Human palaeontology and prehistory

Discovery of a Mesolithic burial near the painted rock-shelter of Ban Tha Si (Lampang province, Northern Thailand): Implications for regional mortuary practices

Découverte d’une sépulture mésolithique sous l’abri-sous-roche orné de Ban Tha Si (province de Lampang, Nord de la Thaïlande) : implications régionales sur l’évolution des pratiques funéraires

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A B S T R A C T

Although the oldest Neolithic cultures in eastern Asia have for the most part been documented in China and Vietnam, a large number of Early Metal Age sites have been reported in northeastern Thailand. On the other hand, the Hoabinhian, principally identified by its characteristic unifacial tools, is known throughout the Late Pleistocene up until 3000 BP and is spread across the whole of continental Southeast Asia. The chronology of Hoabinhian lithic assemblages is still poorly documented and burials from the period are scarce and often do not provide enough information to allow the evolution of regional mortuary practices to be investigated. Here we describe a burial dated to 7047 ± 53 BP found associated with a Hoabinhian stone tool assemblage and fauna near the painted rock-shelter of Ban Tha Si. This discovery provides important new chrono-cultural information for continental Southeast Asia, especially with regard to changing regional mortuary practices.

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R É S U M É

Alors que les cultures du Néolithique ancien d’Asie orientale ont essentiellement été décrites en Chine et au Vietnam, les cultures de l’Âge des Métaux ont abondamment été documentées dans le Nord-Est de la Thaïlande. Par ailleurs, le Hoabinhian, principalement identifié par ses outils unifaciaux caractéristiques, est connu du Pléistocène tardif jusque vers 3000 BP sur l’ensemble du Sud-Est asiatique continental. La chronologie des assemblages lithiques hoabinhiens reste encore peu documentée et les sépultures de cette période

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1. Introduction

Cave and rock-shelter paintings have been known for some time in Thailand (Kerr, 1924; Lunet de Lajonquière, 1912), and numerous new sites have been discovered and documented in the last 30 years. Painted figures belonging to different styles and periods have been identified in various regions, including the coastal areas of southern Thailand (Chaimongkol, 1988), the western part of central Thailand (provinces of Uthai Thani and Kanchanaburi) (Srisuchat, 1989, 1990, 1991), the North-East (provinces of Loei, Nakhon Ratrasima, Khon Kaen, Udorn Thani and Ubon Ratchathani) (Charoenwongsa, 1988; Srisuchat, 1992), and northern Thailand (provinces of Hot, Chiang Mai, and Lampang) (Pautreau and Doy-Asa, 2005; Pautreau et al., 1996; Sidisunthorn et al., 2006; Srongsiri and Sangchan, 1997). Geometric forms, different types of animal representations (wild and domesticated), tools, boats, landscape and hunting scenes, hands and anthropomorphic figures have all been documented. Apart from modern scenes such as the Chinese junk from Phi Phi Island or white animal outlines, prehistoric rock art in Thailand mostly dates from the Iron Age and is associated with sedentary societies (Higham, 2002). Figures are usually painted in red ochre, such as at the Pha Tae’m rock-shelter in northeastern Thailand near the Mekong River, where figures of fishes, fish-traps, geometric forms, hands, deer in rice fields, and an elephant have all been recorded. At Khao Chan Ngam in the Nakhon Ratrasima region, anthropomorphic figures are present alongside cattle and dogs, whereas at the sites of Ban Yang Thong Tai near Doi Saket and at Ob-Luang cliff (Prisanchit and Pengtako, 1984; Santoni et al., 1988, 1990) in the province of Chiang Mai, red paintings depict both wild and domesticated animals. The largest painted rock-shelter in northern Thailand is that of Phratu Pha in Lampang province (Srongsiri and Sangchan, 1997). Although directly correlating the chronology of the paintings with associated human occupations or burials may be difficult, the occurrence of several burials at the base of Phratu Pha painted rock-shelter (Kongsuwan, 2001; Srongsiri and Sangchan, 1997; Winayalai, 1999) dated to about 3000 BP prompted us to undertake excavations at Ban Tha Si because it depicts red painted hands and figures of animals. These new excavations uncovered a single individual buried in a flexed position associated with a series of radiocarbon dates (Table 1), indicating that the rock-shelter of Ban Tha Si was occupied for a significant duration.

