



Chronological and typo-technological perspectives on the Palaeolithic archaeology in Lantian, central China



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ABSTRACT

Lantian, a well-known place for its early discovery of China's *Homo erectus*, is located in the northern piedmont of the Qinling Mountains, where the Bahe River flows from west to east. The well-preserved river terrace sequences are composed of fluvial sediments and overlying eolian loess-palaeosol deposits, embedding Palaeolithic artefacts and occasionally hominin fossils. Field investigation revealed more than 40 Palaeolithic localities in the region. Prior to the 1980s, there were 27 Middle Pleistocene open-air sites identified from which more than 200 stone artefacts, and nine Late Pleistocene open-air sites with more than 400 stone artefacts, were collected. Xishuidong is the only cave site to yield both mammalian fossils and stone artefacts in the region. Since 2009 new field surveys have added several open-air sites with more than 700 lithic artefacts from surface collections, which cover a time from the Middle Pleistocene to the Late Pleistocene.

This paper provides a general review of the Palaeolithic sites in the Lantian region. The newly discovered lithic artefacts were found in both the loess deposits of the Middle Pleistocene and the Malan loess deposit of the Late Pleistocene. Analyses of the lithic assemblage suggest that the retouched tools comprise both heavy-duty tools, which were made of pebbles and large flakes, such as choppers, heavy-duty scrapers, hand-axes, picks, cleavers and spheroids, and small tools, which were made of small flakes, such as scrapers and points. There were no fundamental changes from the late Early to Late Pleistocene. The recent archaeological discovery of lithic artefacts embedded within the Malan loess deposit suggests that the Acheulian assemblage most likely lasted to the Late Pleistocene in this area. This investigation has shown that the Lantian region is an important area of study on the development of Acheulian technology in East Asia.

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1. Introduction

China has long been recognized as a key area for the study of human evolution and hominid behavioral adaptation during the Pleistocene (e.g., Aigner and Laughlin, 1973; Aigner, 1978, 1981; Yi and Clark, 1983; Pope, 1988; Schick and Dong, 1993; Wu and Poirier, 1995; Wang, 2005b; Dennell, 2009; Bar-Yosef and Wang, 2012). However, there has been a conventional notion that it was difficult to compare Palaeolithic cultures between China and Europe because of the great differences in their lithic technologies (Pei, 1939). Subsequently, Movius proposed “hand-axe cultures” in the Western and “chopper-chopping tools cultures” in the East differentiating lithic

technological traditions (Movius, 1944, 1948, 1949). Various explanations have been put forward for lithic technological traditions in different regions based on Movius's model (Schick and Toth, 1993; Lycett, 2007; Petraglia and Shipton, 2008; Lycett and Norton, 2010). However, the new archaeological evidence has challenged the dichotomy (e.g., Huang, 1987, 1993; Lin, 1994; Schick, 1994; Zhang, 1999; Hou et al., 2000; Wang, 2005b, 2007).

Since the 1980s, hominin fossils and archaeological records in China have been greatly expanded (Wang, 2005b; Bar-Yosef and Wang, 2012; Gao, 2013). Based on the new materials, Zhang (1985, 1989, 1999, 2002) recognized that core and flake artefacts, especially the small retouched flake tools dominating the lithic assemblages in the Pleistocene in North China, differ from Movius's characterization of Chinese Palaeolithic assemblages, as they are large choppers. He further proposed that the Palaeolithic industrial basic framework in China consisted of two main lithic industries distributed

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in North and South China, together with several local industries (Zhang, 1999). The lithic industry in North China, including Lantian, was represented by the small hard-hammer percussion Flake Tools Tradition, dominated by scrapers, pointed tools, awls, and graters. Choppers are more common in the early Palaeolithic stage and played a minimal role until the middle and upper Palaeolithic. The second tradition is referred to as the Pebble Tool Tradition, occurring in Southern China, which continues the informal Flake-Core-Chopper tradition made with pebbles/cobbles with no noticeable changes until the Late Pleistocene (Zhang, 1999, 2002).

Other researchers have also emphasized the variability of Palaeolithic cultural patterns in the Pleistocene China (Wang, 2005a). More importantly, although some researchers suggest that hand-axes have a very low occurrence or distribution in China's Palaeolithic assemblages, the previous claims that they are totally absent can now be reconsidered (Yi and Clark, 1983; Zhang, 1985, 1999, 2002; Huang, 1987, 1993; Hou et al., 2000; Wang, 2005a, 2005b, 2007; Huang et al., 2009; Gao, 2012, 2013).

In the early 1960s, the fossils of Lantian hominins were discovered in Lantian County, central China (Fig. 1) (Wu, 1964, 1965, 1966; Jia, 1965; Wu et al., 1966; Wu and Dong, 1985). Human remains and a wealth of mammalian fossils unearthed (Zhou, 1965; Ji, 1980), and lithic artefacts were also found at the Gongwangling and Chenjiawo sites. A total of 27 sites with lithic artefacts from the Early to Middle Pleistocene red silt deposits were identified. In addition to the sites from the Early and Middle Pleistocene, 400 lithic artefacts from the Late Pleistocene were recovered at the Laochihe and Xiehu open-air sites, but without detailed description (Dai and Ji, 1964; Dai, 1966; Jia et al., 1966; Dai and Xu, 1973; Wei, 1977). The Xishuidong site (Fig. 1), reported in the 1980s, is the only cave site with mammalian fossils and lithic artefacts in this region (Huang, 1982, 1983, 1984; Li and Xue, 1996, 1999).

