GEOPHYSICAL SURVEYS AT AL-ZEYTUN AND ABU SHURUF (SIWA OASIS)
REPORT ON THE SEASON 2009

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Introduction

From 5th to12th March 2009 the Institute of Archaeology of the University of Berne/Cologne has conducted a geophysical test survey at the ancient sites of **Al-Zaytun** and **Abu Shuruf at Siwa Oasis**. Both Ptolemaic-Roman sites are located on the Eastern edge of the Al-Zaytun lake. The aim of this test survey was to see if geophysical prospection methods will help to understand the lay-out and structure of both settlements. The survey was carried through by using a Caesium-magnetometer (Geometrics G 859) in quadro-sensor configuration (fig. 5. and 6). Originallly a further test using electrical resistivity was planned (Geoscan RM 15), but this idea was abandoned due to the fact that the surface of all sites at Siwa is covered by kharsif, which prevents to penetrate with the electrodes. In order to integrate the investigated areas into the existing satellite images (google earth) a local measurement grid was built up using tachymeter (Leica TCRA 1205). Subsequently the coordinates of the surveyed areas were measured by real-time GPS (Leica GNSS 900).

Location

The sites of Al-Zaytun and Abu Shuruf are situated in the Eastern part of the Siwa Oasis right on the south-eastern border of Lake Al-Zaytun ca. 25 km east of Siwa town (figs. 1-4). The site of ancient Abu Shuruf is partly occupied by a modern village with the same name. The geographical coordinates in the WGS84 datum are: N 29° 10' 51"; E 25° 44' 50". The site of Al-Zaytun is located at the southern end of the lake ca. 5 km south of Abu Shuruf. In the vicinity of the ancient settlement of Al-Zaytun there is a small abandoned village of the Sanusi order (19/20th cent.) which covers partially the necropolis of Al-Zaytun. Its geographical coordinates in the WGS84 datum are: N 29° 09' 00"; E 25° 47' 05".

Scientific value of the site

It seems that in antiquity the density of population was much higher than today. The ancient sites of Al-Zaytun and Abu Shuruf seem to belong to at least four Ptolemaic-Roman settlements on the Eastern border of Lake Al-Zaytun, which are probably identical to those mentioned by Diodorus as *Ammonos poleis*, which Alexander passed on his travel to the oracle just one day before arriving at Aghurmi (Diod. XVII 49, 6). This would mean – if this tradition is really based on reliable sources of the time of of Alexander – that the settlements or cities must have existed as early as the late 4th century BC. Coin finds of the excavations of the Egyptian Antiquities Authorities in al-Quarayshat cover a period between Ptolemy I. until Anonine Pius (Aldumairy 2005, 76); while from Abu Shuruf some late antique oil lamps are preserved (Aldumairy 2005, 78 with fig. 48). Nowadays one can observe surface finds

which primarily belong to the Roman period (e.g. Glas). Therefore the settelements of of Birket Zaytun could have existed without interruption from early Ptolemaic period into late antiquity with a peak in the Roman period.
Due to the springs on the eastern side of Lake of Al-Zaytun the whole area was very fertile and intensively used for agricultural purposes. Especially dates and olives were grown. At least in the Roman period, the oil was exported into the Nile valley where it reached the highest prices on the market. The population of Siwa seems to have lived in prosperity, as the contemporary tombs demonstrate a relative wealth. But except of some isolated buildings nothing is known about the settlements themselves. However their extension is astonishing: Al-Zaytun has a length of ca. 2,5 km and a width of ca. 0,7 km. It seems therefore that it reached proto-urban character.

Research history

In general the ancient sites in the Eastern part of Siwa Oasis have been described by early travelers like Rohlfs (1871) and Steindorff (1904). At Al-Zaytun and Abu Shuruf no systemic exploration has been done until now. At Abu Shuruf former excavations have exposed a stone building which has been interpreted as temple of the local type (1st BC – 3rd AD; see A. Fakhry 1973, 130). More recently, in the year 2000, the SCA has excavated in its neighbourhood a house with oil presses probably from the late Roman period (see: Aldumairy 2005, 77-78). At Al-Zaytun a bomb attack during World War II exposed in the area of the necropolis on the east of the ancient settlement three tomb chapels in Egyptianizing style, which have been described by Fakhry (1944 and 1973) and Aldumairy (2005). North of them some more tombs have been exposed by illicit digging. However the main part of the site has not been explored yet, thus nothing reliable can be said about the extension, structure and chronology of the ancient settlement.

Results of the survey

At Al Zeytun two test areas have been chosen for the magnetometer survey (fig. 7. 8. 9): one in the center of the settlement (180 x 150 m; fig. 7) and a second in the eastern necropolis, immediately north of the Sinussi village (60 x 120 m; fig. 8).
In both areas the archaeological remains are covered by a massive superficial layer of kharsif, which filters the magnetic signal of the deeper buried structures. Nevertheless the Caesium-magnetometers were able to pick-up very slight signals. In the settlement area the magnetometer data show a dense built-up area with small streets and irregular shaped houses. In some areas the results are very detailed and will allow to reconstruct the plan of some houses. In the necropolis area the results were not as good as in the settlement. This is probably due to the fact, that the tombs are buried deeper than the houses and contain less magnetic materials (like pottery sherds). Nevertheless some few rectangular features seem to indicate the existence of tombs. These features are connectable with low hills on the surface.

