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ABSTRACT

Excavations at Mentesh Tepe, western Azerbaijan, have unearthed Neolithic levels dated to an early stage of the Shomu-Shulaveri Culture, with a specific material culture and several inhumations among which a multiple burial. At that stage, already a full domestication of plants and animals is evident. Many questions have been raised concerning the origins of this culture, and its end is also still obscure. Relations with societies in the north-Mesopotamian area have again recently been evidenced at its beginnings. Mentesh Tepe, with its exceptional succession of occupations from the Neolithic to the Early Bronze Age, could help providing some clues for the links between the Neolithic and the Chalcolithic periods. The site is presented here under different points of views (architecture, burials, material culture) but in a preliminary stage since many studies are still in progress. Questions are raised about the climate and the apparent absence of pre- and post-Shomu-Shulaveri Culture possibly due to silting or erosion processes linked with the mobility of the Caspian Sea level.

1. Introduction

The Shomu-Shulaveri Culture (hereafter SSC) has first been identified about half a century ago by I. Narimanov (1958–1964) during excavations done in Western Azerbaijan on the sites of Shomu Tepe, Tojre-Tepe and Babadervish, and later on other sites in the vicinity (Narimanov 1987). Further discoveries were made by A.I. Dzhavakhishvili and T.N. Chubinishvili a few years later in Eastern Georgia at Shulaveris Gora and other sites around where similar architecture and material culture were unveiled (Kushnareva, 1993, p. 18–51). These and subsequent excavations have shown that several clusters of settlements sharing the same cultural features spread on the northern foothills of the Lesser Caucasus along a series of small tributaries of the Kura River in the middle of its course, from the Khramis in the North to the Zeyem Chaj in the South, astride actual Georgia and Azerbaijan (Fig. 1).

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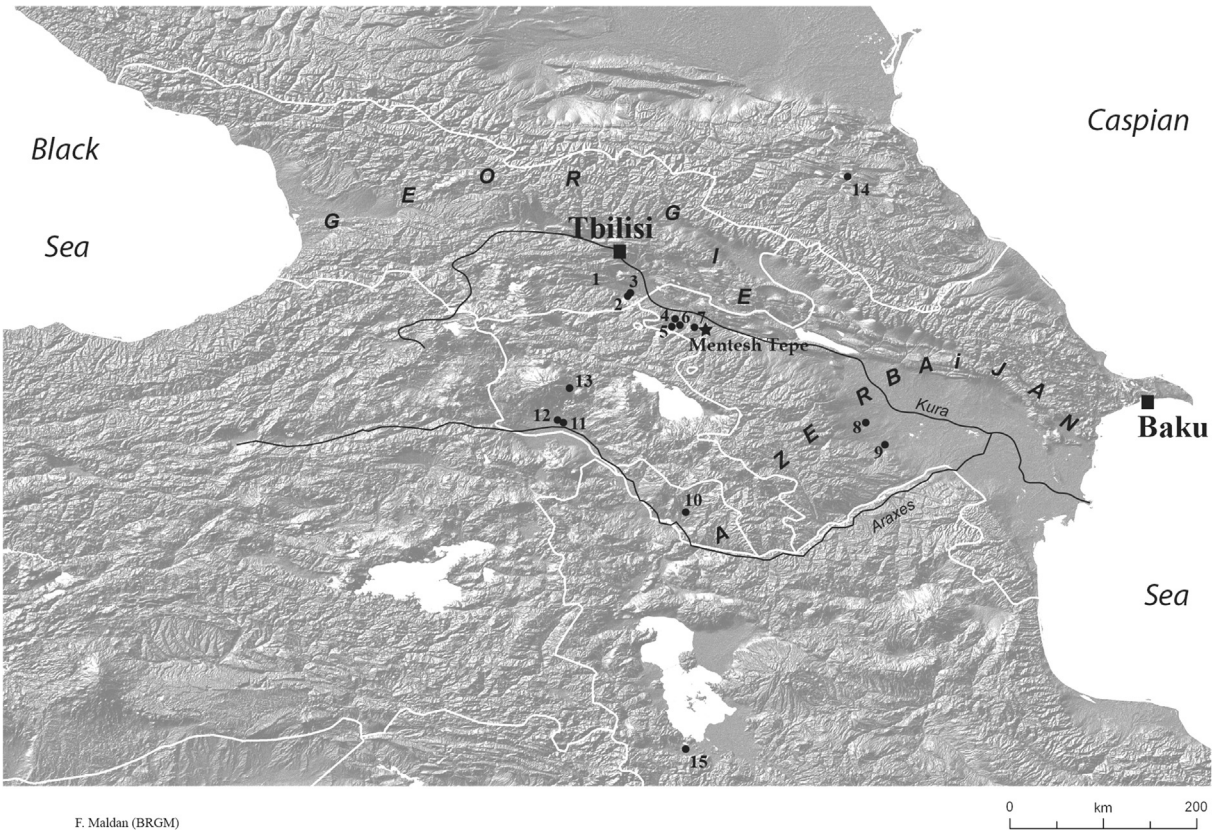

Fig. 1. Map with the sites mentioned in the text. 1.Aruchlo, 2. Shulaveris Gora, 3. Gadachrili Gora, 4. Shomu Tepe, 5. Babadervish, 6. Tojre Tepe, 7. Göy Tepe, 8. Chalagan Tepe, 9. Kamiltepe, 10. Kül Tepe, 11.Aknashen/Khaturnakh, 12. Aratashen, 13. Kmlo-2, 14. Chokh, 15. Hajji Firuz.

A typical circular architecture with a wealth of material (pottery, bone-, obsidian- and stone tools) was retrieved from these sites together with rare discoveries of metal items. Specific studies were made on part of the tools which underlined their main use for agriculture or on animal skins (Korobkova and Kiguradze, 1972; Korobkova, 1979; Arazova, 1986). Attempts were made to organize the material from the excavations in 5 successive phases rising in complexity (Kiguradze, 1976). Most of the plant remains (wheat, barley, pips of grape) and animal bones (caprines, bovids, pigs, and dogs) pointed at an already advanced stage of domestication where caprines played a leading role. This led to consider that this culture was that of sedentary groups already well akin with farming and breeding, and, due to the presence of a few metal objects, it was dated to the Eneolithic/Chalcolithic period.

Contradictory hypothesis were raised about the climate. On the one hand, some considered that it was similar to nowadays or possibly drier on the basis of pollen analysis from two sites, Imiris Gora and Arukhlo 1. They also thought that the birth of agriculture was in itself evidence that climate was getting more arid since wild cereals were not sufficient anymore. On the other hand, others proposed that it was more humid than today, as sites were generally positioned along old, and now dried, courses of the rivers (on that discussion, see Narimanov 1987, p. 11–12).

Other sites dated to the same "Eneolithic" period were discovered at about the same time in south-east of Azerbaijan during surveys and soundings in the Mil' and Karabakh steppes, and two sites were excavated (Alikemek in the Mugan steppes, and Kül Tepe in Nakhichevan). A complete Halaf pot, compared to those of Tilki Tepe near Van, had been found in the lowest levels of Kül Tepe, and probably comes from a grave, though this is not clearly mentioned (Abibullaev, 1982, p. 72–73, 77–78 and pl. XII, 1). While some authors considered these SE sites as belonging to a different cultural group, mainly on the basis of the presence of painted pottery (Munchaev, 1975, p. 115), others proposed that they and the SSC ones were local variants of one unique culture because of similarities in the lithic and bone industries (Kiguradze, 1976).

