Systemizing the Past

Papers in Near Eastern and Caucasian Archaeology Dedicated to Pavel S. Avetisyan on the Occasion of His 65th Birthday

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A Prehistoric Aggregated Cell Structure at 2850 m asl on Mount Aragats, Armenia

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Abstract: This paper presents the preliminary results of a recently discovered and excavated aggregated cell structure at Karmir Sar in Armenia. As the first structure of its kind found at a high altitude, Karmir Sar opens new perspectives for both high-mountain archaeology and the general understanding of these enigmatic structures. Although no definite answer concerning the function can be proposed yet, the extant architecture and the pottery distribution implicate an open-air installation combining space for human habitation with space for herding animals. Radiocarbon dating evidence points to a use episode in the middle of the 3rd Millennium BC, leaving open the possibility that the structure was first built in the 5th Millenium BC. On the basis of comparanda from other periods, this paper argues that the aggregated cells structures were a long-lasting phenomenon reflecting pastoral subsistence strategies. These strategies, though still largely unknown, reoccurred over several millennia, while coexisting or alternating with other competing subsistence strategies in the same regions.

Keywords: Chalcolithics, Early Bronze Age, jellyfish, high-mountain archaeology, pastoralism, vishaps

Introduction

In 2017, during the geophysical prospection of the site Karmir Sar on Mount Aragats, Dr. Harald von der Osten detected a vast and complex stone arrangement of an irregularly oval shape (Figure 1). The structure, otherwise invisible both to the naked eye and aerial survey methods, has a plan reminiscent of a slightly warped wheel and a diameter of *c.* 90m.

Comparable structures have been recorded in desert and marginal environments in the Near East. Depending on the author, they are variously called 'wheels',[1] 'jellyfish',[2] 'agglomerated houses/ agglomerated cells',[3] or 'aggregated cells'.[4] The last two terms are particularly suited for structures that are not perfectly circular, as in our case. Terminologically, they are used as synonyms - a hardly surprising fact given that both adjectives are often interchanged even in the natural sciences.[5] Here, we opt for the 'aggregated cells' variant, following the terminology introduced in the most recent overview of these structures in Armenia.[6] At 2850 m asl, the 'aggregated cell structure' at Karmir Sar is by far the highest found so far, opening new horizons for our understanding of these enigmatic ancient architectures.

In the summers of 2018 and 2019, a test trench was opened, and the direct field study of the structure began. This publication is the first scientific description of our preliminary results, and we are very pleased to dedicate it to Pavel Avetisyan, who, through the years, has unfailingly supported our research at Karmir Sar with his extraordinary scientific knowledge, his open-hearted friendship, and his managerial wisdom.

The Site

Karmir Sar (Figure 2) is a *c.* 60-hectares plateau on the south slope of Mount Aragats, with commanding views of the Ararat plain. It is a five-to-seven-hour trek from the nearest villages at the foothills of the mountains. The site is relatively accessible, flat, and well-served with water sources. We first visited it in 2012, discovering a fascinating place studded with prehistoric stone structures and petroglyphs. In particular, we were struck by the extraordinary concentration of monumental relief steles – so-called 'vishaps.' At first, we identified nine of them. Meanwhile, their number has grown to twelve, and we are still counting.

In 2013, our archaeological explorations at Karmir Sar focused on dating the vishaps and decoding their meaning. Since then, seven one-month summer

[1] Kennedy 2012.
[2] Betts 1982.
[3] Kalantaryan *et al.* 2017.
[4] Barge *et al.* 2021.
[5] Nichols *et al.* 2002.
[6] Barge *et al.* 2021.

