

ABINGDON ARCHAEOLOGICAL GEOPHYSICS
4 Sutton Close, Abingdon, Oxon OX14 1ER
tel. 01235 529720 archgeophys@hotmail.co.uk

© Roger Ainslie T/A Abingdon Archaeological Geophysics 2020

Short Report form no. 2020-05



Name of site: Port Meadow WW1 aerodrome

County: Oxfordshire
NGR grid reference Centred on SP48800921
Nearest postcode. OX2 8PU.

Start date: 5 September 2020 End date: 8 October 2020 Report date: 22 October 2020

Summary

Magnetometry and earth resistance surveys detected the locations of timber huts, a corrugated iron building, canvas aircraft hangars and a firing range which had been removed approximately 100 years ago.

The survival and detectability of the Port Meadow aerodrome's locations of temporary canvas and corrugated iron structures is surprising. It has probably been assisted by the use of cinder and ash for surfacing and the area not having been ploughed, which may have lessons concerning the survival of remains in other grassland areas.

Background

There are many remains on Port Meadow, ranging from Bronze Age barrows to possible stays for 20th century anti-glider poles. This report will restrict itself to the September and October 2020 geophysical survey of the area of the First World War flying training aerodrome.

This is in our short report format as it is designed so others can use the information for their

researches. More detail concerning techniques can be found in our e-book "Archaeology - in the Service of Property Development?"

Copyright

Air photo reproduced by kind permission of The Shuttleworth Trust. The report and survey illustrations are the copyright of Roger Ainslie T/A Abingdon Archaeological Geophysics. The clients may use it for any purpose they wish. Other people must ask us first.

Acknowledgements

We would like to thank Peter Smith and the Wolvercote WW1 Aerodrome Memorial Project for asking us to carry out the survey. We would also thank the City Council and Freemen of Oxford for permitting access for this purpose.

Survey Details

Geology at site

The British Geological survey give this as being Oxford Clay Formation and West Walton Formation (undifferentiated) - Mudstone, covered by Northmoor Sand And Gravel Member - Sand And Gravel and Alluvium - Clay, Silt, Sand And Gravel.

An inspection of the river bank indicates that it is limestone gravel which is covered with a brown/red brickearth type deposit which is in turn covered by alluvium, although the alluvium is not thick and may be concentrated in former ditches.

Known archaeological sites / monuments covered by the survey

This area is a Scheduled Ancient Monument number 1010717 and a Section 42 consent has been obtained for the survey ref no: SL00231554.

The Scheduling was in 1990 and concentrates on the prehistoric remains but does not mention the First World War aerodrome there. Peter Smith's book *Oxford's Lost Aerodrome* (2019), gives details of his researches on the aerodrome and casualties. The presence of the aerodrome which had upto 60 aircraft and 800 personnel otherwise appears to have disappeared from public consciousness. There was some memory of it as R. J. C. Atkinson's article *Archaeological Sites on Port Meadow, Oxford*, *Oxoniensia* 1942, p32, suggested that a layer of blue clay at the top of a prehistoric ring ditch was put there to level the ground for its use as an emergency landing ground in the war of 1914-1918.

Archaeological sites / monument types detected by the survey:

First World War aerodrome buildings, canvas hangar remains and firing butts. Ring ditches and other ditches of presumably prehistoric date.

Surveyor: Abingdon Archaeological Geophysics, Roger Ainslie, Sally Ainslie

Name of client: Wolvercote WW1 Aerodrome Memorial Project.

Purpose of survey:

To ascertain if magnetometry was likely to reveal any archaeological remains in the area centred on the known First World War site. A small area of resistivity was also carried out. These techniques were considered suitable for shallow remains in what could have been a damp area. As it was, the ground was drier than the Scheduling description implied.

Records. Location of:

a) Primary archive, i.e. raw data, electronic archive etc: Abingdon Archaeological Geophysics. Also with client.

b) Full report: ditto

Technical Details

Type of survey

A Magnetometer

Area surveyed, if applicable 7.46 hectares. Traverse separation, if regular: 1 metre

Reading / sample interval: 8 per metre

Type, make and model of instrumentation:

Bartington Grad 601/2

B Earth Resistance

Area surveyed, if applicable 0.1 hectares Traverse separation, if regular 0.5 metre

Reading / sample interval: 2 per metre

Type, make and model of instrumentation:

TR Systems/CIA resistance meter. Twin probe array, 0.5 metre mobile probe separation.

Land use at the time of survey: Grass, pasture.

Additional remarks: 30 metre grids. First line start NE corner going south zig zag.

Grids aligned on national grid. Bottom sensor approx 25cms above ground surface.

Results (refer to plans below)

The survey plans are given as overall plans and also by dividing the area into 4 sections. These smaller areas enable more detail to be seen as they have been processed differently and are at the 1:1000 scale which was the minimum in the, now withdrawn, English Heritage 2008 Guidance.

A diagonal line of narrow grids was surveyed to see if a runway area had been levelled using ash and clinker. We couldn't find any evidence of it being in our survey area.

The Central, Eastern and Western areas focus on the main First World War aerodrome site, the Southern area is where the aerodrome firing range/butts were located.

Magnetometry

Central area

- 1 Track. Probably ash and cinder, although the metamorphic stone chipping surface is visible in places.
- 2 Possible gully around a building.
- 3 Path, probably cinder becoming thicker to south.
- 4 Rectilinear anomalies - presumably related to the instructional and administrative huts there.
- 5 Sections of iron pipes - probably water pipes.
- 6 Rectangular area of higher readings. Understood to be the vehicle park/yard, which appears to have had a cinder surface. Probable rainwater gully to its SE side and a large piece of iron or similar in its NW corner.
- 7 Rectangular area of slightly higher readings. Understood to be a canvas Bessonneau aircraft hangar. As the survey lines were 1 metre apart the single vertical axis magnetometer sensors detected the anomaly beneath them causing the dotted appearance of some of the edges. There is a possible smaller rectangular pattern of high anomalies to its SW, which may have been another similar structure. The large hangar which is known to have been here in 1918 has not been detected.
- 8 Irregular area of high readings. Possibly where rubbish has been put into a gravel pit.
- 9 Square arrangement of high readings. Possibly piers for a timber hut.

- 10 Blank areas where hangars were. These are defined by the higher readings outside them. The western hangar has corners at approximately West 826E 221N: North 840E 237N: East 857E 221N: South 843E 206N. (Eastings preceded by 448 and northings by 209).
- 11 Narrow long anomalies. Presumably cinder tracks to give access from the hangars onto the flying ground.
- 12 Large rectangular arrangement of high readings. Presumably brick supports or padstones for the corrugated iron RFC 1915 Pattern Flight Shed which was there. There are slight lines of higher anomalies running from front to back of this area which could be the traces of floor joists. Its approximate locations are; West corner at 786E 181N: North corner at 819E 211N: South corner at 802E 167N: East corner at 835E 197N. (Eastings preceded by 448 and northings by 209).

Eastern Area

- 13 Access ramps as 11 above, but getting less magnetically visible further east.
- 14 Surfaced paths between hangars.
- 15 Hangars also getting less magnetically visible further east.
- 16 Circular feature. Purpose unknown, but between and straddling the sides of 2 hangars. Possibly a pit with demolition material.
- 17 Curving gully. Purpose unknown.
- 18 One of many pieces of iron. Some of these may have been steel pegs to stop the hangars from blowing away in high winds.

Western Area

- 19 Large piece of iron.
- 20 Small pieces of iron.
- 21 Area of huts, as 4 above.
- 22 Possibly brick piers for a hut.
- 23 Possibly a surface water soak away to drain the car park. It may be made of ceramic field drains and any magnetic signal from the drain has been swamped by that of the ash which accumulated in it. Inspection of the trace plot indicates that it may be approximately 0.75 metres beneath the ground surface.
- 24 Slight indications of magnetic material, possibly around a temporary building.
- 25 Probably a ditch which is either cut through the magnetically responsive topsoils into less responsive gravel or, more likely one with alluvium in its fill. It is less visible in the part of its curve where it goes N-S as this was also the orientation in which the magnetometers were carried.
- 26 Small straight gully. Purpose unknown.

Southern Area

- 27 Probably a track with the eastern ditch having more magnetic material than the western one.
- 28 Possibly an L-shaped ditch. These have only been recognised in the past 10 years or so. They are not 90 degrees and may possibly have some alignment such as midwinter and midsummer sunsets.
- 29 Continuation of alluvium filled ditch 25 above.
- 30 Probably a pit.
- 31 Probably the brick base of the firing range structures. SW end at 448620E 208991N NE end at 448644E 209015N.
- 32 Ring ditch. Probably an Iron Age house as it has several recuts. It is one of several ring ditches in this area. Magnetometry typically finds 3 times more on a site than is known from air photos.
- 33 Straight ditch. Could be part of something larger which is not in the survey area. In this area anomalies are stronger near the settlement as the soil is more magnetically enhanced there.

- The features are still there but less detectable further away.
- 34 Probably modern path routes where people have dropped ferrous litter.
 - 35 Probably a First World War aircraft compass setting/calibration circle. There are 2 pieces of ferrous material at the edge of the circle. There appear to be several other pairs of pieces of iron with approximately 5 metres between them in the survey area.
 - 36 Unknown small sub-circular ditched feature. It may be prehistoric but it could also be related to possible Second World War defences on the Meadow.

Earth resistance

- 37 The path as 3 above. Here it shows as a high resistance, drier feature.
- 38 Areas of low earth resistance readings. The southern one is in the car park area, as 6 above, although here it is damper than the surrounding soil. This indicates that the car park surfacing may be impeding rainwater percolation. There are other rectangular low resistance areas and these may relate to different surfaces.

Surface features

There are few of these. The main one is the access track, which partially still forms a vehicle/path route. The ground surface to the north of the survey area is undulating although this appears to bear no great relationship to the features detected. There is a steel ring, presumably for securing aircraft to stop them blowing over, in the path at 448875E 209229N. The access to a presumed stop cock or similar is at 448760E 209210N. An animal scrape at 448853E 209203N reveals that there is a layer of approx 10cms of ash and clinker there. Further to the east is a small concrete structure which was a shelter for the people who set targets in the nearby ditch.

There is slab of concrete which appears to be some 10m E-W and 5m N-S near the firing range and centred on 448684E 208989N. This is invisible to magnetometry, which brings into question what else has not been detected. Earth resistance should stand a better chance of locating it. It may even not be related to the aerodrome.

