PAPERS AND MONOGRAPHS OF THE FINNISH INSTITUTE AT ATHENS VOL. XXII

THESPROTIA EXPEDITION III
LANDSCAPES OF NOMADISM AND SEDENTISM

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ISSN 1237-2684
ISBN 978-952-68500-0-9

Printed in Finland by Vammalan Kirjapaino

Cover: The Bronze Age site of Goutsoura seen from the south. Photo: Björn Forsén

Layout: Esko Tikkala

Contents

PS 43: A Multi-period Stone Age Site on the Kokytos Valley Bottom

Nena Galanidou and Christina Papoulia

In the middle of the Kokytos valley bottom at an altitude of 106-108 masl lies PS 43, a site remarkably rich in knapped-stone artefacts but devoid of any pottery, built structures or organic remains.[1] It extends over a flat area of 200 by 100 m on a low rising fluvial hill on the southeast bank of a ravine which collects water from the Paramythia mountain range, flows close to Prodromi towards the southwest and joins the Kokytos at the western edge of the valley. The site is located on a ridge in the valley and commands views over the gently sloping lands to the south and the lower reaches of the ravine to the northwest (Figs. 1-2). The sediments of the site are mainly alluvial deposits, brown relatively loose ploughed earth, with a small quantity of stone, comprising mainly flint, knapped and unknapped. Small and medium-size river-rolled flint pebbles are also widely available in the ravine banks.

PS 43 was discovered in April 2007, immediately after tilling a corn-field, at a time of the year when visibility was excellent (Figs. 3-4). Corn crops are cultivated in these fields annually, bringing continually on the surface an ever-increasing number of lithic artefacts. Further exploration of the site's geographical extension took place in June the same year. PS 43 extends in three fields explored as tracts D 20, D 28 and D 80.[2] During both field seasons artefacts were recovered as grab samples using a random sampling technique. When the site was re-visited during the summer of 2008 the crops were fully grown, yet archaeological visibility was still high in the open patches of soil amongst them. During work in the field PS 43 was considered a site. Evaluation and analysis of the neighbouring tract data at a later stage suggest that PS 43 is part of a larger find concentration, Concentration III, located at the westernmost edge of the valley bottom. This is an area where fresh water coming from the numerous local springs abounds.[3]

In this chapter we examine the technological and morphological attributes of the PS 43 archaeological assemblage in an attempt to shed light on the nature and date of human activity that took place at the site. The surface material is considered within a wider context drawing comparisons from sites in Greece and the Balkans. Based on a small number of diagnostic specimens, three components are identified: a Middle Palaeolithic, a terminal Upper Paleolithic/Mesolithic and a Neolithic. We also report on the results of luminescence dating conducted on sediments deriving from the site's upper stratum. The two lines of evidence show that the PS 43 lithic finds are

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[1] We are grateful to Björn Forsén, Giorgos Hourmouziadis, Catherine Perlès and Curtis Runnels for their help. We also thank Yannis Bassiakos and Constantinos Athanassas for conducting in-situ radiometric measurements, soil-sampling and running the OSL analysis at the DEMOKRITOS laboratory of Luminescence Dating. The pencil drawings of the lithics were made by Christina Papoulia and inked by Nikoletta Dolia. Figs. 1-2 were drawn by Esko Tikkala, whereas Fig. 3 was taken by Mikko Suha and Fig. 4 by Nena Galanidou.

[2] Forsén *et al.* 2001, 90-91.

[3] Forsén *et al.*, this volume.

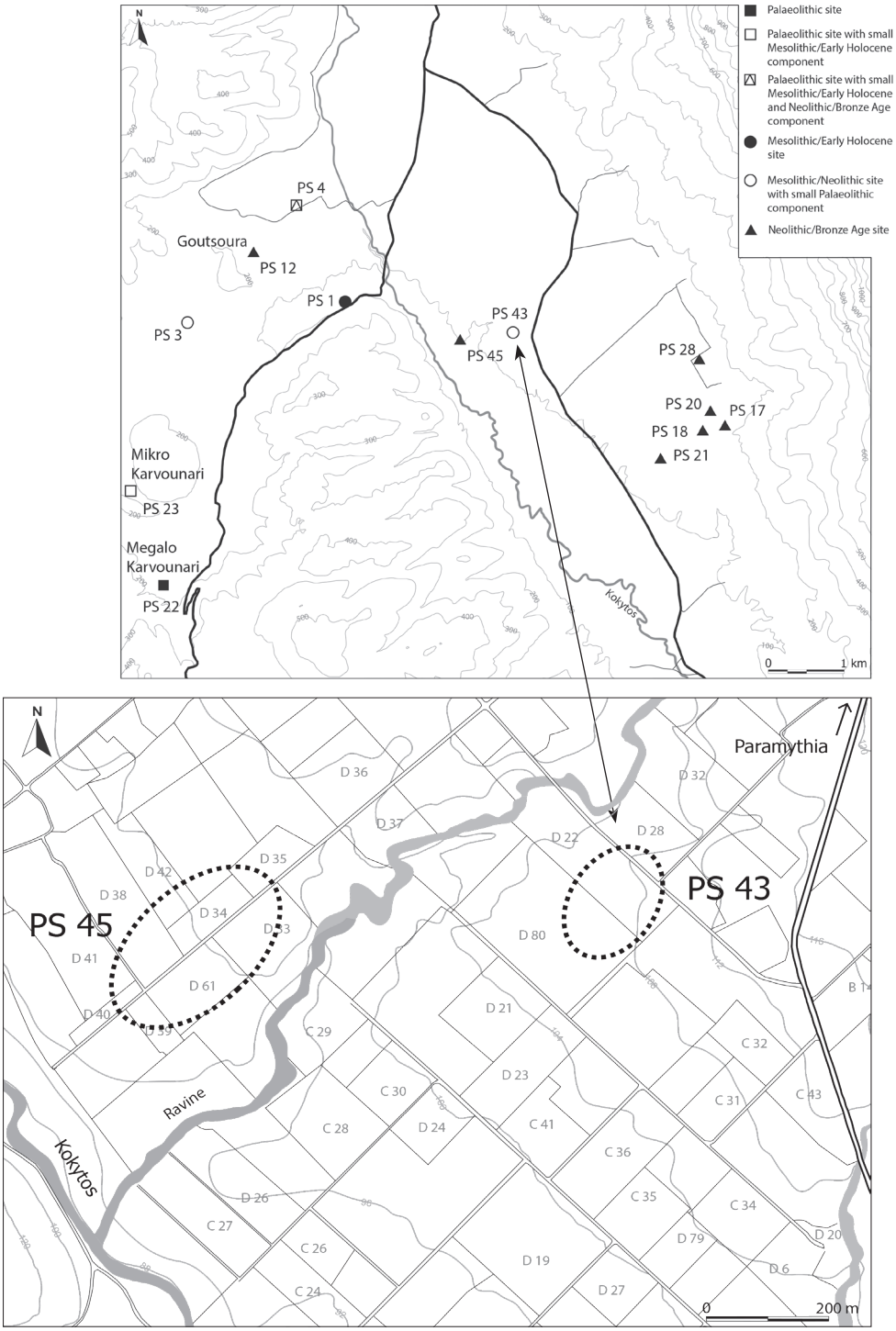

Fig. 1 (above). Location of prehistoric sites in the Kokytos valley.
Fig. 2 (below). Location of prehistoric sites PS 43 and PS 45 in relation to walked tracts.

Fig. 3. Tract D 22 in April 2007, looking northwest towards the ravine which is located below the tree line.

associated with time-averaged deposits.[4] In other words we are dealing with a site where the "palimpsest effect" of multiple superimposed events of artefact deposition at different periods and perhaps through different processes, anthropogenic and natural, is present. We close by discussing the degree to which surface lithics assemblages from sites of this sort may contribute to a Thesprotian prehistory narrative.

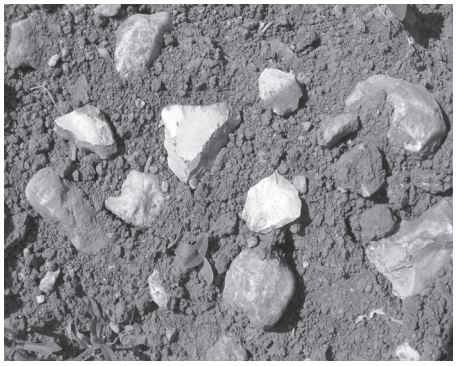

Fig. 4. Lithic artefacts in the ploughed field.

