Chapter 7
The Middle and Upper Paleolithic on the Western Coast of the Mani Peninsula (Southern Greece)

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Abstract Along the western coast of the Mani peninsula (S. Greece) numerous caves with Upper Pleistocene and Early Holocene deposits, preserving cultural remains from the Middle Paleolithic to the end of the Neolithic, form an important group of archaeological sites located in a restricted geographic area. Excavations have been carried out in seven of these caves. The excavation of Kalamakia yielded data about the Middle Paleolithic, while the other six caves have yielded remains of all Upper Paleolithic phases. Of particular interest is the discovery of transitional Middle-Upper Paleolithic layers in Kolominitsa cave. Although preliminary, this evidence demonstrates the importance of systematic research on a regional scale through the comparative study of neighboring and contemporaneous sites. Finally, these sites enable us to date the arrival of anatomically modern humans in this area and to study subsequent ecological and cultural changes.

Keywords Upper Pleistocene • Peloponnese • Cave sites • Environment • Lithic industry • Human diet • Middle-Upper Paleolithic transition

Introduction

The Paleolithic of Greece is still poorly known, since the relevant research remains in the margin of the overall archaeological research in the country, which focuses almost exclusively on the study of later periods. Although Paleolithic projects have multiplied during the last decades, most of them are field surveys, usually yielding finds without stratigraphic context, which are therefore not informative enough (if not questionable). Excavations are comparatively rare and reliable data remain sparse. To date, less than a dozen excavations have been carried out. Petralona cave was, until recently, the only excavated Middle Pleistocene site (Poulianos 1971; Darlas 2014; but see Panagopoulou et al. 2015; Galanidou et al. 2016). The remaining excavated sites date to the Upper Pleistocene (Middle and Upper Paleolithic). Earlier excavations, carried out between 1940s and 1970s, include those of Seidi (Schmidt 1965), Asprochaliko and Kastritsa (Higgs and Vita-Finzi 1966; Bailey et al. 1983), Franchthi (Perlès 1987), and Kefalari (Reisch 1980); while those of Klithi (Bailey 1997), Boila (Kotjabopoulou et al. 1997), Theopetra (Kyparissi-Apostolika 2000), Klisoura (Koumouzelis et al. 2001; Kaczanowska et al. 2010), and Maara (Trantalidou and Darlas 1992) are more recent.

In this context, the presence of numerous caves with Pleistocene deposits containing Paleolithic remains in the Mani peninsula becomes very important for Paleolithic research in Greece. Apart from Lakonis (Panagopoulou et al. 2002–2004), located on the northeastern end of the peninsula, all other caves mentioned here are situated along the western coast. A few contain deposits with Middle Paleolithic remains, while most of them preserve deposits containing Upper Paleolithic remains, providing a sequence of Middle Paleolithic and all phases of the Upper Paleolithic in a restricted area. Because of its rich record and limited geographic area, the Mani peninsula is particularly suitable for systematic research and represents one of the richest areas of the Greek Paleolithic record.

The Mani Peninsula

Mani is the middle of the three peninsulas formed in the Southern Peloponnese. It constitutes the extension of the Taygetos mountain range, which begins at the center of

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Peloponnese and ends at cape Tenaron, and is mostly formed of Upper Cretaceous–Lower Eocene metamorphic limestones (Thiebault 1982). Throughout the entire western coast and especially on the vertical cliffs overhanging the sea—several tens of meters high—there are numerous caves belonging to an extended karstic system (Bassiakos 1993). The size of these caves varies: the majority are small, some tens of meters deep, opened at the current sea level or some meters above it; others are very large with impressive stalagmitic formations (e.g. Diros caves, Aghios Dimitrios cave). Most have been used by humans from the Paleolithic until the recent past. In many cases, the Pleistocene fillings have been eroded; however, nearly all of them still preserve Paleolithic evidence (see also Tourloukis et al. 2014). Today, several caves preserve Paleolithic deposits suitable for excavation.

Geomorphological Evolution and Human Use of Caves During the Upper Pleistocene

The western side of the peninsula presents a stepped morphology, due to the successive horizontal surfaces and the overhanging vertical cliffs. At the current sea level, and slightly above, a Tyrrhenian terrace forms a horizontal zone several kilometers long and 10–100 m wide. Two marine deposits (marine crusting and beach rock) are locally deposited on its surface, attributed to the MIS 5e and 5c transgressions (based on similar formations in Crete; Keraudren et al. 2000). This zone is dominated by a vertical cliff face, several tens of meters high, onto which most of the caves open. Almost all of these caves, especially those situated 0–20 m above sea level (asl), have been eroded by the marine transgression of MIS 5e and 5c and have completely lost their sediment. As a consequence, although the caves could have been inhabited in the Middle Pleistocene, or even earlier, their current infill dates to the Upper Pleistocene and contains archaeological remains of the Middle and Upper Paleolithic as well as of subsequent periods.

The Tyrrhenian terrace (as well as other lower plateaus, currently submerged by the sea) must have been completely free at the beginning of the last glacial, since screes had not yet accumulated. The caves overlooking these plateaus were the most favorable for habitation at that time, with the lower ones inhabited first, since access to the higher caves would have been difficult or even impossible.

Screes were gradually accumulated on the bottom of the cliffs blocking the lower caves first and pushing the human occupation to the higher ones, with the sloping surface of screes facilitating the access. Therefore, the lower caves usually contain Middle Paleolithic remains, while those opened at a higher level contain mostly Upper Paleolithic and younger remains (Darlas 2012). It is worth mentioning that the scree “sealed” the majority of the caves, protecting their filling from erosion.

A similar process took place at the lower level, on the bottom of the cliff in front of the Tyrrhenian terrace. The marine regression in the beginning of MIS 5b and mainly MIS 4 revealed numerous caves, which were consequently inhabited by both Neanderthals of the Middle Paleolithic and *Homo sapiens* of the Upper Paleolithic.

The Holocene marine transgression dramatically limited the living space of the peninsula inhabitants. Most of the previously inhabited caves became submerged and only a small proportion was still available for habitation. On the other hand, after erosion of the scree, the lower caves lost their “protective wall” and erosion of their deposits began. As a result, many caves have lost their entire filling (or a part of it), and are currently empty.

The Archaeological Research

Previous paleoanthropological research at Apidima caves from 1980 to 1984 (Fig. 7.1) recovered two crania attributed to Middle Pleistocene hominins, and a headless burial of a female individual of a possible Upper Paleolithic age (Coutselinis et al. 1991; Pitsios 2000; Harvati et al. 2011).

Kalamakia cave (Fig. 7.1) was excavated from 1993 to 2006 and yielded Middle Paleolithic remains (De Lumley and Darlas 1994; Darlas and De Lumley 1999, 2004). A broader project on the caves of the Mani peninsula was carried out from 1999 to 2005 in the course of which 103 caves were explored. Most are small cavities with archeological remains, and more than 50 of them contain Pleistocene deposits. Small test pits opened in six caves—Kolominitsa, Kastanis, Skini 4, Skini 3, Tripsana, and Melitzia (Fig. 7.1)—yielded Upper Paleolithic material.

The above research demonstrated the great density of Paleolithic caves in Mani and yielded valuable, if preliminary, information about the Upper Paleolithic (Darlas and Psathi 2008). Given the great number of caves with preserved remains of this period, successive restricted excavations were no longer sufficient and the research was organized around systematic exploration of three caves—Melitzia, Kolominitsa, and Skini 2; Fig. 7.1—which contained deposits from all phases of the Upper Paleolithic. The main excavation was undertaken at Melitzia cave, with research in the other two caves complementing the findings. At Kolominitsa, the concentration is on Early Upper Paleolithic phases, which may not be represented at Melitzia cave. At Skini, 2 a series of samples will be collected for paleoenvironmental analysis.

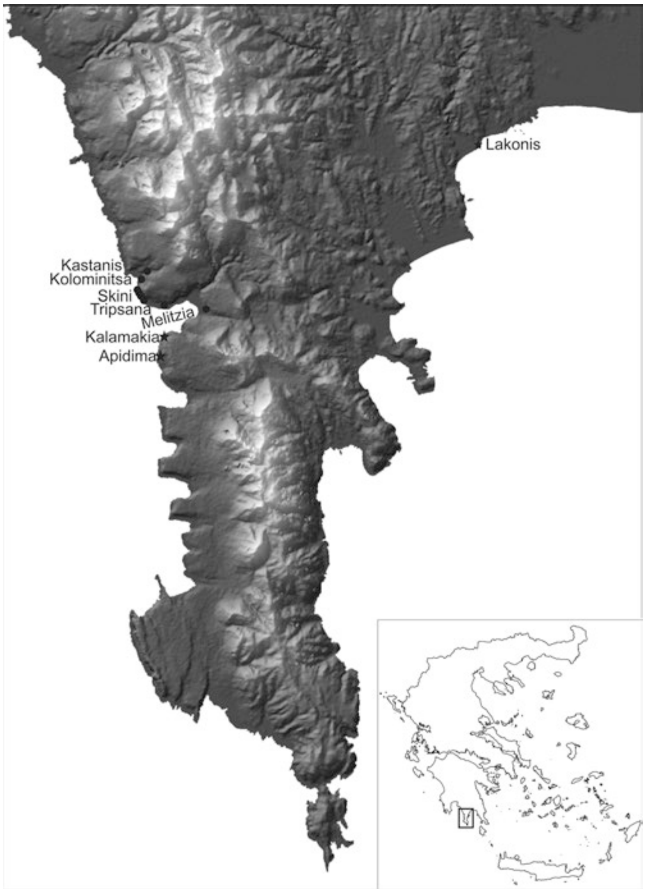

Fig. 7.1 Geographic position of excavated Paleolithic sites in the Mani peninsula (*stars* represent Middle Paleolithic sites; *circles* Upper Paleolithic sites)

Fig. 7.2 View of the entrance of the Kalamakia cave, showing the excavation trenches

The systematic excavation of Melitzia started in 2009; the initial test pit in Kolominitsa was reopened in 2011 in order to examine the deposits in greater depth; while the exploration of Skini 2 has not yet been carried out. Complementing the research in western Mani, the excavation of Lakonis cave at the NE border of the peninsula (Panagopoulou et al. 2002–2004; Harvati et al. 2003), as well as recent work on the northern end of the western coast (Tourloukis et al. 2014), have yielded Middle Paleolithic material.

The Middle Paleolithic

Kalamakia Cave

Kalamakia cave (Fig. 7.1) is located at the entrance of Itylo bay, approximately 2.5 km North-West of Areopolis (36° 40′ 33.68″ N, 22° 21′ 51.45″E). It opens 10 m inland from the current sea shore, at 2.5 m asl, directly on the Tyrrhenian terrace. The cave is 20 m deep, with a 7 m wide and 8 m high entrance. Throughout their entire height, the walls are perforated by *Lithophaga* sp., indicating that during the Pleistocene the cave was submerged for a long period of time. The Pleistocene filling of the cave is more than 7 m thick (Figs. 7.2 and 7.3). At the bottom, two marine deposits (Units 0 [marine crusting] and II [beach rock]) are attributed to the marine transgressions of MIS 5e and 5c respectively. Above these two layers, there are 7 m of accumulated continental deposits, more than 4 m of which are rich in Middle Paleolithic remains (Units III and IV), while the uppermost 2.5 m are practically culturally sterile (Unit VI; De Lumley and Darlas 1994; Darlas and De Lumley 2004).

