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Building the Lesser Caucasus Monumental Landscape during the Bronze Age: Life and Death on the Javakheti Plateau (Georgia)

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Abstract

Surveys carried out in the Javakheti Plateau during the last decade have improved our knowledge of the Bronze Age archaeology of this highland zone of the Lesser Caucasus of Georgia. Surveys have been conducted all over the area surrounding the Mt. Chikiani volcano, along the southern terraces of the Tsalka Reservoir, and some of the north-western slopes of Mt. Paravani. All these territories have yielded impressive evidence of megalithic monuments, stone-walled villages, *kurgans*, basalt and schist quarries, as well as obsidian extraction and production areas. Among these latter is an important circular platform made of basalt boulders, above which a workshop for the manufacture of obsidian bifacial arrowheads and spearheads was discovered. All the aforementioned features have been GPS-recorded and photographed with the use of a non-professional small drone. They show that the entire region is a monumental landscape, which most probably started to be built around the beginning of the Bronze Age, as many of the lithic finds would suggest.

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Keywords

Lesser Caucasus – Javakheti Plateau – Bronze Age – obsidian – mines and quarries – villages and *kurgans*

1 Introduction

The scope of this paper is to present and discuss the results achieved during the 2016–2021 fieldwork seasons around Mt. Chikiani in the Javakheti Plateau (Lesser Caucasus of Georgia). The surveys were carried between *ca*. 1500 and 2500 m a.s.l. The sites were recorded thanks to high-definition B&W satellite images, Google Earth photographs, and aerial photographs taken from several altitudes and with different lights with a small non-professional drone (Parrot Bebop 2).

The area surveyed in 2016–2021 is located *ca*. 25 km from the archaeological sites of Trialeti[1] and Bedeni.[2] It is delimited by the Tsalka Reservoir in the north, and the Paravani Lake in the south (2073 m a.s.l.). In the west, the lake is surrounded by cones and domes of the volcanic Samsari Ridge. Mt. Chikiani (2417 m) rises from the north-eastern shore of Lake Paravani (fig. 1).[3] It is a dome which consists mainly of rhyolithic lavas and perlite deposits.[4] Obsidian is very abundant along the northern and north-eastern flanks of the volcano, although smaller flows are known also along the southern side.

The importance of the plateau has been well-known to archaeologists for decades because of the impressive obsidian sources of Mt. Chikiani, which were exploited in different periods of prehistory and the material of which was traded all over the Caucasus.[5] Mt. Chikiani obsidian is very vitreous, technologically ideal for knapping. It is of many colours: black, grey, orange, red, brown, spotted and striped. The chemical components of the different flows have been defined thanks to the characterization of *ca*. 500 samples, mostly flakes and "bombs".[6] Most samples were retrieved from the surface of mining-pits and archaeological sites located within a radius of *ca*. 25 km from the mining area.[7] The results have shown that Mt. Chikiani obsidian can be subdivided

1 Dzhaparidze 1994.
2 Bertram 2010.
3 Messager *et alii* 2021.
4 Nasedkin *et alii* 1983.
5 Biagi *et alii* 2017a; 2017b; 2022.
6 Biagi *et alii* 2022.
7 Lebedev *et alii* 2008.

FIGURE 1 The dome of Mt. Chikiani seen from the south-east
PHOTO: P. BIAGI, 2019

into three different flows (1, 2 and 3), which originated between 2.80 and 2.41 Myr ago. The third can be further subdivided into two variants, 3A and 3B.[8]

According to the available data, the Chikiani obsidian sources started to be exploited around the end of the Middle Palaeolithic.[9] In contrast, Acheulian and some Mousterian Middle Palaeolithic tools were made from basalt/andesite rock, which is easily available on the Javakheti Plateau.[10] During the Upper Palaeolithic, Mt. Chikiani obsidian was widely spread almost over all the Caucasus. This is confirmed by the discoveries made in the Mezmaiskaya Cave, in Russia.[11]

2 Research Context

The Javakheti Plateau has yielded many traces of human interference, which shaped the landscape in different ways. The most evident structures consist

8 Biagi & Gratuze 2016; Biagi *et alii* 2022.
9 Le Bourdonnec *et alii* 2012.
10 Biagi & Nisbet 2019.
11 Golovanova & Doronichev 2020, 13.

