



**GEOPHYSICAL SURVEY OF THE BEACON,
GRINGLEY-ON-THE -HILL, NOTTINGHAMSHIRE**

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ABSTRACT

A fluxgate gradiometer survey was carried out at The Beacon, Gringley-on-the-Hill, Nottinghamshire. The work was undertaken in September 2017. The purpose of the survey was to determine the nature and extent of any archaeological deposits that lie within the area immediately surrounding the Beacon based on known historical information.

The gradiometer results produced few anomalies that resemble anything related to the Beacon that is not already known. The majority of the anomalies recorded reflect modern ferrous responses from fences, barbed wire and other ferrous material within the soil.

On the beacon, two zones of high magnetic responses were recorded possibly denoting bonfires relating to a beacon that once stood on top of the mound.

The area to the east, two highly magnetic signatures were recorded denoting the presence of burning that may represent a kiln or hearth of unknown date.

Other activity on the mound showed signs of rabbit and sheep activity on the western and northern sides of the mound that appear to be contributing to the subsidence and erosion occurring in these areas.

No other anomalies of archaeological significance were recorded.

1.0 INTRODUCTION

Gringley-on-the-Hill History Club commissioned Cranfield Forensic Institute, Cranfield University to undertake a gradiometer survey of The Beacon and its immediate surroundings (Fig 1: NGR SK 74178 90798). This work was carried out in September 2017.

The purpose of the survey was to determine the nature and extent of any archaeological deposits relating to the remains of the Beacon.

The survey methodology described in this report was based upon guidelines set out in the English Heritage document ‘*Geophysical Survey in Archaeological Field Evaluation*’ (EH 2008).

2.0 LOCATION AND DESCRIPTION

Beacon Hill lies at the eastern end of the village of Gringley-on-the-Hill. It is approximately equidistant between the settlements of Bawtry and Gainsborough (6 miles (10km)) and lies approximately 8.5 miles north-east of Retford. The village of Gringley on the Hill looks over the Vale of the Trent.

The site is comprised of a natural mound known as Beacon Hill which drops away steeply to its north side into the Vale of the Trent. To the east of the Beacon the

ground is relatively flat and contains the present waterworks and reservoir whilst to the west lies the main village centre.

The underlying geology of the site is underlain by Mercian Mudstone. The superficial deposits that overly the bedrock is comprised of a slither of Glacial Fluvial Deposits (Sand and Gravel) that occupies the ridge on which the village stands whilst at the western end and to the south of the A631 is an outcrop of Diamicton (formerly Glacial Till) (Geological Map Data ©NERC 2017).

3.0 BACKGROUND INFORMATION

Beacon Hill Camp is a natural mound that has existed since the Bronze Age (2500BC - 800BC). It is listed as a Scheduled Ancient Monument (Mon No. 1003241) (<https://historicengland.org.uk/listing/the-list/list-entry/1003241>, accessed 9/10/2017).

During the Roman period, the settlement lay in close proximity to the Roman road that ran from Lincoln to Doncaster. The village of Gringley on the Hill is mentioned in the Domesday Book of 1086 (ref) as an average sized settlement consisting of 16 households. In 1252, Henry III granted Gringley a market and annual fair (http://www.castlesfortsbattles.co.uk/midlands/gringley_hill_beacon_hill.html, accessed 9/10/2017).

The mound shows signs of artificial scarping, and possibly traces of a defensive ditch. The function and origin of the mound is unknown but it has been speculated that it could have been an ancient hillfort to a Civil War beacon as a well as a refuge for the villagers during the reign of Stephen and Matilda.

4.0 METHODOLOGY

Gradiometry

Gradiometry is a non-intrusive scientific prospecting technique used to determine the presence/absence of some classes of sub-surface archaeological features (eg pits, ditches, kilns, and occasionally stone walls). By scanning the soil surface, geophysicists identify areas of varying magnetic susceptibility and can interpret such variation by presenting data in various graphical formats and identifying images that share morphological affinities with diagnostic archaeological as well as other detectable remains (Clark 1990).