Combining the magnetometer results with the satellite image of 2003 (google earth) it is possible to reconstruct most part of the street system of the settlement. Furthermore in some parts detailed insights into the organisation of the houses is possible. It seems that two different areas are distinguishable: a potentially earlier centre around an open square (fig. 12 a) with small and curved streets and a dense occupation of small-scale houses of irregular shape. Whereas in the northern periphery there exist bigger houses of orthogonal shape and different room organisation, each of which leaving considerable distance to the neighbouring houses (fig. 12 c, d). It might be that this area of the settlement belongs to a younger extension of the city. The plans of these houses remind house models known from Ptolemaic-Roman Fayyum. In the south of the settlement a possible pottery kiln could have been identified (fig. 12, b).
At Abu Shuruf a survey area of circa. 60 x 150 m has been chosen immediately south of the excavated houses with the oil press (fig. 13). As in Al Zeytun the archaeological remains are covered by a thick layer of kharsif. Furthermore a lot of modern waste, especially metal objects have caused additional disturbances of the signals. However, even here some archaeological features, like a street in East-West direction and some walls of houses are detectable.
Interestingly on the surface of the site of Al-Zaytun a considerable and unexpected high number of fragments of Roman glass and fayence has been observed. Both are probably imported from outside Siwa and indicate on a relatively wealth of the population, which might be the result of massive exportation of oil and dates. It allowed the inhabitants of the settlement an astonishing high standard of living with a material culture that was heavily influenced by importations of the Mediterranean and the Nile valley.

Conclusions

Inspite of the unfavourable conditions (kharsif) the magnetometer survey was especially successful at the site of Al-Zeytun. For further investigations it therefore seems to be promising to continue this methodological approach. It could be that investigations with Ground Penetrating Radar would produce additional useful data. In combination with satellite images (google earth) the results of the geophysical prospection allow a relatively detailed reconstruction of the plan of the settlement. In a second step excavations will be necessary to control the results of the geophysical prospections and to learn more about the dating of the buildings and their phases of use.

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Acknowledgment

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Abb. 1: Siwa. Übersichtsplan der Oase.

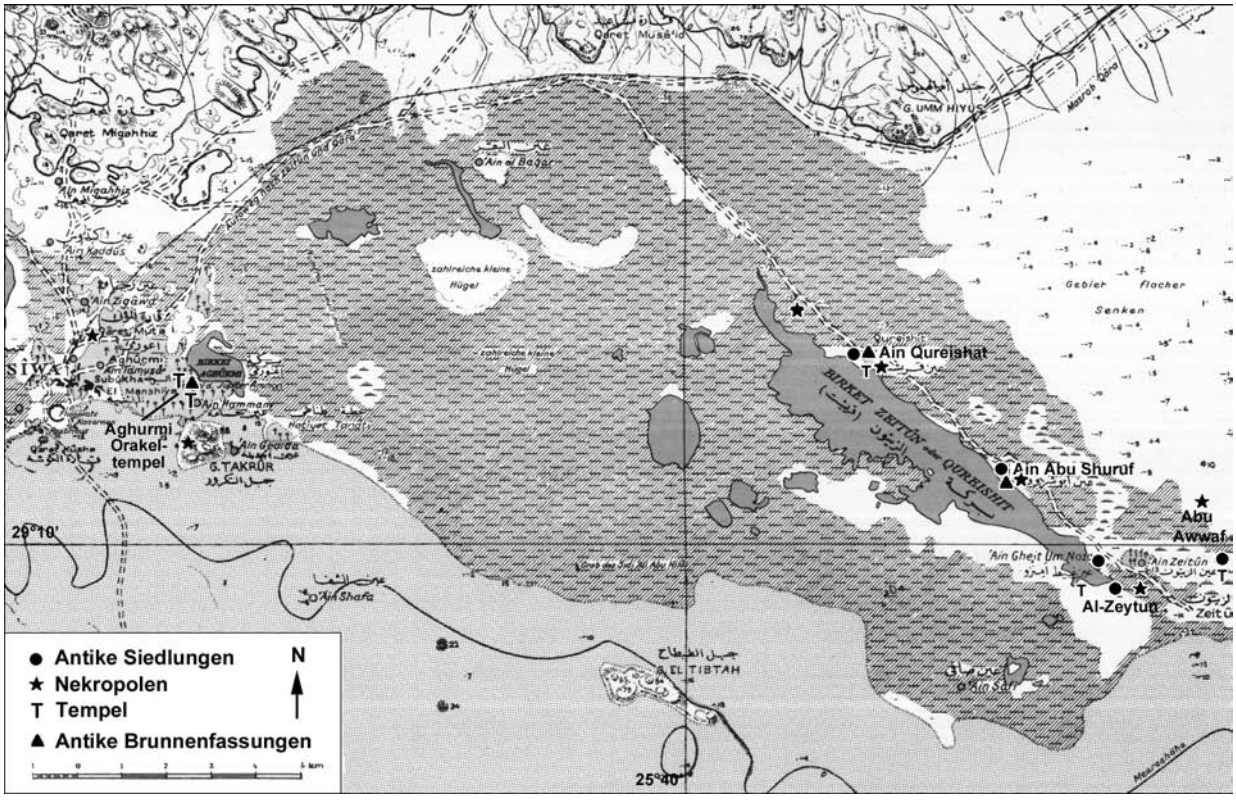

Abb. 2: Siwa. Karte der östlichen Oasenhälfte mit dem Birket Zeytun und den wichtigeren Fundstellen.