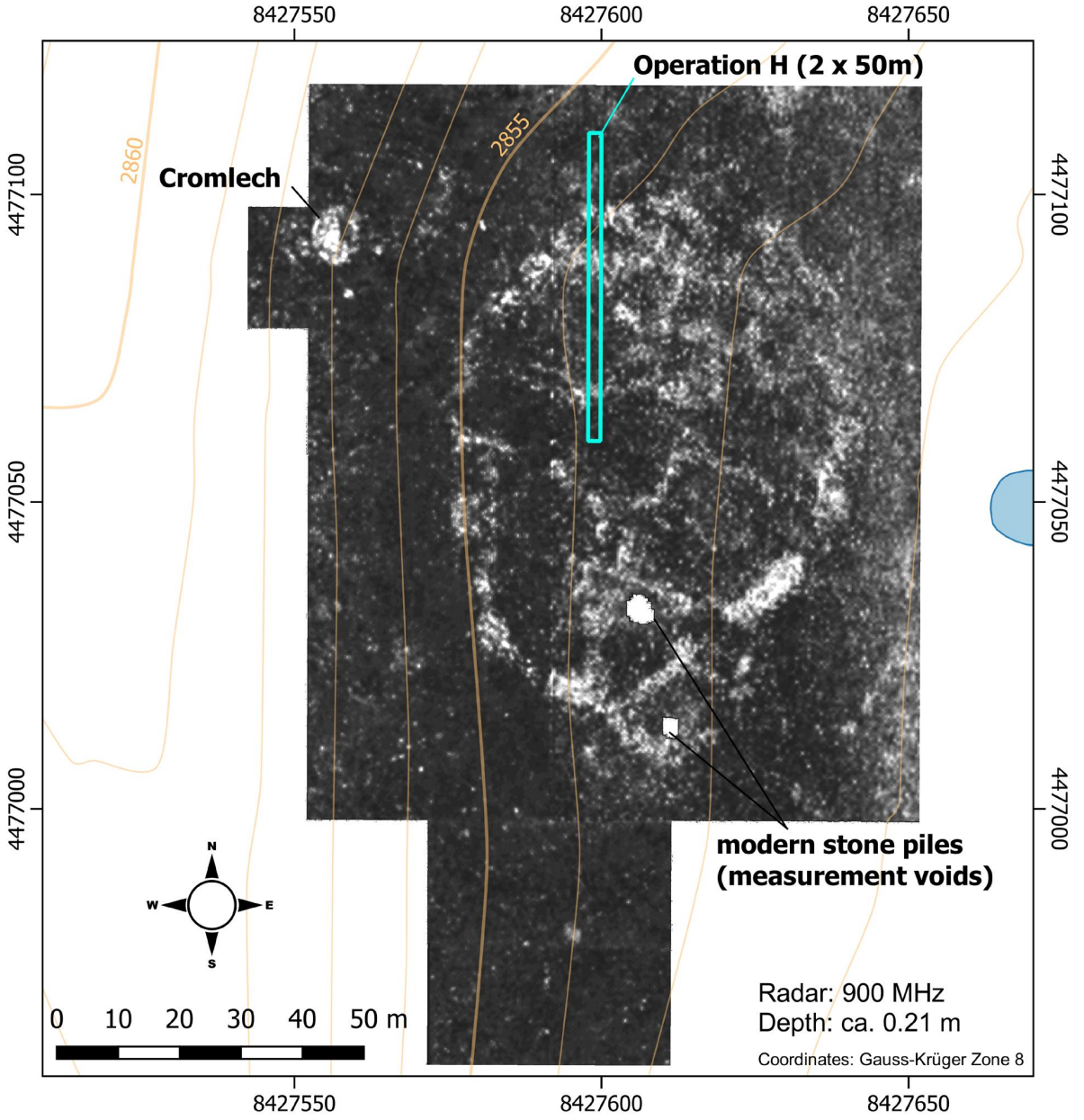
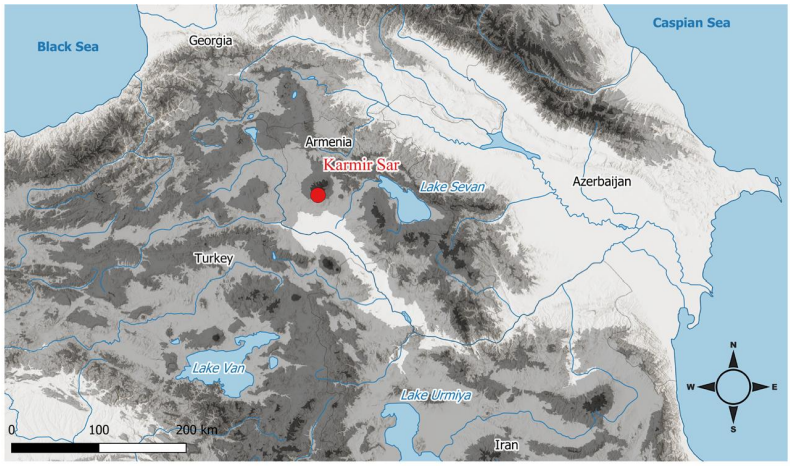


