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Short-Term Occupations in Paleolithic Archaeology

Definition and Interpretation

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Occupying Cave-Sites: A Case Study from Azokh 1 Cave (Southern Caucasus)

Lena Asryan, Andreu Ollé, Norah Moloney, and Tania King

1 Introduction

Site classification (e.g. base camps, short-/long-term occupation sites or ephemeral butchering sites) based on archaeological or ethnographic data (Isaac 1971; Binford 1983) is often arbitrary and not applicable in all cases. It is a difficult task to distinguish individual occupations in archaeological sites, particularly in caves where the sedimentary record is often not clearly delimited. The accumulation of superimposed archaeological material with varying chronologies resulting from different occupations often makes it impossible to estimate the thickness of each individual accumulation and to evaluate the duration and type of occupation (Moncel and Rivals 2011).

† This paper is dedicated into the memory of our wonderful colleague and co-author Dr Norah Moloney, who recently passed away.

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In order to evaluate site occupation and the history of its use by hominins and different animals, it is important to understand the full taphonomic history of the site. There are many different agents (e.g. post-depositional processes, water-induced movements and sedimentation) that may modify the archaeological context, and carnivores are recognised as one of the most active of these agents (Straus 1982; Gamble 1983; Stiner et al. 1996; Villa and Soressi 2000; Camarós et al. 2017). The alternate use of cave sites by hominins and carnivores is well documented in a number of sites (Straus ibid, Baryshnikov et al. 1996; Stiner 1999 among others). Spatial modifications made by these agents often make the archaeological context difficult to study and understand (Camarós et al. 2017).

Faunal remains of anthropogenic origin are recognised as having the potential to characterise the nature of hominin settlement in an archaeological site. However, interpretation is not easy, as faunal remains resulting from human activity could be the outcome of one or several repeated visits to the same place, potentially corresponding to the exploitation of a few animals during each occupation period (Moncel and Rivals 2011; Saladié et al. 2018). Study of the density of remains of one species and evidence of bone exploitation allows researchers to infer specialised occupations (e.g. a butchery site) and whether these occurred during short-term/seasonal visits or longer, more intensive occupations (Jaubert et al. 1990; Armand et al. 2001; Wenban-Smith et al. 2006).

Lithic artefacts can provide valuable information of the type and intensity of site occupation, land use, nature of raw material acquisition and mobility strategies (Kuhn 1994; Petraglia and Potts 1994; Dibble et al. 1997). The relationships between raw materials, tool types and length of occupation (Binford 1983; Kuhn 1992, 1995) or between the proportion of retouched tools and density of material (Conard 2001) and the presence of other components (e.g. refits, cortical pieces, knapping wastes) are often taken into consideration when determining the type of occupation. Short-term or seasonal occupations are often associated with the presence of specialised tools made on raw materials from distant sources or with the presence of used multifunctional or mobile toolkits (Kuhn 1994). In contrast, evidence such as the exploitation of local raw materials from sources close to a site and the presence of most components of the operative chain in the assemblage have been associated with relatively stable or to long-term occupations (Kuhn ibid).

This paper aims to examine the nature of the occupation of Azokh Cave using the archaeological evidence from two stratigraphic units (Units II and V). Our study combines the faunal and lithic assemblages. The stratigraphic sequence at Azokh Cave presents one of the most complete and, to date, one of the oldest archaeological records in the Nagorno Karabakh region that records the alternate use of a site by different hominins and large carnivores. While the Azokh 1 entrance was excavated extensively during the Soviet period, further recovery of archaeological material has been possible through the renewed phase of excavations (ongoing since 2002). These have allowed the further recovery of archaeological material by focusing the investigations on the remaining sediments at the rear of this entrance. These excavations have provided high-resolution data needed for making interpretations about hominin behaviour and occupations of this important archaeological Middle to Upper Pleistocene site in the Southern Caucasus.

2 The Site

Azokh Cave site is located in the Ishkhanaget River valley in Nagorno Karabakh (Southern Caucasus). The cave system is karstic and is developed on thickly bedded Mesozoic carbonates. The limestone bedrock that hosts the Azokh Cave system varies in texture between wackestone and grainstone. In some places, it is also partially silicified and contains chert. The cave system is comprised of a series of NNW to SSE trending interconnected and sub-rounded chambers that extend for almost 130 m (Murray et al. 2016). These inner chambers appear to lack archaeological remains and are presently inhabited by one of the largest bat colonies in the South Caucasus. Several entrance passageways connect the inner parts of the cave to the exterior. Of these entrance passages, only Azokh 1, Azokh 2 and Azokh 5 entrances (Fig. 1) have provided geo-archaeological sediment infill. Azokh 1, which has been the main focus of investigations, is the only entrance to date with Pleistocene to Holocene sediment infill (Fernández-Jalvo et al. 2016a; Murray et al. ibid).

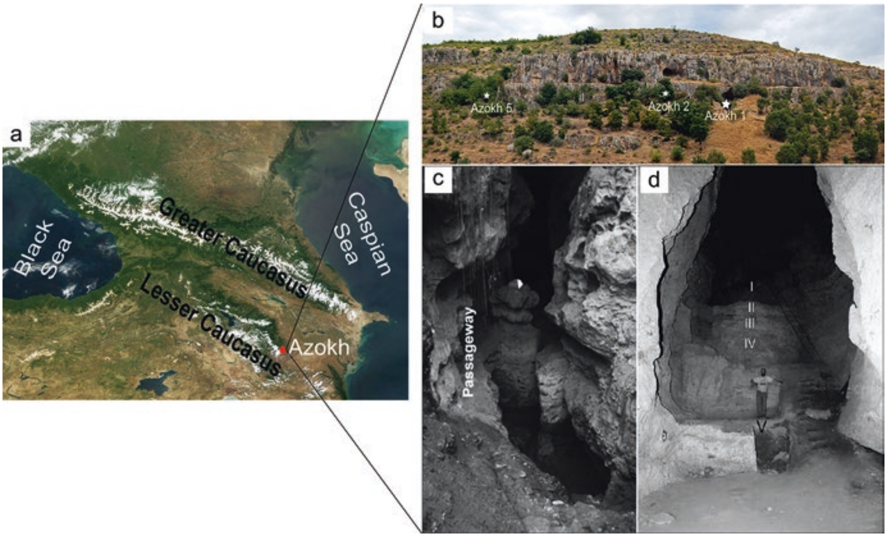

Fig. 1 The site of Azokh Cave: (**a**) the location of Azokh Cave in the Lesser Caucasus; (**b**) the entrance passageways of Azokh 1, 2 and 5; (**c**) The Azokh 1 entrance; and (**d**) upper archaeological sedimentary sequence (Units V–I) at the rear of the Azokh 1 entrance

Azokh 1 Cave Stratigraphy

Azokh 1 is a large passageway measuring 40 m long and 11.5 m in height. Two geological sequences (termed sediment sequences), separated physically and containing nine sedimentary units, have been described (Fernández-Jalvo et al. 2016a; Murray et al. 2016). The lower sedimentary sequence (referred to as sediment

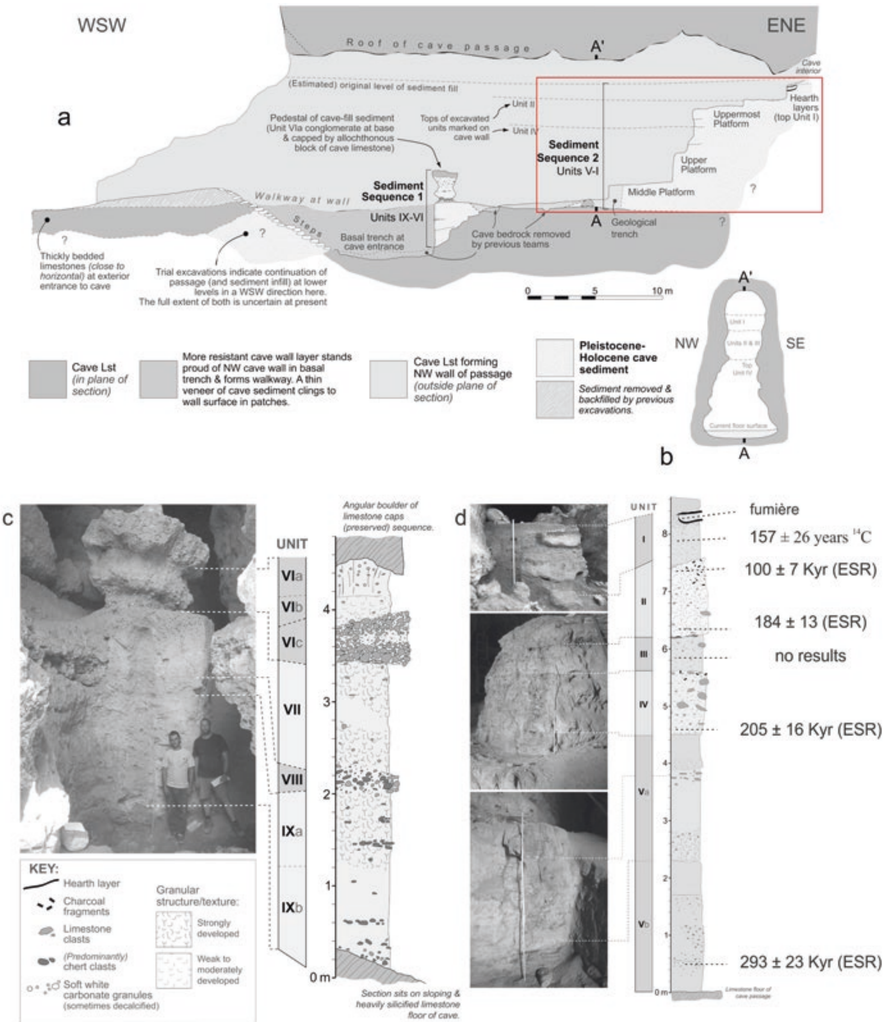

Fig. 2 Stratigraphy of Azokh 1: (**a**) Cross section drawing of the entrance passage sketch made facing NW showing the estimated volume of sediments removed in the previous excavations. The remaining sediments, which are the focus of the current excavations, are indicated by the red box. (**b**) Cross section (orthogonal to the section shown in (**a**)) of Azokh 1 showing the keyhole shape of the passage; (**c**) Stratigraphy of sediment sequence 1; (**d**) Stratigraphy and dating of sediment sequence 2. (Adapted from Murray et al. 2010 and Murray et al. 2016)