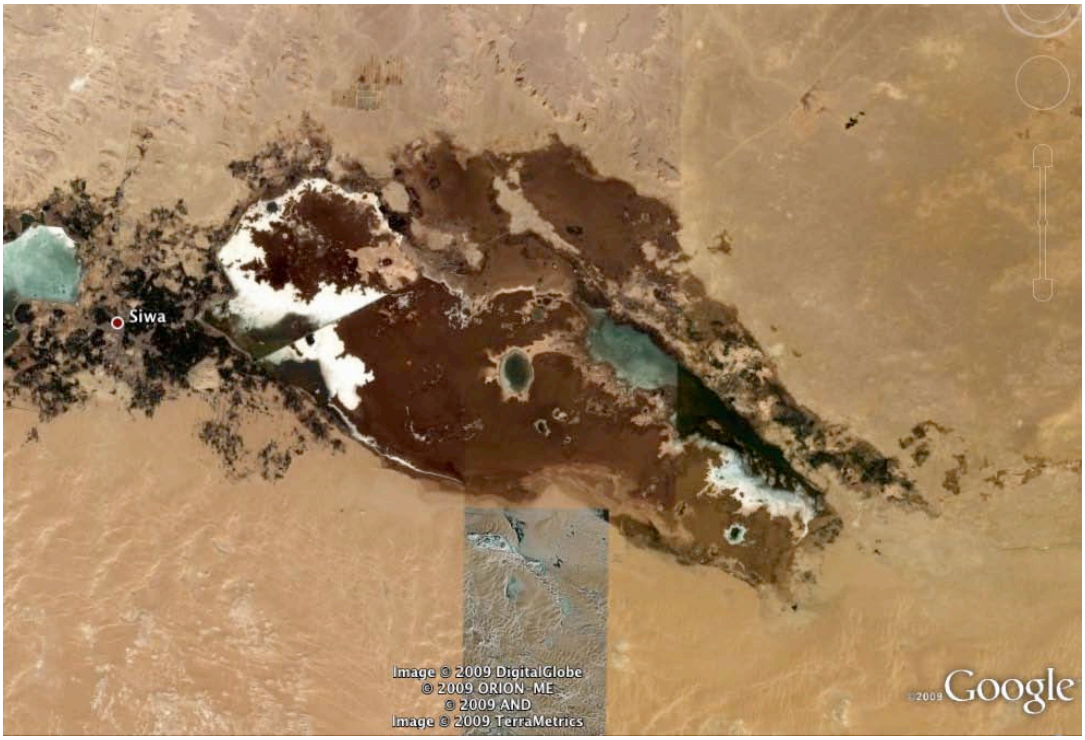

Abb. 3: Satellitenbild 2003 (google earth). Östlicher Oasenteil mit Birket Zeytun.

Abb. 4: Satellitenbild 2003 (google earth). Ausschnitt mit dem dauerhaft Wasser führenden Teil des Birket Zeytun. Im SO die Siedlung al-Zeytun.

Abb. 5: Satellitenbild 2003 (google earth). Reste alter Feldbegrenzungen, heute versandet.

Abb. 6: Al-Zeytun. Versandete Reste großer Steinhäuser (vgl. Abb. 12 c und d).