Figure 1. Aggregated cells structure on ground penetrating radar depth slice at *c.* 21 cm (Dr. Harald von der Osten).

campaigns took place and our work objectives expanded beyond vishaps to include all archaeological traces on this high mountain meadow. In addition to stratigraphic excavations, we are implementing an environmentally-minded research strategy. We prospect the site geophysically, geochemically, and by an aerial drone; we process archaeobotanical and archaeozoological samples; we analyze all lithic artifacts by pXRF.

As evidenced by radiocarbon datings, people of widely different periods frequented the place, beginning with the earliest documented human presence around 5000 BC. Early on, perhaps as early as 4100 BC, the site acquired religious significance and, over a period whose duration remains to be determined, at least twelve imposing vishap steles with animal reliefs were erected (Figure 3).[7] Later, around 2100 BC, the site may have started to be used as a burial ground – as indicated by several groups of stone circles, known in Caucausian archaeology as 'cromlechs'.[8] Although we did not find bones in any of the four cromlechs excavated so far, the shape of the cromlechs and their inventories strongly

[7] Hnila *et al.* 2019.
[8] Osten *et al.* 2018, Figures 3, 5-6.



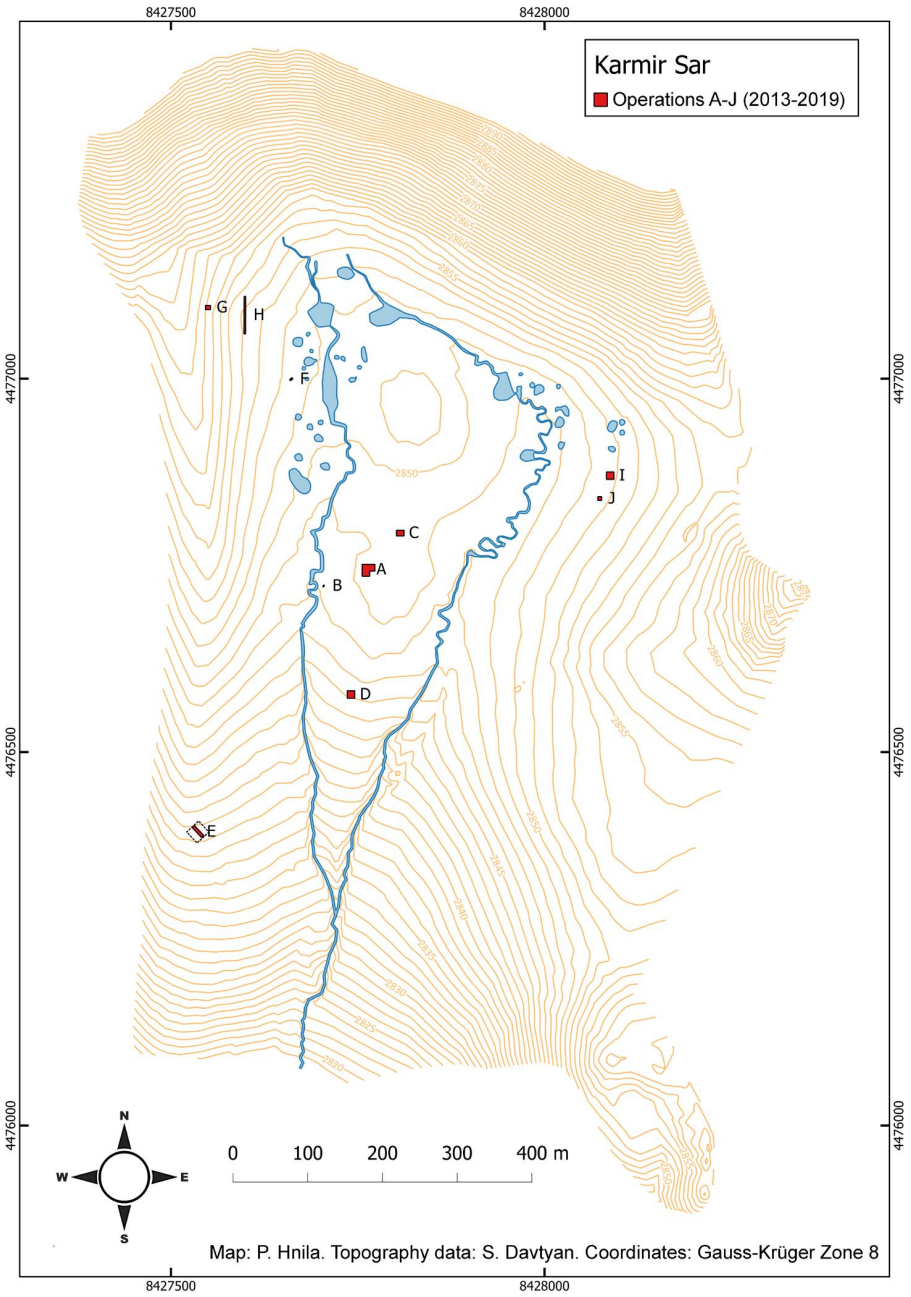


Figure 2. Map of Karmir Sar (P. Hnila).

Figure 3. Vishap stele from Operation D (Photo: P. Hnila).

resemble tombs from the plains. It is plausible that the Karmir Sar cromlechs were tombs as well, but the bones inside them did not survive the long-term exposure to the harsh high-mountainous environment.

At some point during later prehistory, both the collapsed vishap steles and the stone cromlechs were embedded in everyday activities and were used as work platforms. People likely sat on them to produce obsidian tools, which we found used and discarded in conspicuous concentrations around them. The vishap steles and the stone tombs are the most visible prehistoric structures at Karmir Sar, but our research shows that there is more.

The Aggregated Cell Structure

