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Bone needles in China and their implications for Late Pleistocene hominin dispersals

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Abstract: In a recent article, a team of Chinese, French, Canadian, and Czech researchers led by d'Errico suggested the earliest bone needles were manufactured in Siberia and northern China, and were invented independently in both regions. Here, the Chinese archaeological record is reviewed to provide more details on this claim. The occurrence of this tool type is correlated with the associated lithic technologies and the environmental conditions in order to investigate the dispersal events that took place during the second half of the Late Pleistocene. The review suggests the manufacture of needles represents an indigenous innovation that appears in northern China circa 31 kaBP on the onset of the Chinese Late Palaeolithic alongside stone tools attributed to the core-and-flake technology. As of 25 kaBP, a new form of needle is introduced in the archaeological record. These needles are flat and they appear with stone tools attributed to the microblade technology. This evidence likely signals the migration of a populations bringing with them blade technologies from western Eurasia. At the end of the Pleistocene, bone needles are more diversified, which suggests they were used in a variety of tasks. During the late-Tardiglacial, bone needles are found in northern China both in contexts that yielded microblade technology as well as core-and-flake technology with ceramic. In southern China, the first bone needles appear alongside core-and-flake technology around 12 kaBP. The first appearance of this tool type in southern China could either be the result of a convergent innovation or the southward migration of prehistoric populations that lived in northern China prior to the Last Glacial Maximum. South of the Yangzi river, bone needles are manufactured at the end of the Pleistocene in contexts attributed to the core-and-flake technology with ceramic. The presence of the same toolkit in both northern and southern China at the end of the Pleistocene, i.e., core-and-flake technology with ceramic and bone needles, raises the question of potential long-distance population movements and cultural influences across North and South China at the end of the Pleistocene and the beginning of the Holocene.

Keywords: Bone Tools; Eyed Needles; Chinese Late Palaeolithic; Cultural Innovations; MIS 2; Last Glacial Maximum

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1. Introduction

Clothing has provided an immense advantage to prehistoric populations because it allowed them to colonize regions of the planet that were otherwise not suited to their thermal physiology[1]. Difference in the fashion of the clothes also allowed populations to communicate their group and individual identity (for ethnographic examples from Tierra del Fuego and Tasmania, see[2,3]). However, the timing of the appearance of the tools necessary for the manufacture of clothing and their cultural trajectories remains an important subject of inquiry. One of the most obvious archaeological proxy for the manufacture of fitted clothing is the needle[5]. This specialized tool allows both the creation of perforations and the passing of a thread through them to assemble multiple layers of fabric and ensure protection against the natural elements such as rain and wind chill. Needles of various size could be dedicated to specific tasks. For example, big and robust needles may be used to make bags and tents while small and delicate needles may be used for embroidery, appliqué, or fixing adornments[1, 6-9]. In a recent

