

VISVIKI-MAGULA/VELESTINO

GeosSat Research
IMS-FORTH

DIE DEUTSCHEN AUSGRABUNGEN 1941
AUF DER

VISVIKI-MAGULA/VELESTINO

**DIE NEOLITHISCHEN
BEFUNDE UND FUNDE**

VON
EVA ALRAM-STERN
ANGELIKA DOUSOUGLI-ZACHOS

MIT BEITRÄGEN VON
MAXIMILIAN BERGNER, FRANZ BERTSCH †, CAROLINE DÜRAUER,
ALFRED GALIK, HELMUT KROLL, ARETI PENTEDEKA,
ERNST PERNICKA, APOSTOLOS SARRIS UND MITARBEITER,
THORSTEN SCHIFER, GUNTER SCHÖBEL, KOSTAS ZACHOS

GRAFIK: MARION FRAUENGLAS



APPENDIX

MAGOULA VISVIKI FROM A GEOPHYSICAL PROSPECTION PERSPECTIVE

Apostolos Sarris,¹ Carmen Cuenca García,¹ Tuna Kalayci,¹ François-Xavier Simon,¹ Gianluca Cantoro,¹ Jamieson Donati,¹ Meropi Manataki,¹ Konstantinos Vouzaxakis,² Vaso Rondiri,² Polyxeni Arachoviti,² Kaliopi Almatzi,² Despina Efstathiou,² Evangelia Stamelou²

INTRODUCTION

Magoula Velestino 4 – Visviki is located on a flood plain at the foot of Mount Chalkodonion and to the south of Lake Karla. The Lake used to be relatively shallow in the past resulting in various flooding episodes during the Neolithic but also in the later periods. The magoula extends over an area of about 200 × 200 m which is cultivated by cereals and corn. At the top of the magoula where most of the concentration of sherds is noticed, there is also a geodetic base of the Geographical Service of the Army. There are not any obvious architectural remains on the surface of the magoula. When surveyed for the first time in 1941, Magoula Velestino 4 – Visviki was reported to be about 7 m in height and 200 m in diameter (Afram-Stern, this volume) – similar to what we notice even today –, which according to Johnson and Perlès (2004) it is one of the smallest magoules of Thessaly.

SATELLITE REMOTE SENSING & HISTORICAL AERIAL SURVEYING

In order to explore the environs of Magoula Visviki, a GeoEye-1 image from 4 May 2010 was used (Fig. 39). The image had an off-nadir angle of 9.9° and a ground sampling distance (GSD) of 0.50 m (panchromatic) and 1.81 m (multispectral). In addition to the satellite imagery, an aerial photograph from 26 August 1960 was used with a scale of 1:15,000. The environment around Velestino 4 (Visviki) consists of more or less flat agricultural fields that rise gradually toward the west beyond the National Road (500 m away) and the town of Velestino (2.5 km away). Various streams, irrigation channels, and roads leading to Volos pocket the terrain. Several other prehistoric settlements are located in the same area, including Magoula Nikonanou (800 m to the northwest), Magoula Velestino 3 (Mati) (1.8 km to the west), and Magoula Bakalis (3.1 km to the southwest). Elevations around Velestino 4 (Visviki) range from 60–70 masl.

The local environment and land use around Velestino 4 (Visviki) have changed during the second half of the 20th century following intensive farming activities and industrialization. Field boundaries and field orientations are different in the 23 August 1960 aerial photograph than they appear in the 4 May 2010 GeoEye-1. During the 50 year interval, the landscape has been heavily altered to include industrial facilities, a military base, and the National Road. Moreover, the 23 August 1960 aerial photograph documents streams and river beds that are no longer a part of the landscape. In 1960, two rivers passed 200–300 m from the prehistoric tell at the north and south. Now these rivers

¹ GeoSat ReSeArch Lab, Institute for Mediterranean Studies, Foundation for Research and Technology, Hellas (F.O.R.T.H.), Greece, asaris@ret.forthnet.gr.
² Hellenic Ministry of Culture, Education and Religion Affairs, Greece.