A thorough horizontal excavation was conducted at the site. The sediments of Unit IV were excavated throughout their vertical expanse in an area of 4–10 m^2. In Unit III, due to the extremely hard, lithified sediments, only the top layers in an area of 8 m^2 were excavated (Darlas and De Lumley 2004). The attribution of the beach rock (Unit II) to the MIS 5c transgression seems to be confirmed by the U/Th dating of a marine shell (Institut de Paléontologie Humaine in Paris, IPH Kal 9304: 109,000 + 14,000/−13,000 kBP); De Lumley

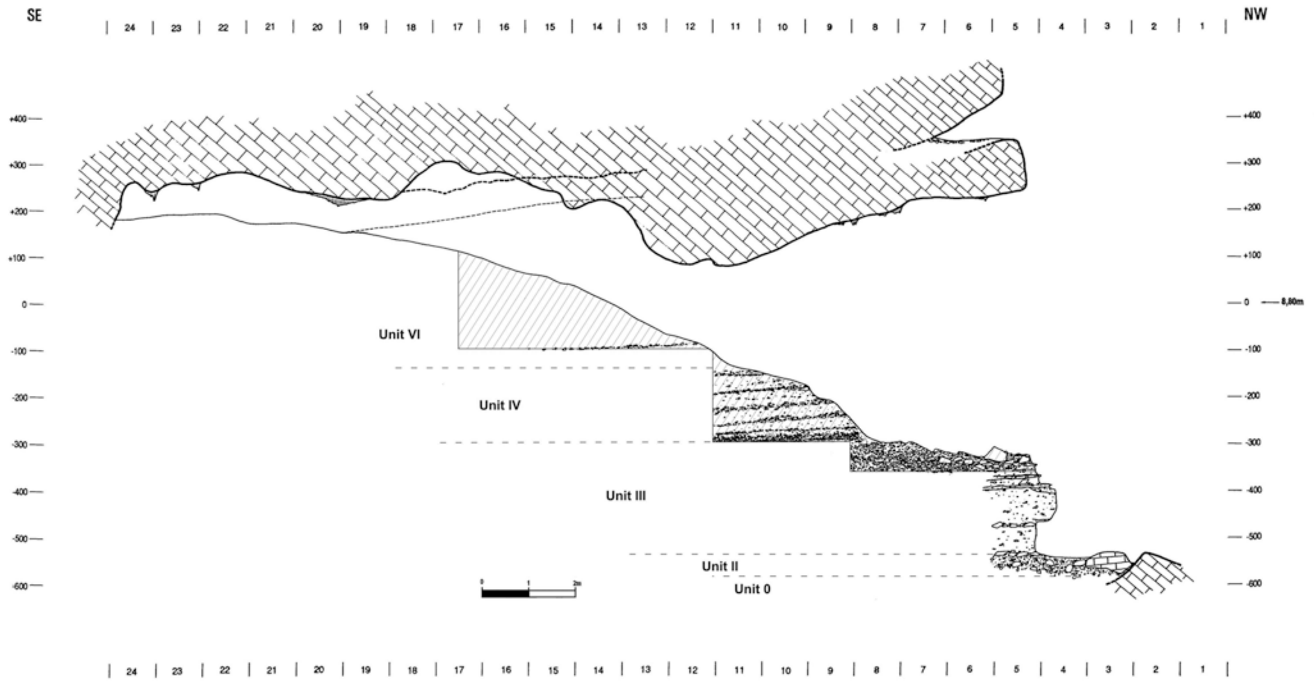

Fig. 7.3 Synthetic schematic representation of the Kalamakia cave stratigraphy. From bottom to top: Unit 0: marine crusting; Unit II: beach rock; Unit III: lithified angular gravel in a reddish sandy clay matrix; Unit IV: loose angular gravel in a reddish sandy clay matrix; Unit VI: layered clayey silts. Adapted from Darlas and De Lumley 2004

and Darlas 1994. The top of Unit IV has been dated to >39,000 years BP (^{14}C AMS dating on charcoal at Gif-sur-Yvette in France, GifA 94592). Therefore, the archaeological deposits of the cave are considered to date between 100,000 and >39,000 years BP. Additionally, one coprolite from the culturally sterile Unit VI has been dated by ^{14}C AMS to 22,410 ± 120 (27,770–26,330 cal BP; Beta-245334).

Environmental data: The large mammal fauna of Kalamakia comprises 17 taxa (Table 7.1). Fallow deer dominates the assemblage, followed by ibex and wild boar (Table 7.2). A few remains belong to elephants and rhinoceros. Carnivores are also present, albeit in low numbers, throughout the stratigraphic sequence, with the red fox as the most common species. The site has also yielded the remains of 60 small vertebrate taxa, including abundant land tortoise remains collected mostly from the lower half of Unit IV. These belong principally to *Testudo marginata* and, to a lesser degree, to *Testudo hermanni*.

On the basis of both pollen and faunal data, during at least the first half of the last glacial, the climate in Kalamakia was mild. This was due both to its geographic position at the southern edge of the Peloponnese, as well as to its coastal location. The surrounding landscape was covered with maquis vegetation and some Mediterranean presteppic forest taxa, such as *Quercus ilex-coccifera*, *Artemisia*, and *Ephedra*. The Mediterranean taxa *Olea* and *Phillyrea* are also relatively well represented (Lebreton et al. 2008). This combination of biotopes would have been able to support substantial faunal populations with various ecological restrictions. The study of micro-vertebrates, especially rodents, indicates a generally open landscape surrounding the cave with dry and relatively warm climatic conditions (Roger and Darlas 2008).

Human Remains: The excavation has yielded 14 isolated human remains, mostly teeth, attributed to Neandertals (Harvati et al. 2013; Harvati 2016).

Human versus *carnivore use of the cave*: Humans seem to have occupied the cave periodically. Zooarchaeological data (processed for publication by E.P.) suggest that humans were responsible for the formation and modification of the larger part of the mammal and tortoise assemblages. The taphonomic analysis—with emphasis on body part representation, fragmentation, and cortex alteration of the bone material—indicates systematic and complete processing of medium-sized ungulates at the site (especially fallow deer and ibex), but also of tortoises. However, carnivores scavenged and inflicted damage both on mammal and tortoise remains in most archaeological layers. Furthermore, carnivores contributed to the formation of some short-term layers in Units IV and VI. Most of the observed carnivore marks are consistent with canid activity (i.e. fox, wolf).

Table 7.1 Faunal list from Kalamakia

Carnivora	***Rodentia***	***Reptilia***	***Aves***
Ursus arctos	*Sciurus vulgaris*	*Testudo marginata*	*Puffinus puffinus*
Panthera pardus	*Myoxus glis*	*Testudo hermani*	*Accipiter nisus*
Lynx lynx	*Apodemus* sp.	*Scincidae indet.*	*Falco* cf. *vespertinus*
Felis silvestris	*Apodemus mystacinus*	cf. *Tarentola* sp.	*Alectoris graeca*
Canis lupus	*Cricetulus migratorius*	*Lacertidae indet.*	*Coturnix coturnix*
Vulpes vulpes	*Microtus arvalis*	*Lacerta* sp.	*Eudromias morinellus*
Martes sp.	*Microtus guentheri*	*Anguis fragilis*	*Chlidonias* sp.
Mustela sp.	*Microtus thomasi*	*Pseudopus* cf. *apodus*	*Columba livia/oenas*
	Chionomys nivalis	*Pseudopus* sp.	*Otus scops*
Proboscidea		*Eryx jaculus*	*Athene noctua*
Palaeoloxodon antiquus	***Insectivora***	*Hierophis gemonensis*	*Strix aluco*
	Erinaceus sp.	cf. *Dolichophis caspius*	*Apus apus*
Perissodactyla	*Talpa* sp.	*Malpolon monspessulanus*	*Apus* cf. *pallidus*
Stephanorhinus sp.	*Crocidura suaveolens*	*Malpolon* sp.	*Hirundo rustica*
		Coronella sp.	*Certhia* sp.
Artiodactyla	***Chiroptera***	*Coronella* cf. *austriaca*	*Turdus* cf. *philomenos*
Sus scrofa	*Myotis* sp.	*Elaphe quatuorlineata*	*Corvus corone*
Cervus elaphus	*Myotis blythii*	*Zamenis longissima*	cf. *Corvus monedula*
Dama dama	*Rhinolophus hipposideros*	*Zamenis* cf. *situla*	cf. *Pica pica*
Capreolus capreolus		cf. *Telescopus* sp.	*Pyrrhocorax pyrrhocorax*
Bos primigenius	***Amphibia***	*Natrix natrix*	*Emberiza citrinella*
Capra ibex	*Bufo bufo*	*Vipera* sp.	
	Rana sp.		
Lagomorpha			
Lepus europaeus			

Human occupation of the cave: *The excavation brought to light significant information concerning the occupation of the site and its spatial organization* (*Darlas and De Lumley* 2004):

(a) Living floors: 17 consecutive living floors have been revealed within Unit IV. The composition and density of the remains in these floors demonstrate that the cave served mostly as a short-term site and sometimes as a longer-term camp.
(b) Hearths: Several hearths have been uncovered. Three different types can be distinguished: (1) simple accumulations of ashes on the ground, (2) accumulations of ashes with stones, and (3) a basin-like hearth bounded by a circle of stones.
(c) Stone structures: Two dallages and a circle of stones have been uncovered.

The evidence from mammal taxa association, as well as from the demographic and taphonomic analysis of the faunal remains from the lower half of Unit IV, indicates prolonged or intense human occupation of the cave in this period. On the other hand, the upper half of this unit clearly shows an alternation of human and carnivore occupations, with carnivores mostly scavenging the animal bone remains accumulated by humans.

Lithic Assemblages: The lithics constitute Mousterian assemblages marked by an elevated frequency of the Levallois method (Table 7.3A). Levallois flakes represent 14.7 % of the total flake component, reaching 19.7 % among the flint flakes and 24.1 % among those made on andesite (Darlas and De Lumley 2004). The main raw materials are flint (obtained at a distance of 15 km) quartz and quartzite (found at a distance of 10 km) and andesite, which comes from a distance of 30 km. The features of lithic industry vary from one living floor to another, thus displaying a good example of variability. The observed differences mainly concern the choice of raw materials and the tool-kit and to a lesser degree, the technological features.

However, it must be emphasized that the main technological, as well as typological, characteristics remain unchanged throughout the entire stratigraphic sequence. These are: very small dimensions of artifacts; very small number of cores, which are extremely wasted (small-sized); total absence of cortical flakes; small number of "debitage by-products"; abundant microflakes ("retouch by-products"); and a high percentage of retouched tools. These features are obviously due to the distant origin and the scarcity of raw materials, which arrived at the cave in an advanced stage of processing, or in the form of already finished tools.

