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Ancient Monuments Laboratory
Report 58/95

EYE HILL FARM, SOHAM, CAMBS.
REPORT ON GEOPHYSICAL SURVEY, NOVEMBER 1995

A E U David
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Summary

Magnetometer and magnetic susceptibility survey of some 4.5 hectares of a later prehistoric lithic scatter was undertaken at Eye Hill Farm, Soham, Cambs. Whilst most of the area was magnetically undisturbed, or interrupted only by modern features, some very limited and dispersed evidence of archaeological activity was identified. There does not appear to be a significant correlation between topsoil magnetic susceptibility and the distributions of burnt or unburnt flint.

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EYE HILL FARM, SOHAM, CAMBRIDGESHIRE.

Report on geophysical survey, November 1995.

INTRODUCTION

Geophysical survey was undertaken at Eye Hill Farm, Soham, Cambs, in response to a request from the Cambridge Archaeological Unit (CAU). Eye Hill Farm represents the first of two areas where lithic scatters, identified under the auspices of the Fenland Management Project (FMP), are being investigated in detail. It consists of a scatter of Neolithic and Bronze Age lithic material, including a large amount of burnt flint, covering an area of up to 10 hectares (ha). The overall aim of the geophysical survey was to broaden the interpretation of the scatter by locating any associated buried features and, perhaps, by offering an insight into its character. The relationship between the variation in magnetic susceptibility (MS) and the distribution of burnt flint was of particular interest.

The surveyed area is located on very sandy loam soils of the Denchworth Association developed over Lower Greensand (Soil Survey of England and Wales 1984, British Geological Survey 1980).

METHOD

Due to the large extent of the flint scatter, a 4.5ha sample was selected for geophysical survey. This area had already been intensively field walked and encompassed some of the most interesting discoveries. These latter included the 'settlement' core, a zone of burnt flint, and a further concentration of burnt flint alongside a presumed palaeochannel.

The sample area, which straddled a modern field drain, was centred on TL 582 770, just to the south of Eye Hill Drove (see Fig 1). A grid of 30m x 30m squares was laid out over using baselines provided by the CAU which were aligned on those used previously for the field walking exercise.

<u>Magnetometer Survey</u>

Each of the grid squares was then surveyed using Geoscan FM36 fluxgate gradiometers. Measurements were recorded at 0.25m intervals along traverses 1.0m apart. The resultant data is illustrated in this report in the form of greyscale and graphical trace plots (see Figs 2 & 3). Presentation of the data has been enhanced by the application of a local median filter to reduce the intense response to ferrous material (Scollar et al 1990).

Magnetic Susceptibility Survey

The same squares were subsequently resurveyed using a Bartington MS2 meter and MS2D field loop. Measurements of volume specific MS were taken at 10m intervals to allow a direct comparison with the field walking data (also collected on a 10m grid). For comparison, the distribution of MS values, flints/100 sq m, and burnt flint (by weight: gms) are all illustrated as greyscale plots on Figure 4. The presentation of these has been enhanced using a local median filter to reduce the distracting effect of random measurement noise. [The filtering does mean, however, that the data distributions depicted on the scalebars on Figure 4 do not reflect the raw values. Also: note that high readings appear on these plots as lighter tones while lower readings are darker.]

Samples of topsoil were collected at 10m intervals along a central transect which crossed the zone of possible 'middening' (Evans, *pers comm*), the burnt flint 'mound' and the palaeochannel. These samples were subsequently dried in air back at the laboratory before their mass specific MS was measured using a Bartington MS2 meter and MS1B bench sensor. Mass specific MS readings offer a more controlled estimate of topsoil magnetic enhancement than the volume specific measurements. The former readings were therefore intended to ensure that the latter offered a fair representation of MS variation across the site. Additionally, soil samples were recovered at depth from two auger holes along this traverse (see Fig 1) so that their mass specific MS could be measured and compared against the surface values. The results of this work are presented in Figure 5.

RESULTS

Magnetometer Survey (Figures 2, 3 & 6)

The most obvious anomalies within the magnetometer data are those in the southern half of the survey area indicative of a pattern of buried linear features. Unfortunately these appear to represent the history of modern land use at the site: former field boundaries (A and B on fig 6), land drains (C) and a possible trackway (D). The extant drain, which bisects the survey into two roughly equal areas, seems to represent a remodelling, aligned with and cutting a former boundary (A) as well as a number of land drains (C). The former (A) have produced detectable anomalies (2-3 nanotesla (nT)) due to their infilling with relatively high MS topsoil (see below). The land drains, however, have been detected as stronger anomalies (5-7.5nT) suggesting that they contain yet more magnetically enhanced material (or perhaps ceramic mole drains).

The survey has also been greatly disturbed in places by the presence of modern ferrous material, most noticeably at E. This may represent the response to the infilling of a former pond (information from the farmer) with ferrous rubbish before this was levelled off with topsoil.

Apart from the modern features referred to above, the magnetic response is quiet. Analysis of the frequency distribution of the data (see histogram on Fig 3) shows that the majority of the readings lie within ±1nT which is close to the maximum sensitivity of the instrument. Nevertheless, some further magnetic variation, which may be of archaeological relevance, is worth drawing attention to.

The magnetometer has mapped a subtle linear anomaly (F) which is of interest as it does not appear to respect any of the modern alignments discussed above. Alongside this feature and just to the south, there is a faint and discontinuous annular anomaly approximately 5m in diameter. A zone of magnetic disturbance (H) at the northern edge of grid square 3 might well be significant also. It may be relevant that this latter zone is encompassed within the area of highest lithic density.

