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# The use of lithic raw materials during the Upper Paleolithic in eastern China: A focus on microblade industries

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## ARTICLE INFO

Article history:  
Available online xxx

Keywords:  
Lithic raw material  
Microblade industry  
Eastern China  
Human territory

## ABSTRACT

During the Upper Paleolithic, many sites with microblade industries were distributed across north-eastern China and the North China Plain in eastern China. Based on the composition of lithic raw materials (LRMs) and the site distributions of microblade industries, this study defined five territories of human groups in two regions of China: 1) the western Changbai Shan Mountains (Mount Paektu) and Song-Nen Plain in northeastern China and 2) the southern Yanshan Mountains, Yi-Shu River Basin, and western Huang-Huai Plain in the North China Plain. In northeastern China, high-quality LRMs, including various types of igneous rock and obsidian, were used in combination with local LRMs such as flint and agate. Based on the distribution range of high-quality LRMs, the territories of human groups in that region are estimated at 300–450 km. It is believed that residential systems were established for the long-distance transport of LRMs and the long-distance movement of human groups. One such system included microblade technology based on biface and flake-blade reduction systems. In contrast, the territory of human groups in the North China Plain was small, with an area estimated at 100–230 km. Given the numerous small sites in that region, it is believed that human groups moved frequently within their territories because they were highly mobile and dependent on local LRM sources (e.g., flint) near their occupation sites. Human groups might have employed various microcore reduction systems to produce microblades, even from limited LRMs. Preliminary conclusions suggest that the divergent activities of late Upper Paleolithic human groups in eastern China could reflect variations in regional economic strategies and ecological environments between the Last Glacial Maximum and the Younger Dryas.

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## 1. Introduction

During the late Upper Paleolithic (ca. 23–12 ka), many sites with microblade industries were distributed across northeastern China and the North China Plain (Li and Ma, 2016; Yi et al., 2016). Based on the composition of lithic raw materials (LRMs) and the site distributions of those microblade industries, this study attempts to estimate the territories or migration areas of human groups. By comparing these, we can understand the regional features of human activity and the use of LRMs during the late Upper Paleolithic

of eastern China. Finally, preliminary conclusions are proposed regarding the relationship between human activities and the regional ecological environment (Yi et al., 2014).

Several previous studies have attempted to reconstruct the territories and activities of Paleolithic human groups in China based on site distributions and LRMs (e.g., Xie, 2001; Du, 2003, 2007; Li and Chen, 2014). While research on this area has been limited, the present study provides a general picture of Paleolithic human territories. In addition, Barton et al. (2007) deductively examined the relationship between Late Pleistocene climate change and transitions in human activities in northern China. In contrast, the present study presents an inductive examination based on concrete data for each region.

Eastern China as described here refers to the Chinese territory east of the Daxing'anling (Great Khingan)—Taihang Shan—Song

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<http://dx.doi.org/10.1016/j.quaint.2016.05.006>

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Shan Mountains. This region is divided into northern and southern parts. The northern section contains geological units such as the Song-Nen Plain, Sanjiang Plain, western Changbai Shan (Paekut San) Mountains, and Liaohe Plain (Liao River Plain) in northeastern China. The southern part corresponds to the North China Plain in the broad sense (Fig. 1). In this paper, the northern region is called northeastern China and the southern part is called the North China Plain.

## 2. Microblade industries and the environment of eastern China

### 2.1. Microblade industries of northeastern China

Twenty-five sites yielding microblade industries have been reported in northeastern China. Most of these (23 sites) form two site groups: sites of the western Changbai Shan Mountains and those of the Song-Nen Plain. The former group is distributed in the hilly area at the western foot of the mountains forming the border between China and North Korea (Fig. 2: 3–13). The latter group is mainly distributed in the Nenjiang River Basin (Nen River Basin) running

along the eastern foot of the Daxing'anling Mountains (Fig. 2: 14–16, 18–22).

There are only two radiometric dates for these microblade industries: Dadong, ca. 21 ka  $^{14}\text{C}$ BP (Zhao et al., 2014) and Daxingtun,  $11,800 \pm 150$   $^{14}\text{C}$ BP (Huang et al., 1984). Based on radiometric dates from neighboring regions (e.g., Shibazhan phase C in Heilongjiang,  $10.3 \pm 0.6$  ka osl BP (Zhang et al., 2006), and Jinsitai cave layer 3B in Inner Mongolia,  $14,745 \pm 60$   $^{14}\text{C}$ BP (Wang et al., 2010)), geological examinations of the sites, and the accompanying fauna, these microblade industries are considered Paleolithic industries from between the Last Glacial Maximum (LGM) and the Younger Dryas (YD) (Chen and Wang, 2008; Li, 2009).

Table 1 shows the compositions of microcores and LRMs from each site comprising the two site groups in northeastern China. Microcores from this region are classified as pyramidal, wedge shaped, and boat shaped; wedge-shaped microcores are subclassified into those with biface reduction and those with flake-blade reduction. LRMs used in regional sites include obsidian, rhyolite, felsite, andesite, basalt, dacite, sandstone, shale, tuff, mudstone, siliceous rock, hornfels, flint, opal, jasper, chalcedony, agate, quartz, crystal, quartzite, orthoquartzite, and granite.



Fig. 1. Map of geographical units in east Asia.

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