2. Materials and methods

The site of Ban Tha Si was found during our surveys in the eastern cliffs of the Doi Pha Kan Mountains, 10 km south of the famous rock art site of Phratu Pha (Fig. 1, district of Mae Moh, Lampang province, N 18° 26.55’ E 99° 45.98’). Excavations at the site were undertaken in collaboration with the Northern Archaeological Center of Chiang Mai University, the Department of Archaeology of Silpakorn University, and the 6th office of Fine Arts Department of Nan. Red painted figures of hands, an elephant and a sun-bear (Fig. 2) were recorded exclusively on the eastern slopes of the mountain, as is also the case at nearby Phratu Pha. A total of 48 stone tools, five pot-sherd and one cowrie were uncovered from a survey of the rock-shelter. An initial 5 m by 1 m trench, excavated at the base of the elephant painting, produced only four stone tools near the surface. It is clear from this trench that the site has been heavily eroded, and the bedrock now lays only 5 to 10 cm below the present surface of the rock-shelter. The deposits are composed of fine aeolian sediments covering the eroded surface of the limestone substratum. Excavations undertaken under the southern overhang of the rock-shelter indicated that the preserved deposits could be divided into two distinct stratigraphic units: an upper layer composed of a fine aeolian sediment, and a 2 to 20 cm thick layer consisting of a combination of the overlying fine sediment and small angular limestone gravels derived from the erosion of the underlying calcareous substrate. The irregular surface of the lower level is due to the erosion of the underlying limestone substratum. The excavations produced 10 cobbles or cobble fragments, 194 flakes, 20 chunks, 44 stone tools (scrapers, denticulated pieces, retouched flakes, limaces) and 85 sherds (<0.5 cm wide) of black cord-impressed ceramics; all archaeological remains were recovered exclusively from the lower layer. Small faunal remains (n = 105, bone fragments, shell and chitin) demonstrate the presence of crabs, land snails, and aquatic molluscs, as well as turtles, varanids, snakes, cercopithecids, muntjak, suids, and an unidentified large bovid. A single burial has also been documented and the original position of the body determined using techniques

<table>
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<tr>
<th>Nature</th>
<th>Date #</th>
<th>14C age (BP)</th>
<th>δ13C (‰, VPDB)</th>
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<td>Charcoal</td>
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<tr>
<td>Charcoal</td>
<td>Wk 29560</td>
<td>11,393 ± 36</td>
<td>-28.9</td>
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<td>Wk 29561</td>
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<tr>
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<td>-25.8</td>
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<tr>
<td>Charcoal</td>
<td>Wk 29563</td>
<td>6673 ± 25</td>
<td>-26.2</td>
</tr>
<tr>
<td>Bone</td>
<td>AA 92549</td>
<td>7047 ± 53</td>
<td>-16.8</td>
</tr>
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developed in field anthropology (Duday, 2009; Duday and Guillon, 2006; Duday et al., 1990).

3. Stratigraphy of the site

Sedimentological analysis indicates that the different layers of Ban Tha Si were heavily eroded, because the base of the rock-shelter has suffered from exposure to rain and wind, resulting in the removal of fine sediments. The stratigraphy is only locally preserved in a pocket beneath a large block that fell from the top of the cliff as well as under the remaining overhang of the southern part of the rock-shelter. The calcareous substratum is either exposed or covered by a maximum of 46 cm of sediments (Fig. 3). Archaeological remains were concentrated within a single archaeological layer that accumulated as a result of splash-creep processes (see Lenoble in Zeitoun et al., 2008, p. 30). Small potsherds of black cord-pressed ceramics known from the Neolithic to the Metal Age in Southeast Asia (Ha, 1985; Prisanchit, 2008) are present, but solely at the top of the archaeological layer, suggesting a more recent human occupation.

3.1. Stone tools

Stone artefacts recovered during excavations fall within the variability documented for the Hoabinhian (Forestier et al., 2005) (Fig. 4) and are very similar to the lithic material recovered from Moh Khiew in southern Thailand (Auetrakulvit et al., 2012). Two types of raw material were used by prehistoric knappers: siliceous limestone and cobbles. The siliceous limestone was reserved for the manufacture of lightly retouched stone tools with highly variable cutting edges. These tools were shaped by simple retouch and bear denticulated, micro-denticulated or notched edges and can generally be classified as end-scrapers, scrapers, notches and the occasional limace. The debitage method is a basic ‘alternating platform system’ applied to small nodules in order to produce different flakes with plain butts and occasional elongated flakes usually transformed into side scrapers. The majority of tools produced on the site were however basic retouched flakes. The second main tool group consists of cobble tools (or typical choppers) generally having a transverse denticulated or straight cutting edge on a single face. This type of heavy-duty tool is reminiscent of the classic Hoabinhian toolkit known from Southeast Asia and contrasts with the other chipped stone artefacts recovered from the site. Various tool functions associated with two different technical systems are perceptible in the Ban Tha Si toolkit: the shaping of cobbles on the one hand and flake production on the other, representing an adaptive technical response to living in a tropical environment.

