

CURRENT ASPECTS OF THE GEOPHYSICAL RESEARCH IN ARCHAEOLOGY

Sorin ANGHEL

National Institute of Marine Geology and Geo-ecology (GEOECOMAR), 23-25 Dimitrie Onciul Str., P.O. Box 34-51, 024053 Bucharest

Abstract. This paper summarizes the main changes in archaeological investigation. Geophysical methods enabled us to locate ancient dwellings, burial mounds, and a distribution of archaeologically significant "culture layers".

Keywords: thermoremanent magnetization, magnetic susceptibility, protonic magnetometer, protonic magnetometer

INTRODUCTION

In Romania, geophysical methods are normally used to estimate the distribution of cultural relics, before digging. Objects of archaeological interest are usually located within a few meters of the surface.

Therefore, geophysical methods suitable for protonic magnetometer are those which provide high resolution at shallow depths. The most commonly used geophysical methods are resistivity and magnetics.

Using geophysical methods we were able to locate ancient dwellings, burial mounds, and a distribution of archaeologically significant "culture layers".

Although the primary method used in archaeological investigation is excavation, there are a number of pre-excavation techniques available to reduce costs and maximize efficiency of research.

This paper synthesizes the most used geophysical methods in archaeology.

It shows that resistivity surveys can be applied in archaeology including identification of anomalies in strata and changes in soil quality caused by the buried remains.

RESISTIVITY SURVEYS

In resistivity surveys, current from surface electrodes flow into the ground. By measuring the potential associated with this current, it is possible to determine the distribution of resistivity in the ground.

In horizontal resistivity surveys, uniform intervals are maintained between current and potential electrodes installed on the surface, and these electrodes are moved horizontally as measurements are made.

Exploration depth is determined by the electrode interval: the greater the interval, the greater the depth of penetration.

DIMITRIU R., ANGHEL S., MERCIU A., 2003, Report of the Geophysical Research in Archaeology Field – Histria and Rosia Montana. Arh. GeoEcoMar, Bucuresti.

MAGNETIC SURVEYS

The endeavour to apply magnetic prospecting in the case of some complex archaeological sites, resulted in the discovery of some important archaeological vestiges belonging to different historical ages.

Magnetic research made by a protonic magnetometer revealed magnetic anomalies which had two major causes (Iliceto, 1991):

- anomalies caused by magnetic susceptibility contrast between archaeological formations (brick walls, ceramics elements, building stones) and loess soil;
- anomalies caused by (ovens or areas affected by fire).

The results of the reasearch are shown in the figures 1 and 2 for Histria (Poarta Mica Zone) archaeological sites and Rosia Montana archaeological site and in the Figures 3 and 4 for Carpeni Zone, as maps with isolines of the magnetic field related to the basic station chosen in the field.

It could see more intensity anomalies, with different shapes and extensions. Thus, the most representative are shown in the interpretative drafts (Figures 2 and 4)

Building elements (walls, cobblestones and so on), revealed by analysts of the magnetic abnormalities, without clearly identifying the age to which they belong, are shown in Figures 2 and 4 (Dimitriu *et al.*, 2003).

In the analysis process we considered the magnetic anomalies of the known zone and those without information about potential archaeological structures.

REFERENCES

- ILICETO V., 1971, Nouvelles prospections geophysique du cimetiere merovingien de Galery – Prospezioni archeologiche Fondazione Leric.
- NABIGHIAN M.N., 1991, Electromagnetic Methods in Applied Geophysics. Geophysics, 46.