of megalithic monuments, whose construction "*demanded organisation, technical knowledge and a substantial labour force*".[12] Moreover, groups of obsidian mining-pits, stone-walled villages, one fortress (Inyak Dağ), *kurgans*, megalithic alignments of stone boulders sometimes longer than 100 m, one *menhir*, and other types of stone mining fields have been mapped during the 2016–2021 surveys. The latter are represented by pits and quarries dug into the bedrock to extract basalt/andesite blocks and schist slabs.[13] The aforementioned structures were built or excavated from the beginning of the Bronze Age, most probably when the Bedeni culture evolved in the region.[14]

The Javakheti monumental landscape[15] is so far unique in south-eastern Europe. Many types of Bronze Age settlements, burials and extractive features are known from the highlands of Europe among which are the Iberian Peninsula,[16] the Carpathians,[17] the Pindos,[18] and the Alps.[19]

However, despite the presence of so many structures, we still know very little of the archaeology of the Javakheti Plateau. Regarding the distribution of the sites, we notice that features of the same group never overlap. The impression is that some areas were chosen to conduct specific activities due to their location, orientation, resources and rock texture (fig. 2). In these areas "*parts of the environment were re-worked into monuments*".[20] Their presence raises a few important questions: did fire play any important role in the landscape re-working?[21] Was the exploitation of wood resources intensified due to mining and building?[22]

The presence of complex structures shows that social transformation developed most probably from the beginning of the 4th millennium BP.[23] Ore mining and metallurgy were practised in the Lesser Caucasus during these centuries. We know that the social order started to change when important economic activities developed and rapidly improved.[24] The most evident are represented by obsidian mining, tools manufacture and trade, production of

12 Scarre 2020, 136.
13 Biagi & Nisbet 2018a; 2018b; Biagi *et alii* 2017b.
14 Kushnareva 1997; Kohl 2007.
15 Hinz *et alii* 2019.
16 Agirre-García *et alii* 2018; Carrero-Pazos & Rodríguez Casal 2019.
17 Pelisiak *et alii* 2018; Beck *et alii* 2021.
18 Biagi *et alii* 2016.
19 Tzortzis & Delestr 2010; Hafner & Schwörer 2018.
20 Fontijn 2013, 14.
21 Weisgerber & Willies 2000.
22 Joannin *et alii* 2022.
23 Kohl 2006; Furholt 2021.
24 Stöllner 2016; Smith 2019.

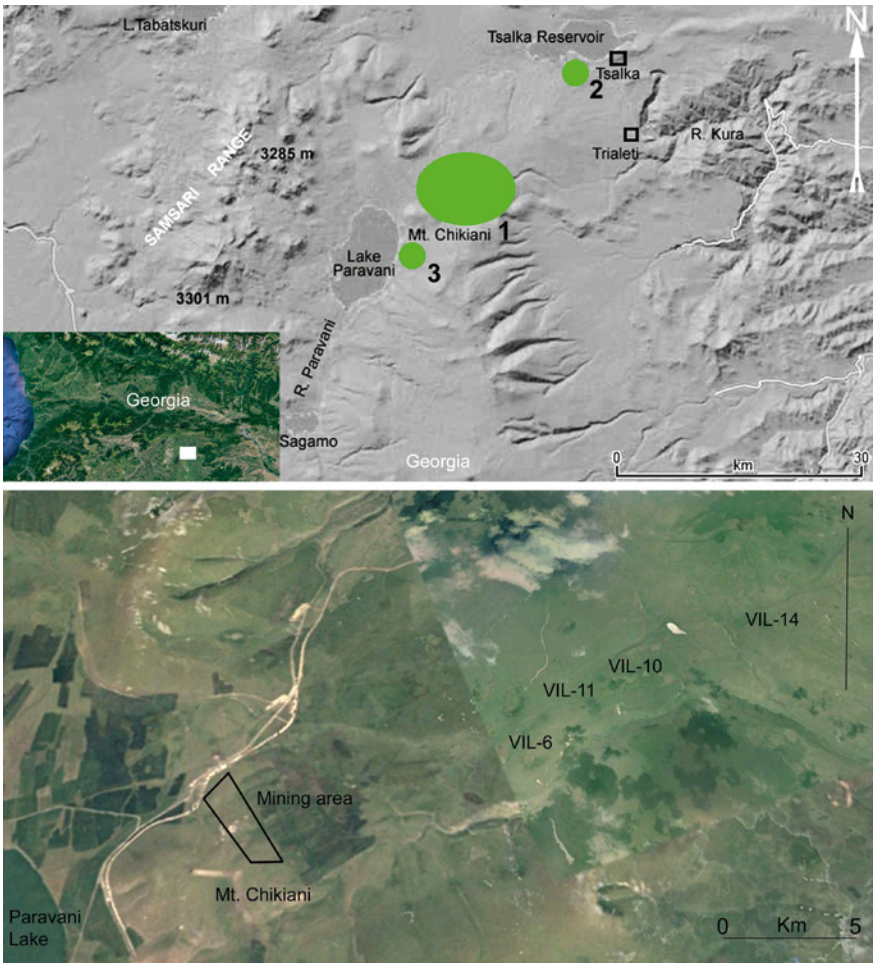

FIGURE 2 Distribution map of the three main surveyed areas (top), and location of some of the most important archaeological villages discovered east of Mt. Chikiani and the related obsidian mining area
DRAWING: P. BIAGI

