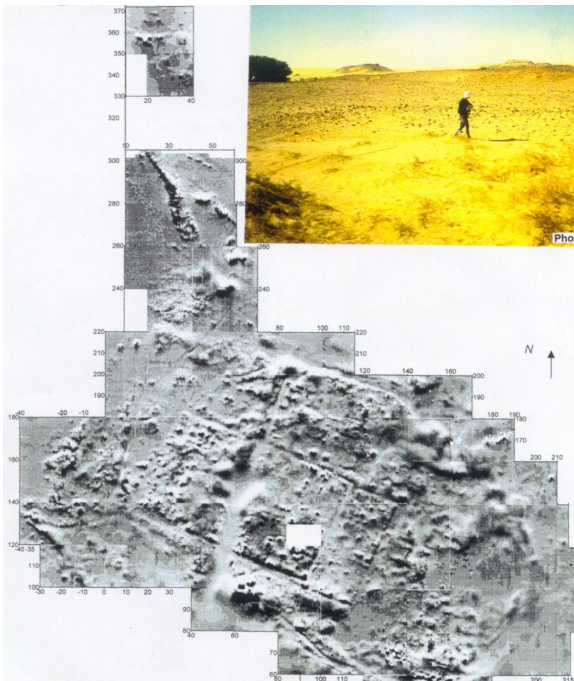


Magnetics for Archaeology

Magnetics are an increasingly key method for archaeology. Main benefits lie in the ability to resolve details non-invasively, the wide range of artifacts and cultural affects that are detectable, and the low-cost of magnetics in comparison to other geophysical methods.

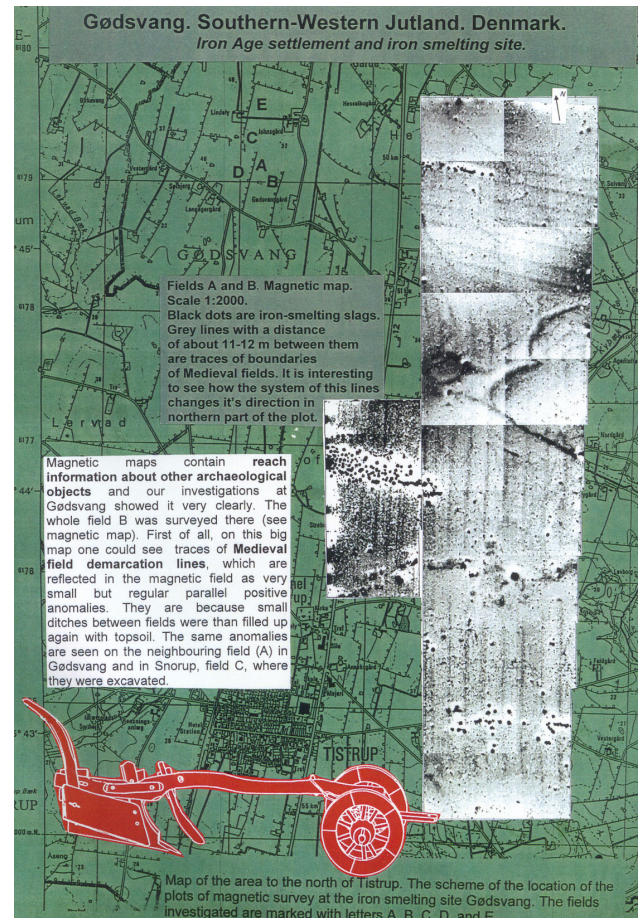


Old Kingdom site, Ein El-Gazareen, Egypt. Image shows mud brick enclosures (weakly magnetized) and kilns, fireplaces, etc. (strongly magnetized).

Having detailed knowledge of a site prior to investigation reduces excavation costs while ensuring that no part of the site is missed. In addition, as many projects are time-sensitive, availability of a rapid, effective method, such as magnetics, may mean the difference between recovery and non-recovery.

An Effective Non-Invasive Method

The method is based on the physical phenomenon that many cultural artifacts are magnetic, or that cultural activities lead to disturbances in soils, etc. that can be detected using magnetic methods.



Agricultural site, Denmark. Vertically-oriented, linear anomalies indicate furrows and magnetic contrast with adjacent sediments. Pattern changes to the north, indicating another potential land-holding or a later farming "event".

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Magnetometer Requirements

The effectiveness of magnetics for archaeology is based on the wide range of magnetic susceptibilities for cultural objects ranging from very weakly magnetic items such as limestone walls to strongly magnetic fired materials or iron such as is used in implements.

Therefore, a key requirement is the availability of instrumentation with high or very high sensitivity for detecting a full range of contrasts. GEM's GSM-19 Overhauser and GSMP-40 Potassium magnetometers / gradiometers both meet the criteria for a full range of sensitivity.



GSM-19 system in use in Denmark. This system provides a light weight, low cost solution for walking use. It also includes a "Walking" mode that enables nearly continuous coverage with resulting high productivity surveys.



The GSMP-40 magnetometer / gradiometer offers very high sensitivity plus rapid sampling for vehicular use. It also operates as a walking unit as shown.

Other key requirements for non-invasive archaeological work that GEM supports, include:

- Multiple array configurations for optimizing the detection and characterization of near surface objects
- A wide range of operation for both hot and cold environments
- Simple console-to-computer data downloading for rapid generation of results
- Optional, professional GEM-VIS quality control and presentation software for easy 2D and 3D confirmation and visualization of results

Maps and GSM-19 photo courtesy of Dr. Smekalova, St. Petersburg State University.