sequence 1 and containing units IX–VI) is not physically connected with the upper sedimentary sequence (sediment sequence 2) and is mainly non-archaeological (Murray et al. 2010, 2016). Sediment sequence 2 has been the focus of the renewed excavations and contains units I–V. It represents a continuous archaeological record ranging in age from Middle Pleistocene (MIS 9–8) to Late Pleistocene (MIS 5) with some Holocene infill at the top of the sequence (Figs. 1 and 2). Unit V forms the base of the sediment sequence 2 and is its largest constituent unit, having a thickness of approximately 4.5 m. This unit is subdivided into two subunits: Vb at the base and Va above it (Murray et al. 2016). It has been noted that this subdivision may be subject to further revision (Murray et al. 2016). Thus, for the purposes of the study presented here, the archaeological material from this unit is referred to simply as belonging to Unit V rather than to subunits within it. Unit IV overlies Unit V and is 100–130 cm thick (Murray et al. 2016). No systematic excavations of this unit have yet been carried out. However, bones and charcoals were recovered from test-trench excavations. Unit III is 60–70 cm thick and contains charcoals, fossil bones and a few stone tools (Murray et al. 2016). Unit II is 100–200 cm thick and includes fossil fauna and stone tools (Murray et al. 2016). Sediment diagenesis most likely caused by bat guano has strongly affected the preservation of fossil bones and some stone artefacts from Unit II (Murray et al. 2010). Unit I (80–150 cm) has been disturbed considerably by ancient and modern animal burrowing (Murray et al. 2016). Palaeolithic faunal and lithic remains were recovered from these burrows together with modern artefacts.

A number of radiometric dates have been provided for sediment sequence 2 (Fernández-Jalvo et al. 2016b, Annex). For unit V, uranium series dating indicated an age of ca. 200 ka, racemisation (D/LAsp) provided an age of ca. 300 ka and ESR dating has suggested an age of 293 ± 23 ka. ESR dating indicates an age of 205 ± 16 ka for the contact between units IV and V. No dating was possible for unit III. ESR dating indicates an age of 184 ± 13 ka for the bottom of the unit II and 100 ± 7 ka for the contact between units I and II. AMS dating of unit I has produced an uncalibrated radiocarbon age of 157 ± 26 years BP (OxAC^{14}19424).

Non-lithic Remains

Around 13,000 specimens (almost 8500 faunal remains and 1199 lithic artefacts) were recovered and recorded in three dimensions during the 2002–2012 excavation seasons at Azokh 1 (Figs. 3 and 4).

In addition to the lithic assemblages discussed in this study, Azokh Cave has yielded a large and diverse fauna (macro-mammals and microvertebrates), hominin remains and charcoals, which together provide information on the paleontological, palaeoenvironmental and occupational patterns of the cave.

Azokh Cave provided evidence of three different species of *Homo*: *H. heidelbergensis* (Unit V, Azokh 1), *H. neanderthalensis* (Unit II, Azokh 1) and *H. sapiens* (Azokh 2 and Azokh 5 entrances) (see details in King et al. 2016).

Recent studies indicate the presence of large mammal fauna (particularly *Ursus spelaeus*) in almost all units of sediment sequence 2 of Azokh 1 Cave (van der Made et al. 2016). Carnivore remains (*Canis aureus*, *Crocuta crocuta*, *Lynx* sp., *Felis*

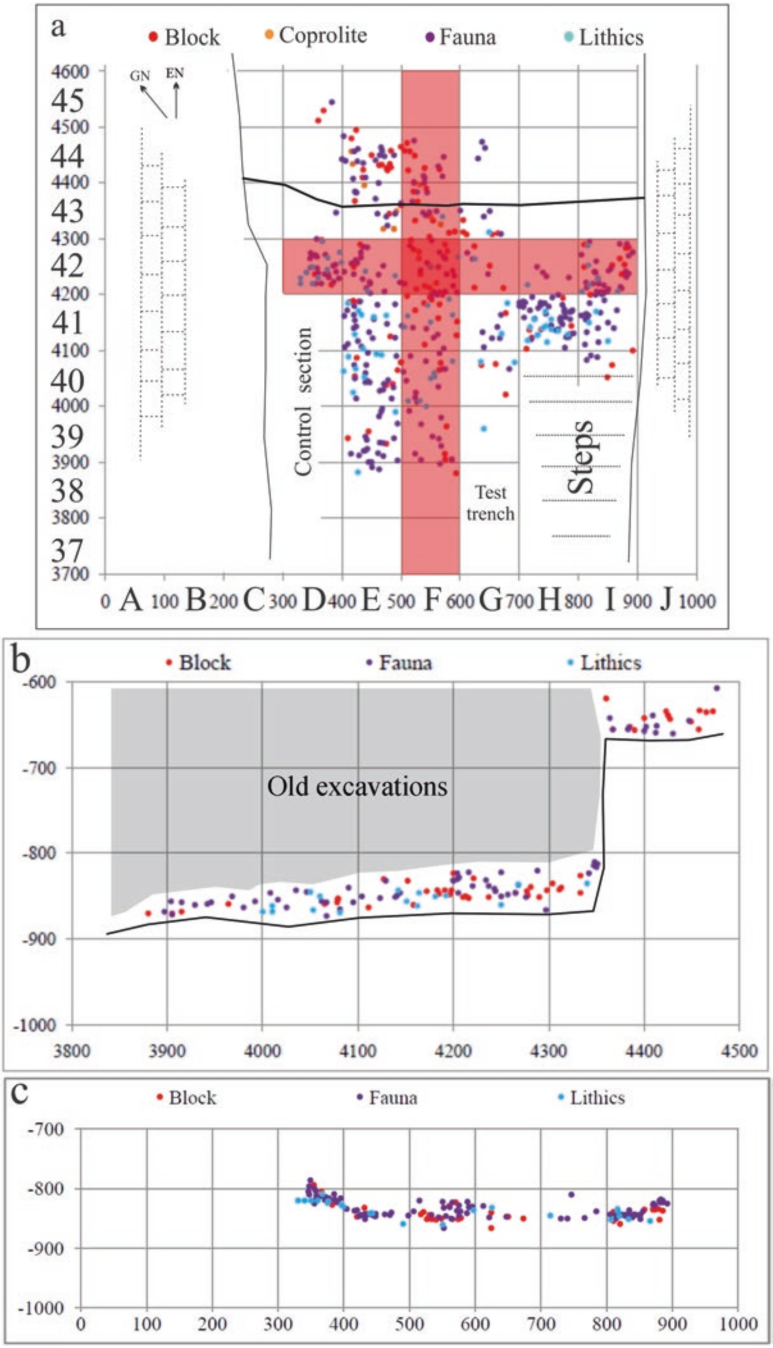

Fig. 3 Dispersion of Unit V archaeological finds: (**a**) spatial dispersion of finds according to X and Y coordinates; (**b**) profile of the South-North band highlighted in figure '**a**'; (**c**) profile of the West-East band highlighted in figure '**a**'. The arrows of the figure 'a' indicate the geographic (GN) and excavation North (EN) of the site. Here the EN was used