everyday metal artefacts and weapons[25] and gold mining for the production of jewellery and luxury items.[26] The importance of obsidian mining and trade has been widely discussed, as well as its complex network considering that "*one kind of work leads to another*", with the consequences that follow.[27] There is

25 Biagi & Nisbet 2023.
26 Stöllner 2012; Hansen 2013.
27 Jacobs 1970, 51.

FIGURE 3 Two characteristic alignments of large stone boulders discovered in the Javakheti Plateau *ca*. 4 km east of Mt. Chikiani
PHOTOS: P. BIAGI AND R. NISBET, 2018

little doubt that the first Bronze Age human presence in the Javakheti Plateau is closely linked to the search for, and the extraction of, obsidian.

We can argue that the Javakheti monumental landscape results from several different human activities among which are mining, production and trade, exchange of goods and commodities, transhumance, pastoralism, funerary and burial practises, and territorial marking (fig. 3). Similar observations have

already been made for other regions of Europe.[28] However, some questions are still waiting for an answer: when and why did Bronze Age communities live and die in such a harsh high-altitude environment subjected to severe winter temperatures?[29]

During the last decades, archaeologists have begun to realise that high-altitude environments have a great potential for the preservation of archaeological remains,[30] and that mountains are not impassable natural barriers for humans.[31] Many highland zones, despite many undisputable living difficulties,[32] have been systematically crossed, exploited and settled at least since historic times by peoples with very similar attitudes, behaviour and cultural background, though often speaking different languages and dialects. We know that the Alpine chain started to be crossed well before the beginning of the metal ages, when environmental conditions were favourable to mountain movements and high-altitude passes were open.[33]

Fieldwork carried out in the highlands of Europe,[34] Central Asia[35] and the Americas[36] have yielded evidence of different types of archaeological remains, many of which, at lower altitudes, would have been destroyed by environmental conditions, industrial development, agricultural activities, and looting.[37] However, only a few mountain ranges have been systematically surveyed to discover, record and preserve archaeological sites from destruction.[38] Consequentially, the probability of achieving significant results from mountain regions is still quite high.

3 The Landscape

The Javakheti Plateau is characterised by cold winters and mild summers with annual rainfalls ranging between 600 and 700 mm.[39] The best data to reconstruct the local environment during the 3rd and 2nd millennia cal BC are a few

28 Wheatley *et alii* 2010.
29 Magomedov 2006; Kohl 2007, 113.
30 Ballbè *et alii* 2016.
31 Körner 2005; Pilø *et alii* 2020.
32 Aldenderfer 2006.
33 Hafner 2015.
34 Biagi *et alii* 2019.
35 Spengler *et alii* 2014.
36 Reinhard 1985; Andrews *et alii* 2012; Jodry & Santoro 2017.
37 Stirn 2014; Laugier *et alii* 2022.
38 Pilø *et alii* 2022.
39 Kvavadze & Kakhiani 2010; Kvavadze & Narimanishvili 2010.

pollen diagrams from cores extracted from and around Lake Paravani (2073 m a.s.l.).[40] The results do not show strong variations in the Bronze Age vegetation cover, although some authors suggest that a more favourable climate existed during the time of the Kura-Araxes culture,[41] which favoured the establishment of high-altitude settlements in the region.[42]

Another crucial question for the interpretation of the economy of the communities which settled in late prehistory regards wood availability. The present landscape around Mt. Chikiani is an almost treeless steppe highland. The earliest deforestation probably took place around the beginning of the Bronze Age, when human interference increased. Action on the forest environment undoubtedly rose with mining,[43] the use of fire intensified,[44] and transport became necessary. This has been observed in other parts of Eurasia roughly during the same period.[45]

From a morphological point of view, the Javakheti Plateau, and Mt. Chikiani in particular, are easy to access due to their gentle slopes which, northwards, move down to the Tsalka Reservoir (*ca.* 1500 m a.s.l.). Many Bronze Age *kurgans*,[46] were discovered close to the northern bank of the lake.[47] They were excavated between 1936 and 1940 when an impressive rescue operation was promoted by the Committee for the Preservation of Cultural Monuments of the Board of Art of the Georgian Socialist Republic.[48]

