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Some preliminary notes on the limited 2020 campaign of the Palamas Archaeological Project (PAP)

Abstract

This paper presents a short summary of archaeological operations carried out in 2020 in the area of the modern village of Vlochos on the western Thessalian plain, Greece, as part of the Palamas Archaeological Project (PAP). Initially, the project aimed to conduct a significant campaign of fieldwork during the 2020 season, but operations were severely scaled back by limitations imposed by the COVID-19 pandemic. Therefore, only a small-scale campaign, aimed at method testing and exploratory investigation, could be carried out. Fieldwork included an evaluation of complimentary geophysical techniques, cleaning operations, and oral history enquiries. The work—despite its limitations—highlighted the value of using multiple geophysical techniques, as well as proving the importance of a systematic cleaning of the site. Overall, the first season of PAP highlighted the productivity of the research project and will act as a strong foundation for the forthcoming field seasons.*

Keywords: geophysical survey, ethnoarchaeology, earth resistivity, electromagnetic survey, Thessaly

https://doi.org/10.30549/opathrom-14-04

Introduction

The Palamas Archaeological Project, Greece (PAP, 2020–), is the successor to the Vlochos Archaeological Project (VLAP, 2016–2018).[1] It is an ongoing collaboration between the Ephorate of Antiquities of Karditsa and the Swedish Institute at Athens, comprising an international team of researchers from the Ephorate, the Swedish Institute, the University of Thessaly (Greece), the University of Gothenburg (Sweden), Bournemouth University (United Kingdom), and Kulturmiljö Halland (Sweden). Whereas the former project aimed at studying the extant remains found at the archaeological site at Vlochos on the western Thessalian plain (region of Karditsa) through non-invasive methods, the current project aims at further studying both the remains at Vlochos *and* its surrounding landscape, roughly corresponding to the municipal unit of Palamas in the eponymous municipality (*Fig. 1*).

The northern half of the survey universe roughly corresponds to what could arguably have been the *chora* of the Classical-Hellenistic settlement at Vlochos (*Fig. 1*), that is, the region from which it most likely drew on the natural resources.[2] The closest neighbouring identified ancient *polis*—that of ancient Peirasia—can be found at Ermitsi, *c.* 10 km to its south, immediately outside the municipal bounds. The archaeological landscape in this region is not limited to Classical antiquity, but contains remains of all chronological periods, and the programme therefore aims at being fully diachronic in its approach. The area has never been systematically surveyed, and one of the central aims of the programme is to establish a catalogue of archaeological sites together with relevant chronological and topographical information.

* The team would like to express its gratitude to the Hellenic Ministry of Culture and Sports for granting the permission to conduct fieldwork in 2020 and for the extension of the five-year permit, and to the Swedish Institute at Athens and its director Dr Jenny Wallensten for her never-ending support and assistance. The limited field campaign was carried out with the generous financial backing of Herbert och Karin Jacobssons stiftelse. The geophysical prospection could not have been carried out without the help from the municipality of Palamas and its mayor Mr Giorgios Sakellariou, who arranged that thistles and weeds on site were mowed. We would also like to thank Messrs Angelos and Petros Davatzikos of Markos for their collaboration during sieving work; they together with Mr Vasilis Kalatharas also deserve all praise for their heroic work in saving the region from the devastating floods of September 2020. Finally, we would like to thank the inhabitants of Vlochos and Metamorfosi for their friendliness and enthusiasm during the course of our work.

[1] Vaïopoulou *et al*. 2020.

[2] This based on the spatial distribution of confirmed urban sites in the region, with several ancient cities located within a *c.* 10 km radius from the site at Vlochos.

