

Magnetic prospecting on Chalcolithic sites in north-eastern Romania: some considerations regarding intra-site spatial organisation

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KEY-WORDS: magnetic prospection, prehistoric sites, Cucuteni culture, north-eastern Romania

INTRODUCTION AND OBJECTIVES

This work is based on a study conducted by the Arheoinvest Platform from the Interdisciplinary Research Department – Field of Sciences of the “Alexandru Ioan Cuza” University of Iași, Romania. The main objective of this endeavour is to produce by means of non-intrusive investigation techniques an ample characterisation of the Chalcolithic archaeological sites from north-eastern Romania. Foremost, when systematic research is not financially or administratively sustained, the integrated employment of methods for archaeological prospecting becomes the only and clearly, the most definitely, the most efficient manner to acquire detailed and precise information on buried remains. This approach has been confirmed by a series of studies that have fulfilled the stringent demands of Romanian archaeological research, with notable results (Asăndulesei *et al.* 2012; Asăndulesei *et al.* 2013; Asăndulesei 2014a; 2014b).

The paper captures relevant elements for an overview of a model of spatial organization of Cucutenian settlements (in this case, the uni-stratified ones), based, at this stage of research, only on information obtained from interpreting magnetic data available for a number of case-study sites from the aforementioned area.

CASE STUDIES

As already mentioned, in order to obtain an image as clear as possible, coinciding with reality, our approach was based on the investigation of the uni-stratified archaeological sites. This study presents the results obtained from processing the data for the Cucutenian sites of Ripiceni–Holm (Botoșani County), Hândrești–Dăiceni II and Brătești–Dealul Chicera (Iași County).

The Cucutenian site Ripiceni–Holm is located in the north-eastern part of the Ripiceni Noi village, on the right bank of the Prut River (today the Stâncă-Costești reservoir), at 1.2 km SSE of the site Ripiceni–Stâncă, and 300 m SSE from the site Ripiceni–La Monument. The site sits on a backslope with an elevation of approx. 82 m. The current geomorphological situation is strongly modified by the construction at the end of the 19th century of a Ripiceni sugar factory, several brick kilns, the Stâncă-Costești dam and reservoir, as well as of a number of gravel quarries. The NNE side is strongly affected by annual floods that “ruined” this part of the heritage site (about half of the area), washing away and decontextualizing most of the archaeological complexes and materials (Boghian *et al.* 2012).

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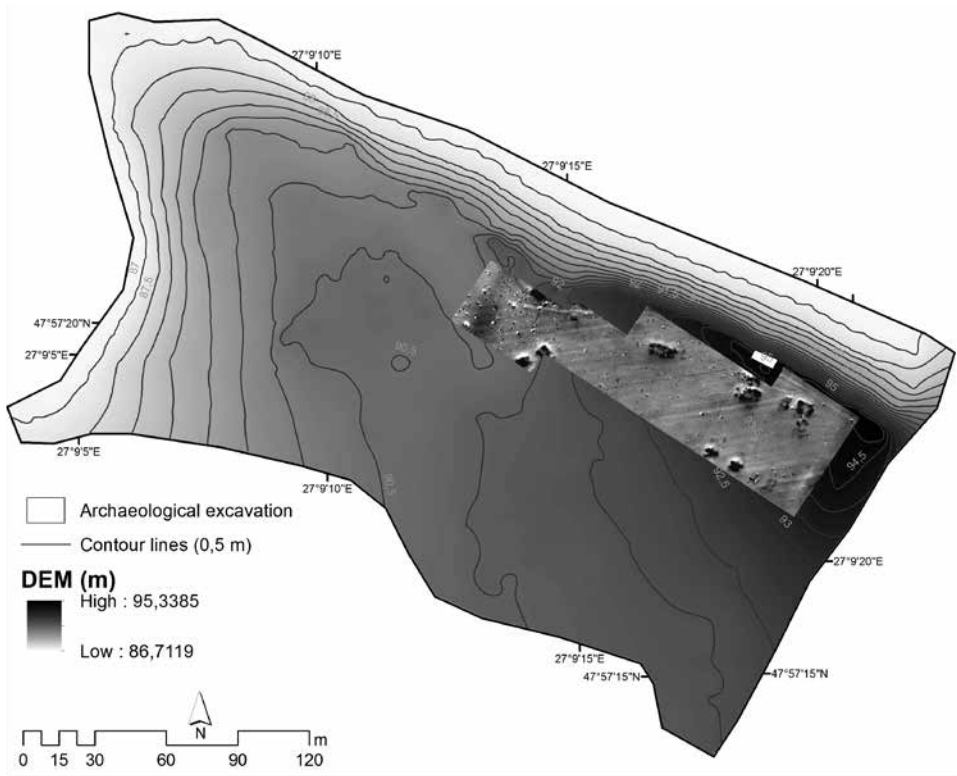


