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The Case of Akovitika»****SUPERVISING COMMITTEE:**

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1. Introduction

First of all, I would like to thank my thesis supervising committee members for all of their meaningful help through this process. The discussions, ideas, guidance, encouragement and feedback provided were not only necessary for the completion of this thesis but also invaluable. I would especially thank Professor G. Tsokas for his patience, his extremely useful comments, direction and bibliography which proved quintessential for this undertaking. Professor N. Zacharias's help, continuous support, insightful comments and constructive ideas were sine qua non for the realization of this thesis and thus I am grateful. I would also like to thank Dr. E. Militsi - Kechagia, member of the examination committee for her valuable time and corrections. Lastly I would like to express my gratitude to my parents for their ethical and material support, all these years and their belief in my aspirations and dreams, which I could not be without.

In this thesis, we are presenting a set of geophysical surveys that took place near the visible ruins of the Protogeometric temple of the sea god Poseidon, in Akovitika in the Municipality of Kalamata, on December of 2012 (Τσόκας *et all.* 2012). The name of the site is given after a suburb of the nowadays city of Kalamata and as a settlement it played a very important role during the Iron Age, despite the inhospitable conditions of the area because of the coastal swamps which brought mosquitoes and other noxious parasites. The purpose of this survey and research was the detection of estimated antiquities and their detailed mapping. In the following chapters we will analyze the methods and procedures that allowed this research to take place, and the processing of the raw data collected during the survey, as much as the interpretation of the data in a way that they would produce a meaningful and informative conclusion. The research was carried out by the Lab of Applied Geophysics of the Aristotle University of Thessaloniki in collaboration with the University of Peloponnese (Τσόκας *et all* 2012). The methods that were used were the Electric Field Mapping and the Electrical Resistivity Tomography, both of which along with the way they work, their principles and uses are going to be analyzed thoroughly. This research was not the first that was conducted at this area, as in 2005 the site was surveyed via geophysical methods, by Moritz Kiderlen and Petros G. Themelis (Kiderlen and Themelis 2010) It is worth mentioning here that multiple geophysical fields distortions were detected and recorded, indicating several underground structures and at least a fraction of them corresponds to ancient ruins. Of course it should be made clear that both the techniques were non-invasive and non-catastrophic for the structures and features that were examined. Furthermore we will assess the parameters of the present state of the ruins and propose solutions in order not only to reveal and preserve it but also to make it accessible to the public and establish it as a feature of the local and national history. A new set of photographs will be taken and some of them will be compared and contrasted, so all the differences will be revealed and recorded properly. Special attention will be paid on every individual part of the archaeological space so every proposed improvement will be

both detailed and the best possible one. Both excessive surveys and excavation will be proposed so in the future the settlement will be revealed in its entirety and presented to the scientific and archaeological community as well as the public as a whole and uninterrupted picture of the life and society of that era.

2. Historical data of the area

In the Akovitika area, near Kalamata, two Early Helladic II Megara were revealed, along with their corridors and traces of roof tiles and ceramics. Both of the Megara were built on a stone platform. Megaron A, the bigger of the two, comprised of two smaller rooms, surrounded by corridors and one of the rooms was divided by smaller spaces. The building was communicating with an open space at the north. The Megaron B is smaller in size but similarly laid out. Both sides of the building have corridors and it is probable that the roof was arced. It was comprised by two rooms as well, which were not equally sized. The corridors are interrupted by walls that provide support to small chambers at the western side of the structure. The eastern side of the building is still not revealed. These mansions were most probably used as residences as it is so indicated by the findings found inside them (Konstantinos Galanakis, 2017).

During some flood control works in 1968, at the river Aris, the ruins of the temple of Poseidon were discovered. At the same area, ten years prior to this discovery, bronze coins were collected dated at the ancient times. The Archaeological Service excavated the place and revealed the northern corner of a rectangular building with an atrium at the center of it. The building's roof was probably comprised of laconic type roof tiled some of which were engraved with letters indicating that the building was of public nature. Among the movable findings, there were miniatures of boats and sea related paraphernalia, indicative of sailor's offerings to Poseidon. Two ceramic fragments were found, proving that the sanctuary was dedicated to Poseidon during the Archaic (700- 480 B.C.) and the Classical times (480 – 323 B.C.) (Καλαμάτα, 2017).

Geophysical surveys of archaeological sites are a tool of extreme importance, contributing to the planning of excavations as they enable researchers to focus limited resources on areas where excavation is likely to be fruitful (Τσόκας *et all*, 2012).

It is a common place that the antiquities are foreign objects to the natural upper layers of the Earth, and as such they cause disturbances to the natural magnetic field of the Earth and also to artificially produced electric fields. These anomalies are detected and recorded by special instruments and sets and are processed through scientific procedures and are composed into maps that provide basic information of what lies underneath (Linford, 2006).

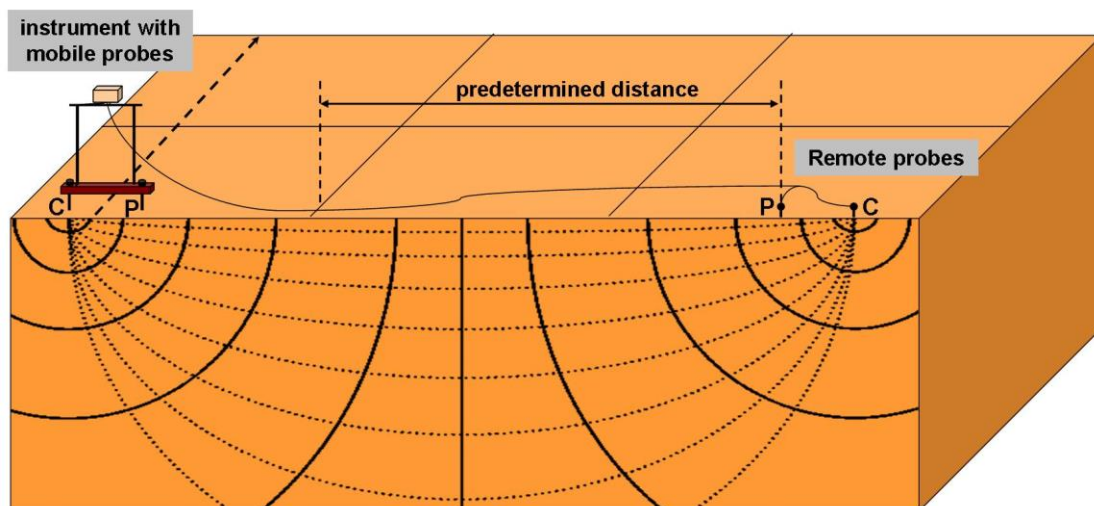
This survey method provides great help to the archaeologists who can that way reduce the time needed for the search of antiquities as they can focus their attention directly to the points of interest without consume time and resources searching and testing for

potential targets. The time and cost of such procedures is extremely low compared to that of the traditional non-technology based methods (Linford, 2006). Between available geophysical prospection methods the best is selected, depending on the place and its morphology that the technique is going to be applied, but also the characteristics of the given targets. After an extensive and meticulous visit on the examined space, the professors Nikos Zacharias and Grigoris Tsokas came out with the estimate that the Electric Field Mapping was the only appropriate solution for the task at hand. The professors also concluded on the pace of the spatial sampling would take place, the distance between the electrodes and the expected structures that would emerge, among other parameters. The use of Electrical Resistivity Tomography would be applied in a complementary level to the Electric Field Mapping. The reason for that decision is that, although the Electrical Resistivity Tomography is capable of penetrating the soil way better than the Electric Field Mapping and provides the operators with 3-dimensional pictures, the procedure of extracting the data is more time consuming and tiresome than the Electric Field Mapping (Τσόκας *et all*, 2012).

3. Mapping of Antiquities

The Electric Field Mapping method uses an electric current and inserts it to the earth through two electrodes. Then the voltage is measured and recorded with the help of two other electrodes. In this way we can have a measurement of the electrical resistance so we can calculate the value of the electrical resistivity of the given space. The value measured is called the apparent electrical resistivity because it alters depending on the geometry of the measurement array (Τσόκας *et all*, 2012). This occurs because the earth is non-homogenous and anisotropic (Montgomery, 1970). These resistances depend on the pores and gaps of the material that lies underneath because of the humidity that collects in these pores and gaps (Linford, 2006). Thus the resistances offer data that correspond to the quality of the materials (Monfort, 2013).

Although many different techniques exist for the placement of the four electrodes on the earth surface, in this particular survey the twin probe array technique (pic. 1) was used as it is the most common in archaeological surveys (Τσόκας *et all*, 2012). This array includes two pairs of electrodes from which one is stable and the other one is movable and used in a certain distance from the stable one. By moving the movable pair of electrodes to new positions consecutively, the operators can take samples of the electrical resistivity of these positions. Then by mapping the measured values a resistance distribution of the whole survey area can be provided (Monfort, 2013).



1 A schematic representation of a twin probe array (ETSU Geosciences Dr. Ernenwein's Research)

4. Electrical Resistivity Mapping

In order to perform the resistivity mapping, a square cell (grid) of 20X20 sqm is established on the ground surface. This provides the operators with flexibility and easier space management. Next, a grid is established inside the cell whose nodes are spread 1 or 0.5 m apart one from the other. The stable electrodes are placed in a frame, out of the grid, while the movable ones are positioned in a manner that the distance between them is steady, but not fixed. (Tsókas et al. 2012) These electrodes have to be away from each measured grid so their distance can be considered infinite (English Heritage, 2008). The operator moves towards parallel outings in a zig-zag manner, from one cell to another. If the operator runs out of cable as they distance themselves from the stable electrodes, the said electrodes are transferred to another position (Stierman and Brady 1999). This situation provides an extra difficulty to the calculation of the resistivity because the measurements are heavily affected by the surrounding area of both the electrode pairs. In order to re-calibrate the device, the operators leave the movable electrodes in a random cell and record the reading of that given area. Then the stable pair is moved so the continuity of the measurements is possible. The operators then adjust the distance between the stable electrodes, so the indication is the same with the one that was recorded, before the stable electrodes were moved (Tsokas et al. 2012).

