



Report on the Activities of the First Field Season of the Georgian-Italian Gardabani Archaeological Project (GIGAP), June-August 2024

Mariam Eloshvili (Ilia State University, Tbilisi), Elena Rova (Università Ca' Foscari Venezia)

INTRODUCTION

Following the short preparatory season in Autumn 2023 and after the official signing, in spring 2024, of the Cooperation Agreement between the Department of Humanities of Ca' Foscari University of Venice and Ilia State University of Tbilisi, the first field season of the Georgian-Italian Gardabani Archaeological Project took place from June 13th to August 17th 2024 and was composed of different, partially contemporary activities. The Italian team of archaeologists arrived in Georgia on June 14th and on the very same day, after a short visit to Tbilisi, reached the village of Lemshveniera, where the expedition house was located. The last members of this group flew back to Italy on July 29th.

The team was headed by prof. Elena Rova of Ca' Foscari University (co-director of the project) and included the following archaeologists: Francesco Bianchi (PhD candidate at the Ludwig-Maximilian University of Munich, Germany), Sebastiano Claut, MA, Michela Ferracin and Riccardo Fava (MA students at Ca' Foscari), Veronica Basso (BA student at Ca' Foscari), and Federico Papa, MA. The following experts joined the expedition for shorter periods: dr. Adeline Vautrin (archaeozoologist), Enrico Chiorrini, MA (sampling for ¹⁴C and FTIR analyses), prof Francesca Bertoldi, Ca' Foscari University, and prof. Pier Francesco Fabbri, Università di Lecce, Museo Fiorentino di Preistoria (physical anthropologists), prof. Aldino Bondesan, dr. Maria Petriccione, Pietro Spiniella and Giacomo Moro, MA students, from Padua University, specialists in magnetic prospections.

The Georgian team was composed of: Mariam Eloshvili (PhD candidate, Ilia State University, co-director of the expedition), joined for shorter periods by Megie Vakheishvili, Tamara Bzhalava, Nikoloz Kakabadze, Nana Dalakhishvili, Tako Ninua (BA students at Ilia State University) and Aleko Zavrashvili (MA student at Tbilisi State University).

The group of geologists attached to the team, composed of Giovanni Boschian (professor at Pisa University, Italy), prof. Mikheil Elashvili and Levan Navrozashvili, PhD candidate (Ilia University, Tbilisi) and their students, had to postpone their field season to 07/08/2024-17/08/2024, but the latter two scholars paid a short preparatory visit to the team in Lemshveniera on 5/7/2024. Both before and after the dates of the main expedition and partially contemporary with it, Francesca Bertoldi and Pier Francesco Fabbri (in collaboration with prof. Lia Bitadze and drs Leonardo Catalini and Denise Piano) and Adeline Vautrin carried out field research in the areas of archaeozoology and respectively physical anthropology connected with other projects of the Ca' Foscari Archaeological expedition in Georgia.

AIMS AND ACTIVITIES OF THE SEASON

The area of interest of the joint team is the southern part of the Gardabani Municipality, approximately from the city of Rustavi to the north to the present border with Azerbaijan to the south (**Fig. 1**). Unfortunately, the main foreseen activity of the season, excavations at the Gardabani Kurgan Field site, could not be carried out because the permission of excavation had not yet been granted by the local authorities (National Agency for Cultural Heritage Preservation of Georgia) before the team's departure from the country.

In spite of this considerable problem, the team managed to carry out an exploratory geological sounding at the periphery of one of the large kurgans, which revealed the general stratigraphy of the area by putting into light a sequence of undisturbed natural layers of sand and pebbles underlying a very thin modern humus layer.



Fig 1. Satellite image of the Gardabani Municipality showing the area of interest of the project and the approximate location of the Gardabani Kurgan Field site.

Samples of sediments and obsidian fragments for archaeometric analyses were collected from the sounding and from the surface of the site. Mikehil Elashvili and Levan Navrozashvili provided a general description of the geomorphological environment of the kurgan field and of the surrounding region.

Another important activity at Gardabani Kurgan Field was the one-week magnetic prospection carried out between July 8th and July 15th by the group from Padua University headed by prof. Aldino Bondesan with the aim of getting a better view of the general layout of the funerary mounds and of possible auxiliary structures. The same group was also engaged in visiting and mapping recent (Soviet) military installations in the area that had been previously identified on satellite images and in analysing their impact on the preservation of archaeological remains and on the present anthropic landscape.

As a consequence of the delayed excavation permission, most of the season was dedicated to surface survey activities and other research in preparation of the systematic survey of the region to be carried out during the autumn season. In spite of the difficult visibility conditions, the survey was quite successful in that it brought to the discovery of 21 new sites (mainly but not only kurgan fields) of different historical periods, thanks to the help of different local scholars and informants, who shared with us their knowledge of the territory. The team also paid visits to the local Historical Museums of Rustavi and Gardabani to ascertain the presence in their reserve collections of possible archaeological materials dating from the pre-classical periods.

Furthermore, during a two-months season from June 14th to August 15th Adeline Vautrin carried out the final revision of the animal bones from the excavations the Georgian-Italian team carried out between 2011 and 2017 at the sites of Khashuri Natsargora and Aradetis Orgora/Doghauri in Shida Kartli at the local Historical Museums of Khashuri and respectively Kareli, and took samples for isotope analyses to be carried out on them in the framework of the PRIN-2022 ESPREMO project about mobility in late prehistoric Southern Caucasus.

Prof. Mikheil Elashvili, Levan Navrozashvili and Nino Ustiashvili, in collaboration with the Italian team and in particular with prof. Giovanni Boschian, are continuing the work started in 2023 on the sedimentological history of the Alazani plain, which has now been expanded to the neighbouring Gardabani region. In August 2024 they drew new cores in the Lagodekhi and Gardabani municipalities and they are presently continuing the analysis of the sediments collected during this season and of those from the 2023 season, that they retrieved in July 2024 from the expedition house in Lemshveniera.

Finally, in June/July 2024 profs. Francesca Bertoldi and Pier Francesco Fabbri and their team carried out the analysis of human osteological remains from Medieval monasteries in the Borjomi region, which is part of an independent research project in collaboration with prof. Lia Bitadze of Tbilisi State University, supported by the same Italian institutions and working in close synergy with the Georgian-Italian Gardabani Archaeological project.

The following paragraphs contain a detailed description of the season's activities.

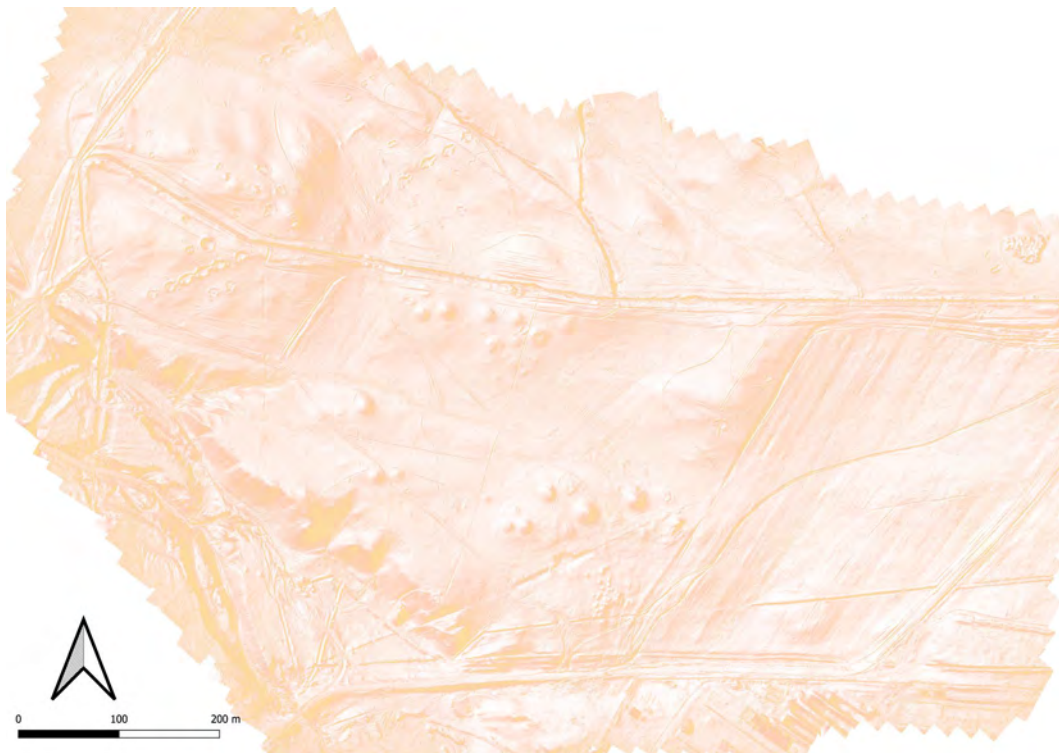


Fig. 2. Shaded DEM of the Gardabani Kurgan Field

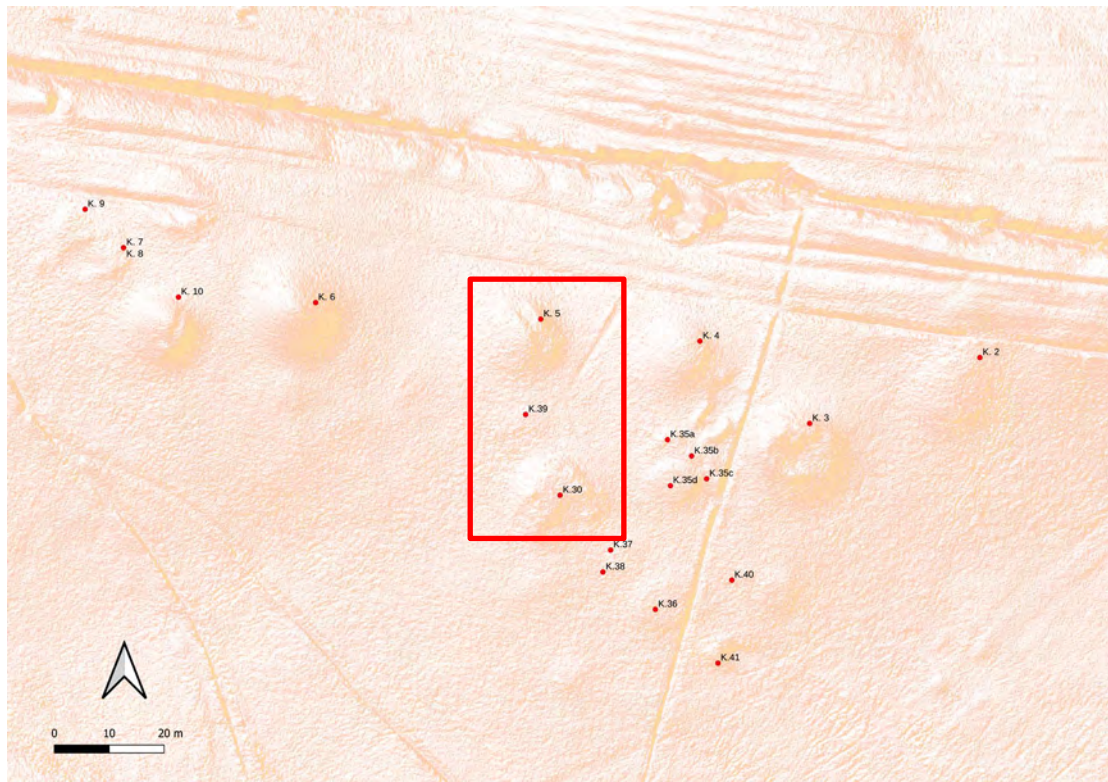


Fig. 3. Shaded DEM of the Gardabani Kurgan Field (above), detail with the location of the proposed excavation area (below)

INVESTIGATIONS AT GARDABANI KURGAN FIELD

Following the analysis of the results of the drone survey carried out in Autumn 2023 (**Fig. 2**), a rectangular area of 625m² belonging to one of the two main observed barrow clusters had been preliminarily selected for excavation (**Fig. 3**). The cluster, which is located just south of the modern canalisation cutting the plateau in slightly NW-SE direction, is formed by 19 elements situated rather close to each other and has a vague general orientation from northwest to southeast.