3.2. Faunal assemblage

The relatively poor (n = 105) and limited faunal assemblage recovered from Ban Tha Si contains species typical of the region’s Holocene fauna: small crab remains, land snails, aquatic molluscs, turtles, varanids, snakes, cercopithecids, muntjaks, and some cut-marked suid bones. The largest piece is a fragment of a bovid long bone. In the contemporaneous levels of Moh Khiew rock-shelter, most of the faunal remains are also small animals weighing up to 10 kg and are typical of assemblages associated with the region’s hunter-gatherer groups: turtles, monkeys, langurs, monitor lizards, squirrels, etc. (Auetrakulvit, 2004a, 2004b; Hongo and Auetrakulvit, 2011).
3.3. Description of the grave

The grave of a single individual was found close to the wall beneath the southern end of the rock-shelter’s overhang. The grave is orientated northeast-east/southwest-west, the feet to the southwest (Fig. 5). The body was positioned on its right side, the head is absent, and the lower and upper limbs are flexed with the hands close to where the chin would have been. The individual was buried directly in the soil. Based on detailed field observations, the sediment rapidly replaced the volume of the corpse, which was still in anatomical articulation. Apart from the differential preservation and decay of the bones themselves, there is no evidence of disturbance, suggesting that the grave was probably not much larger than the body itself. The sex of the male individual was determined at 98% confidence using the DSPV method (Murail et al., 2005) applied to the pelvis and coxal bones. The height of the relatively tall individual is estimated to be between 1.71 and 1.76 m according to Chusiri’s (1991) Regional Anthropological Tables, based on the maximal length of long bones.

3.4. Radiocarbon dating

A series of five radiocarbon-dated charcoal samples (Fig. 3 and Table 1) yielded a consistent series of dates ranging between $11,393 \pm 36$ BP (Wk 29560) and $6673 \pm 25$ BP (Wk 29563). Because no collagen was preserved in the
human skeletal material, structural carbonate present in the mineral fraction of the bone (bioapatite) was sampled and produced an age of 7047 ± 53 BP (AA 92549). Radiocarbon dating of bioapatite has proved useful in arid environments where post-mortem chemical exchanges between bone and the burial environment are limited (Zazzo and Saliège, 2011). However, tropical environments are not ideal contexts for dating carbonate in bioapatites given that the humid climate is likely to promote chemical exchanges. To our knowledge, very few data concerning this technique have so far been reported from tropical environments. When altered, carbonate in bioapatite tends to return ages that are too young; therefore the age estimate should be considered a minimum age for the burial.

4. Discussion

Previous analyses of burial practices from Neolithic cemeteries defined distinct mortuary phases based on the depth, orientation and superimposition of graves, as well as associated grave goods (Higham and O’Reilly, 2004). However, the burial context itself, whether interred directly in the soil, in a coffin, or wrapped in fabric, represents a very important and under-evaluated aspect of funerary practices that is rarely included in Southeast Asian archaeological studies (Willis and Tayles, 2009). Mortuary rituals may be inferred from the nature and significance of grave goods, associated structures, and the size and spatial distribution of burials once the original position of the body has been determined based on techniques developed in field
Fig. 4. Examples of lithic artefacts from Ban Tha Si rock-shelter: a) lateral denticulate on an elongated flake; b) unifacial cobble tool (chopper) with a transverse and convex denticulated cutting edge; c) thick retouched flake tool: limace; d) denticulated; e) double lateral notch, abruptly retouched; f) retouched flake; g) pseudo-Levallois point; h) retouched flake with two notches on both edges.

Field anthropology, also known as archaeoanatolology, employs meticulous observations of the anatomical orientation of bones in a grave to interpret how their original arrangement altered as the body decomposed, thus allowing the original burial context to be determined. Two actions determine the appearance of a grave: intentional human interventions and unintentional modifications resulting from taphonomic processes. The most important factors are interactions between the decomposition of the cadaver and gravity itself. As soft tissue decomposes, movements due to gravity are either allowed by empty spaces in the grave or restricted by the lack thereof. By determining what types of spaces were present in the grave, it is possible to infer how the individual was initially interred (Duday, 2009; Duday and Guillon, 2006; Duday et al., 1990). Because this methodology has only recently been used in Southeast Asia (Coupey et al., 2010; Harris, 2010; Pautreau et al., 2010; Willis and Tayles, 2009; Zeitoun et al., 2012), it is necessary to reappraise (Auetrakulvit et al., 2012) earlier publications and data sets in order to make relevant comparisons.