The use of gradiometry is used to establish the presence/absence of buried magnetic anomalies, which may reflect sub-surface archaeological features.

The area survey was conducted using a Bartington Grad 601 dual fluxgate gradiometer with DL601 data logger set to take 4 readings per metre (a sample interval of 0.25m). The zigzag traverse method of survey was used, with 1m wide traverses across 20m x 20m grids. The sensitivity of the machine was set to detect magnetic variation in the order of 0.1 nanoTesla.

The enhanced data was processed by using zero-mean functions to correct the unevenness of the image in order to produce a smoother graphical appearance. It was also processed using an algorithm to remove magnetic spikes, thereby reducing extreme readings caused by stray iron fragments and spurious effects due to the inherent magnetism of soils. The data was also clipped to reduce the distorting effect of extremely high or low readings caused by discrete pieces of ferrous metal.

5.0 INTERPRETATION AND ANALYSIS OF RESULTS (Figs. 2-7)

Four areas were surveyed: The Beacon, area to the south, to the east and to the north of the Beacon were investigated.

Gradiometer results

Generally, a series of isolated individual anomalies and strong magnetic responses were detected in all of the survey areas (Figs 2-7, examples **circled/outlined in red**). These reflect areas of modern ferrous litter, which lie just below or on the present ground surface or modern disturbances relating to fencing and buried barbed wire.

South of Beacon

The triangular area to the south of Beacon Hill did not produce any significant magnetic anomalies of an archaeological nature. Most of the magnetic signatures denote modern ferrous (for example barbed wire).

The Beacon

An area covering about c. 20m x 30m on top of the Beacon revealed highly magnetic responses (Figs 2, 4 and 7, **1**) that denote zones of burning probably caused by bonfires. At the western end a wooden post could be seen where it had been sawn off at its base. This is probably the remnants of the former beacon that once stood on top of the mound prior to being moved closer to the road today.

East of Beacon

Area to the east of the mound and immediately north of the water reservoir, two distinctive magnetic signatures were detected (Figs 2, 5 and 7, **2**). The trace plot (Fig 5, circled red) depicts a double peak which is normally associated with a kiln or hearth. It is also quite feasible that this may reflect a modern feature.

North of Beacon

To the north of the mound is a triangular field where a 20m wide x 60m long strip was surveyed to determine if there were any archaeological remains situated in this area close to the Beacon.

The results revealed no significant archaeological anomalies. Most of the magnetic responses (Figs 2, 6 and 7) denote modern ferrous deposits within or on the ground surface.

6.0 CONCLUSIONS

Based on the survey results, it can be concluded that few remains were recorded that appear to be of archaeological significance. Most of the anomalies reflect modern ferrous responses mostly of recent origin. The only significant anomalies detected were those in the area to the east of the mound. These could denote the remains of kilns or hearths of unknown origin. It is suggested that the best way to investigate this further would be undertaking a resistivity survey prior to any intrusive archaeological exploration.

7.0 ACKNOWLEDGEMENTS

Cranfield Forensic Institute, Cranfield University, would like to thank Alan Hickman, Gringley on the Hill History club for this commission. The co-operation and assistance of the landowner, Mr James Arguile, is also appreciated.