The Middle Palaeolithic component

Of the 616 knapped-stone artefacts collected from PS 43, a group of 108 objects has Middle Palaeolithic affinities. A flake-dominated assemblage, it comprises, amongst others, two cores and 18 tools. The tools are five Levallois points, one pseudo-Levallois point, three scrapers, two denticulates, two piercers, and five flakes with discontinuous, very brief retouch and/or use scars (Fig. 5).[5] The finds exhibit high degrees of patination, are on average of larger size compared to the rest and are typologically and technologically different from those classified in the Holocene group. The very location of PS 43 at the bottom of the valley and the edge damage present on a good number of these early artefacts suggest finds recovered in secondary deposition.[6]

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[4] Bailey and Galanidou 2009; Holdaway and Wandsnider 2008.

[5] See also Forsén *et al.* 2011, 90. A comprehensive presentation of this component will be the subject of a separate study.

[6] The recovery of Palaeolithic finds from the bottom of the Kokytos valley is discussed further in Forsén *et al.*, this volume.

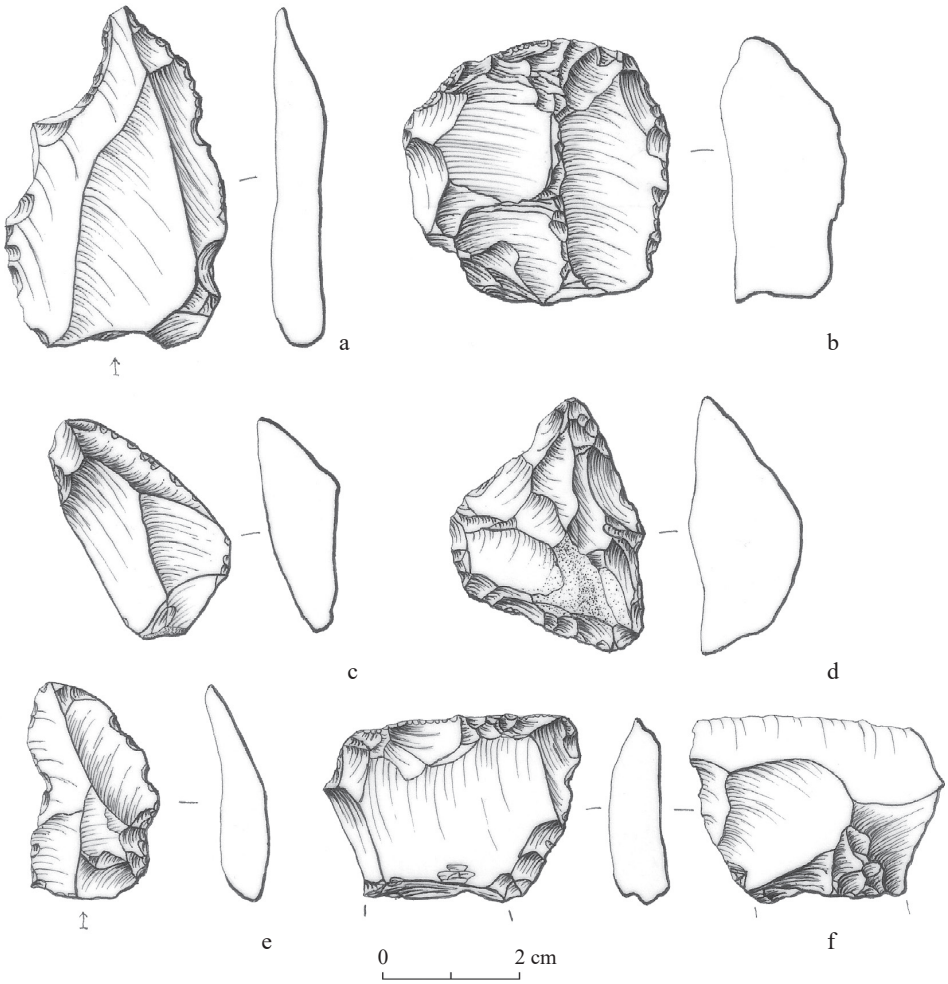


Fig. 5. Middle Palaeolithic tools: retouched Levallois point (a), scrapers (b, d and f), flakes with discontinuous, very short retouch and/or use scars (c and e).

The terminal Upper Pleistocene – Holocene component

The 508 artefacts of this group are distinguished from the Middle Palaeolithic component on the grounds of raw material preservation, size, tool morphology and technology of production. This distinction, notwithstanding, the group contained a small number of diagnostic tools associated with two major industrial traditions of the west Balkans: late Upper Palaeolithic – Mesolithic and Neolithic. A large number of artefacts, especially medium size flakes with no diagnostic features on the dorsal face or striking platform, could be dated to any period of the final Pleistocene or the Holocene (prehistoric and historic alike) and in fact may derive from more than one. Unretouched blanks make up a little less than a half of this group (46.9%), followed by retouched pieces that comprise 36.8%, cores (6.5%), chips (3.7%), debris (2.2%) and two crested blades (0.4%) (Fig. 6). The blade/bladelet to flake ratio is approximately 1:10.

Raw material economy and preservation

Small water-rolled pebbles of grey (light and dark), beige, brown, reddish-brown and off-white, usually fine-grained and occasionally medium-grained flint with chalky cortex were the raw materials used to manufacture the artefacts (Fig. 7). Their small size and surface condition suggest that they were collected from the banks and the beds of the streams in the site vicinity. The same lithology is encountered at all other prehistoric sites[8] and the majority of the tracts walked by the Thesprotia Expedition.[9]

Beyond these raw material categories, a wide variety of colour is seen in the assemblage as a result of surface alteration. 'Patina' is present on the majority (73.62%) of the artefacts (Fig. 8). Four different degrees of alteration have been recorded to denote: no patina (0), early stage of patination, when the original colour is still clearly visible and patina is in the form of a few barely visible dots (1), medium stage of patination, when the original colour has changed but is still close to the initial one (2), and advanced stage of patination with complete alteration of the original colour (3). This alteration effect relates to each specimen's taphonomic history or exposure to weathering and is very common for lithic finds collected by the Thesprotia Expedition. It has often been used as a 'rule of thumb', pointing to a relative chronology of finds. In most cases the more heavily patinated specimens identified proved on technological and typological grounds to be of older date too.[10]

In PS 43 only a quarter of the artefacts has no signs of patina, irrespective of the size or technology of production. When compared with PS 3, the Holocene site of the Kokytos valley whose majority of finds is attributed to the Mesolithic, a different pattern emerges, since only 7.3% of the artefacts were patinated and attributed by Tourloukis and Palli[11] to an earlier component. On the other hand, at the twin *terra rosa* sites of the Kokytos valley, Mikro Karvounari and Megalo Karvounari, the majority of the artefacts are heavily patinated and derive from the Pleistocene

Inventory	n	%
Cores	33	6.5
Flakes	193	38
Laminar flakes	24	4.7
Blades	14	2.8
Bladelets	7	1.4
Crested blades	2	0.4
Tools	187	36.8
Chips	19	3.7
Debris	11	2.2
Other[7]	18	3.5
Total	508	100

Fig. 6. PS 43 terminal Upper Pleistocene-Holocene lithic assemblage composition: Frequency and percentage.

Raw material colour type	n	%
Beige	2	6
Beige/grey	4	12
Brown	1	3
Brown fine-grained	2	6
Brown/beige	1	3
Dark grey	5	15
Grey	10	30
Light grey	4	12
Off-white	1	3
Indeterminate	3	9
Total	33	100

Fig. 7. Raw material composition: Frequency and percentage calculated on cores.

Patina	n	%
0	133	26.18
1	125	24.61
2	117	23.03
3	132	25.98
Indeterminate	1	0.20
Total	508	100

Fig. 8. Degrees of patina on the artefacts of PS 43: Frequency and percentage.