The selected area measured 50 m in north-south and 25 m in east-west direction and was composed of 50 quadrants of 5 x 5 m (**Fig. 4**). It included two main barrows, nos 5 and 30, with a possible smaller one, no. 39, located between them. Small clusters of stones located at the periphery of the two main barrows, possibly representing small secondary graves of ritual pits were also visible on the drone photos. We therefore supposed that the area might provide a good sample of the different structures attested at the kurgan field and of their mutual relations.

While waiting for the excavation permission to be granted, we removed the grass cover over the whole area and took drone photos of it (**Fig. 5**), set the excavation grid and prepared the quadrants. After completing these preliminary steps, activities in this part of the site were abandoned.

Before leaving the site at the end of the season, the team carried out a 2.30 deep, 1 x 2 m large exploratory geological sounding (from alt. 431.71 to 429.37 m a.s.l.) outside of the northwestern limit of the foreseen excavation area, (cf. Fig. 4, above) in order to reveal the general stratigraphy of the kurgan field. Under a 5-10 cm thick modern humus layer, the sounding put into light a sequence of 8 natural layers of alluvial origin consisting of coarse sand of different colours alternating with small pebbles embedded in a sand matrix (**Fig. 6**). At a depth of approximately 40 cm under the present surface, a possible ancient soil was observed, sandwiched between two sand layers, which may correspond to the surface from which the barrows were erected.

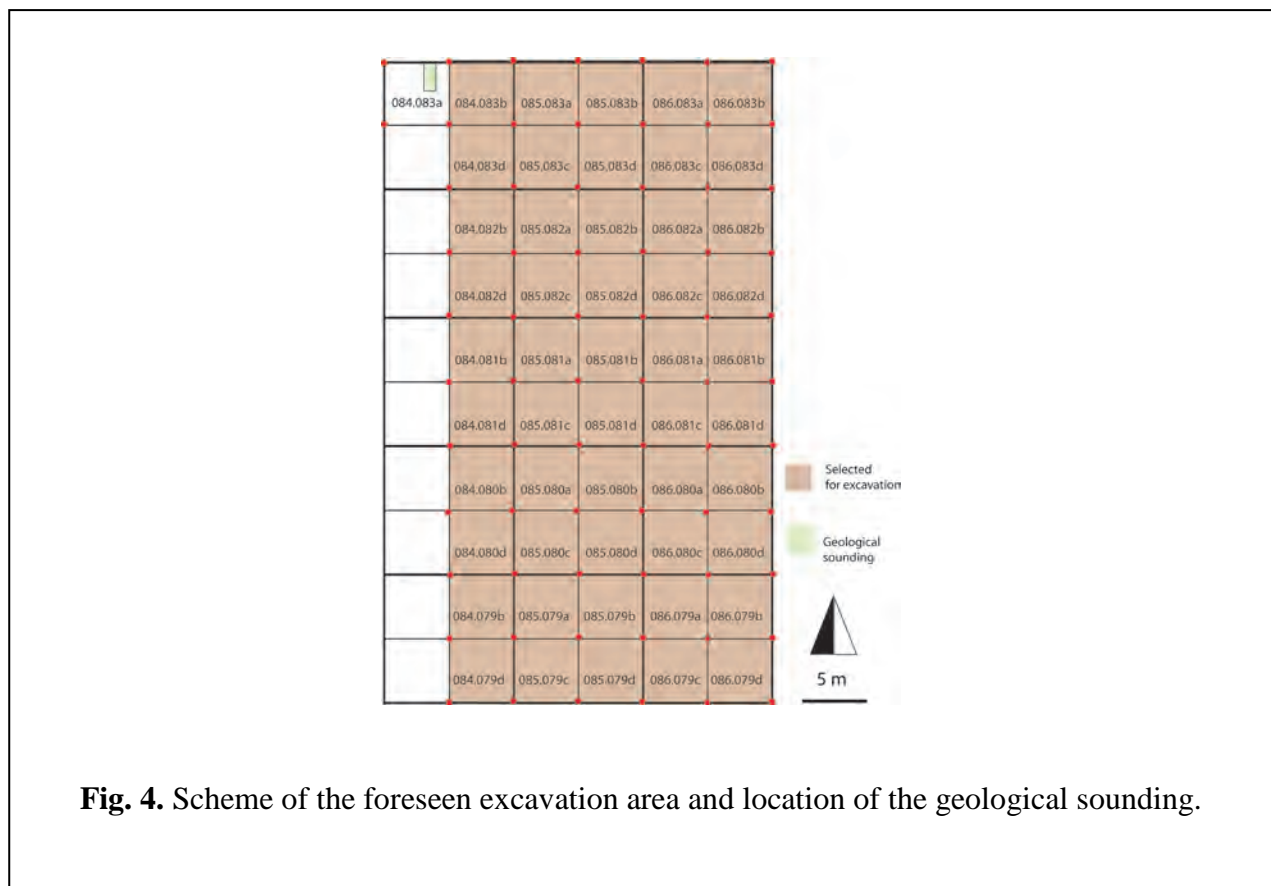


Fig. 4. Scheme of the foreseen excavation area and location of the geological sounding.



Fig. 5. Photoplan of the foreseen excavation area after removing the grass cover.

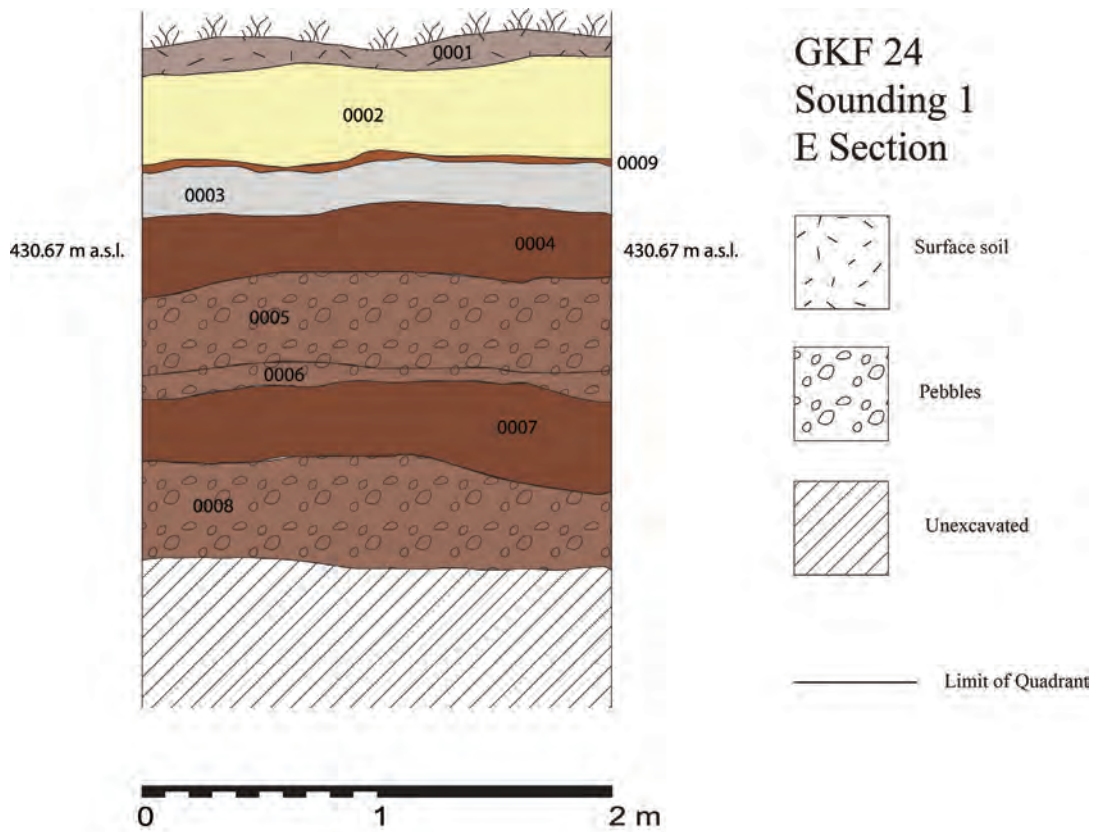


Fig. 6. Sounding 1: view of the sounding from (above) and drawing of the sequence of alluvial layers in the E section (below)

MAGNETIC PROSPECTIONS AND AERIAL PHOTOGRAMMETRIC SURVEY ON THE GARDABANI KURGAN FIELD SITE

These activities were carried out from July 8th to July 15th 2024 by the team from Padua University headed by A. Bondesan with the help of the Ca' Foscari team of archaeologists. The prospected area amounted to ca 12.5 ha in total in the southwestern part of the large plateau on which the kurgan field is situated. It covered the location of all the main four clusters of barrows which had been observed and mapped in the course of the 2023 season, as well as some apparently empty areas between them.

The purpose of the magnetic survey was to highlight the presence of magnetic anomalies linked to sedimentary or pedological structures, such as, for example, accessory elements to the kurgans (ditches, circles of stones, access roads or connections between different kurgans, secondary tombs, small masonry structures, pits, hearths, combustion areas etc.) and the internal structure of the different kurgans (shape and position of the burial chamber and grave goods, presence of secondary burials, etc.), in order to plan the localisation of further areas to be excavated in future campaigns.