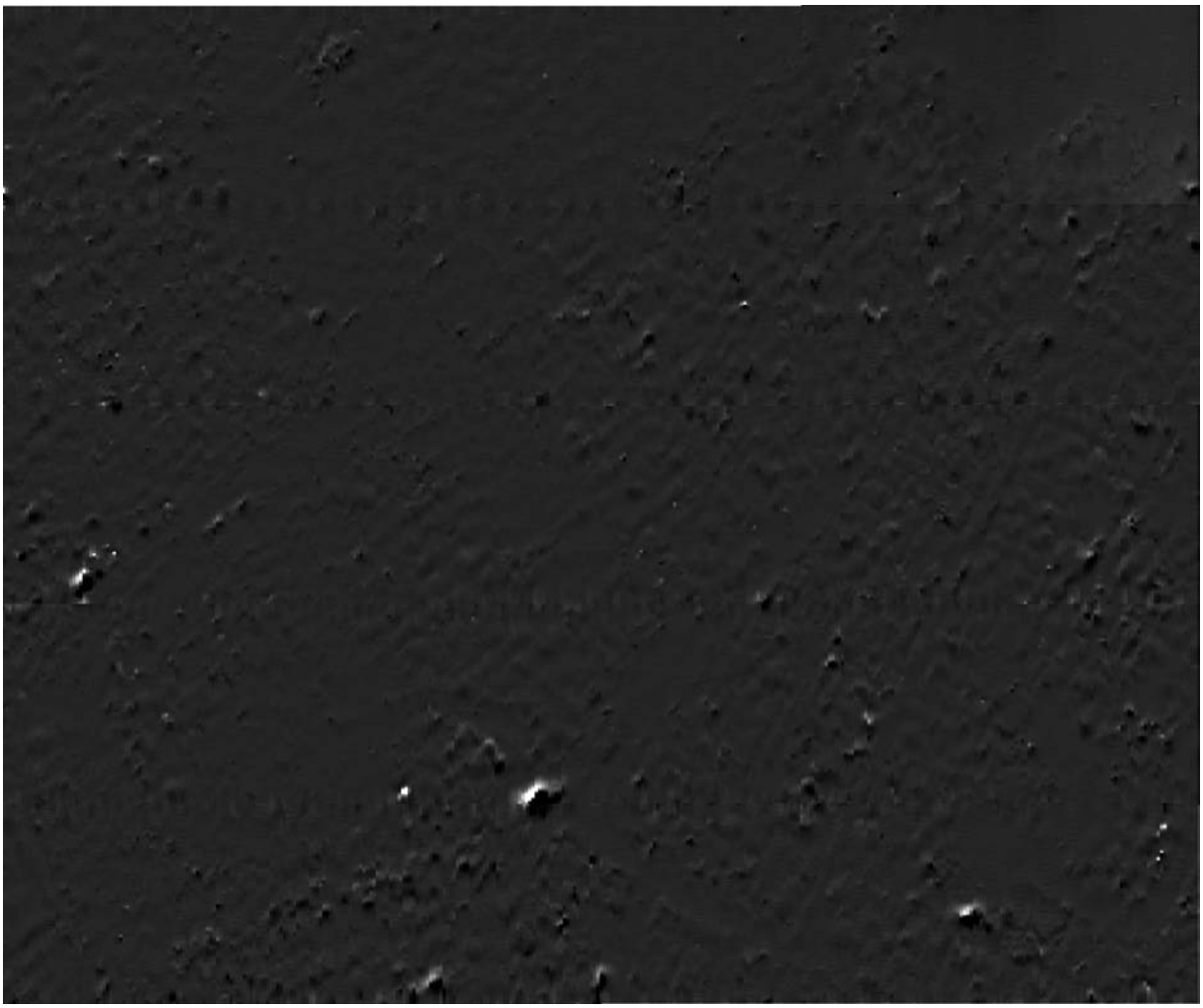

Fig. 5: Al-Zeytun, settlement area. Magnetometer result

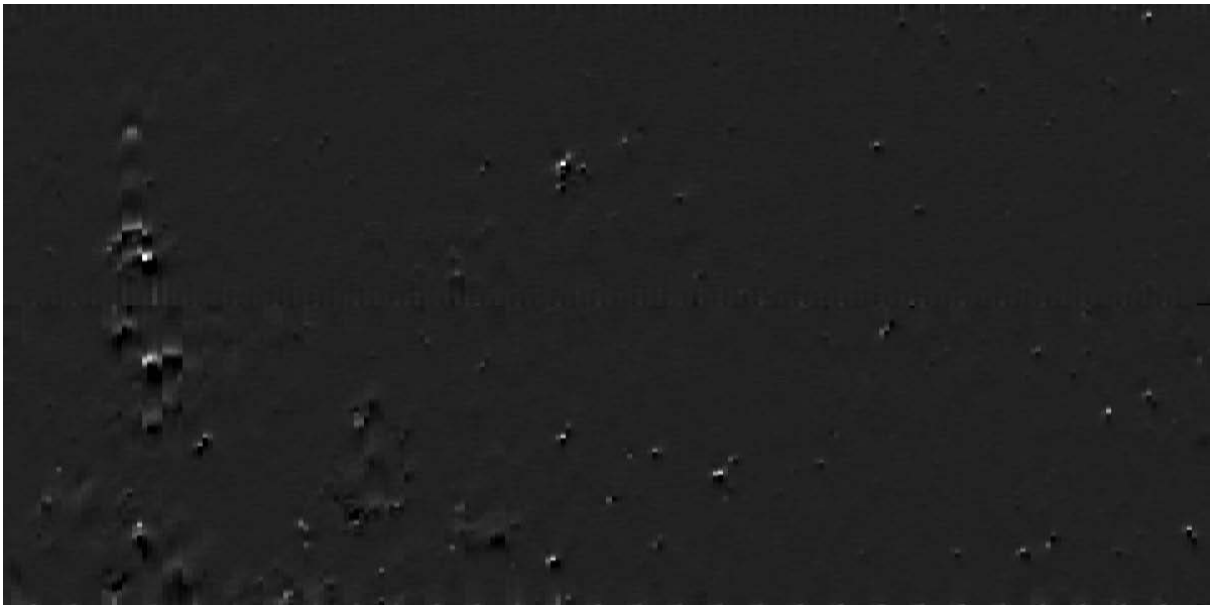

Fig. 6: Al-Zeytun, necropolis area. Magnetometer result

Abb. 9: Satellitenbild 2003. Ausschnitt der Siedlung al-Zeytun (rotes Rechteck: Bereich der Testprospektionen 2009, vgl. Abb. 11).