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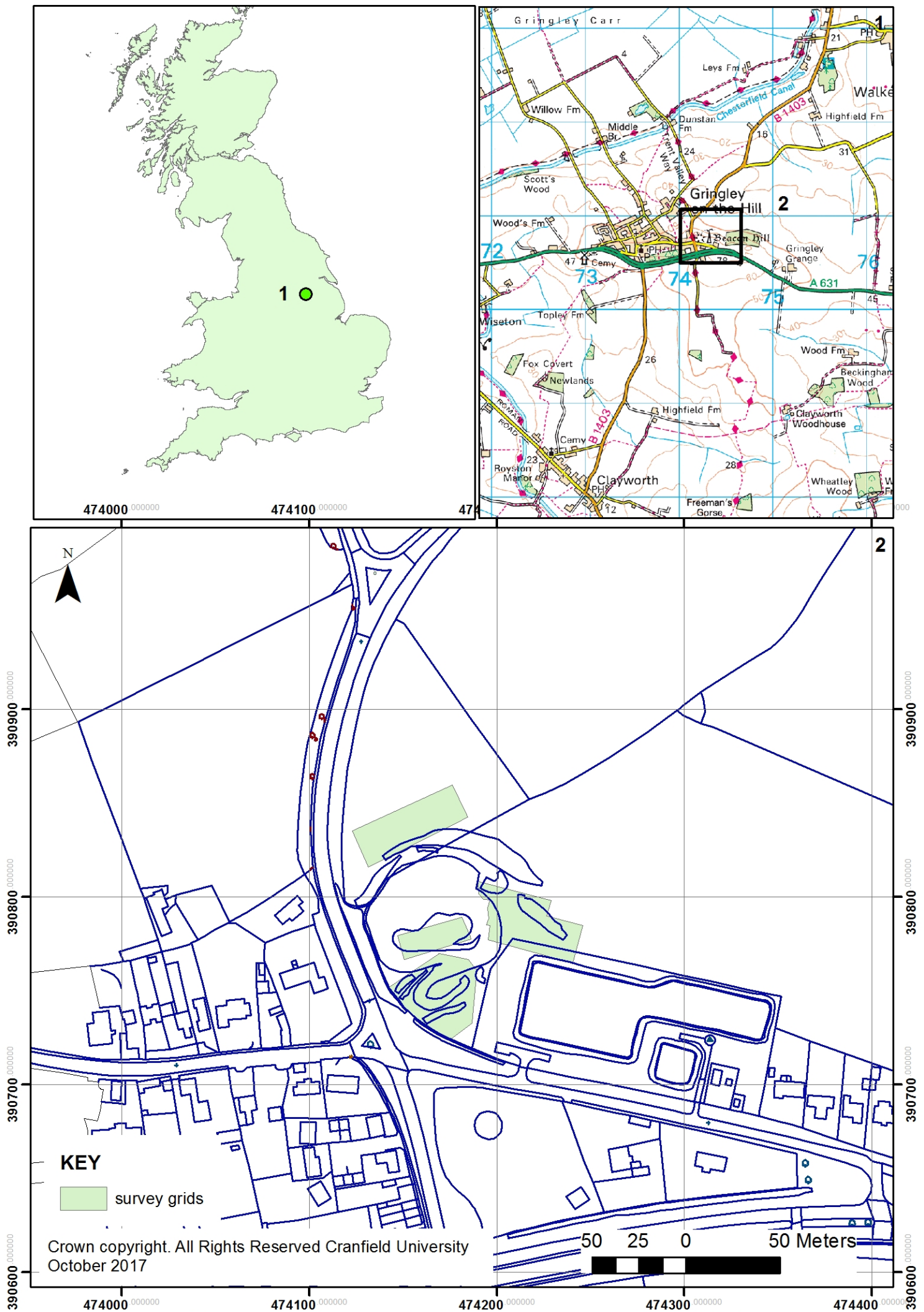