Many questions were raised as to the origins of this/these cultures, since previous "Neolithic" remains in these territories from which they could have raised were unknown at that time, except for very few and doubtful cases. Only Western Georgia had caves and stations dating to an older period, but no links could be established with the central and eastern part of Transcaucasia. General similarities in the architecture and in part of the material of the SSC and SE sites with that of cultures situated further south was mentioned. Some authors considered that the cultures of northern Mesopotamia, especially the Hassuna and Halaf communities, had probably played an important role in the formation of the SSC (Munchaev, 1975, p. 116–119; Kiguradze, 1976; Munchaev, 1982, p. 113), while those of northern Iran and the Zagros had influenced the painted pottery of the SE group (Munchaev, 1975, p.126–127). Altogether, many uncertainties prevented a clear understanding of both the SSC and the SE cultures, among which stood the problems of their absolute dates and a better definition of their features.

New calibrated dates and further research have since then established with certainty that the SSC belongs to the Late Neolithic and that it developed along the 6th millennium (Hansen et al., 2007; Lyonnet and Guliyev, 2010). Several new excavations are now going on and numerous analyses are being made that intend to

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understand the origins, development, economy and environment of the SE cultures in the Mil Plain (Helwing and Aliyev, 2012), and, even more research is going on the SSC, at Aruchlo (Hansen et al., 2007, Hansen and Mirtskhulave, 2012a), at Göy Tepe (Guliyev, Nishiaki, 2012, 2014), at Hacı Elamxanlı Tepe (Nishiaki et al., in press), and at Gadachrili Gora (Hamon et al., this volume). Sites outside of the Kura Valley, like Aratashen and Aknashen/Khaturnakh in the Ararat Plain of Armenia, are also associated to the SSC due to similarities in their architecture and material culture (Badalyan et al., 2007, 2010). Finally, recent discoveries made at Mentesh Tepe can now be added to this list (Lyonnet et al., 2012b, 2012a).

The aim of this article is to present some of the preliminary results of the 2011–2014 excavations which took place at Mentesh and which place it among the earliest known settlements of the SSC. This corrects what had first been proposed, i.e. an early Chalcolithic period (Lyonnet and Guliyev, 2010), and a Neolithic period for phase 1, followed by an early Chalcolithic period for phase 2 (Lyonnet et al., 2012b).

2. General setting of the SSC settlements in the middle Kura Valley

All the SSC sites are visible small mounds, rarely exceeding 1 ha, of various heights (from 1 to 10 m), the base of which is buried ca. 2 m under the actual level of the plain as shown by several excavations. Many have already disappeared due to modern work. All are positioned on the alluvial fans of small rivers coming from the Lesser Caucasus, where arable land and water are abundant. In the Azerbaijanese area, this favorable area occupies a band about 5 kms wide along the wooden foothills, the same as that settled nowadays. The rest of the Kura valley was never reached by these fans and makes another large band, as wide as the other, totally dry and bare of vegetation except for steppe plants. No human installations has been noticed in this area during surveys except for kurgans and very rare small occupations dated to the Islamic period; sheep farms were implanted there during the Soviet period (Lyonnet, 2009; Ollivier and Fontugne, 2012; Ollivier et al., 2015a; map Fig. 2). Where this dry area is cut through by the river-bed of the Kura, a number of resurgences from its tributaries are noticeable. Though these niches are potentially favorable to human installations, no Neolithic site has been discovered. As for the river-bed of the Kura itself, it has largely been destroyed by recent dam construction. The few preserved parts are partially bordered by a riparian forest and subject to fierce inundations in spring time.

Surveys and excavations have shown that the mounds along the foothills have rarely been reoccupied later, except by small occupations of the Late Bronze Age. Almost no new mounds of later periods are present (Lyonnet, 2009). To explain this absence, a detailed research on possible environmental changes and on the geomorphology of the area has been launched. Its major results underlined the close relationships between abrupt and quick changes in the levels of the Caspian Sea and the corresponding episodes of erosion or aggradation from the Kura and its tributaries (Ollivier et al., 2015a; Ollivier et al., this volume). As also shown by its authors, the inland responses to this sea-level phenomenon are not immediate and a necessary chronological interval of several centuries separates one with the other. The depth of the Neolithic levels at Mentesh, at −2 m under the actual surface, clearly illustrates the aggradation process that followed this occupation. The actual image of the settlement pattern of this area is therefore obviously partial and, as our predecessors had already noticed (Dzhavakhishvili quoted in Narimanov 1987, p. 82), any reconstruction of the past must take this in consideration.

Climatic change is often referred to, but evidences for it are difficult to grasp and must be based on a large spectrum of analysis in different fields. The changes in the levels of the Caspian Sea are themselves tied to a very complex array of events only partly explained by climate variations (see for instance Benedysec and Korobanov 2004, Huseynov et al., 2004; Kroonenberg et al., 2007).

Some new data from recent research on various palaeobotanical remains are available. They indicate a major pollen change occurring after 6.45 cal. BC linked with a warmer and more humid period. This change, which happened at the onset of the SSC, is characterized by the development of forest after a long shrubby, cold and arid phase. From Caspian sea cores, this transition is dated between 6.24 and 6.45 Cal BC by Leroy et al. (2013 a,b,c); cores from Paravani lake put it at around 6.55 cal BC (Messager et al., 2013), while other cores in Armenia and in Georgia place it at 6.25 cal BC (respectively Joannin et al., 2014 and Kvavadze and Connor 2005 or Connor and Sagona, 2007). Southeast and west of Mentesh Tepe, this climatic transition seems to be more progressive, starting at 7.05 cal BC at Zeribar (Van Zeist and Bottema 1977) or around 6.3 cal BC in Lake Van (Wick et al., 2003) and between 6.65 and 6.05 cal BC at Eski Acigol (Roberts et al. 2001).

Charred macro-botanical remains from Mentesh Tepe point at an environment richer in various wood species during the Neolithic than later, the area around the site being more wooded or shrubby and the river(s) bordered by a riparian forest (Decaix et al., this volume). However, in the deforestation which followed the Neolithic, it remains difficult to measure the amount due to climatic changes and that due to anthropic activities. Faunal studies from the remains discovered at Mentesh give little information as for the wild fauna which does not seem to have been largely hunted at that time. The presence of a goitered gazelle, however, points at a more steppic area not too far from the site. However, the use of antlers from deer and of tusks from boars in the bone industry points at a more humid and forested area nearby.

3. Mentesh Tepe

Mentesh Tepe lies on the lower part of the fan of the Zeyem Chaj, on the eastern edge of the SSC expansion area, at ~360 m in altitude. It was a small mound (45 m in diameter – i.e. ~0.16 ha, and 1.5 m high) until it was levelled by bulldozer for a vineyard which destroyed all the late occupations above the surface of the plain. Nevertheless, it stands as an exception within this picture of the SSC settlements for several reasons. Firstly, it is unique in its unusually long occupation, from the Neolithic to the Early Bronze Age, albeit with some gaps (Lyonnet et al., 2012b). Secondly, for the first time in Azerbaijan, a Chalcolithic settlement of the second half of the 5th millennium has been identified with its full-fledged rectangular buildings of mud-bricks, with its vegetal-tempered painted and/or combed ceramics and with its metal production. Thirdly, the Neolithic levels that we were surprised to discover under the Chalcolithic ones have provided us with what was an unknown ceramic material at that time, as well as with several burials, including an exceptional grave with multiple inhumations.

3.1. Architecture and phases

All the constructions of the Neolithic level are more or less circular and are sorted in at least two groups of sizes (~2.20 m and ~4.60 m). Bent walls connect some of them, but we have not been able yet to distinguish real courtyards with outdoor activities due to the numerous destructions made by later pits.