[7] Other = indeterminate pieces and burnt debris.
[8] Galanidou *et al.*, this volume; Ligkovanlis 2011; Papoulia 2011; Tourloukis and Palli 2009.
[9] Forsén *et al.*, this volume.
[10] See Tourloukis and Palli 2009; Ligkovanlis 2011; Papoulia 2011.
[11] Tourloukis and Palli 2009.

(Middle Palaeolithic), while a smaller number derive from the Holocene. Significantly, at Mikro Karvounari (PS 23), 16.77% of the artefacts have been attributed to the late Upper Palaeolithic and/or the Mesolithic.[12] A similar pattern emerges from Megalo Karvounari (PS 22).[13]

In addition to flint pebbles which were the main lithic source for blank production, debitage and cores discarded during early uses of the site offered to subsequent occupants an immediately accessible source of raw material or blanks. 9% (n=17) of the tools display short, irregular and often opportunistic retouch on patinated blanks and belong to an expedient organization of technology.[14] They are the following types: truncation (n=2), denticulate (n=2), notch (n=2), linear retouch (n=6) and irregular retouch (n=5). Two flake cores, whose last removals were made after the patination process had begun, bear additional evidence of a re-use practice. Judging from the wide availability of rocks suitable for knapping, this was not dictated by raw material shortage. Occasional re-cycling is also seen in the lithics originating from the Kokytos tracts, Mikro Karvounari and the Eleftherochori 1, 3 and 7 sites.[15] C. Levi-Strauss' concept of *bricoleur*[16] provides a conceptual frame to consider this practice.

Lithic reduction sequences

All 33 cores are small, having maximum dimensions 36.8x40.24x31.59 mm (Fig. 9). The majority was manufactured on very small pebbles, as their preserved chalky (48%) or thick skin (9%) cortex implies (Fig. 10). Flake cores by far predominate the assemblage

Cores (n=33)	length	width	thickness
Min	16	18.52	11.09
Median	26.12	28.71	22.08
Max	36.8	40.24	31.59

Fig. 9. Dimensions of PS 43 cores (measurements in mm).

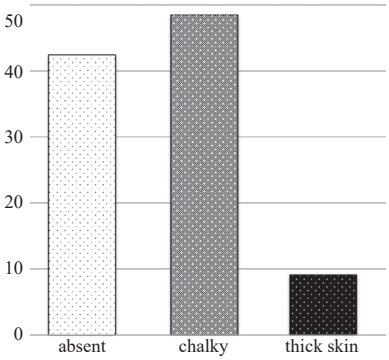


Fig. 10. Column chart with the percentages of the cortex types on the cores.

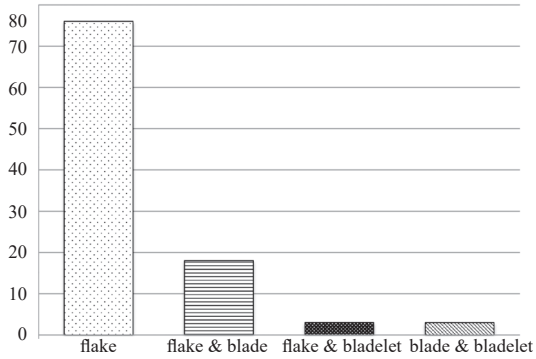


Fig. 11. Column chart with the percentages of the different core types classified by the negative scars on them.

[12] Papoulia 2011.
[13] Ligkovanlis 2011.
[14] See Binford 1979; Binford 1980 for a discussion of curated and expedient technologies.
[15] Forsén *et al.*, this volume; Ligkovanlis 2014; Papoulia 2011; Palli and Papadea 2004; Riginos 1998; Papadea pers. comm.
[16] Lévi-Strauss 1962; Bailey and Galanidou 2009; Brody 1981.

(n=25, 76%), yet there are also a number of cores that produced both flakes and bladelets (n=6, 18%), one flake and blade core and one blade and bladelet core (Fig. 11). Cores comprise 5.5% of the total artefacts from Concentration III, the 3.2% of which belongs to PS 43.[17]

Core types include sub-conical (n=4), prismatic (n=4) and a discoid example with unifacial centripetal removals. In particular, the three sub-conical cores have produced flakes (e.g. Figs. 12a-b) and the fourth one both blades and bladelets (Fig. 13c). Of the four prismatic cores, one is a flake and bladelet core with a single prepared platform and four directions of removal, two of which are orthogonal. The other three are flake cores with two prepared platforms and multiple directions of removals (Figs. 13d-f). A small, exhausted disc core (24.56x26.10x11.09 mm) with four directions of removals has been manufactured on a core tablet (Fig. 13g). There are two more exhausted cores, one of which is made on a thick flake with opposed directions of removals and was probably transformed into a tool by means of informal retouch before it was abandoned (21.20x18.52x15.79 mm). The second one is the smallest core in the assemblage (19.32x22.05x22.15 mm); it has one prepared platform and three directions of removals, two of which are orthogonal. The latter was probably abandoned due to a natural inclusion of the raw material that did not allow any further removals.

Almost half of the cores (n=16) are amorphous, having multiple striking platforms. The majority (n=10) has either one or two prepared striking platforms (e.g.

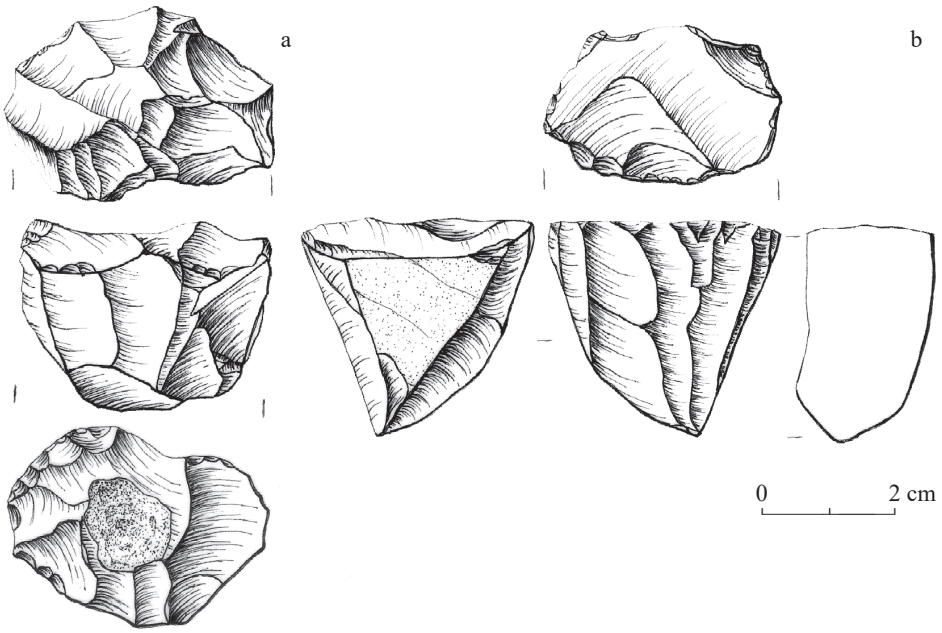


Fig. 12. PS 43 cores (a-b).

[17] Forsén *et al.*, this volume, Fig. 18.