Conclusions

There have been other geophysical surveys of other early 20th century aircraft hangars. The survey of the Wright brothers' hangar didn't find much as it appears that the US military had dug a hole and bulldozed the remains into it. The survey of the WW1 Stonehenge aerodrome as part of the Stonehenge Hidden Landscapes Project appears to have located iron pipes and little else, although the scale used in the report is too small to show detail.

Magnetic detection of the aerodrome appears also to have been caused by the presence of coal ash, which may have been used to make the base of the access track, car park and other hardstandings. Low quality coal "nutty slack" contains silt from when the coal measures were deposited. This contains some iron and when this was heated to over 600 degrees C, it became more magnetic. This dust then got into all sorts of places. The ash may have been part of the construction of the facility as the sites of the bell tents are not visible magnetically, although they may have had heating. We appear to have forgotten the degree to which clinker was used as a surface material - even the Iffley Road track in Oxford, where Roger Bannister broke the 4 minute mile record, was a cinder track.

The propensity of people to leave ferrous material outside the hangars, possibly when dismantling them, has left the hangar areas blank. A similar effect was noted in the excavations at Hen Domen where medieval timber sheds were revealed by the blank areas defined by stones which had accumulated around them.

Although many structures were timber huts, they appear to have had bricks in their packing to make them level and these have been detected. There is the possibility that the Flight/Rigging shed may have had a timber floor as the lines of possible joists are just visible. Similarly, the rows of huts are

best seen by the paving of the paths between them.

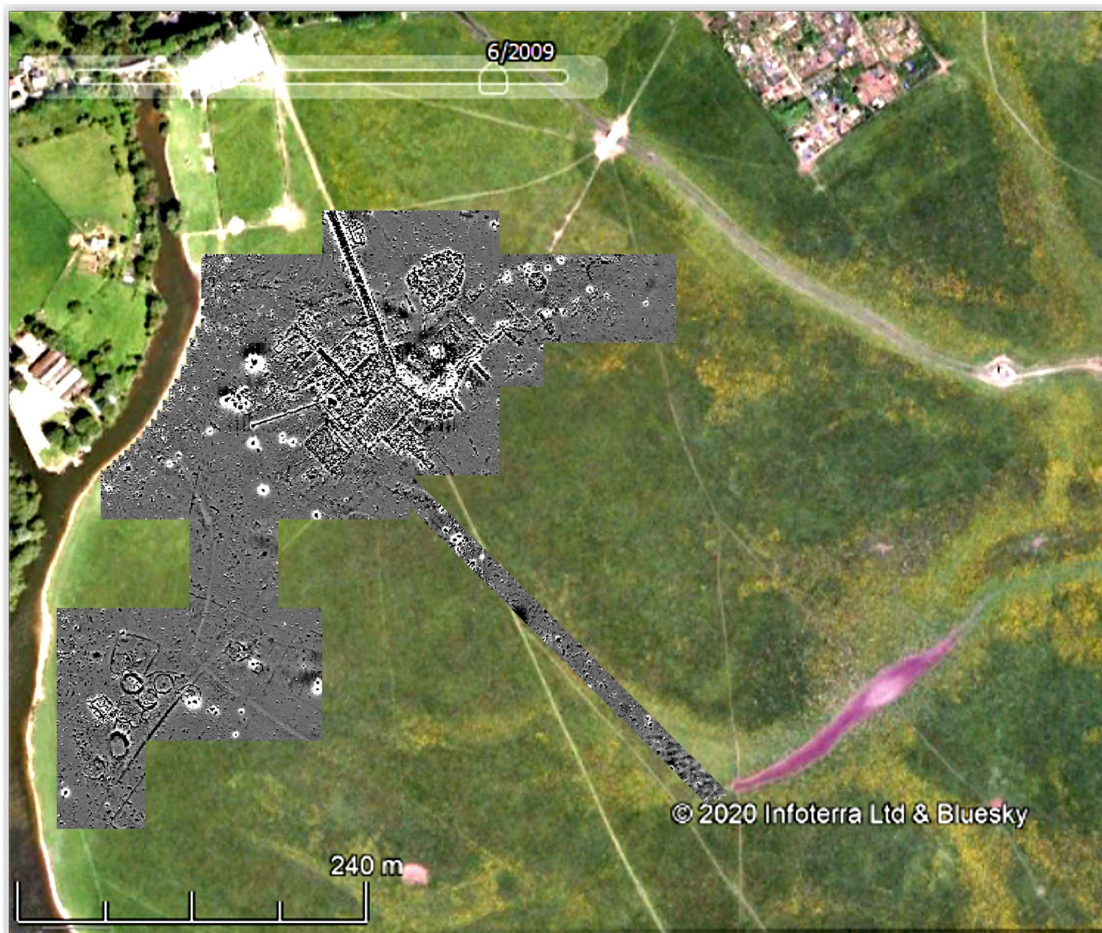
We only have 2 sections of iron pipe visible, which indicates that the rest was removed during the demolition process.

The remains in the south western part of the survey area are more usual, apart from the First World War aerodrome firing range where the brick supports have survived and are detected. There is also one circular feature which would normally be considered to be prehistoric, but might be a compass setting circle for aircraft. The circular ditches have high readings which indicates that they were open long enough to fill with soil which contained magnetic bacteria or had some burnt soil in their fills. One ditch has a wavy course and low magnetic response. Either it was cut into the underlying gravel and has not silted up much, or it has filled with alluvium.

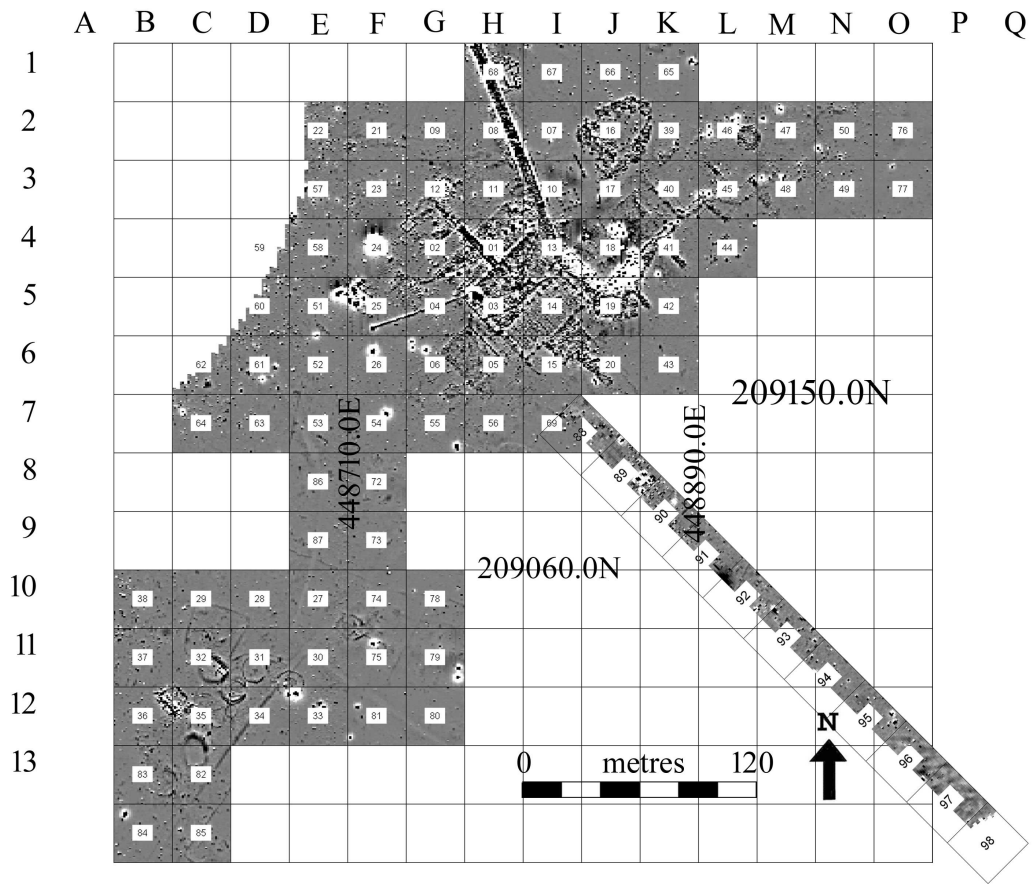
The small amount of earth resistance survey showed that this method would have indicated the presence of paths and a rectilinear arrangement of buildings. We didn't test if it would have produced results in the areas of the hangars where features are smaller.

REMINDER

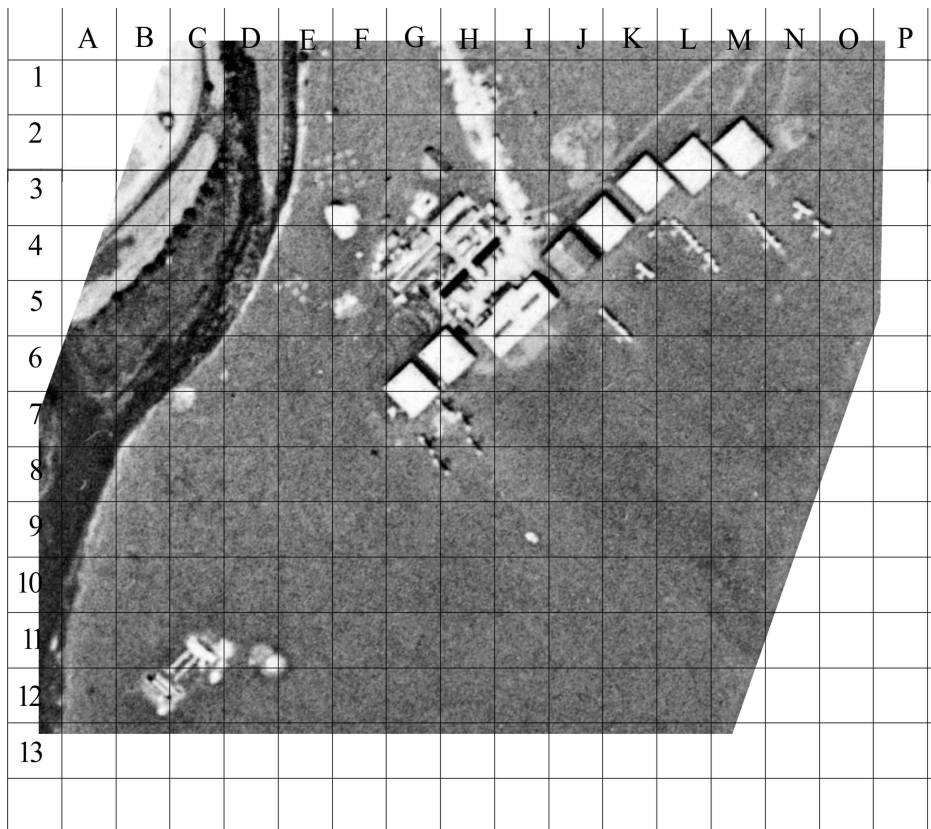
Many features cannot be located by using magnetometry or resistivity. Features including flint scatters and burials may well exist which are not detectable by these survey methods. The failure to locate remains does not mean that they are not there.