Table 7.2 Frequency of large mammal and tortoise remains in Kalamakia

Taxa/NISP[a]	Units III+IV	% NISP
Ursus arctos	17	0.42
Panthera pardus	13	0.32
Lynx lynx	7	0.17
Felis silvestris	29	0.71
Canis lupus	6	0.15
Vulpes vulpes	85	2.09
Martes sp.	17	0.42
Mustela sp.	1	0.02
Paleoloxodon antiquus	40	0.98
Stephanorhinus sp.	8	0.20
Sus scrofa	234	5.76
Bos primigenius	36	0.89
Capra ibex	568	13.98
Cervus elaphus	124	3.05
Dama dama	2671	65.76
Capreolus capreolus	64	1.58
Lepus europaeus	142	3.50
Mammal NISP	**4062**	**100.00**
Testudo (*marginata+hermanni*)	11,140	
Total NISP	**15,202**	
Unidentified *Cervidae*	115	
Unidentified *Artiodactyla*	2517	
Unidentified *Carnivora*	61	
Unidentified mammal bone fragments[b]	6934	
Total NS[c]	**24,829**	

[a]Number of identified specimens
[b]Unidentified fragments longer than 2 cm
[c]Number of specimens

Table 7.3 General composition (A) and tool types (B) of lithic assemblages from Kalamakia

A		
	Nb	%
Flakes	687	73.9
Blades	18	1.9
Cores	18	1.9
Debris	81	8.8
Pseudolevallois points	3	0.3
Levallois	122	13.2
Total	**929**	**100.0**
Debitage < 15 mm	9052	
B		
	Nb	%
Lateral scraper	85	46.8
Transversal scrapers	12	6.6
Double scrapers	24	13.2
Dejete scrapers	7	3.8
Convergent scrapers	3	1.7
Mousterian points	8	4.4
Limace	1	0.5
Notches	14	7.8
Bec	2	1.1
Denticulates	7	3.8
Endscraper	6	3.3
Boreer	7	3.8
Spines	4	2.2
Burin	1	0.5
Bifacial piece	1	0.5
Total	**182**	**100.0**

Levallois products are mostly flakes that display centripetal and unipolar (rarely bipolar) negatives. Levallois blades are very rare, while points are absent. A high percentage (22 %) of debitage products are retouched tools (Table 7.3B). The most common tools are scrapers (77 %), well-shaped and of small dimensions. Converging tools, especially points, are very well shaped. Points are usually very finely shaped (Fig. 7.4).

It is also worth mentioning that the uppermost living floor contains marine shells of the species *Callista chione*, which were retouched into tools in the same way as the lithic artifacts. This is a good example of human adaptation to the environment and exploitation of available natural resources.

The Upper Paleolithic

Kolominitsa Cave

Kolominitsa is located at about 1 km North of Itylo bay (36° 42′ 16.00″N, 22° 20′ 54.96″E; Fig. 7.1). It opens 100 m from the current sea shore and on the top of a talus, at 22 m asl (Fig. 7.5). It is about 40 m deep, 10 m wide, and 12 m high. Kolominitsa is a large cave that served as a major occupation site during both the Paleolithic and subsequent periods, as testified by its very thick stratigraphic sequence with dense cultural remains. The Pleistocene layers date to the Middle and Upper Paleolithic. In most parts of the cave, the uppermost layers have been eroded; they are preserved only at the back of the cave where they are approximately 3 m thick (Figs. 7.5 and 7.6) and contain archaeological remains. Two dates are available from these layers (Table 7.4). The Holocene occupations followed the erosion of the deposits.

A small test pit (1.30 × 1.30 m), opened at the entrance of the cave, was initially excavated to the depth of 95 cm and, in 2011, extended to the depth of 1.70 m. So far, 19 spits have been excavated (Fig. 7.7). From these layers four dates are available (Table 7.5). The two upper spits (1 and 2) yielded a lithic assemblage with backed bladelets (Gravettian). Spits 3–8 yielded an Aurignacian lithic assemblage (Table 7.6; Fig. 7.8). However, the assemblages are very small, and further analysis is not possible. The dating of a sample from the sixth spit (33,870 ± 550 ^{14}C BP; see Table 7.5) points to an early Aurignacian phase.

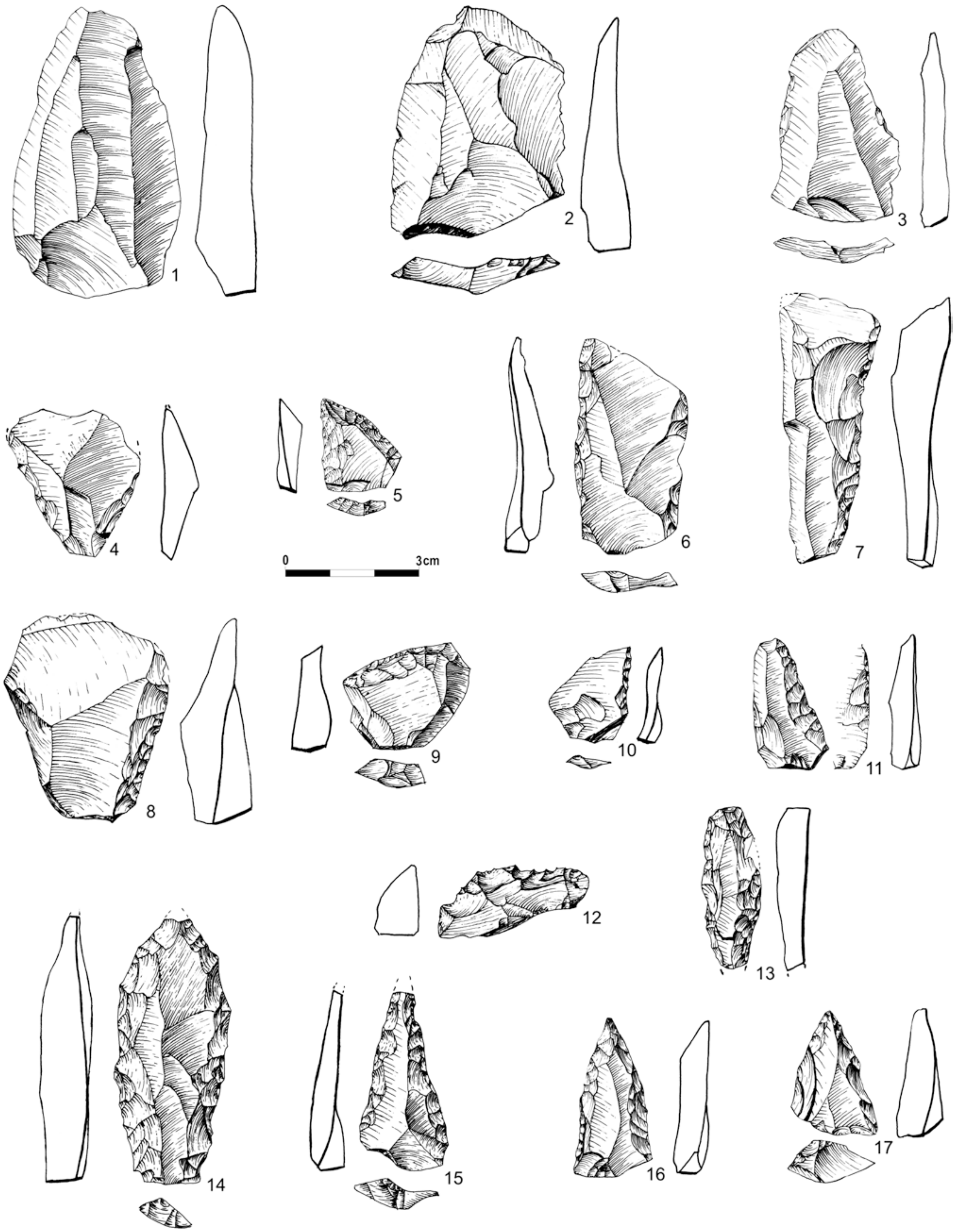

Fig. 7.4 Middle Paleolithic artifacts from Kalamakia. 1, 2, 3: Levallois flakes; 4, 6, 7, 8, 10, 11: scrapers; 9, 12: transversal scrapers; 13: *limace*; 5, 14, 15, 16, 17: Mousterian points. Adapted from Darlas and De Lumley 2004

Spits 9 and 10 were very poor in finds. It is worth mentioning that they have not yielded typical Upper Paleolithic lithic tool types but only scrapers. However, these are not diagnostic of the Middle Paleolithic either. In general, the whole cultural material raises the question of the existence of a transitional Middle-Upper Paleolithic phase (Darlas and Psathi 2008). This question was the main reason for the recent resumption of the excavations. The sediments of spits 11–13 (30 cm thick) have been extremely lithified and contain abundant large stones. However, artifacts are rare and not diagnostic. Nevertheless, the dating of a burnt bone from spit 11 (see Table 7.5), places this layer chronologically in the broader transitional Middle-Upper Paleolithic period.

Further down, spits 14–19 (60 cm thick) contained loose sandy-clayed sediments with very dense archaeological remains, especially lithic and bone material (Tables 7.6 and 7.7). The lithic assemblage displays an unquestionable mixture of Middle and Upper Paleolithic elements, primarily Levallois products and convergent scrapers, but also bladelets extracted from "cores of volumetric reduction" (Figs. 7.9 and 7.10), as well as typical Aurignacian carinated end scrapers (Fig. 7.10: 14, 15). Although a thorough stratigraphic-sedimentological analysis is not yet available, stratigraphic perturbation is not macroscopically visible.

The dating of two charcoal samples from these spits produced ages which are not far from the transitional period (despite the questions arising from the inversion of the ages; Table 7.5). At the same time, faunal data from the same layers are reminiscent of the Middle Paleolithic pattern known from Kalamakia, with fallow deer dominating over red deer and the sudden appearance of land tortoises (Table 7.7). In sum, according to the cultural and faunal material as well as the radiocarbon dates, the 90 cm thick spits 9–19 of Kolominitsa likely correspond to the Middle-Upper Paleolithic transition

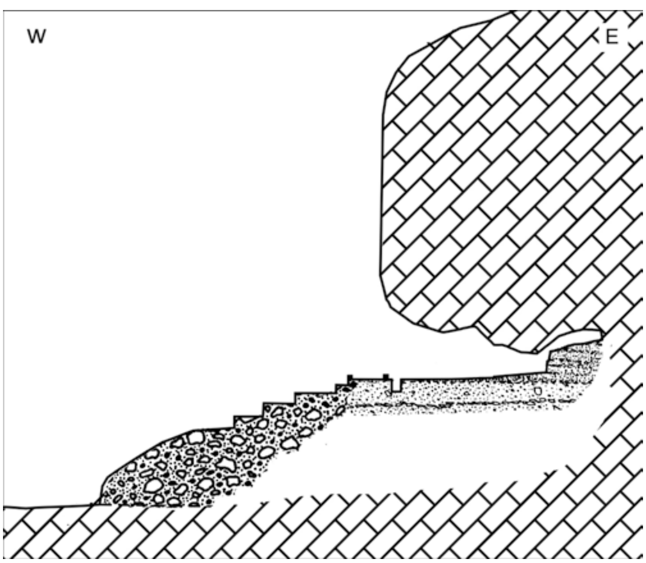

Fig. 7.5 Profile of Kolominitsa and schematic representation of its deposits. In the back of the cave all layers are preserved up to the original top of the filling. The upper layers have been eroded in the rest of the cave. In front of the cave, a thick scree accumulation forms a sloping surface leading from the Tyrrhenian terrace to the entrance of the cave

Fig. 7.6 General view of the interior of Kolominitsa. The paved floor has been constructed on the surface created by the erosion of the upper layers of the deposits. The latter can be seen in the background, where they are preserved up to their original height

Table 7.4 Radiocarbon dates from Kolominitsa (upper layers, preserved at the back of the cave)

Depth	Laboratory code	Material	Method	Conventional age	cal years BP
140	Beta-237175	Charcoal	AMS	19,560 ± 120	23,840–22,690
210	Beta-237176	Charcoal	AMS	21,940 ± 140	26,850–25,930

(*sensu lato*). Pure Middle Paleolithic layers have not yet been reached.

Large mammal remains: Abundant faunal material is attributed mainly to *Dama dama* and *Capra* sp., and, to a lesser degree, to the following taxa: *Cervus elaphus*, *Capreolus capreolus*, *Sus scrofa*, *Bos primigenius*, and *Lepus europaeus*. Present but very rare are *Ursus arctos* and *Canis lupus*. Land tortoises, especially *Testudo marginata*, become very common toward the deeper layers (Table 7.7).

Other Finds: Noteworthy is the presence of pieces of ferrous mineral (hematite) in all layers, from spit 16 to the top.