A Sensys MagDrone R3 was used: a lightweight UAV magnetometer system, ideal for high-resolution surveys (**Fig. 7**). The system incorporates two high-sensitivity triaxial fluxgate magnetometers and a GPS receiver, allowing for accurate data collection during field surveys.

The measurement network was created by the team of archaeologists, who prepared a grid with 50 m side cells through measurements with a total station. Given the presence of many residual ferromagnetic elements related to military training activities in the Soviet era, a systematic collection of all surface residues was carried out to minimise interference and false positives. The line spacing was 1 m, the height of the instrument above the ground was about 1 m (sensor elevation), and the data acquisition speed was linked to the pace of the operator on the ground. The acquisition frequency was 200 Hz. All measurements were georeferenced with an internal GSSN system. The data were interpolated on a regular grid to create a continuous representation of the magnetic field variations. Filtering techniques were applied to remove background noise and improve the signal-to-noise ratio. The magnetic anomalies that may represent buried objects or geological, archaeological, or pedological features of the subsoil were then identified and isolated. Once the anomalies are detected, they will be interpreted to determine their potential sources.

This process involves (1) defining the magnitude of the anomalies: those with a greater intensity of the magnetic field can be considered more likely to represent significant targets; (2) describing the shape of the anomalies: well-defined shapes, such as dipoles, may be more indicative of specific buried objects; (3) analysing the contextual relevance: anomalies located in areas with a known absence of structures (for example, underground utilities or other structures) can be considered more likely to represent objects of interest; (4) integrating the data: combining the classification with information from other sources, such as DTMs and their processing, geological maps, aerial and satellite remote sensing data.

The data will be synthesised into classified anomaly maps. The survey plans will be created with: (1) a background map showing the survey area, boundaries, and any relevant features; (2) anomaly positions with points or polygons representing the positions of the detected targets; (3) anomaly classifications, color-coded or labeled indicating the relative importance or priority of each anomaly; (4) additional information or comments regarding the interpretation of specific anomalies. These maps will serve as a roadmap for further investigation and decisions and for the planning of excavation activities, offering a concise visualisation of the potential targets identified during the magnetometric survey.



Fig. 7. MagDrone R3 on site positioned on the back of the operators

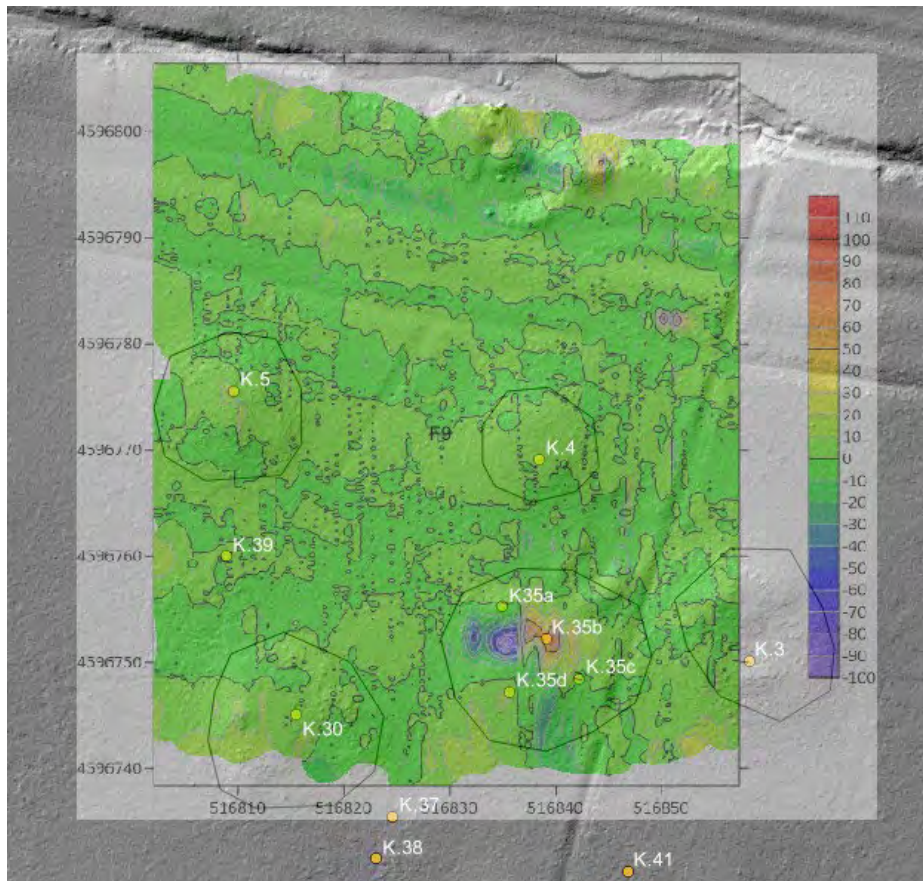


Fig. 8. Example of representation of magnetic field anomalies expressed in terms of deviation from the average within a 15 m radius (nT) superimposed to the shaded DEM (kurgan nos 30, 39, 4, 5, 35)

Fig. 8 represents an example of magnetic field anomalies highlighted in the area occupied by kurgans nos 30, 39, 4, 5, and 35. Noteworthy are: (1) the linear traces arranged in a WNW-ESE direction that are recognised in the magnetic field anomaly values of about 10-15 nT; (2) some small scattered anomalies, most likely generated by modest metal residues of military origin; (3) the important dipolar anomalies in kurgan K35, which make it an object of considerable interest. Once the possible absence of modern metal artifacts on the surface is verified, it could be an archaeological target of interest; (4) the general transverse bending, also observed in other sectors of the surveyed area.

In addition to the magnetic survey, the team carried out aerial photogrammetric surveys by drone on the same area. Aerial surveys were conducted using a drone on sites of archaeological (burial mounds, or kurgans) and military (positions, trenches) interest in order to obtain photomosaics and digital terrain models (DTMs). The operations were conducted using a DJI Mini 3 Pro drone, a lightweight and compact aircraft equipped with a high-resolution camera. The choice of this model was dictated by its maneuverability, flight autonomy, and image quality, ideal characteristics for surveys in areas that are often difficult to access. To ensure data accuracy, ground control points (GCPs) with known coordinates were placed on the ground, located at nodes of the reference topographic grid (50 m x 50 m cells). These points were subsequently used to georeference the images acquired by the drone. The drone flew over the area of interest following a predefined path, taking photographs at regular intervals and with sufficient overlap to allow for subsequent photogrammetric processing. The acquired images were processed using dedicated photogrammetric software (Agisoft

Metashape and Pix4D), which allowed for the generation of: (1) georeferenced photomosaics and (2) digital terrain models (DTMs).

SURVEY OF THE SOUTHERN PART OF THE GARDABANI MUNICIPALITY

The first official season of the Gardabani Survey, under the joint responsibility of Stefania Fiori and Alper Aslan, is planned for September 25th-October 10th 2024. However, in order not to waste time while waiting for the excavation permission, the GIGAP team visited several potential sites and carried out unsystematic exploratory surface investigations (intensive pedestrian survey with transects collection over limited areas and extensive pedestrian survey over larger surfaces) in the course of ca. 4 weeks between June 29th and July 25th. Field operations were led by Elena Rova, Mariam Eloshvili and Sebastiano Claut and involved all the members of the expedition; Stefania Fiori and Alper Arslan followed the activities from remote and took care of the remote sensing analysis.

Technical equipment included: two Garmin GPS, a compass and a DJI mini 2 drone (1/2.3-inch CMOS camera, 12MP photos). Geographical information and morphological descriptions of the investigated areas and of each identified site were collected by means of a daily diary, and a list of visited locations was set up at the end of each day. Geographical data were analysed through QGIS 3.34 software in order to better understand their geographical distribution. Materials collected during the survey (pottery and lithics) were analysed by Michela Ferracin and Mariam Eloshvili to clarify the date of the visited checked sites. All materials were photographed, drawn, described and inserted into a dedicated database.

First of all, we acquired additional information, through contacts with local scholars, about previous surveys and excavation carried out in the area in the early 2000s by different groups of Georgian archaeologists, in particular by V. Varazashvili in the area of the so-called “Coloured Hills” at the border between Gardabani and Sagarejo municipalities (cf. V. Varazashvili, Results of Archaeological Research of Ilia State University at the Lori Upland, *Khornabuji* 1, 2011, 42-105) and in the framework of the South Caucasus Pipeline Expansion (Scpx) Salvage Project (cf. Z.

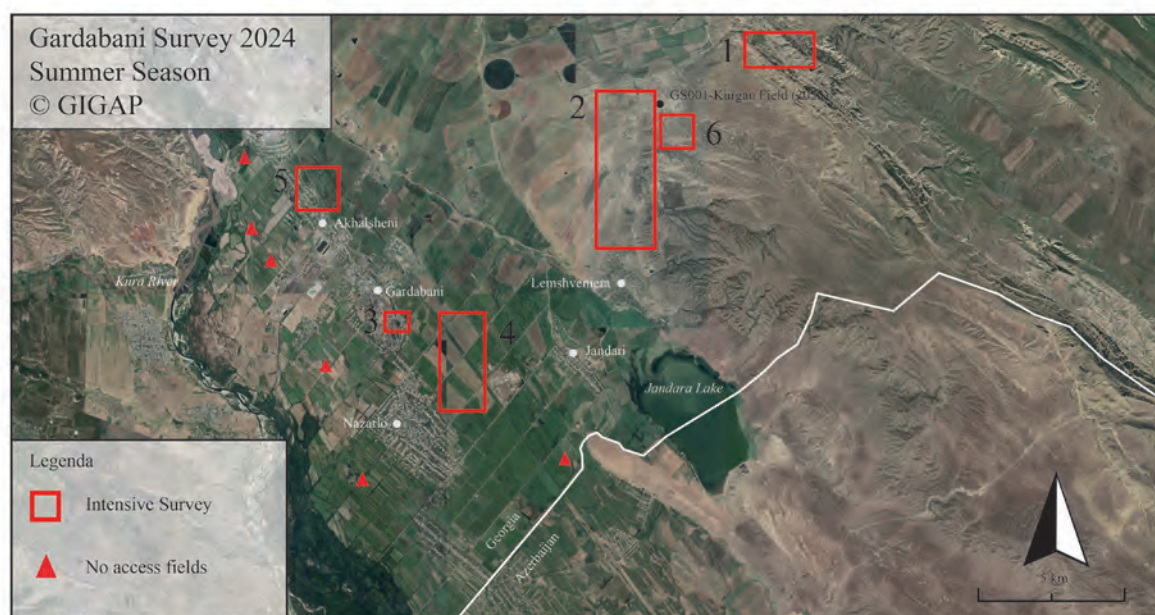


Fig. 9. Satellite map of the southern part of the Gardabani municipality with location of the modern villages (white), surveyed areas (red) and of the Gardabani Kurgan Field (Site GS001).