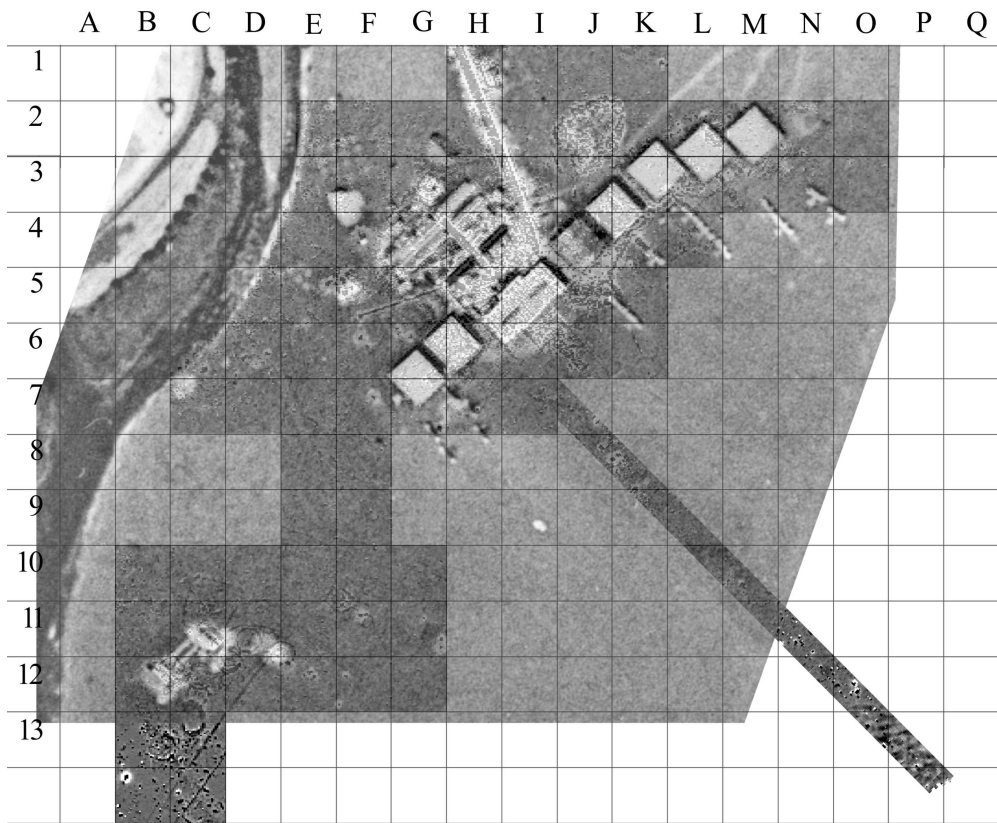
LOCATION on Google Earth base (approx).



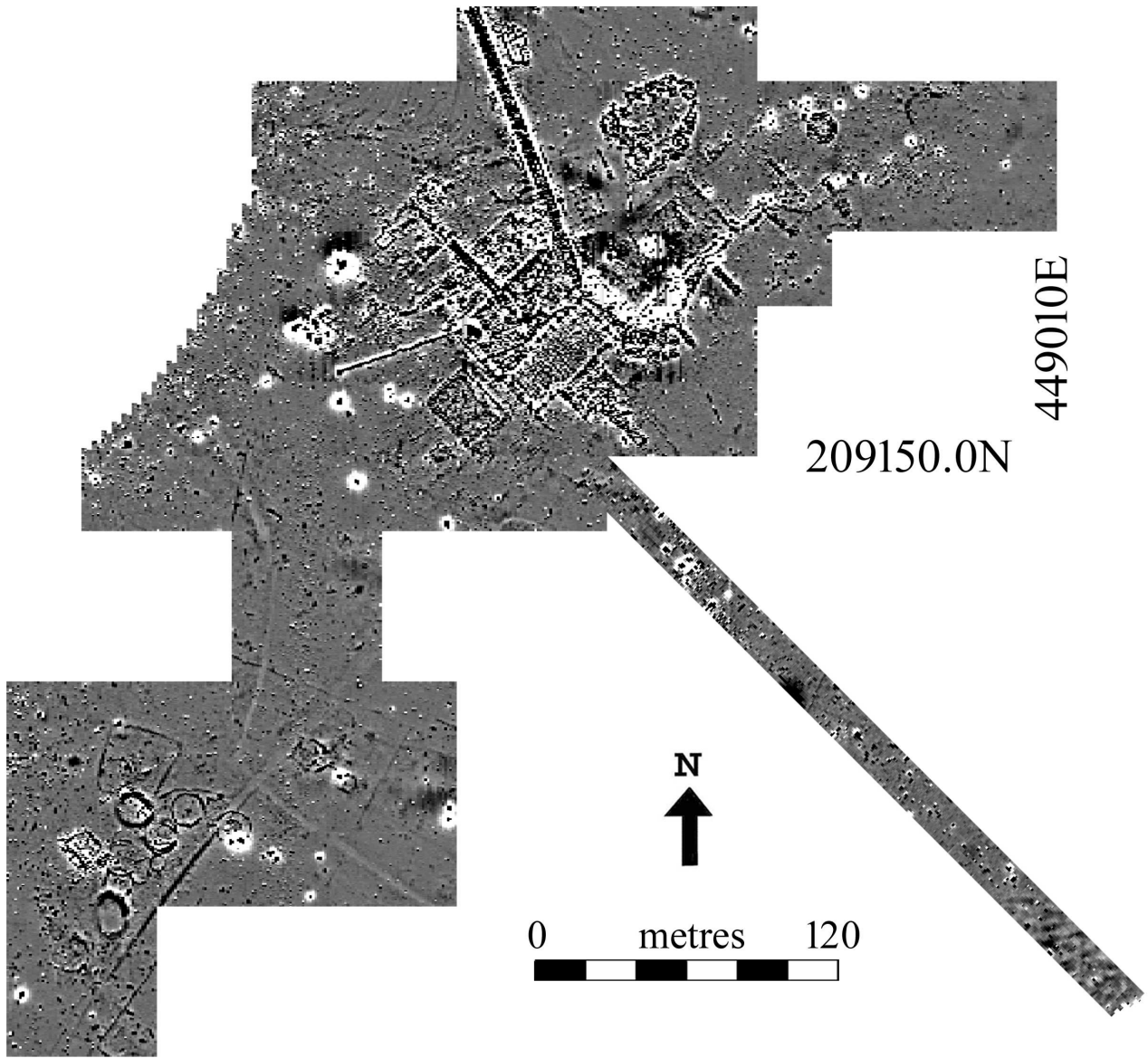
Grid order and location



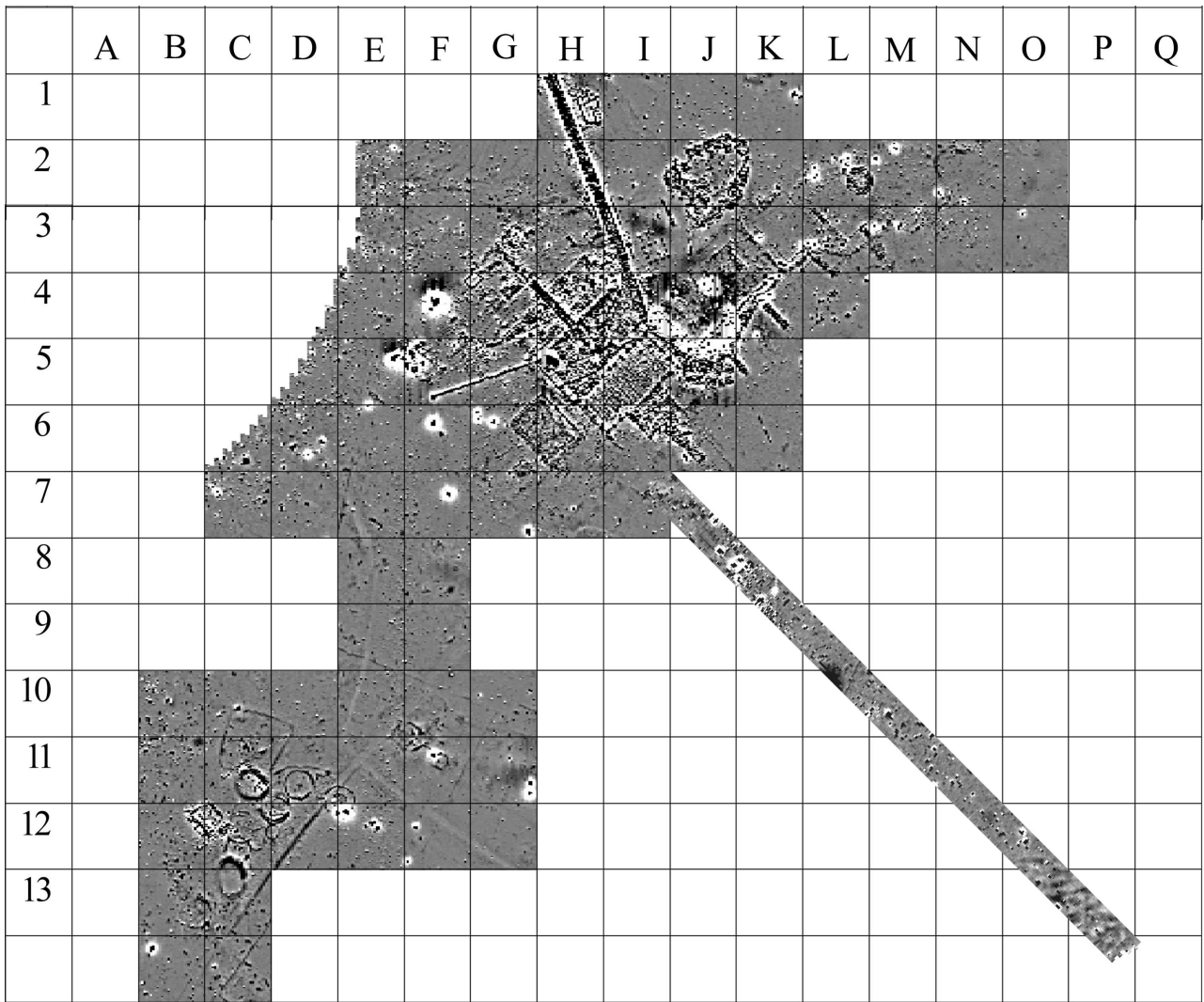
Shuttleworth Collection air photo dated 1918 with grid