The different arrays offer practical advantages such as speed, spatial resolution, light weight, increased depth penetration and so they vary in their suitability for rapid assessments of the changeable ground conditions. A high spatial resolution greatly improves the visualisation and detection of archaeological structures. As usual a compromise is necessary in order to proceed (Bonsall, 2014).

The advantages of the twin-electrode array are the speed of data acquisition in the field and the fact that the response is more simplified when traversing a buried

feature. Practical disadvantages though, include the frequent tangling of the remote electrode pair cable when operating over rough terrain (Linford, 2006).

Earth resistance survey can often identify ditches and pits besides stones, because they retain more moisture than the surrounding soil although not as easily as other techniques like the magnetometer (English Heritage, 2008).

The ancient ruins that are buried in the ground provide higher resistivity compared to the surrounding natural formation, and so they force a greater part of the electric current to move around them, because although longer, it is much easier for the current to penetrate the surrounding soil than the structure (Tsokas *et all*, 2012). Thus the beam-like way of the current from high voltage electrode towards the lower voltage one will be altered as there will be a lower current density and higher voltage scale. The voltage scale can be measured with the voltage electrodes and is expected to be higher on the surface of the buried structures (Monfort, 2013).

If the said structures on the other hand are less resistant than the surrounding soil, then the current penetrates them more easily so the current density is higher while the voltage scale is reduced. Ancient trenches and pits are also detectable and appear more conductive than their surroundings, providing negative indications.

5. Electrical resistivity tomography

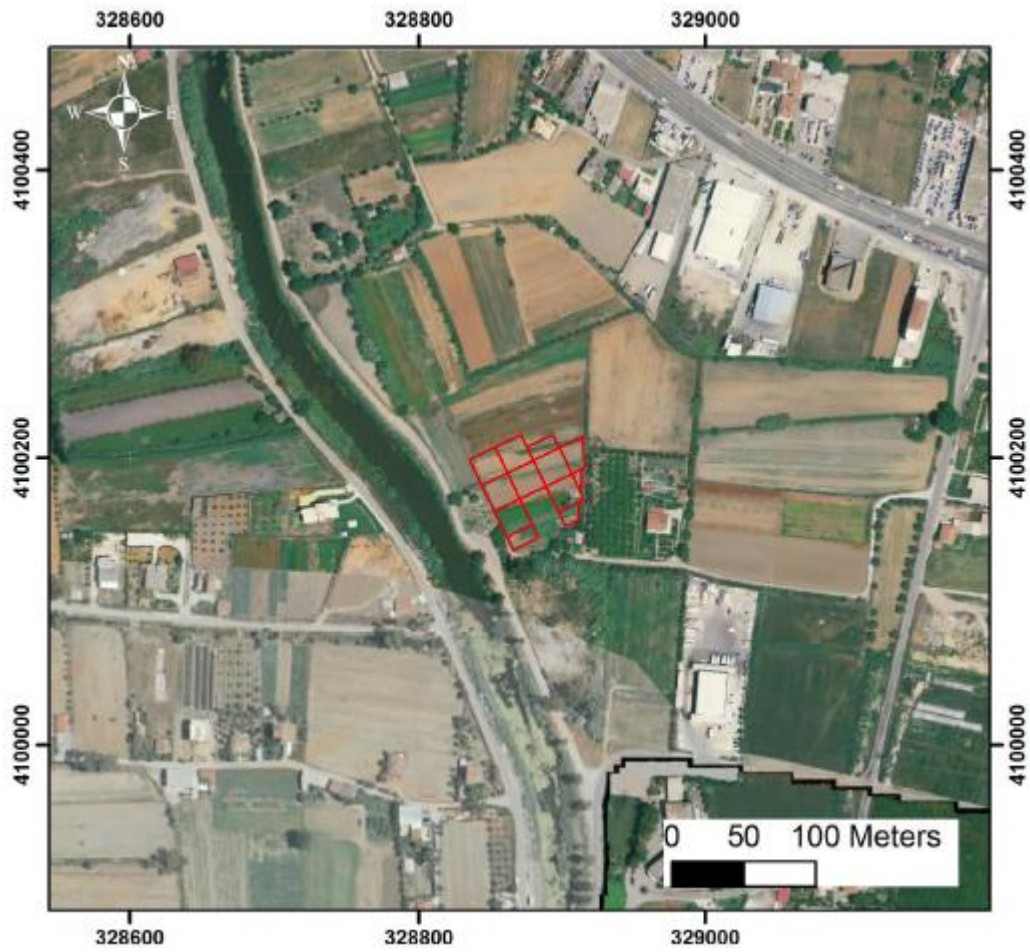
The Electrical Resistivity Tomography combines two traditional techniques: the routing and the sounding. This method retrieves information in a vertical and a horizontal way, thus providing a 3-dimensional result. One of the most important characteristics of the technique is the fact that it provides an excessive amount of measurements and as a result the capacity of this electrical method is increased (Daily, Ramirez, Binley, LaBreque, 2004).

Because of the high number of measurements, the electrodes cannot be moved manually but only through sophisticated automatic systems, that on the downside, increase the cost of the method (Bonsall, 2014).

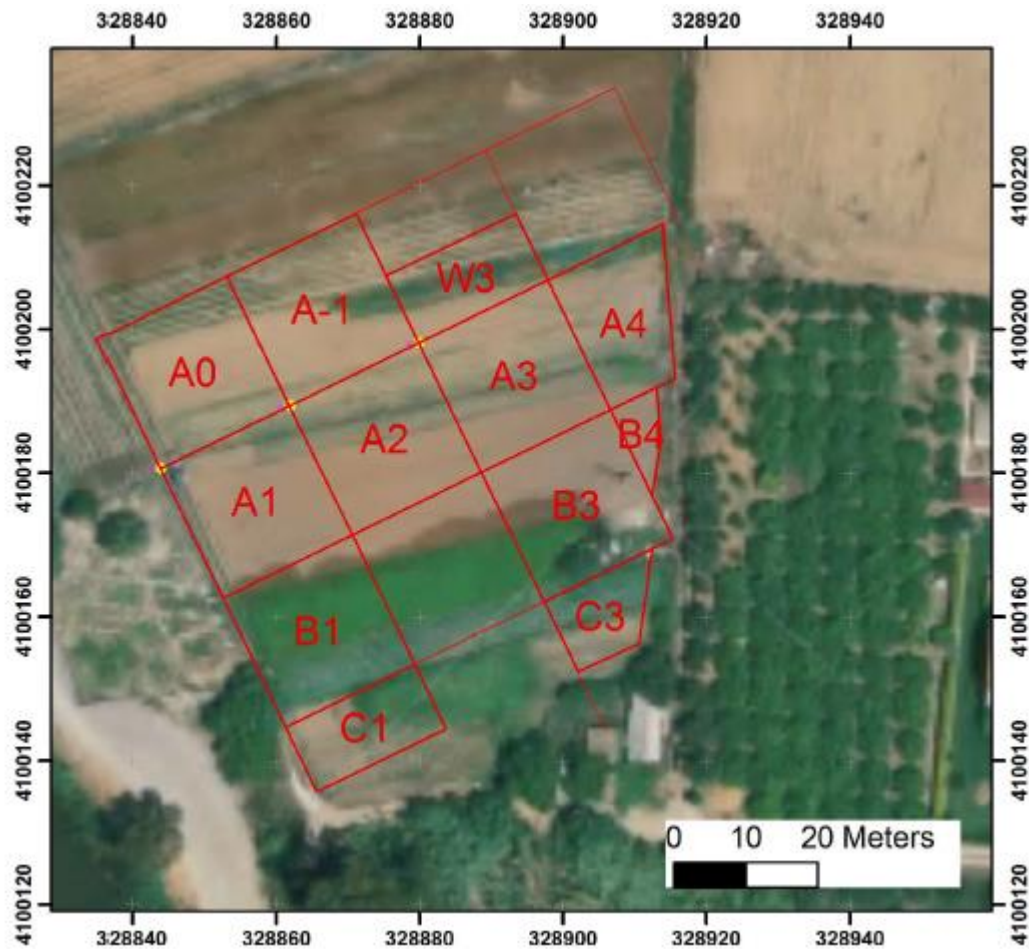
As far as the process of the data and their interpretation is concerned, the techniques that was employed was the Occam's inversion and the Tikhonov regularization in order to develop a model which can provide measurements as close to the real ones as possible and so to restore the real image of the underground (Τσόκας *et all*, 2012).

6. Electrical Resistivity Measurements

The area that the survey took place is shown in the pictures (pic. 2, 3) and as a background a satellite image of the Greek Cadaster is used. The area is positioned west of the city of Kalamata at a close distance of the shoreline. In the same area ruins of the Archaic and Classic temple of Poseidon have been revealed (Τσόκας *et all*, 2012).