4 Materials and Methods

The 2016–2021 surveys were conducted by four people, equipped with Soviet Military Maps and a Garmin-GPS for recording structures and finds, and collecting obsidian samples for characterisation. The presence of scatters of obsidian flakes was noticed in many areas of the plateau. It suggests that obsidian exploitation "*was more than just the extractions of workable stone*".[49] This became clearer after recording a few small *kurgans* whose surface was covered

40 Messager *et alii* 2021.
41 Connor & Kvavadze 2014; Palumbi & Chataigner 2014.
42 Kohl 2007, 91.
43 Biagi & Nisbet 2023.
44 Weisgerber & Willies 2000.
45 Sherratt 1986; Raccidi 2012.
46 Schaeffer 1944.
47 Zischow 2004, maps 1–4.
48 Kuftin 1941.
49 Barber 2005.

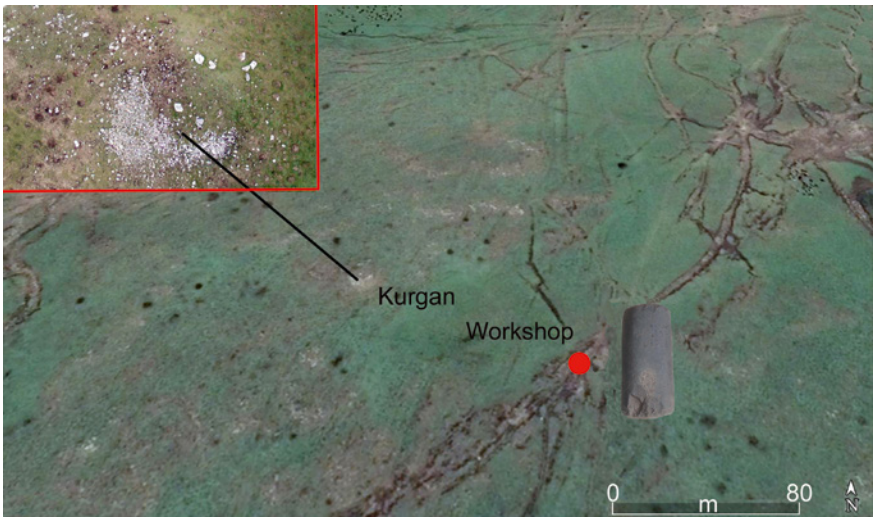

FIGURE 4 Location of a small *kurgan* the surface of which is covered with obsidian flakes, and an obsidian workshop with basalt hammerstones *ca.* 100 m from it
PHOTOS: M. FERRANDI
DRAWING: P. BIAGI, 2021

with dozens of knapped obsidian flakes. Their presence was also noticed in association with different types of megalithic monuments. These data show the importance of obsidian also from a non-functional point of view. Moreover, one small *kurgan*, located *ca.* 9 km east-northeast of the Mt. Chikiani sources, on the surface of which many obsidian flakes were recorded, was discovered *ca.* 100 m from an obsidian knapping floor, from which basalt/andesite hammerstones were also recorded (fig. 4). The presence of lithic scatters, chert in most cases, on the top of burial mounds is rather common in other regions of Europe around the beginning of the Bronze Age, although their presence has been reported very rarely.[50]

The most important obsidian workshop was found on a circular platform of basalt boulders *ca.* 6 m wide. The structure is located along the south-western slope of a volcanic hillock called NECK (fig. 5), *ca.* 2.5 km north-east of the Mt. Chikiani mining-fields. Here, 2617 obsidian artefacts were GPS-recorded from a strip *ca.* 300 m long. Most artefacts result from manufacturing processes which took place on the platform, while the area is unlikely to have been used for other purposes.[51] The knapped stone artefacts are represented by small

50 Barber 2005, 100.
51 Dumitru & Harrower 2018, 252.

FIGURE 5 Obsidian manufacturing area on a circular platform of basalt boulders discovered along the south-western slope of the NECK hillock (top), and obsidian artefact on the surface of the same platform (bottom)
PHOTOS: P. BIAGI, 2018

obsidian untested and tested blocks, primary, secondary and debitage flakes, a few retouched tools, prismatic blades and polyhedral cores. Their presence suggests a *chaîne opératoire* divided into four steps "*prospecting, quarrying, knapping, and trade*".[52] Fragments of basalt/andesite hammerstones and a few ceramic potsherds were also recorded. The retouched obsidian tools consist of a few ovate, bifacial rough-outs, unfinished bifacial spearheads, and one flat-retouched, bifacial Bedeni-type arrowhead. The recovery of these tools shows how important the Mt. Chikiani Bronze Age obsidian sources were. During this period a class of specialists was employed in the manufacture of unique, bifacial, flat-retouched obsidian arrowheads and spearheads. This is very important due to the high technological level reached by metallurgy during this period.[53] These discoveries are exceptional considering the role played by obsidian during the Bronze Age.