In addition, a number of discrete positive anomalies have been detected throughout the survey area which are of unknown but possibly archaeological origin - perhaps pits.

The magnetometer does not appear to have responded to the presence of the palaeochannel.

Soil magnetic susceptibility and flint scatter data (Figures 4 & 5)

The field loop survey revealed values of MS varying between a minimum of 22 $SIx10^{-5}$ (shown as black on Fig 4 plot 2) and a maximum of 138 $SIx10^{-5}$ (shown as white). The highest readings can be seen to be concentrated to the south-west in a discrete zone apparently constrained by the field boundaries (A) referred to above. This suggests some form of differential land use and presumably represents a relatively recent episode of topsoil magnetic enhancement. Beyond this zone of high readings the variation in MS is more subdued, with the lowest values occurring in the south-eastern corner. Within this there is a further area of slightly higher readings (in grid square 45).

Comparison of the field loop and mass specific topsoil MS data (see Fig 5 plot 1) shows that, while the field loop readings are generally lower, both techniques clearly reveal the same relative trend of MS variation.

It was hoped that the episodes during which flint was burnt might leave a detectable magnetic signature in the topsoil. However, there does not appear to be any relationship between the two; indeed, the area where the burnt flint appears to be concentrated coincides with that where topsoil MS is at its lowest. This might imply that the flint was burnt elsewhere before its final deposition, although this is speculative.

The soil samples retrieved from the auger holes show there to be a fairly uniform level of MS within the first 0.4m of topsoil within each hole (as a result of cultivation and natural topsoil mixing) with much lower values within the underlying substrate. The augering at B (Fig 1) demonstrated that the palaeochannel is a very shallow feature, barely evident in terms of depth, at this point.

CONCLUSION

The site conditions proved suitable for the detection of subsurface features with the magnetometer. Unfortunately, however, the most obvious of these are a response to recent landuse. The majority of the remaining area is magnetically undisturbed.

Although smaller features (such as stake holes, small pits etc) may have passed undetected, there are nevertheless a small number of anomalies perhaps indicative of a few dispersed larger archaeological features. The latter include an annular anomaly and some pit-like features. Whilst there may be correlation between some of these (H) and high flint density in the northern part of the survey area, there is otherwise no obvious relationship between the geophysical survey and fieldwalking data.

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Dates: 6-10 November 1995

Reported by: M Cole
A David

30 November 1995

Archaeometry Branch
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We would like to thank David Gibson of the Cambridge Archaeological Unit for kindly locating the baselines upon which the geophysical survey grid was based.

References

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Scollar, I et al., 1990, *Topics in Remote Sensing 2: Archaeological Prospecting and Remote Sensing*, Cambridge.

Soil Survey of England and Wales, 1983, *Soils of England and Wales*, 1:250 000 soil map, Sheet 4, Eastern England.

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Figure 5 Results from magnetic susceptibility traverse and auger holes.

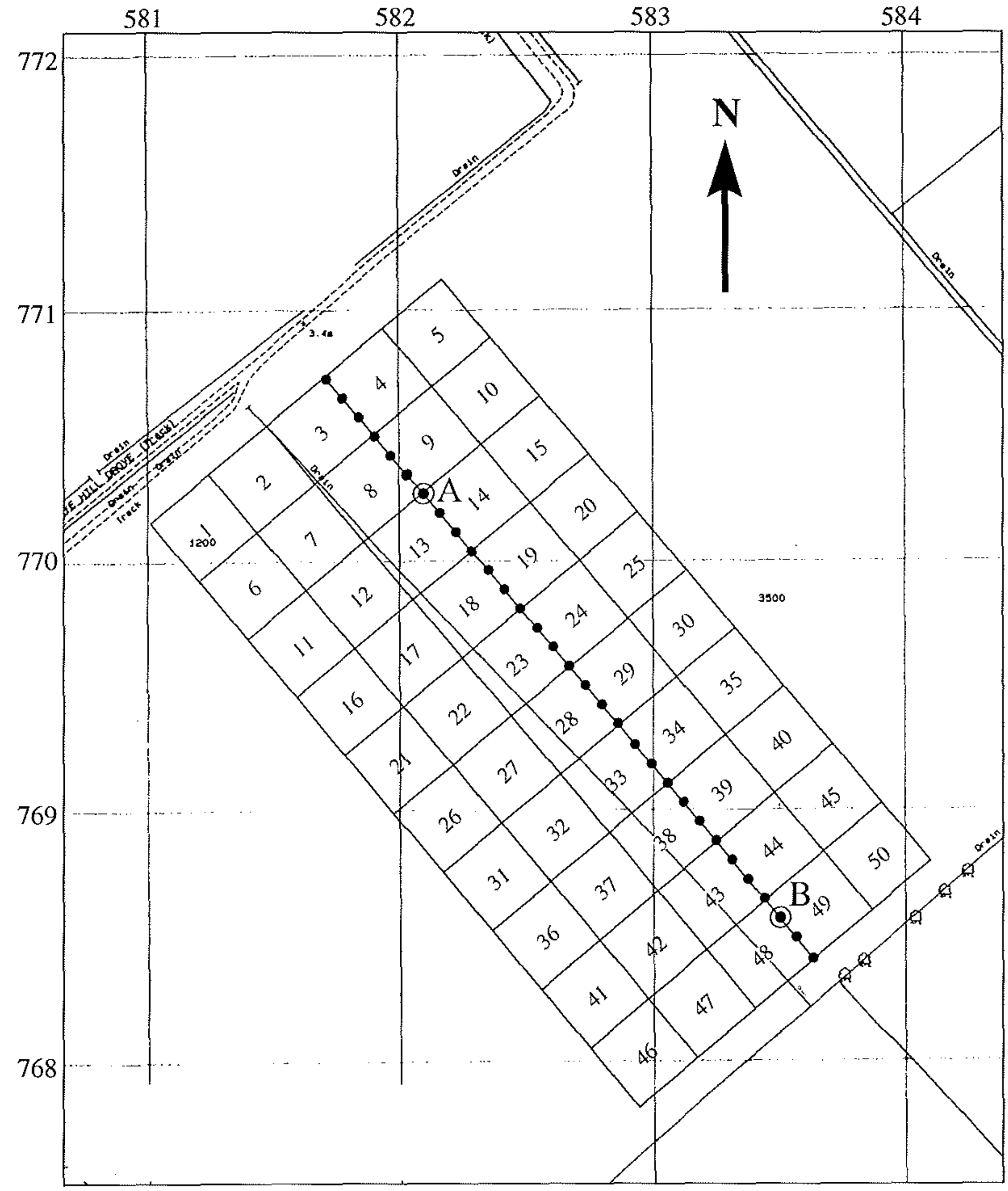
Figure 6 Interpretation of magnetometer survey.