2 The location of the survey (Τσόκας *et al.* 2012)



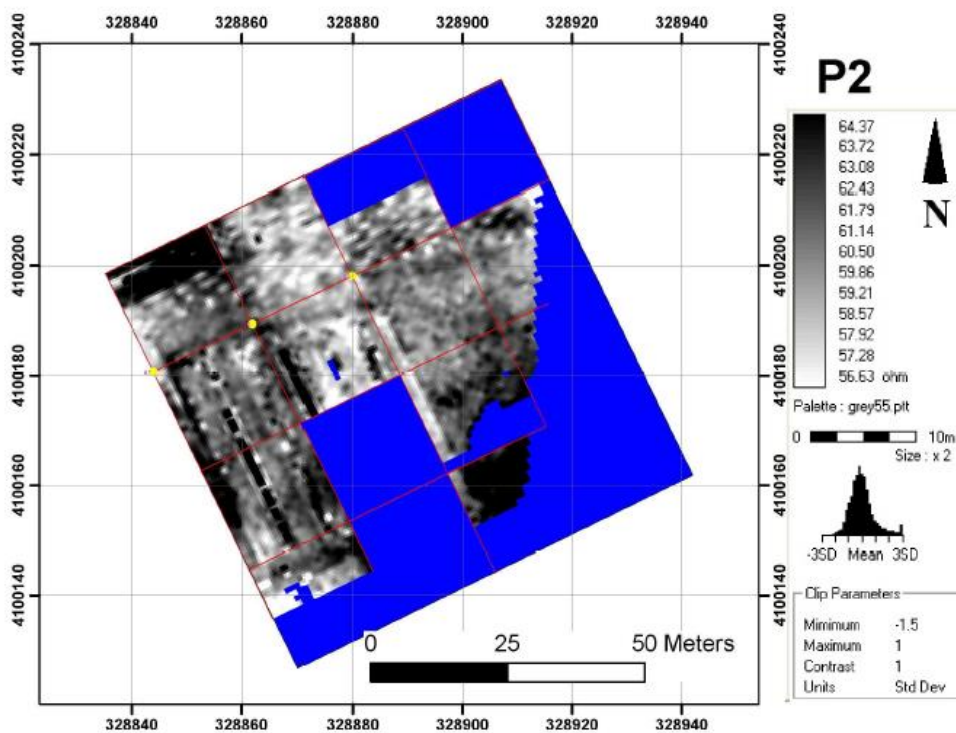
3 The location of the survey with the cells given code names (Τσόκας *et al.*, 2012)

The survey space was partitioned in square cells of 20X20 sqm each and the routings had one meter of distance from one another. This way the procedure can be faster and more flexible in order to avoid pieces of earth unsuitable for the technique such as spaces with vast vegetation or of rocky nature. The cells can be seen in (pic 5). The distance between the moving electrodes was set to 0.5 m, while the stable ones were set in a distance of at least 15 m away from the each measuring spot. The stable electrodes had a distance of 0.5 m between them. The measurements south of the cell A2 never occurred as the ground at this point was disturbed by a channel that had been opened sometime in the past and so what antiquities had ever been there were either badly damaged or destroyed. The channel had roughly N-S orientation and passed through the middle of the cells A1 and A2. Furthermore the removed soil from the opening of the said channel, was distributed to the rest of the fields around this area which were surveyed to no avail, probably because the fields had soil added on them at least two more times. All these features deemed any further examination of the parts of the cells A1 and A2, pointless. The measurements were partially checked and processed on the spot, while most of it was processed at the Lab of Applied Geophysics at the Aristotle University of Thessaloniki (Τσόκας *et al.*, 2012).

After the data was collected the following processing steps took place: The row data were modified into a F(x,y) grid and a local coordinate system was established. A compatibility check was run on the results while black and white maps were made so the antiquities can easily be seen. At last the whole model was put in accordance with the Greek Geodetic Reference System '87 (Τσόκας *et all*, 2012).

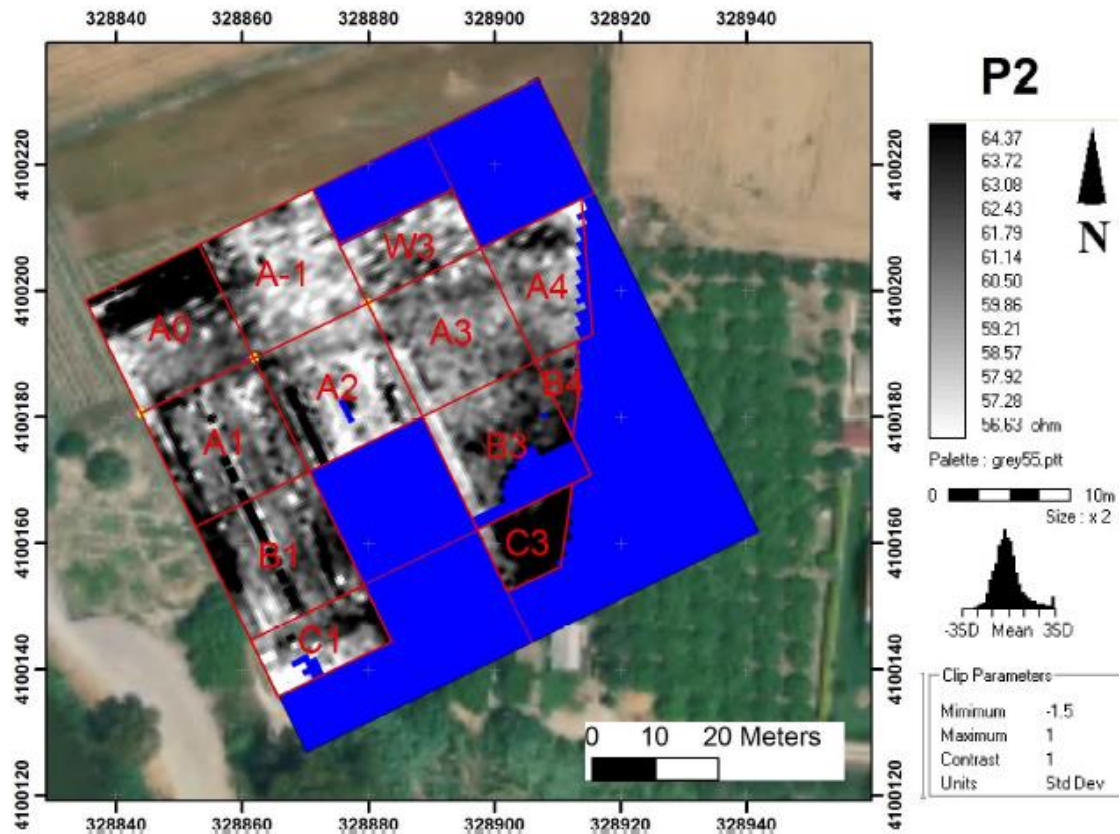
7. The results of the Resistivity Survey

In the pic 4 we can see the distribution of the electrical resistance on the examined field. The presentation is done in hues of gray color in the following manner. All the resistance values that are higher than the Standard Deviation are presented in black, while all the ones that are lower than the threshold of 1.5 of the standard deviations are presented in white. All the rest (-1.5 SD, 1.0 SD) are presented in gray hues, darker moving to higher values.



4 The area examined by Resistivity Mapping (Τσόκας *et all*.2012)

In the pic 5 we can see the same distribution like in the previous picture (pic. 4) but the cells have been given names in order for them to be possible to be referenced.

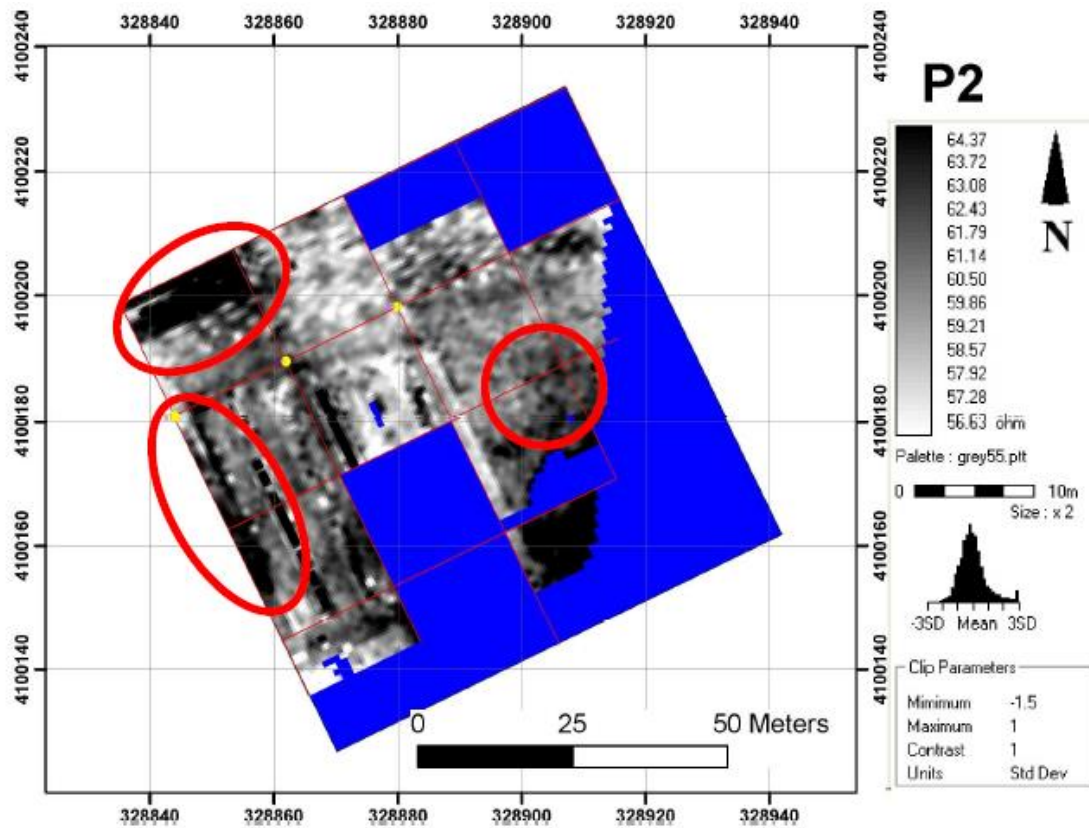


5 The examined area with the code-names corresponding to different spots (Τσόκας *et al.* 2012)

As we can see, the map presents a series of high value anomalies which correspond with the presence of structures underground. Given the fact that the survey took place on sandy soils at a period of time where the soil was very humid, mild resistivity was expected, while the pikes correspond to subterranean structures. It is possible that these structures correspond to ancient structures. The problem occurs with the orientation N-S of the bulk of the anomalies which is not relevant with the orientation of the ruins of the Archaic and Classic period that are in close proximity to the survey fields. Furthermore this orientation corresponds with the modern structures of the fields, such as scaffolds, trenches and irrigation systems that refer to the modern agricultural uses of the fields. It is noteworthy that the anomalies are highly positive, which corresponds with a near surface position of the structures. This situation is probably linked to the modern day channel mentioned above (Τσόκας *et al.*, 2012).