Makharadze, N. Erkomaishvili, M. Tsereteli (eds.), *Rescue Archaeology In Georgia. The South Caucasus Pipeline Expansion (Scpx) Project*, Tbilisi, Georgian National Museum 2018). As far as it was possible, we visited some of these locations and took GPS points on them. We also visited a number of locations indicated to us by Mr. Gocha Omaidze of the Gardabani Historical Museum.

The general area of the survey includes the southern part of the Gardabani municipality, approximately from the modern city of Rustavi to the Azerbaijani border (see Fig. 1, above). Fieldwork developed over 15 working days. It focused on six specific areas (**Fig. 9**) belonging to the three different geo-morphological and environmental zones that characterise the southern part of Gardabani Municipality: a) the Kura river lowland to the west, b) the hilly intermediate zone and, 3) the mountainous zone to the southeast. Investigations mainly focused on the lower slope of the hills (area 2) and, secondly, on the flat plain (areas 3-5 and several only cursorily visited locations). Nine working days were dedicated to area 2, four to areas 3, 4 and 5, one to the mountainous sites in zone c (area 1) and one to the top of the hills of zone b (area 6).

Due to the unfavourable visibility conditions (high grass cover, increased by the unusually high amount of precipitations), the selected areas were covered in a patchy way; results are therefore biased and any resulting distribution pattern should be considered with utmost care. In spite of all these problems, the survey was quite successful in that we managed to identify and geolocalise 21 new sites (nos GS004-024) by using a combination of different sources and methods.

Every point of interest or feature identified in the field was recorded by a GPS WayPoint (UTM zone 38N) and uploaded in the QGis program. An excel database contains the list of all the 347 WPs taken in the season. Site numbers, in the form: GS000-.... (= Gardabani Survey 000...) were assigned only when the surface archaeological evidence (stone structures, pottery, lithics, etc.) was noteworthy enough to attest the presence of ancient human activities.

In total, the team identified 21 new sites (nos GS004-GS024) that add to the three sites discovered on the preliminary survey of Autumn 2023 (nos. GS001-GS003).

The new sites are distributed in the following way:

- area 1 (mountainous, site GS021);
- area 2 (lower hilly slope, sites GS004-GS014, GS016-GS020);
- area 3 (lowland, site GS015);
- area 4 (lowland, no sites discovered, just intensive survey);
- area 5 (lowland, site GS022);
- area 6 (hilltop plateau, GS023, GS024).



Fig. 10. Transect T59 in the lowland zone

The team also tried to survey other locations in the lowland area (red triangles in Fig. 2). Due to the very scanty visibility conditions (cultivated fields or high grass coverage) it was impossible to carry out any systematic study there, but promising locations for transects to be carried out in the course of the Autumn season were checked and a list of them was set up. In only one case, in area 4, we had the opportunity to check two large uncultivated and recently ploughed fields (about 9 and 50 ha each): we carried out several long transects (T55-T60) there (**Fig. 10**), without finding any archaeological material.

Settlement sites were defined by the presence of surface material, such as pottery and macro/micro-lithic tools, or by stone structures (walls, foundations etc.) still visible on the ground. Among funerary sites, kurgan (barrow) fields represent the most attested category. The term kurgan is used here to define a stone assemblage of vaguely circular or oval shape with a diameter larger than 3 meters, usually perceptibly raised on the surrounding surface. Smaller, or more irregularly-shaped assemblage of stones were classified as “stone cluster” and not as “kurgans”.

In the course of the survey, most attention was paid to the western slope of the hilly zone just south of the Gardabani Kurgan Field (area 2), on both sides of the road connecting Lemshveniera with the site. The area develops in a north-south direction between the hills and the lowland. The slope gradient is very low in the lower part, where most of the sites are concentrated, and gradually becomes higher as one climbs up the hills, and is always oriented east-west. Visibility conditions on the whole were good, as the area is treeless, except for some small patches of shrubs, and the soil is sandy-gravelly; modern disturbances were also limited. The maximum extent of the surveyed area is about 4.50 km NS and 1.70 km EW and it lies at an average altitude of 400 m a.s.l.

Nine different macro-cluster of small kurgans (**Fig. 11**) (GS004, GS008, GS010-GS012, GS016-GS018 and GS020), five possible settlement sites (GS005, GS006, GS007, GS009, GS013, GS014) and one medieval cemetery (GS019) were identified in this area. The date of the settlements varies between the late second and the first millennium BC (Late Bronze/Early Iron to Late Iron/Hellenistic period), whereas the precise date of the kurgans is impossible to state due to the total absence of diagnostic material on their surface.



Fig. 11. View of Kurgan No. 4 on site GS018 from W.



Fig. 12. View of the huge kurgan of Akhalsheni (Site GS021) from S.

This year, only in area 2, we recorded, described and georeferenced 114 possible kurgans, which can be added to the 71 we had identified in this area (at sites GS001-GS003) in 2023. On the more significant barrows concentrations we also carried out systematic vertical aerial footage by drone, in order to check the presence of additional kurgans and to study the mutual relations between different barrows belonging to the same cluster. Kurgans were also recorded, though in much lower numbers, in the other surveyed areas, where the intensity of the coverage was however much lower and the number of attestations is therefore not a reliable indicator of their actual frequency.

Most of the kurgans identified are rather small (between 3 and 25 m) and show only a very slight elevation (few centimetres) on the ground, while others are more clearly visible, with a maximum elevation of 1.50 m. Many of them are not, or are hardly visible on satellite images, and their complete mapping, which we intend to carry out during the future seasons, will require developing a specific methodology for this challenging situation.

One huge kurgan (GS022) with a diameter of approximately 70 m (**Fig. 12**) was also visited by the 2024 team in area 5, within the territory of the Akhalsheni village. It has already been identified in the course of the Pipeline Expansion salvage project, and was also present on the map of the region set up by the Georgian-Canadian team in 2019. This kurgan differs significantly from all the other barrows of the southern part of the Gardabani region, and is more similar to examples found further north, in the territory between Rustavi and Tbilisi. According to our observations, it may have been part of a larger group of barrows, most of which have been destroyed by modern agricultural activities.

With the exception of the Akhalsheni barrow, all the identified kurgans are rather small in dimensions, but even a preliminary field analysis allows to state that a wide heterogeneity exists between them, another aspect which undoubtedly deserves future investigations. A common aspect of all these monuments is the almost complete absence of surface material (in particular pottery) on most of them or in their close proximity. This makes it extremely difficult to attribute them to specific periods. Obsidian fragments are present on some, though not on all of them, but are also quite rare on the whole.

The main group is composed of barrows of maximum 10 m in diameter, roughly circular in shape and with an elevation of no more than 30 cm on the surrounding surface. They are composed of small to medium-sized pebbles (max 30 cm) interspersed with gravel and sand. Another group consists of kurgans showing a higher concentration of river pebbles, clearly circular in shape and between 8 and 12 m in diameter, with an elevation of around half a meter. Larger barrows, similar to the last-mentioned ones, can reach 23-25 m in diameter and 1.50 m in elevation. A different type is represented by a site (GS018), where kurgans are made only by stones and no sand or gravel is present, while sites GS016 and GS017 attest to the presence of a still different category of barrows, which makes use also of a few large sandstone blocks (0.80 up to 3 m in length). These are apparently located either in the kurgan's centre or along its circumference. Finally, there is also a variety of smaller circular features of stones (3 to 6-7 m in diameter) for which a definition as "kurgans" is somehow uncertain, which may in fact represent burial monuments of a different type (graves covered by a flat circle of stones or surrounded by a ring of stones).

Until now it seems that the presence of all these features is concentrated in the area of the lower slopes of the hills, between 420 and 380 m a.s.l., but the exceptions represented by sites GS018 (346 m a.s.l.) on the plain and of other kurgan sites on the top of the plateau east of area 2 invites to caution in drawing any conclusion from this apparent distribution, which may be biased by visibility conditions and by modern disturbances in areas subjected to intensive agricultural use, e.g. in the alluvial plain. It was not possible, until now, to identify any intentional alignment of specific kurgan groups beside the fact that the NNE-SSW axis on which they seem to be oriented is clearly determined by the natural morphology of the hill's slope.

The above-described categories represent only a very preliminary draft of a kurgan typology for the Gardabani region which we plan to develop in the course of the next years based both on surface investigation and on selective excavations. The latter will be especially necessary for understanding the diachronic dimension of this huge phenomenon, which so massively and deeply shaped the region's landscape.

The number of settlement sites identified up till now is still limited. According to a preliminary analysis of the recovered ceramics, most of them belong either to the Late Bronze/Early Iron Age, or to the later Iron Age/Hellenistic periods, with minor components of Medieval occupation; earlier material was not recorded with the exception of a few doubtful Neolithic-Chalcolithic sherds. The preliminary GIGAP survey in autumn 2023 had identified one site (GS002, located in area 6 on the edge of the hilltop plateau) with a number of visible stone structures, and pottery and obsidian scattered all over the area. In 2024 this site was re-visited and a drone survey was made on it. Nine additional settled sites located in different altimetric zones were recorded. Their extension ranges between 0.10 and 5 ha: the maximum elevation (656 m a.s.l.) was recorded at the mountainous site GS021, the minimum one at site GS015 (300 m a.s.l.) in the lowland.

Finally, the intensive pedestrian survey along wide transects in the lowland area highlighted the total absence of archaeological material over large areas of this zone, an important information to be verified during the next survey campaign, possibly to be explained with the presence of recent alluvial deposition or with modern disturbances due to the intensive agricultural use of the region in the course of the last century.

ANALYSIS OF THE MATERIALS FROM THE SURVEY OF THE SOUTHERN PART OF THE GARDABANI MUNICIPALITY

Materials from the survey were completely processed during the field season at the expedition house in Lemshveniera: Michela Ferracin, assisted by Veronica Basso, was responsible for pottery and Mariam Eloshvili, assisted by Nana Dalakhishvili and Tako Ninua, for chipped lithics. All finds were drawn, photographed, measured and described, and relevant data were inserted into dedicated databases. They allowed not only to propose a preliminary date for the identified sites, but also to build up a preliminary reference collection and typology of diagnostic fabrics, shapes and decorations, to be implemented during future survey and excavation seasons.

Ceramics

The recovered material amounts to 722 fragments, 223 (31%) of which were diagnostic. Virtually none of them was retrieved on funerary sites, more specifically in connection with individual kurgans; settlement sites yielded higher, but still limited numbers of sherds. Overall, the majority of recovered items belong to the Late Bronze/Early Iron and to the Late Iron Age/Hellenistic period, with a minor component attributed to the Medieval/Modern and just one or two items possibly belonging to the Neolithic/Chalcolithic periods. All pottery finds are very fragmentary and often in poor state of preservation, which made the task of attributing them to specific morphological classes rather difficult. The repertoire of decorations is also rather limited and repetitive.