In 2016 our explorations concentrated on the northwest part of the site. This area is a very gentle slope, flanked by the lateral glacial moraine on the west and a small water stream on the east. The upper part is covered by subalpine grassland vegetation grazed short by sheep and cows. The lower, flatter part is slightly marshy, with moisture-loving plants typical of seasonal high mountain wetlands. Midway, a few aligned stones surfaced over a distance of less than ten meters. Around them, neither drone photographs, nor satellite images, nor vegetation patterns indicated the presence of further archaeological remains. However, prospection with a ground-penetrating radar by Dr. Harald von der Osten conducted in the years 2016 and 2017 revealed the existence of a large circular anomaly (Figure 1). This anomaly resembled the aggregated cells discovered and excavated shortly before by the Armenian-French team in Arteni.[9]

The structure of Karmir Sar covers *c.* 4460 square meters and has a slightly oval shape, with 94 × 69 meters maximum dimensions and several internal divisions. At present, at least 12 cells can be discerned. Since some internal division walls are less clearly visible than others, the exact number of internal cells cannot yet be determined with certainty. The known individual cells cover between 60 to 410 square meters, most of the cells being in the middle of this size range. The center of the structure is occupied by a large cell from which other walls are distributed radially. While some of these radial walls reach the outer perimeter of the structure, others seem to be attached to further irregular cells. The outer perimeter wall is interrupted on at least four spots. Future excavations need to determine whether these gaps are entrances or simply the results of stone-robbing activities.

In 2018 and 2019, we excavated a 2 × 50 meters trench stretching from the middle of the structure to behind its northern limit (Figure 4), labeled 'Operation H' according to the sequential alphabetical system we use at the site. This sounding aimed to understand better the stratigraphy and architectural phasing, as well as to explore the function of the different cells.