The western side of the examined area though, the border of which is attached to the barrier including the ruins of the temple of Poseidon, is presenting positive anomalies that are related with the ancient ruins and probably connect with them. These anomalies do not seem to proceed eastwards and this is interpreted either as indicative of the non-existence of structures at less than 1 m deep, or of the destruction of any possible structure on that certain spot. At the north-west corner of the area that was examined, a strong positive signal was taken that could not be interpreted by mere electrical mapping data. At the eastern part of the examined area, near a well

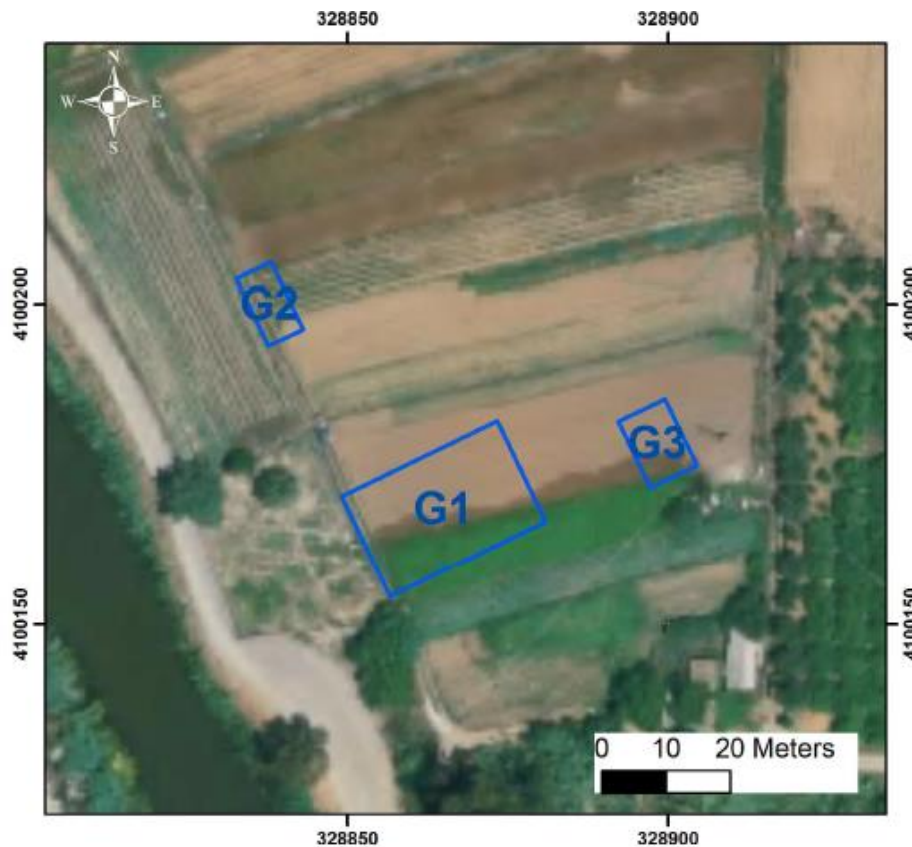
positioned there, more positive anomalies were detected the direction of which is the same with that of the temple ruins. These anomalies have the shape of rectangular masses which correspond to buried edifices and maybe are correlated to the temple itself. After further processing of the acquired images, this conclusion came out stronger but no other information was able to be obtained. The following picture (pic 6) is a map with three distinctive areas marked as potential targets (Τσόκας *et all*, 2012).



6 All the three sites where resistivity anomalies, potentially corresponding to ancient structures were detected (Τσόκας *et all*. 2012)

8. Electrical Resistivity Tomography, processing and results

Electrical Resistivity Tomographies were performed on the positions marked on the following map (pic. 7)



7 The places chosen to be examined with the Electrical Resistivity Tomography Method (Τσόκας *et al.* 2012)

The choice of these positions was made through the resistivity distribution maps, the positions that were probable to contain architectural targets. The survey was performed with these parameters in mind: The space of interest was next to unearthed ruins and it was known for the presence of modern day human activity in the past and thus the researchers could not expect homogeneity in the results. The increasing depth, in which the buried structures were placed, was a negative parameter as the machinery was limited proportionally to the depth increase. The smaller features are obviously harder to detect and in many cases “invisible” to the machine. In this particular case the survey was set in a way that the machinery was giving adequate results for small structures for at least 3 m deep. The chosen array of the electrodes was the dipole – dipole one in order to keep the noise at a minimum in relation to the signal and an adequate detecting capability to the fluctuations of the resistivity (Τσόκας *et al.*, 2012).

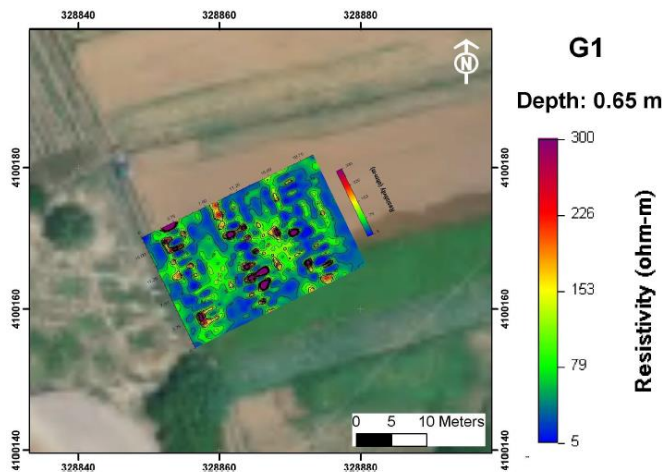
In the process of acquiring data, the distance between the probes remains the fixed, while the same routings are performed repeatedly for different depths each time. In the following pictures we can see an inclusive plan of the performed tomographies. 52 tomographies were performed from which 28 on the G1 position, 17 on the G2 and 7 on the G3 position.

The parameters of each position are the following: The distance between the electrodes is 0.75 m for G1, 0.5 m for G2 and G3. The distance between the power

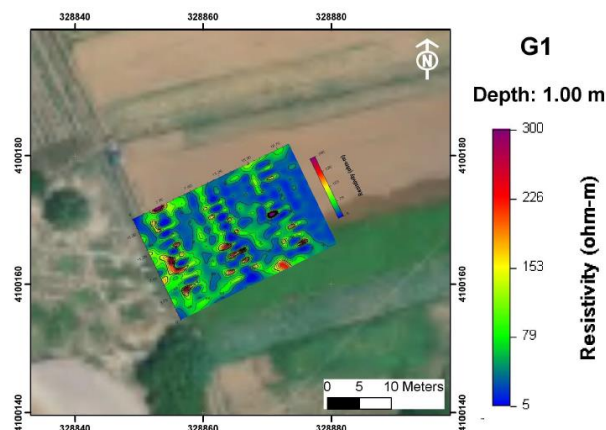
electrode and the measurement dipole was set so the deepest point of detection was 3 to 4 m for the G1 position and about 3 m for G2 and G3. The doubling and tripling of the voltage dipole was also performed. The inversion techniques were employed. They produced small error RMS (1.5-3%) although the quality of the soil produced much sound and some of the measurements had to be discarded for that reason (Τσόκας *et al.*, 2012).

9.1. G1 Position

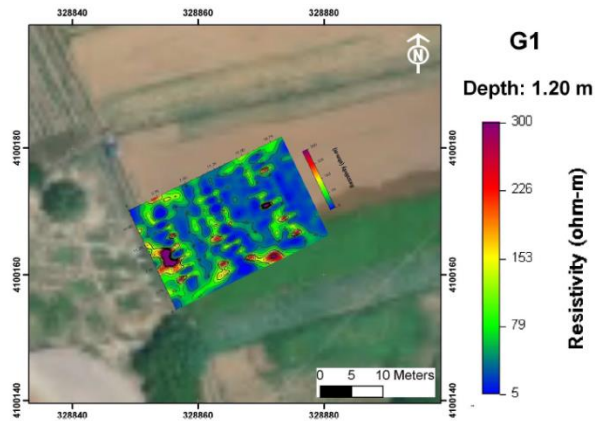
The tomography results can be seen in the following maps (pics 8-15) in the form of trenches of the same depth. The resistance values are depicted according to their magnitude of the rainbow scale as a result the subterranean structures are pictured with warm colors as places of high resistivity, contrasting the surrounding areas (Τσόκας *et al.*, 2012).