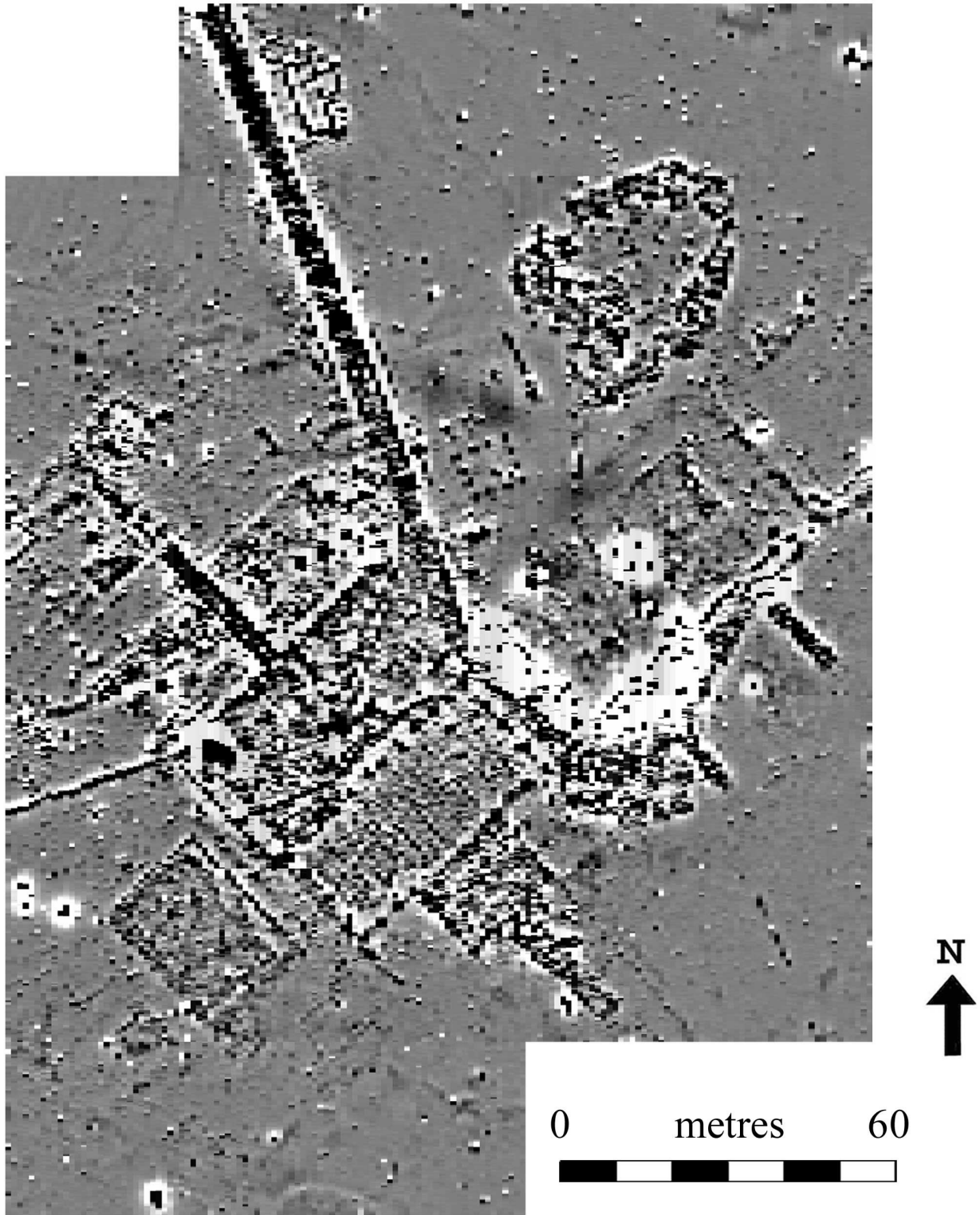
Shuttleworth Collection air photo dated 1918 merged with magnetometry.



All Magnetometry



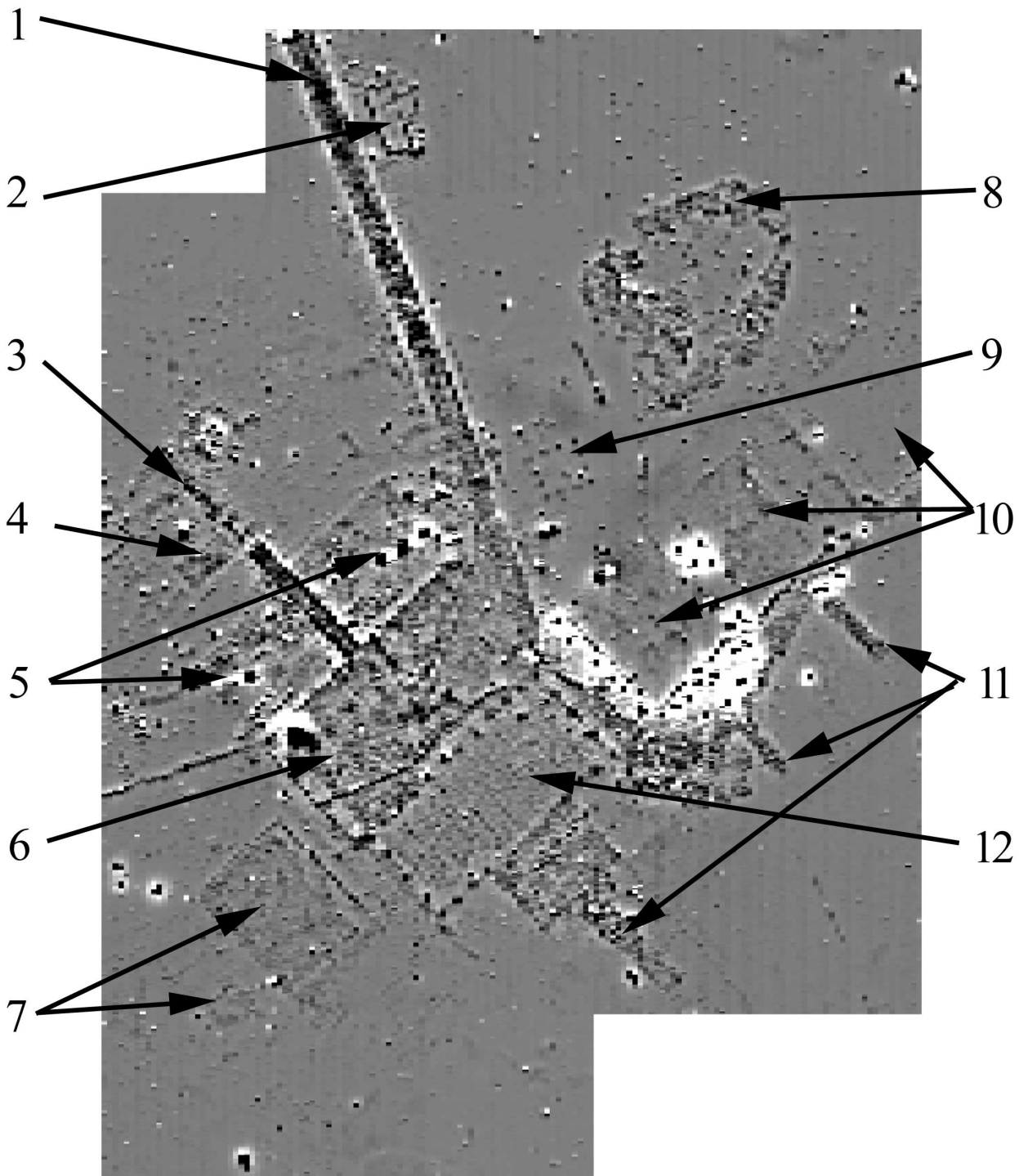
All magnetometry clipped at ± 15 nT with grid



