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LANDSCAPE STUDIES

FROM THE MESOLITHIC TO THE CHALCOLITHIC
IN THE SOUTH CAUCASUS:
NEW DATA FROM THE BAVRA ABLARI ROCK SHELTER

Bastien VAROUTSIKOS, Ana MGELADZE, Jwana CHAHOUD,
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and Christine CHATAIGNER

ABSTRACT

The site of Bavra-Ablari is a Mesolithic-Chalcolithic rock shelter, located on the Javakheti plateau in the valley of a tributary of the Kura River, in southern Georgia. Excavations have been carried out by a Georgian-French team since 2012 and have shed light on processes that took place during the Early Holocene. The Mesolithic layer of the site shows an occupation, not yet fully excavated, which will provide important chrono-cultural information about the exploitation of the mountainous areas during the ninth millennium BCE. The Neolithic occupation chronologically matches the first evidence of agricultural society in the Near East during the sixth millennium BCE, and is characterised by a combination of Neolithic and Mesolithic features. The Chalcolithic layer produced a significant collection of material that supports a re-occupation of the highlands during the fifth millennium, as well as the development of subsistence strategies adapted to this environment.*

* * *

More than a century of archaeological research in the South Caucasus (**Fig. 1**) has highlighted the multiple influences of the region's direct neighbours, the Near East and the Russian plain, while also pointing to local and independent cultural development. Despite intensive archaeological research, many obstacles persist in the reconstruction of the socio-economic and cultural development that occurred in Caucasian prehistory. While identification of a large number of sites has led to the development of several regional chronological sequences, most of these sites lack instructive stratigraphic contexts and radiocarbon dates.

This issue is particularly visible in the context of the socio-cultural and economic developments that took place from the end of the Pleistocene to the mid-Holocene. Recent archaeological research seems to point to an association of long-term, long-distance contacts with Near Eastern groups while also gesturing towards indigenous development within the region itself. Several problems persist, including the socioeconomic nature of Mesolithic cultures, the development of food-producing economies, and the nature of the transition from Neolithic to Chalcolithic.

* We thank the French Ministry of Foreign Affairs for providing financial support for the excavations at Bavra-Ablari, as well as the Georgian State Museum at Tbilisi for its administrative support. We are grateful to Ts. Turkiashvili and G. Devilder for the drawings of the lithic material, and A. Decaix for the anthracological study, and we wish to thank all the students who took part in the excavations (A. Barnaveli, N. Barnaveli, M. Chincharauli, M. Gabunia, M. Kutubidze, A. Mekradze, T. Meladze, N. Nutsbidze, J. Salley).

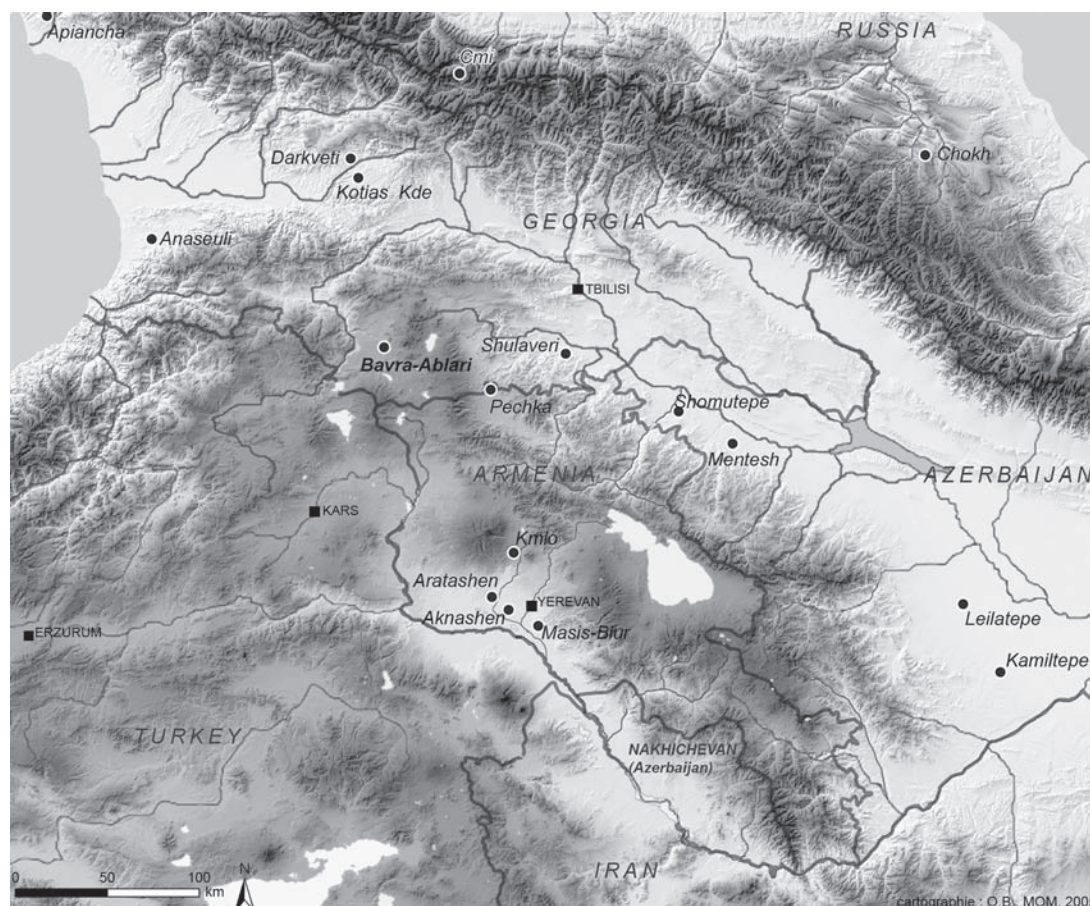


Fig. 1. The South Caucasus: sites mentioned in the text.

A site currently being excavated by a French-Georgian team¹ in the Javakheti plateau has provided a controlled and dated cultural sequence ranging from mid-ninth to mid-fourth millennium BCE and allows us to shed light on some of the processes that have remained obscure.

1. STATE OF THE ART IN THE MESOLITHIC TO CHALCOLITHIC IN THE CAUCASUS

1.1. *Environmental Context*

Following the cold and dry phase of the Younger Dryas (*c.* 11,000–9500 BCE), the beginning of the Holocene is seen in the Caucasus through an extension of a semi-arid, stepic environment.² Most of the paleoenvironmental data seem to emphasise a certain degree of ecological homogeneity across the entire area during the Pre-Boreal and Boreal phases, except for a few glacial forest refugia such as Western Georgia.³

¹ A collaboration between the mission ‘Caucasus’ of the French Ministry of Foreign Affairs and the National Museum of Georgia.

² Connor and Sagona 2007; Messenger *et al.* 2013.

³ Connor and Kvavadze 2008, p. 540.