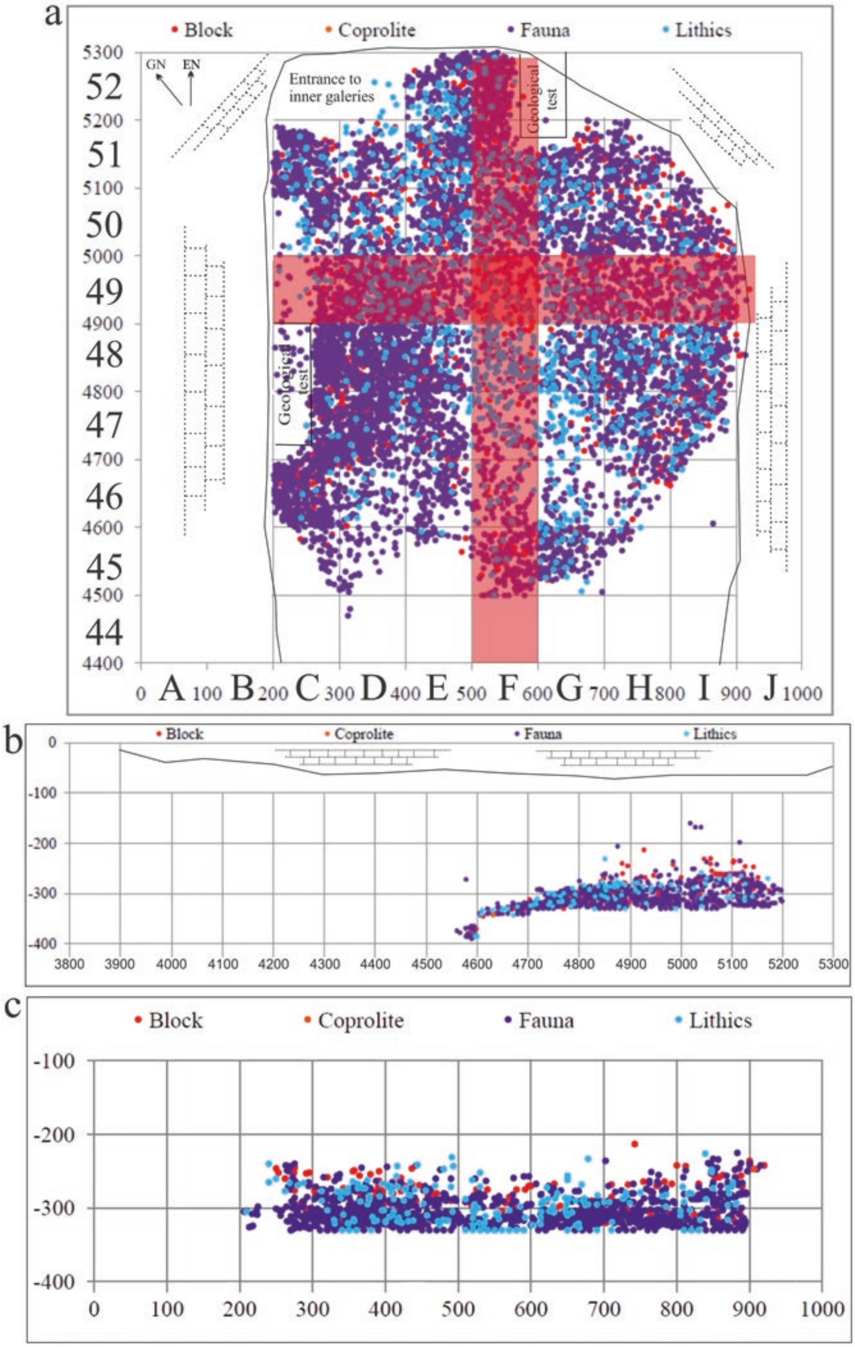

Fig. 4 Dispersion of Unit II archaeological remains: (**a**) spatial dispersion of finds according to X and Y coordinates; (**b**) profile of the South-North band highlighted in figure '**a**'; (**c**) profile of the West-East band highlighted in figure '**a**'. The arrows of the figure '**a**' indicate the geographic (GN) and excavation North (EN) of the site. Here the EN was used

chaus, *Panthera pardus,* etc.) are mainly from Unit V, although some felids (*Panthera pardus*) and canids (*Vulpes vulpes*, *Canis lupus*) are present in Units III and II. Bison (*Bison schoetensacki, Bos/Bison*) are from Units VI, V and II. Other ungulates, such as *Cervus elaphus* and *Capra aegagrus* are well evidenced in almost all units. Rhino (*Stephanorhinus hemitoechus*, *Stephanorhinus kirchbergensis*) and different species of horse (*Equus hydruntinus*, *Equus ferus*) are characteristic of Units VI, V and III. Taphonomic studies indicate that faunal remains recovered from Unit III and from the upper part of Unit V consist mainly of low meat-/low marrow-bearing elements, including fibulae and hand and foot bones (Marin-Monfort et al. 2016). Many bones are complete, and some show cut-marks. Unit II contains large, marrow-rich cave bear limb bones. Some show signs of human activity (e.g. carcass selection, cut-marks and skin removal), although large unbroken bones are also evident. The sparse and incomplete character of small and medium-sized animal skeletons indicate the unusual character of carcass selection and subsequent manipulation (Marín-Monfort et al. ibid).

Azokh 1 Cave has provided a rich and diverse small mammal fauna. A large variety (at least 24 taxa) of insectivore, rodents and lagomorphs was recovered throughout the upper sedimentary sequence with arvicoline rodents being the most abundant group (Parfitt 2016). There is a considerable variety of bats (Sevilla 2016). Amphibians and reptiles were recovered from all units within sediment sequence 2 of Azokh 1 (Blain 2016).

The large mammal fauna is mostly typical of closed environments and dominated by woodland species; however, there are some species adapted to mountainous, rocky or arid environments too (van der van der Made et al. 2016). The Pleistocene small mammal fauna and amphibians and reptiles indicate primarily open dry environments with warm and dry conditions, although there is some rare evidence also for woodland species (Blain 2016; Parfitt 2016; Sevilla 2016).

Charcoal was recovered from all units in the upper sequence, with a greater number found in Units V and II. Recent studies of charcoal remains identified nine plant taxa of which *Prunus* was the most abundant, representing 80% of the Unit II record (Allué 2016).

3 Materials and Methods

The 1,199 lithic artefacts described in this chapter are from the 2002 to 2012 excavations and were recovered from Units V, IV, III, II and I of the upper sedimentary sequence of Azokh 1 Cave. Of these, 1,034 pieces are from Unit II and were retrieved during excavations conducted from 2003 to 2012 from a 42 m^2 area. Fifty-nine pieces were recovered from small (6 m^2) test-trench excavations in Unit III excavated in 2003 and between 2010 and 2012. Four pieces were found during a test-trench excavation in Unit IV (2 m^2). Units III and IV have not been extensively excavated and the techno-typology of the lithics recovered from these units is not yet clear. For this reason, these lithic remains were excluded from the final discussion presented here in this chapter. Further, 77 pieces were recovered from Unit V from a 25 m^2 area excavated between 2002 and 2005 and a 40 m^2 area that was excavated in 2009. Finally, 25 pieces were recovered from Unit I. Given that this unit is highly disturbed, this assemblage was not included in the final discussion.

The following parameters were examined in this study:

(1) A raw material study including surveys of different local and nonlocal sources, macro- and microscopic characterisation of different lithologies and their comparison with archaeological material. (2) A techno-typological study of lithic remains combining the Logical Analytical System (Carbonell et al. 1992 and Rodríguez 2004), as well as the Anglo-Saxon and the French methodological schools (Bordes 1961; Laplace 1972; Clark 2001). (3) A use-wear analysis was conducted using optical light (ZEISS Axioscope A1) and scanning electron (SEM JEOL 6400 and FEI Quanta 600) microscopes. (4) Finally, a study of post-depositional surface modifications [PDSM] was carried out. This used a database specifically created for this analysis and based on different studies such as Levi-Sala (1986), Karkanas et al. (2000) and Burroni et al. (2002), among others. Optical and scanning electron microscopes were used for this study too.

4 Results

4.1 Raw Materials

The bulk of the lithic artefacts recovered from Units V–I is on sedimentary rocks (88.4%) with the remaining 11.6% on igneous rocks.

Chert and flint are the most common sedimentary rocks, followed by limestone, jasper, sandstone, a few chalcedony, agate and xylopal. Basalt dominates among the igneous rocks, followed by obsidian, andesite and gabbro (Table 1).

For the purposes of this study, the term ‘chert’ is used to refer to siliceous material originating from the karstic formation of Azokh Cave. The term ‘flint’ refers to other siliceous materials in the form of nodules available in Cretaceous chalk and originating from elsewhere. Chert is the most abundant raw material but not the most exploited, in the Azokh lithic assemblage (56.7% of the assemblage). It is mainly grey to brownish grey, fine-grained and homogeneous, although with numerous internal fissures and cracks that make it quite difficult to knap. Nodules or big blocks of chert are available within the karstic system of the cave and in nearby surrounding areas. Flint is the most varied raw material in all units, particularly in Unit II where 21 different raw material groups of flint were identified. Colour varies from grey, brown and orange to a combination of several colours. It is mainly fine-grained, homogeneous and easy to work. Some flint types are locally available, although others seem to originate from distant sources. Basalt is well represented in all units. It varies in colour from various shades of black to green and grey and is usually fine-grained, homogeneous and of good quality. Limestone is found infre-

Table 1 Raw materials represented in the lithic assemblages of Azokh 1 Cave

	RM types	Unit V	%	Unit IV	%	Unit III	%	Unit II	%	Unit I	%	Total	%
Sedimentary	Chert	33	42.9	1	25	46	78	589	57	11	44	680	56.7
	Flint	19	24.7	2	50	4	6.8	293	28.3	10	40	328	27.4
	Limestone	3	3.9	–		1	1.7	18	1.7	1	4	23	1.9
	Jasper	–		–		2	3.4	8	0.8	–		10	0.8
	Sandstone	–	–	–	–	1	1.7	6	0.6	1	4	8	0.7
	Chalcedony	1	1.3	–	–	–	–	3	0.3	–	–	4	0.3
	Xylopal	1	1.3	–	–	–	–	–	–	–	–	1	0.1
	Agate	–	–	–	–	–	–	1	0.1	–	–	1	0.1
Igneous	Basalt	17	22.1	1	25	4	6.8	97	9.4	1	4	120	10
	Andesite	–	–	–	–	–	–	4	0.4	–	–	4	0.3
	Obsidian	3	3.9	–		1	1.7	14	1.3	1	4	19	1.6
	Gabbro	–	–	–	–	–	–	1	0.1	–	–	1	0.1
	Total	**77**	**100**	**4**	**100**	**59**	**100**	**1034**	**100**	**25**	**100**	**1199**	**100**

quently in all units of the Azokh 1 upper sequence. It is mainly of medium-to-poor quality with many fissures and impurities. Obsidian, although scarce, is represented in most units of the upper sequence of Azokh 1 Cave. It varies from greyish black to a mixture of yellowish brown and black, is fine-grained, homogeneous and very good to knap. Other raw materials such as jasper, sandstone, chalcedony, agate, xylopal and gabbro are represented in very small numbers and vary from medium to good quality.

4.2 Techno-Typological Study Results

The studied sample consists of unknapped cobbles/pebbles, cores, retouched and unretouched flakes, broken flakes (that present a platform, yet are missing the distal end or part of the laterals), flake fragments (presenting distal or lateral segments without a platform) and fragments (i.e. angular fragments without an identifiable platform, ventral or dorsal face) (Table 2). Most of the complete cores and flakes in all units vary in size from 26 to 69 mm. These form 16.3% of the lithic assemblage, although there are bigger (70–99 mm) and smaller (≤25 mm) pieces. Only 2% of artefacts exceed 100 mm.