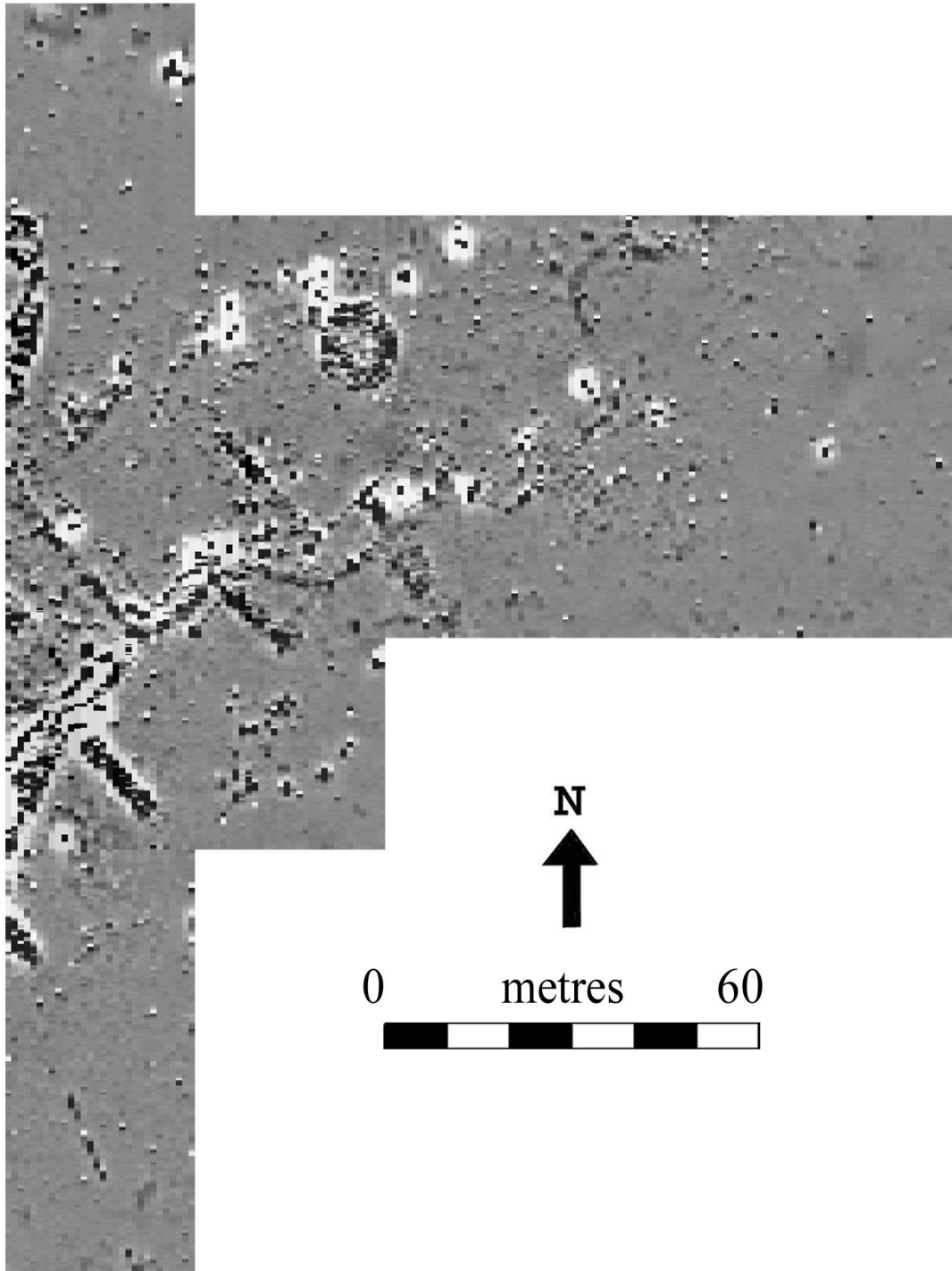
Central area clipped to +/-9nT



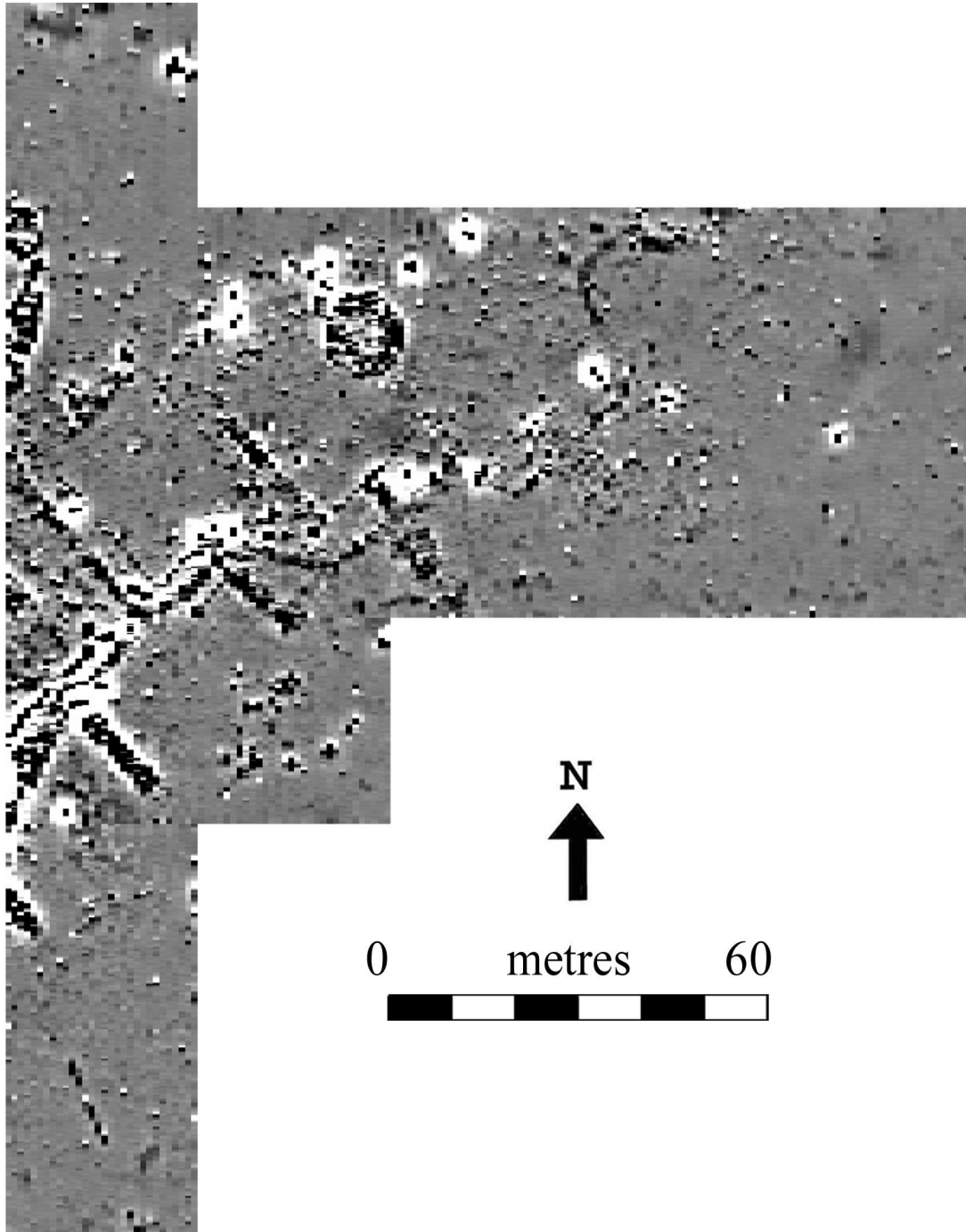
Central area clipped to +/-32nT



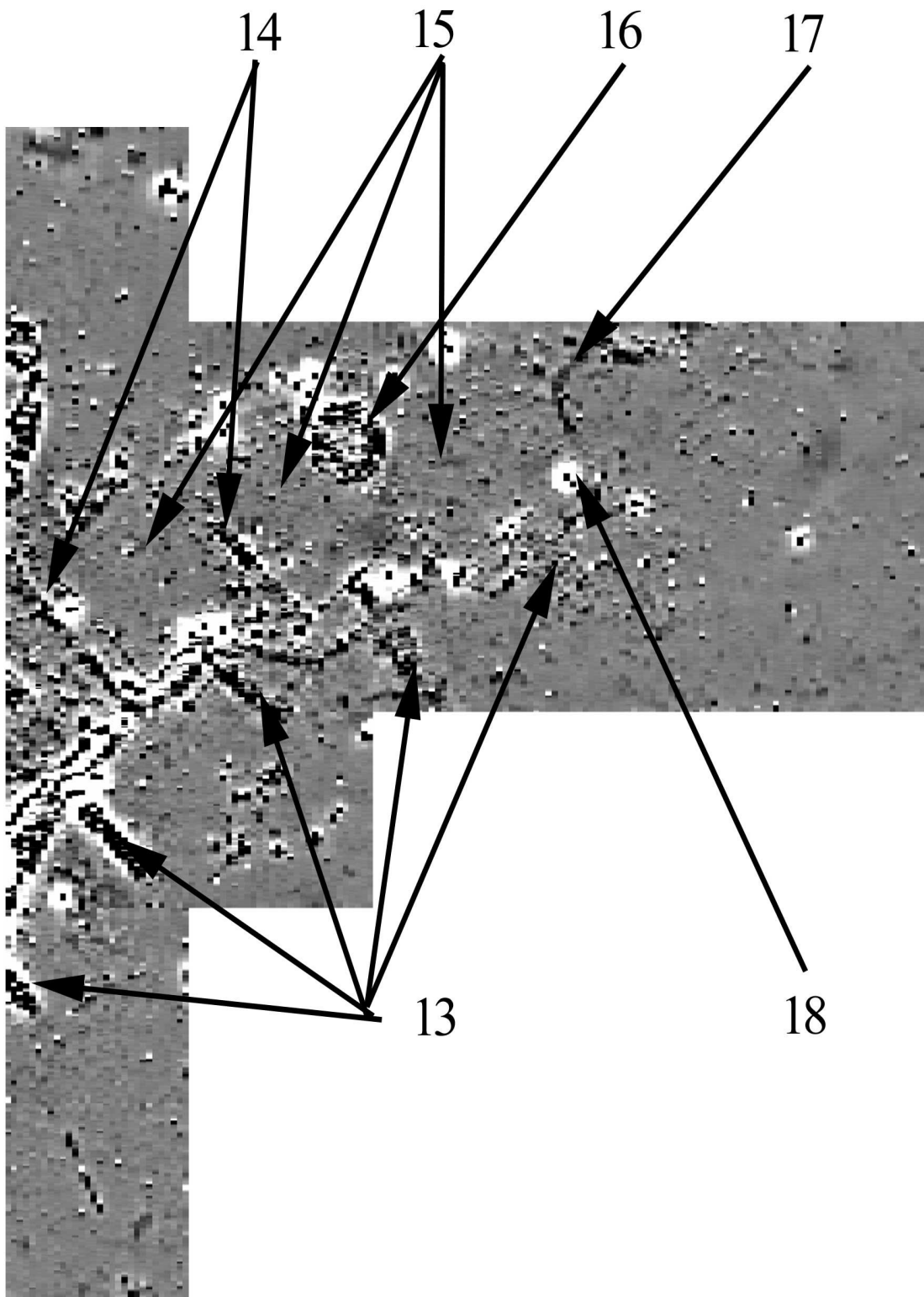
Central area Interpretation