The economic importance, exploitation, manufacture, specialised craftsmanship production, transport and distribution of obsidian have been scarcely considered until recently.[54] The systematic recovery of knapped stone artefacts from many sites of the Javakheti Plateau raises many questions regarding Bronze Age mobility between the Lesser Caucasus lowlands and the highland zones: were these activities linked with pastoralism and transhumance, as it has been suggested for the northern regions of the same mountain chain?[55]

Apart from obsidian mining-fields, manufacturing workshops, lithic scatters and isolated finds, many megalithic structures have been recorded in various parts of the surveyed area. With the exception of one causeway *kurgan* (K-105),[56] a typical landmark[57] on the top of a ridge dominating two opposed lowlands, many small *kurgans* made of basalt and obsidian boulders are aligned along the upper, eastern flank of Mt. Chikiani (fig. 6). Other impressive square and rectangular *kurgans* were recorded in the area just south of the Tsalka Reservoir and along the western slope of Mt. Paravani between *ca.* 2250 and 2500 m a.s.l. These monumental structures are also often associated with scatters of detached obsidian flakes.

Other features consist of alignments of boulders up to 100 m long (fig. 3), stone-walled villages with semi-subterranean rectangular or apsidal rooms

52 Dumitru & Harrower 2018, 250.
53 Hansen 2013.
54 Manclossi 2020, 81.
55 Knipper *et alii* 2020.
56 Biagi & Nisbet 2018a, fig. 3.
57 Doorenbosch 2013, 218.

FIGURE 6 A small *kurgan* excavated on the top of Mt. Chikiani (top), and small *kurgans* made of basalt and obsidian boulders along the eastern upper slope of the same mountain (bottom)
PHOTOS: P. BIAGI, 2018

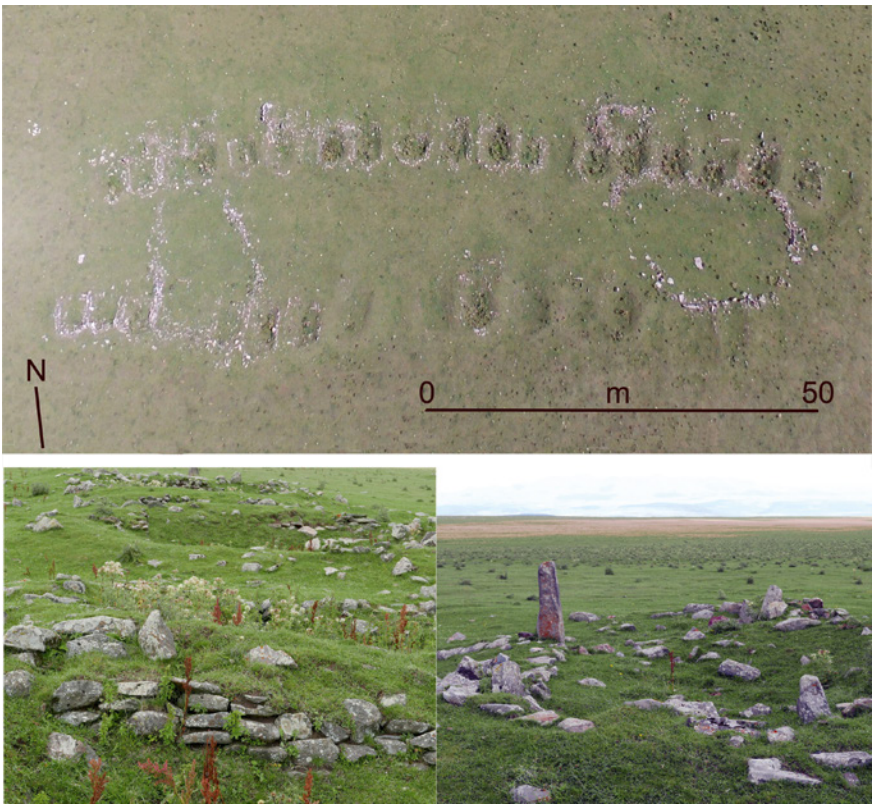

FIGURE 7 The linear settlement of Seyttapa (VIL-6) (top), and particulars of some of the probable house structures located at the western edge of the village (bottom)
PHOTOS: M. FERRANDI AND P. BIAGI, 2021

sometimes arranged in two parallel rows, and one *menhir*, locally called *Tikma-Dash* at the Paravani Pass.[58] Its probable function was to mark the western boundary of the obsidian mining area. The monumental features and the alignments show characteristics and locations which can be related with movement patterns across the landscape and whatever else was occasionally related with them.[59]