Two main phases, at least, are attested as shown by the visible reconstruction of some of the buildings slightly astride the previous ones, such as 286 over 536, or 293 over 344 (Fig. 2). The earliest one

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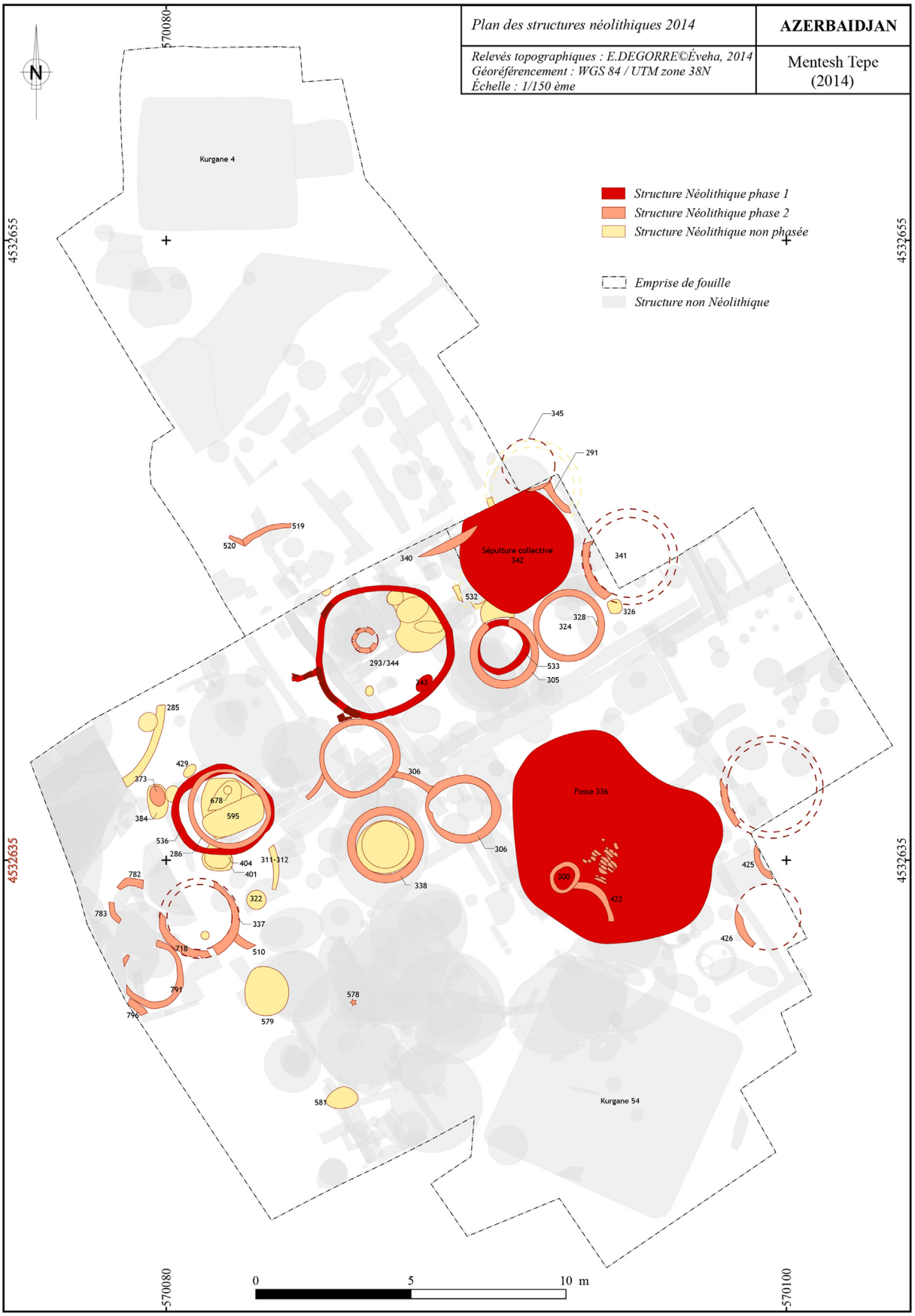

Fig. 2. Mentesh Tepe, plan of the Neolithic levels (phases 1 and 2).

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(phase 1) rests on virgin soil, either identified by sand and pebbles from a natural river channel (under 536 and 336), or by a yellow sediment partly mixed with stones without any visible inclusions related to human activity (under 344). Phase 2, although represented by many constructions, is extremely eroded or levelled when not destroyed by intrusions from the Chalcolithic and Bronze Age layers; it gave almost no material in situ. This explains our hesitations about its dates. In some cases, a thick layer of ashes seems to separate the two phases, while in others no clear phase of abandonment between them has been identified.

In both phases, constructions were built with various techniques: either with plano-convex mud-bricks (for at least two of the buildings) and/or with mud to which are added small quantities of straw or other organic material (usually called *pisé*, but, depending on the precise technique used and the components, the study of which is still in progress, other terms might be preferable). This last material has often melted during the erosion process and makes difficult the identification of the walls and of the floors. The dimensions of the bricks are not standardized (44–46 × 14 × 12 cm or 41–45 × 17 × 9 cm) and no real foundations for the walls have been found, except for a layer of small pebbles under some. Little material was found in the buildings themselves or around them, so that their precise function is unclear. The walls are thin (~20 cm) and covered by a thick coating. Most of them rarely exceed 30 cm high, except for building 536 of phase 1 that reaches over 2 m. Due to its good state of conservation, this construction is the only one where a possibly condemned door has been identified and where an undoubtable off-centered post-hole has been discovered.

In the early phase, the filling of the buildings seems to have been done in a rather short period of time and consists of a succession of black levels containing ashes and charcoal, interrupted by others covered with ochre, as noted in two cases (536 and below the collective grave 342). The reasons for such an accumulation of layers are still unclear. A hearth with two brick-like elements on its sides has been found along the interior of the wall of 536, and a few items of pottery, or tools of stone, obsidian, and bone come from these different layers. A pottery shard from just above the virgin soil in building 536 presents the same technological features as those from phase 1. The most imposing building, 293 (phase 2)/344 (phase 1), is 4.60 m in diameter but is much less well preserved in both its phases of use. It is made partly of plano-convex bricks and partly of mud, possibly after a repair. Inside it, an off-centered more or less circular structure made of brick-like elements is possibly the location of a large post, though no other indications, such as a wedging pit, have been found. Inside, along the eastern side of the wall, an elongated hearth and a small pit had been dug in what has been considered as the virgin soil. No other remains indicating any specific activity were found in both phases of this construction. However, a child burial has been discovered inside the building along the southern side of the wall of the earliest phase and was partly recovered by the wall of the latest phase (see below, burial 343). The base of phase 1 of this building and of a few others next to it, supposedly on virgin soil, is at a much higher level than that of constructions on both sides, i.e. 536 and layers under the collective grave 342. Further research will be made on this point to clarify the topography of the area at that time.

To these round constructions must be added the probable existence of a few post-holes found in different areas of the Neolithic level. Their small number, however, prevents at this stage an understanding of their connections with the buildings.

A large amorphous anthropic pit (7.40 × 6.80 × 2 m) (pit 336) has been found in the vicinity of the constructions and is related to phase 1. It was dug into the geological sediment and, as building 536, its bottom reached a natural river channel. The reasons for digging such a huge pit close to other buildings are not yet clear. Narimanov (1987, p. 15 and 84) also mentions the presence of a large pit at Shomu Tepe, but its length (~10 m) may rather indicate a ditch than a pit. Ditches have also been discovered at Aruchlo (Kushnareva and Chubinishvili, 1970, p. 22–25,; Hansen and Mirtskhulava, 2012a) and at one of the Kamiltepe sites (Helwing and Aliyev, 2012). Though first claimed to be irrigation canals at Aruchlo, the function of these ditches is yet as obscure as that of the Mentesh pit. In our case, the search for building material could be an explanation but we have no evidence. Its fill contained most of the archaeological material recovered from this period, i.e. ceramic potsherds, bone or horn tools, lithic implements, fauna and palaeo-botanical remains. Similar ^{14}C dates from the top and bottom layers (see below) show that it was very rapidly filled in, confirmed by the uniform character of the pottery. A fallen wall of bricks linked to phase 2 was visible on its upper surface.