Abb. 10: Ausschnitt Satellitenbild (vgl. Abb. 9)

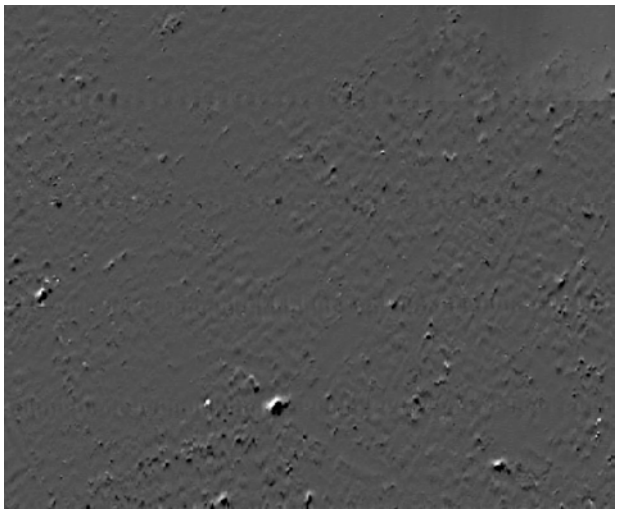

Abb. 11: Magnetogramm (vgl. Abb. 9)

Abb. 12: Al-Zeytun. Überlagerung Satellitenbild und Magnetogramm mit Angabe der erkennbaren Straßen. a. Platzanlage, b. Töpferofen, c und d: große Steinhäuser (vgl. Abb. 6)

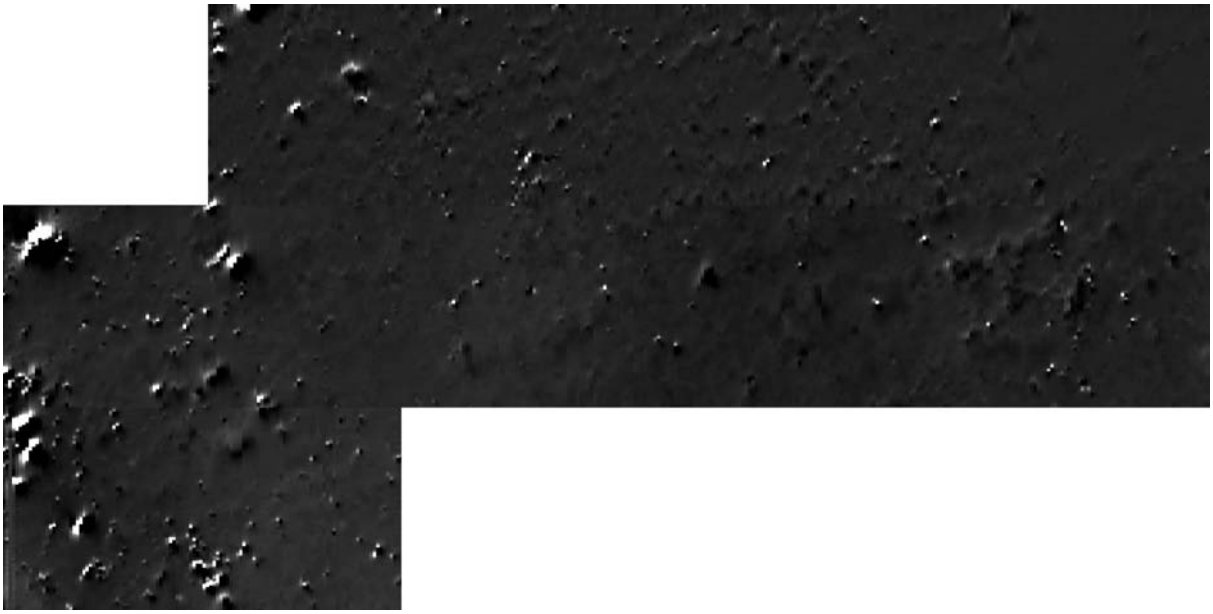

Fig. 7: Abu Shuruf, settlement area. Magnetometer result

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Fig. 1: Siwa. Map of the Oasis.