Between June 2009 and March 2011, eight open-air sites were surveyed in the catchment of the Bahe River (Fig. 1). A total of 770 lithic artefacts were collected, mainly from loess-palaeosol deposits in the L1, S1 and L2 (Fig. 2; Fig. 3) (Wang et al., 2014). In this paper, we will review these sites from the loessic-stratigraphic and chronological viewpoints, focusing on the lithic assemblages and

the nature of human technological behavioral adaptation during the Pleistocene in Lantian.

2. Geological context and environmental background

Lantian is located at the north piedmont of the Qinling Mountains. Regarded as a geographical demarcation line of South-North China, the Qinling Mountains are an east-west extension mountain range. The highlands and Qinling Mountains act as a wind-break wall that blocks the southward moving winter cold air from Siberia and the northward southeast summer monsoon from the sea. The north and south sides of the Qinling Mountains differ in various aspects: (i) The monsoon rainfall is greater in the south, whereas there is a warm-temperate arid and semi-arid climate in the north; (ii) there is red soil in the south and yellow/brown soil in the north; (iii) Evergreen broad leaved woodland in subtropical forest occurs in the south and deciduous broad-leaved forest in the north; (iv) oriental realm fauna in the south and palaeoartic realm fauna in the north. The fauna most likely moved back and forth across the Qinling Mountains during the Quaternary (Ji, 1977, 1980, 1982; Wang, 1996; Zhang et al., 2012).

Lantian has various landscapes with a terrain sloping from the northwest to the southeast. The elevation changes from 420 m to 2449 m. Landforms in this area include bedrock hills, loess deposits, and river terraces. The Bahe River, which originates from the northern slope of Qinling Mountains, has a length of 92.6 km. The well-preserved river terraces are composed ofluvial sediment and overlying aeolian loess. The fluvial sediment is silt to cobbles in particle size, and the loess-palaeosol sequences have a thickness of more than 100 m.

3. Lithic assemblages from the sites of the Early and Middle Pleistocene

3.1. Open-air sites

3.1.1. Gongwangling site

The Gongwangling site is located at the highest river terrace on the left bank of the Bahe River, approximately 15 km east of Lantian

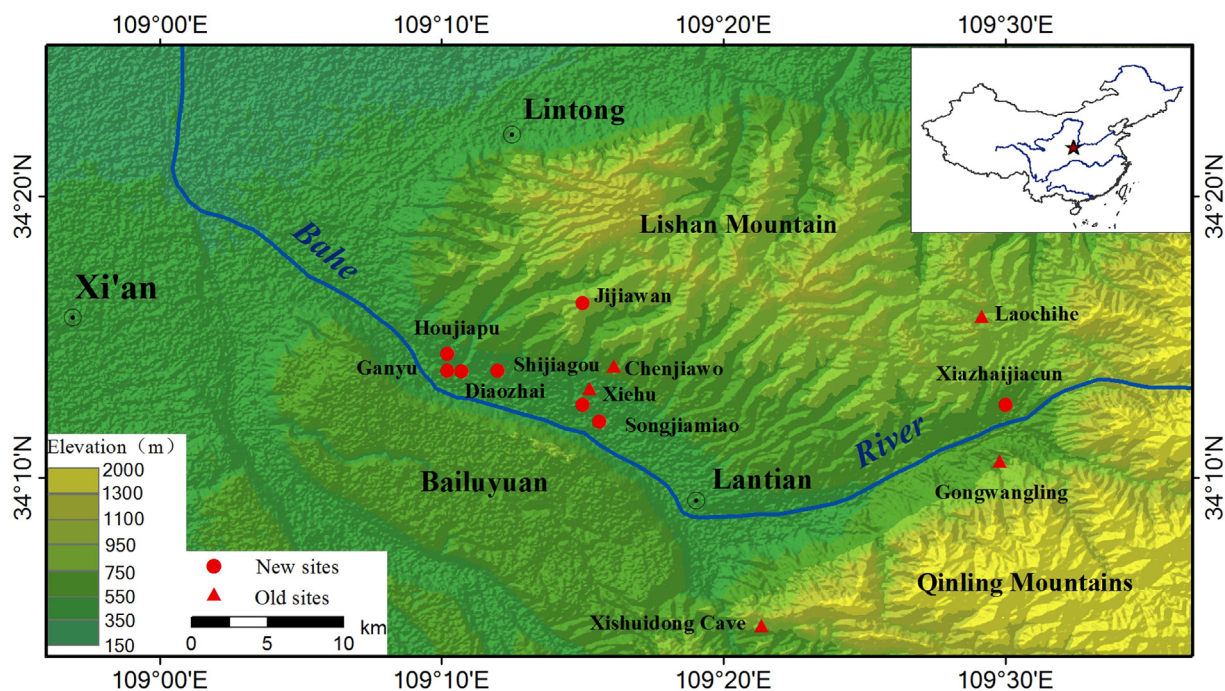


Fig. 1. Geographic location of the major sites in the Lantian region.

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