4.2.1 Unit V

The lithic assemblage (77 pieces) recovered from Unit V is composed primarily of retouched flakes and flake fragments, with some undiagnostic fragments, unbroken flakes and simple cores (Table 2). There are no unknapped cobbles/pebbles and hammerstones in this unit. Two cores (one flint and one basalt) were recovered, which form 2.6% of Unit V assemblage. These vary in size from 50 to 70 mm and are the result of nodule exploitation. The final removals of the flint core show it is

Table 2 Numbers and percentages of lithic artefact types according to stratigraphic unit and technological category

Category	V	%	IV	%	III	%	II	%	I	%	Total	%
Unknapped cobbles/pebbles[a]	–	–	–	–	2	3.4	8	0.8	1	4	11	0.9
Core	2	2.6	–	–	–	–	19	1.8	1	4	22	1.8
Unretouched flake	7	9.1	2	50	5	8.5	103	9.9	4	16	121	10.1
Retouched flake	23	29.9	1	25	3	5.1	96	9.3	–	–	123	10.3
Broken flake	8	10.4	–	–	2	3.4	91	8.8	3	12	104	8.7
Flake fragment	21	27.3	1	25	14	23.7	272	26.3	12	48	320	26.7
Fragment	16	20.8	–	–	33	55.9	445	43	4	16	498	41.5
Total	**77**	**100**	**4**	**100**	**59**	**100**	**1034**	**100**	**25**	**100**	**1199**	**100**

[a]Among unknapped cobbles/pebbles, only four basalt pieces from Unit II show percussion marks (2) and breaks (2) pointing to their use as a hammerstone

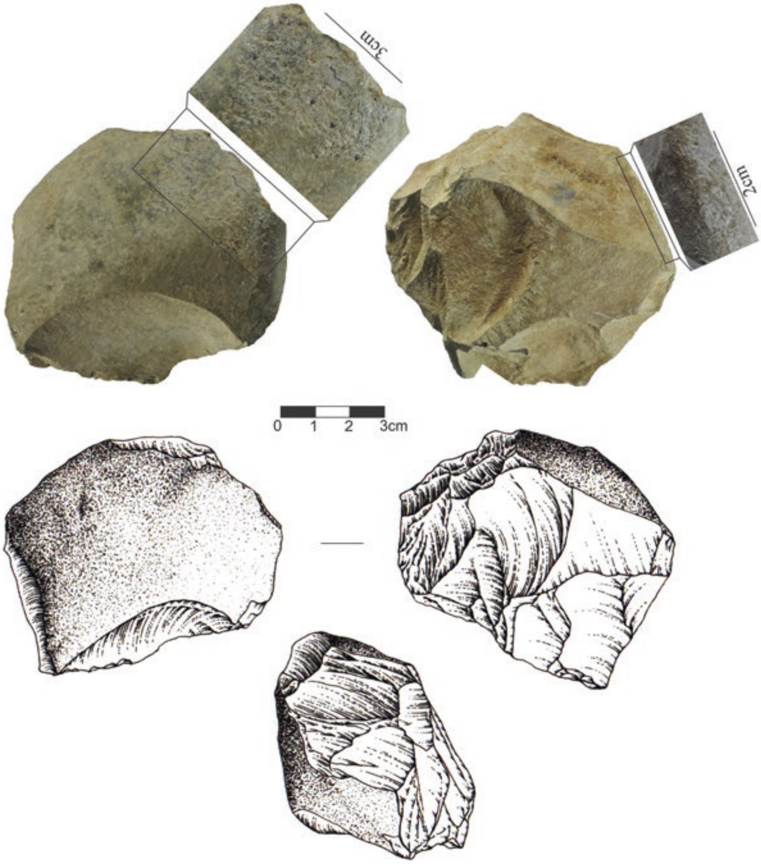

Fig. 5 Basalt bifacial core (E40-4-unV-2005) from Unit V. The areas on both faces encompassed by rectangles indicate the areas with post-exploitation percussion marks

bifacial and hierarchised with one exploitation face and one preparation face. The basalt core is bifacial non-hierarchised both faces acting alternatively as a knapping face and striking platform. The final visible negatives on the flint core are orthogonal and radial on the basalt core. The technological characteristics of the flint core indicate possible bipolar Levallois reduction, and those on the basalt core suggest discoidal exploitation. While the flint core had been abandoned at its final stages of exploitation, the basalt core could have been further exploited. Evidence of additional use of the basalt core as a hammerstone is seen by the presence of percussion marks and some irregular fractures (Fig. 5). As yet no pieces have been directly refitted on these two cores.

Levallois technology is not common in Unit V, but a few flint flakes show some Levallois characteristics. However, technologically, these are not well worked (e.g. there is evidence of poor platform preparation and a poorer organisation of dorsal removals than is seen in Unit II).

The Unit V lithic assemblage is dominated by knapping products (nearly 47%). These are mainly non-cortical with an average length between 40 and 100 mm, while a few larger pieces are present. Most flakes have non-cortical, flat, small platforms that are primarily triangular and trapezoidal, straight and sinuous. While there are generally three or four dorsal negatives, some flakes have one, two and six negatives. Most scars tend to be unidirectional parallel, but some are bidirectional orthogonal and centripetal. Morphologically, knapping products tend to be trapezoidal, triangular and, sometimes, oval.

Three basalt pieces have been refitted and form a cortical cover, suggesting some isolated knapping activities in this unit (Fig. 6).

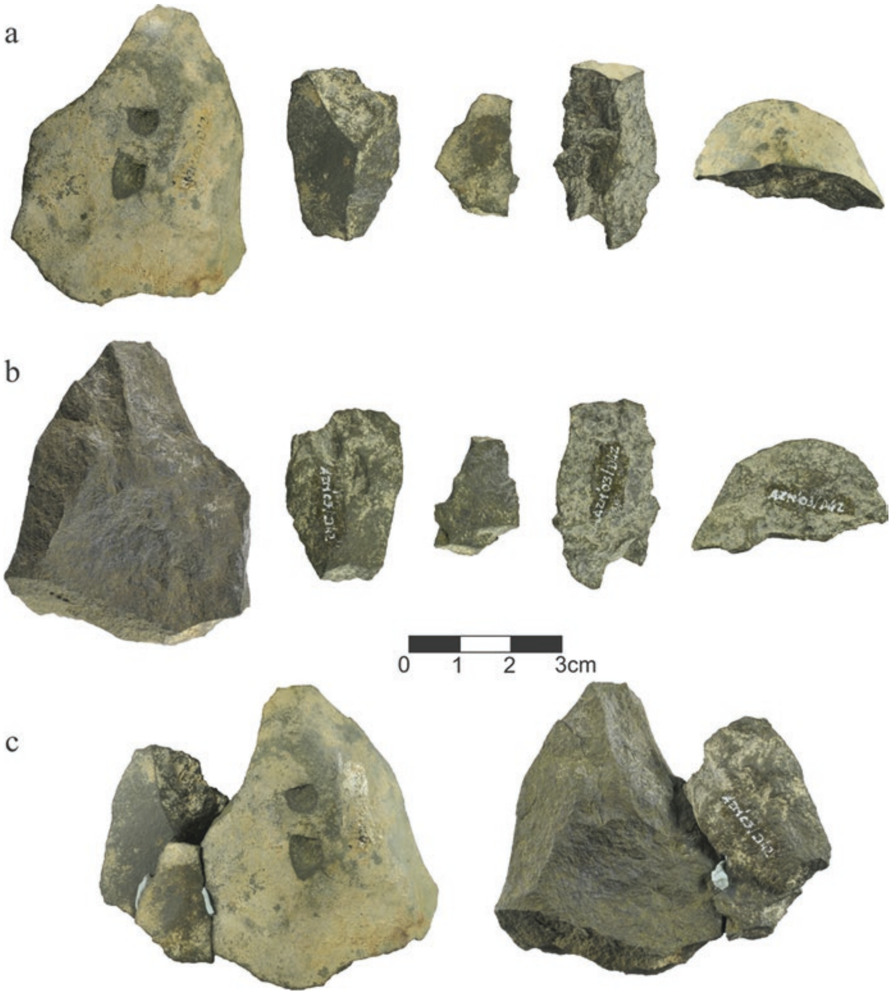

Fig. 6 A set of refitted basalt artefacts (direct refits are the first three samples of lines a and b, the remaining two are from the same nodule but do not refit directly): (**a**) dorsal face; (**b**) ventral faces; (**c**) the refitting of three samples

Almost 30% of Unit V knapping products have been retouched. There are no size differences noted between retouched and unretouched flakes, although thick, partially cortical flakes were often selected for retouch. Retouch generally occupies one or two lateral edges. It is usually unifacial, continuous, deep and made at an acute and semi-abrupt angle. One generation retouch dominates, but a few pieces have stepped (two generation) retouch. Typologically, most retouched pieces are deep side-scrapers with a few denticulates, notches, simple points, an end-scraper and a single bec (Fig. 7).

The patina and lustre characteristics on some retouched flakes may indicate recycling/possible reuse.

4.2.2 Unit II

1,034 lithic artefacts were recovered from Unit II. Flake fragments and undiagnostic fragments (together forming 70% of the assemblage) dominate. Unbroken unretouched flakes, retouched flakes and broken flakes form 28% of the assemblage. There are a few unknapped cobbles/pebbles and hammerstones, cores and retouched fragments (Table 2). Artefact size mainly varies between ~25 and 70 mm, with a few pieces >100 mm and <25 mm. Nearly 30% of unbroken flakes, particularly those on flint and basalt, are elongated.

The few ($n = 8$) unknapped cobbles/pebbles in this unit are mostly basalt, while one is sandstone. They are rounded and, in some cases, polished. Almost all present patina and have concretion that hinders a more detailed study and analysis of their potential use. Four pieces have percussion marks and breaks.