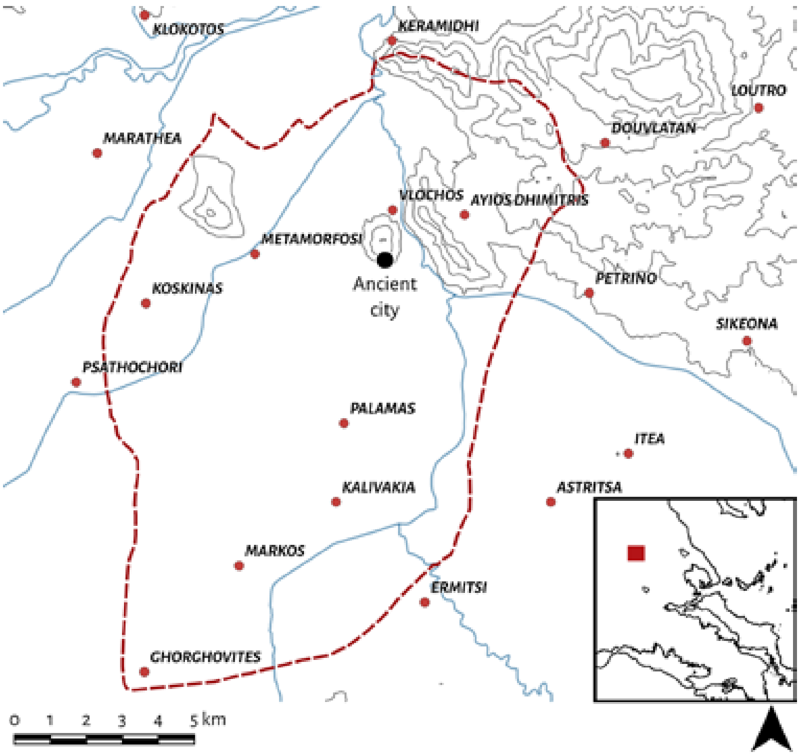

Fig. 1. Approximate extent of the municipal unit of Palamas as shown within Thessaly and Central Greece, with the main modern settlements and waterways. Map by R. Rönnlund.

Several archaeological activities were planned as part of the 2020 field campaign, including excavations at Vlochos, architectural survey of a multi-phase fortress at Metamorfosi, geophysical prospection at multiple locations, and extensive oral history inquiries. However, due to the global disruptions caused by the COVID-19 pandemic, most of our planned activities were either partially or completely postponed. Limited fieldwork, however, was carried out in the beginning of September, including geophysical trials, oral history enquiries, and cleaning at the site of Patoma.

Geophysical prospection

Two additional geophysical methods were tested during fieldwork in 2020, earth resistivity and electromagnetic survey (EM), complementing the fluxgate gradiometry and ground-penetrating radar (GPR) surveys conducted during the previous campaigns. The large flat area of Patoma (Πάτωμα), just south of the hill of Strongilovouni (Στρογγυλοβούνι), was almost completely surveyed in 2016–2018 using fluxgate gradiometry, producing a very detailed outline of the buried remains on the site.[3] This dataset, coupled with the results of targeted GPR surveys, allowed for an extensive interpretation of the structural remains in the area of Patoma. Fluxgate gradiometry primarily reveals the magnetic effects of human activity, however, and as such will only show a certain range of features. For example, wall foundations in the Patoma area were revealed only as shadows in the magnetic plot, meaning that in areas where the magnetic enrichment of the surrounding soil was low, there was little contrast to identify the detail of the wall foundations. The results produced by the GPR in the parallel survey, however, highlighted the potential for using complementary techniques alongside the fluxgate gradiometer. Additionally, the presence of ferrous debris on the ground surface caused significant "blurring" to the final magnetometric image.[4]

The benefit of resistivity is that it shows preserved buried architecture very well. It relies on the presence of moisture in the surrounding soil matrix to conduct electricity, with architectural remains acting as a barrier for the electric current. Consequently, it can clearly reveal structural remains at a level of detail that is not possible with gradiometry. EM highlights similar buried features in that it can be used to show apparent conductivity (the inverse of resistivity) while simultaneously producing a representation of apparent magnetic susceptibility. The latter is typically associated with intense burning or

[3] Vaïopoulou *et al.* 2020, 24–28.

[4] This became very evident in the eastern sector of the Patoma area, where a small (now abandoned) shooting-range had left large quantities of spent bullets and cartridges on the ground.

Table 1. Basic summary of the CMD Mini-Explorer depth settings as used during the survey.

Mode of operation	Appr. depth of reading (metres)
High	0.5
	1.0
	1.8
Low	0.25
	0.5
	0.9