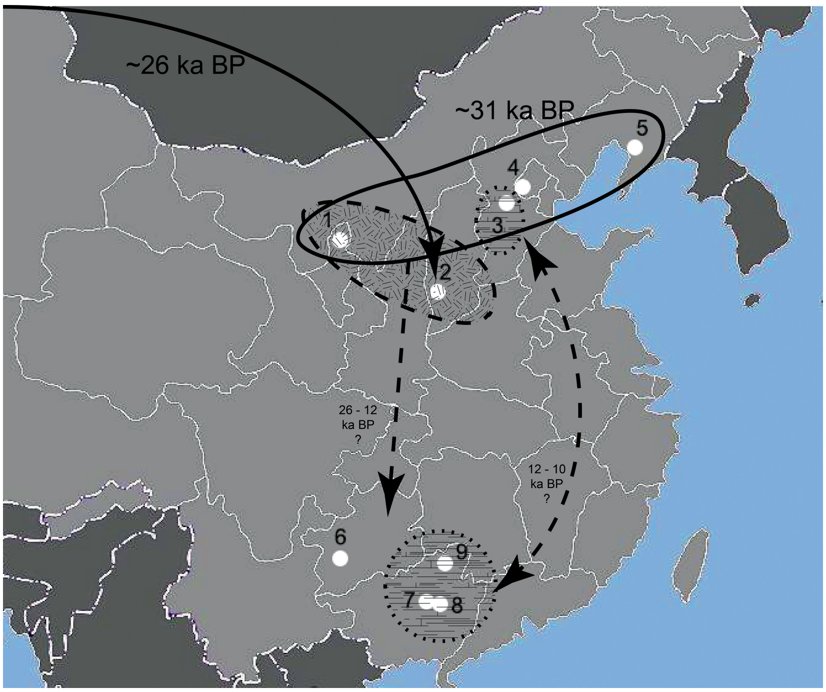

Fig.1 Location of the Chinese Pleistocene sites that yielded bone needles and are mentioned in the manuscript
Northern China: 1) Shuidonggou Loc. 2 and 12; 2) Shizitan Loc. 9 and 29; 3) Nanzhuangtou; 4) Zhoukoudian Upper Cave; 5) Xiaogushan. Southern China: 6) Chuandong; 7) Bailiandong; 8) Liyuzui; 9) Zengpiyan. Solid circle: region where the oldest Chinese bone needles were found. Dashed circle: regions that yielded bone needles at the end of the Pleistocene alongside (big dash) microcore and microblade lithic technology and (small dash) core-and-flake technology with ceramic. Solid arrow: anatomically modern human dispersal from western Eurasia. Dashed arrows: potential dispersal events hypothesized in the text. Note: all dates shown in the figure are calibrated. (modified from https://zh-yue.wikipedia.org/File:China_blank_map-1.png consulted on 2018-11-23)

Tab.1 Geographic, contextual, and chronometric data for the Chinese Pleistocene sites that yielded bone needles and are mentioned in the manuscript

Region	Site	Layer	Technological Attribution	*n*	Manuf. by-products*	Date (kaBP)	References
North China	Shuidonggou Loc.2	2	Cores and flakes technology	1		31.3 - 29.9	[10]
North China	Upper Cave	1	Cores and flakes technology	1		30.4 - 29.9	[1,11-12]
North China	Xiaogushan	3	Cores and flakes technology	3	Yes	35 - 29	[1,13,15]
North China	Shizitan Loc.29	7	Microblade technology	1		25 - 23	[16,17]
North China	Shizitan Loc. 9	4	Microblade technology	2		12.8 - 11.7	[16]
North China	Shuidonggou Loc.12	11	Microblade technology	11	Yes	12.9 - 11.7	[1,10,18]
North China	Nanzhuangtou	5	Cores and flakes technology with ceramic	2		11.5 - 11	[20]
South China	Chuandong	Lower	Cores and flakes technology	1		18 - 16	[21-22]
South China	Bailiandong		Cores and flakes technology with ceramic	1		26 - 13	[24-26]
South China	Liyuzui	Lower	Cores and flakes technology with ceramic	1		21 - 12	[27-28]
South China	Zengpiyan	1	Cores and flakes technology with ceramic	1		12	[23]
South China	Zengpiyan	2	Cores and flakes technology with ceramic	1		10	[23]

* Presence of manufacturing by-products reported in the literature.

paper, d’Errico et al.[4] provided the first review of the evidence for Pleistocene bone needles from Eurasia and North America. They gathered contextual, technological, and morphometric information for thousands of needles found in 355 archaeological layers from 271 sites. They suggested the earliest bone needles were manufactured in Siberia and northern China, and that bone needles were invented independently in these two regions. The goal of the study by d’Errico et al.[4] was clearly to adopt a global perspective on the phenomena and to build a theoretical framework that guide the interpretation of the morphological and technological variability in needles through time and space. In the present article, further contextual data is provided for one of the centres of innovation that yielded some of the oldest known bone needles in the world, i.e., China. The links observed between the bone needles found at key Chinese sites and the associated lithic technologies (Fig.1; Tab.1) combined with the environmental contexts in which this tool was manufactured and used allow to investigate the dispersal events of the prehistoric populations that lived in China during the Late Pleistocene.