Figure 2: Location of gradiometer survey, scale - 1:1000

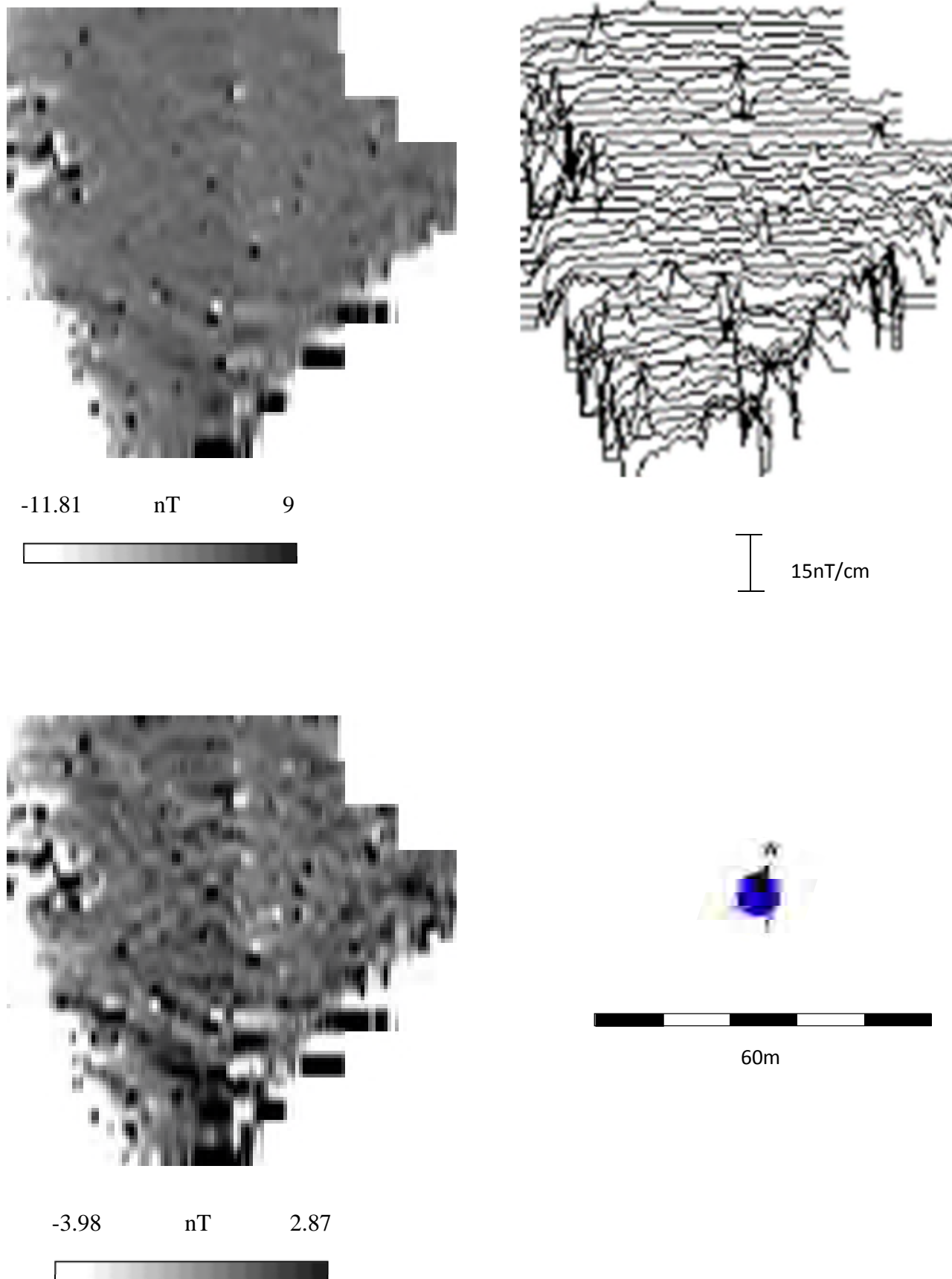


FIG. 3: South of Beacon- Gradiometer Survey – Grey scale and trace plots of raw and enhanced data, scale – 1:500