At this stage, we can distinguish between three horizons of activities. The uppermost one is represented by depressions and post-holes, which post-date the structure, as indicated by radiocarbon dates and pottery, both ranging from the Medieval to the modern period. Below the uppermost horizon, the excavations of the structure itself identified two prehistoric horizons. Their identification is not straightforward and presents some stratigraphic conundrums. We found the stones detected by radar to be laid in mostly one, rarely in two courses (Figure 5). They were aligned but rather dispersed, not always contiguous and often set at varying depths. In some cases, these depth differences may be due to the undulations of the original terrain. Yet, there were clusters of stones without any clear-cut boundaries - they might belong to some upper structure, or to its collapse or to a further structure lower down. In some cases, stones were amassed close to each other and were perhaps initially connected by

[9] Kalantaryan *et al.* 2017.

Figure 4. Aerial view of Operation H visible as a long vertical strip in the lower central part. The summit of Mount Aragats is visible in the background (Drone photo: P. Hnila).

Figure 5. Stones of the aggregated cells structures exposed in Operation H (Photo: P. Hnila).

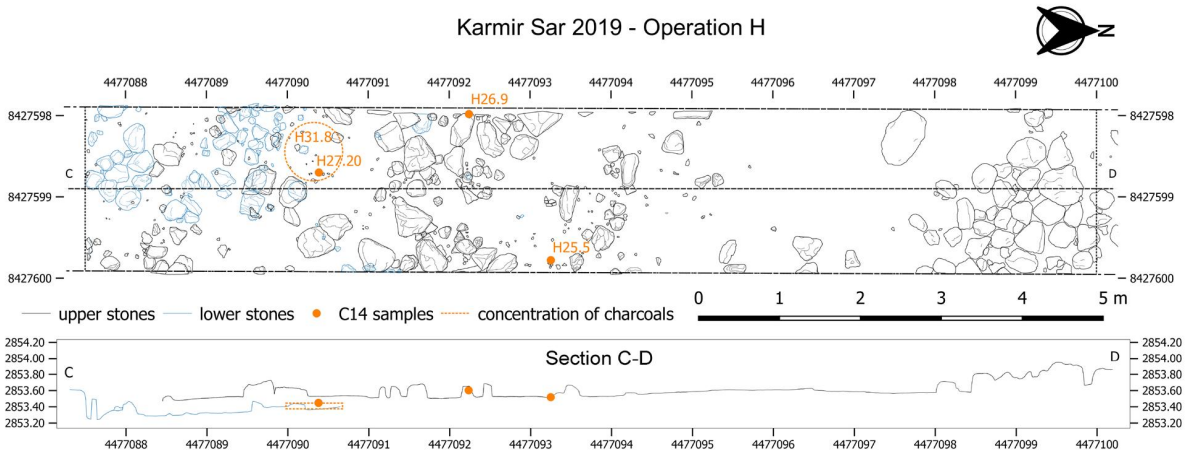


Figure 6. Drawing and cross-section of Operation H. (P. Hnila, S. Piovesan).

clay. In other cases, stones were found in a disconnected position. While we are still working towards a better understanding of the overall ratio, we can already observe that stones are too limited in number to have formed substantial house walls. Rather, the stones were part of a series of low division and delimitation socles.

Our impression is that all structures in this area were open-air installations - presumably seasonal animal pens combined with habitation tents. As observed on some sites of mobile groups, stone accumulations are used to hold down the flaps of tents.[10] Other times, more substantial stone constructions are used as outside tent walls, leaving considerable traces.[11] Remains uncovered at Karmir Sar may reflect both options. Also, we suggest that the observed stratigraphic conundrums were partly caused by earlier stone remains that remained visible on later surfaces. Even today, stone structures from the Middle Bronze Age remain visible on the current surface at Karmir Sar. The local transhumant pastoralists perform everyday activities above them and occasionally integrate them into their seasonal structures.