2. Archaeological Contexts

In northern China, the earliest evidence of bone needles appears between 31 and 29 kaBP at Shuidonggou Locality 2, layer 2[10-11], and Zhoukoudian Upper Cave, layer 1[4, 12-13]. At both sites, the needles were found in association with stone tools attributed to core-and-flake technology. Also, in north-eastern China, bone needles and manufacturing by-products were found at Xiaogushan, layer 3[14]. The precise chronology of this site has been rightfully questioned[15] owing to unclear boundaries between layer 2 and 3 and imprecisions on the provenience of some of the archaeological remains that were dated. However, the dates currently available indicate the deposition of layer 3 likely occurred between 35 and 29 kaBP[16]. Regardless of the imprecisions, similarities between the bone and lithic industries found at Xiaogushan, layer 3 and Zhoukoudian Upper Cave, layer 1, suggest we are probably dealing with two assemblages that share a common cultural affiliation, and that these sites were likely occupied more or less contemporaneously (Fig.2).

Shizitan Locality 29, layer 7, dated between 25 and 23 kaBP, is the only site reported to

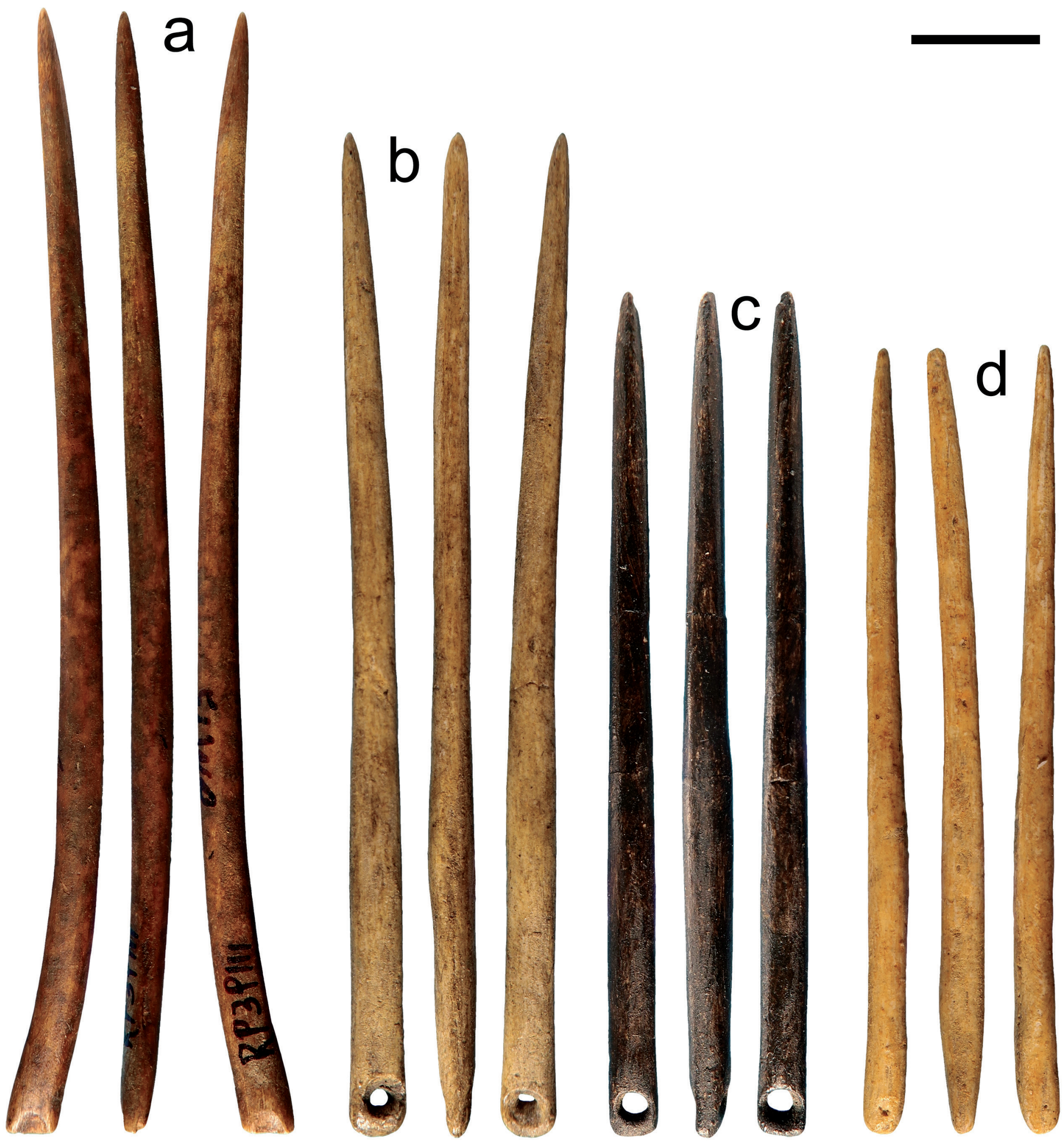

Fig.2 Bone needles

a) Zhoukoudian Upper Cave, layer 1, and b-d) Xiaogushan, layer 3. Modified after[4]. Scale = 1 cm this day from northern China that has yielded a single bone needle fragment[17,18] at a time which broadly correlates with the Last Glacial Maximum(LGM). The flat morphology of this fragment differs significantly from the earlier bone needles found in northern China, which are sturdier and present a circular cross-section[4]. Furthermore, it was found alongside stone tools attributed to the microcore and microblade technology.

After the LGM, bone needles are found in north-central China at Shuidonggou Locality 12, layer 11[4, 11, 19], and Shizitan Locality 9, layer 4[17]. These two sites are broadly contemporaneous with dates ranging between 12.9 and 11.7 kaBP, and both yielded stone tools attributed to microcore and microblade technology. Shuidonggou Locality 12, layer 11 also yielded the richest bone tool assemblage from East Asian late-Tardiglacial context[20], which includes not only bone needles but also a number of modified faunal remains interpreted as manufacturing by-products of needles[4]. These modified faunal remains allowed to reconstruct the reduction sequences

Fig.3 Bone needles from the Shuidonggou Locality 12

a) flat needles made on fresh mammal ribs and long bone diaphysis, and b) sub-circular needles made on weathered mammal long bone diaphysis. Modified after[4]. Scale=1 cm.