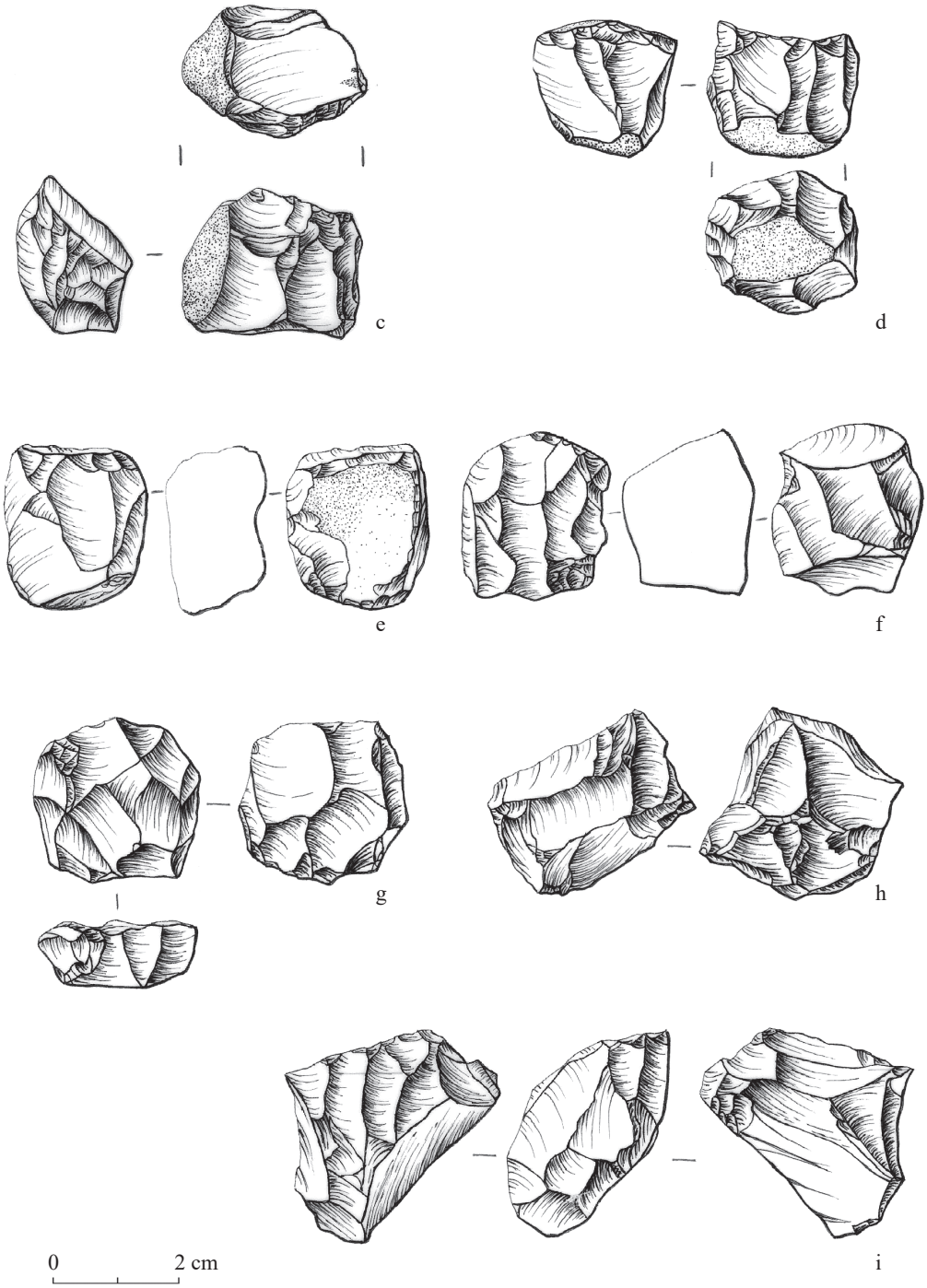


Fig. 13. PS 43 cores (c-i).

Fig. 13i), while five of the amorphous cores have multiple directions of removals but no signs of platform preparation (e.g. Fig. 13h). There is also a core fragment.

Four of the cores, were probably further retouched by means of abrupt retouch to be used as thick scrapers (Figs. 14a-c). All core-tools have been manufactured on thick flakes produced by the splitting of extremely small pebbles. The original size of the pebbles in two of these examples can be inferred by the preservation of their cortex (Figs. 14a-b).

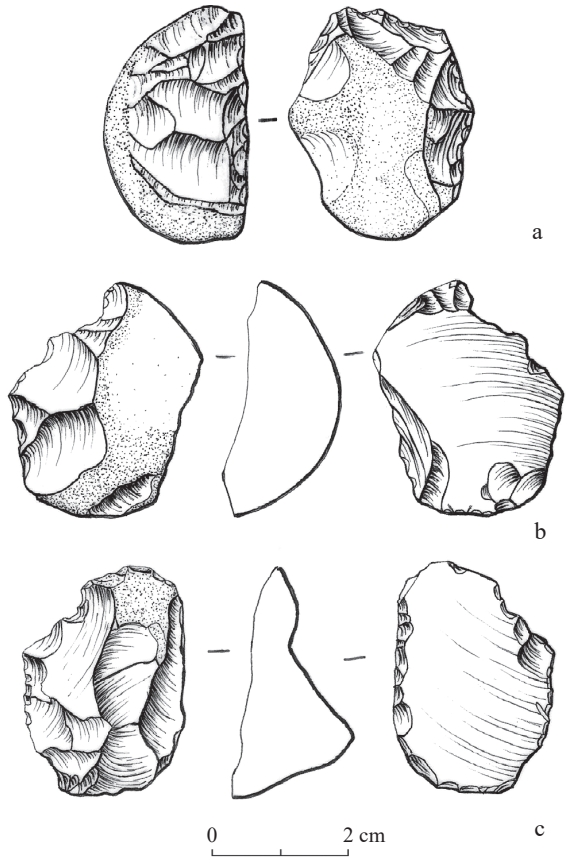


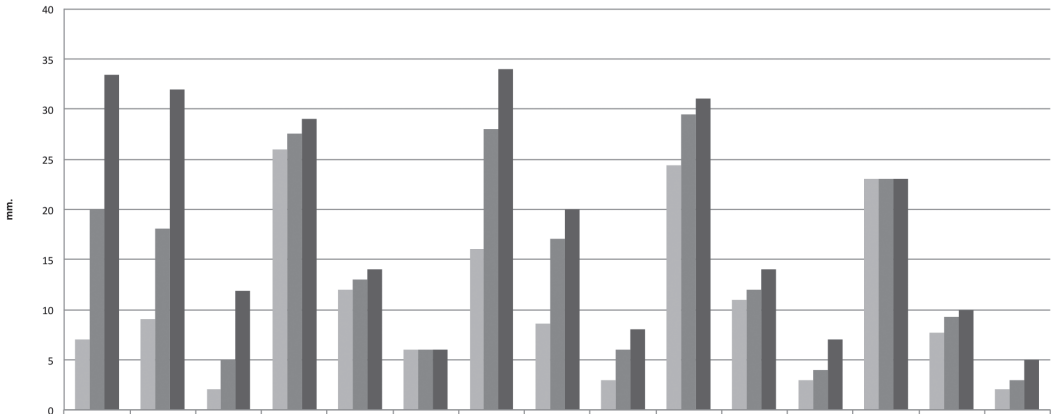
Fig. 14. Thick scrapers made on cores (a) or flake-cores (b-c).

The cores offer information for a variety of flaking methods, elaborate and simple. This ought to be attributed to the different technological traditions present and raw material management strategies employed by different groups merged together by time and archaeologically visible as a single entity, the core group. In many instances after cortex removal and the initial stages of shaping the flint nodule, the knapper proceeded to the preparation of a striking platform to facilitate the production of blanks. In other instances no attention was paid to angle or platform preparation and removal was largely 'opportunistic'. Overall, the core group is poorly diagnostic in terms of temporal classification.

The debitage is of similar poor diagnostic potential. It consists of flakes, which by far outnumber (38%) the rest, laminar flakes (4.7%), blades (2.8%) and bladelets (1.4%).[18] Two technical pieces, i.e. crested blades, complete the unretouched artefact group. These are also small in size, with a median length of less than 30, median width of less than 20 and median thickness of less than 6 mm (Fig. 15).

The predominant type of striking platform (butt) present on both unretouched and retouched artefacts is flat (34%), followed by dihedral (6.6%) and winged (6.3%). Cortical, linear, retouched, spur, pointed and punctiform are other types of

[18] Percentages are calculated on the total number of specimens in this group (n=508). Bladelets in this industry are defined as the elongated specimens whose length is twice as much as its width, and the latter is smaller than 11 mm.



	length	width	thickness	length	width	thickness	length	width	thickness	length	width	thickness	length	width	thickness
	flakes			crested blades			laminar flakes			blades			bladelets		
MIN	7	9	2	26	12	6	16	8,58	3	24,36	11	3	23	7,66	2
MEDIAN	20	18,07	5	27,5	13	6	28	17	6	29,5	12	4	23	9,3	3
MAX	33,43	32	11,85	29	14	6	34	20	8	31	14	7	23	10	5

Fig. 15. The dimensions of the PS 43 debitage and the two technical pieces. Measurements of the debitage (i.e. 92 flakes and 17 laminar flakes) and the two crested blades are taken only on whole artefacts. Measurements of the blades and bladelets have been taken for the whole artefacts (i.e. four blades and one bladelet), while width and thickness has also been measured for the longitudinally broken specimens (i.e. eight blades and six bladelets).