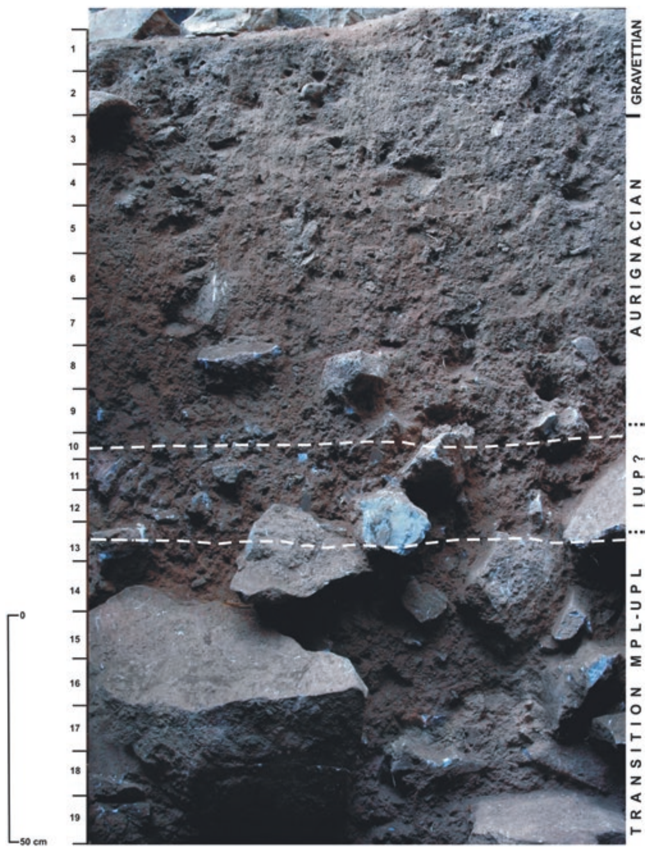

Fig. 7.7 East profile of the excavation trench at Kolominitsa. From bottom to top: loose reddish sandy clay with large stones (MPL/UPL); strongly lithified reddish sandy clay with stones (IUP?); loose reddish sandy clay with rare small stones (UPL)

Melitzia Cave

Melitzia is located on the eastern coast of Itylo bay (36° 41′ 31.95″N, 22° 23′ 35.66″E; Fig. 7.11). It opens at 350 m inland from the current sea-shore at 64 m asl. It is a 20 m wide, 20 m deep, and 4 m high spacious cavity.

After an initial test pit, a more extended excavation over 8 m^2 and reaching 1.5 m in depth has been carried out since 2009. Since the material of the systematic excavation has not yet been studied, the following presentation is based on the results of the initial test excavation. The upper 70 cm yielded reworked sediments containing remains of both prehistoric and historic times (i.e. pottery). The underlying layers date to the Pleistocene and contain Upper Paleolithic material, though very eroded and disturbed (Fig. 7.12). The intense disturbance of the sediments, in addition to the very wet plastic clay (mud), did not allow a clear identification of different layers during the excavation, or the separation of the material uncovered from these layers. Only the lowest excavated layers, around 1.5 m of depth, appear completely or nearly undisturbed.

The excavated layers date to the Upper Paleolithic and, more specifically, between *ca.* 24,000 and 11,000 cal BP (Table 7.8). However, a hiatus appears between 21,000 and 13,500 cal BP. This hiatus is probably due to the erosion of the lower ("Gravettian") layers, the truncation of which can be seen on the profile of the trench (Fig. 7.12).

The dense archaeological material, together with the strong presence of burnt remains, testifies to the intense occupation of the cave. Both large mammals and small vertebrates were uncovered. Red deer heavily dominates the faunal assemblage, followed by wild goat and wild boar (Table 7.9). Large bovids, probably aurochs, are rare and so is the red fox. Among the small-sized species, hares and birds are very abundant. Marine shells and land snails are abundant, while land tortoises are sporadic. The dominance of red deer remains suggests a specific use of the site, linked to the hunting of this animal. Entire carcasses, belonging mostly to adult animals, were brought to the cave.

The lithic assemblage is characterized by the strong presence of projectiles: backed bladelets and points (Table 7.10; see below: Fig. 7.13a). Noteworthy is the complete absence of geometric microliths and microburins. The

Table 7.5 Radiocarbon dates from Kolominitsa (test pit)

Spits	Laboratory code	Material	Method	Conventional age	cal years BP
6	Beta-193416	Charcoal	AMS	33,870 ± 550	40,390–37,180
11	Beta-307820	Burnt bone	AMS	34,320 ± 250	40,040–38,730
16	Beta-333515	Charcoal	AMS	37,840 ± 300	42,800–42,020
18	Beta-333516	Charcoal	AMS	34,150 ± 280	39,650–38,610

Table 7.6 General composition and tool types of lithic assemblages from Kolominitsa

	Gravettian (spits 1 and 2)		Aurignacian (spits 3–8)		IUP? (spits 9 and 10)		MPL-UPL (spits 11–19)	
	Nb	%	Nb	%	Nb	%	Nb	%
Debitage < 20 mm	2	2.0	382	39.3	97	48.5	1329	70.5
Debitage < 20 mm	69	69.0	460	47.4	79	39.5	383	20.3
Levallois flakes	0		0		0		19	1.0
Pebbles	0		1	0.1	2	1.0	0	
Bladelet cores	0		5	0.5	0		0	
Prismatic cores	1	1.0	7	0.7	1	0.5	2	0.1
Divers cores	3	3.0	12	1.2	5	2.5	15	0.8
Crested blades	1	1.0	0		0		1	0.1
Blades	0		1	0.1	0		2	0.1
Bladelets	14	14.0	51	5.2	4	2.0	21	1.1
Burin spall	1	1.0	1	0.1	1	0.5	6	0.3
Retouched tools	8	8.0	52	5.4	11	5.5	107	5.7
Total	**99**	**100.0**	**972**	**100.0**	**200**	**100.0**	**1885**	**100.0**
Tools								
End scrapers	1	12.5	10	19.2	1	9.1	3	2.8
Carinated end scrapers	1	12.5	2	3.8	0		2	1.9
Retouched blades	1	12.5	1	1.9	0		1	0.9
Backed bladelets	1	12.5	1	1.9	0		0	
Truncated blades	0		0		0		1	0.9
Splintered pieces	3	37.5	12	23.2	1	9.1	9	8.4
Burins	0		7	13.5	2	18.2	6	5.6
Scrapers	1	12.5	2	3.8	2	18.2	48	44.9
Mousterian points	0		0		0		4	3.7
Misc. (fragments incl.)	0		17	32.7	5	45.4	33	30.9
Total	**8**	**100.0**	**52**	**100.0**	**11**	**100.0**	**107**	**100.0**

excavation also yielded bone artifacts (awls, needles, points, and rounded blades), a few ornaments (perforated canines and *Dentalium* beads), as well as pieces of ferrous mineral (hematite) found in all layers.

Kastanis Cave

The erosion in Kastanis, a small shallow cave that opens at about 300 m North of Kolominitsa cave (36° 42′ 35.16″N, 22° 21′ 03.16″E; Fig. 7.1), revealed Pleistocene deposits with archaeological material. A very small test pit (30 × 40 cm and only 20 cm deep) yielded charcoal, animal bones, and stone tools. A charcoal sample from the bottom of the pit was dated to 12,390 ± 70 ^{14}C BP (14,910–14,070 cal BP; Beta-237174). The lithic assemblage is marked by the presence of thin backed bladelets and is attributed to the Epigravettian (Table 7.11). The small sample of faunal remains contains *Canis* sp., *Vulpes vulpes*, *Cervus elaphus*, *Capra* sp., and *Lepus europaeus*. Noteworthy is the abundance of hares and birds (Darlas and Psathi 2008).

Skini 4 Cave

Four shallow caves open at cape Skini, on the mouth of Itylo bay, about 500 m South of Kolominitsa (36° 41′ 54.50″N, 22° 20′ 57.01″E; Figs. 7.1 and 7.14). Skini 1 has been eroded by the sea, while Skini 2, 3, and 4 preserve nearly their entire filling. Skini 4, the northernmost of these caves, opens at a distance of 60 m from the current sea-line at 27 m asl. It is 4 m deep, 6 m wide, and 2.5 m high. A small trench (1.5 × 1.5 m) excavated to the depth of 85 cm (Fig. 7.15) produced the following results.

Successive ash layers and very dense archeological material imply an intensive use of this small cave. The dating (^{14}C AMS) of a charcoal from the bottom of the trench gave an age of 26,240 ± 200 ^{14}C BP (31,210–30,540 cal BP; Beta-193419). The lithic industry appears homogenous and

Fig. 7.8 Upper Paleolithic artifacts from Kolominitsa (spits 1–8). 1, 19, 20, 21, 24, 25: bladelets; 2: crested blade; 3, 5, 11: backed bladelets; 4, 6, 7, 8, 10, 12, 13, 15, 16, 17, 18, 22: various end scrapers; 9, 23: burins; 14: core. Adapted from Darlas and De Lumley 2004

Table 7.7 Frequency of large mammal and tortoise remains in Kolominitsa

Taxa/NISP[a]	Spits 1 and 2	Spits 3–8	Spits 9 and 10	Spits 11–19	Total	% NISP
Ursus cf. *arctos*		1			1	0.19
Canis lupus			1		1	0.19
Sus scrofa		1	1		2	0.37
Bos primigenius			3	2	5	0.94
Capra sp.	3	35	13	77	128	23.97
Cervus elaphus	5	18	1	11	35	6.55
Dama dama	12	74	24	140	250	46.82
Capreolus capreolus	1	14	3	10	28	5.24
Lepus europaeus	1	2		4	7	1.31
Testudo (*marginata* and sp.)		2	1	74	77	14.42
Total NISP	**22**	**147**	**47**	**318**	**534**	100.00
Unidentified *Carnivora*	2	2	1		5	
Unidentified *Cervidae*	16	58	8	45	127	
Unidentified *Artiodactyla*	23	116	31	135	305	
Unidentified[b]	236	997	123	2661	4017	
Total NS[c]	**299**	**1320**	**210**	**3159**	**4988**	

[a]Number of identified specimens
[b]Unidentified fragments longer than 2 cm
[c]Number of specimens

unchanged from the bottom to the top of the stratigraphic sequence. It is assigned to an assemblage with backed bladelets (Gravettian). Noteworthy is the presence of shouldered points (see below: Fig. 7.13b). Nearly all steps of the lithic reduction are present in the assemblage: crested blades, other technical pieces, flakes, numerous cores, blades, and bladelets (Table 7.12).

Large mammal bone remains belong to the following taxa: *Vulpes vulpes*, *Felis silvestris*, *Sus scrofa*, *Cervus elaphus*, *Dama dama*, *Bos* sp., *Capra* sp., and *Lepus europaeus* (Table 7.13). Red deer dominates the faunal assemblage, while carnivores are very rare. Several fragments of antler tips have been recorded, including one which had been transformed into a point (see below: Fig. 7.16: 1). All layers yielded pieces of ferrous mineral (hematite).

Skini 3 Cave

Skini 3 opens about 20 m to the South of the Skini 4 cave at the same altitude (36° 41′ 53.42″N, 22° 20′ 57.82″E; Fig. 7.14). A test pit brought to light a double Late Neolithic burial at just 15 cm below the current ground level. The Paleolithic layers immediately underlying the burial were extremely poor in remains, indicating a sporadic use of this cave in comparison with the neighboring Skini 4. Few lithic artifacts were collected (only 32 are longer than 20 mm), including backed bladelets. The dating of a charcoal gave an age of 25,560 ± 190 ^{14}CBP, (30,890–29,700 cal BP; Beta-193418), indicating that the cave was occupied at approximately the same age as Skini 4.