Some 6 km east of Mt. Chikiani, a few volcanic cones form a small chain which reaches its top in a low elevation locally called Seyttapa (2148 m a.s.l.),

58 Zischow 2004.
59 Bourgeois 2013, 190.

and which dominates the entire plateau. In this region, megalithic alignments have been recorded only in an area of some 50 ha, where they delimit the marshy depression that extends west of the aforementioned hill. Three settlements, respectively called VIL-4, 5 and 6, were discovered along the western slope of Seyttapa.[60] VIL-4 and VIL-5 consist of clusters of roughly rectangular and circular stone rooms, without any apparent order, some of which are bordered by vertical slabs. In contrast, VIL-6 is a *ca.* 100 m long arrangement of two almost parallel rows of rectangular, semi-subterranean, apsed rooms separated by an empty space with entrances to the north (fig. 7).

5 Discussion

The Javakheti Plateau is a unique archaeological landscape which offers the opportunity of shedding some light on many problems regarding megalithism in a highland zone due to the presence of a great variety of sites which are rarely found in association on such a restricted territory. Were the Mt. Chikiani mining-fields, megaliths and stone-walled villages part of the same system? Is the presence of all these structures related with the exploitation, control and trade of the most important obsidian sources of the Caucasus, the only ones so far known in south-eastern Europe which have yielded evidence of a well-planned, organised mining system? Can the suggested "*New obsidian*" city model, and the wealth that undoubtedly derived from the exploitation of this valuable knappable stone,[61] be applied to our case? Among the problems to be solved, the most important is linked with the exploitation of the rich obsidian flows, with the excavation of groups of mining-pits, whose number and intensity would suggest that mining took place over a relatively long period.

Despite the absence of radiocarbon dates, due to the lack of organic material for dating, the mining-fields have been attributed to the Bronze Age because of the typological characteristics of some lithic artefacts and cores.[62] We know that during this period metal was exploited for the production of a great variety of daily-use bronze objects, weapons and ornaments, in many parts of Europe.[63] In our case, obsidian was extracted also for the manufacture of specialised tools, among which are elegant winged arrowheads, many of which

60 Biagi & Nisbet 2018a.
61 Jacobs 1970, 18.
62 Biagi *et alii* 2017a.
63 Biagi & Nisbet 2023.

have been retrieved from the burial chambers of monumental *kurgans*.[64] The functional interpretation of megaliths has been widely debated[65] as was their presence in relation with important natural resources.[66] The complexity of the Chikiani monumental landscape raises questions regarding mortuary ritual variability in a high-altitude open landscape.[67] What is the meaning of so many different funerary structures, mainly *kurgans*, which punctuate a burial landscape?[68] Do they reflect hierarchical, chronological, or cultural events or a long-term use of places for unique purposes?[69] Who built them, when and how?[70]

The presence of groups of miners and specialised artisans along the Mt. Chikiani flanks highlights the problem of the location of their permanent settlements and subsistence strategy. The latter was undoubtedly related with the exploitation of animal and vegetal resources, though they left little evidence in the archaeological record, apart from circular stone corrals for keeping flocks or herds (fig. 8). Therefore, we can suggest that the mountain villages were probably related to seasonal pastoralism and transhumance[71] whose impact on the landscape led to the formation of an open grassland.

The linear settlements discovered on the hill of Seyttapa, *ca.* 7 km east of the Mt. Chikiani obsidian extraction zone, show close similarities with the Late Bronze Age "*settlements with symmetric layout*" of the northern Caucasus.[72] In our case the villages are also easy to access as are those of the Elbruz region, though we can note some differences, for example the orientation of the house entrances.[73]

The 2021 fieldwork season led to the discovery of a few more villages. One was found on a terrace bordered by two streams. It consists of a few alignments of different structures, some of which show superimposed stone walls, which can be interpreted as "*multifunctional houses*"[74] or resettled and partly rebuilt features (fig. 9). Moreover, one isolated, semi-subterranean, rectangular stone-walled structure, with a circular fireplace in its centre delimited by slabs, was discovered *ca.* 600 m south of the above village, facing the Jujiani River

64 Murvanidze 2016, 317.
65 Sherratt 1990, 353.
66 Wunderlich 2019, 20.
67 O'Shea 1984.
68 Daróczi 2012.
69 Amkreutz 2013.
70 Cousseau 2020.
71 Kohl 2007, 91.
72 Reinhold 2016.
73 Peters *et alii* 2014, 185, fig. 3.
74 Knipper *et alii* 2017.