Butt types	Blades		Bladelets		Laminar flakes		Flakes		Crested blades		Tools		Total	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Broken	8	57	6	86	3	13	61	32	0	0	63	34	141	33.0
Cortical	2	14	0	0	2	8	5	3	0	0	16	9	25	5.9
Dihedral	0	0	0	0	3	13	14	7	0	0	11	6	28	6.6
Flat	4	28	1	14	9	38	78	40	1	50	53	28	146	34.2
Linear	0	0	0	0	1	4	5	3	0	0	12	6	18	4.2
Winged	0	0	0	0	3	13	17	9	0	0	7	4	27	6.3
Spur	0	0	0	0	0	0	2	1	0	0	2	1	4	0.9
Pointed	0	0	0	0	0	0	2	1	0	0	0	0	2	0.5
Punctiform	0	0	0	0	0	0	0	0	0	0	1	1	1	0.2
Retouched	0	0	0	0	0	0	0	0	0	0	6	3	6	1.4
Indeterminate	0	0	0	0	3	13	9	5	1	50	16	9	29	6.8
Total	14	100	7	100	24	100	193	100	2	100	187	100	427	100

Fig. 16. Striking platform types on unretouched and retouched blanks.

butts encountered on a few artefacts, mainly flakes and retouched blanks (Fig. 16). A significant number is, however, broken (33%).

Tool variation and morphology

The vast majority of tools have irregular or linear and short retouch that rarely extends along the entire edge of a blank. It is more of an expedient character than a curated one:[19] a kind of ad-hoc response to the need for a working edge for immediate use and discard. With the exception of burins, scrapers and transverse arrowheads, the retouch

[19] *Sensu* Binford 1979.

does not result in formal morphologies or 'tool types'. This observation is in tune with a reduction sequence that shows little investment in preparation and managing the raw material volume and the core. Technical pieces, such as platform rejuvenation flakes or core tablets, are not present whereas there are only two crested pieces. The small size of the original blanks may of course account in part for this.

The tool inventory consists of scrapers (8%), notches (12%), denticulates (6%), perforators (5%), burins (3%), truncations (4%), splintered pieces (3%), one backed flake (1%), a trapeze (1%) and two non-geometric microliths (1%). Of special interest are the transverse arrowheads that comprise the 3% of the total retouched tool types. The majority of the retouched artefacts are informal tools made by means of irregular (14%), linear (37%) or very short (nibbling) (2%) retouch (Fig. 17). It is worth noting that no sickle element was recovered from the site though they are present in other contexts in the Kokytos valley.[20] Concentration III, part of which is PS 43, is likewise characterised by a total absence of sickles. Yet concentration III totally lacks arrowheads, which are a distinctive entity in the PS 43 toolkit.

Tools	n	%
Burin	6	3
Denticulate	11	6
Notch	22	12
Transverse arrowhead	5	3
Truncation	8	4
Trapeze	1	1
Backed flake	1	1
Perforator	9	5
Endscraper	12	6
Sidescraper	4	2
Nibbling retouch	4	2
Irregular retouch	27	14
Linear retouch	70	37
Splintered piece	5	3
Non-geometric microlith	2	1
Total	187	100

Fig. 17. PS 43 late component tool repertoire. Percentages are calculated out of the total number of tools that belong to the later component of the site.

Notches (n=22) and *denticulates* (n=11) are produced on small and medium size flakes or broken blades (Figs. 18-19).

Burins (n=6) are made on large flakes, and are thick and rectangular in shape. They are either truncation burins (Figs. 19a, c) or burins on breakage (Figs. 20b, e),

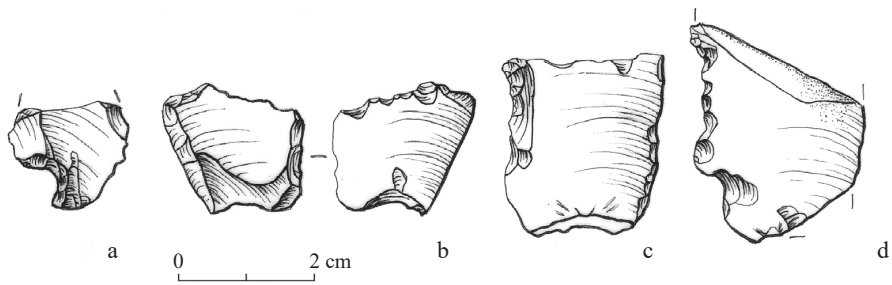


Fig. 18. Notch (a) and denticulates (b-d).

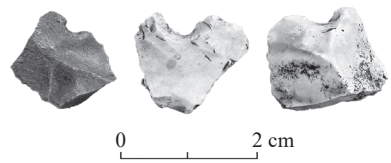


Fig. 19. Notches.

[20] Forsén *et al.*, this volume, Figs. 10l-m and 11a-b; Doulkeridou, this volume, Figs. 12b, d and 14g.

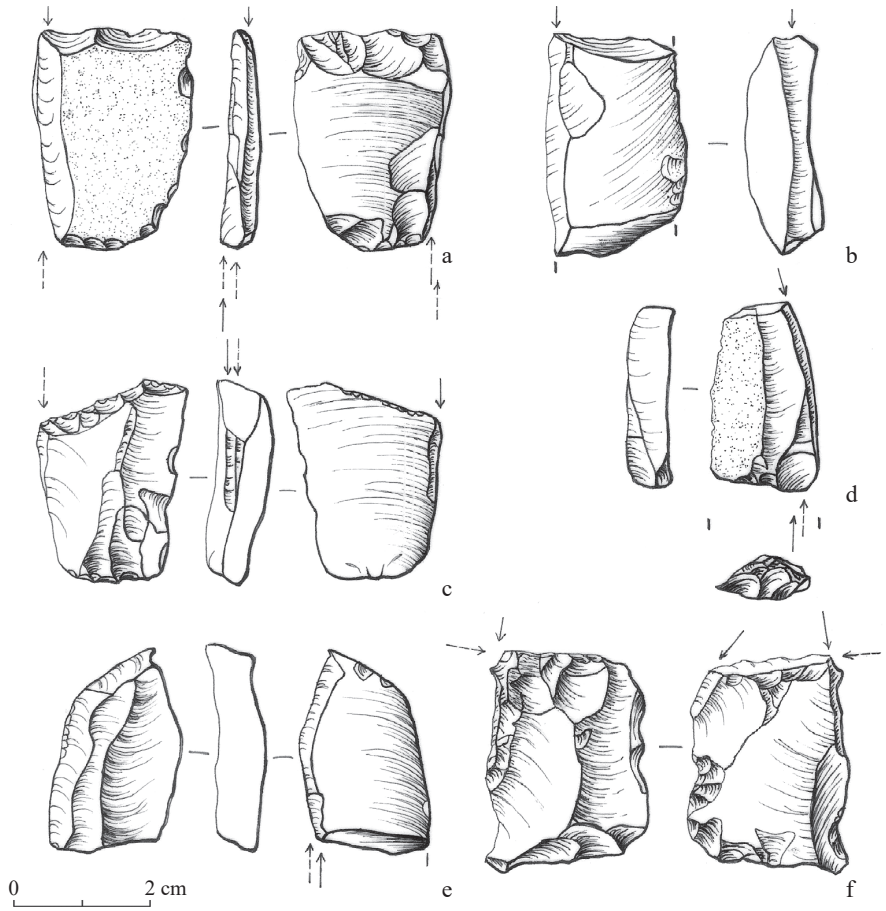


Fig. 20. Burins: truncation burins (a and c), burins on breakage (b and e), double burins on breakage and retouched surface (d) and on a burin facet (f).