of bone needles at Shuidonggou Locality 12, and to technologically and morphometrically differentiate between two needle types, i.e., a flat type made on fresh mammal ribs and sometime long bone diaphysis(Fig.3a) and a sub-circular type made on weathered mammal long bone diaphysis (Fig.3b). At the end of the Pleistocene, bone needles are also present in north-eastern China at Nanzhuangtou, layer 5, dated between 11.5 and 11 kaBP[21]. They are found in association with a toolkit that includes core-and-flake technology and the first instances of pottery in the region.

In southern China, bone needles only appear after the LGM. At Chuandong, upper archaeological layer, the single specimen is found alongside stone tools attributed to core-and-flake technologies[22-23]. At the end of the Pleistocene, bone needles are also found in contexts that yielded both core-and-flake technology and pottery sherds. This is attested from Zengpiyan, layers 1 and 2, dated respectively to 12 and 10 kaBP[24]. Two sites could probably be associated to this latter toolkit, i.e., Bailiandong and the lower archaeological layer of Liyuzui. However, the single specimen found at Bailiandong comes from a disturbed context that yielded dates ranging between 26 and 13 kaBP[25-27]. Likewise, the layer that yielded the single specimen from Liyuzui was dated between 21 and 12 kaBP[28-29].

3. Discussion

Investigations on human dispersals in China at the end of the Pleistocene heavily relied on evidence from stone technology, palaeoanthropology, and palaeogenetic[30-37]. A detailed survey of the occurrence of bone needles provides a new line of information to explore this topic. Broad correlations with the current knowledge on palaeoclimatic conditions also allows to explain the emergence of this key bone tool type in East Asia. The appearance of bone needles in northern China circa 31 kaBP is contemporaneous with an accelerated deterioration of climatic conditions. At this time, the environment shifted from wetland-dominated conditions to eolian-dominated conditions, which favoured the expansion of steppes with coniferous and deciduous tree patches at the expanse of coniferous woodlands[38]. This general environmental change likely pressured the prehistoric populations that were already living in China to come up with a technological solution that would allow the manufacture of clothing with tight seams in order to ensure protection from wind chill. It is noteworthy to emphasize that the first needles are quite sturdy and found alongside core-and-flake technology. Core-and-flake technology in China has been argued to reflect the persistence of local traditions, which origins extend back to the Chinese Lower Palaeolithic[39-42]. This observation indicates that, on the onset of the Chinese Late Palaeolithic, indigenous populations independently invented bone needles. This invention represents a case of convergent cultural evolution with Siberia, where bone needles were also invented but were significantly smaller than the first Chinese needles[4], and found alongside Early Upper Palaeolithic blade technologies that are generally attributed to the arrival of anatomically modern humans in this region[43-47].