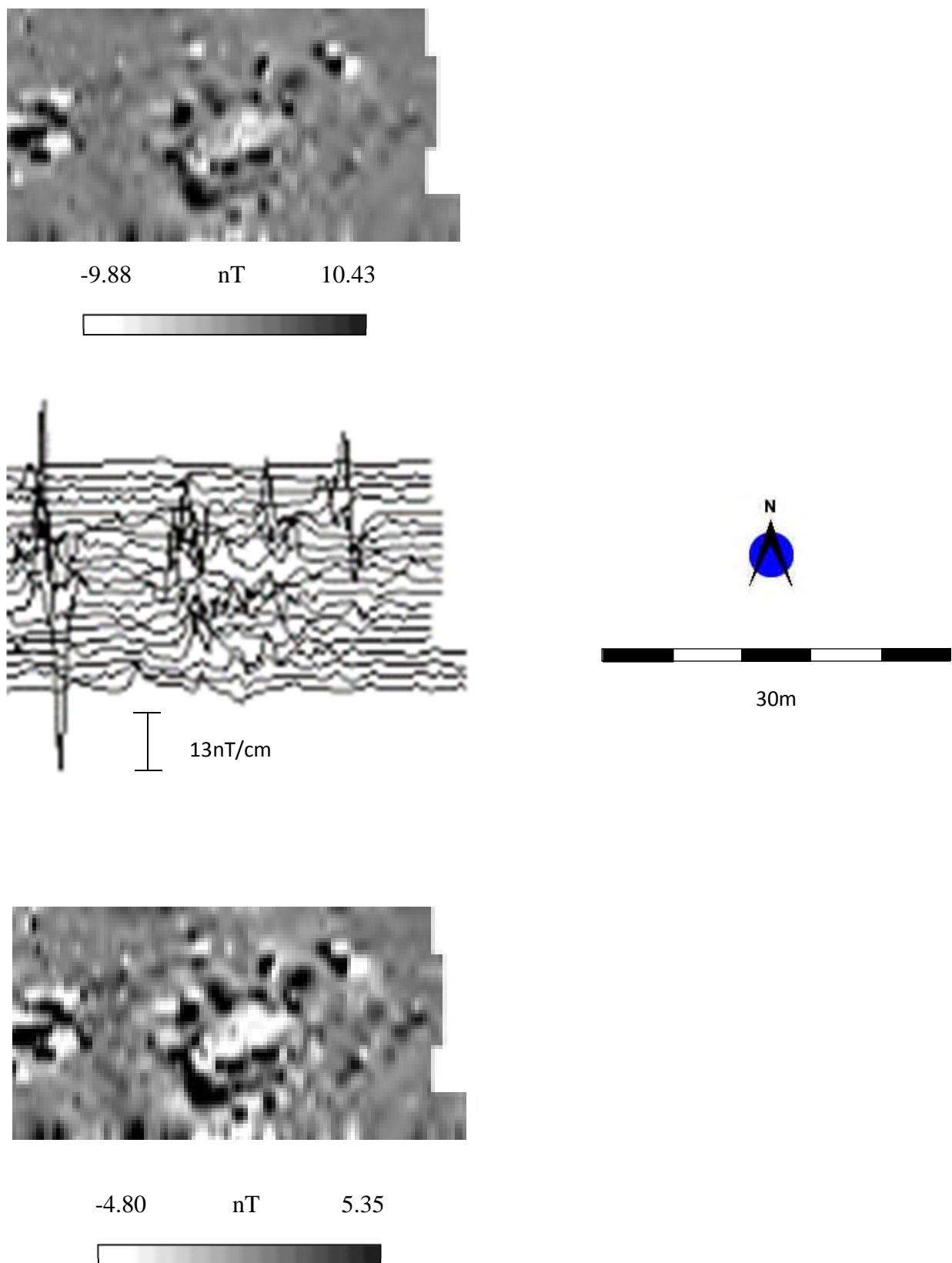


FIG. 4: Beacon - Gradiometer Survey – Grey scale and trace plots of raw and enhanced data, scale – 1:500