358 fragments (**Fig. 13**) were attributed to the Late Iron Age/Hellenistic assemblage. 75% of them were recovered on site GS007, the remaining ones at sites GS006, GS009, GS013 and GS020. The assemblage contains 78 diagnostic fragments (22%), with only one complete profile (GS007-24-C-60).



Fig. 13. Selection of Late Iron Age/Hellenistic sherds from site GS007.

The morphological repertoire of the vessels finds parallels at different first millennium sites from Eastern Georgia (N. Ludwig, *Ostgeorgische Fundplätze des 1. Jahrtausend v. Chr. Die Keramik*, Langenweißbach 2010; S. Brodbeck-Jucker, *Die Keramik von Udabno und ihre Stellung innerhalb des früheisenzeitlichen Südkaukasus*, Bonn 2017), but their fabrics are also reminiscent of Hellenistic productions. Based on firing techniques and surface colours, we tentatively distinguished three different wares: Light Gray, Beige and Orange. Sherds are generally wheel-made, although clear manufacture traces are not visible on all of them; surfaces are either smoothed or untreated. Ca. ¼ of the fragments were decorated, mostly with an incised pattern consisting of straight parallel lines or groups of wavy lines, which seems to have been the most common decorations for the region at the time (see Ludwig 2010, Brodbeck-Jucker 2017).

The Late Bronze Age/Early Iron Age makes up the 18% of the total recovered pottery. The fabric was mostly reduced, either dark grey or brown in colour. The most common building technique was fast-wheeling; some items did not show any clear wheel traces but their surfaces were very regular. All fragments came from sites GS014, GS021 and GS002 (**Fig. 14**). 102 (82%) of them were diagnostic. Most sherds bore an incised decoration of parallel lines, with some examples of “nail impressions”, applied ribs and wavy incised lines. 14% of the pottery (99 fragments, 40 (40%) of which are diagnostic), mainly from site GS007, with a few items from GS006 and GS013, were attributed to the Iron Age. Most of the diagnostic fragments were reduced, a few of them oxidised. Some of the sherds were decorated with incised-line pattern, both wavy and parallel.

A few fragments (6% of the total) from sites GS006 and GS021 were attributed to the Medieval/Modern periods. All of them are oxidised and most are wheel-made. 8 sherds bear incised geometric decorations and one example is glazed.

Out of the 709 recovered fragments, only two may tentatively be attributed to the Neolithic /Chalcolithic periods. One of them, GS014-WP164-C-1 is a decorated rim possibly dating back to the Early Chalcolithic period. The other one, an undiagnostic fragment, is also possibly Chalcolithic to



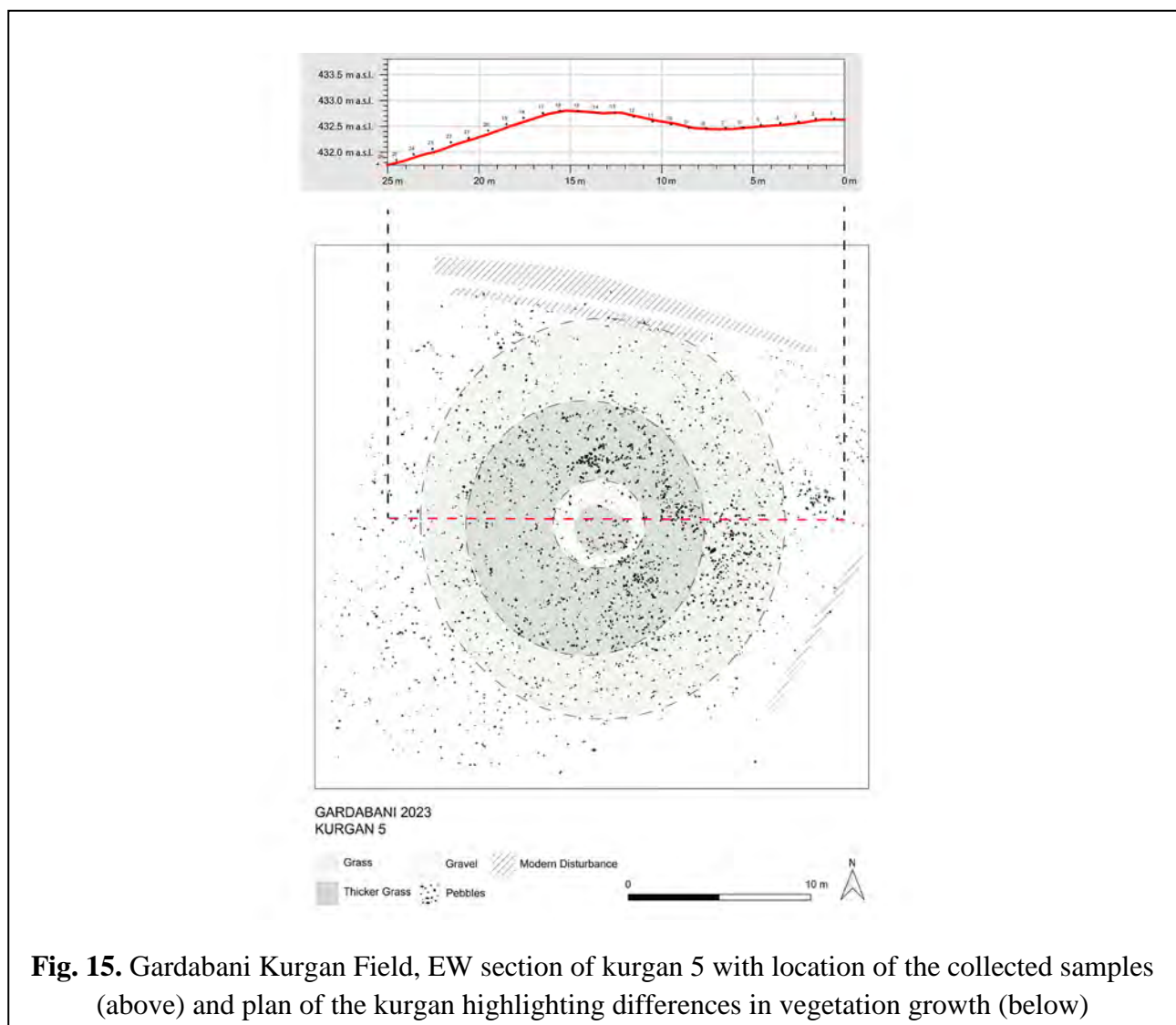
Fig. 14. Selection of Late Bronze/Early Iron sherds from sites GS014 and GS021

judge from the coarse, heavily mineral fabric, but it might also belong to a very similar Late Bronze ware.

SAMPLING FOR ARCHAEOMETRIC ANALYSES

This activity was carried out under the responsibility of Enrico Chiellini. Samples for FTIR and pedological analyses to be carried out in Italy were collected from different locations on the surface of Gardabani Kurgan field. They consists of:

- 52 samples collected along the EW profile of two kurgans, nos 5 and respectively 30 (26 samples each), with the aim of explaining the different vegetation growth on different areas of the burial mounds highlighted by drone photos taken in different seasons of the year (**Fig. 15**).
- 12 samples from different areas of the Gardabani Kurgan field plateau, representing areas characterised by different “signatures” of vegetation growth (crop marks), possibly due to the presence of modern military or agricultural installations or, alternatively, by the different composition of the underlying layers of sediments.
- 8 samples from the different layers of Sounding 1.



From the section of Sounding 1 we also collected 45 samples for palynological analyses to be carried out by Nino Ustiashvili at Ilia State University in Tbilisi and one sample for soil micromorphology analysis to be carried out in Italy under the supervision of prof. Giovanni Boschian.

Finally, a total of 50 obsidian samples for provenance analysis to be carried out by Bernard Gratuze (CNRS Orléans) were collected from the surface of Gardabani Kurgan Field (5 samples), another other barrow cemetery (GS004) and two settlements (GS002, GS006) surveyed by the team (15 samples each).

GROUND AND PHOTOGRAPHIC SURVEY OF THE REMAINS OF THE FORMER SOVIET ALGETI 2 MILITARY TRAINING SITE CLOSE TO THE GARDABANI KURGAN FIELD (A. BONDESAN ET AL.)

The survey at the former Soviet Algeti 2 military training site, which also includes parts of the Gardabani Kurgan Field site, was carried out on the field by the team from Padua University headed by prof. A. Bondesan between 9/07 and 14/07 and its results were preliminarily elaborated between 15 and 19/07/2024. The survey resulted in the identification of a remarkable variety of military structures and artefacts. Different types of positions were identified (**Fig. 16**), including trenches, artillery emplacements, barracks, and vehicle positions. The presence of crop marks, i.e. visible signs on the vegetation caused by buried structures, facilitated the identification of these elements, also thanks to the aerial survey carried out by means of a drone.

During the investigations, numerous materials were recovered, some of which bear impressed or printed dates.

The items found belong to the following categories (**Fig. 17**):

- Ammunition of various calibers: bullets, shell casings, fuzes, etc.
- Military equipment: helmets, buckles canteens, mess kits, shoes, vehicle headlights, etc.



Fig. 16. Drone ortophoto of artillery emplacement consisting of a section of two platoons for a total of 6 pieces

- Everyday objects: bottles, cans, glass jars, utensils, cutlery, etc.
- Construction materials: concrete, nails, asbestos, iron bars, bricks, etc.

The dates printed on the recovered materials, along with other archaeological evidence, suggest that the Algeti 2 site was frequented at least between 1960 and 1982, confirming that the area was used for military training during the Cold War.

In addition to the artefacts dating back to the 1960-1982 period, more recent military materials of Western origin were also found. It can be hypothesised that these findings are related to joint exercises between the Georgian armed forces and the US Marines, which took place in more recent times, before the area was abandoned and cleared of unexploded ordnance by the Halo Trust between 2013 and 2015.



