

THE MAGNETOMETER SURVEY AT THE EARLY ISLAMIC CITY OF KHARAB SAYYAR, NORTH-EAST SYRIA

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ABSTRACT:

By September 2002 the magnetometer survey at the early Islamic site Kharab Sayyar, north-east Syria provides an elaborate idea of the city's street system showing rectangular and irregular components. The most important result was the detection of a mosque. A market street (suq) is identified by dozens of small rectangular buildings (shops) filed along both sides of a road crossing the city for more than 300 m by now. Beside the mosque several large sets of buildings have become visible, from which a pattern of small scale dwellings can be distinguished. Bastions and a gate situated along the city wall can be viewed in detail.

The presentation focusses on the archaeological interpretation of magnetometer data. It is pictured with the case study of a magnetometer survey of the Abbasidic city Kharrab Sayyar. It puts strength on the ability of the magnetometer survey to investigate such a seldomly surveyed type of site within the set of large scale working nondestructive archaeological methods. Its meaning as a powerful tool to detect, record and monitor large archaeological sites or even landscapes becomes obvious. But although one might get the impression that magnetometer survey is well established in archaeological fieldwork there is a lack of discussion on its very own fundamentals and special set of statements compared to other fieldmethods. The full potential of geophysics and especially magnetometer survey in archaeology is received with a proper interpretation of the data and when all disciplines cooperating in a research or cultural heritage project are aware of its possibilities and restrictions.

1. INTRODUCTION

The past decades have seen a growing use of geophysical methods for large scale non destructive investigations of archaeological sites. Such trend is not due to efforts to economize fieldwork only, resulting in a decreasing number of large excavations. There is also the growing awareness for the spatial factor in archaeological research (landscape archaeology). This trend and the enormous exploitation of land by recent societies are the reason for a still increasing use of non destructive methods covering large areas. Beside other methods of remote sensing like aerial photography being used for archaeology since long, geophysical methods have become important. Within the latter magnetometer survey plays a major role in archaeology. It is able to produce detailed maps of sites, which in some instances seem to show the same resolution as an excavation. Although geophysical survey never will substitute excavation, it is a welcome alternative to investigate large areas of archaeological sites fast and without huge expenses. Furthermore geophysical survey is a preserving method since it does not destroy its subject, in contrary to excavation wether its aim is research or cultural heritage. While often its basic task is reduced to aid the planning of subsequent excavation it helps the archaeologist to gain a new viewpoint and therefore recognize new and often unexpected aspects of the site. With respect to these qualities magnetometer survey like all other geophysical methods used in archaeology is an independent method, which has its very own possibilities and restrictions allowing a special set of statements about the subject of research. Along these lines the paper makes use of a casestudy of a magnetometer survey at a large archaeological site in northeast Syria and highlights the interpretation of the data as

well as the meaning of its results for research and cultural heritage management.

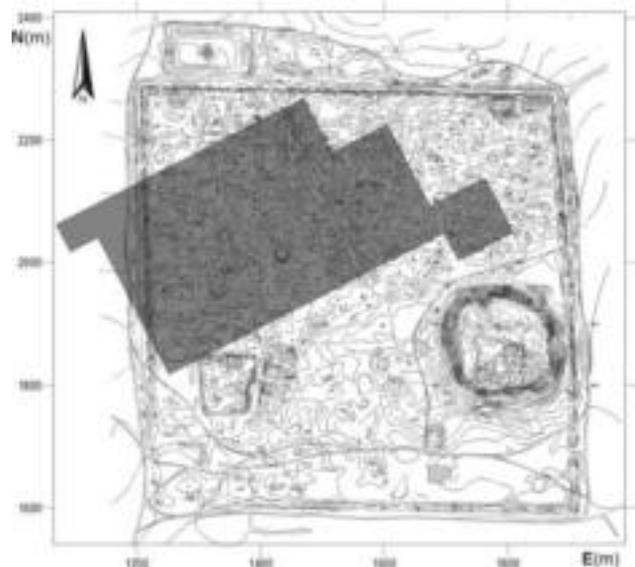


Figure 1. Kharrab Sayyar. Area of the Magnetometer survey pasted to the contour map of the site (contour map: Dipl. Ing. Matthias Kudella).

255-grey-scale plot, Incaur.
Fluxgate-radiometer Farnex 4.032,
four channels, vertical distance: 0.55m,
Resse: inline x crossline: 0.25x0.5m.



Figure 2 (overleaf). Kharrab Sayyar. Complete view of the magnetogram.

2. KHARAB SAYYAR

The site Kharab Sayyar is situated in the District of Raqqa, north-east Syria. Being surrounded by a rectangular system of ditches and walls (Figure 1), its ruins still showing several details of gates and bastions, the site consists of a 650 x 650 m Islamic city of the Abbasidic period (2nd half 9th century to 11th century). The site is almost completely deserted. It is its southern margins merely where some few buildings of the contemporary village are spotted. In the southeastern corner an antique mound (ca. 4 ha) is enclosed in the city fortification. Heaps of debris cover most of the inside area.

Kharab Sayyar was first described by Baron von Oppenheim in 1913. At that time the state of the ruins seem to have been better, since v. Oppenheim was able to identify several buildings (mosque, palace, fortification on top of the antique mound etc.), which he marked in a schematic map of the site. Since 1997 excavations are carried through in the course of a cooperation of the Goethe-Universität Frankfurt/Main, Deutsche Orient Gesellschaft and the Syrian Antiquity Department. Its reason is to learn about the near surroundings (diameter 20 km) of the large settlement mound Tell Chuera from prehistoric periods through recent times. The research at Kharab Sayyar aims to investigate the antique mound, for comparison with Tell Chuera, and an important site of the Islamic period.