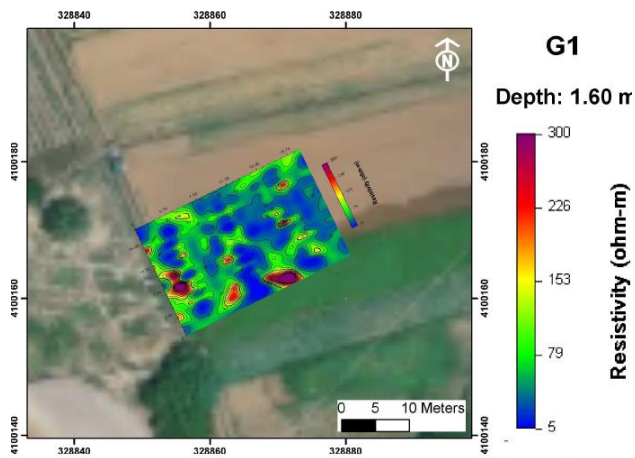
8 The G1 position examined at 0.65 m depth (Τσόκας *et al.*, 2012)



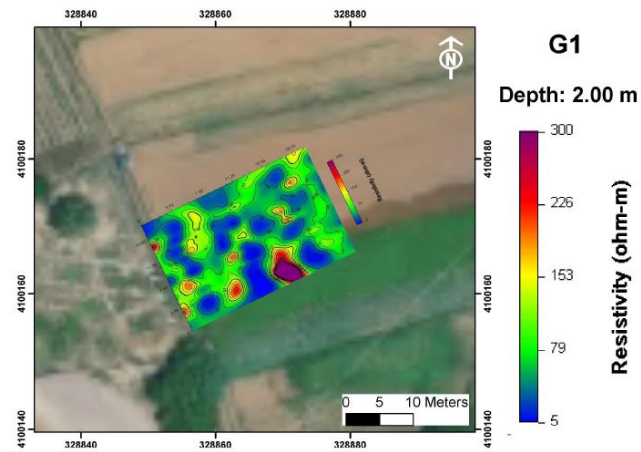
9 The G1 position examined at 1 m depth (Τσόκας *et al.*, 2012)



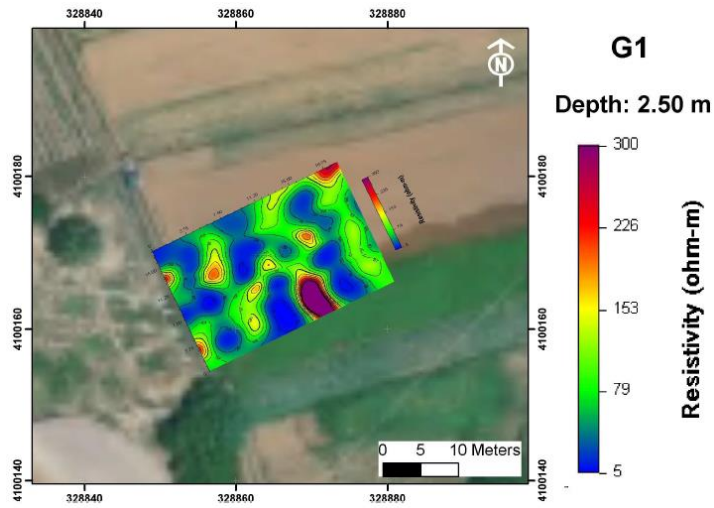
10 The G1 position examined at 1.20 m depth (Τσόκας *et al.* 2012)



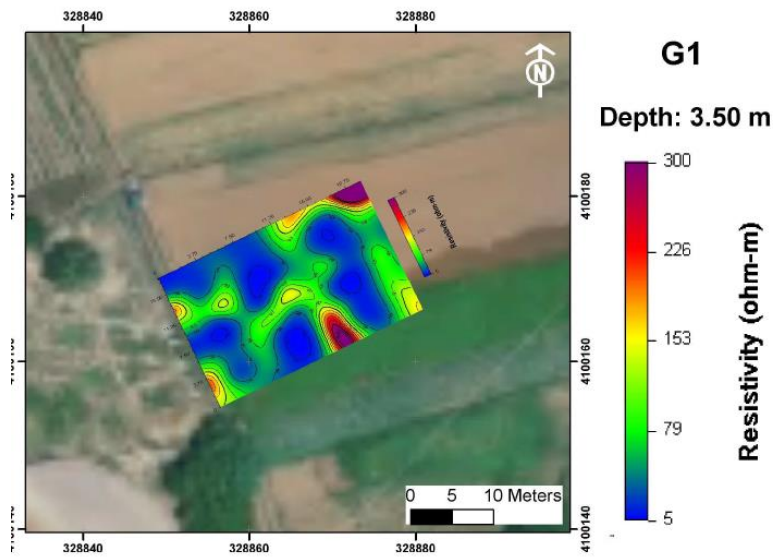
11 The G1 position examined at 1.6 m depth (Τσόκας *et al.* 2012)



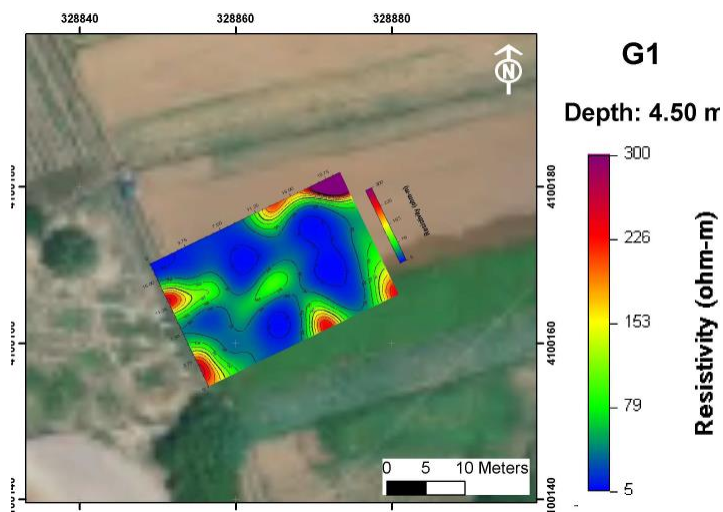
12 The G1 position examined at 2 m. depth (Τσόκας *et al.* 2012)



13 The G1 position examined at 2.5 m depth (Τσόκας *et al.* 2012)



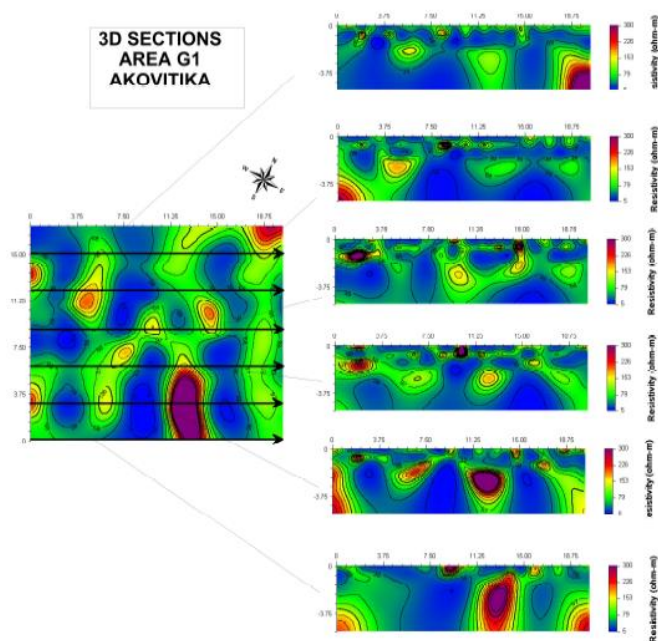
14 The position G1 examined at 3.5 m depth (Τσόκας *et al.* 2012)



15 The position G1 examined at 4.5 m depth (Τσόκας *et al.* 2012)

From the depicted distributions, the ones that refer to the near-surface layers (0.65 m) (pic. 8) are full of small sized positive anomalies, due to the scattering of the ancient material but also the modern one to the surrounding ground. From the 0.65 m point on, anomalies of high resistance appear without any distinctive shape or resembling to a notable structure. Among those anomalies, especially a horizontal trench 1.20 (pic. 10) to 1.60 deep (pic. 11), there are some at the south part of the examined space, that have E-W and N-S orientation, same as the ones of the ruins of the temple (Τσόκας *et all*, 2012).

Positive anomalies of great magnitude are shown at the southern side of the resistivity distribution maps from the depth of 2 m onwards (pic 12) which might correspond to ancient structures although not for sure. One of those is positioned at a distance of 11.5 m away from the limits of the archaeological site and is standing out providing higher values of resistance. This anomaly occurs in other trenches as well and especially in one that is 1.60 m deep (pic. 11). Some of the vertical distribution images are given (pic 15) and as background a horizontal trench with 1.20 m of depth is used. These pictures are complimenting the interpretation of the tomographic data providing the sense of depth in which the findings take place (Τσόκας *et all*, 2012).

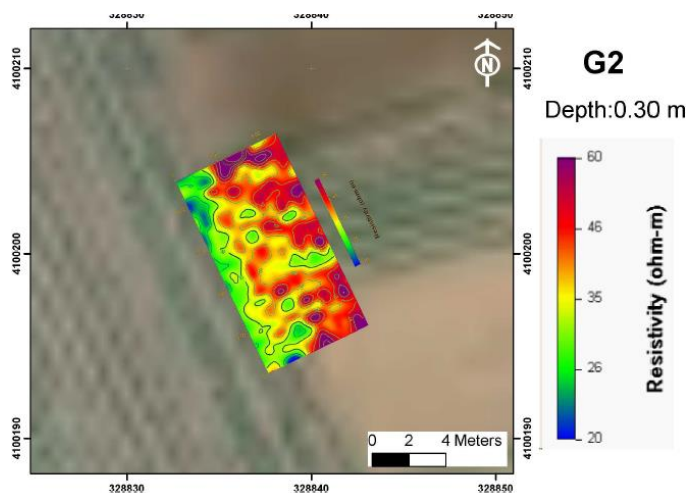


16 The G1 position as shown using the vertical distribution technique at the depth of 1.2 m (Τσόκας *et all*, 2012)

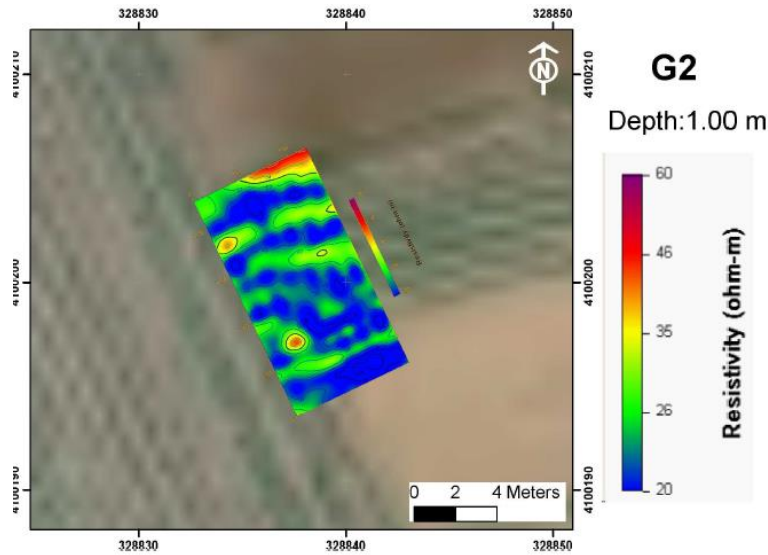
It is apparent that the highly positive anomaly that is noted at the southern part, aforementioned, starts at the depth of 1.50 m depth approximately and combining this information with the rest of the data it is highly possible that is due to ancient structures (Τσόκας *et all*, 2012).