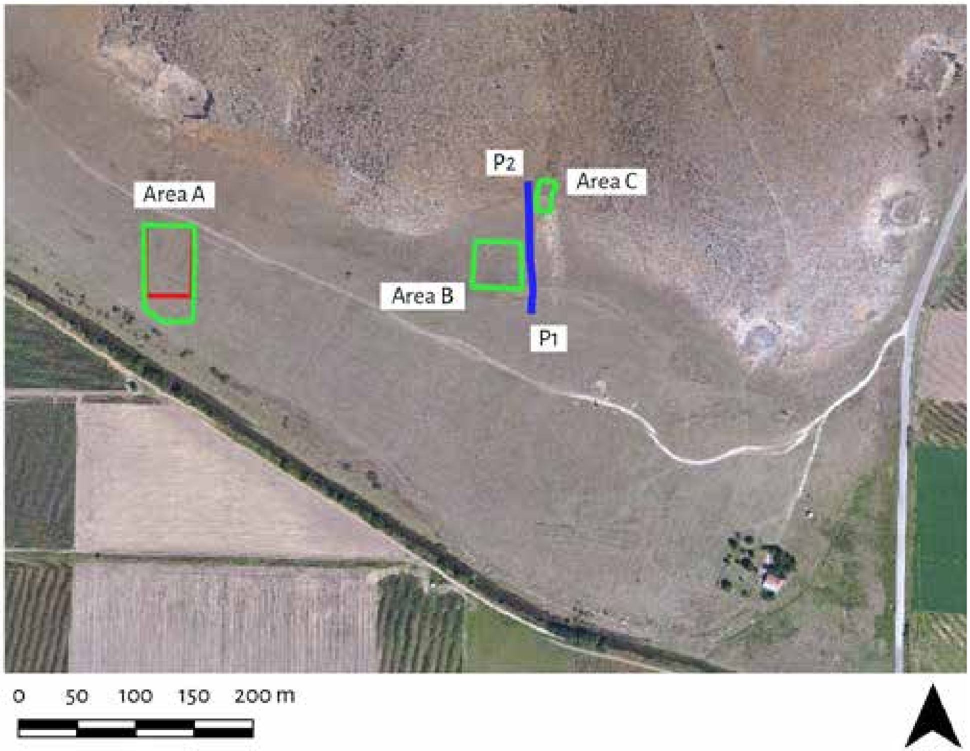

Fig. 2. EM survey areas (green), resistivity survey area (red) and EM profile (blue) of the 2020 resistivity and electromagnetics survey within the 2016–2018 magnetometry survey results. Plot by D. Pitman.

dense areas of burnt material such as fired ceramics, e.g. brick and tile. The combination of these techniques alongside fluxgate gradiometry and GPR can be combined to form a clearer picture of buried structural remains as well as associated traces of activities such as intense burning.[5]

EM was carried out using a CMD Mini-Explorer. The Mini-Explorer has the unique advantage that it can simultaneously record both apparent conductivity and apparent magnetic susceptibility at three different depths. It can also be used horizontally to give additional depth readings. The depths within the two ranges can be seen in *Table 1*. The instrument was attached to a Differential Global Navigation Satellite System (DGNSS) antenna receiving differential corrections from an on-site base station with readings recorded continuously every 0.25 seconds. The survey areas consisted of a series of traverses made one metre apart. The collected data was plotted in TerraSurveyor and survey lines interpolated. The resultant geoTIFs were then imported into QGIS where they were over-laid on the existing survey data.

In addition to the gridded areas, a profile was generated using the EM on the high setting (*Table 1*). The line of the profile can be seen in *Fig. 2* (at P1–P2). The profile was carried out over 100 m of the colluvial fan with the aim of noting any breaks in the subsurface density. The multiple depth measurements were interpolated to produce a pseudo-section using Surfer, a digital data visualization package. This approach was adapted from the workflow as outlined in the GF Instruments manual.

Resistivity was recorded using a Geoscan RM-85 relativity meter along the same grid-based system as was employed in the magnetometric survey of 2016–2018. Readings were recorded every 0.5 m along traverses 0.5 m apart. The approximate depth of measurement was between 0.4 and 0.6 m. As with the electromagnetism, the data was downloaded and plotted in TerraSurveyor before geoTIFs could be loaded into QGIS.

The outline of the survey areas can be seen in *Fig. 2*, showing the three survey zones overlain on the magnetometric results and a digital topographical model. Area A includes both EM and resistivity, while Areas B and C were only surveyed using EM. Areas A and B represent key areas of the site established through previous survey techniques, while the terrain around Area C proved near-impossible to survey using other geophysical techniques. That Area C was possible to survey highlights the flexibility of the EM in difficult terrains.

[5] For a full technical breakdown and methodological outline for EM, see Bonsall *et al.* 2013. For the technical details of earth resistance, see Gaffney & Gater 2003, 55–76.