FIGURE 1.

EYE HILL FARM, SOHAM, CAMBS.
Geophysical Survey, November 1995.

Location plan of survey.

TL 5876-7.



• MS sample
B⦿ Auger hole

0 90m

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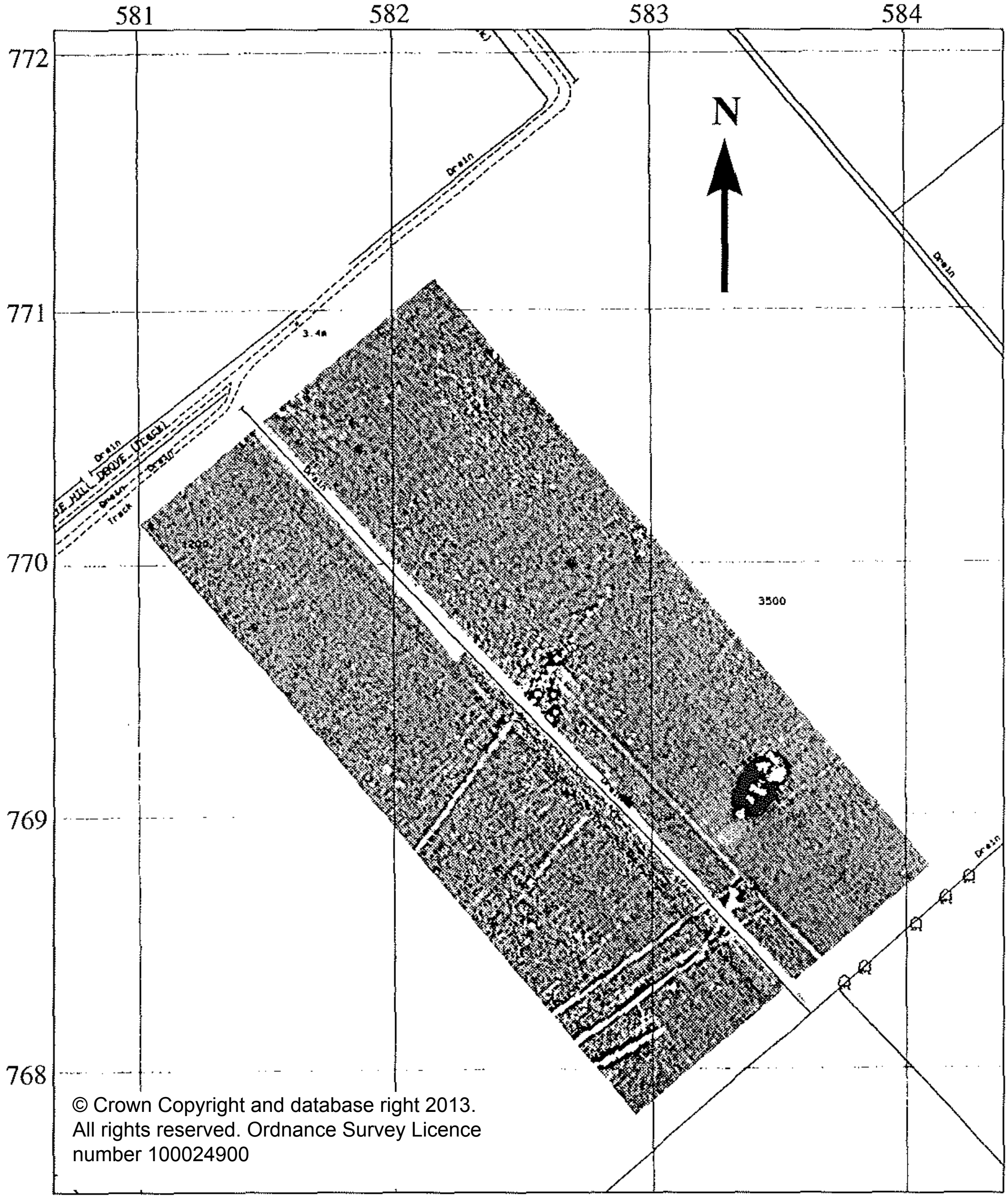
FIGURE 2.

EYE HILL FARM, SOHAM, CAMBS.
Geophysical Survey, November 1995.

Greyscale of raw magnetometer data.

TL 5876-7.