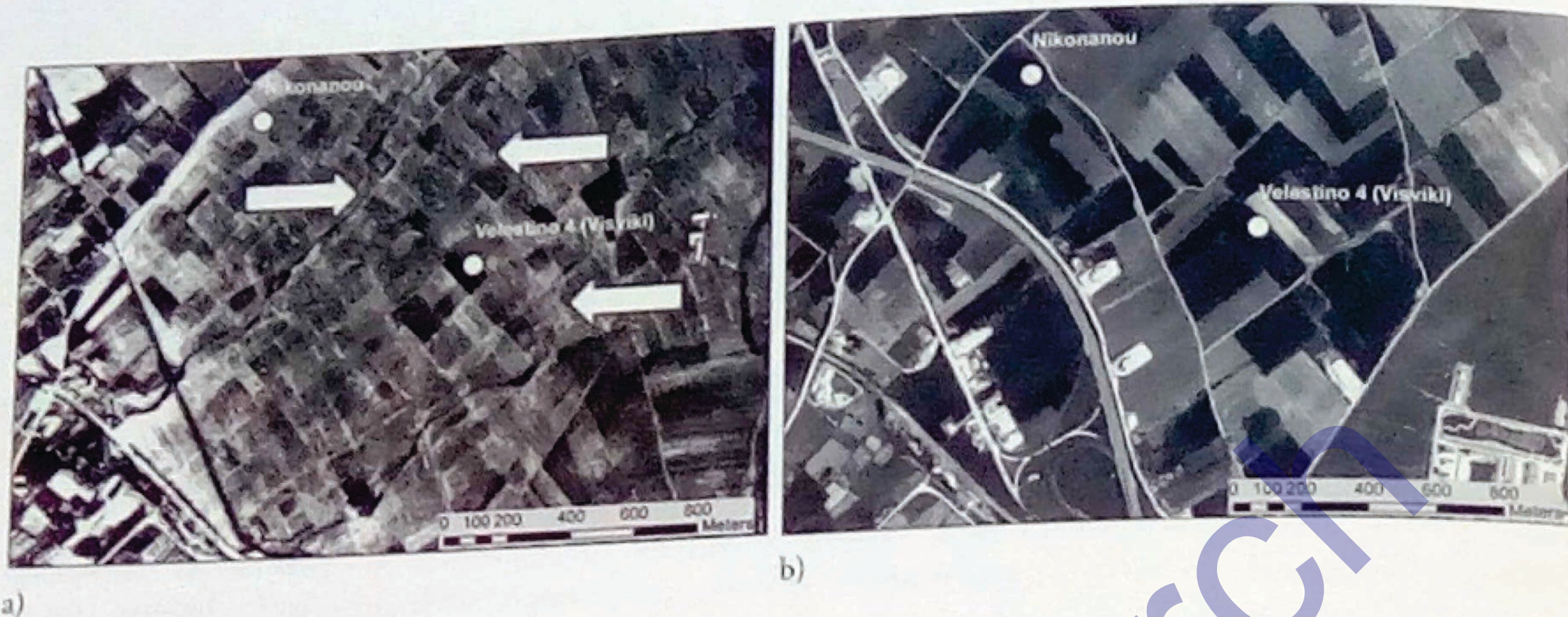


Figure 39 Comparison of the 26 August 1960 aerial photograph (a), and 4 May 2010 GeoEye-1 (b) around Velestino 4 (Visviki). The aerial photograph identifies several rivers and streams (arrows) that are no longer a part of the local topography by 2010.

are covered over and the land has been converted for agricultural purposes. A smaller branch of the northern river appears to pass by the prehistoric tell at a distance of only 50 m.

A number of palaeochannels associated with the rivers and streams that once pocketed the terrain seems to have left their traces in the satellite images. Palaeochannels that appear as soil and crop marks to the immediate north and south of the site were still rivers in the 23 August 1960 aerial photograph. Other anomalies relate to agricultural activity, such as former field divisions and plow lines. Surface anomalies in the satellite imagery and in various combinations of spectral filters indicate the outlines of the circular shape of the prehistoric tell. The evidence suggests that the mound is nearly 200 m in diameter. Vegetation stress and soil marks appear in true color (RGB) images, and define, in particular, what would appear to be a smaller circular feature around 60 m in diameter at the top part of the settlement.