We could identify only one prehistoric walking horizon with certainty; it was characterized by concentrations of broken pottery at the base level of some stones. This walking horizon (Figure 6, black line) is related to the structure and is radiometrically dated by two charcoal samples to the second quarter of the third millennium BC. Specifically, the samples in question are H26.9 (UGAMS-50682, 4020±25), dating to 2618-2468 BC, and sample H25.5 (UGAMS-44555, 4080±25), dating to 2849-2496 BC, both with 95.4% probability after being calibrated in OxCal v4.4.3 software, update of Bronk Ramsey (2009), with the newest curve for atmospheric data.[12] At Karmir Sar, this is the first context pointing to a Kura-Araxes cultural presence at the site.

Indeed, this impression is confirmed by the material culture. The pottery from the walking horizon is diagnostic: it is Kura-Araxes tradition black/brown burnished pottery, one of them with typical incised ornament. Other typical elements such as lugs and rounded 'playing stones' are also present. Kura-Araxes pottery tradition was recently subdivided into two stages.[13] According to this scheme, the pottery from the walking level dates to the end of the second stage. Karmir Sar is thus far the highest attested Kura-Araxes site in the entire area where this archaeological culture spread.

Beneath the walking horizon, at a deeper level (Figure 6, blue line), we registered stone accumulations whose connection to the aggregated cell structure needs to be further clarified. Alternatively, these deeper stones may have belonged to a previous, completely independent, so far unknown context. One of the stone accumulations at this deeper level consists of flat stones set together to form a platform. In its immediate vicinity, we observed a conspicuous concentration of charcoal bits (although the surface of the supposed platform showed no traces of burning). The charcoal accumulation was radiometrically dated by two samples to the mid-fifth millennium BC. Specifically, sample H27.20 (UGAMS-50679, 5700±25) dates to 4607-4456 BC, and flotation sample H31.8 (GrM-21869, 5795±29) dates to 4717-4550 BC, both with 95.4 % probability and calibrated with the same methodology as quoted for the previous two samples.

[10] Rosen 1992: 77, Figure 1.
[11] Reinhold 2017: Figure 1.
[12] Reimer *et al.* 2020 .
[13] Badalyan 2014.

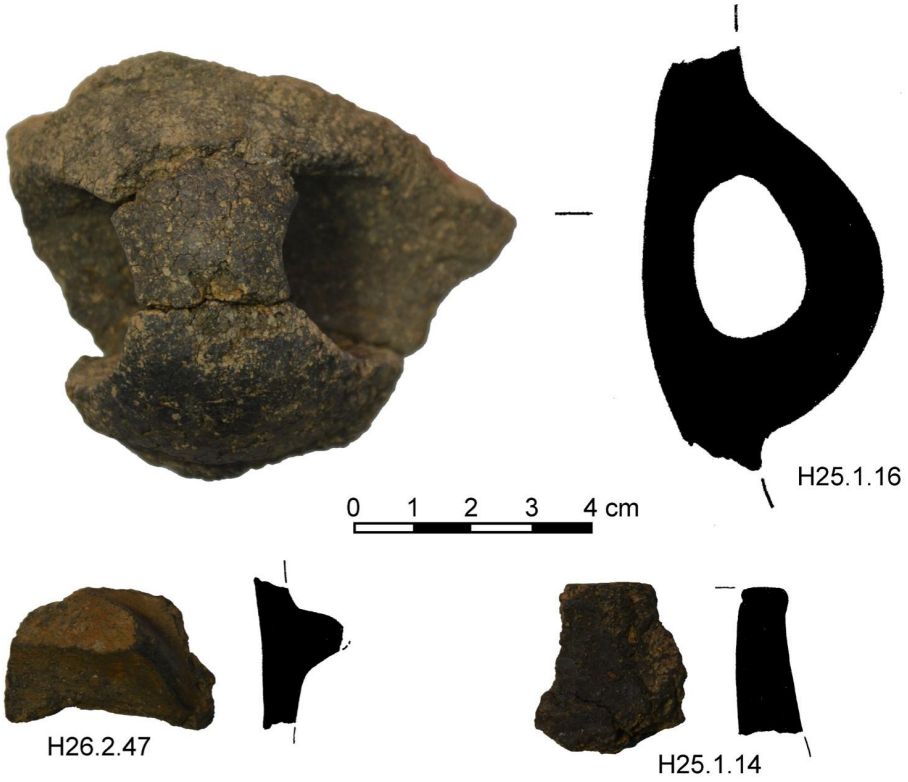


Figure 7. Selection of Kura-Araxes pottery from Operation H.