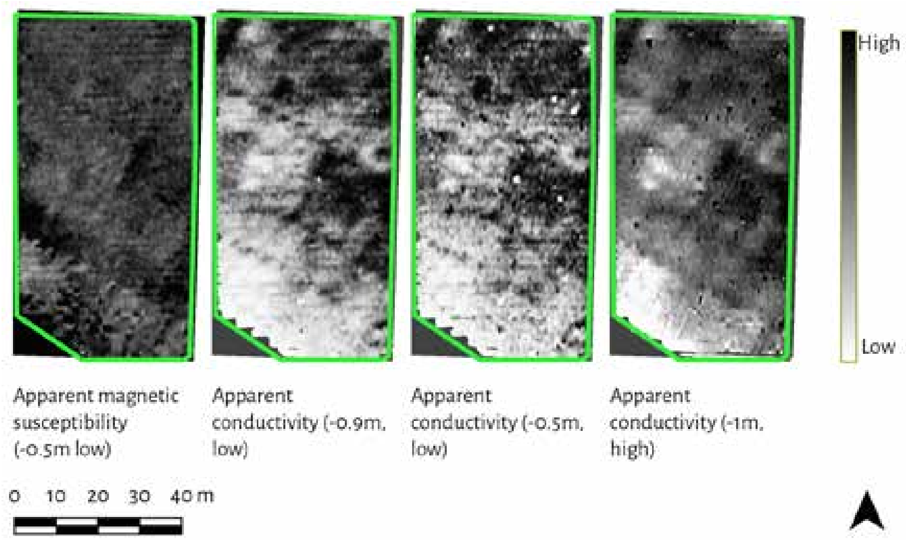

Fig. 3. Results of EM survey, Area A. Plots by D. Pitman.

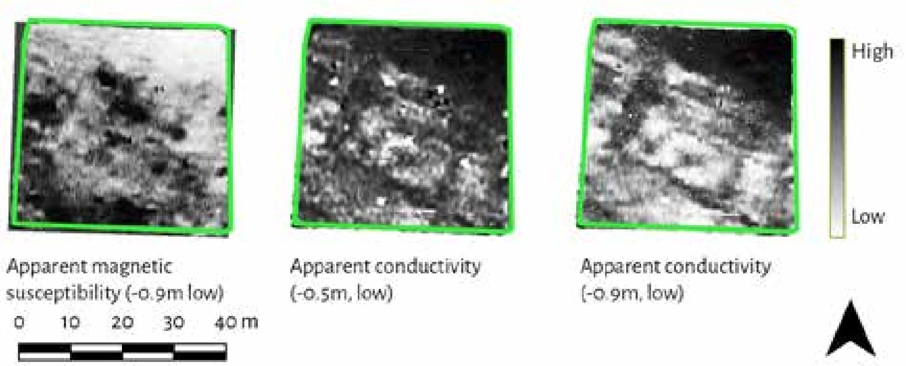

Fig. 4. Results of EM survey, Area B. Plots by D. Pitman.

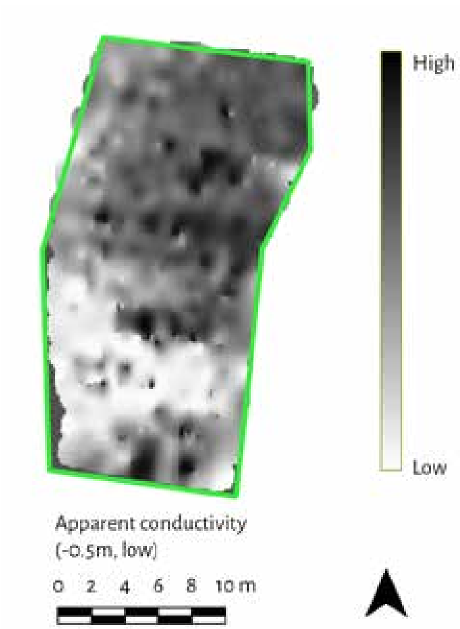

Fig. 5. Results of EM survey of Area C. Plot by D. Pitman.

ELECTROMAGNETIC RESULTS

The results of the EM survey can be seen in *Figs. 3–5*. The depths selected for illustration are those that most clearly show structural remains. It is clear from these pilot survey areas that the technique has the potential for revealing structured remains even at a comparatively low traverse resolution.

The survey in Area A (*Fig. 3*) suggests that architectural remains (including foundations) potentially extend to a depth of 1 m, while the large street or avenue,[6] which was most clearly visible in the apparent magnetic susceptibility plot, is most visible at 0.5 m deep. This area was selected for method tests due to the presence of an off-grid structure that was visible in the GPR survey, but was less clear in the magnetometry.[7] The foundations of the building are visible in the EM survey results, but are not as clearly defined. The survey results do however show a series of walls/foundations perpendicular and parallel to the large avenue.