Tripsana Cave

On the north coast of Itylo bay (36° 41′ 36.80″N, 22° 21′ 57.91″E; Figs. 7.1, 7.11, and 7.17) at the Tripsana location, a rescue excavation has been carried out in a small cave. The natural substratum was reached in both opened trenches: in the interior, Trench A reached 1.60 m depth (Fig. 7.18), while near the mouth of the cave Trench B reached 1.28 m in depth. A charcoal sample from the 14th spit (depth 1.40 m) of trench A gave a date of 28,060 ± 250 ^{14}C BP (33,025–31,550 cal BP; Beta-237180). Archaeological remains testify to the ephemeral use of the site during the Gravettian. Both excavation trenches yielded few stone artifacts attributed to the Gravettian (Table 7.14; Fig. 7.13C). In addition to lithic artifacts, five fragments of bone tools have also been collected (four points and one retouched splinter; Fig. 7.16), along with hematite pieces. The identified remains of large mammals belong to the following taxa: *Canis lupus*, *Vulpes vulpes*, *Felis silvestris*, *Martes* sp., cf. *Mustela*, *Sus scrofa*, *Cervus elaphus*, *Dama dama*, *Bos* sp., *Capra* sp., and *Lepus europaeus*. *Cervus* and *Capra* dominate the faunal assemblage (Fig. 7.15); fallow deer remain quite common, while numerous hare remains have been recorded in the top layers.

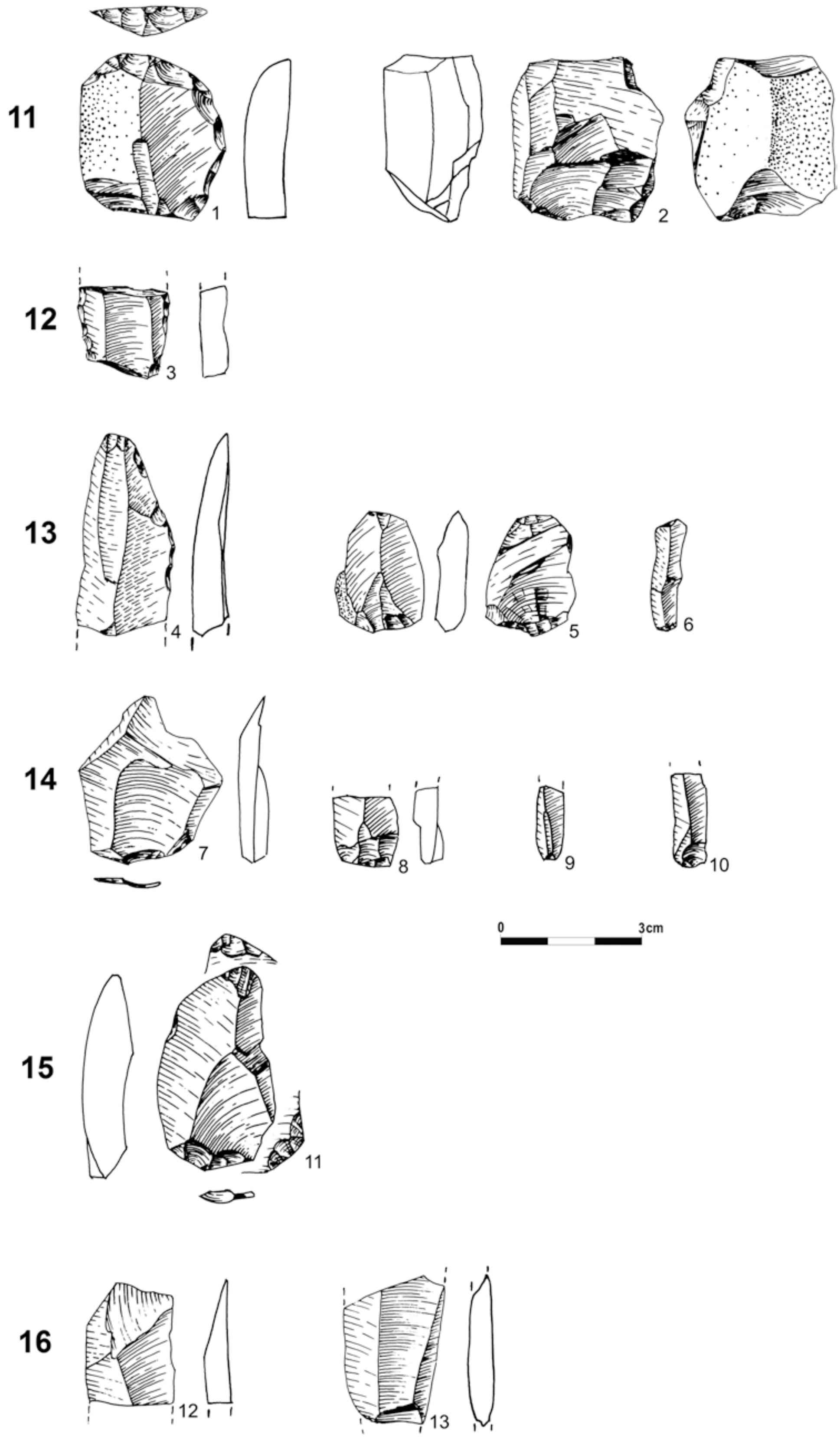

Fig. 7.9 Kolominitsa. Lithic artifacts from the Middle-Upper Paleolithic transition phase (spits 11–16). 1: end scraper; 2: unipolar core; 3: double scraper; 4: end scraper on blade; 5, 11: splintered pieces; 6, 8, 9, 10: bladelets; 7, 12, 13: Levallois flakes

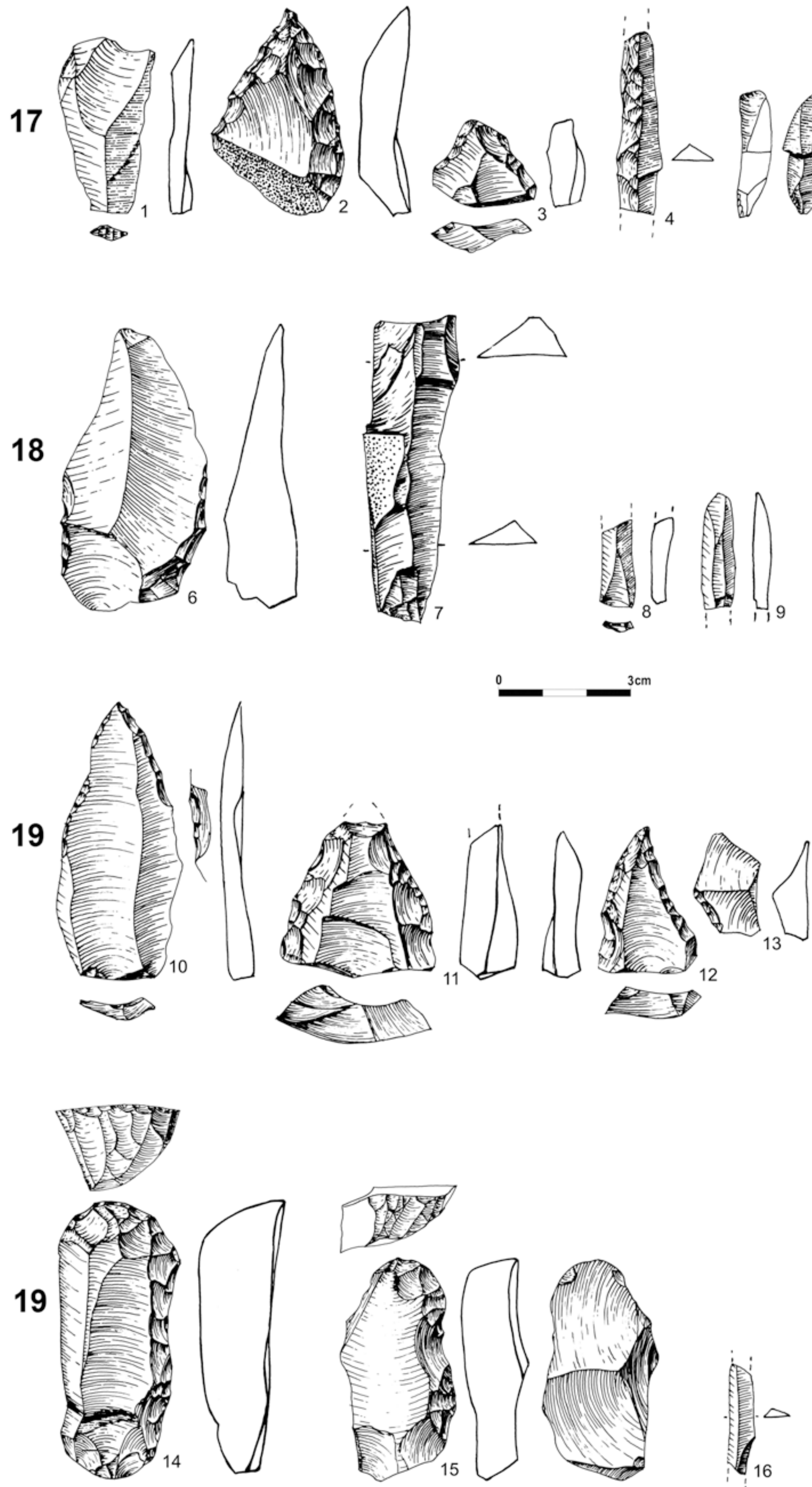

Fig. 7.10 Kolominitsa. Lithic artifacts from the Middle-Upper Paleolithic transition phase (spits 17–19). 1: Levallois flake; 2, 11, 12: Mousterian points; 3: convergent scraper; 4: crested blade; 5: burin; 6 double scraper; 7; blade; 8, 9, 16: bladelets; 10: elongated Mousterian point on a Levallois blade; 13: pseudo-Levallois point; 14: carinated end scraper on retouched blade; 15: carinated end scraper on retouched blade (blank: pseudo-levallois point)

Fig. 7.11 Location of Melitzia on the eastern coast of Itylon bay (view from SE). Tripsana is also indicated at the northern coast as well as Cape Skini at the northern end of the bay

Data Synthesis on the Upper Paleolithic of the Mani Peninsula

Test excavations in the six caves described above brought to light significant cultural remains dating from the beginning to the end of the Upper Paleolithic. The Middle-Upper Paleolithic transition and the Aurignacian are represented only in Kolominitsa. Gravettian has been attested in Kolominitsa, Skini 4, Skini 3, and Tripsana caves, as well as in the "lower layers" of Melitzia, while the phase corresponding to the Epigravettian has been identified in Melitzia ("middle layers") and Kastanis caves.

Environmental Data and Human Diet

In the absence of completed laboratory analyses, the environmental evidence from the Upper Paleolithic of the Mani peninsula is poor compared to that of the Middle Paleolithic. So far, only the preliminary study of the large mammal fauna provides some evidence of the change toward drier and colder climatic conditions that led to the restriction of the Mediterranean forest. The latter is mainly attested through the progressive replacement of the fallow deer, the typical eastern Mediterranean cervid, by the red deer, better adapted to a sparser vegetation cover.