The scarcity of sites that yielded bone needles in northern China during the LGM supports the idea that this vast region was somewhat deserted owing to environmental deterioration[48]. The harsh climatic conditions likely encouraged prehistoric populations to minimize risks by moving southward to refugia where resources were more abundant and accessible[27]. However, on the onset of the LGM, a new type of stone technology appears in the archaeological record of northern China, i.e., microcore and microblade technology. It is generally agreed this aspect of material culture represents a reliable proxy for the dispersal of anatomically modern humans in northern China from the west across Siberia and Mongolia[37,40,49]. The co-occurrence of this new way of making stone tools with the significant change in the morphology of bone needles seems to indicate flat needles were brought into China as part of the toolkit of this new population. Co-occurrence of flat needles and microcore and microblade lithic technology is also attested in the late-Tardiglacial context of Shuidonggou Locality 12. However, at this site, a second needle type is also identified, i.e., small sub-circular needles made from weathered bone splinters. The scarcity of evidence from the archaeological record prevents to establish whether or not this second type was part of the toolkit of anatomically modern humans responsible for the deposition of the remains at Shizitan Locality 29, layer 7. The diversification in the reduction sequences leading to the production of morphometrically distinct needle types nonetheless suggests each type was meant to fulfil different functions[4]. Finally, during the late-Tardiglacial, evidence from northern China show a clear pattern of regionalization. In north-central China, needles are found alongside microcore and microflake lithic technology while, in north-eastern China, they come from contexts associated with core-and-flake lithic technology and the earliest evidence of pottery in the region, as it is attested at Nanzhuangtou.

The appearance of bone needles in southern China only occurs after the LGM. It is generally agreed this region was less affected by the climatic fluctuations of MIS2, and therefore, was richer in plant and animal resources than the area north of the Yangzi river[27]. The processes responsible for the introduction of bone needles in the hunters-gatherers toolkit in this region remain to be eluded. Indeed, if favourable ecological conditions prevailed in southern China throughout and after the LGM, the production of fitted clothing unlikely constituted a sufficient reason that would have pushed these populations to manufacture needles. The many gaps in the Chinese archaeological, both in time and in space, only allow to propose two hypotheses to explain the emergence of this tool type that could be tested in the future. First, the origin of bone needles in southern China may correspond to a case of convergent innovation but, if this is the case, future studies must investigate the pressures and processes that led to this cultural adaptation. Second, the first occurrence of bone needles in the southern region could have resulted from the dispersal of populations related to the indigenous invention of bone needles in northern China. To substantiate this claim, it will become necessary to document evidence from a number of sites that are temporally and geographically coherent with a southward dispersal from the north between 26 and 12 kaBP.

During the late-Tardiglacial, bone needles are also found alongside the first instances of pottery in south-central China. The contemporaneous occurrence in north-eastern and southern China of needles in association with core-and-flake technology and ceramic raises the question of the dynamics responsible for the emergence of this toolkit in East Asia. Future research should be undertaken to establish if this pattern is due to a technological convergence or to the diffusion of an adaptive cultural system across diverse ecological contexts. In this latter scenario, efforts should be invested in trying to differentiate between a diffusion that resulted from the dispersal of people over vast regions or the transmission of technology over large distance through small chains of interactions (sensu[50]).