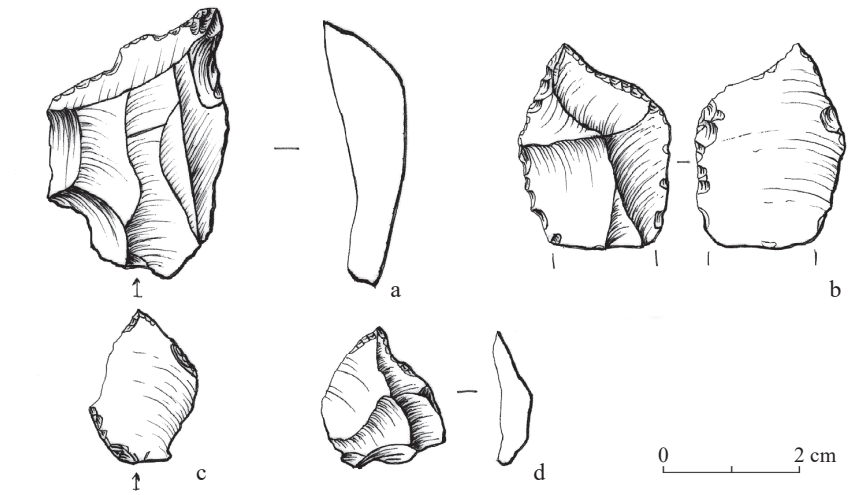


Fig. 21. Perforators (a-d).

a double burin on breakage and retouched surface (Fig. 20d) and a double burin on a burin facet (Fig. 19f). Burins, though a distinctive tool category, are hard to pin down chronologically. The particular PS 43 specimens could be part of either a Late Upper Palaeolithic or a later industry.

Perforators (n=9) include three piercers (Figs. 21b-d) and six becs (e.g. Fig. 21a). Piercers are characterized by thin projections made by means of very short, at times nibbling, retouch, either direct or inverse, while becs are here classified as having thicker, nosed projections. The use of the particular retouched tools as 'perforators' might or might not be proved by use-wear analysis. The particular tool-type is made only on flake blanks, some of which are at the same time the largest examples amongst the retouched artefacts.

Splintered pieces (n=5), the a posteriori tool type, is represented by five examples that are also made on small flakes (Figs. 22a-b) or blades (Fig. 22c).

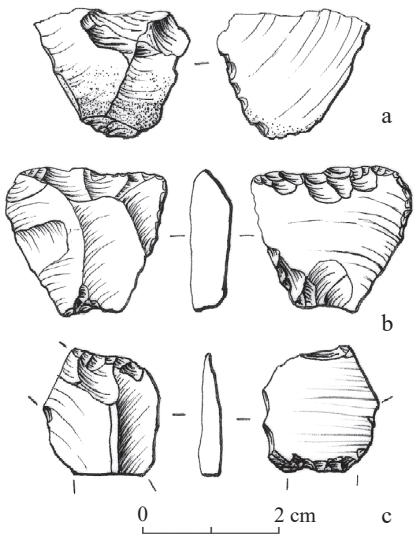


Fig. 22. Splintered pieces on flakes (a-b) and blades (c).

Scrapers (n=16) include both sidescrapers (n=4) and endscrapers (n=12) and vary in size. The majority is made on flakes (e.g. Fig. 23a), sometimes thick, cortical ones (Fig. 23c), and only two are made on a blade (Fig. 23g) or a laminar flake (Fig. 23h). Two small pieces, a circular endscraper (Fig. 23d) and a denticulated sidescraper (Fig. 23f) with affinities to the thumbnail type, have been produced by long, semi-abrupt retouch. Thumbnail and circular endscrapers are integral elements of the west Balkan Epigravettian and Mesolithic assemblages.[21] A thumbnail endscraper very similar to Fig. 23d was collected at Mikro Karvounari.[22] Small denticulated endscrapers were discovered at Tsouknida, further south in the Preveza nomos, and a Mesolithic date is proposed for them.[23] Thumbnail endscrapers were also found at the Mesolithic layers of Kleisoura Cave.[24] The PS 43 scraper group exhibits variation in blank and retouch, thence we are inclined to think that it originates from more than one industrial entity dated to the Late Upper Pleistocene and the Holocene. Given the lack of a firm chronostratigraphic framework for the site, its treatment under the archaeologically meaningful category of a 'tool type' has a descriptive value that probably masks a more complex history.

Non-geometric microliths (n=2) are small flakes (less than 22x22x22 mm) with retouched platforms produced by short, low angle bifacial rectilinear retouch in the first case and short, inverse retouch on the right lateral edge.

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[21] Komso and Pellegatti 2007; Whallon 1999; Kotjabopoulou *et al.* 1999; Mihailović 1999; Miracle *et al.* 2000.
[22] Papoulia 2011, fig. 38d.
[23] Runnels and van Andel 2003, 117-124 and figs. 3.52.1-2.
[24] Kaczanowska and Kozlowski 2014, fig. 5.4.

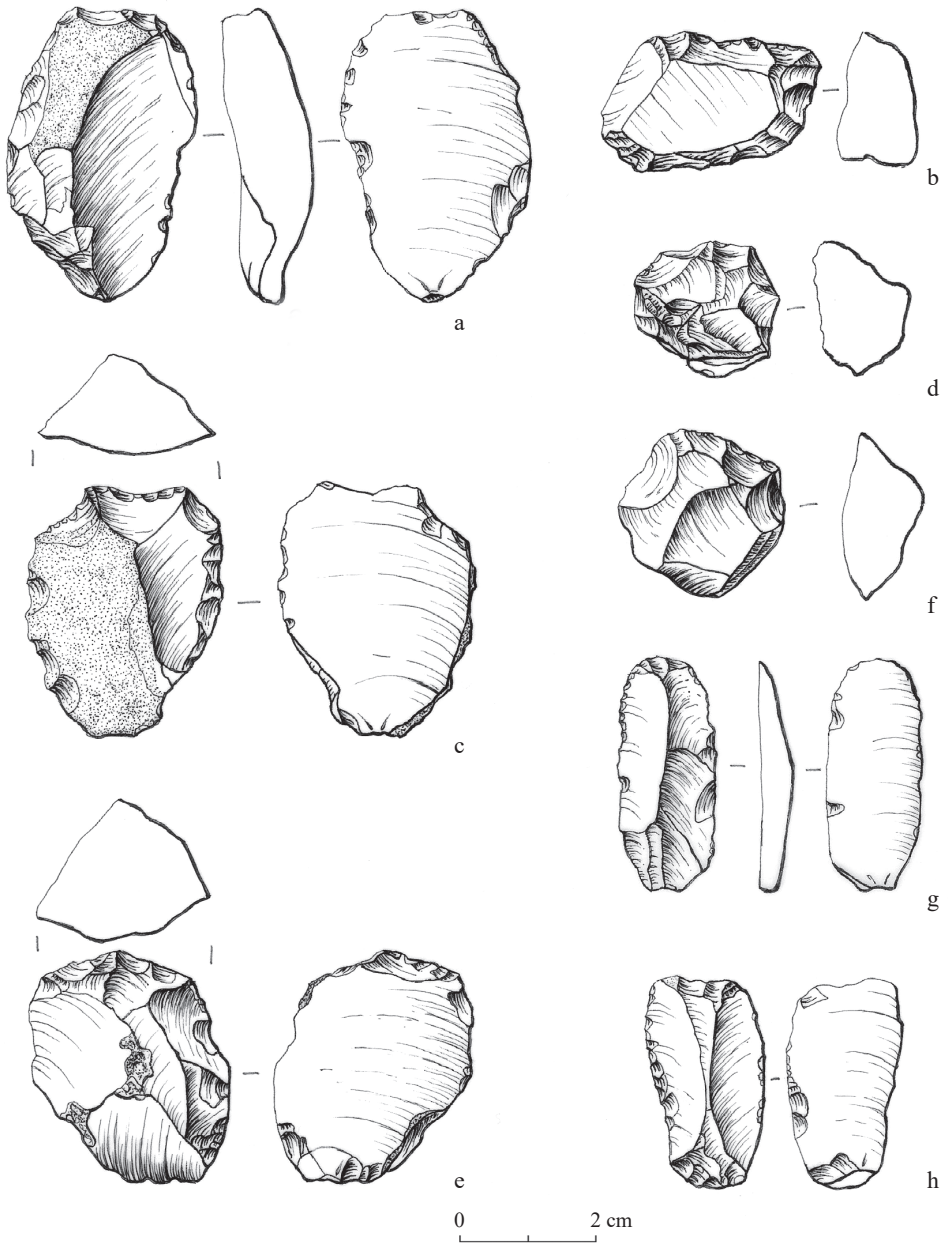

Fig. 23. Scrapers: endscrapers on thick flakes (a, c and e), circular and thumbnail endscrapers (b, d and f), endscraper on a blade (g), endscraper on a laminar flake (h).