Around 6500 BCE, a warmer and more humid Atlantic phase was concomitant with the development of a mixed oak forest (*Carpinus caucasicus*, *Quercus*, *Ulmus*), both in the lowlands and in the highlands, as identified by pollen cores sampled in Armenia, South Georgia, SE Turkey, and NW Iran.⁴ In the South Caucasus, this phase was connected to the development of the Late Neolithic Aratashen-Shulaveri-Shomu culture.⁵

During the mid-Holocene, evidence for increased rainfall is seen at many sites in Georgia.⁶ The first part of this period corresponds to the Chalcolithic (c. 5000–3500 BCE), a phase marked by striking socioeconomic changes such as increasing pastoral activities and shifts in settlement patterns.⁷

1.2. Mesolithic/Early Neolithic (c. 9500-6000 BCE)

Several sites attributed to Mesolithic or ‘Early Neolithic’ cultures have been identified over the course of the past century in the Caucasus. Most of them are located in Georgia and a very few in Armenia, Azerbaijan or the North Caucasus. However, the large majority of them have neither secure context nor radiocarbon dates. We will therefore focus on settlements that have produced satisfying stratigraphic contexts and C14 dates.

1.2.1. Georgia

The possible status of Western Georgia as a forest refugium may explain why it has provided the largest number of Mesolithic settlements in the South Caucasus. Most of the known sites in the region are caves or rock shelters such as Apiancha, Kvachara cave, and Darkveti.⁸ While the majority of these sites have provided interesting stratigraphic sequences, none has produced a datable sample. In the Darkveti rock shelter, a Late Mesolithic layer (VI) is separated by 1 m of sterile sediments from an Early Neolithic layer (IV), overlaid by a Chalcolithic layer (III).⁹ Layer IV yielded microliths, as well as polished axes, grain-grinders and faunal remains attributed to domestic species. Some issues with the dating, stratigraphy and attribution of domesticated status to this assemblage call for caution.¹⁰

Kotias Klde provides the best context to study early Holocene cultures in the region. Located in Imeretia, south of the Kvirila River, and close to Darkveti, Kotias Klde has produced two layers dated to 10,850–8240 BCE (layer B Mesolithic) and 7690–7300 BCE (layer A2 Early Neolithic).¹¹ Kotias Klde’s Mesolithic industry is resolutely microlithic, and is characterised by a significant number of backed bladelets, with geometrics (scalene triangles) and end-scrapers. In two cases, the micro-burin technique is apparent. Furthermore, some bladelets and blades show traces of bipolar retouch. In layer A2, tools with hooked projections, characterised by continuously retouched lateral edges, were recorded. This type of tool, found also on the proto-Neolithic Paluri-Nagutni sites in northwestern and northeastern Georgia¹² is particularly interesting, as similar retouched tools (‘Çayönü tools’)

⁴ Ollivier *et al.* 2010; Messager *et al.* 2013; Wick *et al.* 2003; Djamali *et al.* 2008.

⁵ Kiguradze 2001; see also Chataigner *et al.* 2014.

⁶ Connor and Kvavadze 2008, p. 538.

⁷ Kiguradze and Sagona 2003, p. 40.

⁸ Tsereteli 1973; Nieberidze 1978; see also Amirkhanov 1994; Meshveliani *et al.* 2007.

⁹ Nebieridze 1978.

¹⁰ Matskevich and Meshveliani 2009; see also Korobkova 1996, pp. 60-62.

¹¹ Meshveliani *et al.* 2007.

¹² Grigolija 1977.

were recovered from aceramic Neolithic sites in Turkey and Iraq.¹³ At Kotias Klde, only wild fauna has been found in layers B and A2 and no domestic plants are attested.¹⁴ This situation renders an Early Neolithic attribution, based solely on evolution of the lithic industry, problematic.

The Javakheti plateau also has several Mesolithic sites excavated in the 1970s.¹⁵ Located in the Paravanitskali canyon, the Bavra cave and the Bavra rock shelters 1 and 2, across the river from Bavra-Ablari, produced two layers, Upper Paleolithic and Mesolithic. The Mesolithic assemblage, mainly in obsidian, shows a high ratio of bullet cores, backed bladelets, end-scrapers, burins (with a possible identification of micro-burin), lunates, rare scalene triangles and trapezoids. Numerous faunal remains (equids, bisons, waterbirds) were found. A single radiocarbon date is available for the Mesolithic layer (I) of Bavra cave: 9650–8640 BCE.¹⁶

1.2.2. Armenia

In Armenia, besides typological attribution based on undated excavations or surface collections,¹⁷ only two Mesolithic sites have recently been excavated: Pechka grotto and Kmlo-2. Only the latter provided radiocarbon dates, connecting it to the early Holocene.

Pechka Grotto¹⁸ is located in Northern Armenia on the Somkhetian ridge, at 1670 m a.s.l. A small scale excavation identified four undated layers, layers 3 and 4 having produced artefacts of Mesolithic appearance, such as prismatic and pyramidal cores, microliths (segments), backed microblades and blades, as well as a few micro-borers.

The cave of Kmlo-2¹⁹ is located on the Aragats massif in Armenia. Phases IV and III of the stratigraphy are associated with the early Holocene, respectively 10th to mid-ninth and mid-ninth to mid-eighth millennium BCE. Layer IV produced an abundance of microliths, including backed bladelets, scalenes, and lunates, some of them manufactured using the micro-burin technique. Layer III has also produced ‘Kmlo tools’, a type of lithic artefact with long abrupt parallel retouch using pressure flaking. These tools are typologically similar to Paluri’s ‘hooked tools’ in Georgia (Kotias Klde Layer B, mid-eighth millennium BCE) and “Çayönü tools” from northern Mesopotamia (eighth–seventh millennium BCE), with slightly different manufacturing processes and uses.²⁰

1.2.3. North Caucasus

Chokh is a multi-layered rock shelter located on the northeastern slopes of the Caucasus Mountains in the Republic of Dagestan.²¹ It has produced two Mesolithic (E-D) layers and one Neolithic layer (C), separated by a short hiatus. The Mesolithic assemblage includes scalene triangles, asymmetrical trapezoids, and thin-based and diagonally truncated ‘Chokh points’, said to be local. The excavator attributed the layers E-D to the eighth–seventh millennia, but no radiocarbon dates are available.

¹³ Redman 1982; Fujii 1988.

¹⁴ Bar-Oz *et al.* 2009.

¹⁵ Gabunia 2000; Gabunia and Kalandadze 1982; Gabunia and Tsereteli 2003.

¹⁶ Bavra cave radiocarbon date, 9700 ± 140 BP; see Gabunia 2001, p. 145.

¹⁷ Gasparyan 2001; see also Sardaryan 1967; Martirosyan and Munchaev 1968.

¹⁸ Aslanian *et al.* 2006, 2007.

¹⁹ Arimura *et al.* 2010, 2012.

²⁰ Arimura *et al.* 2010, p. 78.

²¹ Amirkhanov 1987; see also Amirkhanov 1994; Kotovich 1957, 1964.

In North Ossetia, the site of Cmi is located at the confluence of the Mamison and Ardon Rivers.²² The settlement's sequence is composed of a Mesolithic layer (horizon 1) dated to 6500–6350 BCE, and two Neolithic layers (horizons 2 and 3) ranging from 6000 to 5670 BCE. Horizon 1 has produced several hearths and a posthole. Its industry comprises numerous flint cores, bladelets, end-scraper on blades, and round scrapers, as well as geometric microliths (lunates, asymmetrical trapezes) and a Chokh point. This layer may show some parallels with Chokh's layers E-D, which could thus be dated to the seventh millennium BCE. Horizons 2 and 3, on the other hand, show clear analogies with Chokh's Neolithic layer C in their ceramics and domesticates.²³

1.3. Late Neolithic (c. 6000–5000 BCE)

The first unambiguous evidence of agricultural societies is recorded in the mid-Kura and mid-Araxes valleys at the very beginning of the sixth millennium BCE.