Another large and more or less circular pit (pit 342), surrounded and partly covered by phase 2 buildings, proved to be a multiple burial (see below). Its mouth is ~1.50 m wide, widening (~3.70 m) near the bottom and narrowing at its base (3.30 m). It was probably dug within an abandoned construction as shown by the presence of several bricks or parts of bricks in its fill, and, under the lowest skeletons, by that of black and ochre layers similar to those of the earliest layers in building 536.

This description of the architectural elements would not be complete without the mention of a thick grey–blue layer (~10–20 cm) of ash with very small inclusions of charcoals that has been identified over a large part of the Neolithic level of the settlement. In some of the buildings, it clearly separates the two phases of occupation. Further analysis is planned to determine its exact composition and nature.

Many samples for palaeo-botanical and phytolith studies were taken from the floors, pits or hearths of these buildings, as well as from the burials or from the large pit 336. The results are given elsewhere (Decaix et al., this volume).

3.2. Burials

Several burials related to the Neolithic period have been discovered. All are primary inhumations. Three are individual infants' grave, a fourth is a multiple burial with 31 individuals of both sexes and different classes of ages. Two other individual graves (one infant and one adult) are not yet dated with certainty and will not be described here.

Burial 343 was discovered along the southern part of the wall of building 344 (phase 1) and was partly covered by its reconstruction (building 293, phase 2). Hence, it is related to phase 1. No specific pit associated with it was identified during the excavations. The child (between 5 years 3 months, and 6 years 6 months old according to the methods of Moorrees et al., 1963) was lying contracted on his right side against the wall of 344, head to the NE, looking north. His body had been covered with branches of a hackberry tree, for either protection or a food deposit, the fruits of which had left white dot remains, and finally with earth. A fragment of a pig mandible was lying over his head, and a bone awl was found near his legs.

Burial 373 was found outside the NW part of building 536/286 and belongs to phase 2, though a later date cannot be totally excluded. The skeleton is that of a juvenile, between 3 and 6 months old (according to Moorrees et al., 1963). He was lying contracted on his right side in a pit, head to the NW, looking south. The disposition of the bones indicates the possible presence of a flexible element around the corpse before it was covered with earth. No associated material was found.

Burial 578 is that of a juvenile that was almost totally destroyed. Only the long bones of his arms and legs, a few ribs and small bones

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of the feet were preserved. They were lying on the grey–blue ashy layer. The area (Z. 19) is completely disturbed by a succession of pits dated to the Chalcolithic period so that this burial is totally isolated from any dated architectural remains. Only its ^{14}C date allows a relation with phase 2.

Burial 342 is an exceptional multiple burial with 31 skeletons of different ages and both sexes. They were lying in a pear-shaped pit 3.70 m in diameter near its base, probably dug within an abandoned building. It rests on a succession of black and ochre layers, similar to those found in building 536, which contained many fragments of obsidian and bone tools. At this stage of our research, both the underlying domestic levels and burial 342 are related to phase 1, as later circular constructions of phase 2 partly covered them. The skeletons are well preserved and complete except for a few lacunae (some of the long bones of three individuals). All are primary burials, as the small bones of the hands or of the feet are present. A few items in bone (Fig. 6. 8, 10–12) and obsidian (Fig. 7) have been found in association with the skeletons, as well as a large shard of a bowl (Fig. 9. 1). The bodies were superimposed on a ~50 cm high deposit, although this is one single episode. The first bodies were laid on a slightly conical layer, which explains why they are arranged in a ring (Fig. 3). Those on the top layer are in the center of the pit and were partly covered by the collapse of its exterior wall. The accurate observation of the position of the bones and of the skeletons attests of a multiple burial taking place within a short period of time. There is no specific orientation or position of the bodies: most are on their side, some on their belly, others (usually juveniles) are on their back, and a few cannot be identified. Some are extended while others are strongly contracted. In a few cases, an intentional arrangement is clear (Fig. 4). It is not yet established with certainty whether the bodies were wrapped or not before deposition, as contradictory observations have been made, but the possibility of human intervention taking some of the bones is likely, as a few are missing. Further research is planned on that matter. A study of the skeletons, though still preliminary, has identified 11 adults and 20 juveniles, but no infant less than a year old. No trauma or specific pathologies, especially no strongly marked hypoplasy of the teeth enamel, have been noticed. In the current state of the research, we can therefore discard both a violent episode, natural or human-made, as well as a long famine followed by starvation. An epidemic is possible but other causes have also to be investigated. Further analyses from the samples collected will hopefully give a more accurate answer to this question. We also hope to determine the kinship relations between these individuals through ancient DNA studies (under the direction of E. Heyer and C. Bon, Museum National d'Histoire Naturelle, Paris), their diet, etc.

Fig. 3. Mentesh Tepe, multiple burial 342, the lower skeletons in a circle.

Fig. 4. Mentesh Tepe, multiple burial 342, two skeletons in close connection.

3.3. Fauna

The animal bones collected in the different structures of the Neolithic levels until 2013 show a variety of domesticated animals, among which ovicaprids are the most numerous, followed by cattle, pig, and dog (Table 1). Wild animals are particularly rare during this period at the site. The presence of a goitered gazelle is interesting in that it points at a rather steppic environment not too far from the site, while the absence of deer and the rarity of boars raise the question of the provenance of the raw material used in the bone industry.

Besides the determination of the species and studies on the culling age of the animals, specific analyses are being made on the fauna in order to trace the origins of domestication in this area (DNA). To these are added studies on the strontium isotopes to search for an eventual seasonal mobility of the animals from the plain to the mountains (under the direction of M. Mashkour, Museum National d'Histoire Naturelle, Paris). All are in progress.

3.4. Dates

When we discovered the first remnants of a circular architecture and before we got the results from ^{14}C analyses, we thought for different reasons that they dated to a post SSC period (Lyonnet and Guliyev, 2010). After further excavations and the first ^{14}C dates,