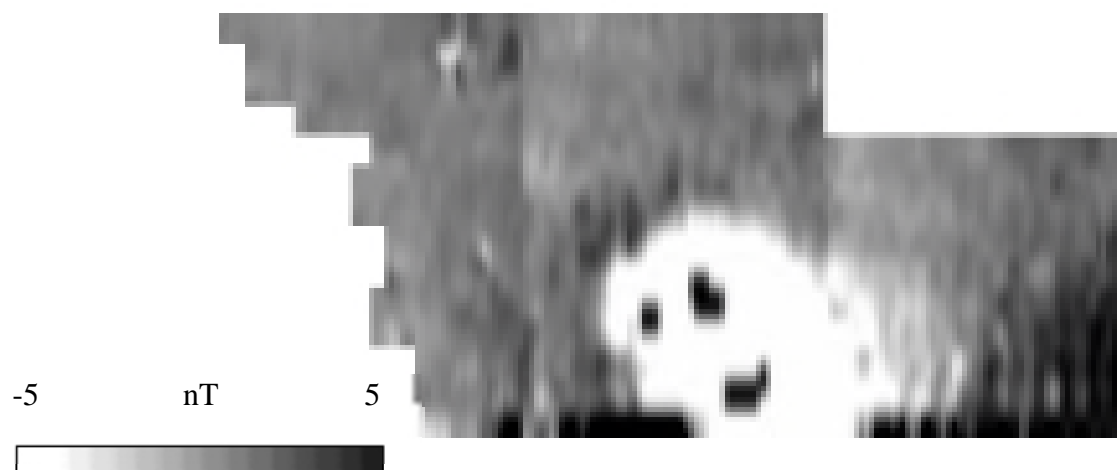
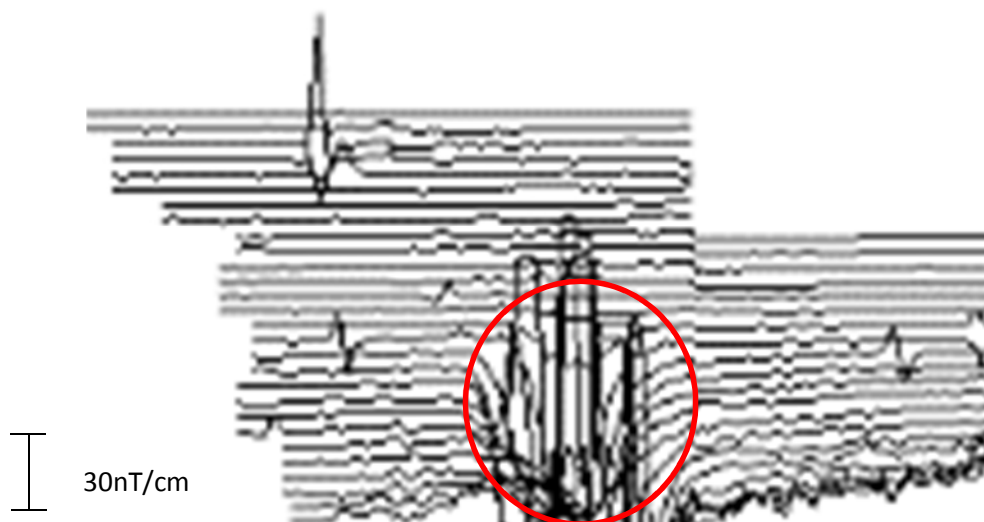
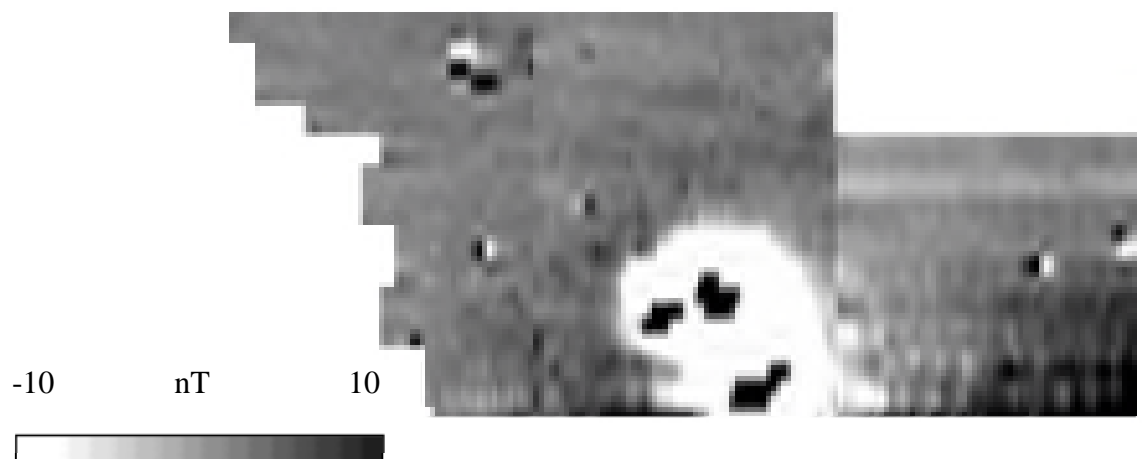
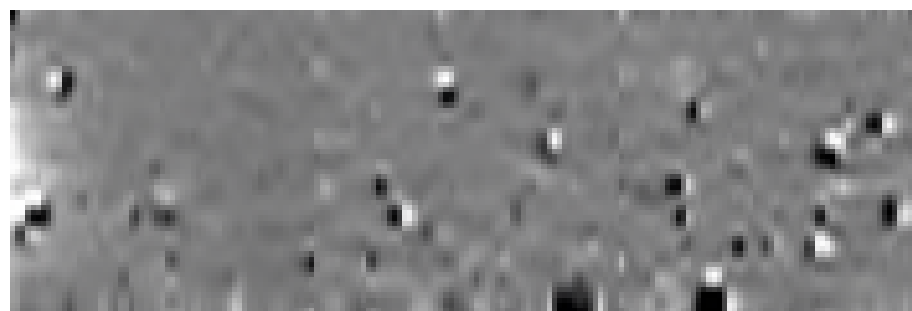
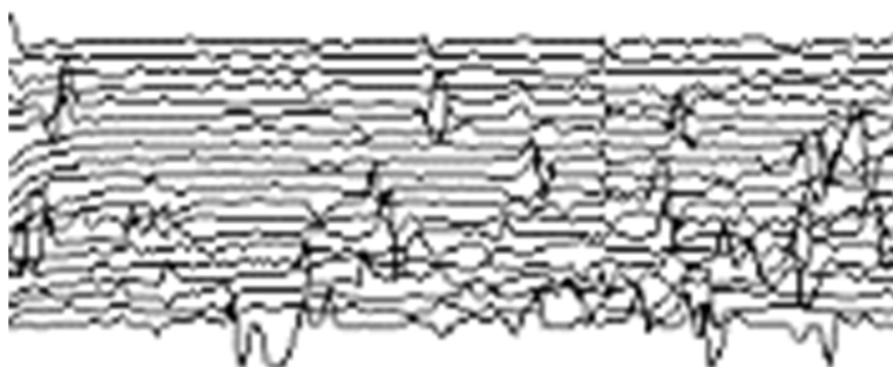