1.3.1. Kura and Araxes valleys

The Mid-Kura valley hosts the sites of Shulaveris Gora, Imiris Gora, Khramis Didi Gora, Arukhlo, and Gadachrili Gora in Georgia.²⁴ In Azerbaijan are found Shomutepe, Toiretepe, Göy Tepe, and Mentesh Tepe.²⁵ In the Araxes valley, the majority of the information on agricultural settlements comes from Aratashen, Aknashen-Khaturnakh and Masis Blur.²⁶ Each of these sites has produced dates from the sixth millennium BCE.

The subsistence economy of these sites was based on domesticated sheep-goat and cattle, along with the cultivation of naked wheat and emmer, as well as naked and hulled barley. The material culture is generally characterised by a large industry in obsidian, based on the production of blade blanks to be used as sickle elements or side-scrapers, along with a large production of burins, borers, drills, and the large carinated round scrapers characteristic of the area. In the lower layers, the pottery is composed only of imported elements (painted sherds belonging to the Halaf culture). Later on, there is evidence of original production of ceramics, sometimes decorated with 'reliefs'.²⁷

Another culture has recently been identified in the Mil steppe in Azerbaijan, between the lower Kura and the Araxes valley. Both excavations and surveys around Kamiltepe have revealed an extensive Neolithic occupation beside the Qarasu River.²⁸ The settlement seems to have been organised around a monumental central mud brick platform and comprises domestic dwellings and storage structures, generally dated to the middle of the sixth millennium BCE. This system of organisation, along with the material culture associated with the lower layers of Kamiltepe, does not exhibit many parallels with the Shulaveri-Shomu group so far, but it could potentially be connected with NW Iranian cultures.²⁹

²² Rostunov *et al.* 2009.

²³ Rostunov *et al.* 2009, p. 68.

²⁴ Djavakhishvili and Djaparidze 1975; Kiguradze 1986; Chelidze and Gogelia 2004; Hansen *et al.* 2007, 2013; Lyonnet *et al.* 2012, pp. 58–86; Hamon *et al.* in press.

²⁵ Narimanov 1987; Guliyev and Nishiaki 2012, 2014; Kadowaki, *et al.* 2015; Lyonnet and Guliyev 2010, 2012; Lyonnet *et al.* 2012, pp. 86–121.

²⁶ Badalyan *et al.* 2007, 2010; Martirosyan-Olshansky *et al.* 2013.

²⁷ Lyonnet *et al.* 2012, pp. 78–80.

²⁸ Aliyev and Helwing 2009; see also Lyonnet *et al.* 2012, pp. 4–17.

²⁹ Lyonnet *et al.* 2012, p. 178.

1.3.2. West Georgia

Close to the shores of the Black Sea, several sites have traditionally been attributed to the Early Neolithic (Kobuleti, Anaseuli 1, etc.).³⁰ This attribution was made on the basis of the lithic assemblages, which are characterised by blade production, as well as the presence of sickle blades and polished stone tools. However, almost no data exist pertaining to the subsistence economy at these sites; moreover, new excavations at Anaseuli 1 yielded a radiocarbon date (5746–5595 BCE), which suggests that this site was contemporaneous with the Late Neolithic culture of Aratashen-Shulaveri-Shomu.³¹ It is also likely that Late Neolithic sites of West Georgia (Anaseuli 2, Odishi, etc.), where incised pottery is attested,³² are also partly contemporaneous with the Aratashen-Shulaveri-Shomu culture.

1.3.3. North Caucasus

In the Neolithic layer (C) at Chokh, the lithic assemblage seems to show an important degree of continuity with the Mesolithic layers (E-D): besides scalene triangles, small blades become more and more frequent. Grinding stones and pottery also appear in this layer, along with a bone sickle handle decorated with incised motifs which closely parallel the culture of Sialk I (sixth millennium BCE) on the Iranian plateau.³³ Based on the presence of domesticated animals (sheep) and a large assortment of cereals, the excavator considered this site provided evidence of local domestication.³⁴ However, the cereals found there belong to evolved varieties of wheat and barley—no wild varieties were found, and it is likely that these cereals were domesticated elsewhere before arriving at Chokh.³⁵

1.4. Chalcolithic (c. 5000–3500 BCE)

The first Chalcolithic groups in the North Caucasus are found in the context of the Svobodnoe-Meshoko-Samok culture, around 4500 BCE.³⁶ Around 4000 BCE, these groups developed into a new cultural entity, the Majkop culture, whose pottery and metallurgical production show clear contacts with populations from northern Mesopotamia.³⁷ In the South Caucasus (Azerbaijan steppes and mid-Kura valley), the same connections with Ubaid groups are identified in the so-called Leilatepe culture, through similar architecture, funerary rituals, and ceramic production.³⁸

In parallel, the Sioni culture is also seen in the South Caucasus (5000–3500 BCE) and is characterised by a light architecture of small dry stone walls and temporary structures, and pottery with incised lips or a series of perforations right under the lip.³⁹ This population is generally considered more mobile, settling on plains, plateaux and highlands, with an economy based on transhumant herding.

³⁰ Nebieridze 1972, 2009–2010; Gogitidze 1977.

³¹ Matskevich and Meshveliani 2009, p. 156; see also Meshveliani 2013.

³² Nebieridze 1972; see also Kiguradze and Menadbe 2004, pp. 349–351.

³³ Amirkhanov 1987; see also Wechler 2001, p. 208 and taf. 57.

³⁴ Amirkhanov 1987, p. 179.

³⁵ Chataigner *et al.* 2014, p. 19.

³⁶ Lyonnet 2004, 2007.

³⁷ Ivanova 2013, pp. 52–53.

³⁸ Kohl and Trifonov 2014, p. 1577.

³⁹ Kiguradze and Sagona 2003, p. 50.

In the northeastern part of the Caucasus, the Ginchi culture starts at about 4300 BCE. It is contemporaneous with the Sioni culture in the South Caucasus and the beginning of the Maijkop culture⁴⁰.

1.5. Conclusion

In every part of the Caucasus where Mesolithic and Early Neolithic layers have been identified, no clear evidence for domestication was found and the lithic industry was resolutely microlithic. The first food-producing economies thus appear suddenly as fully developed agricultural societies around 6000 BCE in the South Caucasus, in the Kura and Araxes river basins, but also in the North Caucasus, as shown by Chokh (Dagestan) and Cmi (North Ossetia). The origin and mechanisms of this neolithisation process have yet to be precisely determined.

2. BAVRA ABLARI

The Javakheti region is a volcanic plateau, extending into northern Armenia, that reaches altitudes of up to 2500 m and can be, in modern times, hardly accessible from November to March, due to thick snow cover. It also houses tributaries of the Kura River (the Khrami and Mashavera Rivers), a path used by modern transhumants as they climb to alpine pastures during the summer. The rock shelter of Bavra Ablari is located at 1660 m a.s.l. in a canyon at the confluence of the Paravanitskali and Ablari Rivers, close to the city of Akhalkalaki.