0 90m

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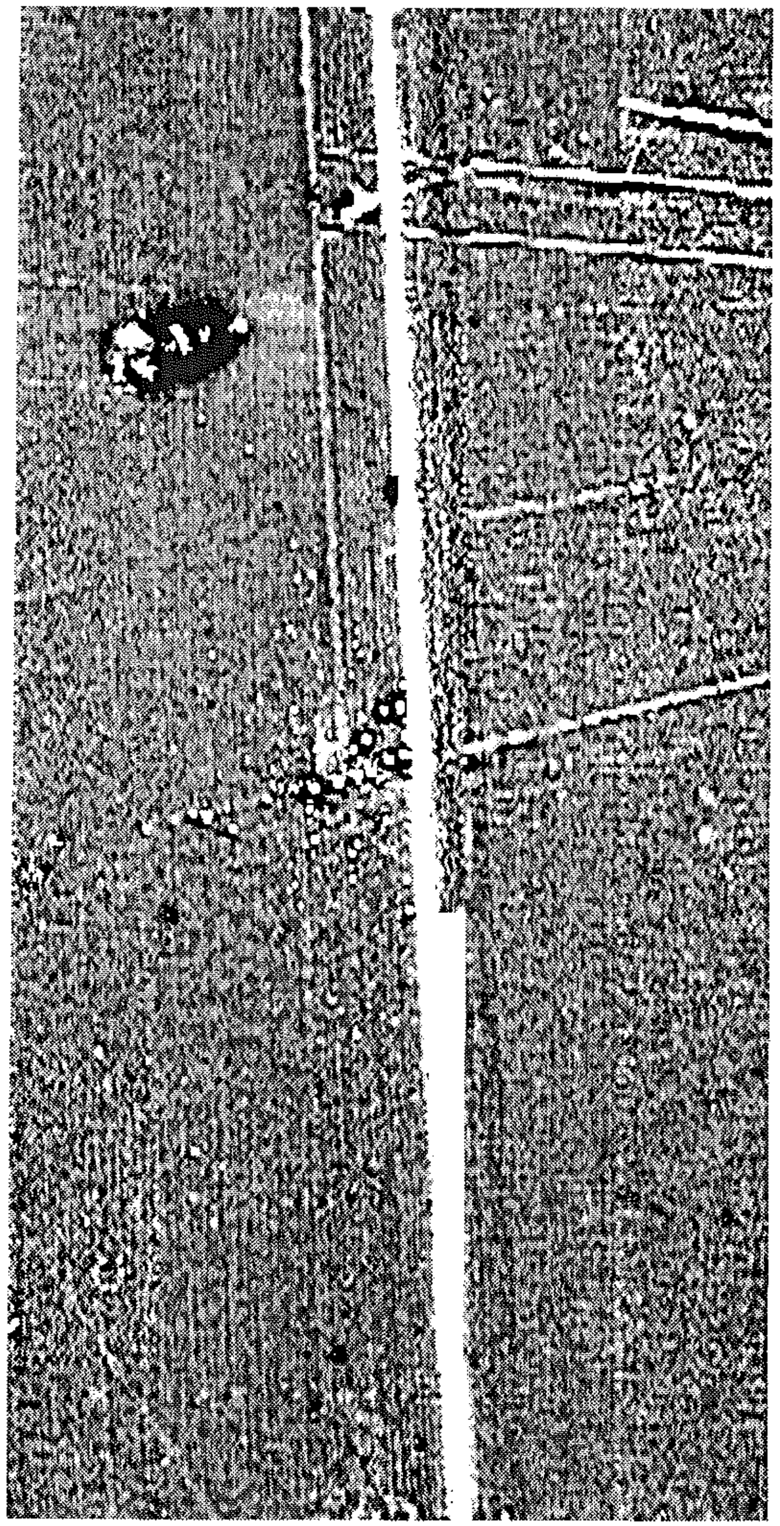
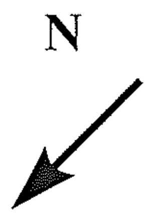
FIGURE 3.

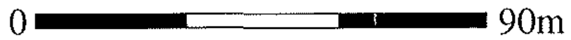
EYE HILL FARM, SOHAM, CAMBS.
Magnetometer Survey, November 1995.

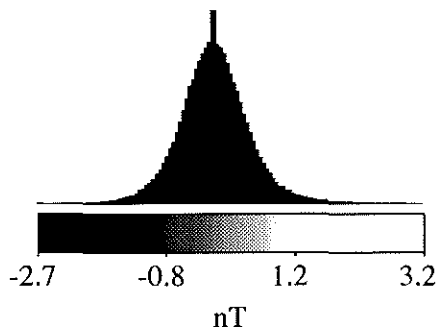
50	49	48	47	46
45	44	43	42	41
40	39	38	37	36
35	34	33	32	31
30	29	28	27	26
25	24	23	22	21
20	19	18	17	16
15	14	13	12	11
10	9	8	7	6
5	4	3	2	1