Geophysical Surveying

The geophysical survey at Magoula Velestino 4 – Visviki was carried out by GeoSat ReSeArch Lab of IMS-FORTH using the SENSYS configuration for the measurement of the vertical magnetic gradient (Fig. 40) and two GPR systems, the Noggin Plus with a 250MHz antenna and the MALA with a 400MHz antenna. The core habitation zone seems to be confined by an enclosure (A5) of oval shape having a diameter ranging from 70–80 m. Within this area of about 4,500 square meters a few architectural remains are shown. The most extended one is a long compound (A28) consisting of various compartments at the NW side of the core habitation zone and very close to the inner enclosure. The dimensions of the compound are about 38×9 m and it is most probably the particular feature that has been identified with the megaron type building resulting from the German excavations of 1942. The intense magnetic signature of the outline of the compound suggests residues of burn mud brick and also hot targets within the rooms. In a close distance from the long house, two more architectural features (A29 and A30) are indicated, having a similar magnetic signature with the longhouse. With the exception of a small feature (A25), the center of the core habitation zone has been left empty reminding the central country yard in Dimini. This was also confirmed by the signals



Figure 40 a) Resulting map of the high resolution magnetic data; b) interpretation of the geophysical anomalies. The diagrammatic interpretation of data was based on the results arising from all the geophysical methods.

of the GPR survey which registered intense reflections from the area of the large compound at A28 mainly from a depth of about 90–100cm below the surface and no reflections at all from the central area of the magoula. A strong magnetic feature (A24) representing a smaller longhouse of dimensions 10.6×6 m is also evident to the opposite side within the enclosure. Two more vague anomalies are included within the inner enclosure: A26 and A27, the first being most probably associated to a structure and the second possibly representing residues of modern activities.

A few more enclosures can be noticed as we move outwards from the inner core of the magoula. Magnetic traces A3, A4, A20, A21, A22, A23 and A32 manifest the existence of at least two enclosures around the magoula. A few more extended enclosures (A14 and A15) expand further to the north and NE, where the terrain is flatter with respect to the south. A two room (12.5×6.5 m) and a single room (3.5×4.5 m) structures (A17) are located between the probable ditches A14 and A32 towards the NE, and another candidate structure (A18) can be found inside ditch A15. Three more structures (A7, A8 and A9) are located towards the SW, between the inner enclosure and the second enclosure in an area that may constitute one of the gates of the settlement.

To the east, a rectangular structure (A10) of dimensions 9×6 m, together with some large dipole anomalies (probable pits, A11), seems to constitute another smaller habitation core, as there are signs of two almost concentric enclosures (5–12 m apart) that run around the particular features to the north and east directions. The traces of these enclosures are lost as they project towards the center of the magoula, suggesting they probably belong to an earlier habitation phase than the one of the magoula itself.

Both clusters at A17 and at A10/A11 are located at the lower elevations of the terrain and it is possible that the accompanied enclosures of them (A14/A15 and A12/A13 respectively) acted as defensive constructions against flooding, as the simulation models have proven that the northern and western sides of the magoula are more susceptible to flooding. If we take into account that the habitation at these lower elevations at A10/A11 and A17, and even at A18, predates the occupation phase of the magoula, as it is suggested from the magnetic survey, it is logical to suggest that we notice a dispersed settlement in the earlier phase of occupation and a tendency of aggregation within the magoula in the later phases.

To end, the large linear anomalies (A1, A2 and A33) which are located to the southern region of the magoula, are caused by recent human interventions. A33 is the most recent one and it is caused by the ditch that has been constructed for the water pipe network that leads towards the city of Volos.

FINAL REMARKS

Due to the fuzziness of the exact coordinates of the plan of the excavated long house, there were specific difficulties to rectify it in the current projection system. Rectification of the plan was based on the iso-elevation lines and the interpretation of the results of the magnetic (SENSYS multisensor configuration) and GPR surveys, though the matching of the orientation of the complex and taking in account its dimensions (Fig. 41). The RMS error of the rectification was kept lower than 4 m. It has to be mentioned that extended magnetic anomalies do not exist at the highest elevation point, and that if the results of the geophysical survey are compatible with the plan of the excavated long building, the trenches should not exist at the pre-mentioned distance from the highest elevation of the mount. Instead they should be located at a distance of about 20 m and 46 m correspondingly for trenches A and B from the longhouse (or 57 m and 82 m correspondingly from the highest elevation of the magoula).