Truncations (n=8) are often produced by means of very short, either oblique or abrupt retouch (e.g. Fig. 24). Most of them are made on flake blanks, and only one is made on a laminar flake. In two out of eight cases the retouch scars have no patina, while the blank of the tool exhibits some kind of patina. The only *trapeze* (n=1) is an asymmetric bi-truncated piece by means of brief, rectilinear retouch (Fig. 25) whose

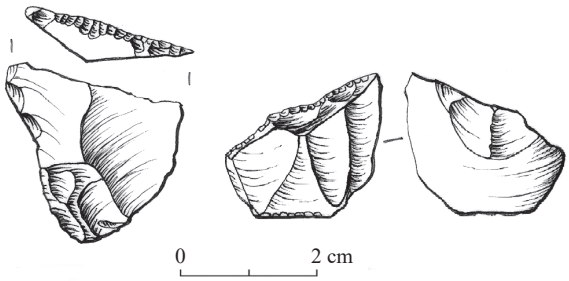

Fig. 24. Truncations.

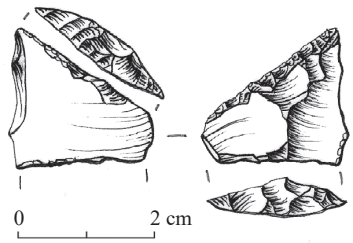

Fig. 25. Asymmetric trapeze.

closer affinities are identified in the Franchthi Cave Early Neolithic trapezes (Phase FLP N I) manufactured on jasper or blond flint.[25]

Transverse arrowheads (n=5) is a particularly homogeneous group of fairly small tools with bifacially shaped lateral edges (Fig. 26). The group recalls some of the Middle Neolithic (Phase FLP N II) transverse arrowheads made on jasper and blond flint from Franchthi Cave in the Argolid,[26] though the PS 43 tools are smaller (Fig. 27). The Franchthi specimens came from a narrow horizon dated between 6200/6000 and 5400 bc cal.[27] Similar examples were collected from other parts of the Kokytos valley as well,[28] and in both cases these were probably manufactured in order to be hafted in wooden hafts serving as the tips of composite hunting tools.[29] Curtis Runnels has kindly informed us that a similar piece was collected from a site in a fossil sand dune outcrop on the Preveza coast by the Nikopolis survey project.[30] Only one of the PS 43 transverse arrowheads (Fig. 26d) finds affinities in finds deriving from the Upper Mesolithic / Final Mesolithic Interphase layers (Phase VIII/IX) of Franchthi Cave.[31]

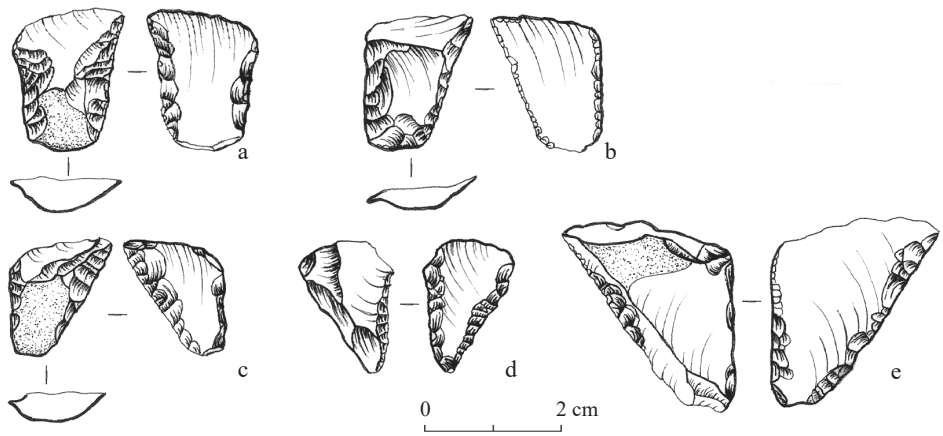

Fig. 26. Transverse arrowheads (a-e).

[25] Perlès 2004, figs. 6.3.6 and 6.3.8.
[26] Perlès 2004, fig. 8.4.1-4, 8.4.9.
[27] Perlès 2004, 90.
[28] See Forsén *et al.*, this volume, Fig. 9.
[29] See Gibaja and Palomo 2004; Fischer 1990; Finlayson and Mithen 1997.
[30] Runnels pers. comm. 11.3.2011.
[31] Perlès 1990, figs. 22 and 27.

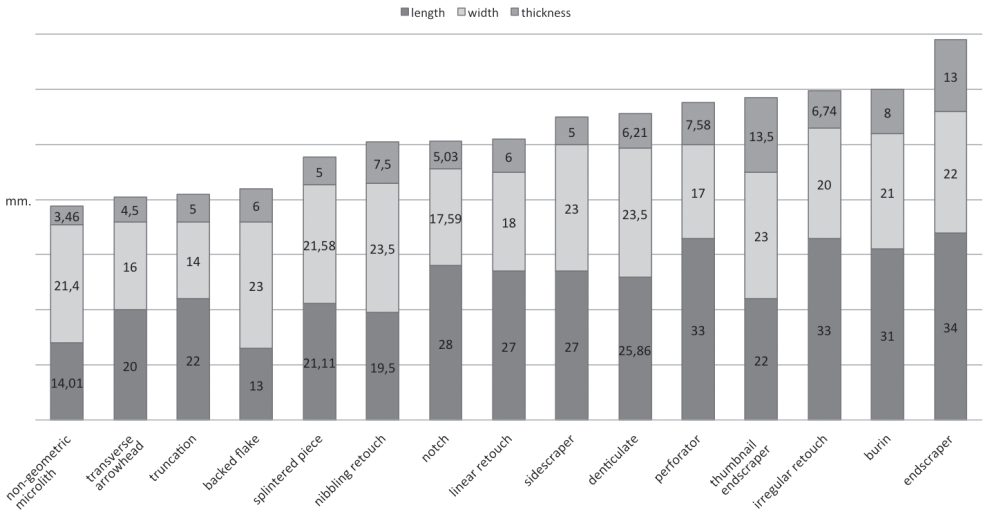

Fig. 27. The median dimensions (length, width, thickness) of all tool types. Measurements are in mm and have been calculated only for the whole blanks.

In the *assymetrical* point group specimen Fig. 26e finds its closest comparandum in the Chalcolithic points from Drakaina Cave in southeast Kephallonia.[32] The Late Neolithic and Chalcolithic deposits of this cave have yielded a large and impressive assemblage of projectile tips that were hafted and used as inserts to hunting weapons. The chronostratigraphic context of the Drakaina projectile tips shows that developments in morphology and technology of projectile points in western Greece followed its own independent course compared to that encountered in other areas of the Neolithic Aegean world.[33] The majority of the Drakaina projectile types is not seen in the PS 43 inventory.

Luminescence dating

Given the multiple uncertainties arising from the archaeological study of the surface lithic finds, we used Optically Stimulated Luminescence (OSL) in an attempt to place the artefact-bearing sediments in a firm chronostratigraphic context. Soil-sampling was conducted at PS 43 in the summer of 2011. Radiometric measurements were also taken on site with a calibrated portable scintillometer in order to calculate the local dose rate (D_R). PS 43 is a remarkably plane site with no natural section or trench exposed. Three soil-samples, PS 43A, PS 43B, PS 43C, were thus perforce obtained for the upper stratum lying immediately below the topsoil at depths ranging between 50 and 35 cm below the surface and at penetration angles ranging from vertical to ~300 sloped. The distances between the three samples were more than 40 m.