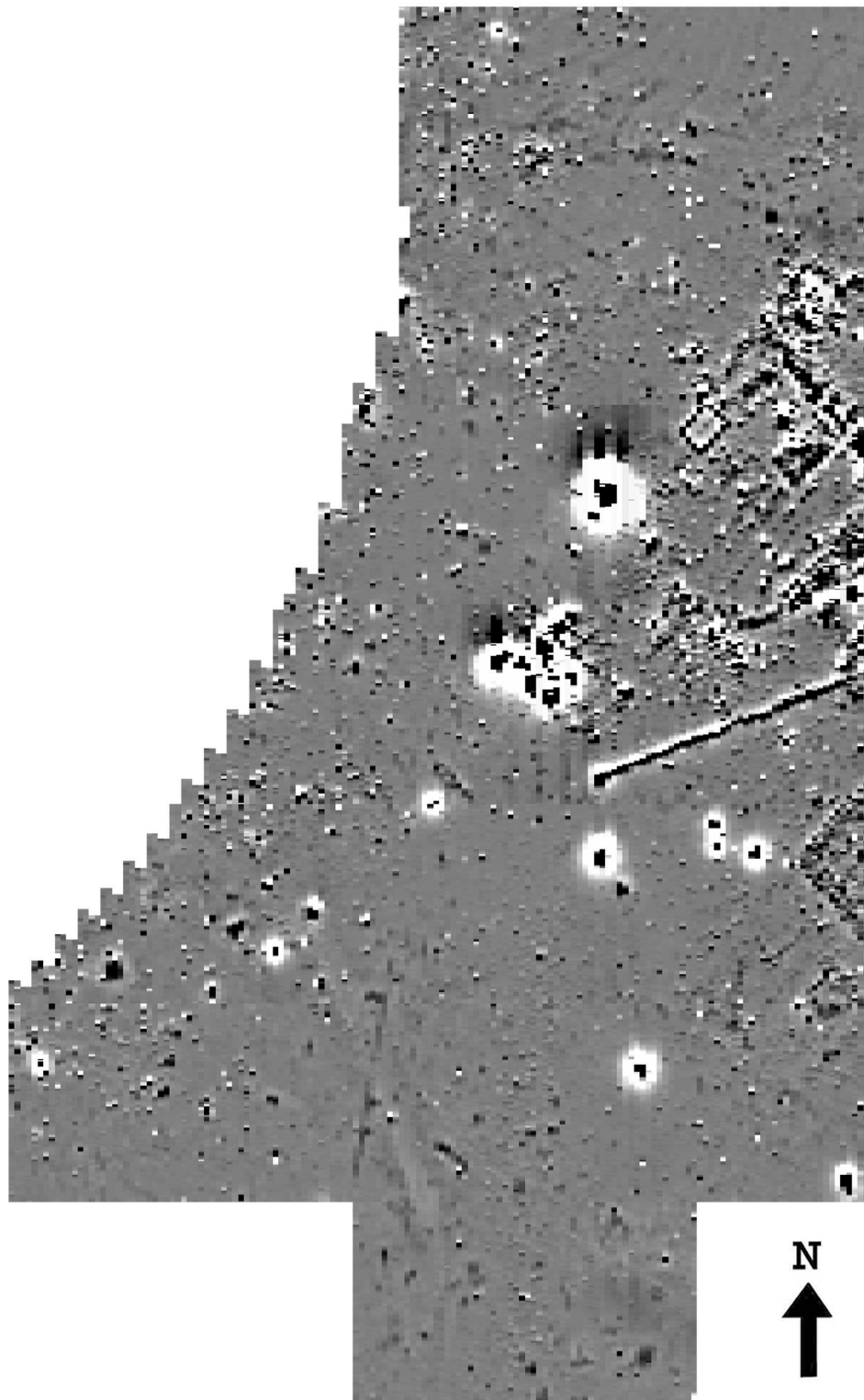
Eastern area clipped to +/- 10nT



Eastern area clipped to +/- 5nT

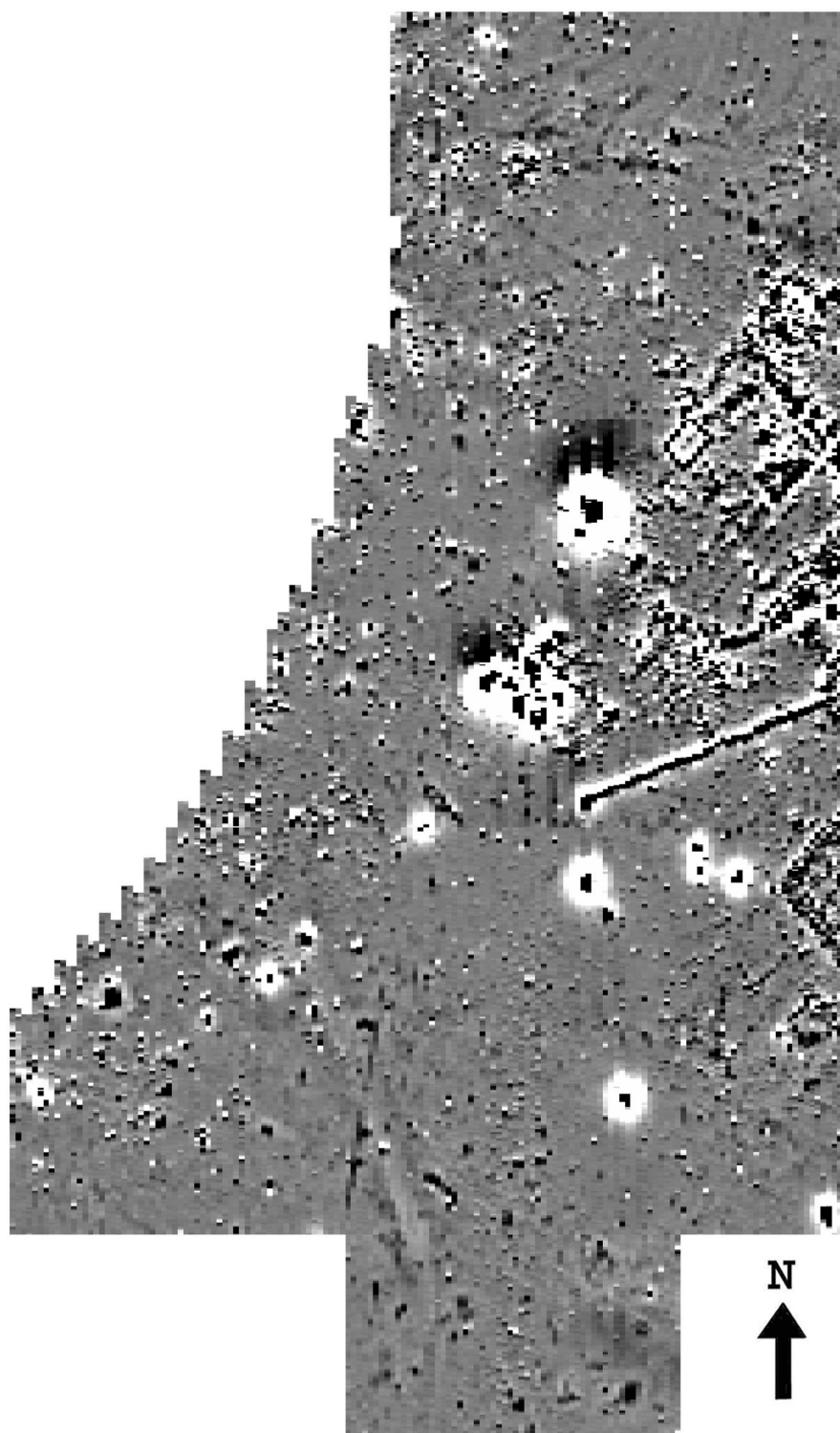


Eastern area Interpretation



0 metres 60