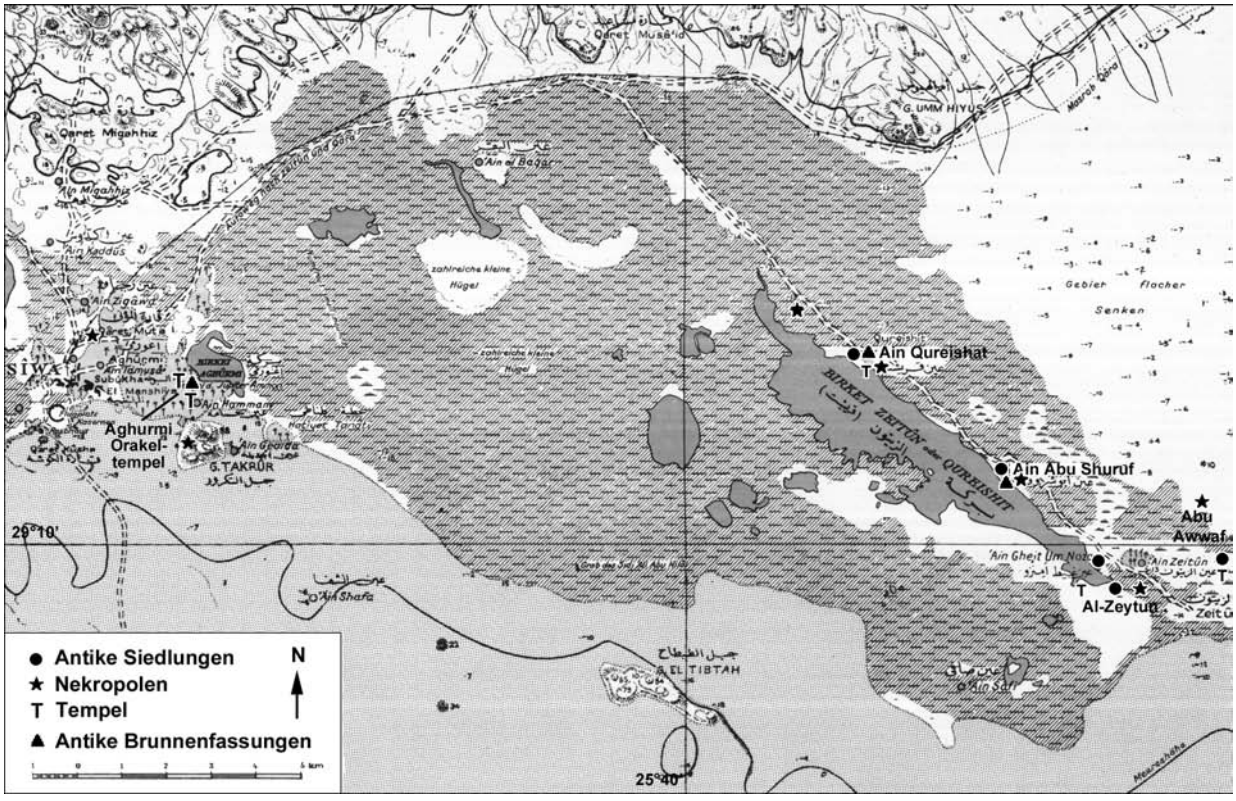

Fig. 2: Siwa. Map of the eastern part of the Oasis with Birket Zaytun and the major antique sites

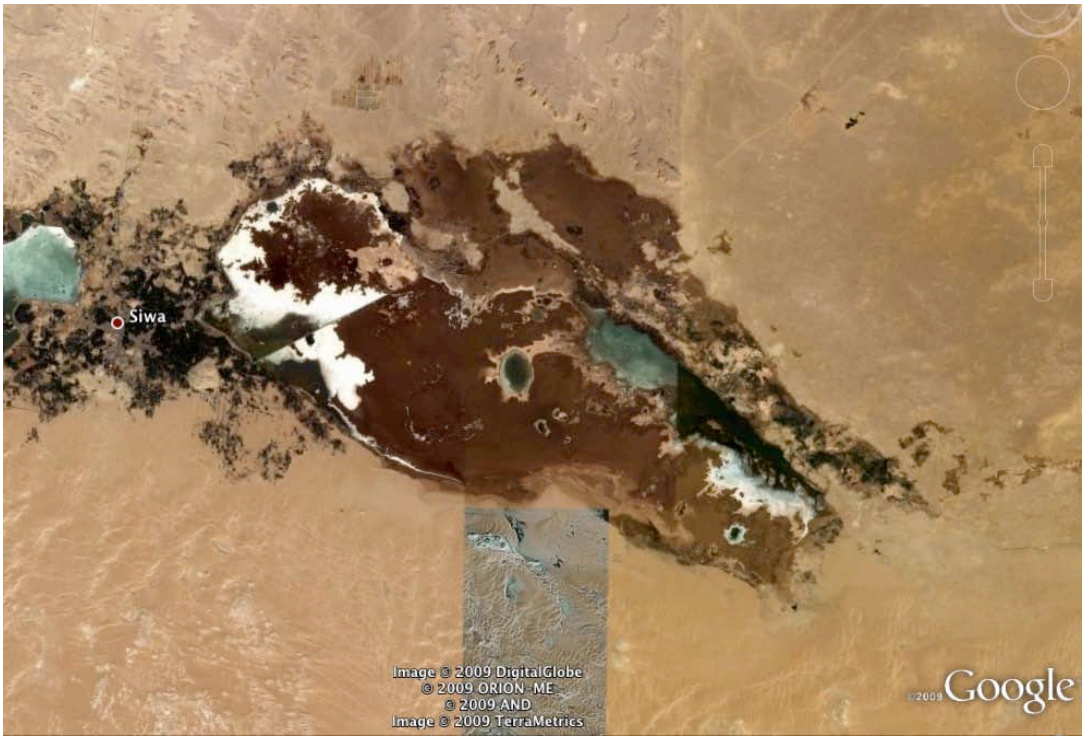

Fig. 3: Satellite image 2003 (google earth). Eastern part of Siwa with Birket Zaytun.

Abb. Fig. 4: Satellitenbild 2003 (google earth). Ausschnitt mit dem dauerhaft Wasser führenden Teil des Birket Zeytun. Im SO die Siedlung al-Zeytun.

Fig. 5: Al-Zaytun. Magnetometer Geoscan G-858 with 4 sensors.

Fig. 6: Al-Zaytun. Geophysical prospections in the necropolis. In the background the abandonned Sinussi village.