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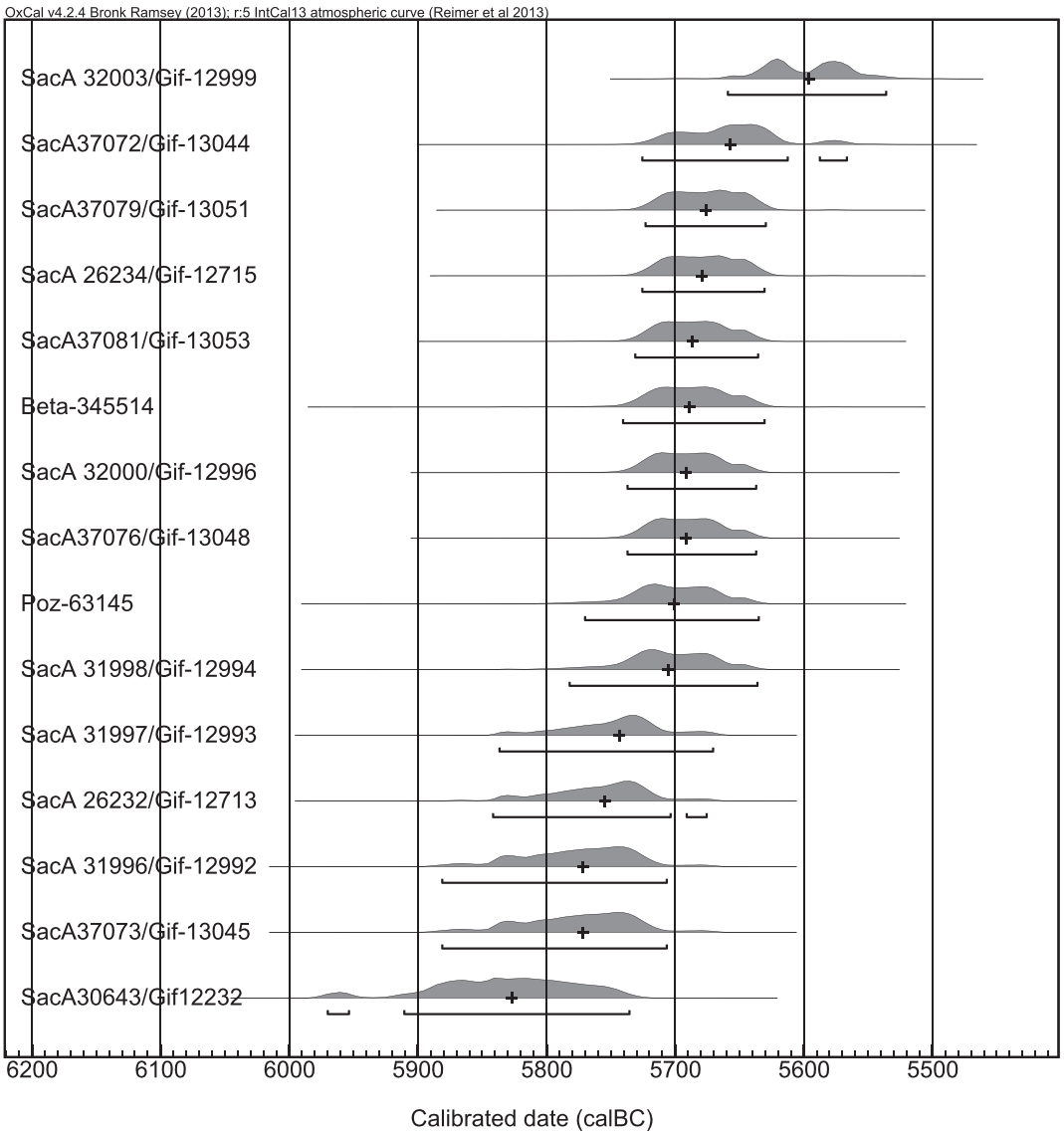

Fig. 5. Mentesh Tepe, graphic of the 14C calibrated dates for the Neolithic levels (phases 1 and 2).

phase 1 was given the dates it has here, but phase 2 was still considered to belong to an early phase of the Chalcolithic period (Lyonnet et al., 2012 b).

From the 15 ^{14}C dates done on charcoals, seeds and human bones specifically related to the Neolithic levels (Fig. 5 and Table 2), we now have a very homogenous image for the occupation at that time, with the extreme earlier date going back to 5882 cal. BC, and the extreme later one dated to 5536 cal BC. In median dates, both phases are situated between ca. 5800 and 5600 BC, with five (phase 1) falling into the first half of the 58th c. BC and seven dates (phase 2) falling into the first half of the 57th c. Only one date, from building 286, is slightly more recent, 5660–5536 cal BC. However, the dates on samples taken from the earliest levels excavated this last season are still awaited, so that the exact beginning of the site is not yet known.

Therefore, and contrary to the first proposals we had made, Mentesh Tepe is among the earliest known settlements of the SSC, together with Hacı Elamxanlı Tepe (Nishiaki et al. in press) and Gadachrili Gora (Hamon et al., this volume) in the Middle Kura Valley, or with Aratashen level II in the Ararat Plain (Badalyan et al., 2007; table I). Our phase 1, however, should date later than the earlier levels at Aratashen and Hacı Elamxanlı Tepe. Our phase 2 seems to overlap with a large array of dates from Aruchlo 1 (Hansen and Mirstkhulava, 2012b, Tables 19 and 20). Mentesh was already partly deserted when Göy Tepe was in its full development (bracket dates placed between 5650 and 5300 BC, see Guliyev and Nishiaki, 2014).

3.5. The material culture

As mentioned above, not much material was found in situ within the buildings. An important part, however, came from the large pit 336, which was quickly sealed.

3.5.1. The bone industry (Fig. 6)

Over 100 tools made of bone and antler come from the Neolithic levels, among which 1/5 come from buildings, 16 from funerary contexts, and the rest from the large pit 336. Awls and pointed objects are by far the most numerous. A few needles are also noted. Cutting tools, among which shovels and beveled perforated tools

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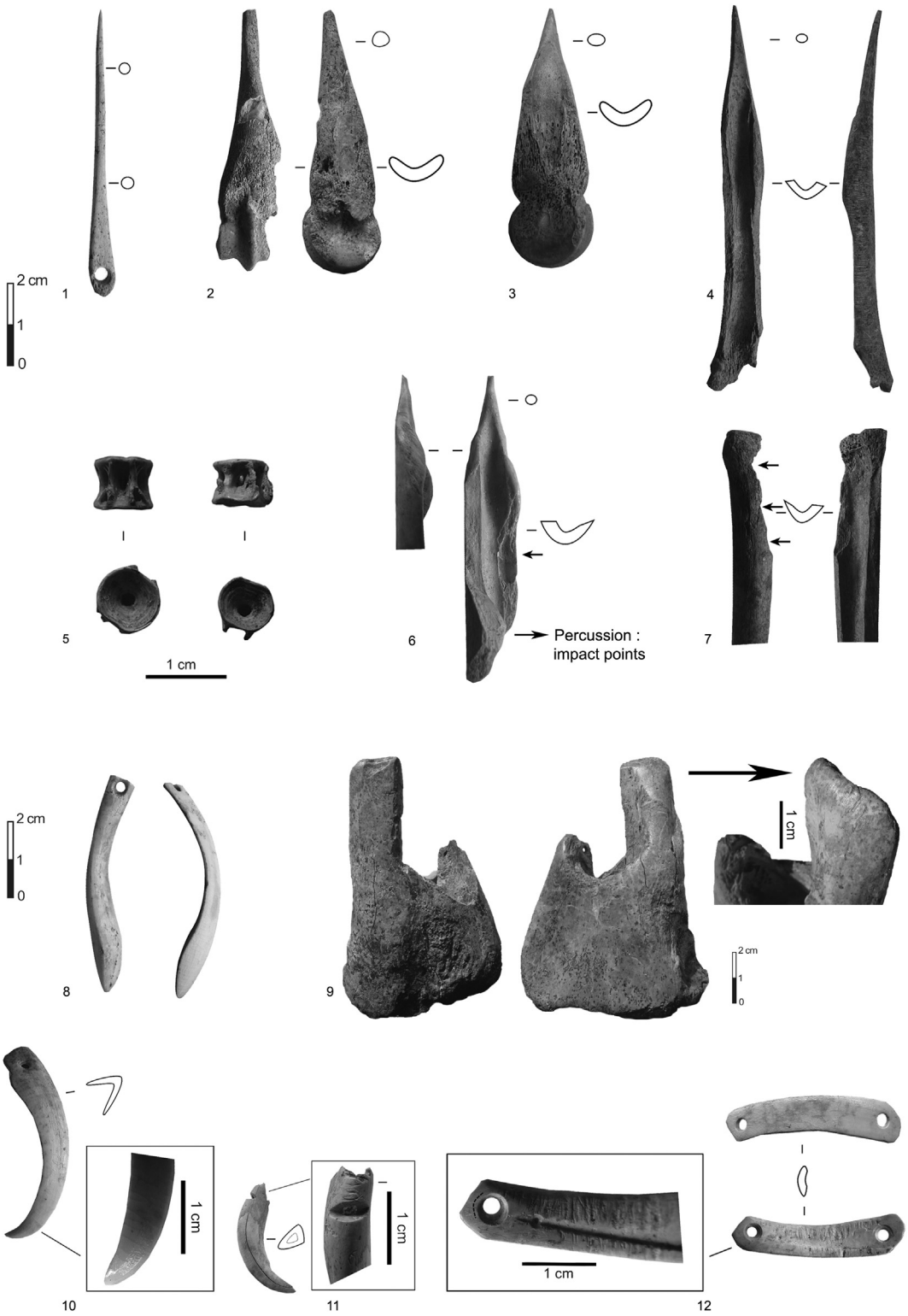

Fig. 6. Mentesh Tepe, bone industry from the Neolithic levels.

made on large mammal bones are less abundant. Some beveled perforated tools were found in building 286/536, apparently in relation with metal work, but this needs to be tested. Smoothing tools are also not very frequent. Finally, several pendants come from the multiple burial 342.