The site is approximately 15 m × 8 m, on a small terrace 8 m above the river, created by an agglomerate of sediment and boulders. The entire surface of the original terrace is likely once to have been 20 to 30 per cent longer, but its northern section collapsed during the construction of a road below the shelter. The excavations are ongoing, but the 32 m² opened in 2012-2014 (**Fig. 2**) have already provided interesting information regarding cultural and economic processes taking place in the South Caucasus during the Holocene.

2.1. Stratigraphic Sequence and Taphonomy

At Bavra Ablari, the presence of fallen boulders hinders the identification of stratigraphic units from one square to the next, and may also have caused lateral and horizontal movement of material. Despite these limitations, a fairly coherent chrono-stratigraphic sequence has been reconstructed, supported by different types of evidence: sedimentology (**Fig. 3**), radiocarbon dating (**Fig. 4**), 3D plotting of artefacts, and lithic refitting.

Seven layers have been identified:

Niv. 0A: A mixed layer showing modern, sub-modern and medieval material culture, such as imperial ruble coins, medieval ceramics, and modern gun shells.

Niv. 0B: A mixed layer that still produced medieval pottery sherds, but also a majority of obsidian flake-based industry. An association with the Early to Middle Bronze Age can be suggested based on the presence of a characteristic Bedeni arrowhead.

⁴⁰ Kiguradze and Sagona 2003, p. 45; see also Courcier 2014.

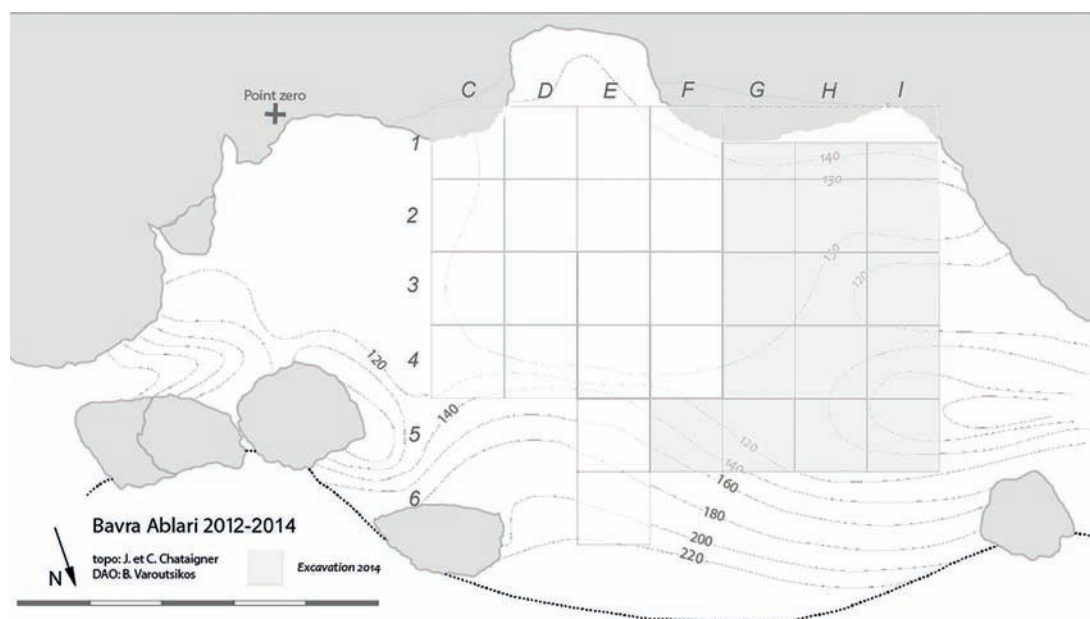


Fig. 2. Plan of Bavra-Ablari rock shelter.

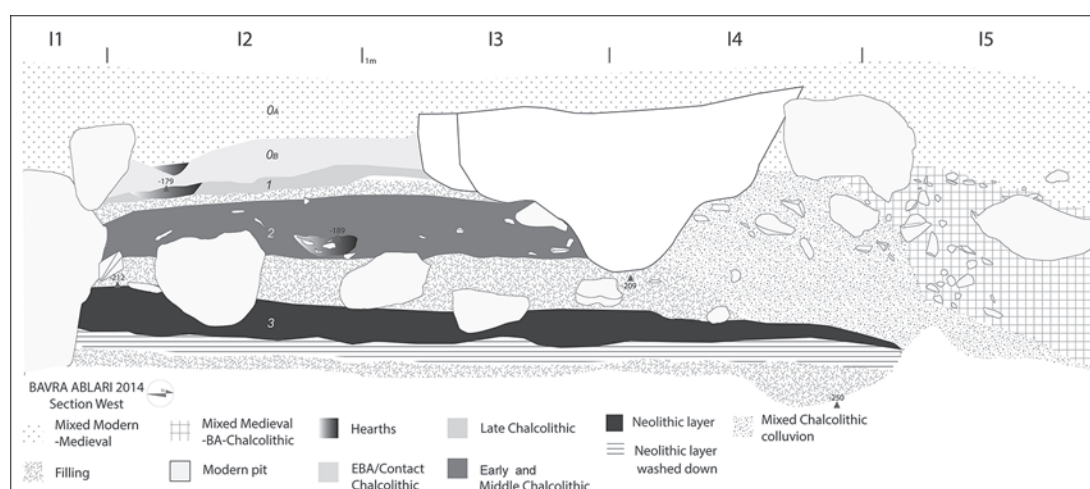


Fig. 3. Stratigraphic sequence (simplified version): squares I1–I5, western section, surface – layer 3 (DAO: B. Varoutsikos).

- Niv. 1: Late Chalcolithic layer (first half of the fourth millennium BCE). Denser light brown sediment that produced faunal assemblage, lithics and ceramics.
- Niv. 2: Early and Middle Chalcolithic layer (c. 5000–4250 BCE). Several hearths attest to repeated occupation over short periods of time. Large lithic and faunal assemblages are also represented, with a few pottery sherds.
- Niv. 3: Late Neolithic layer, dated to c. 6000–5350 BCE. Dense sedimentary matrix is located under a collapsed phase of the shelter's wall. Smaller density of faunal and lithic finds; no pottery was found.
- Niv. 4: Mesolithic layer, dated to c. 9100–8600 BCE that has only been identified in the northern part of the site.

Niv. 5: No traces of material culture have been recovered in this layer yet (but only 4 m² has so far been opened), radiocarbon dates on Equid tooth (*Equus* sp.) indicate a date *c.* 10,400–9800 BCE, during the Younger Dryas. The geological substratum has not yet been reached.

2.2. Mesolithic (Layer 4)

Layer 4 was only identified in the northern part of the site. The sediment is a humid black clay with high levels of preserved organic material and a large quantity of micro-charcoals. C14 dates have placed this sediment between the ninth millennium and the first half of the eighth millennium BCE.

2.2.1. Lithics

The Mesolithic chipped-stone assemblage contains only 123 pieces, as layer 4 was only opened in 4 squares so far. It is mainly obsidian (92%), along with some pieces in dacite. As the crow flies, the site is located *c.* 32 km from the only known obsidian source in Georgia (Chikiani), an outcrop that produces excellent raw material and that has been in use since the Lower Paleolithic, as evidenced by the bifaces found in the vicinity of the source.⁴¹

The typo-technological characteristics show an assemblage based on production of bladelets and small blades (**Fig. 5:2**). It is most likely that this production took place on-site, as demonstrated by the proportion of by-products and technical pieces that show a careful management of small bladelet pyramidal cores (**Fig. 5:1, 3–5**). The element most characteristic of on-site production is the backed bladelet, sometimes showing a burin strike in the continuity of the steep retouch. However, while the industry is consistent with Mesolithic production, there are so far no clearly diagnostic elements like geometric microliths or micro-burin technique.