These absolute dates translate to the Early/Middle Chalcolithic period. In Armenia, scholars refer to this period as 'Adablur-Sioni tradition' represented at the sites Aratashen 0, Aknashen 1, and Adablur, which are contemporary with the Halaf and Ubaid traditions in the Near East. Currently, we do not see in the material from Karmir Sar the usual diagnostic pottery sherds of this period (ie, chaff faced or sandy). This absence may either reflect the actual situation (with extant inventories limited to lithics), or unique site conditions (the pottery was made *in situ* and lacks diagnostic features), or our insufficient knowledge (missing criteria for chronological distinctions among the coarse non-diagnostic sherds). The latter option in particular deserves scrutiny, especially when accounting for a considerable quantity of pottery with Middle Bronze Age traits but whose dating is not yet supported by radiometric absolute dates from the structure itself.

The stratigraphical adjacency of widely different periods is not all too surprising. It should be stressed that all strata, topsoil included, are compressed into 40 centimeters of deposits. At such high altitudes, the pedologic formation process is extremely slow. Structures remain visible on the surface for millennia and stones tend to be re-used following similar patterns. Preliminarily, we envisage two distinct scenarios. The first scenario foresees the dating of the earliest building phase of the aggregated cell structure to the mid-fifth millennium BC, and its later re-use in the Early Bronze Age. The second scenario dates the construction of the aggregated cell structure to the Early Bronze Age, using building material spoliated from older, hitherto unknown structures dating to the mid-fifth millennium BC. Although the die cannot yet be cast, we believe that the height differences between the stones and the evanescence of the preserved structures score more points in favor of the second scenario.

The presence of Chalcolithic people at Karmir Sar is relatively well documented. Several radiocarbon dates attest to human activities between the end of the sixth and the end of the fifth millennium BC in five out of nine excavation areas. In particular, absolute dates around 4200-4000 BC are specifically found around the vishap steles, which may have been first erected in this period. If so, the deeper levels detected in Operation H open a unique opportunity to explore Chalcolithic life on site beyond the activities that took place in the immediate vicinity of the vishaps, and at the same time help contextualize the origins of these extraordinary monuments.

The Early Bronze Age pottery and C14 datings associated with the aggregated cell structure are equally significant for our understanding of the site. They are the only

known attestation of human activities at Karmir Sar in the first half of the third millennium. Generally speaking, our preliminary impression is that human presence at Karmir Sar follows discontinuous patterns, perhaps related to microclimatic changes. Until now, our working hypothesis was that the Early Bronze Age should be filed within the periods of abandonment of high-altitude sites. Now, this hypothesis needs an accurate revision.

Concluding Remarks

The exploration of a large aggregated cell structure at Karmir Sar adds a new level of depth and complexity to the case of prehistoric use of high mountain sites. It also contributes to the discussion about the dating of aggregated cells structures and it adds a new, ecologically distinct zone to their overall distribution.

Aggregated cells structures are otherwise only known from the lower foothills of Mount Aragats in Armenia and from the Black desert (Harrat al-Sham) in Jordan, Syria, and Saudi-Arabia.[14] The most recent dedicated survey in Armenia identified 121 examples,[15] yet only three of them have been excavated: at Lernamerdz, Aghavnatun, and Arteni.[16]