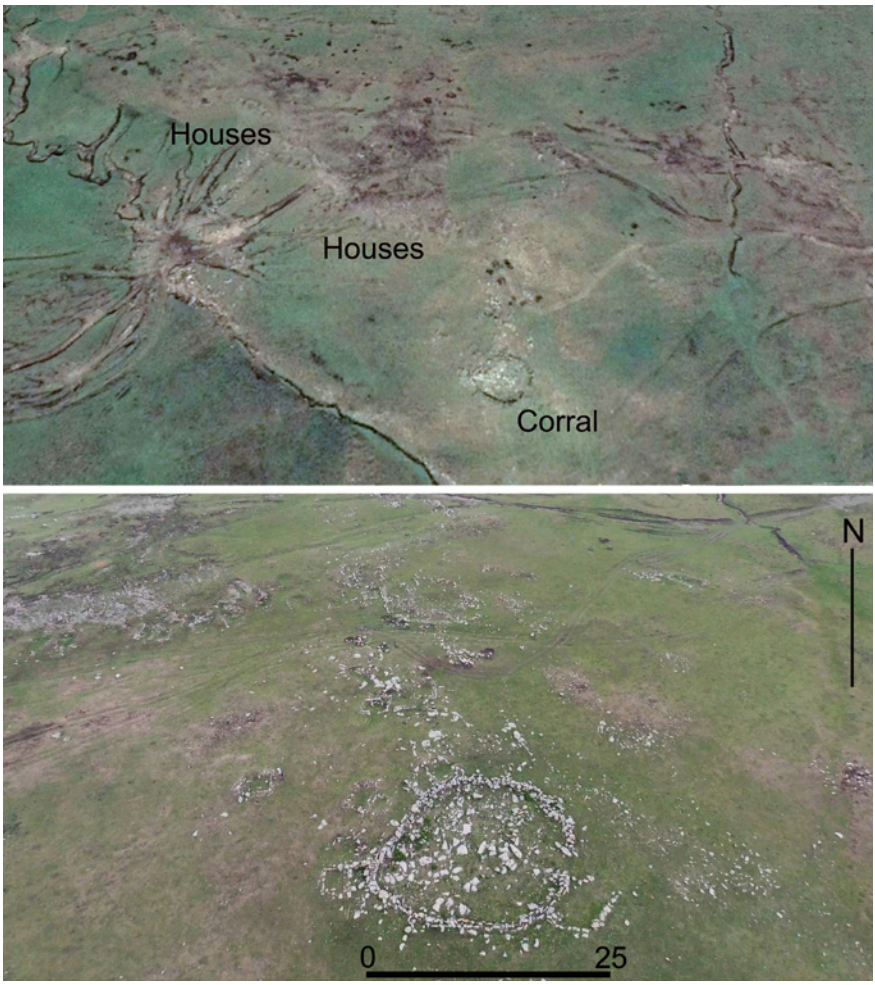

FIGURE 8 Stone-walled corrals and probable rectangular house structures of VIL-14 (bottom), the easternmost so far discovered in the highland (top)
PHOTOS: M. FERRANDI, 2021

Valley, close to a schist quarrying area (fig. 10). The stone-walled structures of the Javakheti villages show different states of preservation: some of them are clearly visible from the surface, while others are partly hidden by the grass cover. This may be due to the different chronology of the villages. However, in contrast to the evidence available from the northern Caucasus,[75] no radiocarbon date is at present available from any of the sites so far discovered in the Javakheti Plateau.