6 Vaïopoulou *et al.* 2020, 24.
7 Vaïopoulou *et al.* 2020, 26–27.

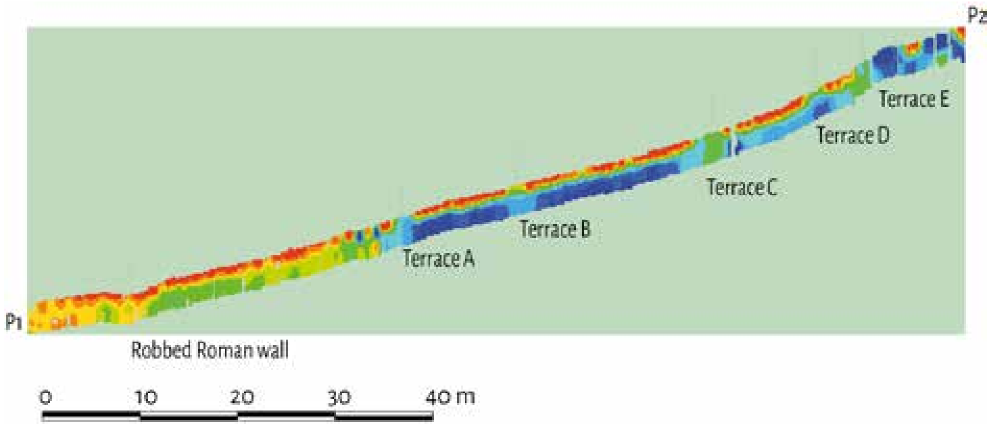

Fig. 6. EM profile (pseudo-section) showing the location of possible terraces and the line of the robbed-out Late Roman wall. The locations of P1 (south) and P2 (north) are shown on Fig. 2. *Section by D. Pitman.*

Survey Area B (*Fig. 4*) was targeted on a potentially complex structure[8] identified on a slightly raised square plateau within the area surveyed through magnetometry. The conductivity results show substantial structural remains that correspond very well with the magnetometry. The apparent magnetic susceptibility results highlight a significant deposit of magnetically enriched material that seems to correspond with areas surrounded by structural remains. This is potentially a significant collapse of burnt material which, in the context of this site, is most likely the roof tiles of a collapsed roof. This strengthens the argument that this area represents a complex with substantial monumental architecture.

Area C (*Fig. 5*) was targeted in the colluvial fan of the slope just north of the survey area of 2016–2018. This area was selected because a section of a Late Antique fortification wall had been revealed by rain erosion here in 2016.[9] It was hoped that the EM would be able to identify the continuation of this fortification inside the deep colluvium. While the survey results here are coarsely defined, there is a clear east–west parallel line in the conductivity data suggesting the continuation of this buried fortification wall.

The results of the profile can be seen in *Fig. 6*. The results show five clear changes in the subsurface density, some of which correspond with noticeable breaks in the topographic profile of the slope. It is highly probable that these represent either terrace walls, substantial building foundations, or fortifications. Terrace E (in *Fig. 6*) is in line with the continuation of the Early Byzantine fortification wall noted in Area C and in the eroded section of the colluvial fan.

[8] Identified in the previous study as a potential public or monumental complex, Vaïopoulou *et al*. 2020, 61.

[9] Vaïopoulou *et al*. 2020, 50–52.

RESISTIVITY RESULTS

Resistivity was only carried out in Area A, but at a higher resolution than the EM survey in the same location. In total six survey grids of 20 m by 20 m were surveyed. The results show a very clear plan of buried architectural remains, including the main structures identified on the magnetometry plot and the off-grid structure identified in the GPR survey. The clarity of the results—despite the less-than-ideal ground conditions—means that resistivity has tremendous potential for improving our understanding of the layout of the site prior to excavation.

COMPARISON OF TECHNIQUES

The plots in *Figs. 7* and *8* show a direct comparison of the techniques applied at Areas A and B. The surveys of Area A show a clear correlation between techniques in some structures, with major walls visible in all approaches, whereas the off-grid structure appears most clearly in the resistivity and GPR data. This is potentially due to a different construction material or method, or due to differences in use of the structure. Similarly, the surveys in Area B highlight some similar features, but they also complement each other with walls and possible terraced structures identified in each plot alongside potential structural remains and post-use debris. These surveys have shown the potential of complementary techniques in the Patoma area at Vlochos, and more work could potentially yield significant insight into the architectural remains and overall use history of the site.