Fig. 1. Magnetic map of the Ripiceni–Holm archaeological site ($-30 / +30$ nT, white to black) overlaid on a detailed topographic map

The archaeological site at Hândrești–Dăiceni II is located on the terrace of the Dăiceni brook, south of the village of Hândrești, Oțeleni commune. Surface research in this area revealed the presence of a Cucutenian settlement (A–B phase, based on pottery and figurines) (Chirica and Tanasachi 1985: 298).

The site of Brătești–Chicera is found at the southeastern edge of Brătești village, on a plateau of the steep northward-facing slope of Chicera Hill. It is a hilltop settlement, with a relative altitude of 65 m and an absolute one of 340 m. The site, assigned to the B phase of Cucuteni culture, was discovered in 1983 during construction works (Chirica and Tanasachi 1985: 375).

METHODOLOGY

The methodology consisted primarily of magnetic prospection combined with archaeological topographic surveying. The present paper presents the most important results achieved so far, some preliminary, obtained through multi-faceted interpretation of data obtained with state-of-the-art tools.

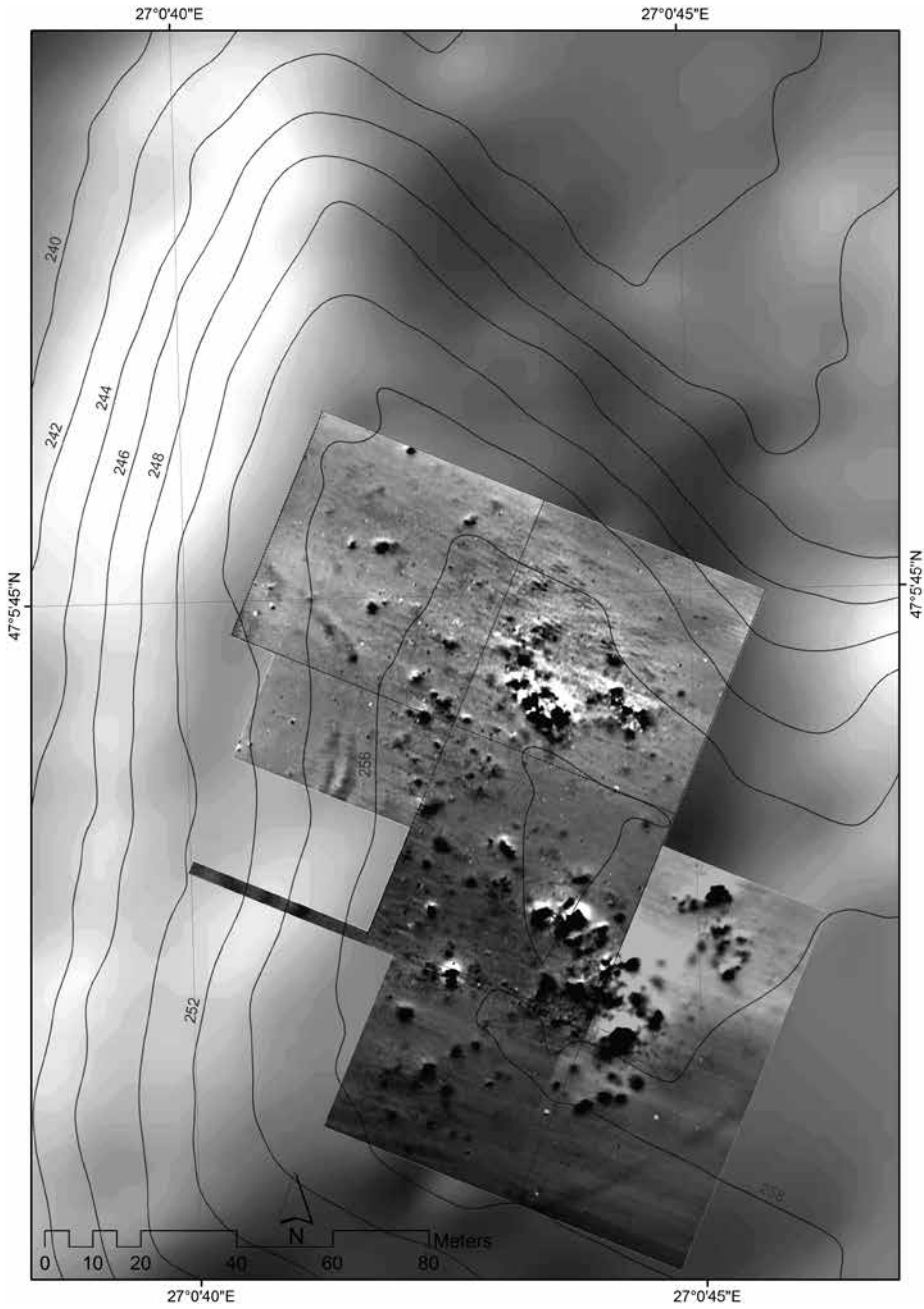


Fig. 2. Magnetic map of the Hândrești-Dăiceni archaeological site (-40/+40 nT, white to black) overlaid on a detailed topographic map