Such a reappraisal is particularly warranted when discussing Higham and Higham’s (2009) recent analysis of
Neolithic and Metal Age sites that considered flexed burials characteristic of the so-called indigenous Southeast Asian hunter-gatherers, whereas Rispoli (2007) considers southern China a ‘spread zone’ where Late Neolithic technological and cultural innovations originated and subsequently diffused across Southeast Asia. This expansion would include sedentism, agriculture, and ultimately the abandonment of chipped or flaked stone industries and is coincident with increased inhumations in the extended position, as opposed to the flexed position which may also reflect possible cultural influences from China.

By comparing the mortuary practices known from northern Thailand in the area of the two painted rock-shelters (Phratu Pha, Ban Rai) with the well-established chronology of burials documented at the site of Moh Khiew, it is possible to trace changing mortuary practices in Thailand. The well-dated flexed burial from Ban Tha Si rock-shelter occupies an intermediate chronological position between the burials known from Neolithic and older Hoabinhian sites (Tham Lod and Ban Rai) and therefore sheds new light on changing regional mortuary practices.

4.1. Regional comparison of Hoabinhian burials

At the painted rock-shelter of Phratu Pha, 10 km north of Ban Tha Si, five individuals buried in supine positions with their limbs extended have been documented and could support the funerary trends described by Rispoli (2007) or Higham and Higham (2009). Furthermore, these ‘extended burials’ containing rice grains, bamboo and wood...
have been radiocarbon-dated to between 3195 ± 55 BP and 2975 ± 65 BP. It should also be noted that one of the best-preserved burials is an adult individual directly interred in the soil in a supine position with upper and lower limbs extended and entirely wrapped in bark cloth. The burial has been directly dated to 3090 ± 60 BP, identical to the date of 3085 ± 70 BP obtained from rice grains recovered from a pot forming part of the associated grave goods (Winayalai, 1998). Nevertheless, the hypothesis of a ‘new Chinese fashion’ of inhumation still requires further investigation given the lack of secure chrono-cultural markers and detailed descriptions of burials in Southeast Asia capable of shedding light on mortuary rituals such as those provided by field anthropology. The statement that the flexed burial from Ban Tha Si predates Neolithic examples suggests that the chronological and cultural significance of this type of burial also needs further revision. The scarcity of Upper Pleistocene to Late Neolithic Hoabinhian burials further complicates issues concerning the chronology of regional mortuary behaviour.

The features of Hoabinhian graves therefore provide no conclusive evidence of any standardisation or evolution of funerary practices in terms of the position of the body, the shape of the grave or the way the body was interred. Erosion, the presence of indistinguishable fills, or bioturbation often renders it impossible to discern and describe the shape of the initial grave. Finally, it is at least clear from other Hoabinhian sites in northern and southern Thailand that the so-called flexed position is not the sole mortuary practice associated with these hunter-gather groups. Indeed, three burials from the Hoabinhian level 3 of the Moh Khiew rock-shelter in southern Thailand (Fig. 6) have produced radiocarbon dates ranging from 11,020 ± 150 BP to 8420 ± 90 BP, and a single piece of charcoal from a fourth grave has been dated to 25,800 ± 600 BP (non calibrated) (Pookajorn, 2001). The two upper levels of this site also produced radiocarbon dates spanning 7060 ± 100 BP to 4250 ± 150 BP and contain potsherds of a mainly dark fabric or pottery with cord impressions (Pookajorn, 2001).

Different types of burials are not observable between the lower and upper portions of the sequence (Auethakulvitr et al., 2012, Fig. 6). The incomplete remains of an adult individual, placed on their back and oriented north–south with the upper part of the body lying extended under a large limestone block, was found in the lowest level. Two juveniles were buried in extended positions, oriented north–south with their heads to the south in the upper level. An adult individual buried in a half-flexed position with the upper part of the body on its back and lower limbs in a flexed position resting on the left side of the body was uncovered in the same level, but in the level overlying the two juveniles. In order to re-evaluate these mortuary practices, new excavations were carried out in 2008 and uncovered several new primary burials including an incomplete adult skeleton in a supine position with the head turned towards the west. Although the base of this burial cuts into the lowest level, the majority of the remains were concentrated in the overlying level which has been dated by a series of new radiocarbon determinations to between 11,220 ± 510 BP and 9470 ± 420 BP. Three other burials have been uncovered at the top of the same level 3 as those excavated by Pookajorn (1990, 1994, 2001), including an incomplete skeleton of an adult lying in a supine and possibly half-flexed position in an almost north–south direction, the head facing southeast. A second north–south oriented and poorly preserved individual was buried in a supine position, but with extended limbs. A final burial contained an incomplete individual with only the lower limbs and pelvis preserved. The individual was buried on their left side and in a flexed position.