9.2. G2 Position

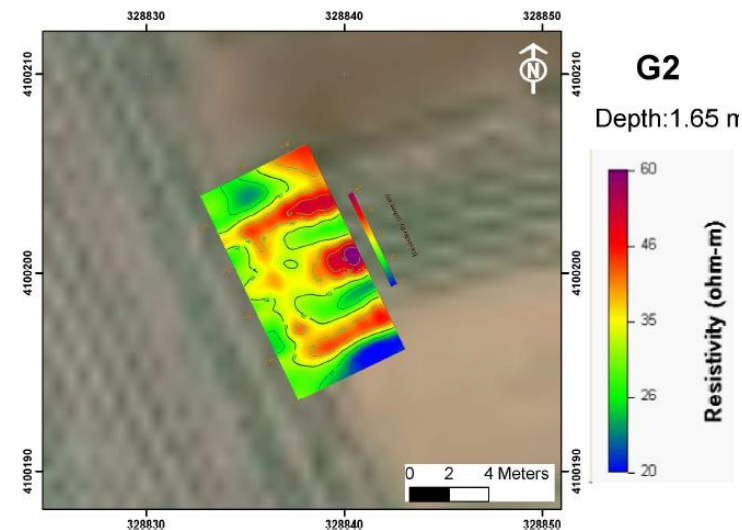
In the following pictures (pic 17 - 19) we can see the results of the inversion of the resistivity data in the form of horizontal trenches. It is shown that the small sized positive anomalies are abundant until the depth of 1 m (pic. 18). This is probably the result of the lack of cohesion of the soil and the presence of debris. At 1.60 m onwards though (pic 19), some linear-patterned anomalies appear, with a SW-NE orientation, forming an almost rectangular shape. It would not be without reason the fact that this shape can be indicative either of an ancient structure or of modern day human activity remains, such as buried irrigation systems that are no longer visible. In the shape (pic. 19) at the depth of 1.65 m, we can see three extremes of high resistances and that these are responsible of the rectangular shape mentioned above. These high resistances though, are continued at depths of more than 3 m. This leads to the conclusion that if these high resistances are indicative of an ancient structure, then the ruins are extended at these depths and the embankments are extremely large. On the other hand the possibility that modern day activity is responsible for such signals cannot be excluded (Τσόκας *et al.*, 2012).



17 The position G2 examined at 0.3 m depth (Τσόκας *et al.*, 2012)



18 The G2 position examined at 1 m depth (Τσόκας *et al.* 2012)

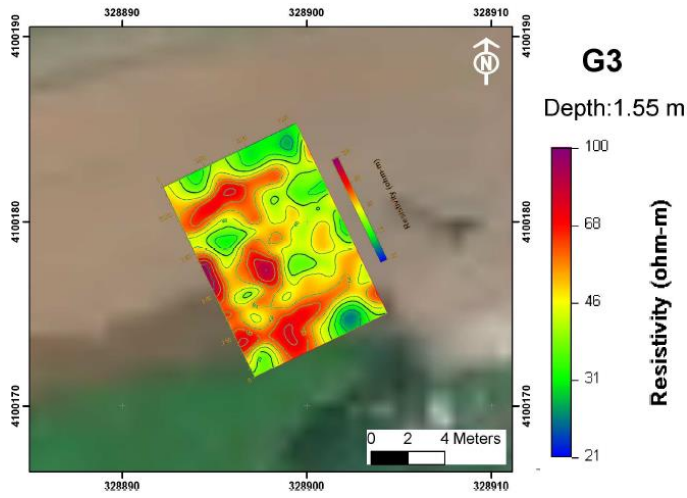


19 The G2 position examined at 1.65 m (Τσόκας *et al.* 2012)

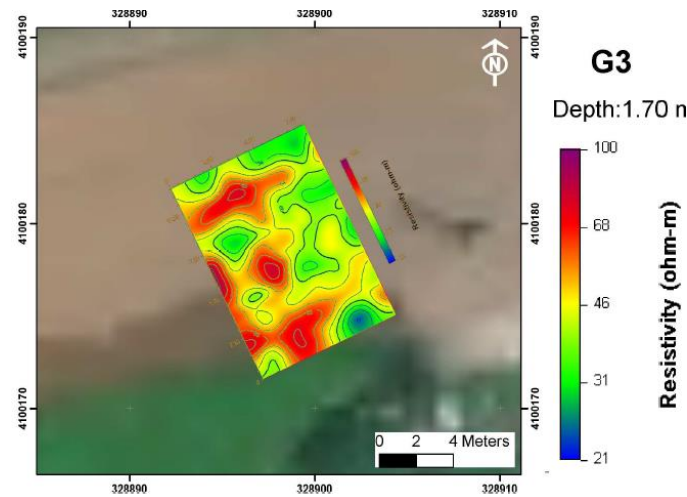
9.3. G3 Position

At the following pictures, we can see the results of the inversion of the resistivity data. As for the two previous positions, the resistances are classified by the colors of the rainbow, so the higher values are depicted with warm colors. Again we have the scattered high values of small shape because of the soil quality that we described earlier and this occurs until the depth of 1 m, From 1.30 to 2.30 m (pic 20-22) though many linear positive anomalies are occurring with an orientation SW- NE for some of them and SE-NW for the rest. These anomalies have a rectangular shape, which means that they are probably of manmade origin. Some of these anomalies are probably continuing further down, especially the northern one. The picture (pic 22) provides us with images of the vertical resistivity distribution at the depth of 1.70 m. These images provide us with a relatively high resistivity layer at 1 m until

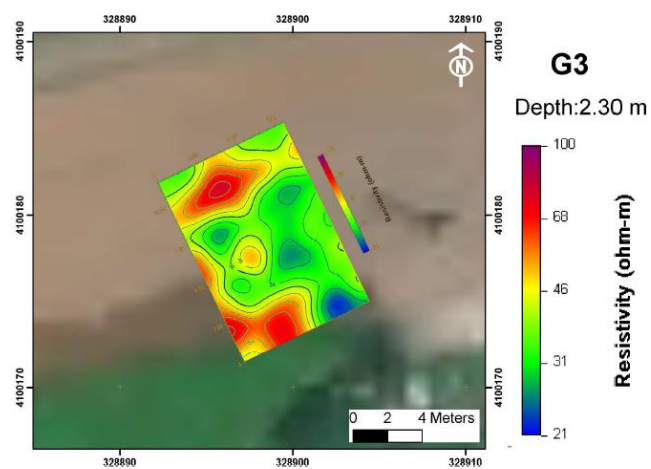
approximately 2 m deep, while anomalies of high magnitude of the northern and southern limit are extended at greater depths (Τσόκας *et al.*, 2012).



20 The G3 position examined at 1.55 m depth (Τσόκας *et al.*, 2012)



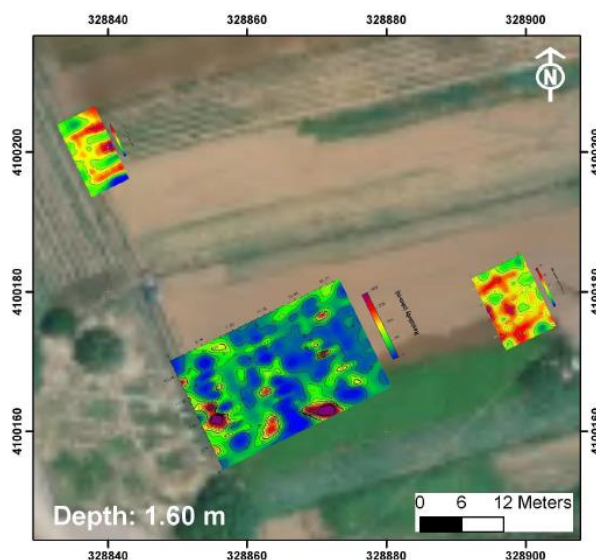
21 The G3 position examined at 1.70 m depth (Τσόκας *et al.*, 2012)



22 The G3 position examined at 2.30 m depth (Τσόκας *et al.*, 2012)

10. Survey Summary

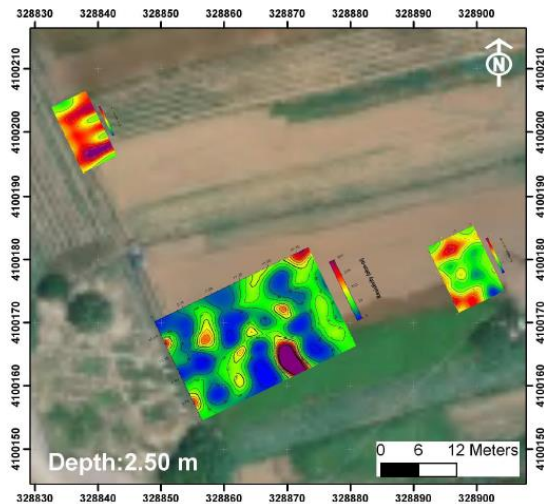
As described earlier, the Resistivity Mapping and the Electrical Resistivity Tomography, of the area eastern of the temple of Poseidon, revealed many anomalies in the resistivity distribution in the subterranean, which form rectangular shapes and linear shapes. The Resistivity Mapping technique revealed features that morphologically could signify ancient features, but their orientation does not agree with the one of the excavated buildings (pic. 5 cells A1 and B2). The orientation of some other features though corresponds to the orientation of the ruins and in some cases we can conclude that they are indeed ancient structures. In the following pictures (pic 23- 25) we can have an inclusive image. These conclusions though, cannot be validated as excavation data and test trenches are needed. A future systematic excavation can be proven very useful, shedding some light on what really lies underneath (Τσόκας *et all*, 2012).