2.2.2. Faunal remains

The excavation of the Mesolithic layer is currently in progress, hence only 37 faunal remains have been studied so far. The Mesolithic spectrum comprises mainly large wild ungulate remains (31 NISP [number of identifiable specimens]), including deer (*Cervus elaphus*) and aurochs or bison (*Bos* sp./*Bison* sp.) and six remains of unidentified small-sized ungulates (probably wild Caprinae).

2.3. Neolithic (Layer 3)

Layer 3 is an accumulation of brown silty sediment with several large blocks. This layer contains far fewer organic inclusions than layer 4, although several charcoal lenses and a single hearth have been identified. The layer is dated to the late seventh–early-sixth millennium BCE (**Fig. 4**).

⁴¹ Kikodze and Koridze 1978.

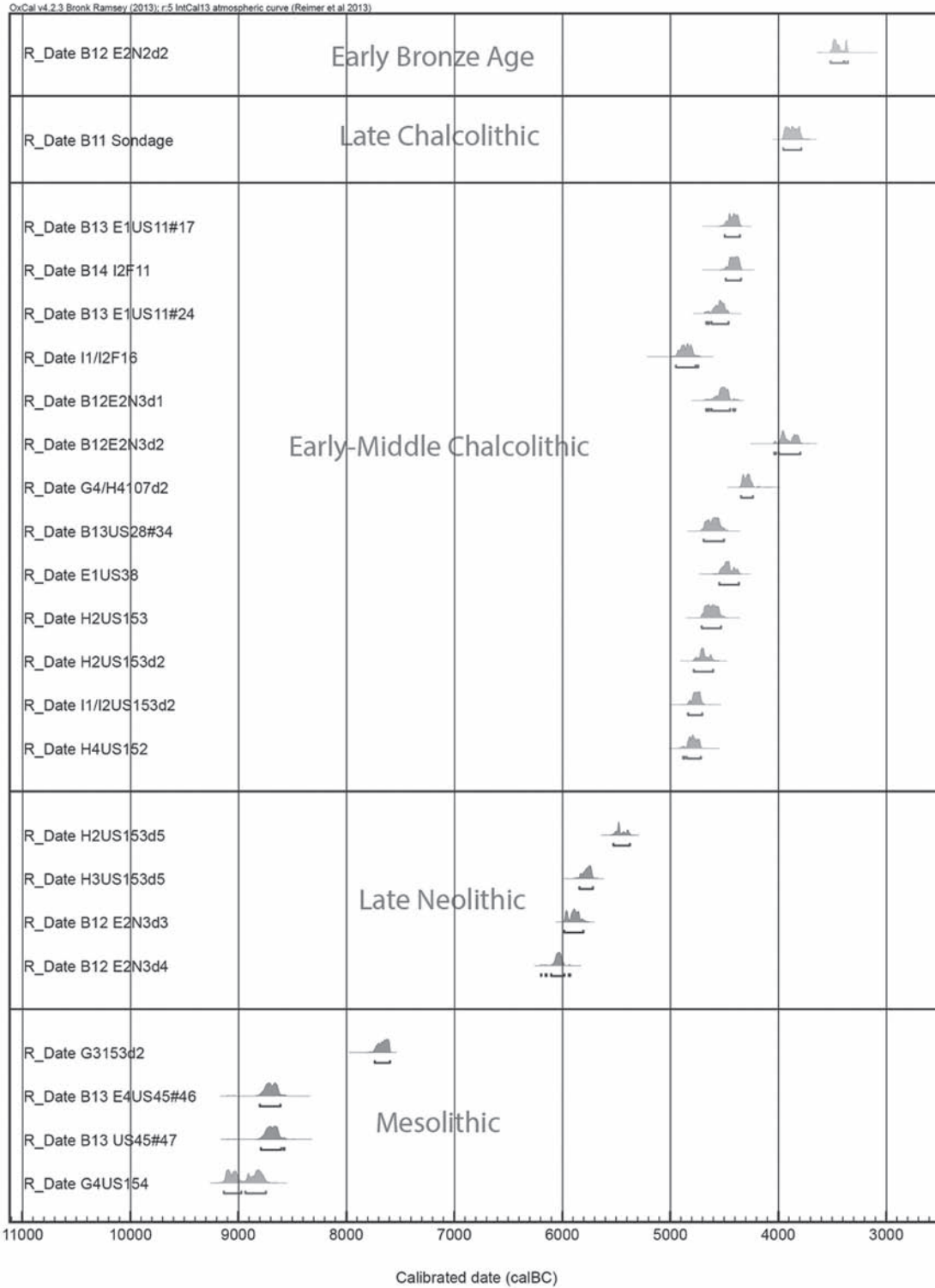


Fig. 4a.

BAVRA-ABLARI

Lab. N°	Year	Square	Context	Depth	Material	BP	cal BC (95%)	Level
Lyon-10371 (SacA-34118)	2012	E2	niv.2 dec.2	176,5	charcoal	4635 ± 30	3516–3355	Level 0B Early Bronze
BETA-304872	2011	Sound.			bone	5060 ± 30	3954–3789	Level 1 Late Chalcolithic
Poz-61368	2013	E1	US.11 #17	177,5	charcoal	5600 ± 35	4496–4356	Level 2 Early and Middle Chalcolithic
Poz-66737	2014	I2	F11	179	charcoal	5580 ± 40	4488–4347	
BETA-363171	2013	E1	US.11 #24	184	charcoal	5710 ± 30	4668–4461	
Poz-66738	2014	I1/I2	F16	194	charcoal	5970 ± 35	4949–4743	
Lyon-10372 (SacA-34119)	2012	E2	niv.3 dec.1	197	charcoal	5680 ± 40	4669–4400	
LTL-13032A	2012	E2	niv.3 dec.2	204	charcoal	5125 ± 45	4037–3797	
Poz-66739	2014	G4/H4	US 107 dec.2	205	bone	5430 ± 35	4346–4236	
Poz-61369	2013	D1	US.28 #34	205	charcoal	5750 ± 35	4692–4503	
Ly-11541 (SacA-38690)	2013	E1	US.38 #36	210	charcoal	5640 ± 40	4546–4366	
Poz-66740	2014	H2	US 153	216	charcoal	5765 ± 35	4710–4532	
BETA-393560	2014	H2	US 153 dec.2	224	charcoal	5830 ± 30	4768–4612	
BETA-401373	2014	I1/I2	US 153 dec.2	224	charcoal	5890 ± 30	4830–4705	
BETA-401372	2014	H4	US 152	214	charcoal	5920 ± 30	4845–4720	
Poz-66741	2014	H2	US 153 dec.5	228	bone	6500 ± 35	5527–5375	Level 3 Late Neolithic
BETA-401371	2014	H3	US 153 dec.5	239	charcoal	6890 ± 30	5840–5720	
Lyon-10373 (SacA-34120)	2012	E2	niv.3 dec.3	218	charcoal	7000 ± 30	5984–5806	
BETA-328952	2012	E2	niv.3 dec.4	237,5	charcoal	7170 ± 40	6198–5928	Level 4 Mesolithic
BETA-393559	2014	G3	US 153 dec.2	233	bone	8670 ± 30	7740–7595	
BETA-363172	2013	E4	US.45 #46	262	charcoal	9420 ± 40	8803–8612	
Poz-61370	2013	F4	US.45 #47	265	charcoal	9410 ± 40	8793–8575	
Poz-66742	2014	G4	US 154	268	charcoal	9530 ± 40	9135–8745	
Poz-61367	2013	E3	US.46	330	tooth	10250 ± 50	10415–9813	Level 5

Fig. 4. Calibrated radiocarbon sequence: a) graph; b) data.