1. Greyscale of raw magnetometer data.

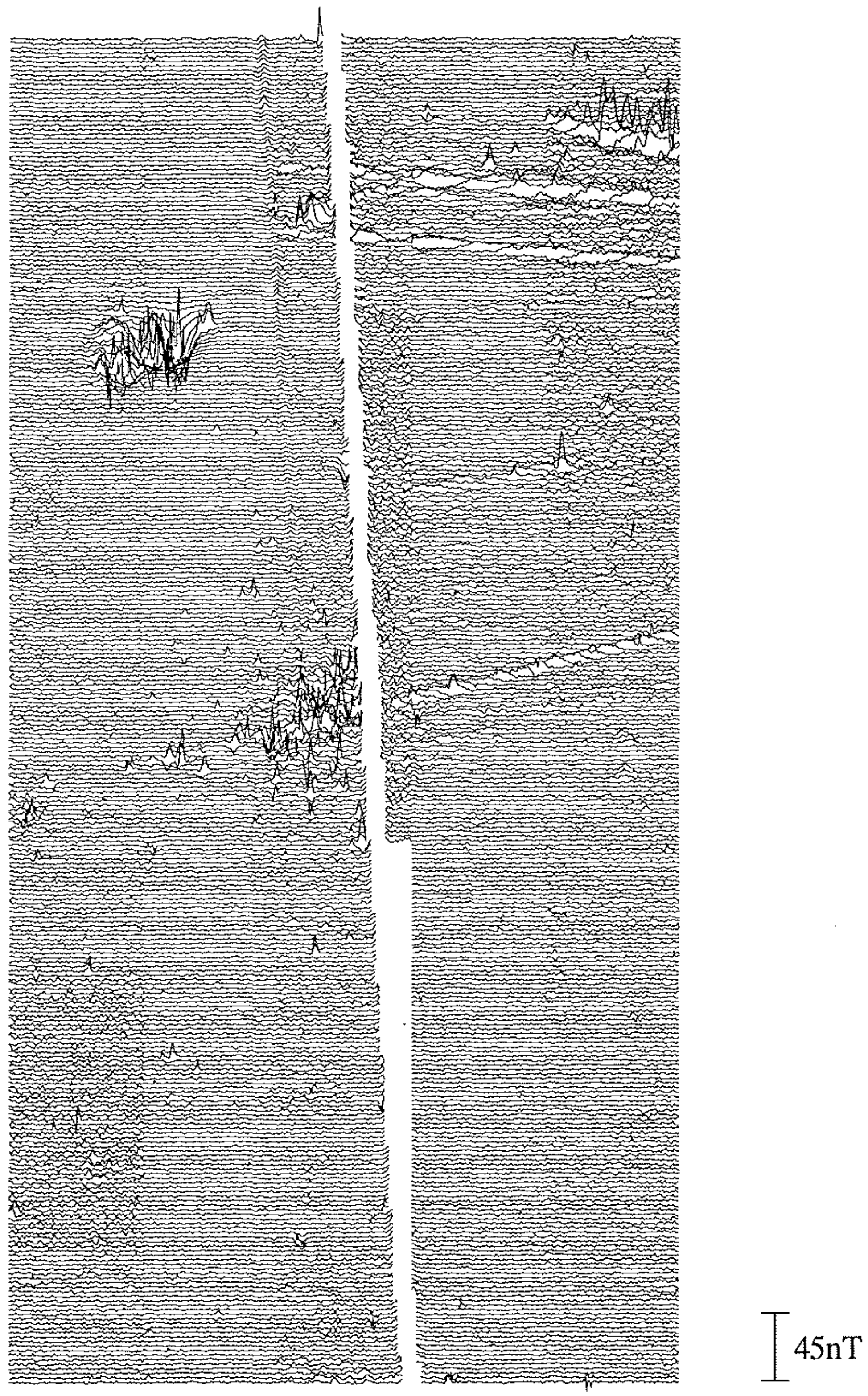








2. Traceplot of raw magnetometer data.



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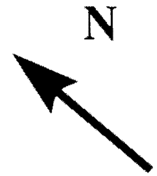
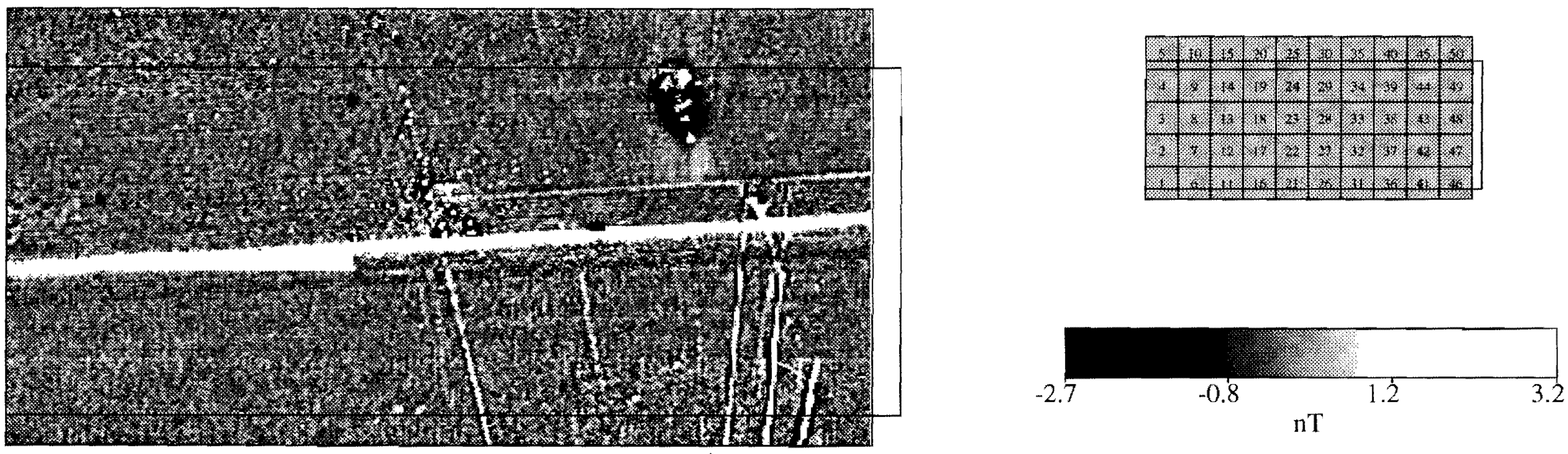
Comparison of geophysical and flint data.