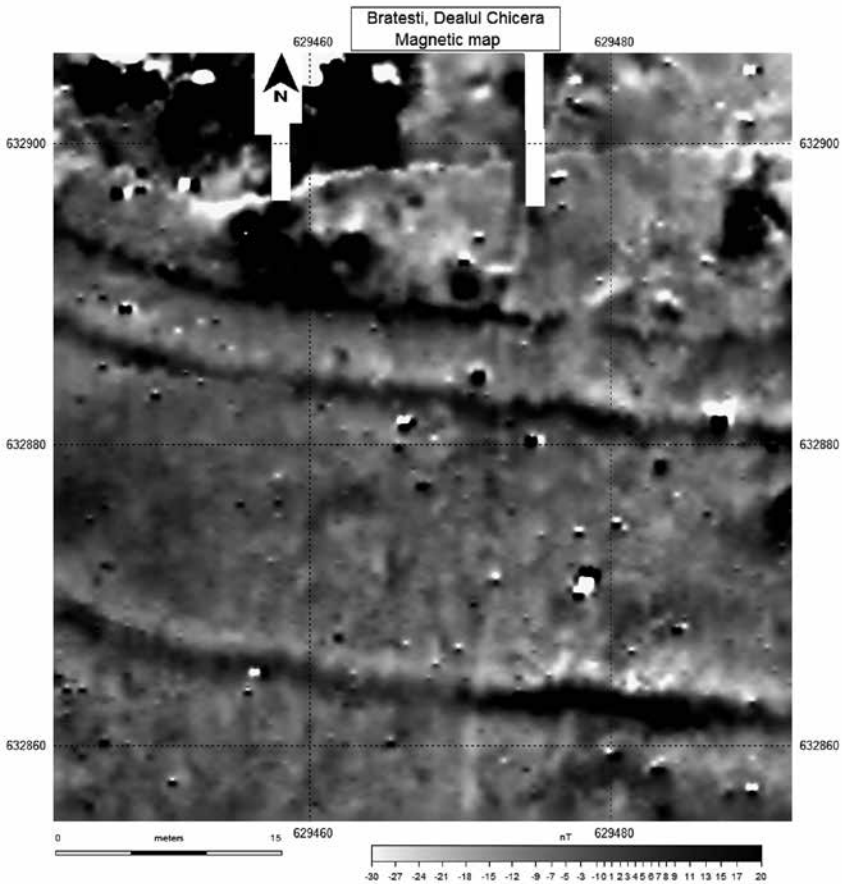


Fig. 3. Magnetic map of the Brătești–Chicera archaeological site ($-30/+20$ nT, white to black)

In the first stage, the sites were selected from dedicated literature, identified in the field and placed on a topographical map using GPS, followed by topographic surveys. Magnetic measurements were performed using a Geometrics G858 caesium magnetometer with two sensors, and the data was processed with the equipment native software.

RESULTS AND DISCUSSION

The magnetic method is very sensitive to changes in soil susceptibility. Likewise, it is very suited to environments that display a high contrast in thermoremanent magnetisation, specific to burned archaeological remains, such as kilns, hearths or, in our case, habitation structures. Because archaeological excavations in Cucutenian sites almost invariably produce dwellings that are very strongly burned, our results were consequently very satisfactory.

As such, with respect to our aim to establish a model of internal organisation of Cucutenian settlements, we first take up for consideration the new data obtained for Ripiceni–Holm. Alongside a series of small-scale characteristics, several rectangular anomalies can also be observed (which can be attributed to burned archaeological complexes, most probably dwellings), characterised by a strong positive signal, running along a NNV–ESE direction, in two relatively parallel rows. In this case, the interpretation is not definite, since the surface of the site did not allow for a full magnetic survey; future research will clarify this issue.

The situation of Hândrești–Dăiceni II differs from that of the previous case study. Thus, even though most anomalies identified are similar (i.e., characterised by an intense magnetic signal caused by burning), in this case they seem to group into several main clusters located, foremost, in the highest area of the site. These agglomerations consist of positive pyrogenous or non-pyrogenous anomalies of different sizes. Other anomalies of different shapes were also identified, most noteworthy two semicircular ditches along the northwestern side of the site, and one along the southeastern side, the latter seemingly delimiting the settlement on its exposed front.