3. THE MAGNETOMETER SURVEY AT KHARAB SAYYAR

After two excavation campaigns it was planned to do geophysical survey to explore the complete site. The aim of the initial fieldwork in 2000 was to test if a magnetometer survey can be used successful at Kharab Sayyar. An area of ca. 5 ha in the northeastern corner of the city was chosen. It covers the area, where v. Oppenheim located a mosque. Furthermore the area of investigation should cross the city's fortification including an assumed gate. The area extended to the outside of the city to verify whether there are further structures or not.

Since the first fieldwork in 2000 was successful it was decided to survey the site completely. In 2002 the magnetometer survey was continued. By September 2002 a total of 15 ha was covered (Figure 1).

The magnetometer survey used a multiprobe fluxgate-gradiometer with four probes (vertical distance: 0.65 m) fixed to a lightweight plastic array. Measurements were taken in 0.25 m distance inline and 0.5 m crossline.

4. RESULTS

The plot of the magnetometer data shows several structures which can be easily recognized and identified (Figure 2). The most prominent structure is the street system which shows both rectangular irregular elements. Situated in the northeastern corner of the city a mosque (Figure 3) is visible. It can be identified by its rectangular groundplan of ca. 43 x

48 m. Inside, a pile of columns running parallel to the northern, eastern, and western walls form a square. The qibla is situated at the southern wall.

To the east a market street (suq) runs from an assumed gate in the northern wall to the center of the city. It consists of dozens of small shops piled along both sides of the street for more than 300 m regarding the recent state of the survey.

In close distance to the market street several large building complexes are visible. The magnetometer data here show a high contrast, which might indicate the influence of thermal processes by the formation of the feature. These spots of high contrast correspond with obvious heaps of ash. The excavation of one of these spots proved, that it was a bath. At least a part of the ash is the result of heating water for the bath. But it is questionable if this finding can be extrapolated to all other similar structures.

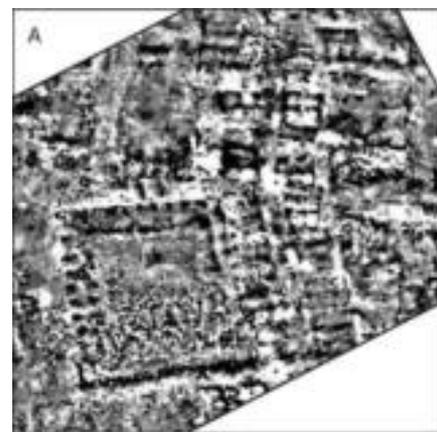


Figure 3. Kharrab Sayyar. Detail with mosque and market (suq). A Magnetogram. B Interpretive Drawing.

A section of the eastern city wall is visible. It shows alternating rectangular and round bastions in equal distances. To the outside a ditch and another wall follow. Situated in the middle of the eastern city wall a gate with two bastions allows to enter the city. Several linear structures indicate a

bridge crossing the ditch in front of the gate. From this point a street runs straight eastward to the center of the city.

Covered by a small part of the magnetometer survey outside the city several structures appeared. Yet they are difficult to interpret by the recent state of the survey. But since they are oriented to the groundplan of the city they are likely to be contemporary to the Abbasidic site.

Some 50 m east from the gate in the eastern city wall a large building complex (Figure 4) is visible, the largest part of it extending ca. 70 m from east to west. It is found in the region where v. Oppenheim identified "barracks" and "stables". This region borders to the north of the ruins still huge which Oppenheim has identified as the "palace of the caliph".



Figure 4. Kharrab Sayyar. Detail with large building complex. Magnetogram.

Inbetween the larger and more obvious objects the usual dwelling architecture can be found. But in seldom cases only more or less complete groundplans can be found. In most cases only single or irregular sets of walls are visible.

5. CONCLUSION

A magnetometer survey detected several elements of the topography of Kharab Sayyar. Adding to the knowledge about the city derived from the description of Baron von Oppenheim and the ruins visible at the sight a detailed map is the result. The localization of buildings and facilities of the Abbasidic city and the identification of their function succeeded. Embedded in the system of streets a mosque neighbouring a market street (suq) can be determined. The market street runs across the northern part of the city from the northern citywall to the center so far as it is investigated now. Several details of mosque (walls and piles of columns) and market (walls of the shops) are visible. Furthermore several large buildings and sets of buildings did appear, in most cases showing a tendency to concentrate along the market street, but their function remaining speculative. The main elements and several details of the city's fortification system including a gate are clearly visible. And also outside the city structures of unknown function appeared unexpectedly which seem to be oriented to the city and thus likely to be contemporary with it.

To evaluate the results of the survey regarding the initial aim of research it is necessary to consider the conditions under which the magnetometer survey was taken through. While multiple factors have impact on the successful use of a survey technique in the case of Kharab Sayyar many statements are clearly influenced by the state of preservation and the heterogen materials used for construction. To articulate both the statements derived from positive structures as well as restrictions of statements derived from the discussion of the conditions under which the survey was taken through makes the interpretation a liable source of data. With the state of the magnetometer survey by September 2002 the knowledge about the topography of Kharab Sayyar has grown. The resulting city map allows the archaeologist to view his excavation data from another perspective. Further research can be planned efficiently. Moreover an enduring cultural heritage management now has detailed knowledge about the site and thus the set of arguments has grown to protect it from destruction by erosion or recent human activity.

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