Although the specific function of the aggregated cells is still debated, the combined archaeobotanical and archaeological evidence from Arteni - consisting of large quantities of uncovered herbivorous animal coprolites and sheep/goat bones - implies that the cells were likely connected to pastoralist practices.[17] So far, the function of the aggregated cell structure at Karmir Sar could not be ascertained unequivocally. The extant evidence points to an admixture of ephemeral domestic spaces and perhaps animal corrals. Given the distribution of multiple larger ceramic sherds within one cell, it is likely that at least that particular cell served for habitation purposes. Others might have served for keeping animals, as implied by their considerable size. Similar spatial division has also been suggested for megalithic structures at Khirbet al Umbashi and Hebariye, in the arid steppe south of Damascus, Syria. Because ceramics and lithics were missing in these buildings, they were interpreted as 'monumental animal pens associated with monumental houses'.[18] Such space management strategy is still present today in several pastoral societies. For instance, Bedouin tents in Jordan are internally subdivided into spaces for men, women, and animals - an arrangement that can be traced back at least to Safaitic times, approximately two thousand years ago.[19] The functional division of architectural spaces between humans and animals is also microbiologically attested for the houses of Late Bronze Age settlements with a symmetrical layout in the North Caucasus.[20] However, in this last quoted example the animals are believed to be wintering there,[21] which cannot have been the case in the harsh high-mountain conditions of Karmir Sar.

Is it possible to date the aggregated cells phenomenon to a specific period? Before we proceed with our interpretation, let us sum up the current evidence. The structure excavated at Arteni was dated by pottery and C14 into the Late Bronze Age, *c.* 1430-1280 BC,[22] the Lernamerdz and Aghavnatun structures were dated to the Middle Bronze Age, *c.* 2100-1900 BC,[23] yet radiocarbon dates from Karmir Sar indicate an Early Bronze Age date between 2800-2500 BC. The Jordanian site Jebel Qurma yielded lithic evidence for an even earlier date - Late Neolithic, *c.* 6400-6100 BC.[24] Furthermore, it has been noted that aggregated cells often occur in the same geographic settings as 'kites,' i.e., large-scale V-shaped stone structures, mostly believed to be hunting traps.[25] In Armenia, a direct stratigraphic superposition between kites and aggregated cell structures was observed in two cases. In both of them, the kites postdated the aggregated cells.[26] In Jordan, however, the opposite sequence was observed: the aggregated cells post-dated the kites[27] – thus seemingly adding to the dating complications.

Given these dating peculiarities, our impression is that the rise and demise of the aggregated cell structure may directly relate to specific evolutions or trends in herding techniques or herding management strategies, requiring for some reasons adjacent corrals. In this view, which is still to be proven aggregated cell may have been constructed over millennia rather than over centuries, making it difficult to date them with precision on a purely formal basis. Similar longevity in design has been proven for the kites.[28] If both the kites and the aggregated cell structures were parallel long-term phenomena, it can reasonably be supposed that sometimes kites were built over aggregated cells and other times vice versa. The presumed longevity of both phenomena, combined with their shared ecological settings, allows for various interpretative scenarios.

[14] Cf. Barge *et al.* 2021; Kalantaryan 2017.
[15] Barge *et al.* 2021.
[16] Shakhmuradyan 2017: 30.
[17] Barge *et al.* 2021; Hovsepyan 2018: 626-627.
[18] Braemer and Taraqji 2016: 202-203, Figure 5.
[19] Helms 1981: 49.
[20] Reinhold 2017: 169.
[21] Reinhold 2017: 189.
[22] Kalantaryan *et al.* 2017: 190.
[23] Shakhmuradyan 2017: 30.
[24] Akkermans *et al.* 2014: 190.
[25] Barge *et al.* 2021; for opposing earlier views on kite function in terms of pastoralist or cultic use see Echallier and Braemer 1995; Malkinson *et al.* 2018, Shakhmuradyan 2017.
[26] Barge *et al.* 2021.
[27] Kennedy 2012: 80.
[28] Barge *et al.* 2021.

Whether they were always contemporary neighbors and their differences were caused by variations in subsistence strategies of different human groups, or whether they alternated according to some seasonal or long-term socio-environmental patterns among the same population, constitute challenges to be solved by future research. Backed by this interpretative framework, we currently do not see a contradiction between an Early Bronze Age date for the Karmir Sar aggregated cells structure and a Late Bronze Age date for the Arteni aggregated cells. Both could have been expressions of the same subsistence strategy in different epochs. Admittedly, more dated structures are needed in order to verify this preliminary impression.

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