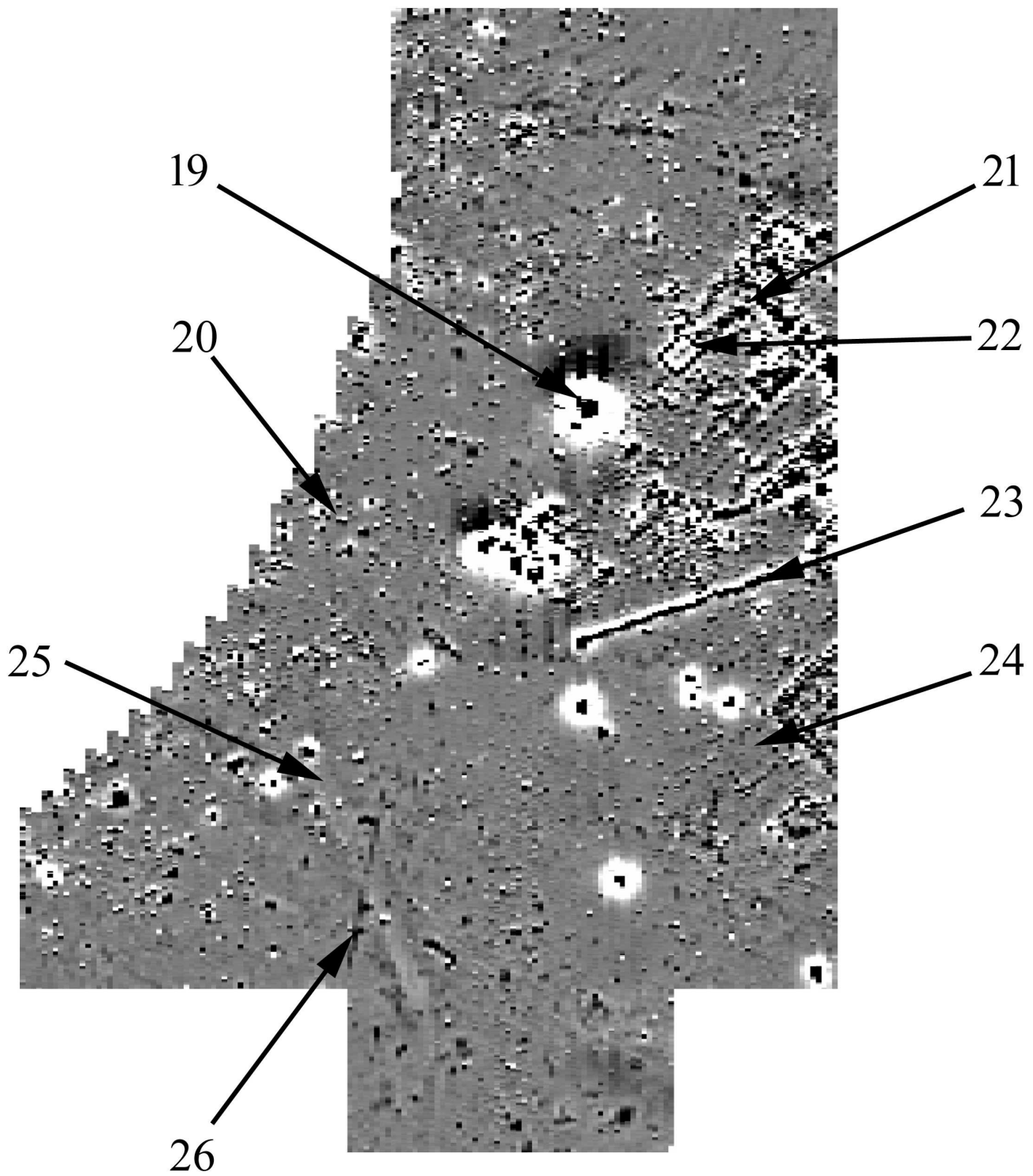
Western area clipped to +/-10nT



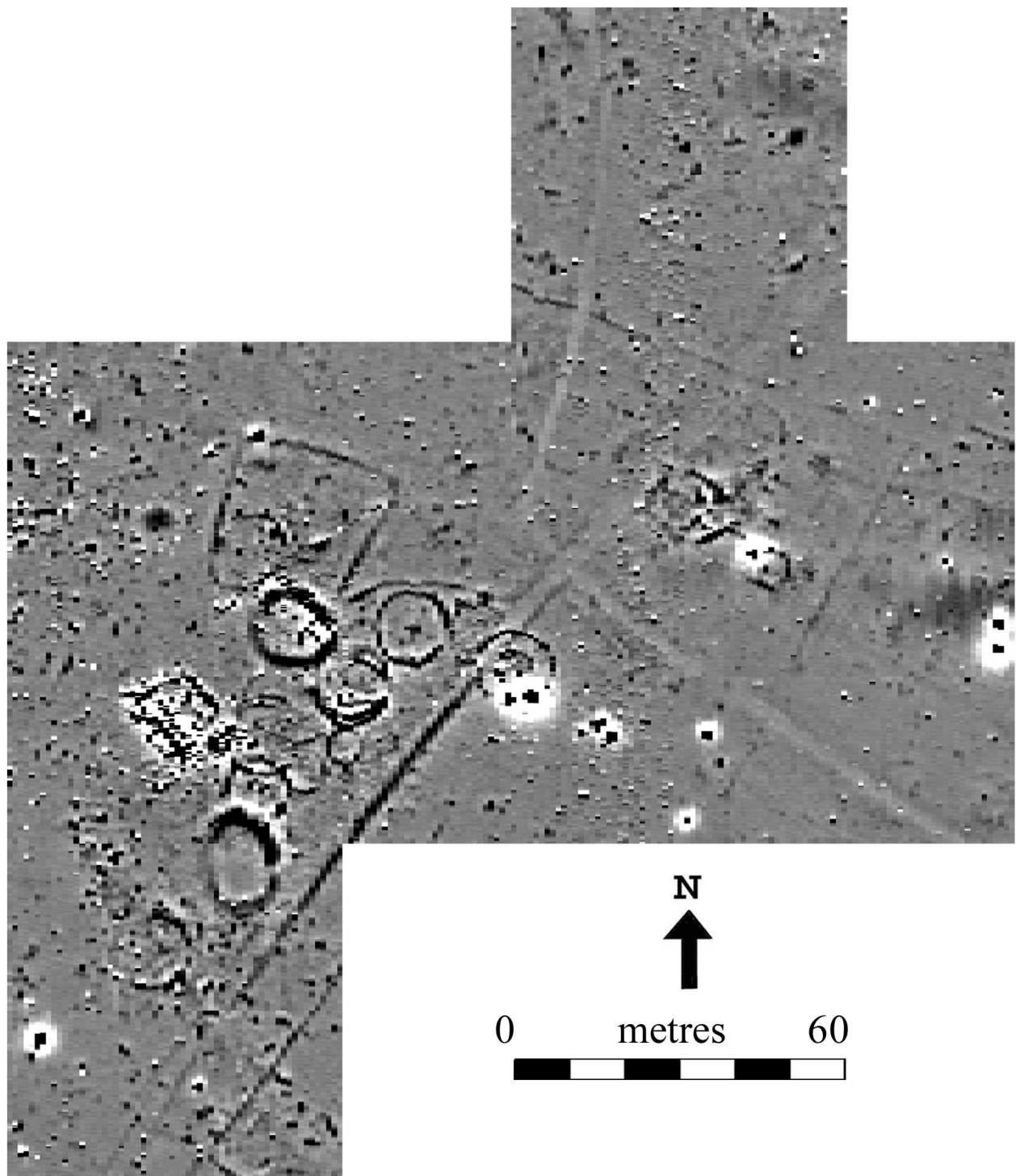
0 metres 60



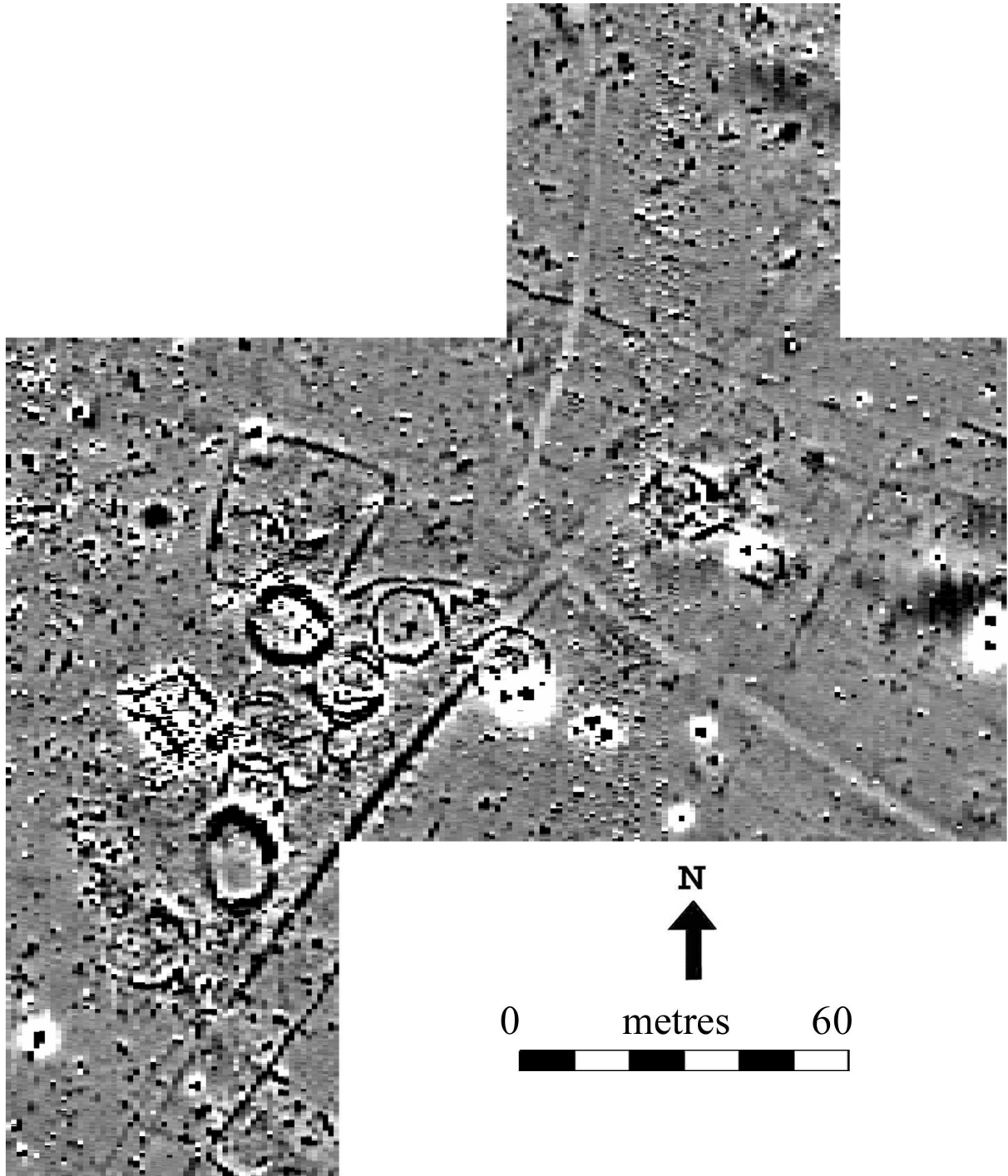
Western area clipped to $\pm 5\text{nT}$