Rather than reflecting significant climate change, extinctions and/or oscillations in the frequency of several species (e.g. cervids versus *Capra*, increasing rarity of land tortoises), as well as new faunal associations (e.g. *Lepus* and avian species) present during the first half of the Upper Pleistocene (Kalamakia cave), and up to the second half of the Upper Pleistocene (the above-mentioned six Upper Paleolithic cave sites), might reflect changes in subsistence strategies adopted by humans in each of these Upper Paleolithic sites. This was possibly combined with a rise in human population size. The Upper Paleolithic large mammal fauna contains significantly fewer taxa. Several carnivore species, as well as the very large elephants and rhinos disappear, while the frequency of smaller species, such as hares and birds, sharply rises. Land tortoises,

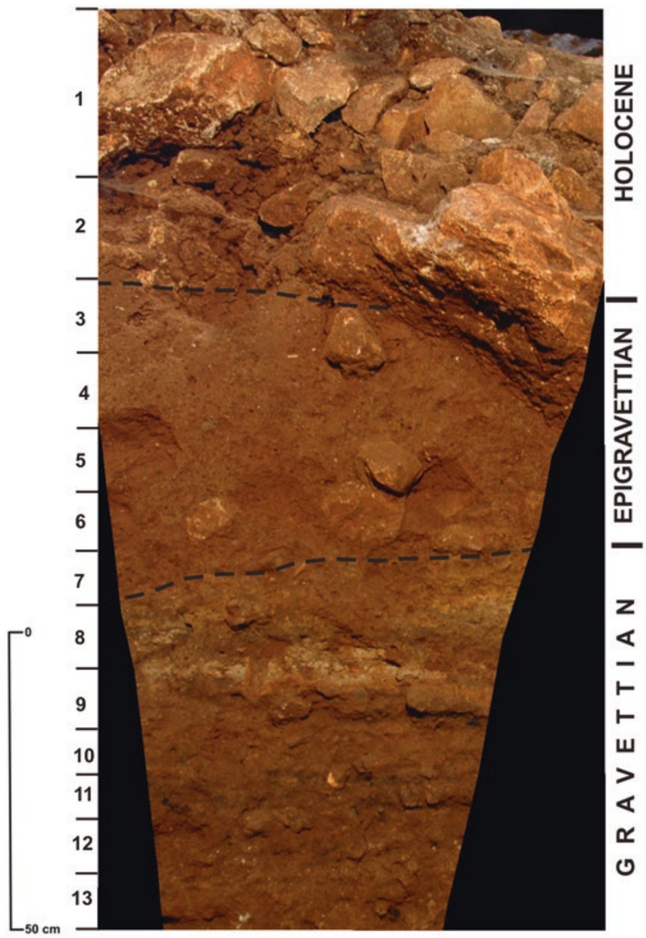

Fig. 7.12 West profile of the excavation trench at Melitzia. From bottom to top: successive layers of ashes, burnt remains and clay, truncated at the top ("Gravettian"); very plastic red clay ("Epigravettian"); disturbed layer of stones in plastic red clay matrix ("Holocene")

very abundant at least in the lower half of the stratigraphic sequence at Kalamakia, become rapidly very rare, while the consumption of edible sea shells and land snails—which are not well represented in Kalamakia and Kolominitsa cave (at least in the lower layers of the latter)—intensifies toward the end of the Paleolithic, at least in Melitzia cave.

Lithics

Despite the small scale of the excavations and low number of recovered artifacts, it was possible to define the main characteristics of the lithic assemblages.

The *Middle-Upper Paleolithic transition* appears in the record of Kolominitsa cave. The lithic assemblage of spits 19–14 is marked by a mixture of Middle and Upper Paleolithic elements (Figs. 7.9 and 7.10). Middle Paleolithic markers are Levallois products (quite rare) as well as the products of discoid debitage and, finally, some characteristic tool-types, such as Mousterian points and convergent scrapers. Among Levallois products, most characteristic are the very elongated flakes or blades with completely parallel ridges (products of the unipolar recurrent method). On the other hand, the presence of several blades and bladelets, extracted without any doubt from "cores of volumetric reduction", is considered as evidence for the Upper Paleolithic. These laminar pieces are not retouched. Their high frequency implies that the presence of these artifacts cannot be random or coincidental. Moreover, the carinated end scrapers are the most characteristic Upper Paleolithic tools (Fig. 7.10: 14, 5). The Kolominitsa spits 14–19 probably correspond to layer VI at Klissoura Cave 1 in Argolid,

Table 7.8 Radiocarbon dates from Melitzia

Depth	Laboratory code	Material	Method	Conventional age	cal years BP
87	Beta-269603	Charcoal	AMS	11,670 ± 60	13,680–13,380
97	Beta-269604	Charcoal	AMS	9330 ± 60	10,700–10,390
91	Beta-269605	Charcoal	AMS	9550 ± 60	11,150–10,680
98	Beta-286709	Charcoal	AMS	19,300 ± 80	23,270–22,600
108	Beta-286710	Charcoal	AMS	11,270 ± 50	13,240–13,090
116	Beta-307818	Charcoal	AMS	19,460 ± 80	23,450–23,230
122	Beta-307819	Charcoal	AMS	18,870 ± 80	22,530–22,330
144	Beta-333517	Charcoal	AMS	17,970 ± 80	21,530–21,340
133	Beta-359676	Charcoal	AMS	19,120 ± 80	22,990–22,480
144	Beta-359677	Charcoal	AMS	20,460 ± 90	24,560–24,310
134	Beta-359678	Charcoal	AMS	20,160 ± 90	24,320–23,870

Table 7.9 Frequency of large mammal remains in Melitzia

Taxa/NISP[a]	Spits 1 and 2	Spits 3–7	Spits 8–13	Total	% NISP
Canis lupus	0	2	1	3	1.97
Vulpes vulpes	0	3	3	6	3.95
Mustelidae	0	0	1	1	0.66
Sus scrofa	5	2	1	8	5.26
Cervus elaphus	11	63	21	95	62.50
Capra sp.	1	21	3	25	16.45
Lepus europaeus	1	11	2	14	9.21
Total NISP	**18**	**102**	**32**	**152**	**100.00**
Unidentified *Artiodactyla*	34	151	101	286	
Unidentified[b]	39	350	139	528	
Total NS[c]	**91**	**603**	**272**	**966**	

[a]Number of identified specimens
[b]Unidentified fragments longer than 2 cm
[c]Number of specimens

Table 7.10 General composition and tool types of lithic assemblages from Melitzia

	Disturbed (spits 1 and 2)		Epigravettian (spits 3–7)		Gravettian (spits 8–13)	
	Nb	%	Nb	%	Nb	%
Debitage <20 mm			47	18.8	5	11.6
Debitage >20 mm	5	62.5	124	49.6	25	58.2
Pebbles	1	12.5	0		0	
Prismatic cores	0		0		1	2.3
Divers cores	0		10	4.0	7	16.3
Crested blades	0		1	0.4	0	
Blades	0		6	2.4	0	
Bladelets	0		17	6.8	0	
Burin spalls	0		4	1.6	0	
Retouched tools	2	25.0	41	16.4	5	11.6
Total	**8**	**100.0**	**250**	**100.0**	**43**	**100.0**
Tools						
End scrapers	0		0		1	20.0
Retouched blades	0		1	2.4	1	20.0
Backed bladelets	0		27	65.8	1	20.0
Burins	0		1	2.4	0	
Splintered pieces	0		4	9.9	1	20.0
Misc. (fragments incl.)	2	100.0	8	19.5	1	20.0
Total	**2**	**100.0**	**41**	**100.0**	**5**	**100.0**

which presents a mixture of Middle and Upper Paleolithic elements (detailed analysis on the lithic material of this layer is not yet available; Kaczanowska et al. 2010). At Kolominitsa, the overlying layers (spits 11–13) did not yield any diagnostic finds. More Uluzzian specifically, they do not contain any new types of tools, characteristic of the Initial Upper Paleolithic, as for example, the curved backed points of "uluzzian" type found in the layer V of Klissoura (Koumouzelis et al. 2001; Kaczanowska et al. 2010). It seems highly probable that the corresponding layers of Kolominitsa have been eroded, at least in the area of the test pit. We hope that they have been preserved in another area of the cave.

Both the Kolominitsa stratigraphic sequence and the radiocarbon dates obtained from that site present great analogies with those of Klissoura Cave 1 (Kuhn et al. 2010). On the other hand, there are no analogies with Lakonis, which does not seem to contain any layer of the Middle-Upper Paleolithic transition. The excavators of Lakonis have argued for the presence of this phase (Panagopoulou et al. 2002–2004; Elefanti et al. 2008). Nonetheless, the lithic assemblages coming from the deposits claimed as dating from the "Initial Upper Paleolithic", do not show any characteristic attributes of the Upper Paleolithic artifacts (neither in technological nor in typological terms), and therefore could not justify the above arguments (see Kozlowski and Otte 2009). In any case, with caution due to the limited test-character of the excavation, it could be suggested that the mixture of Middle and Upper Paleolithic elements in spits 19–14 of Kolominitsa could indicate the coexistence and cultural interaction between Neanderthals and anatomically modern humans.

From the sites discussed here, the *Aurignacian* is represented only in Kolominista (spits 3–8). However, the finds, especially the lithic ones, are very rare and do not allow any detailed description. We note only the relatively high frequency of carinated end scrapers and splintered pieces (Table 7.6; Fig. 7.8).

Contrary to the very sparse Aurignacian evidence, the presence of industries with backed bladelets (*Gravettian*) is very strong and found in most caves discussed in this chapter. While blades generally represent only a small part of the debitage products, these assemblages are marked by the high frequency of backed bladelets and points, particularly the most characteristic shouldered points. The Gravettian layers from these sites are dated between 28,260 ± 250 ^{14}C BP (33,025–31,550 cal BP) and 19,580 ± 120 BP (23,835–22,692 cal BP).

The lithic industry from the middle layers of Melitzia and the small sample from Kastanis can be attributed to the *Epigravettian*. Their age ranges between 12,390 ± 70 ^{14}C BP (14,910–14,070 cal BP) and 9350 ± 60 ^{14}C BP (10,320–10,310 cal BP). In Melitzia, we note the abundance of extremely small backed bladelets and points (Table 7.10). Splintered pieces are present in all Epigravettian layers, while geometric microliths and microburins are completely absent.