The raw material by far comes from bones of small mammals. Cervidae, large bovids and boars were also exploited. It seems that specific rules were followed when making the bone tools: most of the awls are made on long bones of small mammals, shovels are made on scapula of large mammals, beveled perforated tools are

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Fig. 7. Mentesh Tepe, multiple burial 342, obsidian blades.

made on radius or tibia of large mammals, while most of the pendants are made on boars' tusks.

Several methods were used to transform the bones: direct shaping (pendants), sectioning (beveled perforated tools, tools on antlers), bipartition (awls), fracturation (awls). The most common technique for longitudinal division of the bones is percussion. Direct and indirect percussion were used with a quite high skill level. Nonetheless, the general rate of transformation, except for pendants and some tools found in the funerary pit, is low, and most of the operational sequences were done quickly. Shaping is mainly made by abrasion, probably with the help of ochre. Perforation was made by sawing or by rotary piercing. Altogether, not much investment in this production is visible.

3.5.2. The chipped-stone industry (Figs. 7 and 8)

Up until now, 692 chipped stones come from undisturbed Neolithic levels at Mentesh Tepe (Table 3). Most are very well preserved. Since their study is still in progress, we present here only preliminary results. Most of them (n = 598, i.e. 86%) were collected in the large pit 336, while very few items come from the collective burial 342, and from the round buildings 293/344 and 286/536. The most frequently used raw material is obsidian, the different sources of which are currently being studied with LA-ICP-MS and XRF by B. Gratuze, IRAMAT, Orléans. Chalcedony is the second raw material used (n = 63, i.e. 9.1%). The other raw materials (flint, jasper) are marginal.

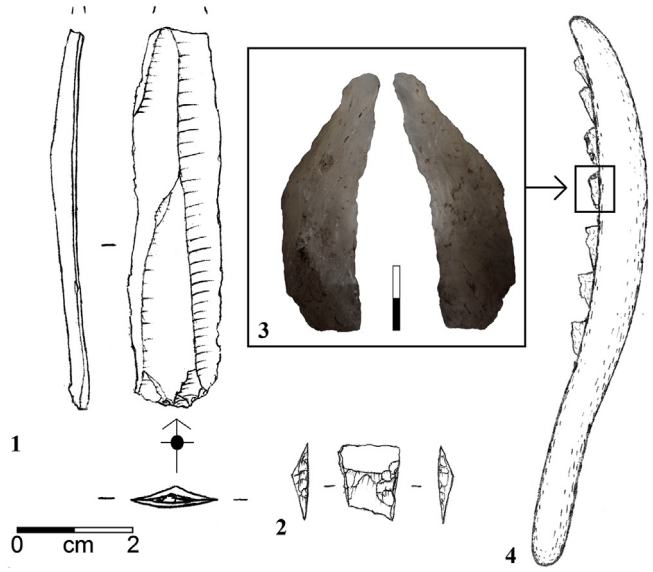

Fig. 8. Mentesh Tepe, lithic tools from the Neolithic levels.

Obsidian blades made by pressure (Fig. 7) are particularly frequent compared to the flakes made in the same material. Among the other raw materials, chalcedony seems to be mostly devoted to a flake industry producing sickle inserts to be hafted obliquely (Figs. 3, 4 and 8), and part of it were made in situ as indicated by the presence of a few cores and blocks.

Only a few tool types have been recognized, whatever their raw material. Most are blanks with retouched edges. Many wedges, a few burins and truncated pieces, as well as the sickle inserts mentioned above were also identified. Some are rare items, like backed pieces, denticulates, scrapers, notches and two transverse arrowheads (Figs. 8 and 2).

3.5.3. The macrolithic tools

A very preliminary study has been made on the macrolithic tools coming from the neolithic discoveries at Mentesh tepe. Though it is based only upon 15 tools, it already points at some diversity. A fragment of a slab and two pestles are the only grinding tools that have been recognized. A hammerstone, a chopping tool, two retouched flakes and a possible scraper remind the industries on basalt cobbles from the Mil Steppe, but in much lower proportions (Hamon in Lyonnet et al., 2012). Several polishing tools are also present, including a small polisher, a handstone, and several burnishers on cobbles.

To these tools may possibly be added three other remarkable polished tools, two axes and one damaged perforated spherical mace-head. Such items are often found in contemporary Neolithic sites. At Mentesh, they were discovered within Chalcolithic layers or structures, but the great disturbances made by pits of different periods leave doubts as to their original provenance.

Altogether, these tools point to craft activities rather than food transformation on the site. Phytoliths and charred palaeo-botanical remains show an intensive processing of cereals on the site at that time (Decaix et al., this volume). Typologically, the macrolithic tools correspond to those identified on other sites of the SSC in Georgia (Hamon, 2008).

3.5.4. The pottery (Fig. 9)

Pottery shards are attested from the earliest levels of the Neolithic period at Mentesh, but not in great number (n = 1157).

Three main groups have been recognized, depending on the temper used, but there is no radical frontier between them and some shards may present a combination of them. By far, group 1, related to phase 1, is the most numerous (Fig. 9. 1–7). Its characteristic temper is made of small oval seeds of wild plants (*poaceae*) which left similar holes after firing. The temper is sometimes hidden by the final polishing treatment but visible in the section. This specific vegetal temper is, in exceptional cases, still attested during the Chalcolithic period. This pottery group is mostly of light color on the surface (pinkish, greyish, or light buff) often with a grey core, and usually polished. A few shards with this temper present a black painted decoration probably made with bitumen (motifs unknown) (Fig. 9. 2).

Far less numerous is group 2, related to phase 2, tempered with other vegetal elements (shaft) leaving rather long and/or large prints on the surface of the shards (Fig. 9. 8–10, 12). These are often covered with a red slip and polished. Except for this slip, their external appearance makes them difficult to differentiate from the Chalcolithic pottery.

Group 3 consists of very few shards with rather large grit temper (Fig. 9. 13). Besides the already mentioned cases of polishing, of red slip and of a few cases of black painted motifs, only two or three shards present an applied decoration along the rim (Fig. 9. 11).