4. Conclusion

Bone needles represent an indigenous innovation from northern China that occurred circa 31 kaBP. Populations already living in this region and making core-and-flake lithic technology likely invented this emblematic tool type when the environment shifted from wetland-dominated to eolian-dominated conditions. In this context, needles would have been an advantageous innovation to manufacture clothing with tight seams to ensure protection from wind chill. On the onset of the LGM, two dispersal events are co-occurring. First, the populations indigenous to northern China seem to move southward in refugia where plant and animal resources favoured a continuous occupation. Second, anatomically modern humans migrated from western Eurasia across Siberia and Mongolia bringing with them a novel toolkit. This latter dispersal event seems to be signal by the appearance of microcore and microblade lithic technology as well as by a change in the morphology of bone needles, i.e., the sturdier needles, circular in section, are replaced with flat needles. The appearance of bone needles in southern China after the LGM could either be due to convergent innovation or to the southward migration of populations who lived in northern China prior to the LGM and who also manufactured core-and-flake technology. During the late-Tardiglacial, microcores and microblades technology is still present in north-central China alongside bone needles. However, this latter tool type is more diversified, as attested by the two reduction sequences leading to the manufacture of technologically and morphologically distinct needles at Shuidonggou Locality 12, layer 11. This diversification likely signals the use of needles in specialized tasks. At the end of the Pleistocene, bone needles are found in association with core-and-flake technology and pottery both in southern and north-eastern China. The gaps in the Chinese archaeological record, both in time and in space, prevent us to distinguish at this point if this pattern is the result of a convergent adaptation or of the diffusion of an adaptive cultural system across diverse ecological settings, either through the dispersal of individuals or the transmission of an idea over long distance through small chains of interaction.

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References

[1] Gilligan I. The prehistoric development of clothing: Archaeological implications of a thermal model[J]. Journal of Archaeological Method and Theory, 2010, 17(1): 15-80

[2] Albes E. The Fuegians and their cold land of fire[J]. Bulletin of the Pan American Union, 1917, XLIV(1): 1-21

[3] Lloyd GT. Thirty-three years in Tasmania and Victoria[M]. London: Houlston and Wright, 1862

[4] d'Errico F, Doyon L, Zhang SQ, et al. The origin and evolution of sewing technologies in Eurasia and North America[J]. Journal of Human Evolution, 2018, 125: 71-86

[5] Stordeur-Yedid D. Les aiguilles à chas au Paléolithique. Gallia Préhistorique Supplément XIII[M]. Paris: Éditions du CNRS, 1979

[6] Bird C, Beeck C. Bone points and spatulae: Salvage ethnography in Southwest Australia[J]. Archaeology & Physical Anthropology in Oceanian, 1980, 15(3): 168-171

[7] Lyman RL. North American Paleoindian eyed bone needles: Morphometrics, sewing, and site structure[J]. American Antiquity, 2015, 80(1): 146-160

[8] Vanhaeren M, d'Errico F. La parure de l'enfant de la Madeleine (fouilles Peyrony). Un nouveau regard sur l'enfance au Paléolithique supérieur[J]. PALEO. Revue d'archéologie préhistorique, 2001, 13: 201-240

[9] Wilder E. Secrets of Eskimo skin sewing[M]. Anchorage: Alaska Northwest Pub. Co., 1976

[10] Chen F, Li F, Wang H, et al. Excavation report of the second location of Shuidonggou site in Ningxia[J]. Acta Anthropologica Sinica, 2012, 31(4): 317-333(in Chinese with English abstract)

[11] Gao X, Wang H, Pei S, et al. Shuidonggou - Excavation and research (2003-2007) report[M]. Beijing: Science Press, 2013(in Chinese with English abstract)

[12] Li F, Bae CJ, Ramsey CB, et al. Re-dating Zhoukoudian Upper Cave, northern China and its regional significance[J]. Journal of Human Evolution, 2018, 121: 170-177

[13] Pei WC. The Upper Cave industry of Chokoutien[J]. Palaeontologica Sinica(Series D), 1939, 1-58

[14] Huang W, Zhang Z, Fu R, et al. Bone products and decorations in Haicheng Xiaogushan[J]. Acta Anthropologica Sinica, 1986, 5(3): 259-266(in Chinese with English abstract)

[15] Norton CJ, Jin JJH. The evolution of modern human behavior in East Asia: Current perspectives[J]. Evolutionary Anthropology: Issues, News, and Reviews, 2009, 18(6): 247-260

[16] Hedges REM, Housley RA, Law IA, et al. Radiocarbon dates from the Oxford AMS system archaeometry datelist 8[J]. Archaeometry, 1988, 30(2): 291-305

[17] Li X. A research on the bone needles of Shizitan site in Paleolithic period and its related problems[D]. Taiyuan: Shanxi University, 2013(in Chinese with English abstract)