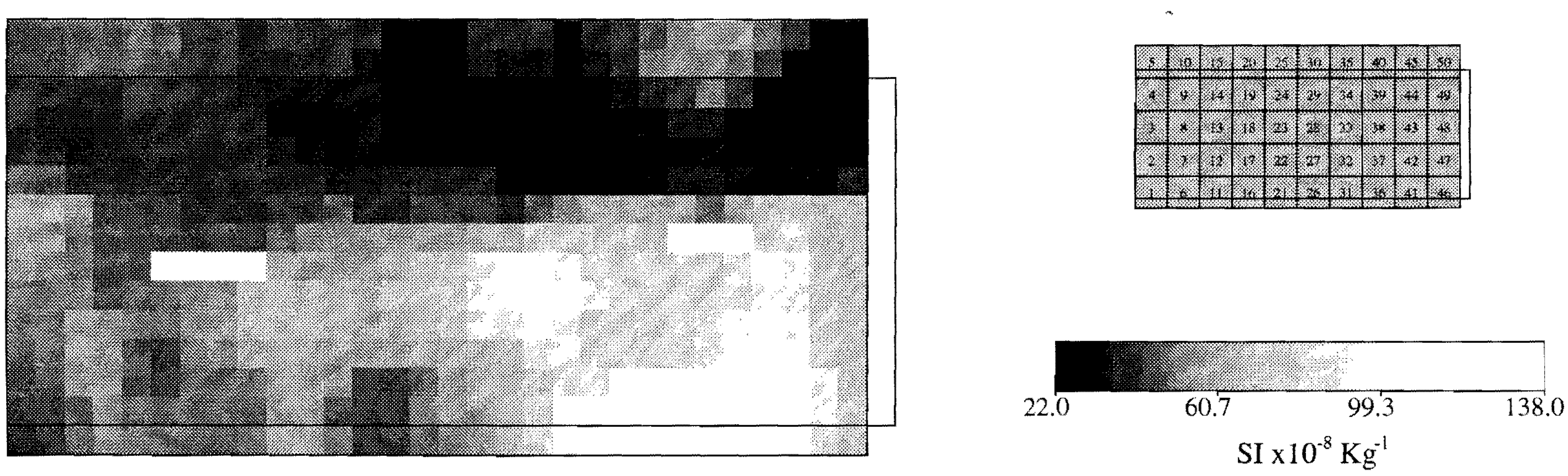
FIGURE 4.



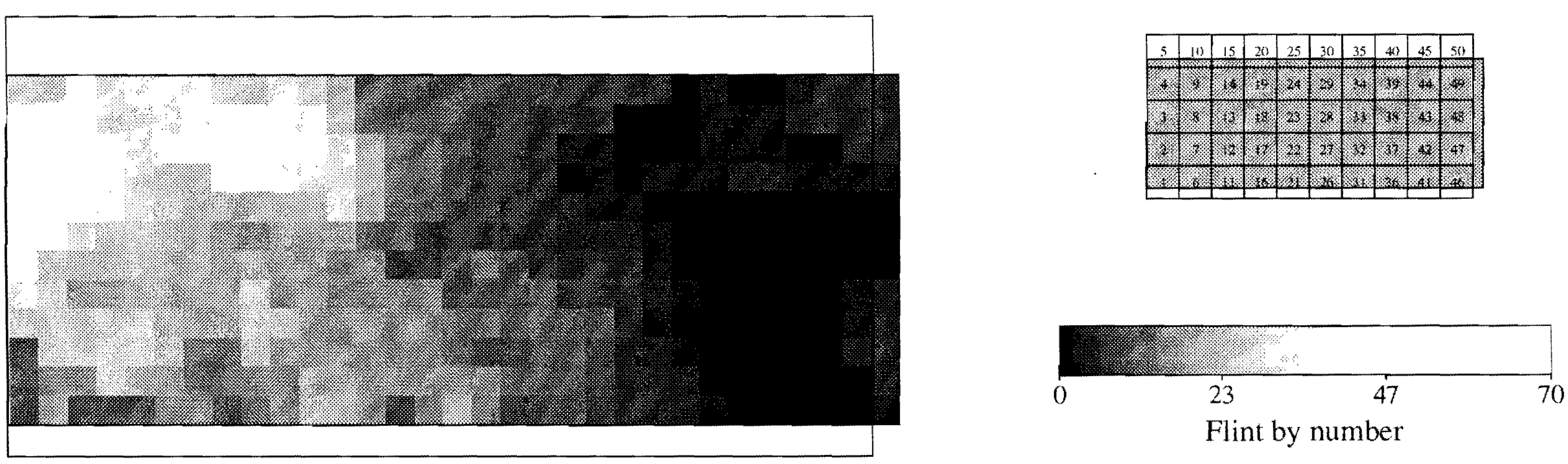
1. Greyscale of raw magnetometer data.