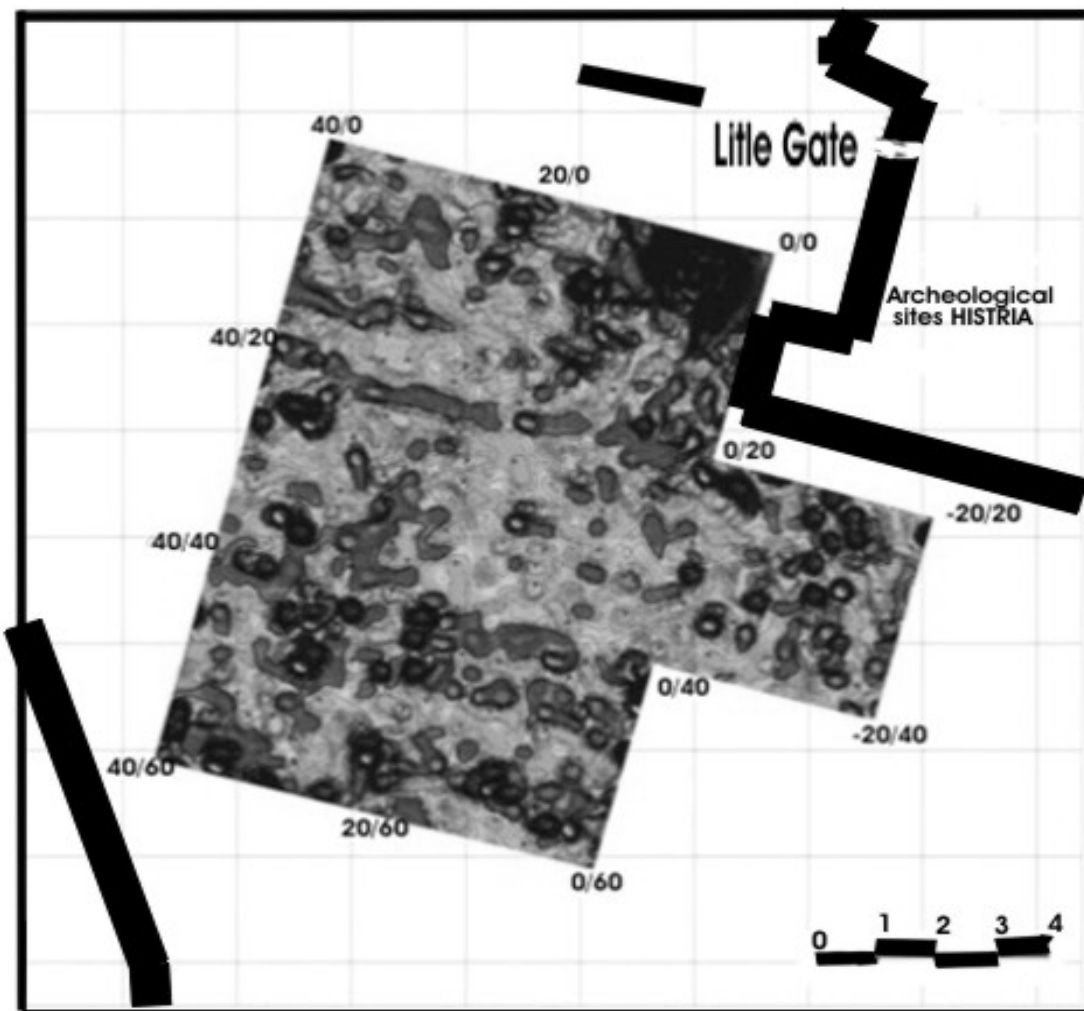


Fig.1 The Magnetic Map of the Histria Zone-Little Gate Archaeological Site

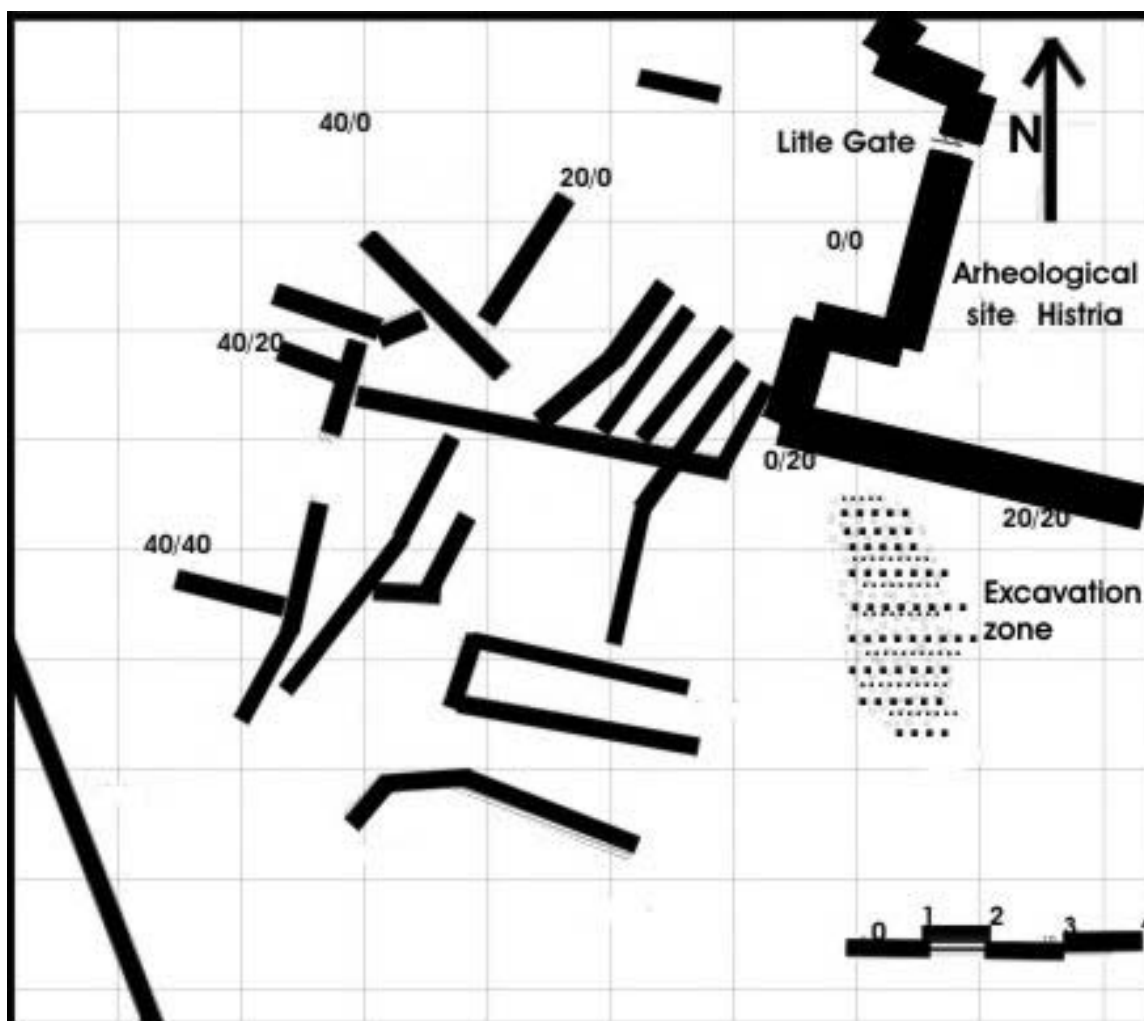


Fig. 2 The Interpretation of the Magnetic Anomalies Map

