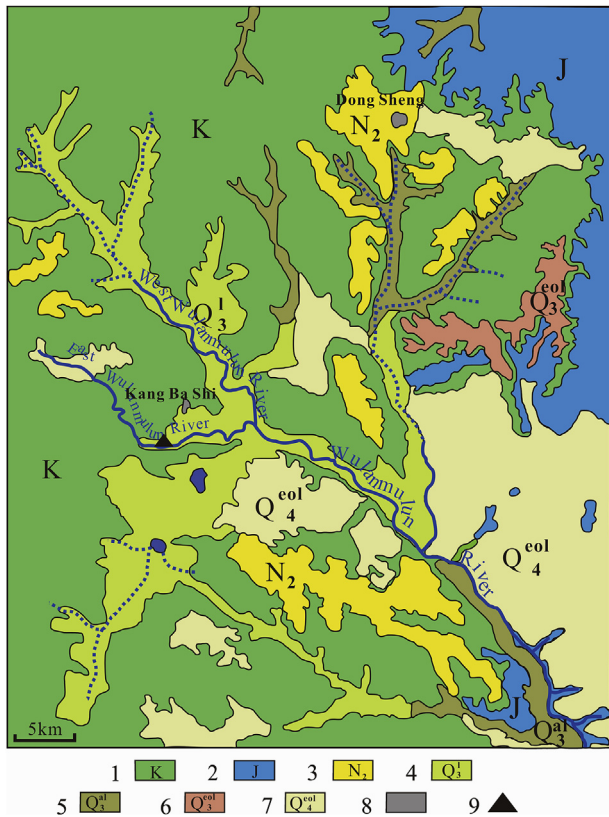


Fig. 1. Simplified geological map of Ordos illustrating the distribution of Cenozoic strata. 1. Cretaceous deposits; 2. Jurassic deposits; 3. Neogene deposits; 4. the Late Pleistocene deposits; 5. Late Pleistocene alluvial deposits; 6. Late Pleistocene aeolian loess; 7. Holocene aeolian deposits; 8. city; 9. Wulanmulun Paleolithic site.

Locality 3 was excavated in 2012 also in limited scale but only a small number of animal bones were unearthed.

The total thickness of the deposits at Locality 1 measures 15 m, the width of the deposits also measures 15 m. The formation of the deposits can be divided into two periods. The Paleolithic remains were recovered from the lower part of the deposits with a thickness of 5–8 m. The bedrock was cut by a tributary and a moderate valley formed in the first period and just after the cutting period the valley started to receive fluvial-lacustrine deposits, including prehistory human traces, in the second period (Hou et al., 2012).

The fossiliferous deposits at Locality 1 can be divided into eight layers (Fig. 2). Layer 1 is on the top of fossiliferous deposits and it is mainly red sandy deposits from weathered Cretaceous bedrock. Its thickness measures 1–2.1 m. Only one piece of fossil was unearthed from the layer.

Layer 2 is composed of upper and lower parts. The upper part is composed of red sand deposits with a few weathered Cretaceous bedrock breccias and a few Paleolithic remains. The lower part is composed of grayish green fine sand deposits with rich stone artifacts and animal bones. The thickness of the layer measures 0.6–1.4 m.

Layer 3 is mainly red fine sand interpolated with gray fine sand with rich stone artifacts and animal bones. The thickness of the layer is 0.3–0.8 m.

Layer 4 is composed mainly of grayish green silt with partial red fine sand. The stone artifacts and animal bones are rich in the layer and the thickness measures 0.2–0.6 m.

Layer 5 is grayish green silt interbedded with red fine sand with large amount of stone artifacts and animal bones. Its thickness is 0.15–0.4 m.

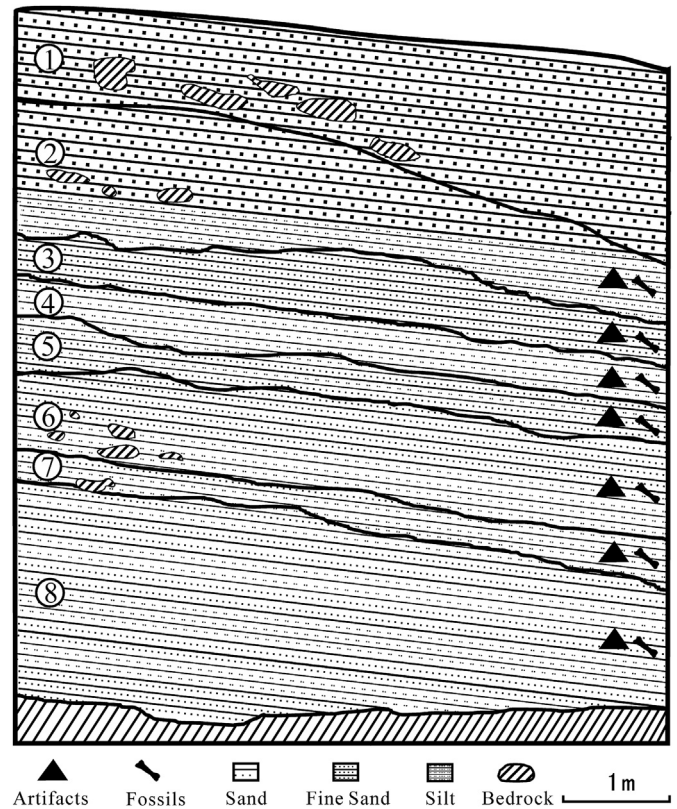


Fig. 2. Stratigraphic profile of Locality 1 at Wulanmulun site.

Layer 6 is composed of red fine sand with some weathered Cretaceous bedrock breccias in the upper part and grayish green silt in the lower part. Many stone artifacts and animal bones were unearthed from the layer. Its thickness measures 0.6–0.8 m.

Layer 7 is mainly grayish green silt with red fine sand on the top and a few Cretaceous bedrock breccias in the middle. Plentiful stone artifacts and animal bones were recovered from the layer. Its thickness is 0.2–0.4 m.

Layer 8 is composed of grayish green silt interbedded with red fine sand. Its bottom rests on the Cretaceous bedrock. Many stone artifacts and animal bones were unearthed from the layer and its thickness is 1.1–1.2 m.

The identified mammalian taxa from Locality 1 of the site include *Myospalax* sp., *Cricetulus* sp., *Microtus* sp., *Apodemus* sp., *Arvicola* sp.?, *Dipodidae* gen. et sp. indet., *Lepus* sp., *Mustelidae* gen. et sp. indet., *Coelodonta antiquitatis*, *Equus przewalskii*, *Camelus* cf. *C. knoblochi*, *Megaloceros* (*S.*) *ordosianus* and *Gazella* sp. The Wulanmulun fauna is in the North China paleozoogeographic sub-province of the Late Pleistocene (Dong et al., 2014).

The comprehensive age of the Paleolithic layers combining the synthesized carbon-14 dating and OSL (optically stimulated luminescence) ages is from 30 ka to 70 ka (Hou et al., 2012), confirmed by feldspar multi-elevated-temperature post-IR IRSL dating (Rui et al., 2015).

3. Materials and methods

3.1. Materials

The mammalian remains from Locality 1 of Wulanmulun site collected in excavation campaigns from 2010 to 2012 are identified into 13 taxa (Dong et al., 2014). They include both small and large mammals. The unearthed specimens total 4131, in which 2693 are

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