23 The survey results in whole picture possible structures at G2 and G3 positions at the depth of 1.6 m (Τσόκας *et all*. 2012)



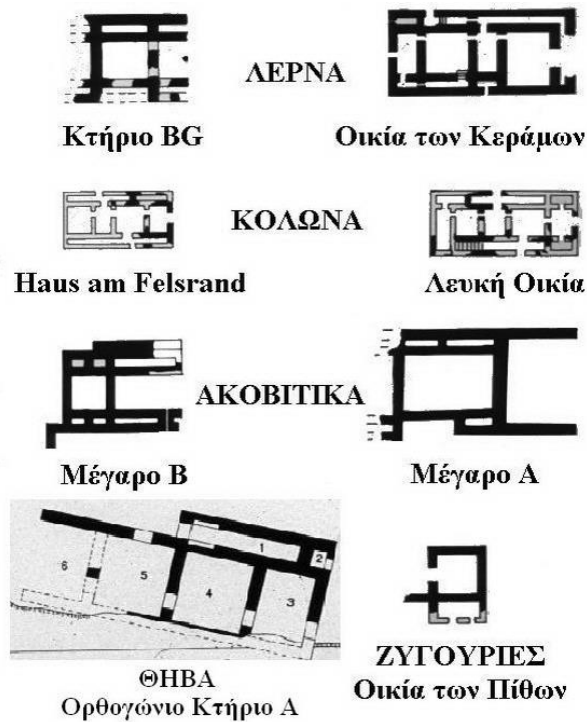
24 The whole picture of the possible structures at the depth of 2 m (Τσόκας *et all*. 2012)



25 The whole picture of the possible structures at the depth of 2.5 m (Τσόκας *et al.* 2012)

11. Suggested Excavations, Researches, Problems and Solutions of the Archaeological Site

As we saw earlier, while the G1 position remains problematic because of the number of factors that were examined earlier, the geophysical research results of G2 and G3 positions are more than indicative of what lies hidden underneath. While at the G1 position test trenches and systematic excavation research is the only way of finding out if there are structures underneath and of what quality or quantity these structures are of, at the positions G2 and G3 the situation is much more clear and it leads us to the conclusion that the structures revealed, correspond, almost without a doubt, to the plots of ancient structures of the same time period as the one of the temple of Poseidon. The positions of the potential structures, as much as their orientation, contribute to that conclusion. Even more gravity to this conclusion there is, if we compare the results to a plot of an actual building of that era such as the buildings presented on the (pic. 26). It is note-worthy that Megara A and B in the said plot (pic. 26) are from the area of Akovitika, making this assumption more valid.



26 Buildings from the Early Helladic period (Konstantinos Galanakis, Archaeology and Arts)

As an important settlement of that era, it is essential to reveal the boundaries of it to a satisfactory level, even if the option of revealing it to its entirety is unfortunately not a vital option, due to economical and other reasons. Revealing the hidden structures preoccupies the use of geophysical methods, in order to specifically map the possible spots of interest, and then proceed to test trenches and at last excavation. The most adequate and also tested option of geophysical examination for this specific case is the Resistivity Mapping and the Electrical Resistivity Tomography, as both have been employed to the field and yielded extraordinary results. After the conclusion and interpretation of the acquired results, the project would then proceed to excavate the points of interest, revealing the ancient structures and testing the machinery's accuracy. In parallel with these actions, research and geophysical surveys should be conducted in order to cover the area between the ruins of the temple of Poseidon and the ones of the Early Helladic buildings, found in close proximity to the temple. This area is covered by crop fields and vineyards, and so it will not be an easy task to complete the survey, let alone, excavate the place. However, the unification between the two sites is of utter importance, as such a project will not only give the Early Helladic settlement the true perspective of what it was, but also it will enhance the idea to the visitor and to the scientist, that these ruins are related and parts of the same settlement, giving a more inclusive image of the ruins and the society that produced them. It is worth noting that only a part of the ruins of the temple of Poseidon is uncovered by the archaeologists, as the rest of it lies beneath the road at the south and a vineyard at the north.

As we can see in the following pictures, the nowadays picture of the said ruins and their condition, although it must be mentioned that they are cautiously cleaned

systematically and at a regular basis, is disappointing, as they appear overlooked, rundown and deserted. Although the lack of funding is a substantial factor, especially in the resent economically pressured times, the main reason is the location of these ruins and the attitude of some people who systematically neglect the ancient ruins by throwing garbage at the vicinity of the ruins as they do not comprehend their importance (Eleutheria Newspaper, 2nd of June 2011).

Although picturesquely located next to the bank of the river Aris, which flows out of the village of Pidima, both the sites are too far from major roads or other landmarks and amidst crop fields and factory units. Furthermore the Early Helladic Megara are only accessible by an unmade road which is in a very poor condition. The same nature of the ruins, like the poor condition they are in, the lack of connection between them and the lack of sufficient explanatory plates, (there are only one at the temple of Poseidon and one at the Early Helladic Megaron, and they only indicate the names of the sites), contributes to the degradation of the sites.

Since there is a protective zone around the revealed structures and is in effect, in which no building or crop growing can be allowed, we can extend the research to the surrounding areas of the ruins and progressively excavate the whole settlement, unifying the two archaeological sites into one major site.

If the two places are unified, the whole area will be upgraded, as it would become an impressive and meaningful archaeological site, worthy of a visit by tourists and researchers and ultimately contributing to the local community as much to the archaeology. Furthermore, the site will be, that way, sufficiently and more adequately guarded, protecting the cultural heritage and the treasures of the area.

The artifacts of the excavation can be initially kept by the Archaeological Museum of Kalamata and then, by the time the excavations have been throughoutly concluded, they can either be returned to a properly built new local museum at the vicinity of the archaeological area, or remain at the Archaeological Museum of Kalamata. Then the most prominent and important ones can be replicated and exposed to the Akovitika area inside the archaeological site, in a predefined space, or even at the spots the original ones were found. This will preserve the identity of the space and will give the the visitors the sense of connection between the artifacts and their environment and the locals will be satisfied that the artifacts of their own area were not “taken” to the city museum away from them. The Archaeological Ephorate of Messenia is currently developing plans, pushing towards this direction and working on the solution of the issues mentioned above.

The ancient ruins as much as the surrounding environment, although are currently used as the base of educational and recreational tours and activities for every kind of visitor and of every age, these activities have to be enhanced and extended in a manner that they become an experience, not only pleasurable and memorable but also one of learning and enlightening. Guided tours and school excursions as well as

recreational treasure-hunts for children and even canoe trips along the river can be arranged and added to the site, in a way that promotes the archaeological site and points out its importance to the local history.

Special attention has to be paid on information plates and signs so the visitors will know the basic information of the site. Plates written in Greek, English and the Braille system along with miniatures of the most important buildings have to be installed for people with sight problems, as well ramps and special routes for people with mobility problems.

Enrolling the local community in the excavation and promotion process, will infuse them with a sense of identity and a strong feeling of pride and duty towards the monuments, and eventually the neglecting attitudes will cease, deeming the site protected, beneficial and instrumental to the society.

In the following pictures we can see the present day state of the archaeological site, its features and characteristics, so we can have a picture of how it is now in order to imagine, design and eventually, one day, make it a site which reflects its importance and true value to the visitors. In the pictures that follow (pic. 27 to 30) we can see the Early Helladic Megaron of the Akovitika area, which is positioned on the road that runs along the Aris River. In the picture 27 we can see the information sign that stands at the corner of the site as the visitor would look at it from the side of the road. In the pictures 28, 29 and 30 we can see the ruins of the Early Helladic Megaron. One can observe that only the basement of the building remains to our days, while there are no other informative signs to be found. The site presents signs of neglect as tree leaves and grass have covered a significant portion of the ruins making it hard, even for the trained visitor to make sense of it.



27 The Early Helladic Megaron, courtesy by P. Dellaportas



28 The layout of the site, courtesy by P. Dellaportas



29 The layout of the site, courtesy by P. Dellaportas



30 The site as seen from the side of the road, courtesy by P. Dellaportas

In the next set of photos (pic. 31- 34), we can see the Temple of Poseidon as it is today. Perhaps the most striking feature of this site is that it is not excavated and revealed in its entirety and so neither the visitor nor the archaeologist or the scientist can be provided by a conclusive picture. This problem is shown in an even more prominent way in the picture 31 in which we can see that the SE corner of the temple is not yet revealed entirely as well as the SW part of the temple. The ruins are also covered by grass but in this case tree leaves are less because the large trees are almost absent. The grass covering problem can be solved relatively easily, by covering the soil with gravel, which will prevent the grass from growing. It is a cheap and non-intrusive solution that has been employed to a number of monuments around the globe.