Cores form 1.6% of Unit II lithic assemblage. These are mainly flint and basalt, while one is chert. Most cores result from nodule exploitation, although there are a few cores on flint flakes (Fig. 8). Cores range in length from 4 to 6 cm. Partial cortex is present on almost all. Core organisation is mainly bifacial and hierarchised (one non-hierarchised), and more rarely trifacial, unifacial and non-hierarchised. Final removals are primarily centripetal, at times orthogonal and opposed. Most cores were abandoned at their final stages of exploitation when the complete nodule was fully exhausted; a few, including a chert core, were abandoned due to poor raw material quality. Some exhausted cores were further modified using denticulated or continuous retouch. Three different reduction sequences of core exploitation were distinguished in this unit: (1) Levallois (which is the most common reduction sequence and which is seen in 13 out of 17 cores); (2) discoidal; and (3) multifacial orthogonal/opposed. These cores are characterised by the presence of more than two exploitation/preparation faces, while neither is hierarchised. Striking platforms are orthogonal (more rarely opposed), showing orthogonal organisation of removals.

The cores from Unit II present clearly organised operative schemes with clearly defined exploitation techniques. The small size of most cores and further retouch of some indicate maximum exploitation and use of good-quality, non-local raw materials.

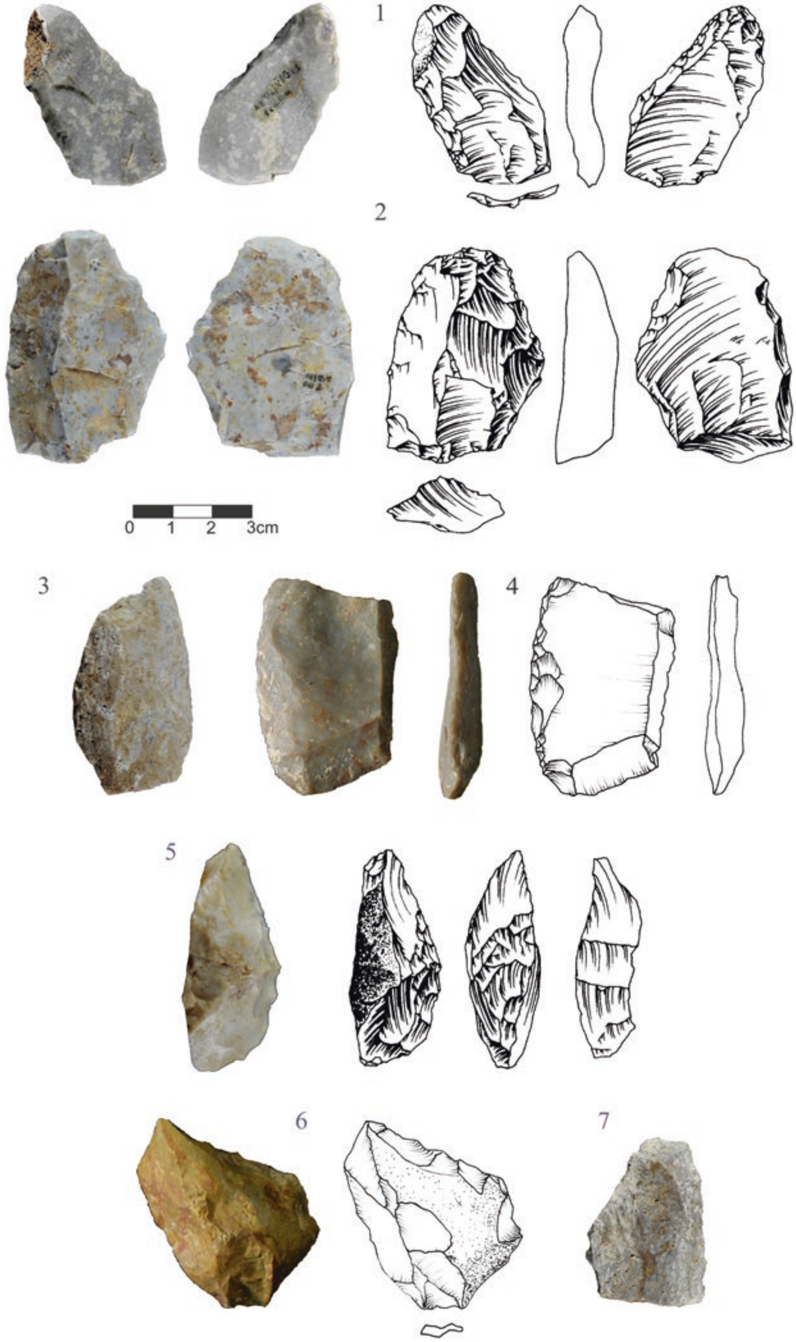

Fig. 7 Unit V retouched flint flakes: (**1**) Double side-scrapers (G41-gf-unV-2002), dorsal (left) and ventral (right) faces; (**2–7**) Single side scrapers (F41-2-unV-2005 (2); F40-4-unV-2009 (3); F40-2-unV-2009 (4); I41-19-unV-2009 (5); H41-10-unV-2009 (6); I41-5-unV-2009 (7)). Frontal (left) and lateral (right) views

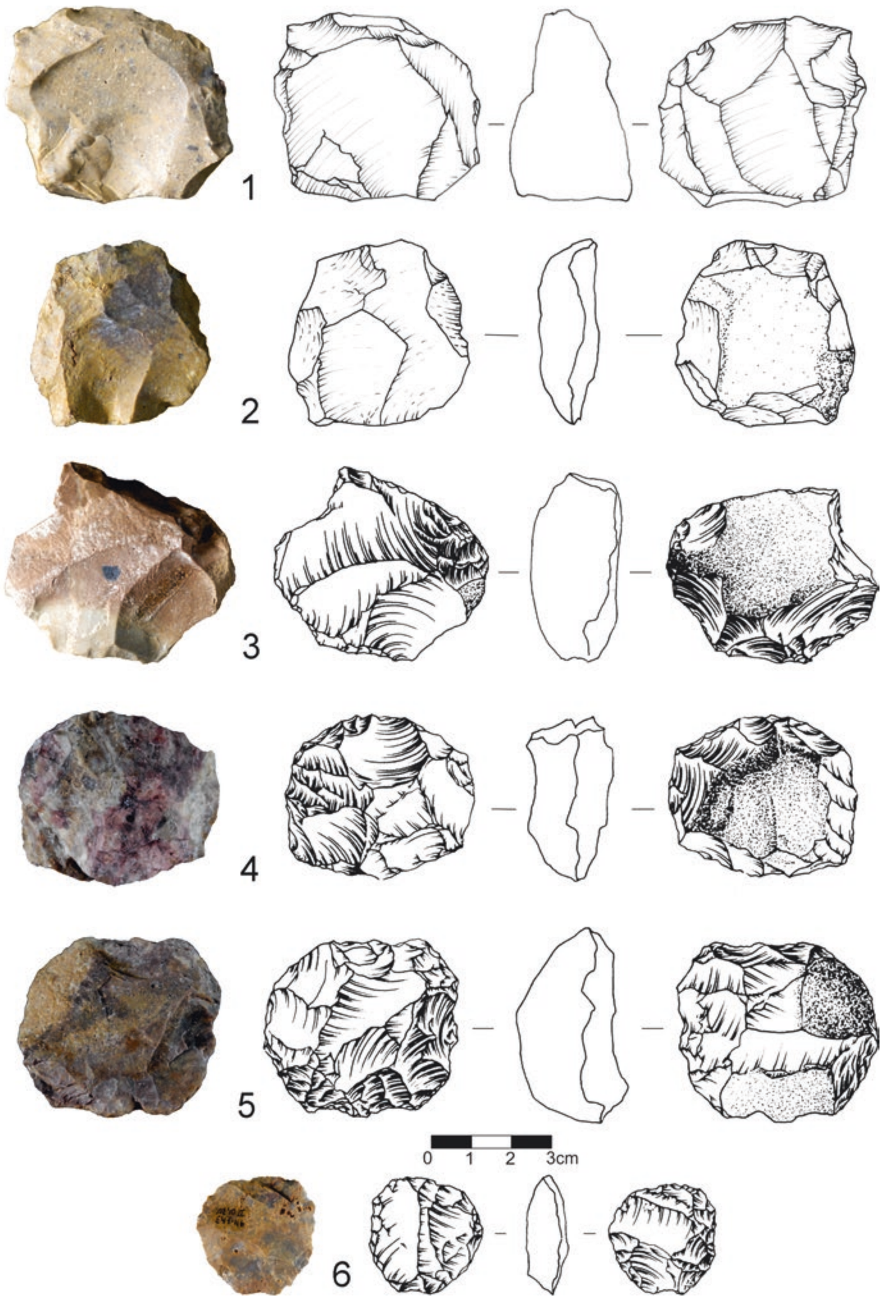

Fig. 8 Unit II bifacial Levallois flint cores: (**1**) G47-3-unII-2005, (**2**) F48–139-unII-2006, (**3**) D46-56-unII-2003, (**4**) F48-24-unII-2011, (**5**) H50-13-unII-2010, and (**6**) E47-116-unII-2010