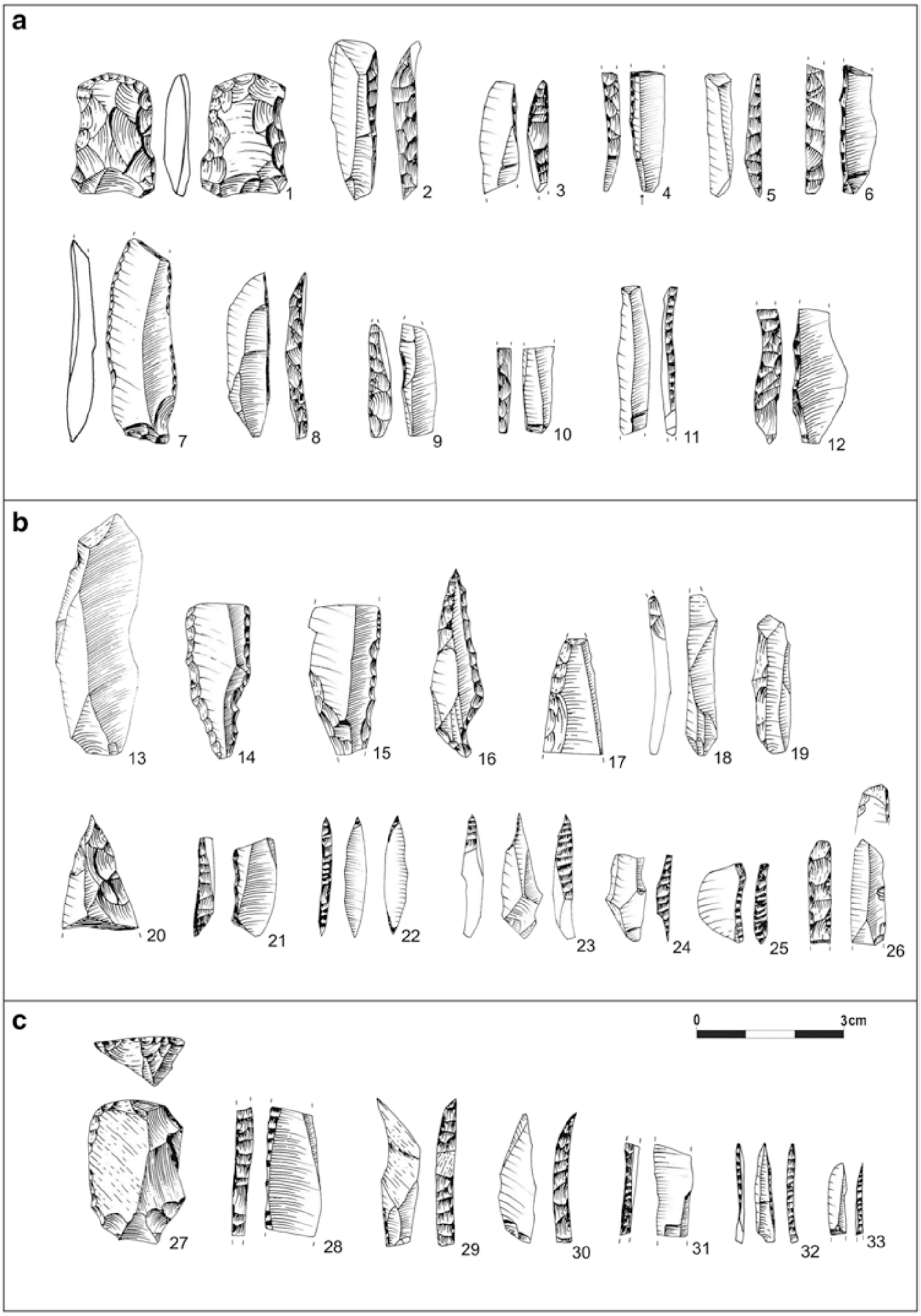

Fig. 7.13 Upper Paleolithic artifacts from Melitzia (**a**) Skini 4 (**b**) and Tripsana (**c**). 1: bifacial tool; 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 21, 24, 25, 26, 28, 29, 30, 31, 33: backed bladelets; 7, 13: blades; 14, 15: shouldered pieces; 16: shouldered point; 17, 18, 20, 22, 30, 32: various points; 19: crested blade; 23: borer. Adapted from Darlas and De Lumley (2004)

Table 7.11 General composition and tool types of the lithic assemblage from Kastanis

	Nb	%
Debitage <20 mm	63	53.0
Debitage >20 mm	37	31.1
Prismatic cores	1	0.8
Crested blades	1	0.8
Bladelets	6	5.1
Burin spalls	1	0.8
Retouched tools	10	8.4
Total	**119**	**100.0**
Tools		
End scrapers	1	10.0
Backed bladelets	5	50.0
Splintered pieces	1	10.0
Misc. (fragments incl.)	3	30.0
Total	**10**	**100.0**

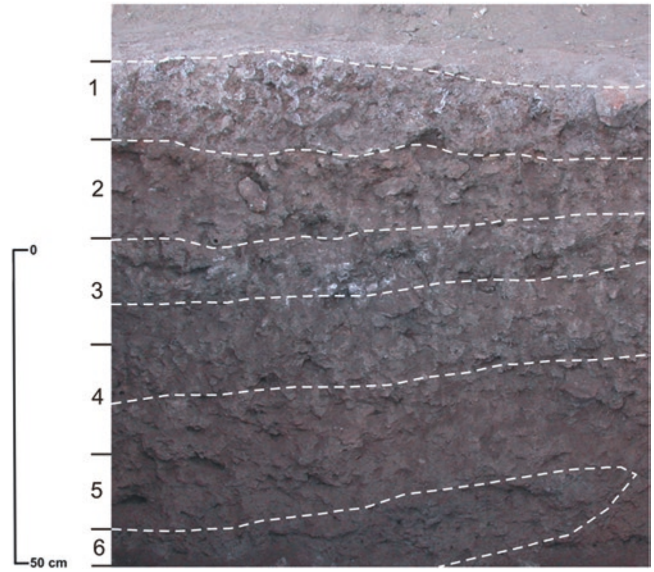

Fig. 7.15 East profile of the excavation trench at Skini 4. Loose sandy clay sediments with successive ash layers

Fig. 7.14 General view of Cape Skini; Skini 1, 2, 3, and 4 can be seen from right to left (S–N)

The main raw materials used for the lithic tools are flints of various colors, quartz, quartzite, and andesite. The latter, known also as “stone of Krokees”, is not a local rock, and must have been transported from a relatively great distance (30 km). After the Aurignacian, the red jasper—a rock of very good quality and distant origin—appears and becomes very common.

Table 7.12 General composition and tool types of the lithic assemblage from Skini 4

	Nb	%
Debitage <20 mm	244	24.4
Debitage >20 mm	508	50.9
Prismatic cores	23	2.3
Divers cores	21	2.1
Pebble	1	0.1
Crested blades	5	0.5
Blades	20	2.0
Bladelets	49	4.9
Burin spall	1	0.1
Retouched tools	127	12.7
Total	**999**	**100.0**
Tools		
End scraper	13	10.2
Retouched blades	18	14.2
Backed bladelets	19	15.0
Shouldered point	1	0.8
Splintered pieces	10	7.8
Burin	2	1.6
Scrapers	1	0.8
Misc. (fragments incl.)	63	49.6
Total	**127**	**100.0**

Bone Tools

In addition to lithic artifacts, bone tools appear from the beginning of the Upper Paleolithic, although not in great quantities. These are fragmented bone and awls, rounded blades and, finally, needles, the latter discovered in Melitzia cave (Fig. 7.16).

Pieces of Ferrous Minerals

A special mention should be made of the presence of pieces of ferrous minerals, especially hematite. This material, although naturally present in the broader area, is completely absent from Kalamakia and other Middle Paleolithic sites, as well

Table 7.13 Frequency of large mammal remains in Skini 4

Taxa/NISP[a]	Total	% NISP
Vulpes vulpes	7	5.34
Felis silvestris	1	0.76
Sus scrofa	2	1.53
Cervus elaphus	46	35.11
Dama dama	10	7.63
Cervus/Dama	42	32.06
Capra sp.	13	9.92
Lepus europaeus	10	7.63
Total NISP	**131**	**100.00**
Unidentified *Artiodactyla*	101	
Unidentified[b]	585	
Total NS[c]	**817**	

[a]Number of identified specimens
[b]Unidentified fragments longer than 2 cm
[c]Number of specimens

Fig. 7.16 Fragments of bone points and tools from Skini 4 (1), Tripsana (2, 3, 4), Kolominitsa (5, 6) and Melitzia (7)

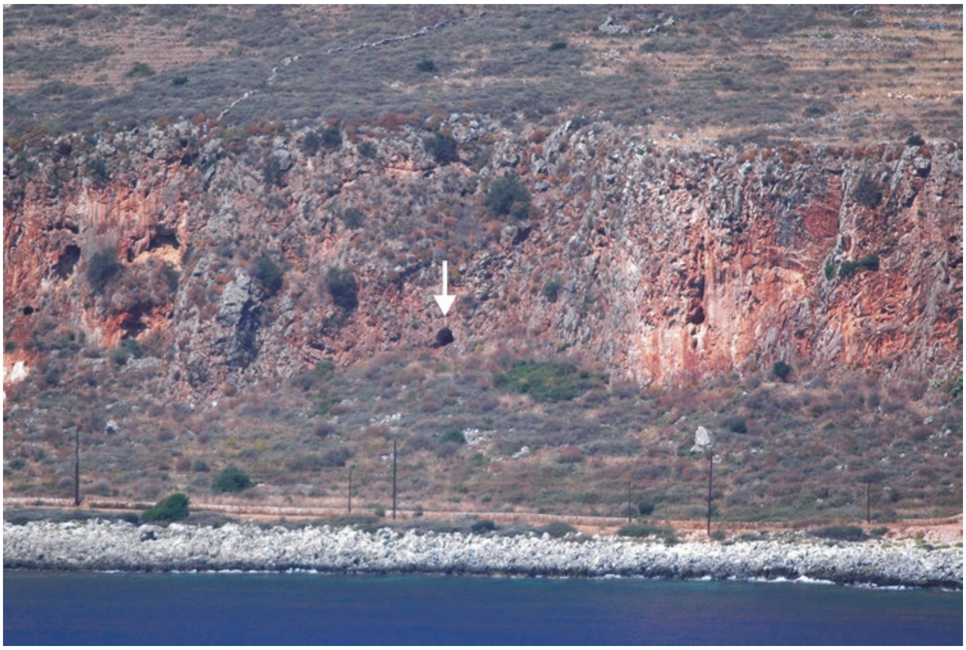

Fig. 7.17 The entrance of Tripsana, at the northern coast of Itylon bay, opens in the middle of the vertical cliff, at the top of the scree talus

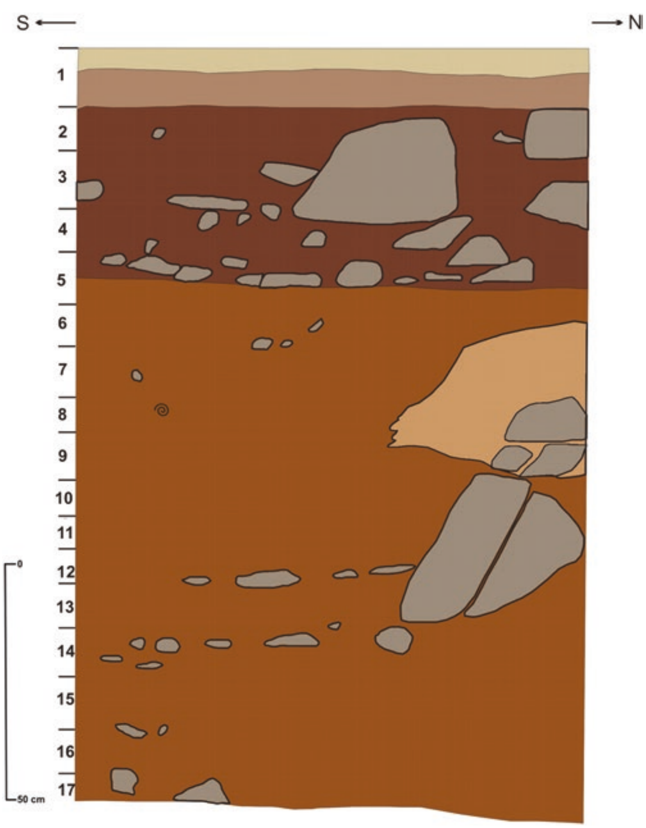

Fig. 7.18 Stratigraphy of Tripsana deposits. From bottom to top: light brown sandy clay; dark brown sandy clay with large blocks of stones; two successive thin layers of humus

Table 7.14 General composition and tool types of the lithic assemblage from Tripsana

	Nb	%
Debitage <20 mm	44	28.9
Debitage >20 mm	81	53.4
Prismatic cores	2	1.3
Divers cores	5	3.3
Blades	2	1.3
Bladelets	7	4.6
Burin spalls	1	0.6
Retouched tools	10	6.6
Total	**152**	**100.0**
Tools		
End scrapers	2	10.0
Retouched blades	1	10.0
Backed bladelets	3	30.0
Splintered pieces	2	20.0
Scrapers	1	10.0
Misc. (fragments incl.)	1	10.0
Total	**10**	**100.0**

Table 7.15 Frequency of large mammal remains in Tripsana

Taxa/NISP[a]	Total	% NISP
Canis lupus	1	0.21
Vulpes vulpes	13	2.75
Felis silvestris	8	1.69
Martes sp.	2	0.42
Mustela sp.	1	0.21
Sus scrofa	10	2.12
Cervus elaphus	122	25.85
Dama dama	26	5.51
Cervus/Dama	56	11.86
Capra sp.	56	11.86
Lepus europaeus	177	37.50
Total NISP	**472**	**100.00**
Unidentified Carnivora	20	
Unidentified Artiodactyla	395	
Unidentified[b]	841	
Total NS[c]	**1728**	

[a]Number of identified specimens
[b]Unidentified fragments longer than 2 cm
[c]Number of specimens

as from the current lowest layers of Kolominitsa cave (spits 17–19). In contrast, it is consistently present in the Upper Paleolithic layers of the caves discussed here. It seems that this material might have been used by *Homo sapiens* as a colorant, while it was ignored by the Neanderthals. This material can be considered as local and it is found in the form of irregular "iron pebbles" of various sizes (often 2–10 cm long). The finds yielded by excavation are mostly intact, but they can also be slightly processed, in the form of "pebble tools" or "cortical flakes". Their surface is usually well preserved; sometimes it is corroded and occurs as "rusty". Traces of use could not be established macroscopically on any of the pieces. Their future analysis will undoubtedly yield more information.