Analytical work was conducted at the laboratory of Luminescence Dating at the National Center for Scientific Research DEMOKRITOS in Athens. Initial sample

[32] Stratouli and Metaxas 2008, fig. 12.a
[33] Stratouli and Metaxas 2008, 317-324.

preparation showed that one of the samples, PS 43A, did not have any luminescence-datable mineralogical ingredients. "Luminescence measurements were carried out on the remaining two samples using a RISØ-TL/OSL reader. Measurements included calculation of the paleodose (D_e) and estimation the dose rate (D_R). The equivalent dose was estimated by running the post -Infrared-Infrared Stimulated Luminescence (pIRIR) Single-Aliquot Regenerated (SAR) Dose protocol[34] on multiple aliquots from each sample, generating in this way a number of individual paleodoses per sample."[35]

The two dates obtained are 48.0+24.0 ka and 19.0+8.0 ka (Fig. 28). This broad spread of ages falls within the Upper Pleistocene, even reaching the onset of the Holocene. If taken at face value the age spread spans from the Middle Palaeolithic to the onset of the Mesolithic, but given the very large standard deviations that accompany the numeric estimates, caution is suggested with regards to their precision. Probably relating to the nature of sediment samples submitted to OSL that derived from a loose, ploughed and generally bioturbated soil, this absolute dating attempt has been of little value in placing the PS 43 finds in a firm chronological context.[36]

Sample	Depth below surface	Age (ka)	Error (standard deviation)
PS 43B	35 cm	48.0	24.0
PS 43C	35 cm	19.0	8.0

Fig. 28. OSL dates from PS 43. The two samples were taken in tract D 80 with a distance of 40 m between each other, both by ~35° sloped penetration from the surface.

Discussion

PS 43 is a multi-period site containing knapped-stone left behind by Middle Palaeolithic, Late Upper Palaeolithic or Mesolithic and Neolithic groups having a highly mobile lifestyle. In terms of content, it is similar to other open-air sites of the Ionian zone where flint artefact recovery combined with no pottery or architectural remains dominates the archaeological picture.[37]

At the early stages of research on the PS 43 material, the predominance of flakes produced by simple flaking methods, combined with a good number of tools with minute retouch and the absence of any ceramic finds, guided us to consider the late component of the site as predominantly Mesolithic. PS 43, then, would be the second Mesolithic site on Kokytos following PS 3 for which Mesolithic affinities were proposed on the basis of artefact technology and typology.[38] PS 3, which is located ca. 4 km to the west of PS 43, is a flake industry, producing debitage of comparable small size, manufactured on the same variety of raw materials that exhibit little or no patination. At PS 3 there are very few bladelets and laminar flakes and blades. Cores are of small overall size, and

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[34] Thiel *et al.* 2011.
[35] Bassiakos and Athanassas 2012.
[36] They vividly show the need of a more flexible legislation that allows a strategy of surface survey combined with small-scale test-pit excavation to shed light on the context and chronology of sediment deposition. The Thesprotia Expedition research permit allowed trial excavations at a handful of sites, but PS 43 was not one of the sites included in the trial excavation programme.
[37] Runnels and van Andel 2003; Galanidou 2014; van Wijngaarden *et al.* 2013.
[38] Tourloukis and Palli 2009.

no specific form, with the occasional preparation of platforms and multiple directions of removal. In some cases irregular, occasional and marginal (nibbling) retouch is hard to distinguish from edge-damage from use rather than systematic retouch. At PS 3 there are numerous notches and denticulates, pieces with direct or inverse linear retouch, and numerous pieces with short irregular retouch as well as the occasional endscraper or sidescraper, yet no other formal tool types. The PS 3 industry points to an opportunistic use of tools. Possible Mesolithic material is also reported further south at six sites in the Preveza nomos and some of them are securely placed to the early Holocene by optically stimulated luminescence dates.[39] Mesolithic presence is radiocarbon dated north of the Kokytos in the deposits of Konispol Cave in south Albania[40] and in other open-air sites.[41]

At PS 43 the burins and two scrapers may be parts of either a terminal Pleistocene or an early Holocene tool repertoire. Their classification in the latter could be argued on the basis of an overall good preservation, lack of patina and the conspicuous absence of other late Upper Palaeolithic tools, such as backed bladelets or micrograveттes.[42] Thus although a Mesolithic component is indeed present at PS 43 it cannot be distinguished from a terminal Upper Palaeolithic. Considering the record of northwestern Greece and Albania in terms of an Upper Palaeolithic to Mesolithic transition is not a productive approach, since a rupture from an old lifestyle to a new one is not supported by the archaeological evidence.[43] With the data to hand we envision that some late hunter/gatherers were present at the valley bottom and from a historical point of view it makes little difference whether they had crossed the Holocene threshold or not.

Beyond hunter/gatherer groups, the PS 43 assemblage contained a distinctive component associated with agropastoralist communities. A cluster of transverse arrowheads and a trapeze, made on flake blanks and showing standardization in production and morphology is a manifestation of later activity in the bottom of the valley. The comparanda for this group spread chronologically from the Early Neolithic to the Chalcolithic. The lack of opportunism in their retouch contrasts the group with other tools of an expedient character discussed above and encountered on site. It is not clear whether the tools with minute retouch ought to be solely attributed to the early Holocene or were indeed a trait of Neolithic assemblages recovered from open-air sites. The array of outdoor activities conducted outside a domestic setting (whatever that meant in the context of Thesprotia)[44]would require a different range of tools from those usually excavated within the confines of a Neolithic settlement. A good example of this dichotomy is seen in the archaeological evidence from the Orestias lake basin where one clearly sees the complementary nature of lithics from open-air sites in the environs of Dispilio recovered through surface survey with the lithics excavated in the settlement itself.[45] The contribution of off-site archaeology to offer a more complete picture of landscape use in a given region when combined with on-site settlement research is underlined.

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[39] Runnels and van Andel 2003, 118-123.
[40] Petruso *et al.* 2014.
[41] Ruka *et al.* 2014.
[42] This notwithstanding, it is possible that some late Upper Palaeolithic specimens are indeed lurking in the debitage and bladelet cores.
[43] Galanidou 2011.
[44] Forsén and Galanidou, this volume.
[45] Galanidou 2007; Doulkeridou 2009.

With regard to the prehistoric agropastoralist presence on PS 43, a question that emerges is, then, why are there so few sickle elements in the bottom of the Kokytos valley. Their total absence in PS 43 speaks for absence of agricultural or plant-harvesting activity. At the same time the presence of projectile points suggests hunting activity. In this respect PS 43 is in tune with the big picture obtained from the study of the Kokytos surface finds where sickles are very few compared to points and hunting implements, present in a ratio of 2:9.[46] In PS 43 as in other parts of the valley lowlands hunting activity, specialised and clearly focused or embedded within transhumance, is the one with the heavier imprint at Neolithic times.

The known Neolithic sites from Epirus and south Albania are typically associated with ceramic finds.[47] Seen from the same perspective of a site associated with outdoors Neolithic activity, the absence of pottery from PS 43 deserves our attention. What it shows us is that we can expect to discover Neolithic sites with no pottery without necessarily blaming the poor ceramic preservation, post-depositional attrition or taphonomy for this absence. When Neolithic people were involved in hunting or animal attending activity, in which high mobility in the landscape was essential, ceramic containers would be a burden. During hunting these could well be replaced by lighter containers, for instance flasks made out of animal skins. And even those organic containers may not have been necessary if distances from the permanent settlement were not great and deep knowledge and mapping of the landscape features would lead Neolithic hunters to the fresh-water springs to drink water when thirsty.

There are many archaeological questions that can be resolved without the walking stick of stratigraphy and date. PS 43 sends a strong Neolithic signal, a signal that relates to a mobile lifestyle rather than a sedentary one. A Neolithic site in the open-air, devoid of pottery and built structures which, like the one discovered by Nikos Pantazopoulos in the vicinity of Dispilio at the Orestias Lake Basin, speaks for Neolithic people in their landscape. It invites us to envision Neolithic life beyond the boundaries of a settlement or a cave.

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[46] Forsén *et al.*, this volume.

[47] Douzougli 1996; Dousougli and Zachos 2002; Youni 2010; Lera *et al.* 2015; Winjen 1981.

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