2.3.1. Lithics

Chipped-stone tool assemblages show a slight decrease in the use of obsidian (81%) and the increased presence of a special type of fine-grained dacite, the origin of which is as yet unknown. One flake and one backed blade in white flint have also been found. One large blade from this layer, which demonstrates parallels with the Aratashen-Shulaveri-Shomu production, was geochemically characterised (ICP-MS). The raw material for the blade originated from the neighbouring Chikiani volcano (lab. IRAMAT, Orléans). The small sample size recovered from the Neolithic layer (N=328) calls for the use of caution as we address

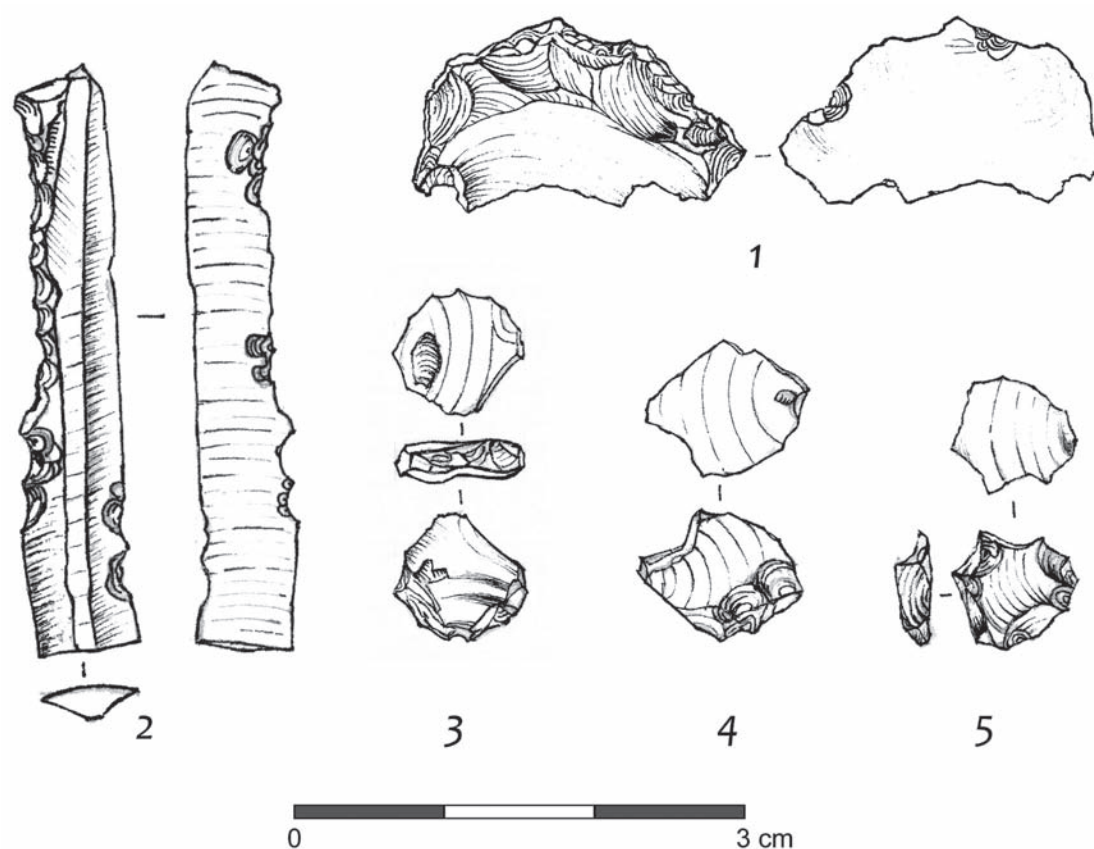


Fig. 5. Mesolithic assemblage: bladelet core striking platform (1); prismatic bladelet with steep retouch (2); by-products (3–5) (drawings Ts. Turkiashvili).

typo-technological trends, but several general tendencies can be distinguished among the sample. Layer 3 has produced several obsidian scrapers (rounds, on blades, thumbnail, $N=11$) (**Fig. 6:1**), bladelets that are completely or partially backed, and two microliths (trapezes) (**Fig. 6:2**). The industry is based on the production of small blades and bladelets, although the minimal evidence of debitage and technical pieces (fragment of a crested blade, and fragment of striking platform) (**Fig. 6:3**) prevents the reconstruction of on-site debitage activities. Several fragments of long prismatic blades were found within the layer, although no associated cores or technical by-products could be identified. In addition to these elements, the small proportion of cortical flakes would suggest that blade cores were produced off-site and then brought to the site for debitage of blanks. This hypothesis seems to be supported by the presence of a larger proportion of tools than was found in other layers (20%). On the other hand, more by-products associated with bladelet production, including two bladelet cores (**Fig. 6:4, 5**), are found in this layer. Overall, this collection shows parallels with both local Mesolithic assemblages and techno-typological behaviours from the Aratashen-Shulaveri-Shomu sites.

Most of the dacite production is expedient, and no specific sequences have been identified. However, some retouched tools in finer-grain dacite are significantly longer and more carefully retouched than the tools found in the Chalcolithic layers. This is especially apparent in regard to a large dacite tanged point or spearhead with bifacial retouch (**Fig. 6:6**).