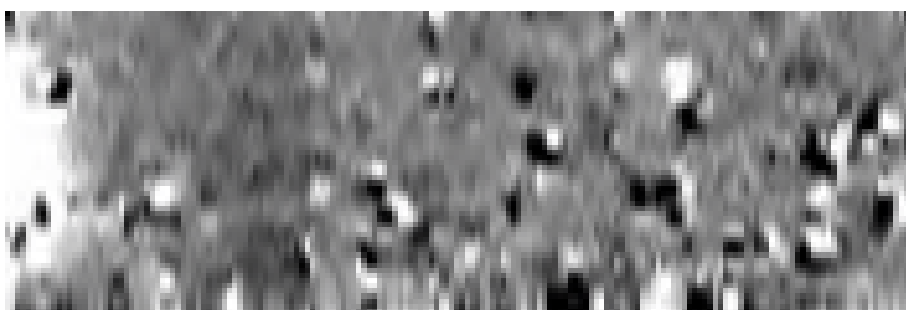
FIG. 5: East of Beacon- Gradiometer Survey – Grey scale and trace plots of raw and enhanced data, scale – 1:500



-10 nT 10



10nT/cm



-2 nT 2



30m

FIG. 6: North of Beacon- Gradiometer Survey – Grey scale and trace plots of raw and enhanced data, scale – 1:500



Figure 7: Interpretation of results, scale - 1:1000