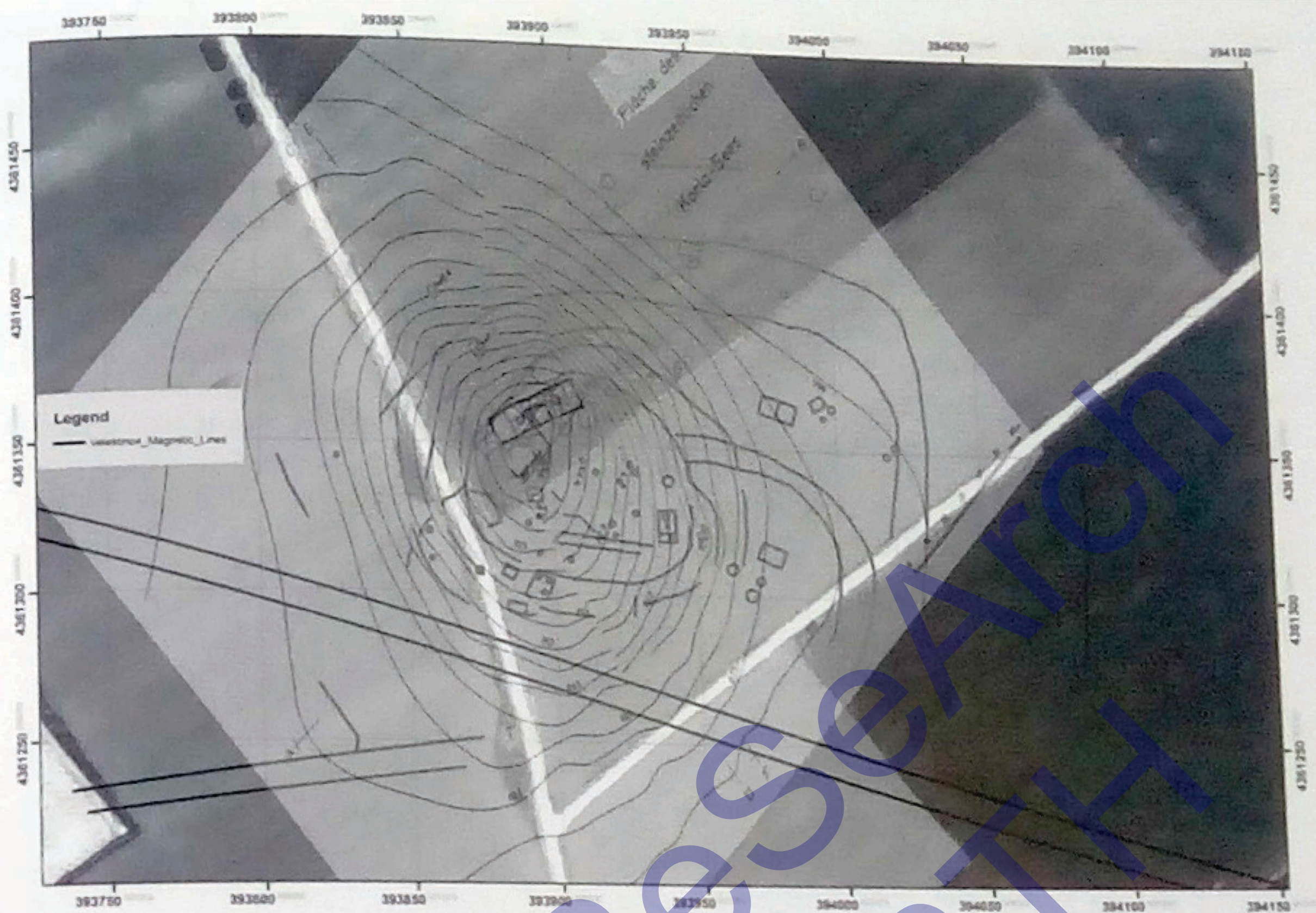


Figure 41 Registration of the old excavation plan in Area I with the topographic data and magnetic results.