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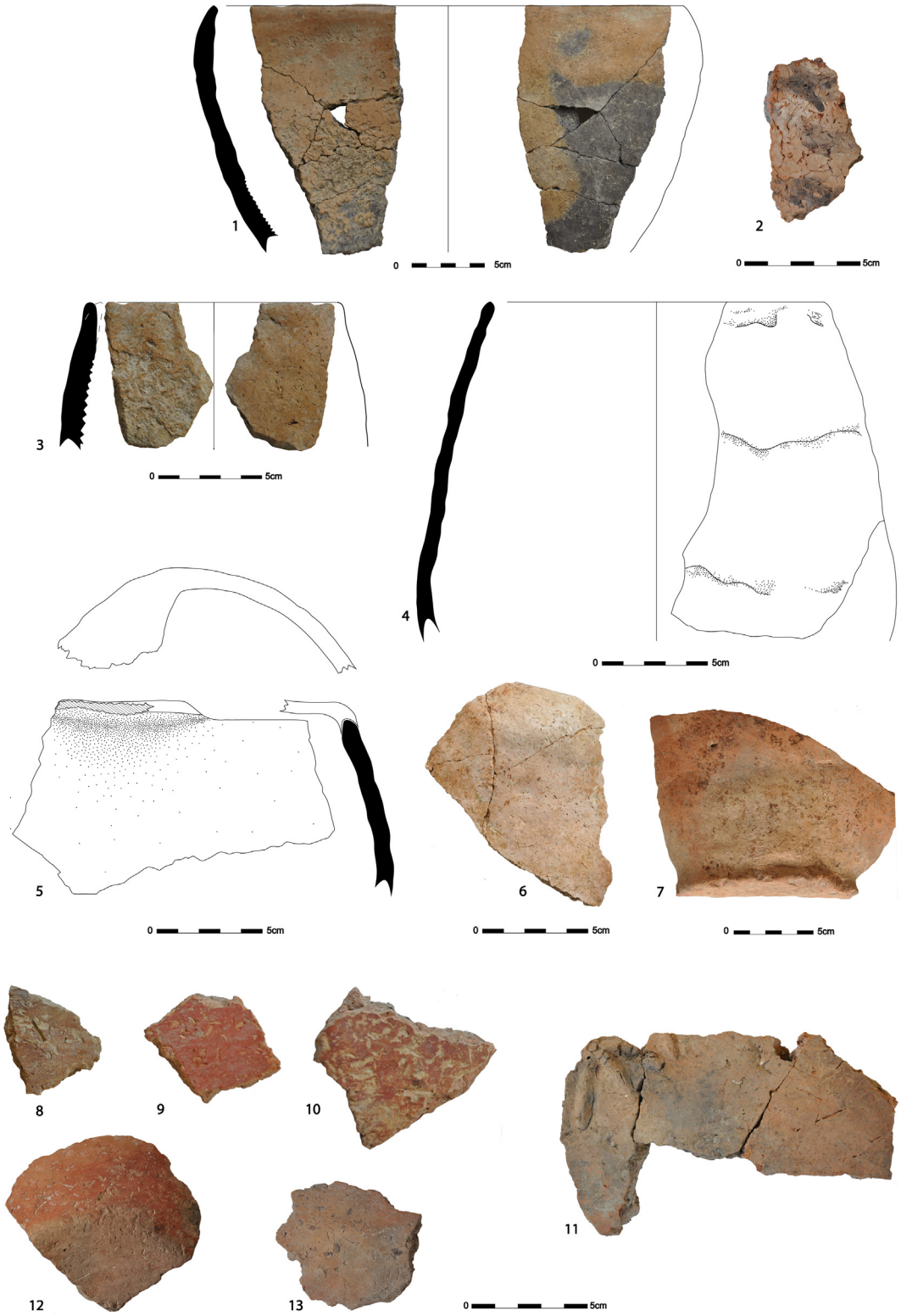

Fig. 9. Mentesh Tepe, pottery from the Neolithic levels.

Pots were made in large bands, but the slab technique is also noted. Rims are always simple, and the bases are generally slightly raised, without mat impressions (only one case has been noticed).

The poor preservation of most of the finds prevents a full reconstitution of the shapes. The most recognizable ones consist of hole-mouth pots, the tops of many of which are partly closed, perhaps to better grasp the pot (Fig. 9. 5, 6). The nice finish of the edge of the closing part clearly shows that this is not a base. Bowls are rare, as are handles or long lugs.

3.5.5. Metal

Metallurgy is not yet noted at that time, and no item or jewel in metal has been found at Mentesh. However, two discoveries made within phase 2 of building 286/536 have to be mentioned because

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Table 1
Mentesh Tepe (excavations 2008–2013), fauna. Species composition in the hand-collected materials (NISP).

Species	Neolithic phase 1	Neolithic phase 2 (and early Chalco?)
Domestic Animals		
Sheep/Goat	669	266
(Sheep)	(41)	(24)
(Goat)	(8)	(2)
Cattle	105	47
Pig	75	25
Dog	25	16
Domestic/Wild animals		
Bos	–	1
Canis	1	–
Wild animals		
Wild pig (*Sus scrofa*)	1	–
Goitered Gazelle (*Gazella subgutturosa*)	1	1
Hare(*Lepus europaeus*)	1	–
Birds	1	–
Turtles	22	–
Unindentified		
Mammals (large size)	80	42
Mammals (medium size)	1984	1633

they may point at its very preliminary steps: one is a wide greenish spot on a floor surface that analysis has proven to contain copper, the second is the presence of a small azurite ore a few centimeters below. A ^{14}C date from the floor with a copper stain is the latest of all the dates for the Neolithic period at Mentesh (see Fig. 5).

4. Discussion

The excavations of Neolithic levels at Mentesh Tepe have brought to light a material culture which is not that usually recorded for SSC sites.

In SSC sites, vegetal temper pottery is usually said to be not numerous ("not more than 15–20%" according to Narimanov 1987, p. 117; "not in great number" according to Kushnareva, 1993, p. 43). The same specific temper with oval seeds of poaceae has been recently identified at Aruchlo 1 (ware 5) where it is said to be the least represented with 0.34% (Bastert-Lamprichs, 2012). Kiguradze (1976) had pointed out that vegetal temper was beginning in period II of the SCC. Red-brown slip with polishing is mentioned as linked with this vegetal-tempered pottery and considered as a table ware

Table 3
Mentesh Tepe, lithics from the Neolithic levels.

Locus/Raw material	Obsidian	Calcedony	Flint	Others	Total
Building 293/344	7	1			8
Large pit 336	536	57	3	2	598
Burial 342	24	2			26
Building286/536	55	3		2	60
Total	622	63	3	4	692
%	89.9	9.1	0.4	0.6	

(Narimanov 1987., p.117 and 119). It is therefore also rare, except, it seems, at Baba-Dervish (Kushnareva and Chubinishvili, 1970, p. 34). Painted pottery is very rarely mentioned in the references mentioned above, and since the "Eneolithic" period included later Chalcolithic sites at that time, it is almost impossible to figure out its correct dating. Finally, the strange shape (hole-mouths pots with their top partly closed) is never represented in pictures or in drawings. The very rare shards with gross mineral-temper or applied motifs that we have found at Mentesh are always said to be the most typical pottery group of the SCC sites.

These assessments led us at first to consider that we were probably dealing with a still unknown transitional period with the Chalcolithic (Lyonnet and Guliyev, 2010). Comparisons between the strange shape and some pots from Kamiltepe made us later propose that its presence could be the results of contacts with the SE sites of Azerbaijan (Lyonnet, 2012).

^{14}C analyses have shown that we were wrong on the first point and that, on the contrary, these levels were much earlier than expected. A recent publication and our own research made in the funds of the Institute of Archaeology and Ethnology in Baku have shown that the strange shape with its opening partly closed is present at Shomu Tepe (Akhundov, 2013; pl. 138, 1; pl. 177; pl. 192, 1; pl. 206, 7/106; pl. 207), and at Chalagan Tepe in the Karabakh steppe. With this in mind, a new reading of Narimanov noted that he had observed and described the shape ("Part of the rim of vegetal-tempered pottery is sometimes pushed inside, almost at an horizontal position, as for a better grasp with one hand" (1987, p. 118, our own translation)). It is also present at Ilanly Tepe which, as Chalagan, is considered to belong to the SE cultures. Questions on the internal development of the SCC and on its links with the SE cultures are, therefore, once more raised. The investigations on different settlements of these cultures will hopefully help to solve that in the near future.

Table 2
Mentesh Tepe, ^{14}C dates.