Cleaning operations in the Patoma area

During the 20th century, the site at Vlochos was subjected to several destructive interventions, mainly in the form of extensive quarrying of the rock-face at the foot of the hill. Seven modern quarries can be noted at the site, most of which appear to have been active around the middle of the last century. Following the discovery of ancient remains at one of the quar-

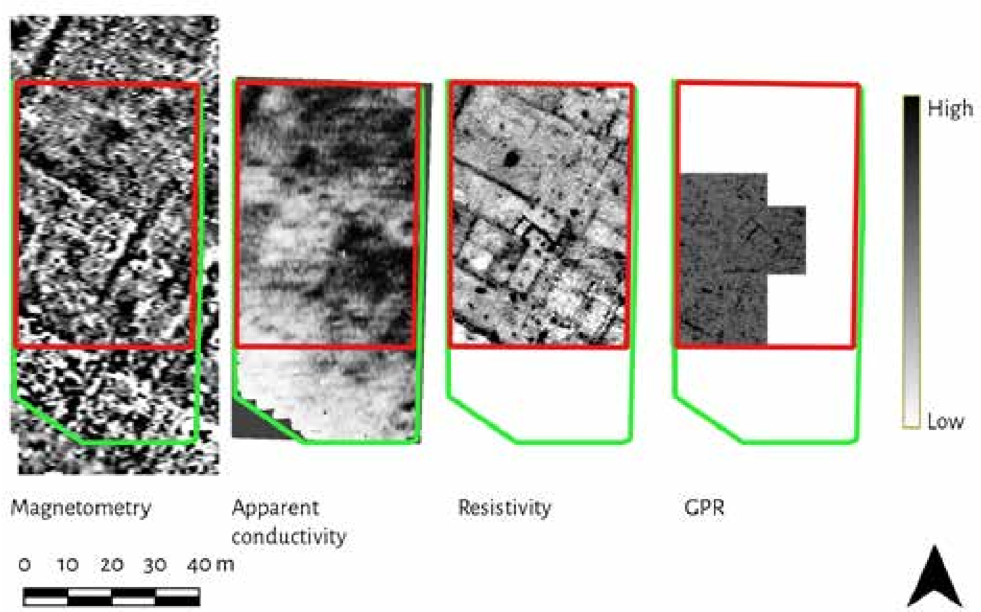

Fig. 7. Comparison of survey techniques at Area A. Red rectangle marks the extent of the resistivity survey, green polygon the extent of the conductivity survey. Plots by D. Pitman and R. Potter.

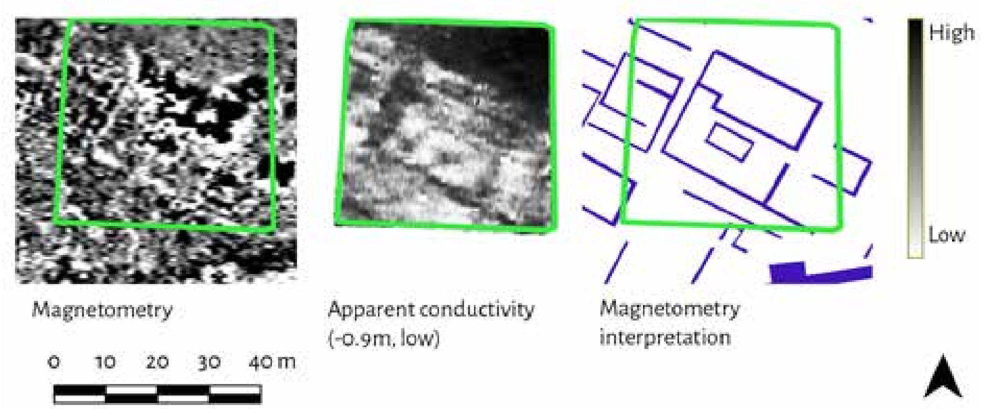

Fig. 8. Comparison of survey techniques at Area B, with interpretation of magnetometric results. Area marked with green corresponds to extent of conductivity survey. Plots by D. Pitman and R. Rönnlund.

ries in 1964,[10] all commercial activities were banned at the site and the quarries consequently shut down. Similar issues with quarrying within archaeological sites have been noted elsewhere in Thessaly,[11] constituting—together with mechanized agriculture—the largest threat to the archaeology in the region in the period following the Second World War.

Three of the quarries are located within the walled area of the Classical-Hellenistic settlement and appear in the aerial photographs from the 1960s of the site (A, B, and C in *Fig. 9*). The westernmost of these (A in *Fig. 9*), identified by a local informant as the quarry where four votive *stelai* were found in 1964,[12] is the largest and presents a wound-like cavity in the hillside (*Fig. 10*). To access the rock-face, a large amount of soil had been moved from in front of the quarry, probably (based on the topographic scarring) using bulldozers and mechanical excavators. This soil was massed in two heaps, one large and one small, just south of the quarry (*Fig. 11*), where it was left after the quarry had been abandoned. At the start of the 2016 campaign, we noted that the slowly eroding sides mainly of the large heap contained much pottery and fragments of architectural elements, with the latter also spread out on the ground in the surrounding area. These various artefacts caught our interest and led to our plans for a systematic examination of the soil in the heaps.