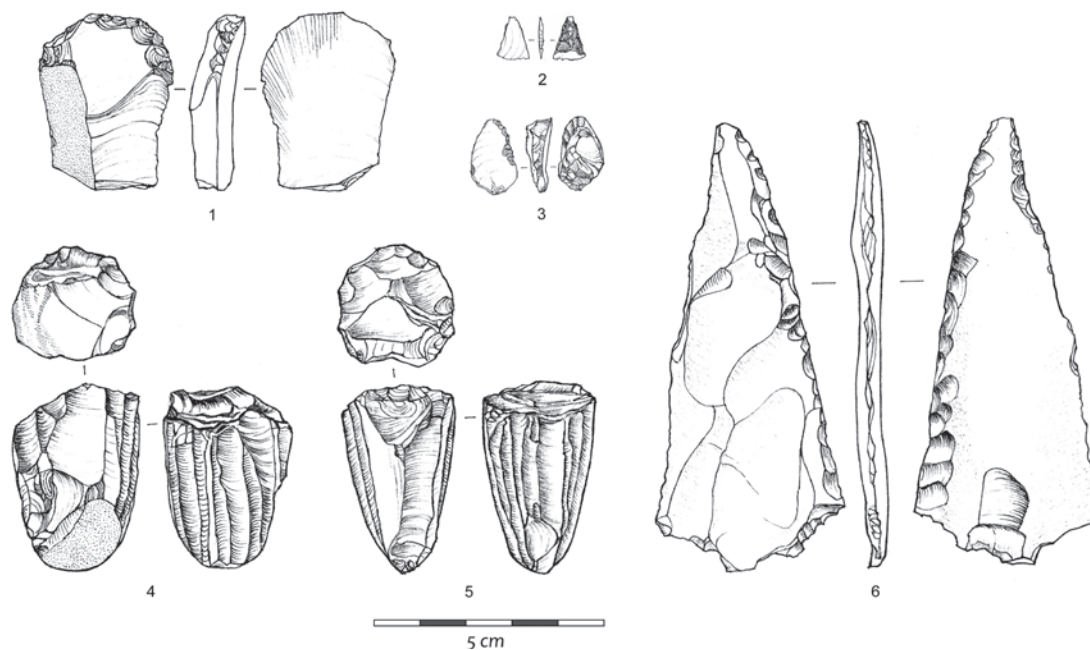


Fig. 6. Neolithic assemblage: end-scraper on blade distal (1); geometric microlith (2); bladelet core striking platform (3); bladelet cores (4–5); tanged point with bifacial retouch (6) – artefacts in obsidian (1–5) and dacite (6) (drawings Ts. Turkiashvili).

2.3.2. Faunal remains

The faunal assemblage of the Neolithic layer studied so far comprises 533 remains: 268 identified specimens are attributed to mammals (the study of rodent bones is not included in this paper). The preliminary results indicate a spectrum dominated by ungulates (91%). Caprinae (*Capra* sp. and *Ovis* sp.) make up 87% of the total mammal NISP; the rest are bovine (*Bos* sp. 4%), and one molar of swine (*Sus* sp.). The remains of these four taxa are very fragmented and attributed with caution to domesticated species.

The wild fauna is represented by equids (3%) and cervids (3%) in equal proportions, followed by carnivores (3% of NISP: bears, and *mustelidae*). Overall, and considering the small faunal assemblage, the Late Neolithic population at Bavra Ablari most probably had an economy based on husbandry practices supplemented by occasional hunting.

A bone tool, a broken-eyed needle, was found in this layer (**Fig. 7**).

2.4. Chalcolithic (Layers 2 and 1)

The distinction between the two Chalcolithic layers is based on slightly changing sediments. The brown-grey clay matrix of layer 2 transitions into dark brown-black sediment in its upper portion. However, both layers have produced fairly similar assemblages that can be presented together.



Fig. 7. Neolithic bone tool: a broken-eyed needle.

2.4.1. Structures and concentrations

Although the abundance of boulders in the stratigraphy strongly limits our ability to delimit structures, several areas of activity have been identified in the Chalcolithic layers. Areas of consumption are located close to the wall of the shelter. The evidence consists of a concentration of burnt faunal remains and lithic debitage, associated with a series of superposed hearths. Up to four Chalcolithic hearths have been identified, along with several lenses. Several types of hearth are represented: a hole dug in the ground; a hole covered by a sill plate of small rocks on top of which the wood is placed; and a structure composed of several stones positioned vertically.

The density of charcoal and ashes, the superposition of lenses and hearths, and the amount of faunal and lithic remains are surprisingly high for a settlement type that would generally be associated with short-term occupations. Several hypotheses can be made. It is possible that Bavra-Ablari was a short-term settlement and the density of remains represents repeated occupations over a short period of time. This situation could potentially explain the lack of structures and postholes. Alternatively, the rock-shelter served as a longer-term settlement, possibly in the context of semi-nomadic transhumance. The existence of such a settlement would raise important considerations about the evolution of settlement patterns during the Chalcolithic period.

2.4.2. Pottery

Pottery sherds (N=53) were recovered only in the Chalcolithic layers. These sherds are of a dark-brown/black ware, mainly mineral tempered. Characteristic features are notched rims and perforations under the lip (**Fig. 8:1, 2**). This type of ceramic, defined as “Sioni”,⁴² is found at sites throughout the Caucasus in the course of the Chalcolithic, such as Mentesh Tepe in Azerbaijan, Aknashen-Khaturnakh in Armenia, or Damtsvari Gora in Georgia.⁴³ Finally, let us note the identification of what could possibly be a fragment of *tuyère* (**Fig. 8:3**).

2.4.3. Lithics

There is a clear inversion in terms of raw material management between the Neolithic and the Chalcolithic layers. In the latter, dacite is the main raw material, representing up to 65% of the assemblage. A few pieces of quartz and flint have also been found. The dacite used here is also different from the Neolithic layer; it is coarse-grained and darker, most likely coming from a local source.

Assemblages from the two Chalcolithic layers (N=3380) are typo-technologically similar. The industry focused on dacite is characterised by three different *chaînes opératoires*, based on the debitage of small pebbles. After opening a striking platform a large flake is obtained through direct percussion. This thick blade-like flake is then retouched bifacially to rapidly obtain large bifacial implements. Another sequence uses the same core to produce expedient smaller blade-like flakes, that are then transformed into side-scrapers. Finally, the last *chaîne opératoire* removes long flakes on the side of the core in order to produce ridges that will drive a longer removal. This final product does not necessarily show any retouching, but may provide evidence of use-retouches. We found only very rare occurrences of striking platform

⁴² Kiguradze and Sagona 2003; Kiguradze and Menadbe 2004, p. 359.

⁴³ Lyonnet *et al.* 2012; Badalyan *et al.* 2010; Varazashvili 1992.



Fig. 8. Chalcolithic clay objects: 'Sioni' pottery (1-2); tuyère (3).

preparation and only very few technical pieces. Minimal investment is made in the shaping of the core and the dacite production is clearly expedient, dedicated largely to the manufacture of large butchering tools, bifacial pieces, and side-scrapers.

Obsidian production was largely aimed at creating microliths (Fig. 9:1–5), and especially small armatures such as trapezes or “tranchants” (Fig. 9:3–5). This typological category is seen in most sites around the South Caucasus, from the Late Neolithic to the Late Chalcolithic. The *chaîne opératoire* of this production is only partially represented on-site (few technical pieces such as overshot blade or striking platform fragments were found). The limited presence of cortex and of sub-products generally associated with the production of bladelets supports the idea of production taking place mostly outside of the site. This is also noticed in relation to the round scrapers (Fig. 9:6) and end-scrapers identified in the Chalcolithic layers (Fig. 9:7, 8).

2.4.4. Subsistence economy

The faunal assemblage is more abundant in the Chalcolithic layers, with around 3448 mammal remains. Only 2015 specimens are identified to family and species levels. The spectrum is plainly dominated by domestic species, which represent 93% of the assemblage (NISP), including Caprinae (54%) and cattle (39%). Swines are attested by four remains and whether they were domestic or wild remains difficult to assess. Along with the livestock, dogs were present on site (1% of NISP). The wild fauna is in great majority represented by equids (3%) and red deer (2%), while three remains of aurochs (*Bos primigenius*) have also been identified. Other carnivores are attested in minor quantities, such as mustelid and foxes (1%). Thus, there is a clear exploitation of the plateau for pastoral activities along with cervids and equid hunting. In addition to the exploitation of mammals, there are also traces of river resources such as fish and crabs (56 remains) and evidence of bird hunting (37 remains). These faunal remains thus emphasise a pastoral economy, with rare hunting activities and opportunistic fishing.