Lab. N°	Sample ref./Material	Conventional age BP	Stratigraphic context	Calibrated dates interval (2 sigma)		Median dates
SacA 32003/Gif-12999	MT 2012, CHARB 25- charcoal	6680 ± 35	Z. 15, alt. 357.94, str. 568 (copper stain)	−5660	−5537	−5597
SacA 37072/Gif-13044	MT 2013, FLOT 303-seed	6745 ± 45	Z. 17–19, US 582	−5726	−5567	−5658
SacA 37079/Gif-13051	MT 2013, CHARB 16, charcoal	6775 ± 35	Z. 15–16, str. 536, alt. 357.17	−5724	−5630	−5677
SacA 26234/Gif-12715	MT 2011, CHARB 112,charcoal	6780 ± 35	Z. 9, loc. 342, alt. 358.8	−5726	−5631	−5680
SacA 37081/Gif-13053	MT/KUR 2013, 09,charcoal	6795 ± 35	South balk, grey–blue level	−5732	−5636	−5687
Beta-345514	MT 2012, ANT,human bone	6800 ± 40	Z. 9, str. 342, indiv. 3	−5741	−5631	−5690
SacA 32000/Gif-12996	MT 2012, FLOT 281,seed	6805 ± 35	Z. 10, str. 344, US 548	−5738	−5638	−5692
SacA 37076/Gif-13048	MT 2013, CHARB 1,charcoal	6805 ± 35	Z. 19, TP 577	−5738	−5638	−5692
Poz-63145	MT 2012, ANT 8/CAZ 105, human bone	6820 ± 40	Z. 19, burial 578	−5771	−5636	−5702
SacA 31998/Gif-12994	MT 2012, FLOT 269seed	6825 ± 40	Z. 21–24, str. 336, US 451	−5783	−5637	−5706
SacA 31997/Gif-12993	MT 2012, FLOT 270,charcoal	6865 ± 35	Z. 21–24, str. 336, US 430	−5837	−5671	−5744
SacA 26232/Gif-12713	MT 2011, CHARB 35, charcoal	6875 ± 35	Z. 21–23, loc. 231, pass 2	−5842	−5676	−5755
SacA 31996/Gif-12992	MT 2012, FLOT 226,charcoal	6890 ± 40	Z. 16, str. 536, US 429	−5882	−5707	−5772
SacA37073/Gif-13045	MT 2013, FLOT 302,seed	6890 ± 40	Z.17–19, US 588, under grey–blue level	−5882	−5707	−5772
SacA30643/Gif12232	MT 2011, ANT 12, human bone	6950 ± 40	Z. 10, str. 344, burial 343	−5971	−5736	−5828

Conventional ^{14}C ages are expressed in years before present (BP), with 1σ error. These ages were calibrated using OxCal v4 2.3 (Bronk Ramsey and Lee, 2013): r5 IntCal 13 atmospheric curve (Reimer et al., 2013). The calibrated dates are given with a level of confidence of 95.4% (2 σ range).

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The new recent discoveries made at SSC sites do not overpass, in the actual state of our knowledge, the very end of the 7th-beginning of the 6th millennium for the first settlements (Hacı Elamxanlı Tepe, Gadachrili Gora and Mentesh Tepe in the Kura Valley and Aknashen and Aratashen in the Ararat Plain). All these sites show an already very advanced stage of neolithisation with full domestication of cereals and animals and the presence of pottery, albeit in small number.

Interestingly, in both Aknashen (Badalyan et al., 2010) and Hacı Elamxanlı Tepe (Nishiaki et al. in press) which are probably the earliest of all the known sites, the authors have independently mentioned the presence of painted shards related to the Samarran sphere of Northern Mesopotamia. To these proposals may perhaps be added a painted pot from grave 71 at Kül'Tepe (Abibullaev, 1982, p. 40 and 73, and pl. XII, 2). However, though the beginning of the 6th millennium is also contemporary with the Halaf culture, no new discovery that would indicate relations with it has recently been made. The scanty evidence is located in the Araxes Valley, at Kül'Tepe, and at Aratashen. Unfortunately, the few shards found in the last site come from a pit and prevent an exact correlation with one of the SSC phases (Palumbi, 2007). If our understanding of the SSC is progressing through better dates and more diversified studies on the different finds from the excavations, we converge with our predecessors on several of their observations as far as foreign relations are concerned, and we are still explaining the origins of the SSC.

Recent attempts have been made to search for Mesolithic or Early Neolithic sites, both in the eastern mountainous part of the Great Caucasus and in the central part of the Lesser Caucasus. Some are still in progress. A major step was done about 25 years ago with the new excavations at Chokh in Daghestan which led to the discovery of a succession of Mesolithic and Neolithic layers, but with a probable hiatus between them (Amirkhanov 1987, p. 94). The author considered that most of the Neolithic features of the site could be explained by a local evolution based on the domestication of local vegetal and faunal species, and he insisted on the differences with the SSC, though he did notice some similarities (round stone architecture with a central pole, ceramics with a few cases of applied decoration, etc.). The Neolithic level at Chokh was dated around 6000 BC mainly on the basis of the lithic material, but unfortunately without any ^{14}C dates. At that time, this date was much earlier than those accepted for the SSC (5th millennium BC). The new and secure dates for the SSC make it at least contemporary with the Neolithic level of Chokh. However, doubts can be raised for such an early date for Chokh because of the number of pot-shards that were found in this strata (~900 shards, Amirkhanov 1987, p. 127) compare to the very few mentioned at Hacı Elamxanlı Tepe. Chokh might be slightly younger than supposed.

Another important discovery is that of the rock-shelter of Kmlo-2 in Armenia, where several occupations occurred from the 12th to the 5th millennium (Arimura et al., 2010, 2012). As at Chokh, no clear change in the lithic industry is observed throughout the layers of Kmlo-2, but there is an undoubtedly marked difference with that of the SSC.

Up until now, unfortunately, we still lack the discovery of a 7th millennium site that would play in favor of a transitional phase and would secure a local origin to the Neolithic of the Shomu-Shulaveri and of the South-East cultures. The major climatic change that occurred during that millennium probably explains this situation.

The end of the SSC also keeps its mystery. Even if Mentesh provides some clues because of its Chalcolithic levels superimposed on the Neolithic ones, a significant hiatus is present between them. The reasons why most of the mounds are left unoccupied towards the end of the 6th millennium still remain unclear. Elements of continuity in the material culture have been underlined at Mentesh (Lyonnet et al., 2012b), so that we can assume that there was no abrupt end, but rather a probable change in the position of the sites. Whether this was related to a climatic and/or to a silting- or erosion-phase due to a new change in the Caspian Sea level needs to be searched for in more detail. It may have resulted in a new type of light architecture, the remains of which did not lead to mound formations.

5. Conclusion

The Neolithic discoveries made at Mentesh Tepe have brought to light several features previously poorly known in the Shomu-Shulaveri Culture. Burials are rarely mentioned in the middle Kura Valley except for one discovered at Babadervish (Narimanov 1987, p. 169 and Fig. 29), and others at Aruchlo, including a cremation (Wahl and Hansen in Hansen and Mirtskhulava, 2012a). Similarly, it stressed the importance of a specific vegetal temper in the ceramics and of a specific shape partly closed at its rim. Many more results are expected from the different studies, and analysis still in progress. They, together with the data obtained from other excavations actually going on at contemporary settlements, should help produce a better definition of the different horizons of the SSC, distinguishing eventual local variants or settlements with a specific function.

The questions of the origins of the SSC are still unsolved, although relations with northern Mesopotamian societies have again been underlined recently. As with the “absence” of pre-SSC sites dating to the 7th millennium, that of post-SSC sites on the plain needs to be further addressed. This might be explained by the importance of the silting and erosion processes due to the changes in the Caspian Sea level, and/or by climatic changes leading to a new and more mobile way of life with light architecture. All this needs to be more precisely studied on the basis of new and precise excavations and further analysis.

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