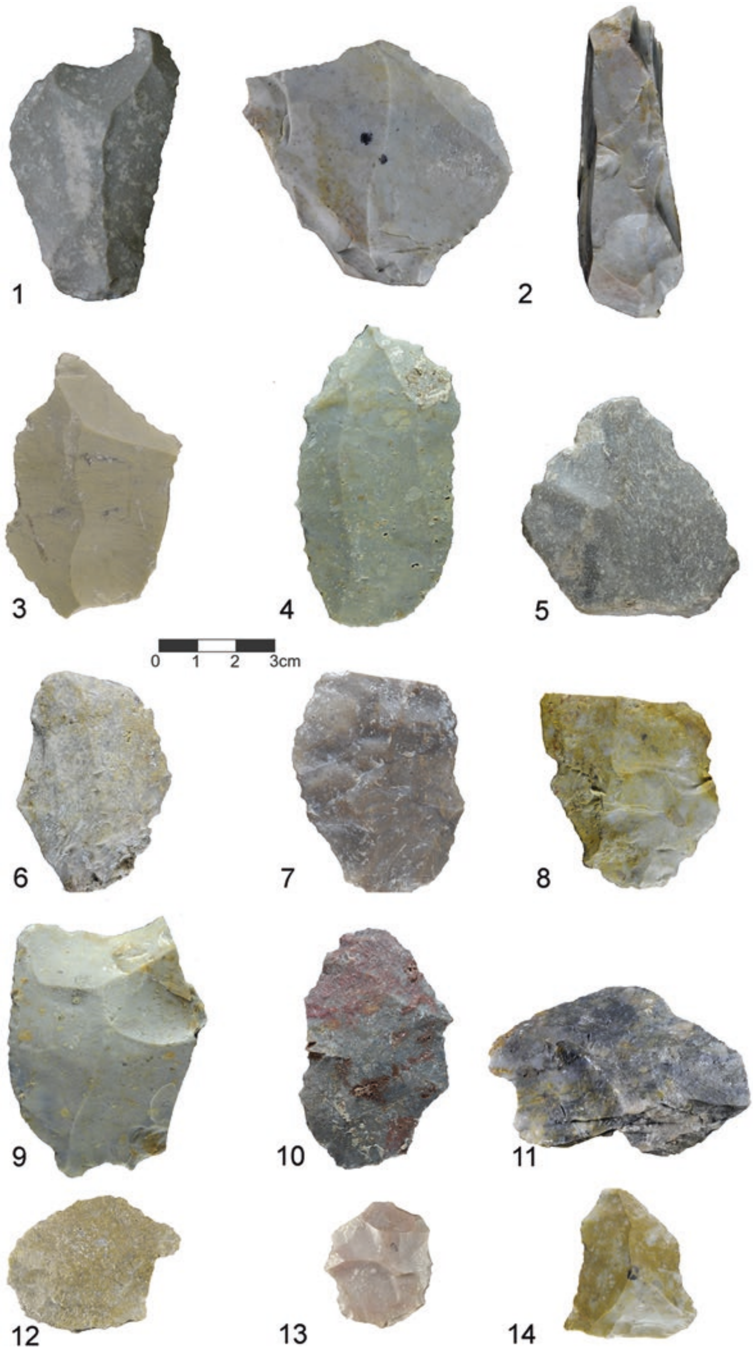

Fig. 9 Unit II flint flakes: (**1–8**) Levallois flakes with bidirectionally distributed dorsal negatives; (**9–14**) Levallois flakes with centripetal dorsal negatives

Technologically, flake products have mainly non-cortical, well-prepared bifaceted and multifaceted platforms, some with a clear *chapeau de gendarme* or 'wing-like' morphology. Artefacts are generally non-cortical and usually have more than three negatives of previous removals, which are primarily longitudinal, orthogonal and centripetal. The horizontal morphology of most artefacts is trapezoidal, while some are triangular, polygonal and oval (Fig. 9). Levallois technology is commonly used for flake manufacture. The presence of some knapping waste, mainly flint and basalt, indicates knapping or retouching activities may have taken place in the cave.

The blanks of almost all raw materials selected for retouching are often larger than unretouched flakes. However, both groups are almost always consistent in technological terms. Levallois flakes dominate with clear evidence of prepared platforms, organised dorsal removals resulting in the clearly evident predetermined character of these blanks. Retouch is usually unifacial, direct, continuous, from marginal to deep occupying one sometimes also two laterals of the flake, made at semi-abrupt and acute angle. Most flakes have one generation of retouch, although some (particularly obsidian) have invasive stepped or scalar retouch. Typologically, deep side scrapers dominate (almost 43%) followed by denticulates and notches. Post-depositional surface modification evident in this assemblage hinders the study of possible re-use or recycling, although some different patina existing on the retouched and unretouched parts of some flint and basalt pieces indicates that these may have been recycled.

4.3 Functional Study Results

Fifty-two artefacts (4.3% of the total number of pieces) were included in the functional analysis, most from Unit II, some from Units V and III. More than 80% were made from flint, with a few basalt, obsidian, jasper and xylopal pieces. The majority were retouched flakes (primarily side-scrapers), and a number of unretouched flakes were included too (Table 3).

Rounding, polish, linear features and edge damage were the clearest wear features on artefact edges. On those artefacts with clear signs of use, there was good

Table 3 Pieces used for functional studies according to unit, raw material (RM) and techno/typological category

Units/raw mat-s	Flint	Basalt	Obsidian	Jasper	Xylopal	Total
Unit V	6rf/1unrf	1rf	1rf	–	1rf	10
Unit III	–	–	1rf	1rf	–	2
Unit II	18rf/17unrf	5rf	–	–	–	40
Total rf/unrf	24rf/18unrf	6rf	2rf	1rf	1rf	**34rf/18unrf**
Total per RM	42	6	2	1	1	**52**

rf retouched flake, *unrf* unretouched flake

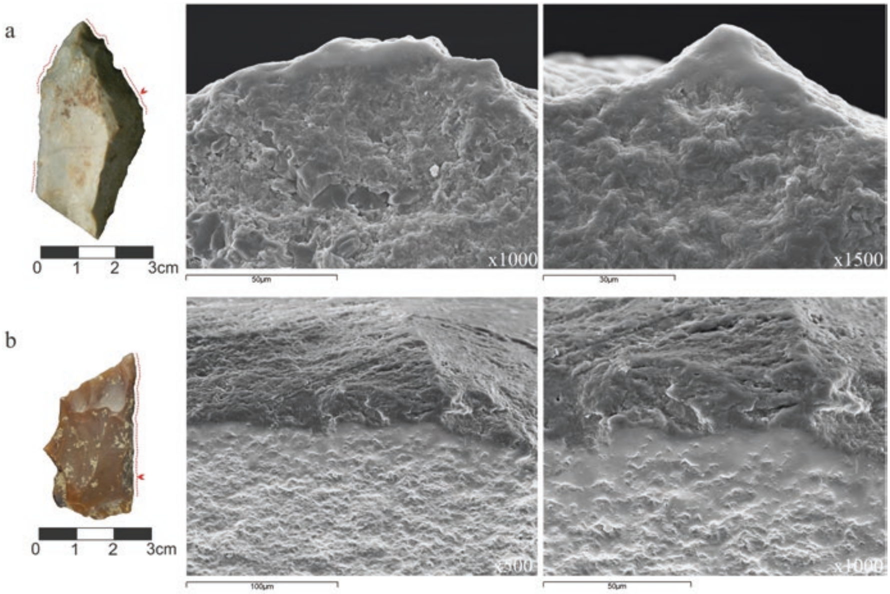

Fig. 10 Microscopic (SEM) images of lithic tools with clear use-wear traces resulting from working hard plant material: (**a**) Rounding, very smooth polish, and some linear features on the edges of a retouched flint flake from Unit V (I42-42-unV-2009); (**b**) Rounding, very smooth polish, plastic deformation and edge damage on the edges of retouched flint flake from Unit II (I48-39-unII-2011). The used portions of the edges are highlighted by dashed lines and the area shown in the microscopic images by arrow

evidence of orientation and distribution of use traces, not evident on pieces with post-depositional alterations.

In general, use-wear traces were better preserved on the Unit V artefacts, although some clear evidence of use-wear has been observed on the Unit II lithics. Based on the study results, artefacts were divided into four groups: (1) artefacts with clear use-wear traces; (2) those with indeterminate modifications; (3) those with post-depositional alterations; and (4) those showing no use-wear traces. The first group (with clear use-wear traces) consisted of the seven pieces of which five seem to have been used on soft animal (e.g. meat, skin), applying high-angled longitudinal movements perhaps for cutting or skinning actions. Other pieces in the group (one flint and one obsidian) showed clear use-wear related to transversal movement using a medium working angle, possibly in scraping activities of soft material. Two artefacts (a Unit V flint point and a Unit II flint side-scraper) seem to have been used on harder material (e.g. bone, antler, wood) (Fig. 10) and show oblique and longitudinal movements carried out at a high-working angle, possibly in scraping or whittling actions. Group 2 (pieces with indeterminate modifications that could be use-related), comprised ten samples showing some type of alteration over their edges. This is potentially related to a particular type of movement, to an action and, at times, to a worked material. Two artefacts showed possible longitudinal movements, perhaps indicating activities related to the skinning or cutting of soft material; two pieces, present a combination of longitudinal and transversal movements, which could have been used for cutting/skinning activities; three had signs of transversal movement, possibly indicating scraping activities; and three showed oblique/transversal movements. It was impossible to identify the worked material for most of the samples, although the traces on a jasper tool from Unit III may be from hide working. In the third group with post-depositional alterations, some displayed a mixed or juxtaposed presence of use-wear and post-depositional surface modifications. The 23 pieces in this group (mostly flint, one basalt, one obsidian) presented a combination of deformations caused by post-depositional movement and use. A slight deformation (e.g. rounding, abrasion, some polish and linear features) on the edges may be associated with use, as the wear traces seem to have some orientation and a directionality which is not seen in deformations caused by post-depositional movements. It was impossible, however, to include these artefacts in the group with clear or possible use-wear deformations, as these have wear traces on other parts of their surface definitely resulting from post-depositional alterations (e.g. abrasion, polish, unevenly distributed striations). The 12 artefacts forming Group 4 (without use-wear traces) have fresh edges (i.e. without use and alterations), ridges and surface, although a few (n = 5) bear very light post-depositional alterations; 10 are from Unit II and two from Unit V.

4.4 Post-depositional Surface Modification (PDSM) of Lithic Assemblages

Most Azokh Cave lithics are affected by different post-depositional alterations. Artefacts from all units have different mechanical and chemical alterations, although there is also some evidence of thermal alterations. Pieces often show a combination of various post-depositional alterations (i.e. the presence of mechanical, chemical and thermal alterations) (Table 4).

Almost 80% have different mechanical alterations, among which rounding, edge damage and fractures are most common, including evidence of striations, mechanical sheen, pits and cracks (Table 4). Mechanical alterations affect artefacts of all raw materials in all units.