The results obtained following measurements conducted for the last case study revealed, beside a heavily burned characteristic (probably dwellings) in the southern part of the site, which is not naturally defended, the presence of two large anomalies, parallel, forming a semicircle. They can be ascribed to defensive ditches, which alongside a much-narrower third anomaly to the inside (probably a palisade), constituted a complex fortification system that was often encountered in Cucutenian hilltop sites.

CONCLUSIONS

From the above it can be drawn that the planimetries of the uni-stratified Cucutenian sites can vary from one chronological phase to the other, or according to the type of settlement. Nonetheless, on the basis of the available magnetic data we can distinguish for northeastern Romania at least two types of internal organisation (in rows or in groups), often accompanied by fortification works in the form of one, two or three defensive ditches.

Although the present study was limited to the presentation and interpretation of results obtained by means of magnetic surveying, its continuation will undoubtedly make use of the other archaeological prospecting techniques, alongside input from older or newer archaeological excavations (Bem 2001; Lazarovici and Lazarovici 2007), which are mandatory for discerning the internal spatial organization of Cucutenian sites located in northeastern Moldavia or elsewhere.

Unfortunately, the investigation of our case studies has not been exhaustive, particularly due to the presence of crops on the sites or due to land ownership issues. We intend to complete the body of knowledge by completing magnetic measurements and, in the future, by integrating other prospecting methods (GPR, electrical resistance) that will contribute to our view of ancient Cucutenian communities.

ACKNOWLEDGEMENT

This work was supported by a strategic grant POSDRU/159/1.5/S/140863, Project ID 140863 (2014), co-financed by the European Social Fund within the Sectorial Operational Program Human Resources Development 2007–2013.

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