75 Reinhold 2017.

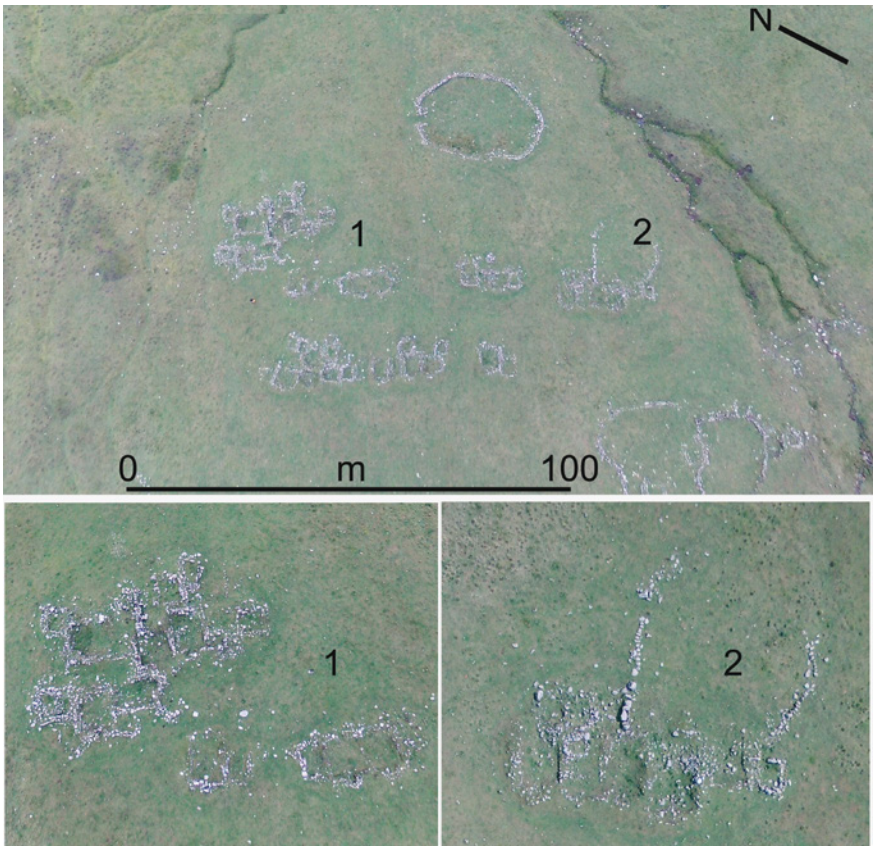

FIGURE 9 Large village with complex structural remains and a few corrals around it (VIL-10)
PHOTOS: M. FERRANDI, 2021

The stone-walled features discovered during the 2016–2021 seasons are more numerous and varied than those recently reported from the territory around Tsalka.[76] Further investigations are necessary to interpret their function and architectural complexity. Moreover, the stone walls of the Javakheti settlements are always low, they do not show traces of pillars or postholes, and their suprastructures are unknown. None of the features shows evidence of rubble due to stone-wall collapses. Do these remains represent the lowermost parts of wool-covered tents similar to those reported by R. Cribb from many high-altitude summer, pastoral camps, which were widely spread in part of the Taurus Mountains of southern Anatolia and Turkish Kurdistan until the end of the last century?[77]

76 Reinhold 2016, 360.
77 Cribb 1991.

FIGURE 10 Schist quarry-pits and rubbles (top) and semi-subterranean, rectangular house structure with fireplace in its centre, discovered close to it (bottom)
PHOTOS: M. FERRANDI, 2021

6 Conclusion

The surveys carried out around Mt. Chikiani have greatly improved our knowledge of the Bronze Age archaeology of the area, though many questions remain unsolved. The monumental landscape of this part of the Javakheti Plateau has been strongly conditioned by the exploitation of the obsidian sources, which most probably changed the living conditions on the highland. The Mt. Chikiani

obsidian sources are the only ones known in Europe which show an organised mining system. Mining was carried out digging series of opencast mining-pits, whose openings are surrounded by a ring of stone rubble and obsidian debris. These features resemble the chert mining-pits and shaft-holes of many prehistoric sites in other regions of Eurasia.[78] The study of the Mt. Chikiani obsidian, and the characterisation of three different flows, have greatly improved our knowledge of the exploitation and circulation of obsidian in the Caucasus.[79] However, much work is still to be done to interpret the way Mt. Chikiani obsidian was traded, and the many functions that obsidian played during the Bronze Age and other periods of prehistory and early history.

Another problem to be solved regards transport in relation to the complexity of the landscape.[80] The idea of trans-Caucasian routes punctuated by Bronze Age "*barrow-burials*" to move across the mountain chain during the Bronze and Iron Ages was put forward by S. Piggott in the 1960s.[81] Wheeled vehicles were most probably used for transport and trade, not only for mining and building a monumental landscape for the living and for the dead.[82] This work undoubtedly required a great quantity of wood which was available at slightly lower altitudes, though, as far as we know, not from the highland zones.

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78 Russell 2000.
79 Badalyan 2010.
80 Wilson 2007.
81 Piggott 1968, 278.
82 Pickett *et alii* 2016; Reinhold *et alii* 2017, 93.

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