Many pieces (~46% of the assemblage)—both those with and without mechanical alteration—display chemical alteration. This is well represented in all units, yet particularly so in Unit II. Of all raw materials, the most affected are basalt and limestone artefacts (92.5% and 65.2% of their respective assemblages). Patina and hard, very compact concretion are the most common types of chemical weathering, while some pieces have manganese concretions.

Thermal alterations, affecting 6.7% of the lithic assemblage, are usually found on siliceous materials, while theses are rare on volcanic rocks. Thermally altered artefacts are more frequent in Unit II and less so in Units V, IV and III. Cracks,

Table 4 Post-depositional alterations of the Azokh 1 Cave lithic assemblages

General alteration	Type	N	%/1199
	Fractures	928	77.4
	Sheen	371	30.9
	Edge damage	351	29.3
Mechanical	Rounding	333	27.8
	Cracks	192	16
	Pits	153	12.8
	Striations	59	4.9
	Polish	41	3.4
Total mechanical alteration		**955**	**79.6**
	Patina	519	43.3
Chemical	Concretion	493	41.1
	Manganese	48	4
Total chemical weathering		**553**	**46.1**
	Lustre	80	6.7
Thermal	Cracks	70	58.4
	Colour change	68	5.7
	Cupule	32	2.7
Total thermal alteration		**80**	**6.7**

colour changes and lustre are the most common types of thermal alteration, with slight evidence of thermal cupules.

5 Discussion

Most of the artefacts presented in this study are from Units V and II, being the most extensively excavated units of Azokh 1 Cave. These finds have been used to provide the interpretation of the site's occupation patterns. It should be noted, however, that a very marginal area of the cave was excavated. In light of this, our results do not represent the full occupational history of the site but only of a restricted area at the rear of the cave. Moreover, a substantial portion of Units V and II to be further excavated. Because of this, the interpretations presented here are not definitive and should be revised as excavations continue.

5.1 Interpreting the Lithic Assemblages of Azokh 1 Cave

A study of the lithic assemblages of Azokh 1 indicates that artefacts are primarily on local raw materials, ranging from <5 km from the cave. These raw materials consist in chert, flint and basalt, while other raw materials present are from more distant sources. These non-local materials include some types of flint and basalt, yet also include sandstone, jasper and xylopal. Obsidian forms a very small part of the Azokh lithic assemblage. Surveys have not revealed any potential primary or secondary sources of obsidian close to the cave. It seems that this is the only raw material originating from a distant source. Known obsidian sources in northern Nagorno Karabakh are located in Mt. Qarvatchar (known also as Mt. Kelbadjar) and Merkasar (known also as Kechaldag) in the Shahumyan region (Blackman et al. 1998). Nevertheless, numerous obsidian sources are also known in Armenia, which have been classed into three groups—the Arteni, Gutansar and Atis volcanic complex located in Central Armenia; the Tsaghkuniats (Damlik, Kamakar) and Ashots ranges in Northern Armenia; and the Gegham mountains (Geghasar and Spitakasar) and finally the Syunik range (Sevakar, Satanakar) in Southern Armenia (Barge and Chataigner 2003). A comparison of archaeological obsidian from Units V and II with some black and black–brown obsidian samples from Central Armenia (around 400 km from the cave) showed similar compositional and structural characteristics (Asryan 2015). While it is unlikely that the Azokh obsidian came from Central Armenian sources due to distance, studies of the Azokh obsidian show that it is possibly the only rock in the assemblage that comes from potentially distant sources (>80 km, situated perhaps in Northern Karabakh or Southern Armenia).

Some locally available rocks (e.g. chert, limestone, basalt, some types of flint) have primary and secondary sources next to the cave, in the nearby Azokh village and in the Ishkhanaget River valley. Sources of more distant rocks are unknown and need further studies. Chert and limestone are available locally, however, given their poor quality, these raw materials were not popular in any of the units. More varied and better-quality flint and basalt were often preferred for the preparation of retouched tools in all units, while they can also be considered popular for Levallois reduction in Unit II. Nevertheless, the operative chain for both units and in the case of all local and non-local rock types is fragmented.

Unit V presents the earliest phase of occupation, studied through the current excavations at Azokh 1 Cave. Artefacts from this unit include a relatively high presence of retouched flakes and flake fragments, followed by undiagnostic fragments, broken and unbroken flakes, as well as a few cores. There are no unknapped cobbles/pebbles or large tools (bifaces, choppers, chopping tools). Some knapping products show a tendency for elongation, yet none are blades or blade-like. Thick pieces are also present, especially among retouched artefacts. The Levallois reduction method is not common in Unit V; however, a few flakes and one core present Levallois characteristics. Given the chronology of Unit V, as well as the general technological characteristics of artefacts in the unit, this may be early evidence for the use of Levallois methodology, also registered in other sites of the Southern Caucasus (Adler et al. 2014). Typologically, side-scrapers dominate alongside a few denticulates, notches, points and abrupt scrapers. Some side-scrapers show attributes characteristic of *Quina-type* European side-scrapers (Dibble 1984a, 1987; Moncel 2001; Dibble et al. 2009) or perhaps similar to the

Acheulo-Yabrudian side-scrapers of the Near East (Dibble 1984b; Rink et al. 2004; Zaidner et al. 2005, 2006).

Characteristics of Unit V lithic assemblage indicate that most artefacts on all raw materials were introduced as ready-made tools; however, the presence of a refit set may point to some isolated in situ knapping. The techno-typological characteristics and chronology (~300 ka) of Unit V shares similarities with the *Acheulo-Yabrudian* techno-culture of the Levant and the *Kudaro-Acheulean* techno-culture of the Caucasus (Asryan et al. 2014a; Asryan et al. 2016; Asryan 2015). From a broader perspective, this assemblage is Late Acheulean or pre-Mousterian without large-cutting tools.

Unit II is younger than Unit V (180–100 ka) and contains most of the lithic artefacts found in the cave. The operative chain of different raw materials is based primarily on knapping products, including flakes, flake fragments and broken flakes. To a lesser degree, this unit also presents unknapped cobbles/pebbles, cores, knapping waste and debris. The percentage of elongated flakes is high, consisting in almost 30% of unbroken retouched and unretouched flakes, particularly among flint and basalt artefacts. This elongation tendency is not reflected in cores. Thick pieces are also evident, especially in basalt and chert assemblages. The rounded and, at times, polished character of unknapped cobbles/pebbles supports the hypothesis that they originated from the nearby river valley. Although almost all unknapped cobbles/pebbles present patina and have concretions caused by chemical alterations preventing a more detailed study regarding their use, most present percussion marks and breaks likely caused during knapping or other activities. These may include breaking bones, a hypothesis supported by percussion marks on some bones from the same unit (Marin-Monfort et al. 2016). Levallois technology clearly dominates the core assemblage and knapping products. The small size of most cores and further retouch of some indicate maximum exploitation and use of good-quality, non-local raw materials. There is a clear dominance of predetermined Levallois knapping products, many of which are elongated and some include Levallois blades. Presence of some knapping waste in this unit indicates the occurrence of specific activities (e.g. knapping or retouching) in the unit. Among the retouched flakes, side-scrapers dominate, although denticulates and notches are well represented. A few points and end-scrapers are present too.

These characteristics imply almost all artefacts entered this area of Unit II as ready-made tools, with most presenting a clearly predetermined character. There may have been some in situ knapping and retouching activities, suggested by the presence of knapping waste. However, the total absence of refits, the no correlation of cores with knapping products by raw material, dimensions and morphologies indicate that the main exploitation of nodules took place elsewhere, perhaps near raw material sources or at the entrance to the cave. Techno-typologically and chronologically, this assemblage shares similarities with the Tabun C-type Mousterian in the Levant and the Kudaro-Djruchulian techno-group in the Caucasus (Asryan et al. 2014a; Asryan et al. 2016; Asryan 2015). From a broader perspective, this can be considered as a Levallois facies of the Mousterian industry.

Evidence for use has been identified on some artefacts from different units, with Unit V presenting more evidence than Unit II. The percentage of clearly used artefacts, however, is not very high. Our studies indicate that activities related to butchery, hide-working and, at times, wood-working were carried out using these artefacts. It is difficult to know if these activities occurred in the area of current excavations or if these artefacts were used somewhere else, before their introduction into Azokh 1 Cave. The presence of bones with cut-marks in the area, however, suggests that some or part of these activities may have taken place at the rear of Azokh 1 Cave. The conditions of this area regarding natural light and safety, however, are not optimal, possibly indicating it was not a particularly comfortable area to engage in such activities for long periods of time.

The percentage of post-depositional surface modifications (particularly mechanical alterations) is very high in the lithic assemblage. Many researchers suggest trampling and water-induced movements are the main cause of mechanical alterations in archaeological sites (González Urquijo and Ibáñez Estévez 1994; Levi Sala 1996; Burroni et al. 2002; Thiébaut 2007). Recent sedimentological, geological and site formation studies at Azokh 1 have indicated two potential episodes of energetic water flow in the cave (Fernández-Jalvo et al. 2010; Murray et al. 2010; Murray et al. 2016), one (more powerful) in the lower layer VIc, which may have been related to the opening of the cave entrance, and another (less energetic) in the Unit I/Unit II boundary. This caused the flooding of the substrate and consequent erosion of Middle to Upper Pleistocene transitional phase. The lithic artefacts discussed in this chapter were not recovered from these areas; therefore, a priori water-induced movements cannot be considered as the cause of such important PDSM in Azokh. With regard to trampling, the abundance of bear remains at the rear of Azokh 1 Cave, and particularly their clear dominance in the faunal assemblage of Unit II has led to speculation as to whether this area can be considered a bear hibernation den (Marin-Monfort et al. 2016). High frequencies of bear skeletal remains are known from a number of Pleistocene sites in Eurasia, including the examples of, Kudaro, Treugol'naya, Mezmaiskaya, Tsona, Matuzka, Hohle Fels and Arago, where a tendency for association with lithic artefacts has been observed. In addition, cave bears are known to be very important trampling agents when occupying their den sites or preparing their winter beds (Stiner et al. 1996, 1998). Experiments conducted with bears (*Ursus arctos*) clearly demonstrated they could cause significant horizontal and vertical dispersion of artefacts, as well as macro- and microscopic alterations on some surfaces within a short time period (Asryan et al. 2014a, b; Camarós et al. 2017). We suggest, therefore, that cave bears (*Ursus spelaeus*) were the most important agent of mechanical alterations of the Azokh Cave assemblage and that bear trampling caused the highest percentages of fractures and other (mechanical) alterations in the faunal and lithic assemblages of Azokh.