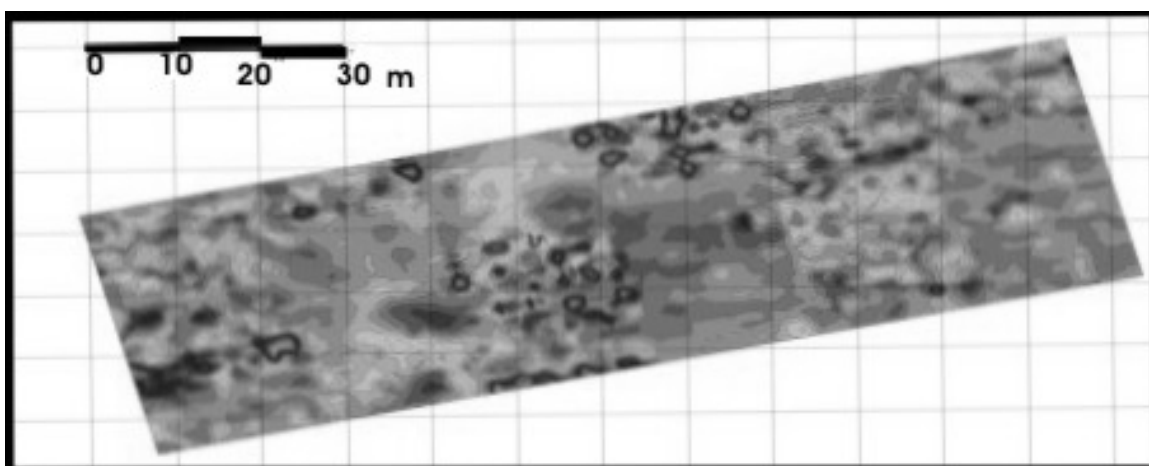


Fig. 3 The Magnetic Map of the Rosia Montana Zone-Carpeni Archaeological Site

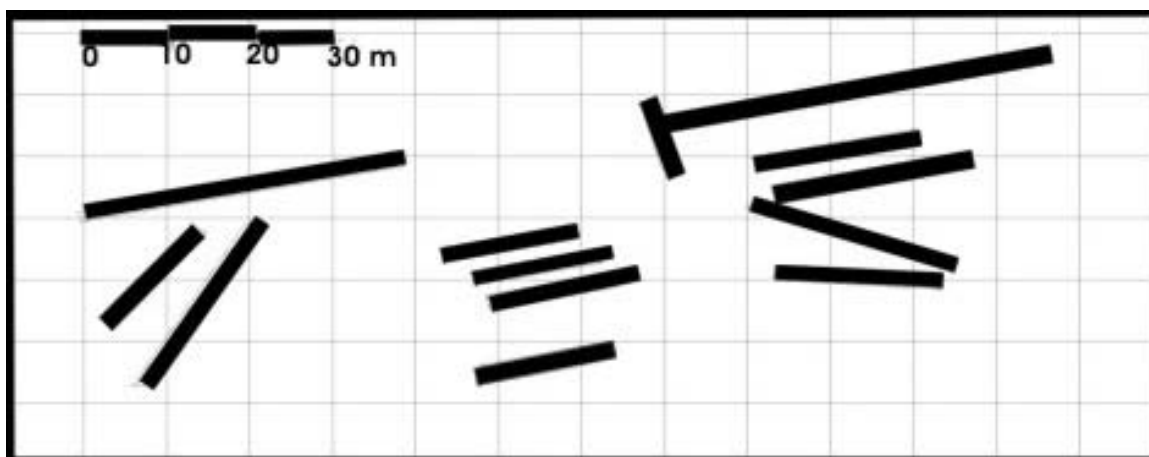


Fig 4 The Interpretation of the Rosia Montana (Fig. 3) Anomalies Magnetic Map