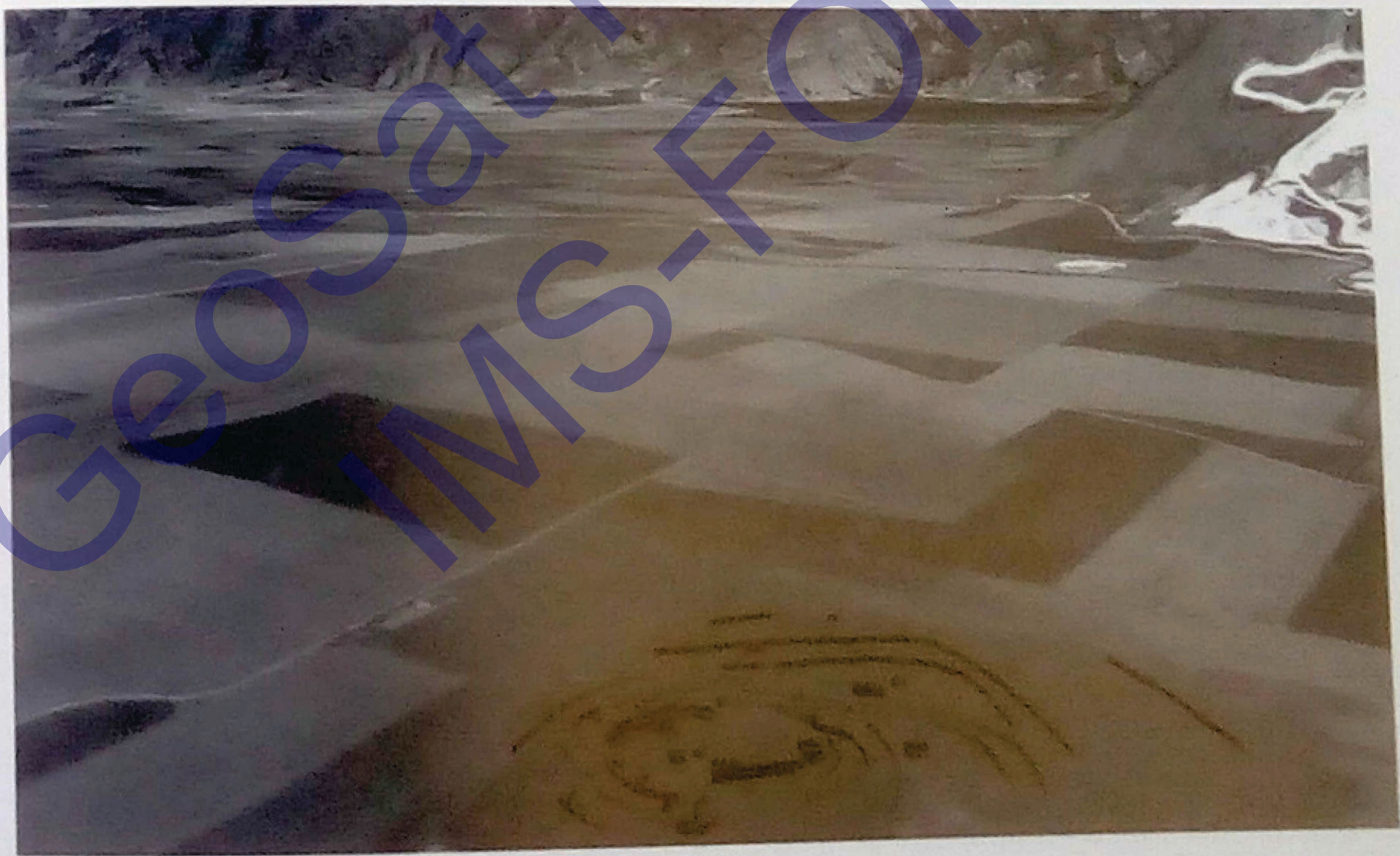


Figure 42 Reconstruction of the settlement of Magoula Visviki based on the results of the geophysical prospection. The plan has been superimposed on the 3D Google Earth digital elevation model. Lake Karla is indicated to the north of the figure, towards the direction of the multiple ditches that have probably operated as a precaution measure against flooding episodes.

To conclude, the geophysical data contributed in relocating the older excavation trenches and outlining the limits of the magoula itself through the definition of the enclosures which seem to have acted as a precaution measure against flooding episodes. The settlement shows evidence of a more dispersed occupation in the early phases of habitation which gradually concentrated within the top of the magoula. Even within the core habitation zone most of the structures seem to be located around an empty central place and close to the inner enclosure. The geophysical results were able to make a reconstruction of the settlement of Magoula Visviki that is exhibited in Fig. 42.

Acknowledgements

This work was performed in the framework of the IGEAN ("INNOVATIVE GEOPHYSICAL APPROACHES FOR THE STUDY OF EARLY AGRICULTURAL VILLAGES OF NEOLITHIC THESSALY") project which is implemented under the "ARISTEIA" Action of the "OPERATIONAL PROGRAMME EDUCATION AND LIFELONG LEARNING" and is co-funded by the European Social Fund (ESF) and National Resources.