Although available information is incomplete, it can nonetheless be supposed that the initial extended burials belong to the middle period of the level dated to around 10,600 BP, while the other extended and flexed burials are likely younger than the top of this level (e.g. around 7000 BP) based on the information provided by Pookajorn (2001). The date of 4200 BP from the overlying level in which the grave from the level 3 was cut likely represents a ‘minimum’ age for the burials. It is nevertheless impossible to precisely determine the chronology of the different types of graves (flexed, half-flexed and extended) at Moh Khiew given the resolution of available chronological information. However, only burials containing individuals in extended supine positions are present at the base of the chronological sequence and therefore significantly predate the appearance of the flexed burials or any new Chinese cultural influence as advanced by Rispoli (2007) or Higham and Higham (2009).

Burials known from Hoabinhian periods in northern Thailand include a very incomplete burial of an adult in an extended supine position found at Tham Lod rock-shelter, 46 cm below the surface, with a hammer stone lying on top of the lower limbs. The associated sediment has been radiocarbon-dated to 12,100 ± 60 BP (non calibrated) (Shoocongdej, 2006). Underlying this burial, at a depth of 90 cm, an individual buried in a flexed position on the left side was covered by a ring of five large cobbles with a radiocarbon date of the fill at 13,640 ± 80 BP (non calibrated). Both burials are from a level that contains cores, flakes and sumatroliths made from quartzite, mudstone, andesite and siltstone, which falls within the variability of the Hoabinhian.

Two human occupations are separated by a hiatus between 6000 to 3000 BP at Ban Rai rock-shelter, 12 km west of Tham Lod. The more recent occupation, dated to between 1200 to 2500 BP, is associated with log coffins, while the earlier occupation phase (10,600 to 7250 BP non calibrated) is characterized by an abundance of Hoabinhian stone tools and numerous faunal remains including large boulders, deer, monkeys, squirrel, turtle, freshwater fishes and shellfish, as well as land snails (Sidisunthorn et al., 2006). A single grave of an adult individual in a supine position with the lower limbs in hyperflexion and the knees and arms bent inwards was recorded at the site. The body was buried directly in the soil within a circular pit devoid of any ornaments or grave goods. The fill of the grave has been radiocarbon-dated to 9720 ± 50 BP (non calibrated) (Pureepatpong, 2006).

The relative chronology of the burials from Moh Khiew rock-shelter and available dates from Tham Lod both
indicate that extended burials predate flexed burials which, according to Rispoli (2007), originated in China and spread southwards during the Late Neolithic (4450–3450 BP). The directly dated individual burial at Ban Tha Si has produced an intermediate age of 7047 ± 53 BP.

5. Conclusion

Although there is a long history of rock-shelter occupations in Southeast Asia, it is not yet possible to determine the chronology and authorship of the cave paintings. While the majority of the lithic material from the long sequence of human occupations near the rock-shelters belongs to the Hoabinhian tradition, this does not constitute strong evidence because some of the paintings are linked with both agriculture and sedentism. One possible hypothesis is that different populations used the rock-shelters as funerary areas or as temporary camps, much like hunter-gatherer groups still living in the vicinity of such cliffs in southern Thailand (Pookajorn, 2001). Although the significant duration of the Hoabinhian lithic tradition provides an ideal opportunity for investigating the evolution of mortuary practices in Southeast Asia, the lack of detailed descriptions of burials based on methods developed in field anthropology, combined with direct dating of the skeletons, precludes building a solid database for testing hypotheses of migration or hypotheses concerning the spread of cultural influences. The reappraisal of field data from Moh Khiew or Tham Lod, as well as new excavations at Ban Tha Si, including field anthropology and direct dating, have provided the first concrete evidence contesting Chinese influences and produced earlier dates for extended burials.

Acknowledgments

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References


Rispoli, F., 2007. The incised and impressed pottery style of mainland Southeast Asia following the paths of neolithization. East and West 57, 235–304.