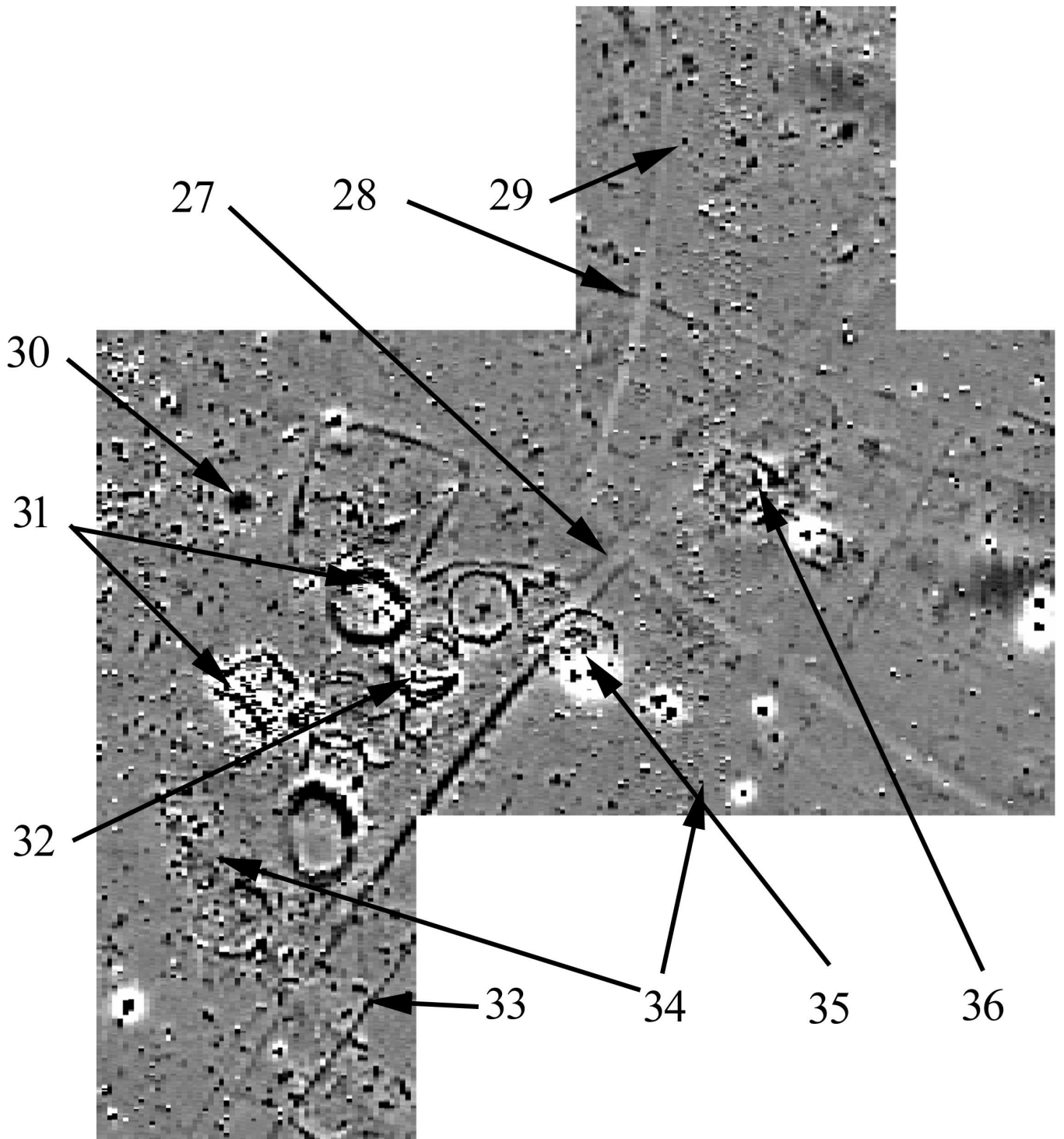
Western area Interpretation



Southern area clipped to +/-5nT

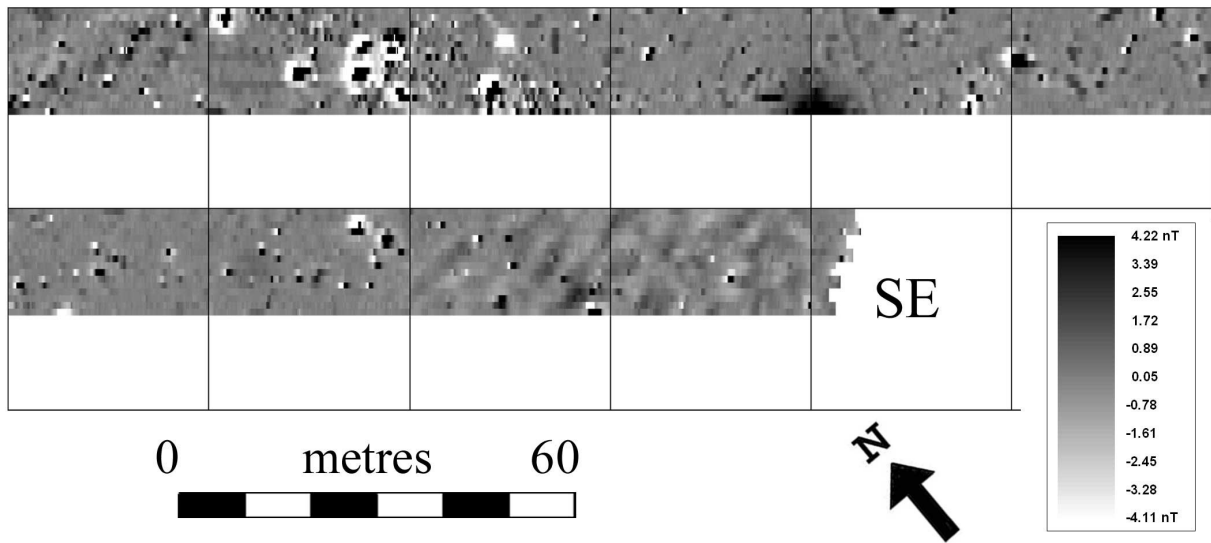


Southern area clipped to $\pm 2nT$

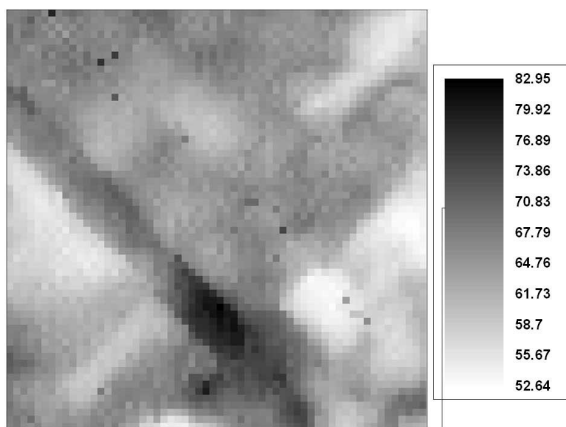


Southern area Interpretation

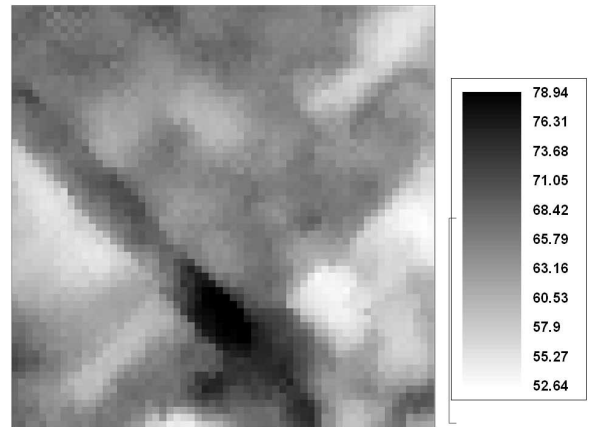
NW



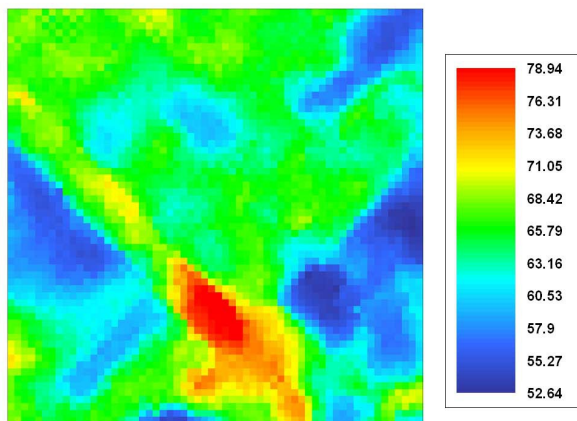
Diagonal transect detail



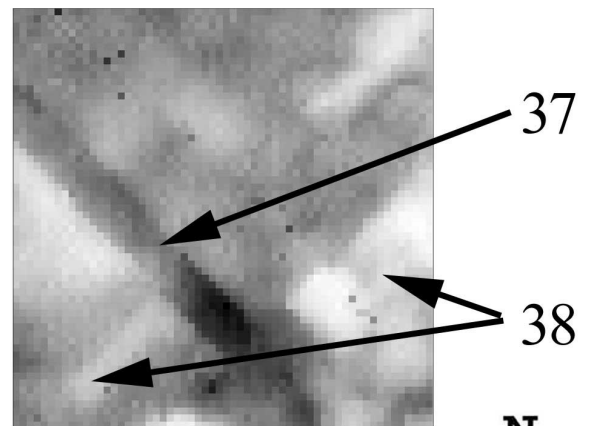
Original data



De-spiked and clipped

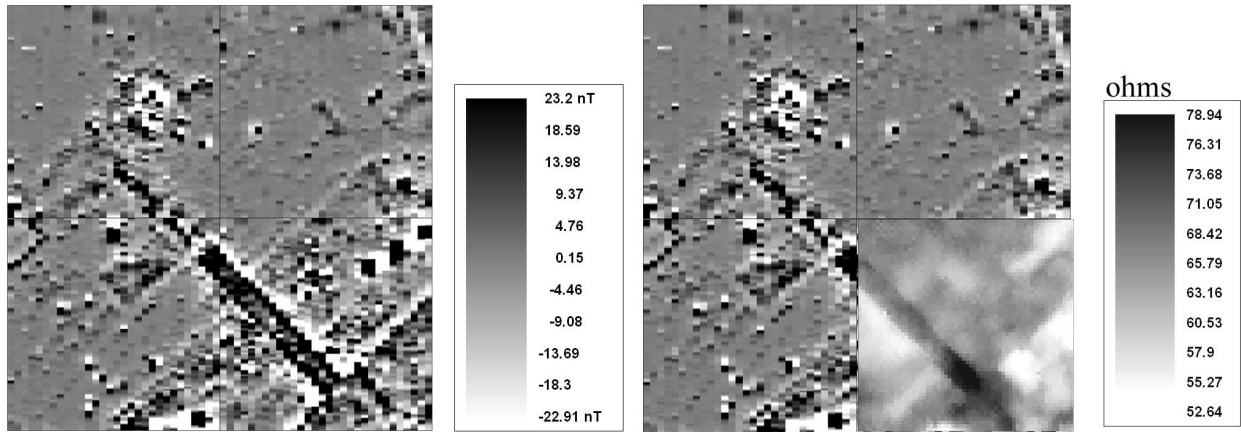


De-spiked and clipped colour plot

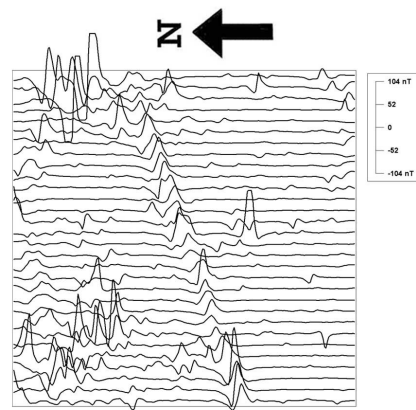


Interpretation

Grid 1 Earth Resistance



Magnetometry grids 12,11,02 and 01 compared with earth resistance of grid 01



Grid 4 trace plot

Trace plot of grid 4 showing the possible soak away pipe.