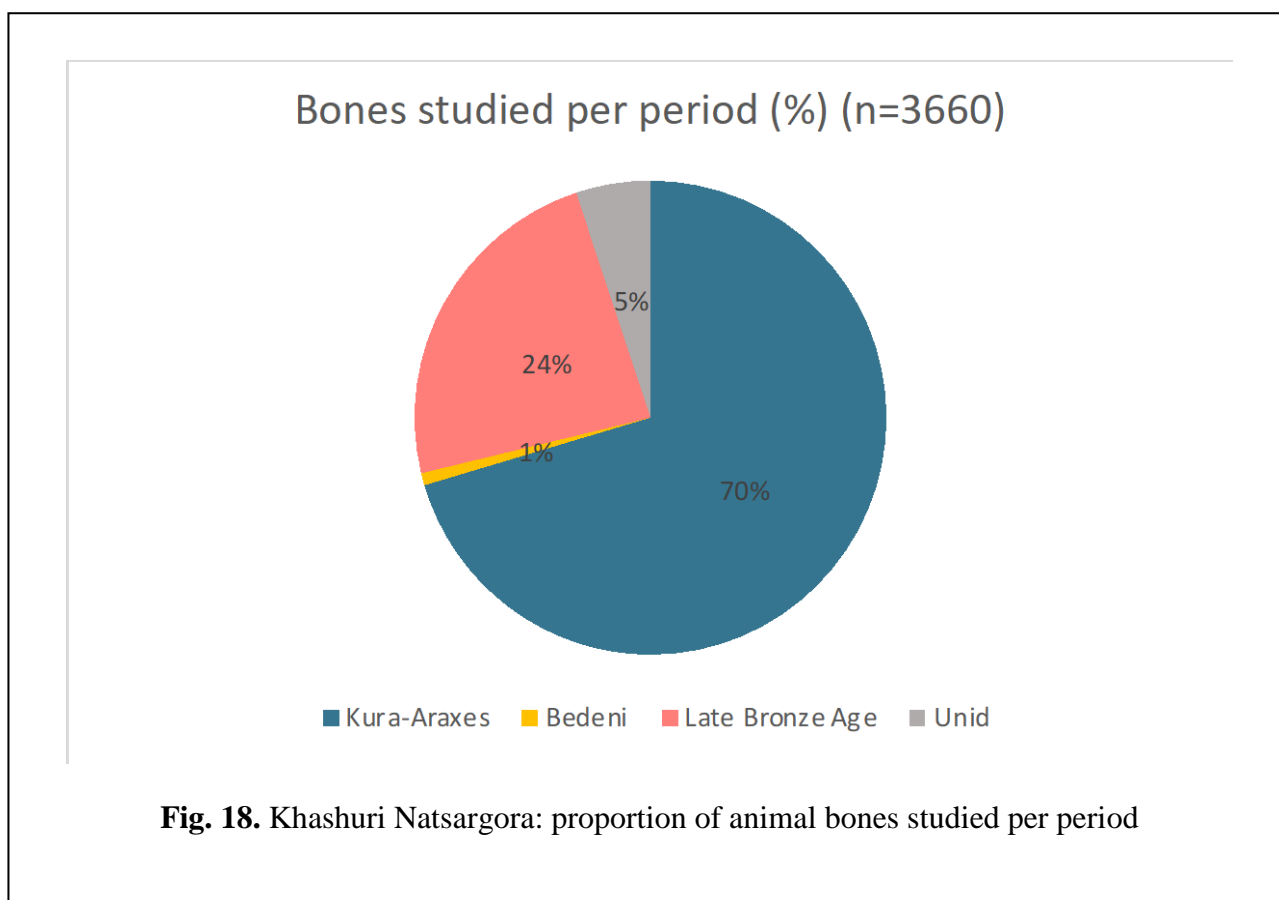
Fig. 17. Finds from the Algeti 2 military training site: sole and upper part of a military boot, spent blank cartridges, fragment of a military vehicle headlight

WORK AT KHASHURI AND KARELI MUSEUMS (A. VAUTRIN)

The mission by Adeline Vautrin (research fellow at Ca' Foscari University of Venice) was devoted to the final revision of the animal bones from the excavations the Georgian-Italian team carried out between 2011 and 2017 at the sites of Khashuri Natsargora and Aradetis Orgora/Doghlauri in Shida Kartli and to collect samples for isotopic analyses to be carried out in the framework of the PRIN-2022 ESPREMO project about mobility in late prehistoric Southern Caucasus (P.I. E. Rova). The study took place at the local Historical Museums of Khashuri (Natsargora materials) and respectively Kareli (Aradetis Orgora/Doghlauri): it started on June 14th and ended on August 15th 2024.

During three and half weeks at the Historical Museum of Khashuri a total of 3660 bones have been studied. 2576 of them belong to Kura-Araxes levels, 31 belong to Bedeni contexts and 866 to the Late Bronze Age period (187 belong to unclear contexts) (**Fig. 18**). As the contexts associated with Bedeni culture are not statistically reliable, they will not be further discussed.

Initial results show the importance of caprine (sheep and goats) in the assemblages (**Fig. 19**). Occupations associated with the KA period show the importance of caprines, followed by cattle and then pigs. The proportion of pigs is much higher than the published data for other sites of the period. This specificity of the Natsargora site will be studied in greater detail in the forthcoming months. As for the Late Bronze Age, caprines are still in the majority, followed by pigs and cattle. An almost complete half-skull of a pig (**Fig. 20**) represents a remarkable find, which has been studied in detail. Sampling strategies in the herds will also be studied for each species and by period. Caprine, bovine and pig teeth were sampled in preparation for isotopic studies. Some bones were also selected for DNA analysis



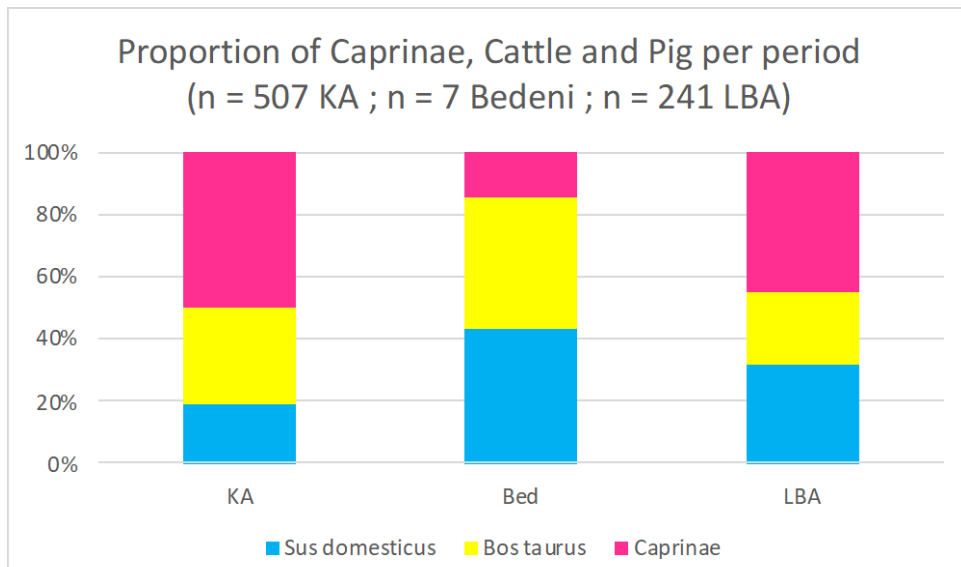


Fig. 19. Khashuri Natsargora: proportion of caprinae, cattle and pig per period



Fig. 20. Khashuri Natsargora: Pig skull - LBA period

A total of 3844 bones have been studied for Aradetis Orgora. 1086 of them belong to Kura-Araxes levels, 1369 belong to the Late Bronze Age period and 1328 to the Iron Age period (61 come from unclear contexts). The first results show the importance of caprines (sheep and goats) in the assemblage of the Early Bronze Age period. Unlike Natsargora, no suid remains have been identified at Aradetis Orgora during this period. During the Late Bronze Age, pigs were the most commonly exploited animals, followed by cattle and caprines. This trend is repeated during the Iron Age, with pigs in the majority, but caprines and cattle in the majority (**Fig. 21**).

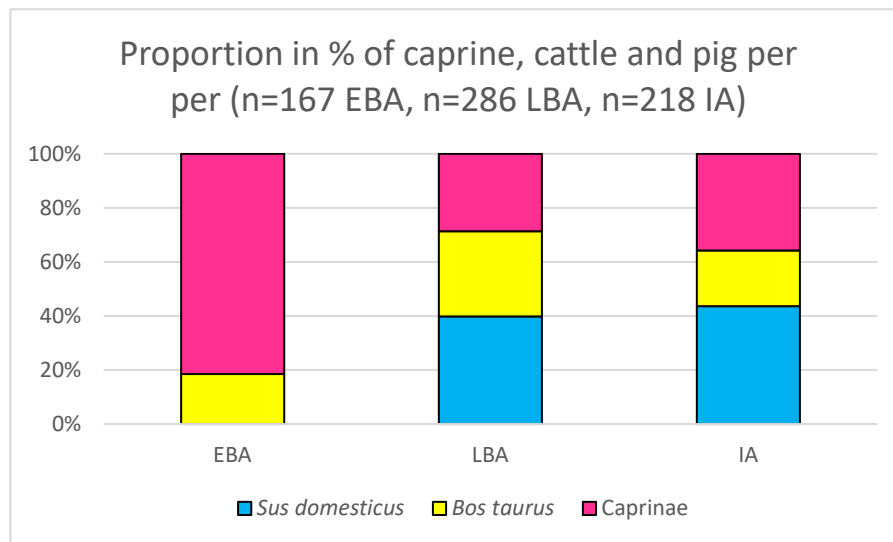


Fig. 21 Aradetis Orgora: proportion of caprines, cattle and pigs per period

Faunal remains from 13 tombs attributed to the Late Bronze Age period from the neighbouring cemetery of Doghlauri were studied. Cattle and caprine animals were the main represented species (**Fig. 22**). However, one deer fragment was identified. As with Natsargora, samples of dental and bone remains were sampled from Aradetis Orgora/Doghlauri in preparation for isotopic studies, and some bones were selected for DNA analysis.

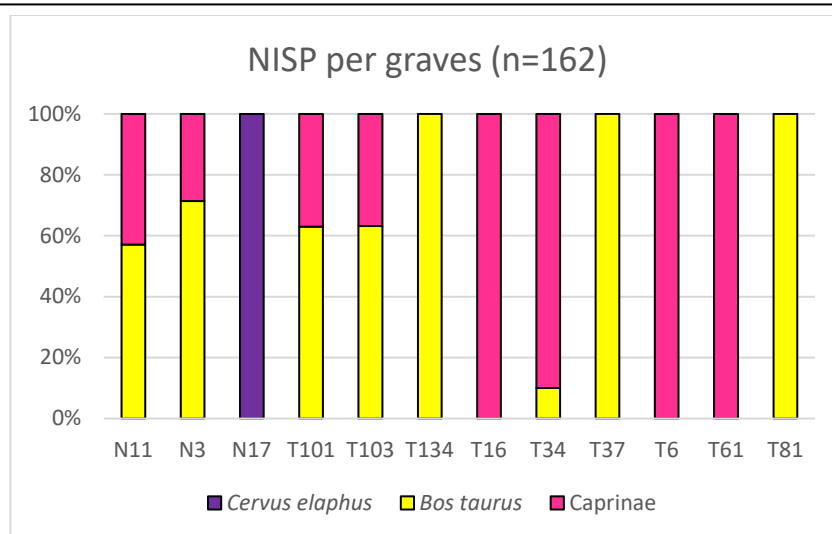


Fig. 22. Doghlauri: number of identified specimens in % per graves

SURVEY OF THE HUMAN OSTEOLOGICAL REMAINS FROM MEDIEVAL MONASTERIES IN THE BORJOMI REGION (F. BERTOLDI, P. FABBRI)

From June 7th to June 14th 2024 the team of the associated project “Bioarchaeological research on the population of the Southern Caucasus from the late prehistory to the Middle Ages” under the responsibility of prof. Francesca Bertoldi (Università Ca’ Foscari) in collaboration with prof. Lia Bitadze (Tbilisi State University) continued the study of the human osteological remains started in 2023. The team included Prof. Francesca Bertoldi, prof. Pier Francesco Fabbri (Università di Lecce, Museo Fiorentino di Preistoria), drs Leonardo Catalini (Università del Molise) e Denise Piano (Università Politecnica delle Marche) assisted on line by prof Roberto Cameriere (Università del Molise).