[10] Liangouras 1965; Vaïopoulou *et al.* 2020, 12.
[11] Most notably at Ghoritsa and New Halos, the latter of which was severely damaged by these activities. Reinders 1988, 13 (New Halos); Bakhuizen 1992, 30 (Ghoritsa).
[12] Liangouras 1965. This report names the quarry as being at Gekas (Γκέκας), which we have been informed is actually a location somewhat further to the east. The inscriptions were published in detail in Decourt 1995, 2–3 (nos. 2–5).

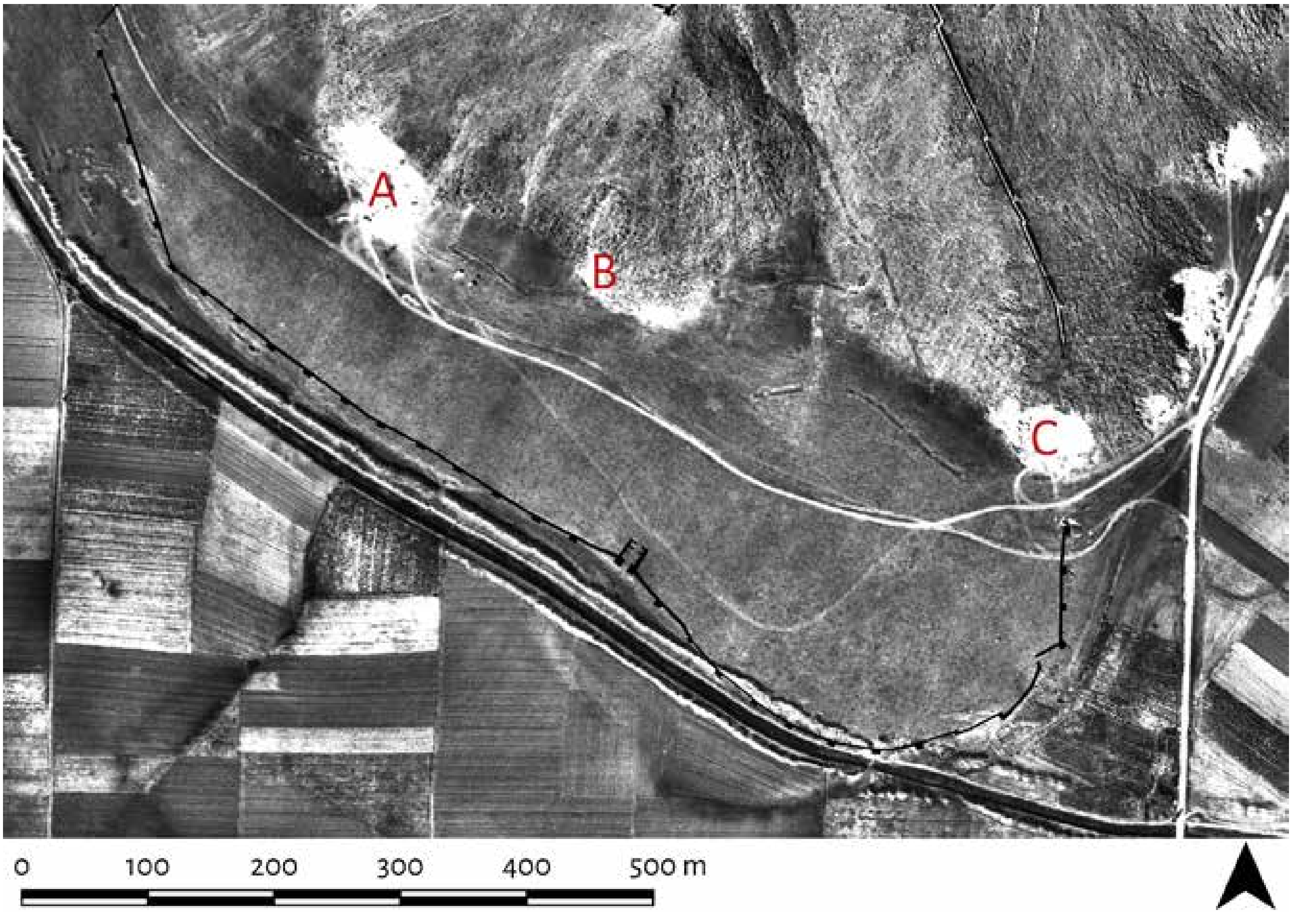

Fig. 9. 1960 NATO aerial photograph of the Patoma area, with reconstructed trace of Phase 2A and 2B fortifications. © The Hellenic Military Geographical Service. Graphics and rectification by R. Rönnlund.