The study of chemical alterations on the Azokh 1 Cave assemblages, alongside their comparison with experimental results (Asryan et al. 2017), suggests bat guano to be the primary cause of chemical alteration in the assemblage. While thermal alteration is not common in the lithic assemblage, it is present on artefacts in all units, particularly in those from Unit II. Nevertheless, it seems that thermal alteration was not intentional, such as the case of heat treatment in knapping activities. If anything, artefacts from the rear of the cave may have possibly been altered related to the effects of hominins introducing and using firewood in this area.

5.2 Cave Occupation

The following relevant occupational features should be taken into consideration in order to understand the nature of the occupation of Azokh 1 Cave.

1. *The area where the faunal and lithic assemblages have been found*. Most of the Azokh 1 Cave entrance, amounting to approximately 3400 m^3, was excavated in the period between the 1960s and the 1980s by Soviet researchers (see details in Huseinov 1985; Fernández-Jalvo et al. 2016a). However, as the availability of data about these excavations is sparse, it is difficult to reconstruct the stratigraphy, geo-archaeological context and material distribution at the entrance of the cave. The material presented in this current study was recovered from the rear of the cave where natural light and habitability is limited. This makes it difficult to imagine hominins using this area for long periods of time.
2. *Cave occupation by bears and other carnivores*. The presence of bears and other carnivores in different units of Azokh 1 Cave has been indicated by various authors (Huseinov 1985; van der Made et al. 2016). According to van der Made et al. (2016), carnivore remains are more varied in Unit V than other units of the upper sedimentary sequence. Cave bear (*Ursus spelaeus*) is the most represented carnivore species in Units V and II. Occupation of Pleistocene sediments in Eurasian caves by predatory species other than hominins (e.g. wolves (*Canis lupus*), foxes (*Vulpes* spp.), spotted hyenas (*Crocuta crocuta*) and bears (*Ursus* spp.) is not uncommon (Baryshnikov 1993; Baryshnikov et al. 1996; Stiner 1999). Throughout the course of human evolution, there seems to be a consistent overlap both in the use of space and in foraging strategies employed by hominins and other predators. It is suggested that humans and carnivores (other than bears) tend to occupy areas close to cave entrances, while bears more frequently occupy the rear of caves in order to ensure an undisturbed hibernation (Stiner 1990, 1991, 1999; Stiner et al. 1996, 1998; Hoffecker et al. 2003). Moreover, canids, hyaenids and hominins are seen as important collectors of bones at their den or residential sites, while bears show quite different behaviour. Various studies of black and brown bears show little transport of food to den-sites and little consumption of food during hibernation. When preparing for hibernation, bears try to avoid the presence of food remains around their winter beds, which might attract other predators during their hibernation (Ross et al. 1988; Hayes and Pelton 1994; Stiner 1999; Fourvel 2010; Fourvel et al. 2014). Other carnivores, particularly felids, hyaenids, canids and hominins, are considered as scavengers and consume hibernating bears. Consequently, this produces the accumulation of remains of other taxa, such as deer, goats, pigs and rhino, in bear

hibernation levels. Analysis of the faunal assemblage from the rear of Azokh 1 indicate bear remains alongside the presence of some carnivores (hyena, wolf, fox and panther) and ungulates (deer, wild goat, wild boar, hoarse and rhino). Nevertheless, recent taphonomic studies indicate the scarcity of tooth-marks and other carnivore-induced damage on faunal remains at Azokh (Marin-Monfort et al. 2016). These studies also indicate some human activity on large mammal remains (other than bear); however, patterns of butchery and carcass selection are unclear. This could possibly be explained by use of other areas of the cave for such activities. These remains could have been subsequently transported to the rear of the cave by other animals. Taphonomic studies also show the presence of more complete and organised butchery on bear remains, suggesting in situ activities at the rear of the cave.

The rear of Azokh 1 (almost 40 m from the entrance) was clearly a bear hibernation area, pressuring hominins and other carnivores to undertake 'careful planning' of their visits and activities in the cave. Hence, they would need to avoid those periods when the cave was occupied by bears. In contrast, the cave seems to have been an attractive area for hominins in post-bear hibernation periods. When free of bears and safe for temporary occupation, it can be considered logical to take advantage of decaying bear remains, a behavioural attribute evident in other Eurasian sites (e.g. Kudaro I and III, Treugol'naya, Mezmaiskaya, Tsona in the Caucasus (Baryshnikov 1993; Hoffecker et al. 2003; Liubin 1998) and Yarimburgaz in Anatolia (Stiner et al. 1996, 1998), Arago in Europe (Quilès 2004; Quilès et al. 2006)).

3. The *fragmented operative chain of all raw material types in both units*. The absence or rarity of unknapped cobbles/pebbles, hammerstones, knapping waste, cores and refits, alongside the dominance of knapping products (whole and broken flakes, flake fragments and retouched flakes) in both units, indicates that most of the knapping processes took place elsewhere. These activities could have taken place, for example, close to raw material sources or at the cave entrance, and most artefacts might have entered the area of current excavations as ready-made end-products. Factors such as raw material accessibility, energy costs of raw material transportation, patterns of site use, character and function of the toolkit are considered to play a decisive role in the integrity of the operative chain at archaeological sites (Binford 1979; Geneste 1985; Kuhn 1991, 1994; Féblot-Augustins 1993). Availability of raw material and difficulties of transportation directly influence hominin decisions on how, and in what format (for example, nodules or end-products), they carry stones to the site. Preliminary "in situ" knapping of blanks and production of ready-made tools at distant raw material sources would have avoided transportation of large, heavy nodules. Such artefacts on non-local stone are often rejuvenated, reshaped and recycled to increase their use-life, in contrast to artefacts on local raw materials (Geneste 1985; Kuhn 1991). Accumulation of mounds of raw material nodules and their in situ exploitation is characteristic of residential sites where operative chains are generally complete (Rolland and Dibble 1990). Pleistocene hunter-gatherers, however, moved continuously to find new sources of water, food and raw materials.

Their ‘mobile toolkits’ (Kuhn 1994), composed of several well-prepared and versatile tools, are considered an important component of such territorial movements. The size and contents of mobile toolkits vary based on factors such as landscape, mode of transport and activities planned. For example, Geneste (ibid) has suggested that Neanderthals travelled long distances (>100 km), transporting a wide range of lithic artefacts, of which hand-axes, scrapers and large Levallois flakes were recognized as the favourite components in their mobile toolkits.

From this point of view, given the distances between the cave and potential obsidian sources in Armenia and Nagorno Karabakh (>80 km), the presence of obsidian artefacts primarily in the form of end-products in the assemblages of both units of Azokh is understandable. The dominance in the assemblages of end-products from more local sources (e.g. basalt, flint), however, may have a surprisingly simple explanation. Taking into account the characteristics of the area in the cave where these artefacts were found (e.g. a lack of natural light and hibernating bears), and if hominins occasionally entered the area to scavenge dead bears, it is highly unlikely that they would do so without ready-made toolkits. Nor were they likely to have organised extensive knapping activities once established in the area. The characteristics of lithic assemblages from Units V and II suggest they probably formed part of mobile toolkits from different hominin groups who possibly discarded them at the back of the cave, accidentally or otherwise. The recycling and reuse of previously discarded artefacts by a group of hominins in a subsequent occupation of a site is seen to be common practice among early hominin, particularly Neanderthal groups (Camilli and Ebert 1992; Amick 2007; Vaquero 2011; Turq et al. 2013). While this interpretation may explain the presence of some recycled artefacts at Azokh (basalt, flint, jasper and obsidian), the post-depositional alterations make characterisation of these artefacts slightly more difficult.

4. *Limited processing of faunal remains and presence of use-wear traces on artefacts from Units V and II*: Butchered and dismembered carcasses were found in both units as seen through the presence of anthropic bone surface modifications, including cut-marks, percussion marks and bone breakage. Some bear remains in Unit II also show a complete butchering sequence (Marín-Monfort et al. 2016). This information is supported by the presence of use-wear traces on some lithic artefacts from both units which, due to different post-depositional alterations, were better preserved on artefacts from Unit V. Most of the few artefacts with use-wear are retouched tools (side-scrapers in particular), presenting traces indicatory of butchery and hide-working activities. To a lesser degree, there are also some signs of woodworking activities.
5. *Absence of organised hearths*: The lack of hearths, which could be used to provide information on the spatial organisation or behavioural patterns (Binford 1979, 1985), is yet to be discovered in the rear of the cave. The presence and large size of numerous charcoal fragments have been interpreted as the result of the anthropic introduction of firewood into the area (Allué 2016).

6 Conclusions

The results of this study suggest that the occupation of both units was short and seasonal, perhaps more episodic and isolated in Unit V, and for slightly longer periods in Unit II. As both assemblages represent a marginal area at the rear of the cave, it is difficult to discuss spatial organisation of occupation in either unit. The presence of large carnivores, particularly cave bears, in both units was an important factor affecting the period and duration of cave occupation by hominins. Characteristics of the lithic assemblages imply mobile toolkits, with some isolated evidence of in situ knapping or retouching activities. Results of functional studies of lithic artefacts and the presence of cut-marks and percussion marks on the bones suggest some butchery activities may have taken place at the rear of the cave. Azokh 1 Cave was not a residential site but can be consider a site periodically visited by early hominin groups for short periods of time as part of their foraging strategies.

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