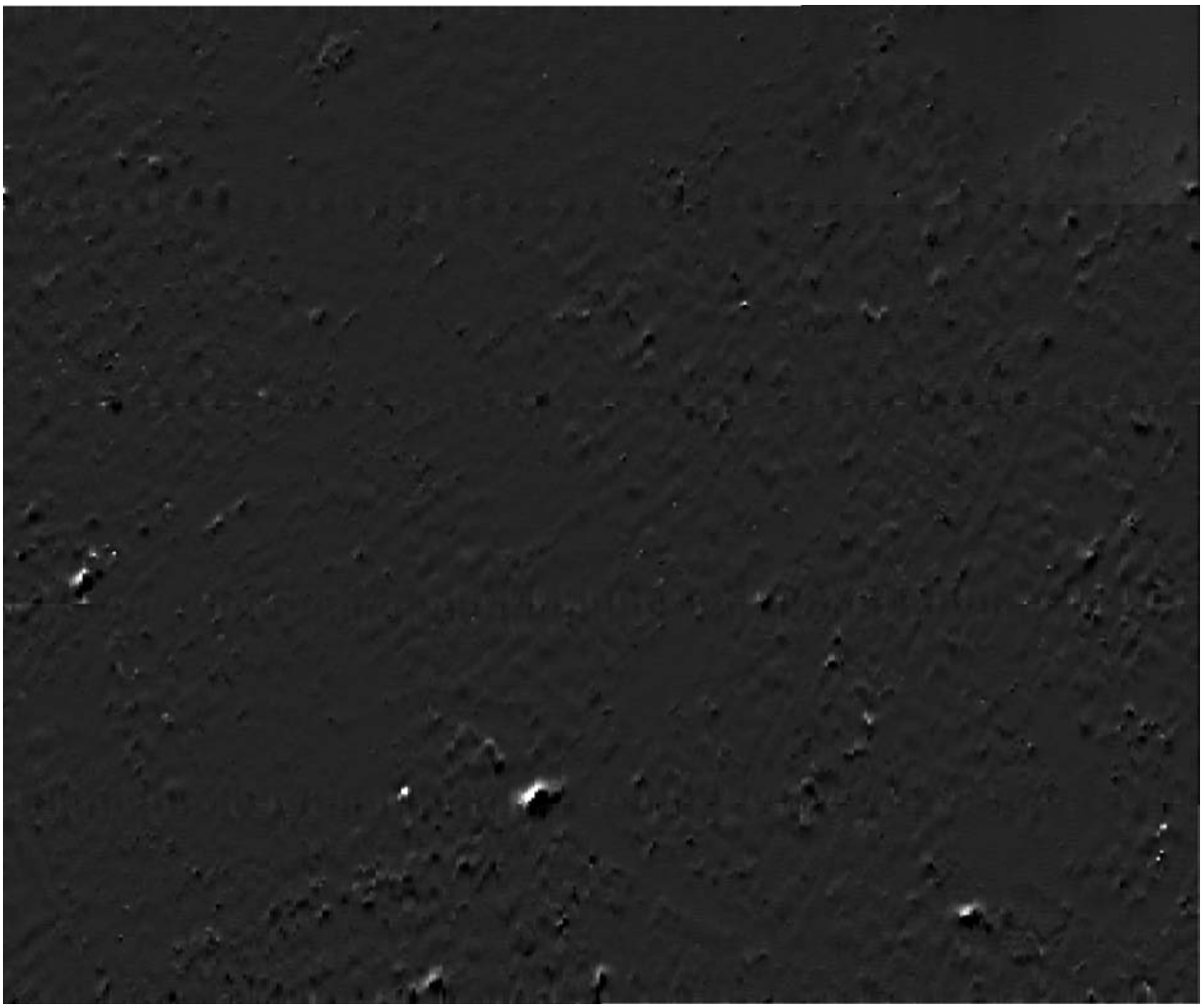

Fig. 7: Al-Zaytun, settlement area. Magnetometer result

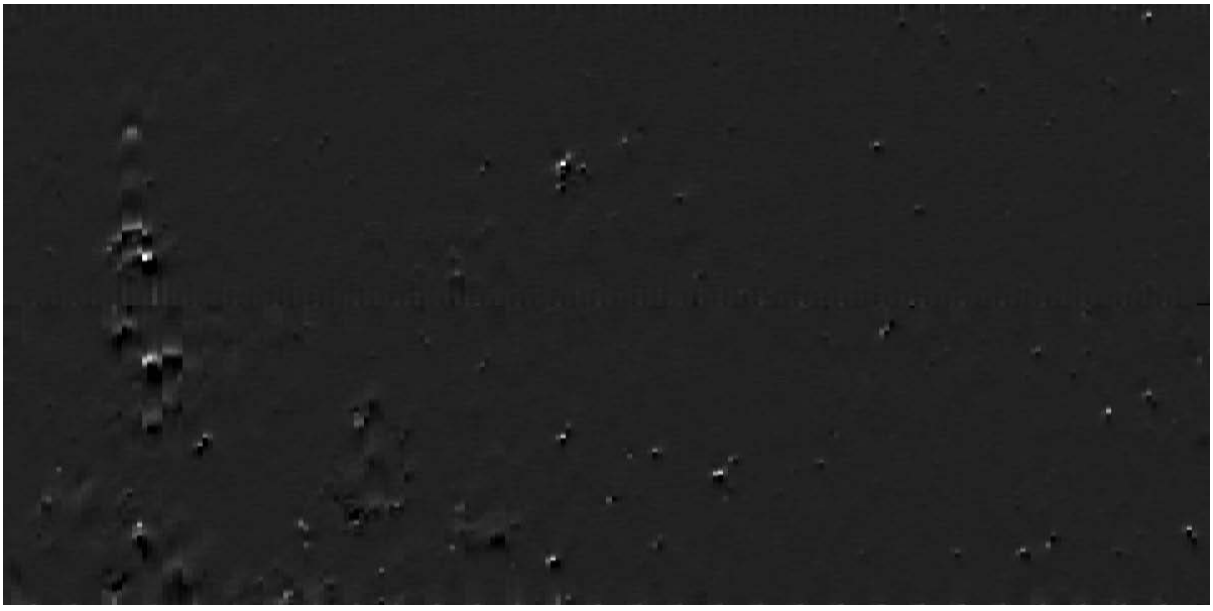

Fig. 8: Al-Zaytun, necropolis area. Magnetometer result

Fig. 9: Satellite image 2003. Settlement of al-Zaytun (marked in red: area of prospections, cf. fig. 11).

Fig. 10: Part of satellite image (cf. fig. 9)