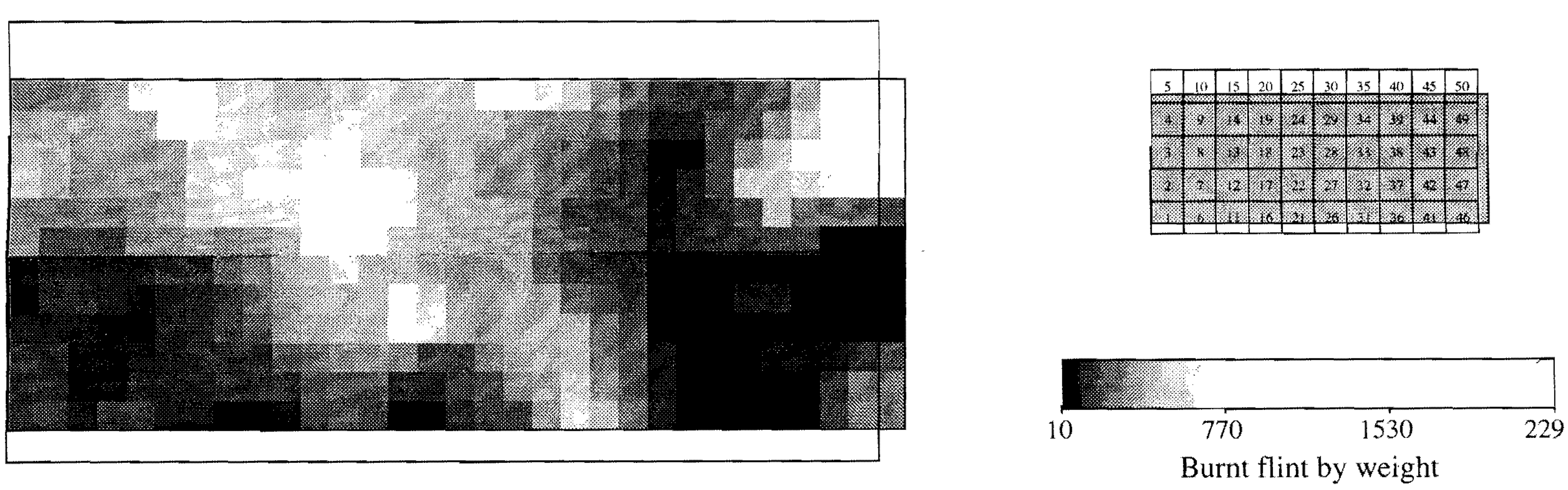
2. Greyscale of filtered magnetic susceptibility data.



3. Greyscale of filtered flint data.



4. Greyscale of filtered burnt flint data.



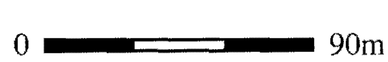


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FIGURE 5.

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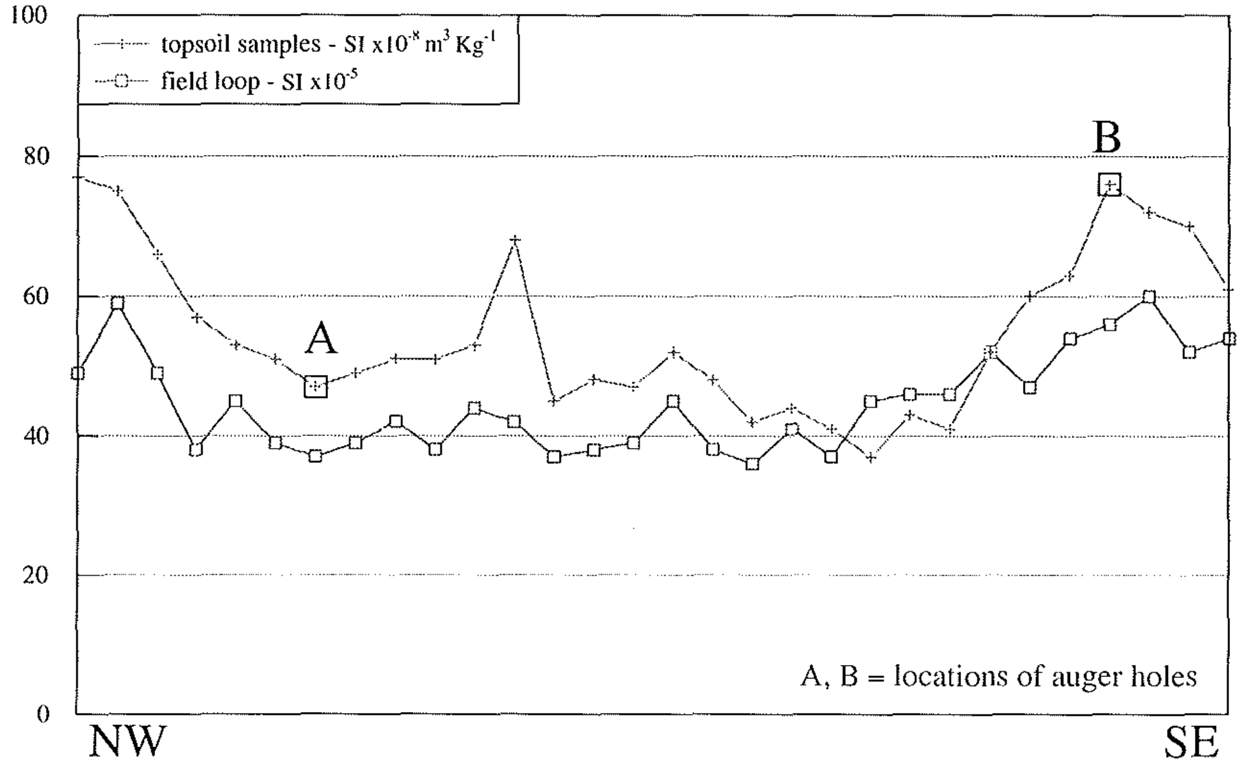
Magnetic susceptibility survey.