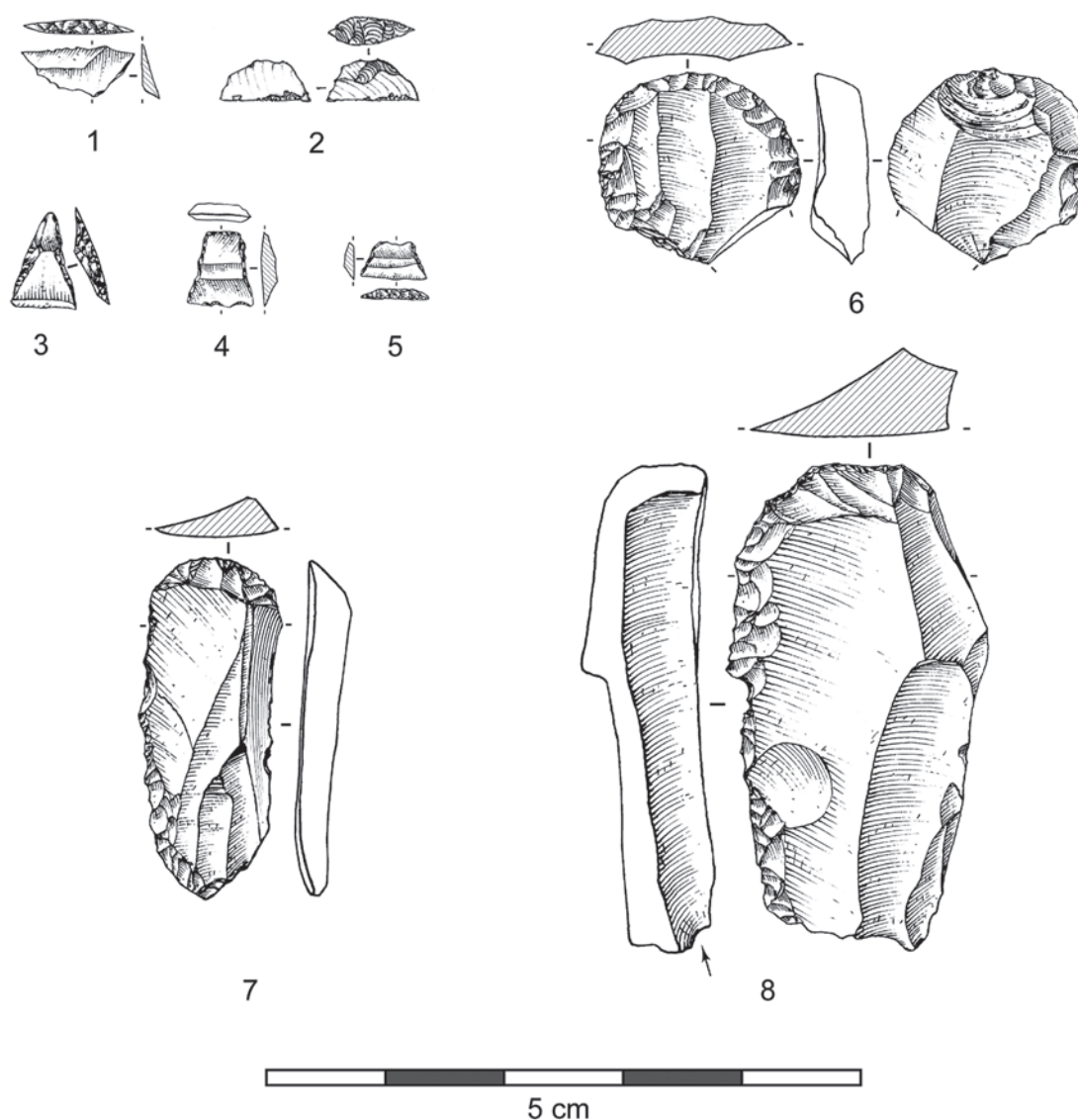


Fig. 9. Chalcolithic obsidian assemblage: geometric microliths (1–5); round-scraper (6); end-scrapers on flakes (7–8) (drawings G. Devilder).

The presence of different body parts of ungulates, fresh bone fractures and butchery cut marks on the bone remains, along with the lithic tools identified in these layers, reveals that butchering activities took place on the site.

Bone tools are rare: two borers or awls (**Fig. 10:1, 2**) and a possible decorative plate (**Fig. 10:3**) were found.

Archaeobotanical analysis permits a first insight into the plant economy. A total of 187 L of sediment has been sampled from secured contexts. Preliminary study shows that domesticated species such as barley (*Hordeum* sp.) and einkorn wheat (*Triticum monococcum*) are attested in the Chalcolithic layers. These two rustic species are well adapted to mountain environments. Wild plant remains were also recovered, such as nuts (*Corylus avellana*), elderberry (*Sambucus* sp.), and hackberry (*Celtis* sp.), and could be related to gathering activities.



Fig. 10. Chalcolithic bone tools: awls (1–2); pendant (3).

3. DISCUSSION

Bavra-Ablari's Mesolithic layer (layer 4) has, so far, only been excavated over 4 m², and its lithic assemblage is at present too small to be properly characterised. Besides backed bladelets, none of the tools can yet be connected to any other Mesolithic assemblages identified in the area, at sites like Bavra or Edzani.⁴⁴ No microliths—geometric or scrapers—are present; however, the assemblage clearly reveals the production of bladelet blanks. Future excavation seasons should allow us to better understand the place of Bavra-Ablari in the cultural landscape of the South Caucasus Mesolithic.

After a hiatus identified in the stratigraphy and the chronology, the rock shelter was occupied at the end of the seventh to the early sixth millennium BCE. This layer is attributed to the Neolithic, with a probable assemblage of domestic fauna that shares similarities with Chalcolithic domestic species in terms of frequencies, age groups and animal sizes. Furthermore, the lithic industry shows some degree of continuity with the local Mesolithic assemblage, even though several typologically Neolithic traits are present.

Bavra-Ablari would seem to confirm the absence of a progressive domestication process in the South Caucasus. Several fully developed agricultural societies appear suddenly c. 6000 BCE in the Kura and Araxes valleys and on the northern slopes of the Great Caucasus. The origin of this secondary neolithisation has yet to be determined.

The Chalcolithic is by far the best represented period at Bavra-Ablari. There seems to be a change in settlement pattern: a decrease in tell-type sites from the plain and an increase in cave sites and rock-shelter occupations. This change persisted to such an extent that by the beginning of the fourth millennium, mountainous areas were intensively occupied.⁴⁵ Indeed, the density of finds and the number of hearths supports an interpretation of either regular, short-term occupations of the rock shelter, or the persistence of single, longer-term settlement. This evolution is necessarily connected with a change in subsistence patterns. Data provided by Bavra-Ablari show the presence of an economy based on a full exploitation of the plateau, involving livestock herding supplemented by occasional hunting, as well as the possible cultivation of plant species better adapted to high altitudes, such as einkorn. This view is also supported by the lithic assemblages. Using local raw materials, these assemblages were intended for the production of butchering tools, as well as for the creation of a few hunting implements, used to acquire fish, birds or small mammals.

The site of Bavra-Ablari requires further excavation and analyses, but it already provides a unique glimpse into the sequence of cultural, social, and economic development that occurred during the early Holocene in the South Caucasus.

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⁴⁴ Gabunia and Tsereteli 2003.

⁴⁵ Kiguradze 2001.

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