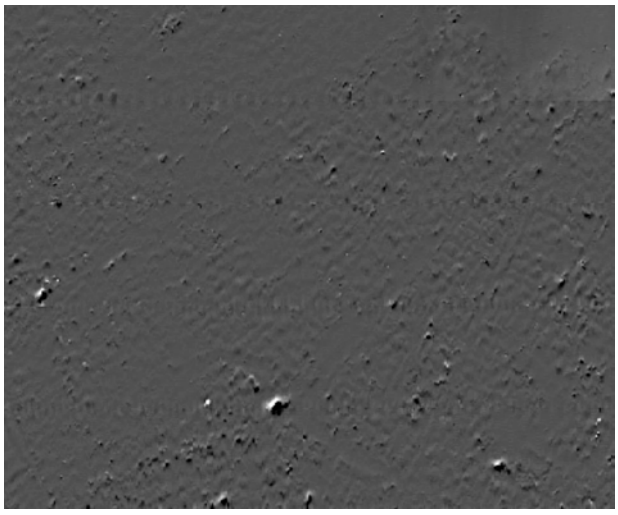

Fig. 11: Magnetogramm (cf. fig. 9)

Fig. 12: Al-Zaytun. Satellite image with results of magnetometry. In blue: streets. a. open square, b. pottery kiln (?), c und d: stone houses,

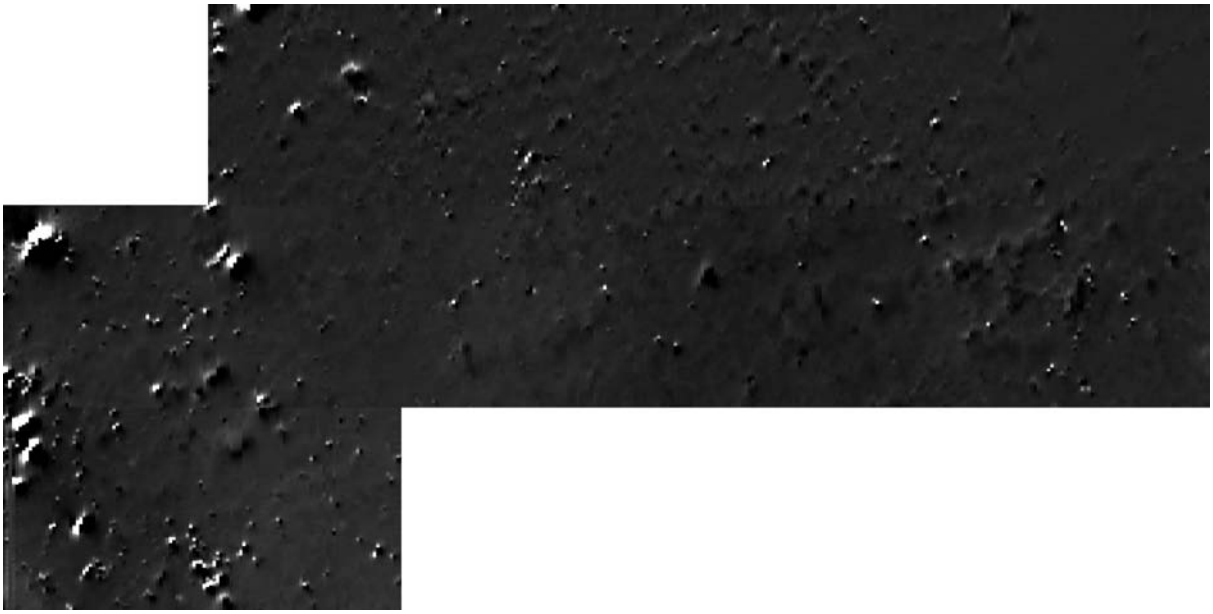

Fig. 13: Abu Shuruf, settlement area. Magnetometer result