1. Graphs of topsoil and field loop MS.



2. MS results from auger hole samples.

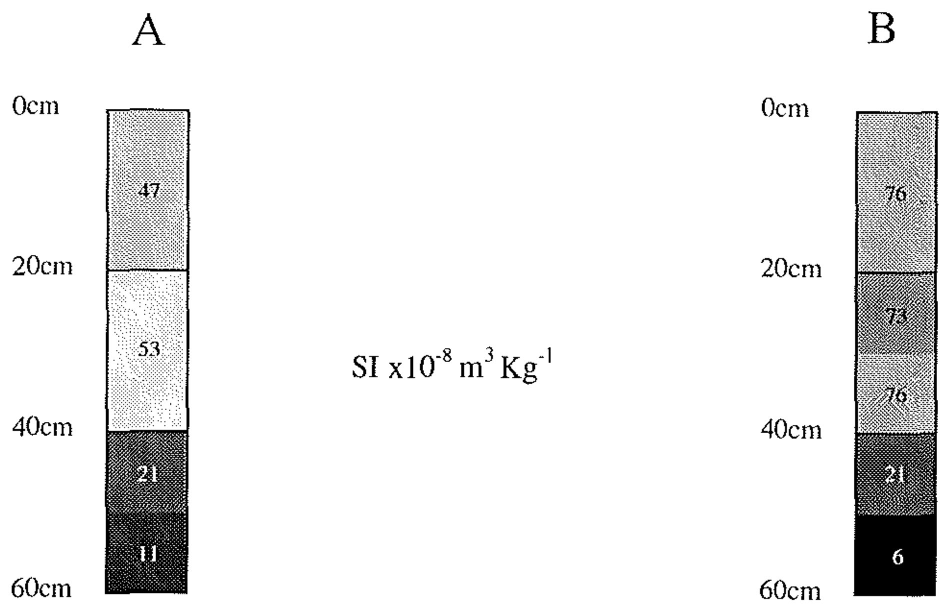


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FIGURE 6.

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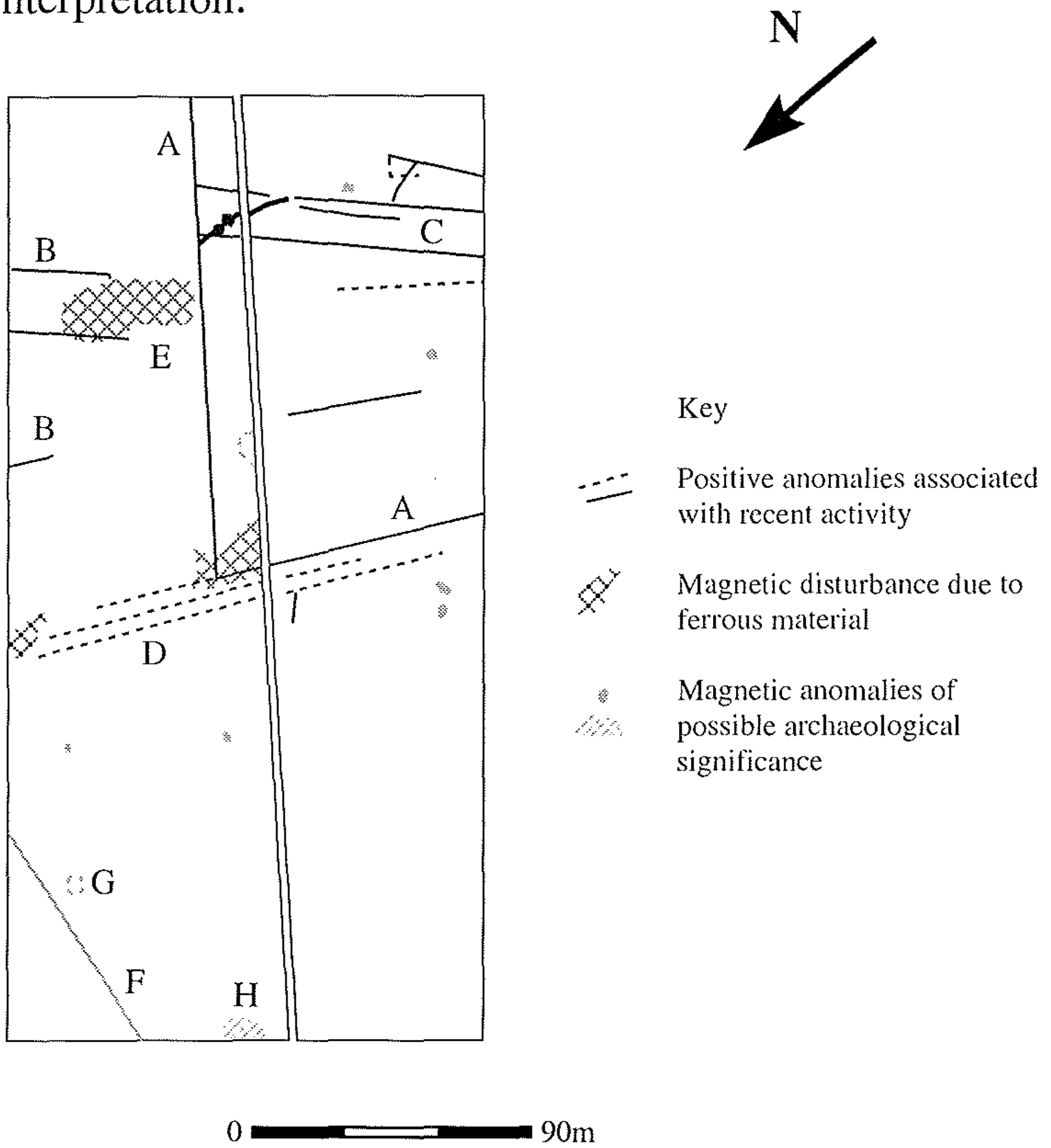
Magnetometer Survey, November 1995.

Interpretation.



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