The team completed the analysis of the finds from the crypt of the Berebis Saqdrebi monastery (X-XVII century a.D.), which consist of 617 skulls of adults and 2 of infants, ca 20% of which show traces of injuries (**Fig. 23**). All available canines or monoradicular teeth were sampled and X-rayed by 137 Rx for age determination by radiographic methods in addition to classical anthropological ones (cranial sutures, tooth wear). The results obtained by the two methods on a first group of 54 skulls were compared with each other and statistically elaborated. The results of this work are presently in press on the *Chronos* journal and will be presented at the EAA international congress in Rome (August 28th-31st 2024).

In addition, the team verified the sex diagnoses obtained on skulls and pelvises, which confirmed that the majority of the sample belonged to males. Finally, 18 samples were collected for ¹⁴C dating, microtac, sex determination by amelogenin, DNA, dental tartar study and palaeonutritional analyses.



Fig. 23. View of the skull collection from Berebis Saqdrebi monastery (above) and examples of skull injuries (below)

GEOARCHAEOLOGICAL RESEARCH (M. ELASHVILI, G. BOSCHIAN)

This activity took place between 07/08/2024 and 17/08/2024 under the responsibility of prof. Mikheil Elashvili of Tbilisi State University and with research funds and equipment partially provided by Tbilisi State University. The Georgian component consisted of: prof. Mikheil Elashvili, Levan Navrozashvili, PhD candidate (Ilia University, Tbilisi), Nino Ustiashvili and five students from Ilia State University; the Italian team was represented by prof. Giovanni Boschian (University of Pisa). The first week was devoted to completing the corings in the Alazani valley initiated in summer 2023 in the framework of the “Georgian-Italian Lagodekhi Archaeological Project”; during this period the team was based in the expedition house at Akhalsopeli.

The general purpose of the project is to reconstruct the late Pleistocene and Early Holocene geomorphological and environmental evolution of the Alazani valley and of the Gareji region. The aim is to contextualise the findings of the archaeological expedition within a longer sequence of environmental data, with the twofold final purpose of determining which conditions may have fostered possible older phases of settlement, and of evaluating human influence on the environment starting from at least the late Chalcolithic. In order to achieve this aim, the project focusses on collecting physical, chemical and biological samples from long stratigraphic sequences, to be used in sedimentological, geochemical and palynological studies, as well as for dating the sequences. Considering the morphological and sedimentological characteristics of the study areas and the time span to be documented, shallow drillings (10 m deep at maximum) are the most suitable method selected for acquiring the data, with special focus on areas that were also studied from the archaeological point of view. The holes were drilled using a handheld Atlas-Copco Cobra jackhammer equipped with 80 mm fenestered corers (Fig. 24).



Fig. 24. Drilling with Atlas-Copco Cobra jackhammer (left); fenestered corers with sediment from DR24-5, Jikurebi lake (right)

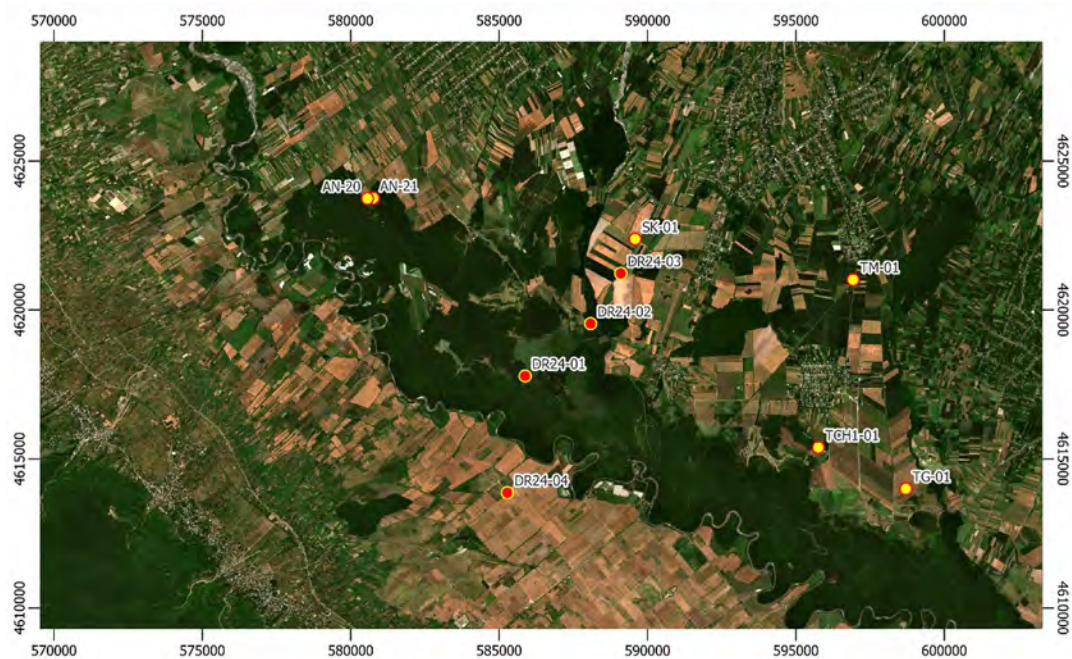


Fig. 25. Drilling sites location in the Alazani plain. Yellow circles: 2023 fieldwork; red circles 2024 fieldwork

Four new 10 m-long cores were drilled along a NNE-SSW transect, approximately along the direction between Saqobo and Heretiskari (**Fig. 25**), starting from the 2023 drilling site SK-01 and ending on the right side of the river. Interestingly, well-preserved wood fragments, probably suitable for 14C dating, were found in a sand layer from core DR24-02. Samples for sedimentological and geochemical analyses were taken from the cores following the same protocol employed in 2023. The samples were sent to Ilia State University for processing and study.



Fig. 26. Sampling location of DR24-06 at the NW end of Mlashe lake

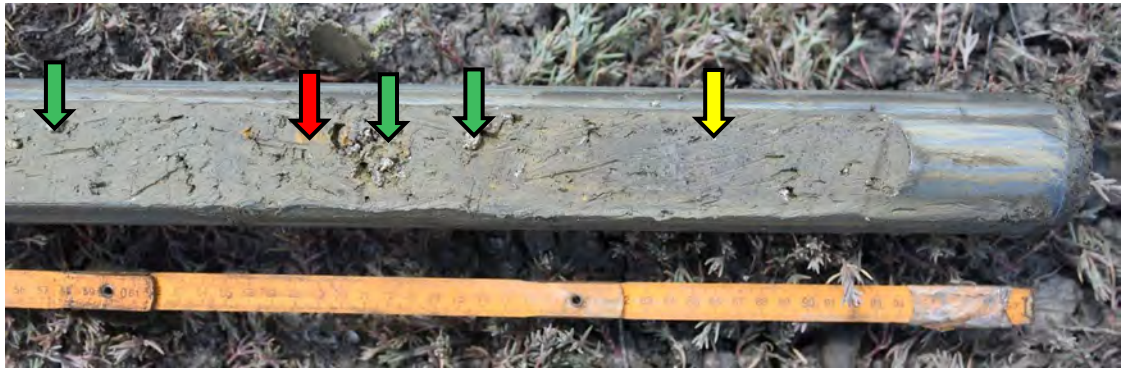


Fig. 27. Core DR24-06, section between 5.55 and 6.00 m, including fine gravel (green arrows), some clods of oxidized sediment (red arrow) and small pedorelics of blackish soil (yellow arrow)

During the second week of work, the expedition was based in Tbilisi and work focused on the region at the border between the municipalities of Gardabani and Sagarejo. Two days were spent drilling cores in the Gareji region. The main purpose was to sample good quality pollen sequences; consequently, drillings were carried out in active lakes, selecting those without tributary rivers that may have transported reworked or allochthonous pollen into the basins. Lakes Jikurebi and Mlashe were apparently suitable for the purpose and two test cores were collected, one in each of the basins. Core DR24-06 was drilled on the north-western shore of the Mlashe Lake (**Fig. 26**), from a freshly emerged area of the lake bottom.

The coring could not be pushed deeper than 6 m because of the strong attrition due to the clayey composition of the sediment. The sequence is very rich in clay deposited in reducing environment that has given the sediment a characteristic greyish colour and has likely favoured the preservation of pollen grains. At about 5.50 m depth, the sediment includes some fine limestone gravel and small lumps of very dark sediment (**Fig. 27**) that are probably pedorelics of soils previously developed outside the lake and transported into the basin following a phase of erosive processes.

Geological survey was carried out for two days in the area surrounding the kurgan area of Gardabani. Several itineraries were walked and partly driven through the area, in order to obtain a general perspective of the local geomorphology (**Fig. 28**), which could also be observed from an elevated point of view on the fringe of the Red (= Coloured) Hills range.