[18] Song Y, Li X, Wu X, et al. Bone needle fragment in LGM from the Shizitan site (China): Archaeological evidence and experimental

study[J]. Quaternary International, 2016, 400: 140-148

[19] Zhang Y, Gao X, Pei S, et al. The bone needles from Shuidonggou locality 12 and implications for human subsistence behaviors in North China[J]. Quaternary International, 2016, 400(Supplement C): 149-157

[20] Zhang SQ, Doyon L, Zhang Y, et al. Innovation in bone technology and artefact types in the late Upper Palaeolithic of China: Insights from Shuidonggou Locality 12[J]. Journal of Archaeological Science, 2018, 93: 82-93

[21] Li J, Qiao Q, Ren X. Excavation to Nanzhuangtou site in Xushui County, Hebei in 1997[J]. Acta Archaeologica Sinica, 2010(3): 361-392(in Chinese with English abstract)

[22] Mao Y, Cao Z. A preliminary study of the polished bone tools unearthed in 1979 from the Chuandong site in Puding County, Guizhou[J]. Acta Anthropologica Sinica, 2012, 31(4): 335-343(in Chinese with English abstract)

[23] Zhang S. A brief study of Chuandong prehistoric site (excavated in 1981)[J]. Acta Anthropologica Sinica, 1995, 14(2): 132-146(in Chinese with English abstract)

[24] Chinese Academy of Social Science Institute of Archaeology, Guanxi Zhuang Autonomous Region Institute of Cultural Relics, Guilin Zengpiyan Site Museum. Zengpiyan in Guilin[M]. Beijing: Science Press, 2003(in Chinese with English abstract)

[25] Jia L, Qui Z. The Ages of Chopping tools from caves in Guangxi[J]. Vertebrata PalAsiatica, 1960, 2(1): 66-70(in Chinese with English abstract)

[26] Lotus Cave Science Museum, Beijing Museum of Natural History, Guangxi Wenwu Gongzuodui. Archaeological finds in the Bailian cave site of stone age[J]. Southern Ethnology and Archaeology, 1987: 143-160(in Chinese with English abstract)

[27] Qu T, Bar-Yosef O, Wang Y, et al. The Chinese Upper Paleolithic: Geography, chronology, and techno-typology[J]. Journal of Archaeological Research, 2013, 21(1): 1-73

[28] Jiang Y, Liu W. Liyuzui site - from Paleolithic to Neolithic[J]. Prehistoric Study, 2004, 232-240(in Chinese with English abstract)

[29] Liuzhou Museum, Guangxi Wenwu Gongzuodui. The Neolithic shell mound - Dalongtan Liyuzui site in Liuzhou City[J]. Archaeology, 1983, 9: 769-775(in Chinese with English abstract)

[30] Bae CJ. Late Pleistocene Human Evolution in Eastern Asia: Behavioral Perspectives[J]. Current Anthropology, 2017, 58(S17): S514-S526

[31] Bae CJ, Douka K, Petraglia MD. On the origin of modern humans: Asian perspectives[J]. Science, 2017, 6368: eaai9067

[32] Bae CJ, Li F, Cheng L, et al. Hominin distribution and density patterns in Pleistocene China: Climatic influences[J]. Palaeogeography, Palaeoclimatology, Palaeoecology, 2018, 512: 118-131

[33] Gao X, Zhang X, Yang D, et al. Revisiting the origin of modern humans in China and its implications for global human evolution[J]. Science China Earth Sciences, 2010, 53(12): 1927-1940

[34] Gómez Coutouly YA. The Emergence of Pressure Knapping Microblade Technology in Northeast Asia[J]. Radiocarbon, 2018, 60(3): 821-855

[35] Martinón-Torres M, Wu X, Bermúdez de Castro JM, et al. Homo sapiens in the Eastern Asian Late Pleistocene[J]. Current Anthropology, 2017, 58(S17): S434-S448

[36] Sikora M. A Genomic View of the Pleistocene Population History of Asia[J]. Current Anthropology, 2017, 58(S17): S397-S405

[37] Wang Y. Late Pleistocene Human Migrations in China[J]. Current Anthropology, 2017, 58(S17): S504-S513

[38] Feng ZD, Tang LY, Ma YZ, et al. Vegetation variations and associated environmental changes during marine isotope stage 3 in the western part of the Chinese Loess Plateau[J]. Palaeogeography, Palaeoclimatology, Palaeoecology, 2007, 246(2): 278-291