The large heap (nearly 30 m in diameter and 3–4 m high) posed the greatest challenge due to its size and the large amount of stones mixed with its soil. The large-scale removal of the soil layers from their original contexts by the mechanical excavators and subsequent mixing on the heap, however, meant that all finds within the heap were all clearly *ex situ*, and there was thus no need for precise recording of find-spots, contexts, etc. A custom-made mechanical sieve had been acquired,[13] allowing for the quick separation of dirt from stones and artefacts. The sieve is easily powered by a small tractor, making it both efficient and movable (*Fig. 12*).

Using a mechanical excavator, the soil was first examined for larger stone artefacts before sieving operations began. One worker operated the tractor, while four archaeologists worked at the sieve, carefully examining the sieved soils and collecting finds as they were revealed.

Among the finds we recovered considerable amounts of pottery and broken tile, mostly dated to the Classical-Hellenistic and the Late Roman-Early Byzantine periods. These dates correspond to Phases 2A/2B, 3, and 4 of the settlement, as discussed in the previous publication.[14] Among the more rare finds were several fragments of sculpture of the Classical-Hellenistic period—including statuettes and votive reliefs—as well as fragments of three inscriptions, one nearly complete. The soils also contained additional fragments of monumental architecture in limestone and marble, similar to those found on the ground surface in the area. Together, the finds give the impression that the remains of a monumental building in stone—probably belonging to a sanctuary—had existed in the area prior to the destruction caused by the quarrying activities. The finds are now under conservation and will be presented in a future publication.

[13] Designed and custom-built by Mr Athanasios Bolorizos of nearby Markos.

[14] Vaïopoulou *et al.* 2020, 36–52.

Fig. 10. The westernmost quarry (A in Fig. 9*), seen towards north.* Ex situ *architectural elements visible on the ground at front. Photograph by R. Rönnlund.*

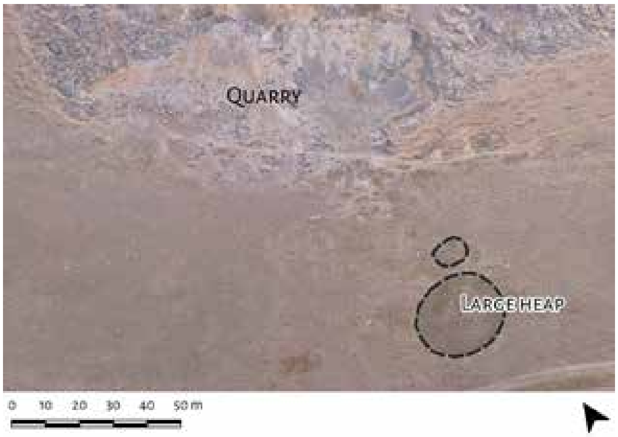

Fig. 11. Position of soil heaps at westernmost quarry (at A in Fig. 9*). Aerial photomosaic by D. Pitman and R. Potter.*

Fig. 12. The mechanized sieve system (nicknamed Ymir by the team) in its full set-up. Photograph by R. Rönnlund.

The soil also contained considerable amounts of modern rubbish, including tin cans, beer bottles, and pieces of broken machinery, all further supporting the modern date of the heap.

We aim at finishing the sieving operations during the coming field campaigns, and thus restoring some of the original terrain.

Concluding remarks

Due to the restrictions and cancellations caused by the COVID-19 pandemic, the activities carried out during 2020 should only be labelled as pilot studies in preparation for more extensive work. Despite limitations, they have shown great promise, and we hope that we can soon resume normal fieldwork activities.

Several tasks are planned for the coming field seasons, including a wide range of archaeological methods. The areas surveyed by the two new geophysical methods will be expanded, hopefully to cover the whole of the Patoma area. Targeted excavation will be conducted in the Patoma area (Area A in *Fig. 2*) in order to better understand the geophysical results, but also to access the stratigraphy of the buried remains.

Beyond the site at Vlochos, the multi-period fortress atop the Kourtikiano hill,[15] *c.* 4 km to the east, will be thoroughly examined through an architectural survey of the standing remains. In addition, a number of prehistoric tells (*maghoules*) will be surveyed by the magnetometry team, aiming at understanding the spatial extent and organization at these locations.

The enquiries into the local oral histories will continue, expanding to other villages in the area. The local population is ageing, and the recording of local memory is therefore pressing. In the long perspective, we would like to encourage the locals to record their own histories and memories, thus making them accessible on their own terms.

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[15] Decourt 1990, 120–121, 159–160, figs. 47–56.