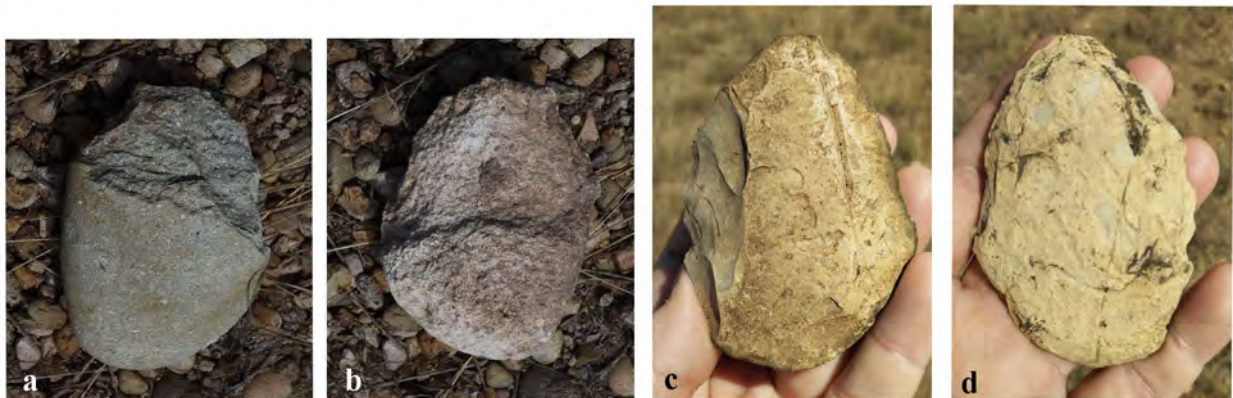


Fig. 29. Artefacts from geological survey itineraries. a, b: crudely flaked chopper-like tool on volcanic rock; c, d: partly flaked platy flint pebble

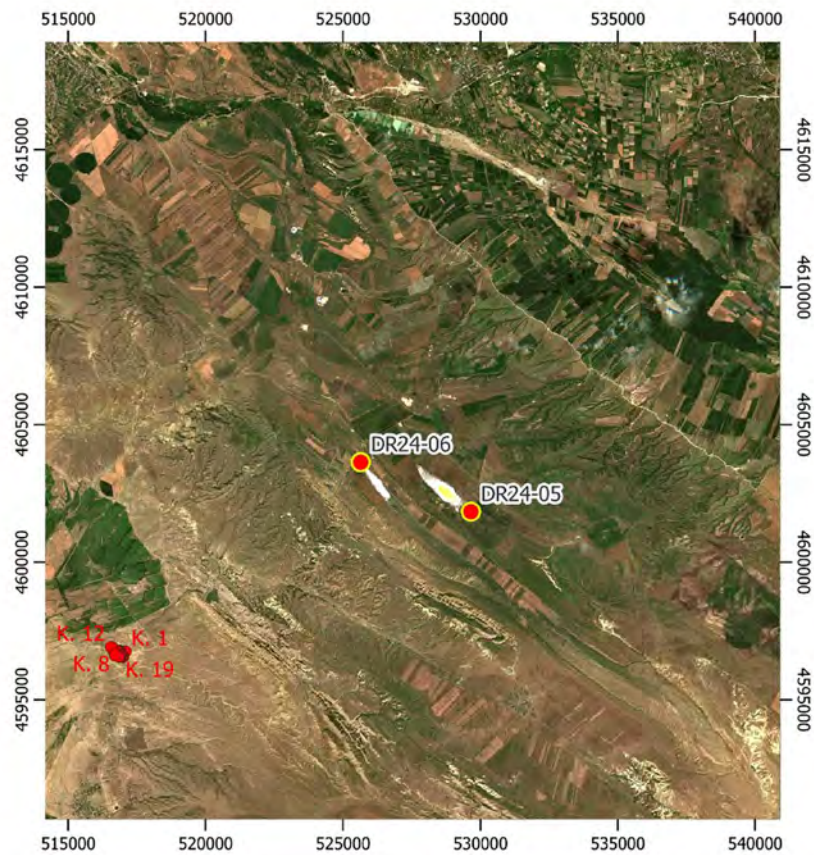


Fig. 28. Drilling locations in the basins of lakes Jikurebi (W) and Mlashe (E). Red&Yellow dots: drilling locations; red dots: kurgan sites in the Gardabani area

Cultural remains are not common on surface; the collected and documented ones (then abandoned on site) include one chopper-like artefact (**Fig. 29a, b** “Chopper?”) on volcanic rock and a biface-like artefact (**Fig. 29c, 9d**, “Preform”) on chalcedony, both probably representing preforms for the production of foliate tools. Some geological profiles showing the presence of typical alluvial fan deposits were observed along these itineraries. The profile in **Fig. 30** (= **Fig. 28**, “2 Profiles2”) is characterised mostly by fine sediments with intercalated gravel layers and lenses and possibly including the lower horizons of a very poorly developed soil.

The kurgan area is situated on top of the aforementioned fan, which is the southernmost element of a group of anastomosed alluvial fans (**Fig. 31**) fed by streams flowing from the Red Hills. It is strongly dissected and shaped by secondary channels and gullies, resulting in an apparently complex landscape characterised by low hills and shallow valleys.



Fig. 30. Profile “2 Profiles”, composed of fine grain-size sediments with thin gravel layers and lenses

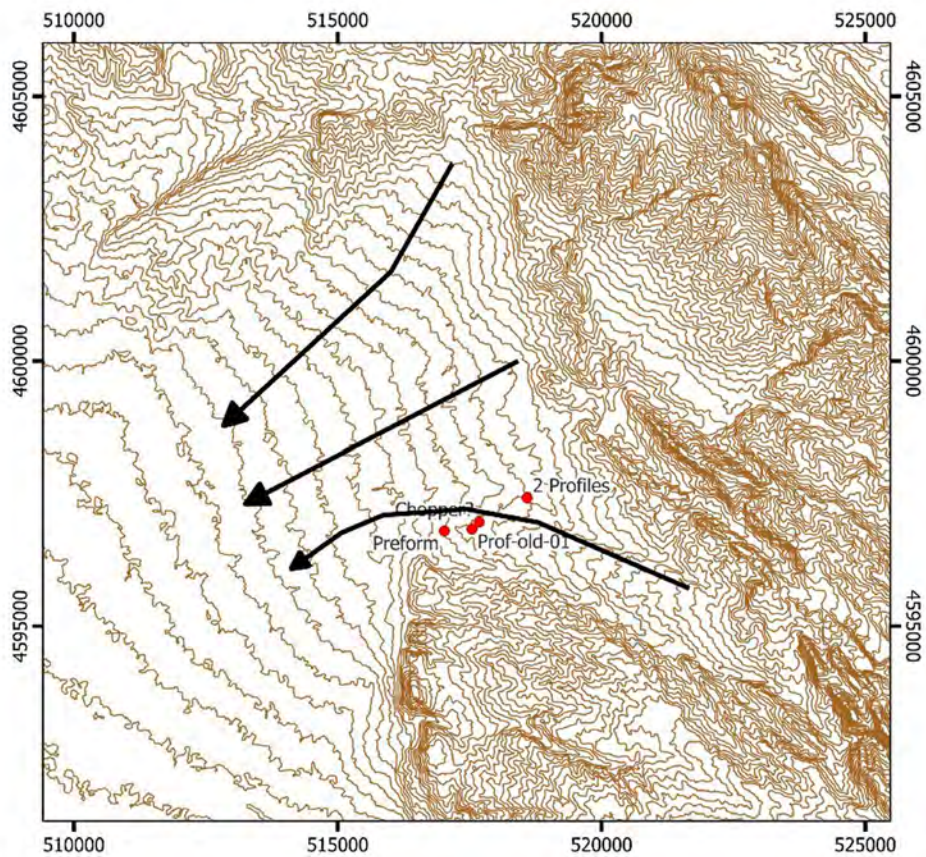


Fig. 31. Isoline map of the Gardabani area, showing three main alluvial fans (arrows) originating from the Red Hills and anastomosing into a single megafan towards the plain situated to the east

RESULTS AND FUTURE PERSPECTIVES

In spite of the fact that, for reasons independent from our will, it was impossible to achieve what was supposed to be the main aim of the season, that is to begin excavations at the important funerary site of Gardabani Kurgan Field, during the June/August season the expedition reached a number of important results.

First of all, it completed the magnetic prospection and aerial reconnaissance of the barrow field, carried out a geological sounding and took soil samples for chemical/pedological analyses of the natural sediments all over the site, in order to better understand its geomorphological context and the history of its anthropic occupation. Geomorphological research in the region was continued, between August 7th and August 17th 2024, by the Georgian experts of the team with the assistance of prof. Giovanni Boschian. The team recorded exposed sections and carried out drillings at selected locations in the region surrounding the site, for a better geomorphological contextualisation of the latter. These activities will help better programming the future excavation season, which is now planned for June/July 2025. The same team of geologists completed the work initiated in 2023 in the Alazani valley, by carrying out additional drillings there.

Significant results were also obtained about the impact on the preservation of the archaeological remains or the recent (Soviet and post-Soviet) activities connected with the Algeti 2 military training site. The survey conducted by the experts from Padua University resulted in the identification and mapping of a remarkable variety of military structures and artefacts and in their approximate dating between the 1960s and the late 2000s.

Research connected with the archaeological survey of the southern part the Gardabani municipality, the first official season of which was foreseen for September/October 2024, was partially anticipated to the summer season, and indeed represented the main activity carried out by the group of archaeologists. Besides collecting information about previous survey activities in the area, the group visited various areas within the different environmental zones in which the region can be subdivided, and carried out extensive and intensive pedestrian survey in selected areas of good ground visibility belonging to different environmental zones. This resulted in the discovery of 21 new sites, mainly dated to the late second and first millennium BC, many of which were previously unknown. These are mainly kurgan fields concentrated at the feet of the hilly area bordering the region to the southeast, but also include settlement sites located in different environmental and altimetric zones. The density of funerary sites, in particular, appears to be much higher than expected. As many of them are indeed hardly visible on satellite images and even by non-intensive pedestrian survey, a systematic mapping of them will represent a considerable methodological challenge, but also a primary goal for the future field activities of the expedition, to start with the forthcoming Autumn 2024 survey season. The analysis of the ceramic and lithic materials recovered during the survey allowed to set up a preliminary list of regional diagnostic types, to be used to date the sites discovered during the forthcoming seasons.

Finally, research by scholars associated with the Georgian-Italian expedition in different parts of Georgia (archaeozoological study by A. Vautrin, research about the human remains from the medieval monasteries in the Borjomi region under the responsibility of F. Bertoldi and L. Bitadze) could be carried out according to the foreseen schedule and with very positive results.

Acknowledgements

Thanks are due to Ilia State University of Tbilisi and to the Italian Embassy in Tbilisi for their constant support during the field activities of the expedition. We are extremely grateful to Mr Gocha Omaidze (Gardabani Historical Museum), Shalva Babutsidze MA (Rustavi Historical Museum), dr. Davit Darejanashvili, prof. Mikheil Elashvili, who provided invaluable information about the location of archaeological sites in the Gardabani region. We are also very grateful to Mr. Tamaz Latsabidze and

Mrs Mzia Lobjanidze (Director and official of the Khashuri Historical Museum), to Mr. Dimitri Ramishvili (Director of the Kareli Local Museum) who allowed Adeline Vautrin to study the animal bones from Natsargora and Aradetis Orgora stored in the reserve collections of these museums and facilitated her work in several ways.

The 2024 field season of the Georgian-Italian Lagodekhi Archaeological expedition was funded by Ca' Foscari University of Venice (Fondo Ateneo Scavi Archeologici 2024 and DSU department funds), Ministero degli Affari Esteri e della Cooperazione Internazionale (Contributi Missioni archeologiche, antropologiche e etnologiche italiane all'estero 2024) and Ministero dell'Università e della Ricerca Scientifica (PRIN-2022 ESPREMO project).



Fig. 24. Group pictures of the 2024 GIGAP team