[39] Gao X. Explanations of Typological Variability in Paleolithic Remains from Zhoukoudian Locality 15, China[D]. Tucson: University of Arizona, 2000

[40] Gao X, Norton CJ. A critique of the Chinese 'Middle Palaeolithic'[J]. Antiquity, 2002, 76(292): 397-412

[41] Li Y, Bodin É. Variabilité et homogénéité des modes de débitage en Chine entre 300 000 et 50 000 ans[J]. L'Anthropologie, 2013, 117(5): 459-493

[42] Zhang S. The regional development and interaction of Paleolithic industries in northern China[J]. Acta Anthropologica Sinica, 1990, 9: 322-333(in Chinese with English abstract)

[43] Derevianko AP. Three scenarios of the Middle to Upper Paleolithic transition. Scenario 1: The Middle to Upper Paleolithic transition in Northern Asia[J]. Archaeology, Ethnology & Anthropology of Eurasia, 2010, 38(3): 2-32

[44] Derevianko AP, Shunkov MV. Formation of the Upper Paleolithic traditions in the Altai[J]. Archaeology, Ethnology and Anthropology of Eurasia, 2004, 3: 12-40

[45] Derevianko AP, Shunkov MV. Development of early human culture in northern Asia[J]. Paleontological Journal, 2009, 43(8): 881-889

[46] Derevianko AP, Markin SV, Tabarev AV. The Palaeolithic of Northern Asia[A]. In: Cummings V, Jordan P, Zvelebil M eds. The Oxford Handbook of the Archaeology and Anthropology of Hunter-Gatherers. Oxford: Oxford University Press, 2014, 1-20

[47] Shalagina AV, Baumann M, Kolobova KA, et al. Bone needles from Upper Paleolithic complexes of the Strashnaya Cave (North-Western Altai)[J]. Theory and Practice of Archaeological Research, 2018, 21: 89-98

[48] Ji D, Chen F, Bettinger RL, et al. Human response to the Last Glacial Maximum: Evidence from North China[J]. Acta Anthropologica Sinica, 2005, 24(4): 270-282(in Chinese with English abstract)

[49] Brantingham PJ, Krivoshapkin AI, Li J, et al. The Initial Upper Paleolithic in Northeast Asia[J]. Current Anthropology, 2001, 42(5): 735-747

[50] Lombard M, Högberg A. The Still Bay points of Apollo 11 Rock Shelter, Namibia: An inter-regional perspective[J]. Azania: Archaeological Research in Africa, 2018, 53(3): 312-340

中国的骨针及其对晚更新世人类扩散的指示意义

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摘要 : 在最近的一篇文章中，由 d’Errico 教授率领的来自中国、法国、德国研究者的工作表明，世界上最早的骨针出现于西伯利亚和中国北方地区，且这两个地区的骨针可能是独立起源。中国考古学的纪录为这一观点提供了更多的新证据。本文将这一工具类型与石器技术和环境背景结合考察，探讨更新世晚期后半段发生的人群的扩散。我们通过材料的梳理证明，中国北方地区的骨针，是出现于距今 31000 年前的一次技术创新，这一技术创新以石核–石片技术为代表的中国旧石器晚期的到来为背景。距今 25000 年，一种新形制的骨针出现。这些骨针形制扁平，与细石叶技术同时出现。这可能反映了欧亚大陆西方人群的东迁，这些人群带来了细石叶技术。更新世末，骨针更加多样化，这意味着他们可能有多种用途。在晚冰期末段，中国北方地区的骨针不仅与细石叶技术共出，同时也与石核、石片和陶器共出。在中国南方地区，在距今 12000 年前，骨针的出现与石核–石片技术同时出现。南方地区的骨针或是本地的的发明，或由末次冰期前北方人群的南迁带来的。长江以南地区，骨针与石核、石片和陶器在更新世晚期同时出现。更新世晚期中国南北方地区同时出现的这一工具组合，即石核、石片、陶器和骨针，预示着南北方地区在更新世晚期和全新世早期可能存在着长距离的人群的移动和文化的交流。

关键词：骨制工具；骨针；中国旧石器时代晚期；文化创新；MIS 2；末次盛冰期