Conclusion

The above brief synthesis demonstrates the wealth of information that can be obtained by our research project. The dense cluster of the western Mani cave sites, located in a very restricted geographic zone and sharing very similar formation and occupation histories, makes it possible for us to carry out a detailed regional study. With data spanning the whole Upper Pleistocene, and a very good resolution, the regional approach allows detailed comparisons among contemporary sites of the same type. Finally, such regional studies possibly constitute the best way to study, describe and define the Greek Paleolithic, which is still poorly known in comparison to the state of research in most European and Mediterranean areas.

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References

Bailey, G. N. (Ed.). (1997). *Klithi: Palaeolithic settlement and quaternary landscapes in Northwest Greece*. Cambridge: McDonald Institute for Archaeological Research.

Bailey, G. N., Carter, P. L., Gamble, C. S., & Higgs, H. P. (1983). Asprochaliko and Kastritsa: Further investigations of Palaeolithic settlement and economy in Epirus (North-West Greece). *Proceedings of the Prehistoric Society, 49*, 15–42.

Bassiakos, E. I. (1993). Chronologissi apolithomaton ke spilaeothematon me ti methodo tou syntonismou tis ilektronikis stroformis kai meleti morfologias ypogeiou karst kai ton schetikon radiometrikon ke geologikon synthikon se spilaeoperivallonta tis periohis Dirou Manis (Dating of Fossils from Caves and Speleothems: Evidence from Electron Spin Resonance (ESR) Technique, the Study of Underground Karst Morphology and the Relevant Radiometric and Geological Conditions in Speleoenvironments of Dyros, Mani). Ph.D. Dissertation, University of Athens.

Coutselinis, A., Dritsas, C., & Pitsios, T. K. (1991). Expertise médico-légale du crâne pléistocène LAO1/S2 (Apidima II), Apidima, Laconie, Grèce. *L'Anthropologie, 95*(2-3), 401–408.

Darlas, A. (2012). Gheomorfologhiki exelixi ke katikissi ton spilaeon tis dytikis aktis tis Manis kata to anotero Plistokeno ke to Olokeno (Geomorphological evolution and use of the caves of the Western coast of Mani during the Upper Pleistocene and the Holocene). In N. Zacharias, et al. (Eds.), *Proceedings of 5th Symposium of the Hellenic Society of Archaeometry* (pp. 237–253). Athens: Papazissis.

Darlas, A. (2014). Anazitontas tin taftotita kai ti spoudeotita tou spilaiou Petralonon gia tin elliniki kai evropaiki proistoria (in search of the identity of Petralona cave and its importance for the Greek and European Prehistory). In E. Stefani, et al. (Eds.), *1912–2012. A century of research in prehistoric Macedonia*, International Conference Proceedings, Archaeological Museum of Thessaloniki 22–24 November 2012 (pp. 195–204). Thessaloniki: Ziti.

Darlas, A., & De Lumley, H. (1999). Palaeolithic research in Kalamakia Cave, Areopolis, Peloponnese. In G. N. Bailey et al. (Eds.), *The Palaeolithic archaeology of Greece and adjacent areas* (pp. 293–302). Athens: British School at Athens Studies 3.

Darlas, A., & De Lumley, H. (2004). La grotte de Kalamakia (Aréopolis, Grèce). Sa contribution à la connaissance du Paléolithique moyen de Grèce. In *XIVème Congrès UISPP. 5ème Section: Le Paléolithique moyen*, BAR International Series 1239 (pp. 225–233). Oxford: Archaeopress.

Darlas, A., & Psathi, E. (2008). Le Paléolithique supérieur dans la péninsule du Mani (Péloponnèse, Grèce). In A. Darlas & D. Mihailovic (Eds.), *The Palaeolithic of the Balkans,* BAR International Series 1819 (pp. 51–59). Oxford: Archaeopress.

De Lumley, H., & Darlas, A. (1994). Grotte de Kalamakia (Aréopolis, Péloponnèse). *Bulletin de Correspondance Hellenique, 118*(2), 535–559.

Elefanti, P., Panagopoulou, E., & Karkanas, P. (2008). The transition from the Middle to the Upper Paleolithic in the Southern Balkans: The evidence from the Lakonis I Cave, Greece. *Eurasian Prehistory, 5*(2), 85–95.

Galanidou, N., Athanassas, C., Cole, J., Iliopoulos, G., Katerinopoulos, A., Magganas, A., et al. (2016). The Acheulean site at Rodafnidia, Lisvori on Lesbos, Greece: Part I. In K. Harvati & M. Roksandic (Eds.), *Paleoanthropology in the Balkans and Anatolia: Human evolution and its context*. Dordrecht: Springer.

Harvati, K. (2016). Paleoanthropology in Greece: Recent findings and interpretations. In K. Harvati & M. Roksandic (Eds.), *Paleoanthropology in the Balkans and Anatolia: Human evolution and its context*. Dordrecht: Springer.

Harvati, K., Darlas, A., Bailey, S. E., Rein, T. R., El Zaatari, S., Fiorenza, L., et al. (2013). New Neanderthal remains from Mani peninsula, Southern Greece: The Kalamakia Middle Palaeolithic cave site. *Journal of Human Evolution, 64*, 486–499.

Harvati, K., Panagopoulou, E., & Karkanas, P. (2003). First Neanderthal remains from Greece: The evidence from Lakonis. *Journal of Human Evolution, 45*, 465–473.

Harvati, K., Stringer, C., & Karkanas, P. (2011). Multivariate analysis and classification of the Apidima 2 cranium from Mani, Southern Greece. *Journal of Human Evolution, 60*, 246–250.

Higgs, E. S., & Vita-Finzi, C. (1966). The climate, environment and industries of stone age Greece: Part II. *Proceedings of the Prehistoric Society, 32*, 1–29.

Kaczanowska, M., Kozlowski, J. K., & Sobczyk, K. (2010). Upper Palaeolithic human occupations and material culture at Klissoura Cave 1. *Eurasian Prehistory, 7*(2), 133–285.

Keraudren, B., Dallongeville, R., Bernier, P., Caron, V., & Renault-Miskovsky, J. (2000). Le Pléistocène supérieur marin (Tyrrénien) en Crète nord-occidentale (Grèce). *Géomorphologie: Relief, Processus, Environnement, 3*, 177–190.

Kotjabopoulou, E., Panagopoulou, E., & Adam, E. (1997). The Boila Rockshelter: A preliminary report. In G. N. Bailey (Ed.), *Klithi: Palaeolithic settlement and quaternary landscapes in Northwest Greece* (pp. 427–437). Cambridge: McDonald Institute for Archaeological Research.

Koumouzelis, M., Ginter, B., Kozlowski, J. K., Pawlikowski, M., Bar-Yosef, O., Albert, R. M., et al. (2001). The Early Upper Palaeolithic in Greece: The excavations in Klissoura Cave. *Journal of Archaeological Science, 28*, 515–539.

Kozlowski, J. K., & Otte, M. (2009). La fin du Paléolithique Moyen et le début du Paléolithique Supérieur dans l'est des Balkans. In I. Gatsov & J. L. Guadelli (Eds.), *Saxa loquuntur* (Honour of the 65th Anniversary of Nikolai Sirakov, pp. 183–196). Sofia: Avalon.

Kuhn, S. L., Pigati, J., Karkanas, P., Koumouzelis, M., Kozlowski, J. K., Ntinou, M., et al. (2010). Radiocarbon dating results for the Early Upper Paleolithic of Klissoura Cave 1. *Eurasian Prehistory, 7*(2), 37–46.

Kyparissi-Apostolika, N. (Ed.). (2000). *Theopetra Cave. Twelve years of excavation and research 1987–1998*. Athens: Institute for Aegean Prehistory.

Lebreton, V., Psathi, E., & Darlas, A. (2008). Environnement végétal des néandertaliens de la grotte de Kalamakia (Aréopolis, Grèce). In A. Darlas & D. Mihailovic (Eds.), *The Palaeolithic of the Balkans* (BAR International Series 1819, pp. 61–68). Oxford: Archaeopress.

Panagopoulou, E., Karkanas, P., Tsartsidou, G., Kotjabopoulou, E., Harvati, K., & Ntinou, M. (2002–2004). Late Pleistocene archaeological and fossil human evidence from Lakonis Cave, Southern Greece. *Journal of Field Archaeology*, *29*, 323–349.

Panagopoulou, E., Tourloukis, V., Thompson, N., Athanassiou, A., Tsartsidou, G., Konidaris, G. E., et al. (2015). Marathousa 1—A new Middle Pleistocene archaeological site from Greece. *Antiquity Project Gallery, 89*(343).

Perlès, C. (1987). *Les industries lithiques taillées de Franchthi (Argolide, Grèce): Tome I, Présentation générale et industries paléolithiques*. Bloominghton: Indiana University Press.

Pitsios, T. K. (2000). *O Tenarios anthropos (The Tainarian man)*. Athens: Ellinika Grammata.

Poulianos, A. (1971). Petralona. A Middle Pleistocene Cave in Greece. *Archaeology, 24*, 6–11.

Reisch, L. (1980). Pleistozän und Urgeschichte des Peloponnes (unpublished). Habilitationschrift, Friedriech-Alexander Universität Erlangen, Nürberg.

Roger, T., & Darlas, A. (2008). Microvertébrés, paléo environnement et paléoclimat de la grotte de Kalamakia (Péloponnèse, Grèce). In A. Darlas & D. Mihailovic (Eds.), *The Palaeolithic of the Balkans* (BAR International Series 1819, pp. 77–84). Oxford: Archaeopress.

Schmidt, E. (1965). Die Seïdi-Höhle eine jungpaläolitische Station in Griechenland. *Proceedings of IV Colloque International de Spéléologie, 1er en Grèce, Athens 1963,* pp. 163–174.

Thiebault, F. (1982). *Évolution géodynamique des Hellénides externes en Péloponnèse méridional (Grèce)*. Publications de la Société Géologique du Nord 6.

Tourloukis, V., Thompson, N., Garefalakis, C., Karkanas, P., Panagopoulou, E., Harvati, K. (2014). *New Middle Paleolithic sites from the Mani peninsula, Southern Greece*. Abstracts book, XVII World UISPP Congress (pp. 491–492). Burgos: Union International de Science Préhistoriques et Protohistoriques.

Trantalidou, K., & Darlas, A. (1992). Erevnes sta spilea tou nomou Dramas (researches in the caves of Prefecture of Drama) 1992. *To archeologhiko ergo sti Makedonia ke Thraki, 6*, 587–603.