31 The Temple of Poseidon as seen from the vineyards at the north, courtesy by P. Dellaportas



32 The temple was a covered walkway building with an internal terrace, courtesy by P. Dellaportas



33 The site from the south-eastern corner of the Poseidon temple, the well with the sewage disposal channel can be seen at the center, courtesy by P. Dellaportas



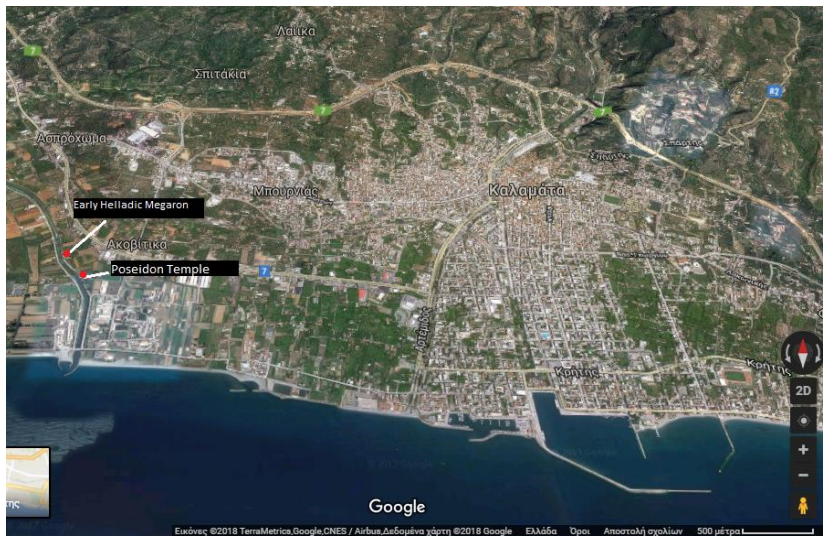
342 The view from the southern side of the temple, the inner terrace can be seen along with the well and its channel at the center, courtesy by P. Dellaportas

The Akovitika archaeological site (pic. 35, 36), can only present its true character and full potential as a monument, only in contingency to the other exceptional historical monuments and museums of the surrounding areas. Only then it can be conceived by the visitors as a part of continuous chain of structures and ruins that gave life and transformed the course of the local history. We chose to unify the site with the Ancient Thouria (pic. 37) archaeological site that lies at the north of the Akovitika site

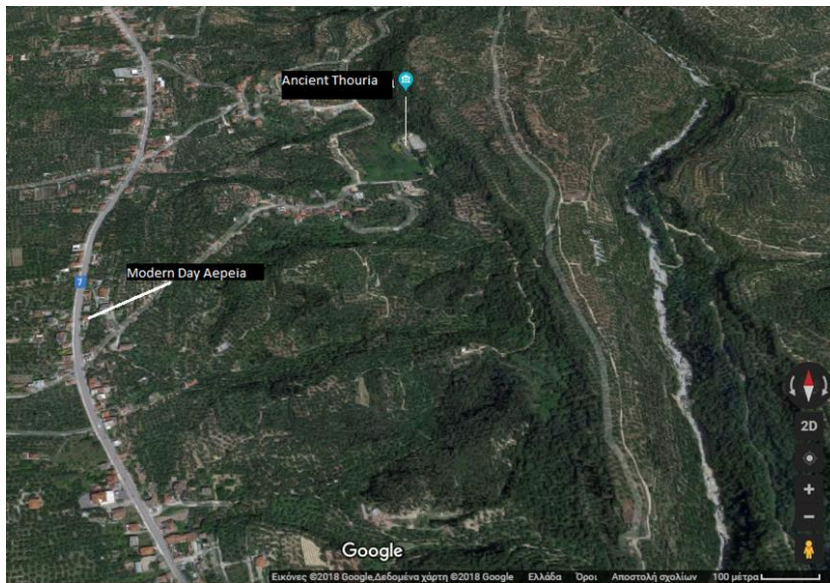
(pic. 39). Such unification will present the continuity from the archaic to the classical and Hellenistic period. Then the ancient Roman baths (pic. 38, 39), which have been found in modern day Anthia, will be added in order for the visitors to have a glimpse of the life and architecture in the roman period. Then the city of Kalamata must be included to the unification as it is the heart of the surrounding areas and the place that attracts the main body of the visitors. The museums the city has are relative to the sites we want to be unified and provide the visitors, not only with information about the findings and the history of Messenia, but also with educational programs that are extremely useful especially with the young ages. The Castle of Kalamata along with the other monuments of the city, being either from the Byzantine, Ottoman or the modern era, conclude the historical tour of the area, giving the visitor an enlightening and inclusive experience that highlights some of the most prominent and characteristic eras of the local history.. Furthermore the city provides communication and transportation to and from these sites so the visitors can easily be informed about and transported to these places. In the following pictures we can see the whereabouts of the areas mentioned above and the linkage between them (pic 39).



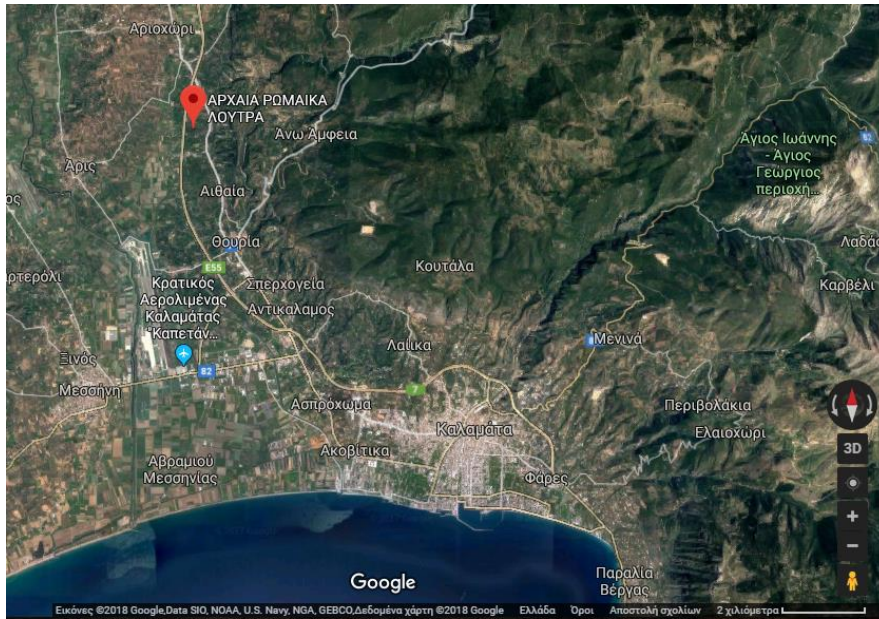
35 Akovitika, Google Earth



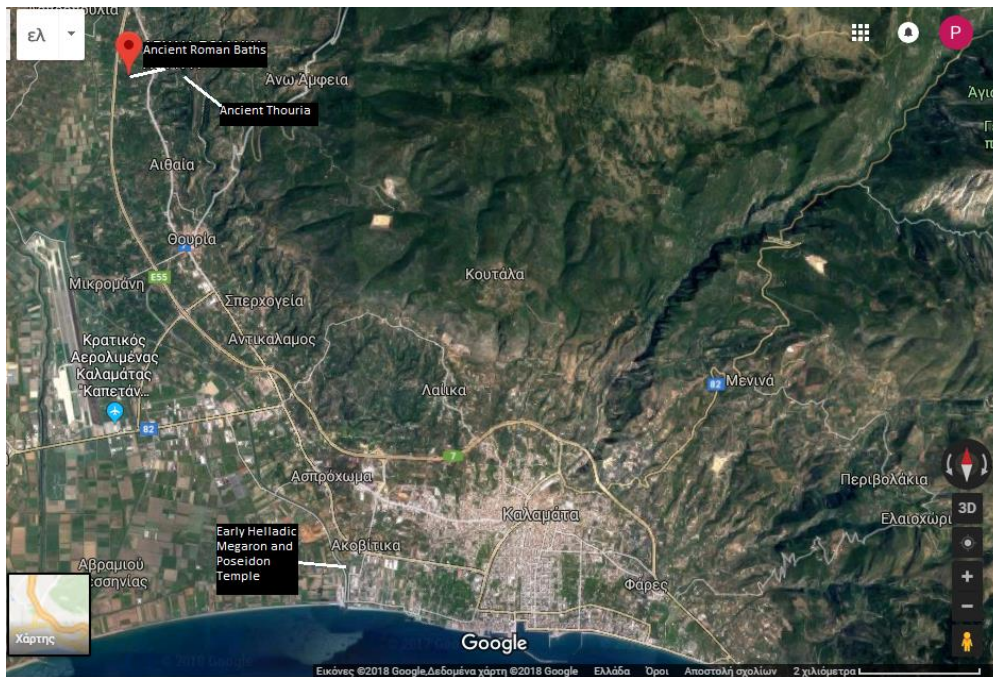
36 Akovitika and Kalamata, Google Earth



37 Ancient Thouria, Google Earth



38 Ancient Roman Baths and Kalamata, Google Earth



39 Akovitika, Ancient Roman Baths, Ancient Thouria and Kalamata, Google Earth

12. Conclusions

We can see now that the Resistivity Mapping and the Electrical Resistivity Tomography are two extremely valuable tools for research of stone structures in humid terrains. At this particular case they proved to be very useful as they revealed not only the position of the subterranean structures, but the quality of those, such as the plot and the orientation of the structures.

We analyzed that the G1 position is problematic and excavation is necessary in order to reveal whether or not there are hidden ancient structures underneath, as the position includes features from modern day interventions, which deem the situation complicated and non-conclusive.

The G2 and G3 positions are extremely helpful for us to understand the nature of the ruins that are positioned underneath. We can clearly see plots in the results of the Electrical Resistivity Tomography technique and almost be sure that the structures correspond and are linked to the ruins of the temple of Poseidon and the Protohelladic mansions found in close proximity.

Furthermore, we made suggestions as to how the sites should be unified in order to preserve their connection and pass the idea that the temple was a functional feature to the settlement and the mansions. We discussed about the excavations and the need to be extended to the boundaries of the settlement and how useful it would be to apply the same techniques that were applied at the two times the site was geophysically surveyed. Last but not least, we mentioned the fact that if these procedures occur, not only the archaeologists and scientists will be benefited by the valuable information that is going to come out of the project, but the local society is going to be benefited as well, as it will develop an interest of the local history and the past of their area, as well as a piece of identity for themselves. Additionally, the interest of people outside the local boundaries is going to prove economically practical as the visitors will combine the natural beauty with the ancient ruins and will contribute to the preservation and management of the archaeological site. Lastly we introduced the surrounding areas that present historic and archaeological interest, so the visitors can be provided with an all-inclusive overview of the history of the city of Kalamata, in a way that points out the continuity of the settlements and their distinctive monuments, made by a variety of different civilizations throughout the centuries.

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