YCCCART 2017/Y12

Terrain modelling compared with resistivity surveys off Ham Lane, Yatton. (Mr Simmons 1 & 2)

YATTON, CONGRESBURY, CLAVERHAM AND CLEEVE ARCHAEOLOGICAL RESEARCH TEAM (YCCCART)

General Editor: Vince Russett

The Team

Please see separate report for Appendices 1 to 10

Abstract

Terrain modelling was performed, using an electronic, hydrostatic level (Nivcomp) and a computer programme (Surfer 10, Golden Software), as described previously (YCCCART 2012/Y4), to produce contour and 3-dimensional images, to correlate, if possible, surface features with resistivity surveys (YCCCART 2017/Y3) in fields bordering Ham Lane, northwest of Yatton. Results indicated that the features were subtle, and showed some correlation between resistivity (RM15) findings and terrain modelling.

Acknowledgements

A Heritage Lottery Grant allowed YCCCART to acquire a Nivcomp electronic, hydrostatic level which provided the data for the "Surfer10" software program, kindly donated by Golden Software Ltd.

This survey could not have been carried out without the willing permission of the landowner, Mr R Simmons.

The authors are grateful for the hard work by the members of YCCCART in performing the surveys and Vince Russett for editing.

Introduction

Yatton, Congresbury, Claverham and Cleeve Archaeological Research Team (YCCCART) is one of a number of Community Archaeology teams across northern Somerset, formerly supported by the North Somerset Council Development Management Team. Our objective is to undertake archaeological fieldwork to enable a better understanding and management of the heritage of the area while recording and publishing the activities and locations of the research carried out.

Site location

The fields lie in the north-west quadrant of the staggered crossroads of Ham Lane and Kenn Moor Road, Yatton, around ST42386751. The southern field is referred to as Mr Simmons 1 and the adjacent northern field is Mr Simmons 2 (Figure 1).

Fig 1: Site location indicated by the red arrows

Land use and geology

The fields are under permanent pasture; in 2016 used for hay/silage.

The survey area lies at the junction of the alluvial clays and peats of the North marsh, resulting in dark, moisture retentive, peaty top soils. This is underlain by the Mercia Mudstone Group comprising Mudstone and Halite stone.

Historical & archaeological context

See Gradiometry and resistivity surveys off Ham Lane, Yatton, (Mr Simmons 1 & 2). YCCCART 2017/Y3

Survey objectives

The site comprises two fields with some surface undulations. Using an electronic, hydrostatic level (NIVCOMP) and a computer programme (Surfer 10, Golden Software) as described previously *(YCCCART 2012/Y4)*, contour and 3-dimensional images of selected features were produced to see if they matched the Geoscan Resistivity Meter (RM15) study (*YCCCART* 2017/Y3). Since the surveys were time-limited, two features were selected in Simmons 1 and one feature in Simmons 2.

Methodology

Terrain modelling

The surveys were undertaken during the period January to September 2016 by teams from YCCCART using an electronic, hydrostatic level (Nivcomp). Tapes were laid relative to baselines and grids established for the RM15 survey. For each grid, a zero point for the level was established, and the height in millimetres at each point in the grid, above or below the zero point, was recorded on paper. An appropriate interval of recording was selected, for each feature, which was considered to provide the best representation. The data were entered into an Excel file (Microsoft) and processed using the Surfer 10 programme (kindly donated by Golden Software, USA). Paper and electronic copies of the raw data are preserved in the archives. The surveyed sites are shown in Figure 2. Photographs were taken by members of YCCCART, and remain the copyright of YCCCART.

Fig 2: Features surveyed

Results

Simmons 1

Feature 1

The location of this approximately rectangular feature is shown in Figure 2. Four grids (Grids 1 and 2, Nov 26 and Grids 1 and 2, Jan 21; Appendices 1- 4) were used to cover the feature outlined by the RM15 survey, (Figure 3), in the north east corner of the field close to the gate and small building. These were then combined, making the final grid approximately 40 x 30m. For each individual grid, a tape grid was laid out using the RM15 survey baseline. Grids 1 and 2, Nov 26 were 20 x 20 m, Grid 1, Jan 21 was 20 x 10m and Grid 2, Jan 21 was 10 x10m. Heights were measured at 1m intervals along the X axes northerly and the Y axes, easterly. The zero point for Grids 1 and 2, Nov 26 it was 10m along the southern edge of Grid 1; for Grids 1 and 2, Jan 21 it was at the northwest corner of grid 1. The reading was zero for both points. The Z axis for both grids was the height above, (+), or below, (-), the zero point in mm. The results were recorded on paper. Maximum heights above or below the zero point were 240 to -225 mm. The raw data were processed electronically as described previously, and a 3-dimensional image, including contours (Fig 4), was produced.

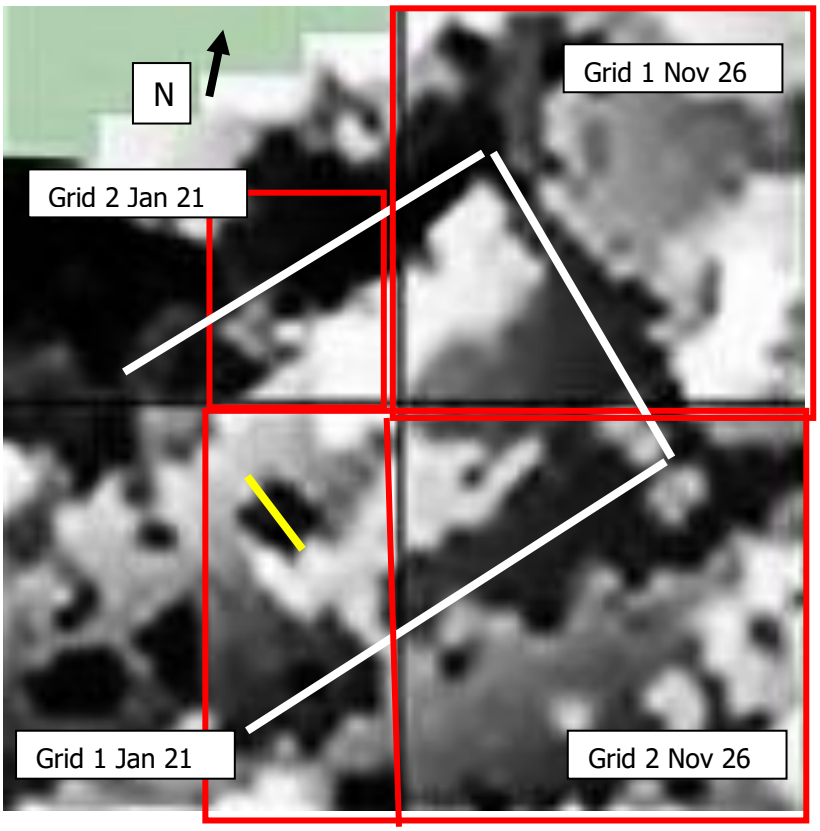

Fig 3: RM15 grids showing a rectangular feature outlined in white. An approximately square feature is shown represented by the yellow bar.

Whilst there was some disturbance close to the north - eastern edge of Grid 1, Nov26 (nearest the gate), it doesn't appear to have interfered with the grid. There appears to be good correlation of the rectangular feature, observed with the RM15 result. In addition, the approximately square feature corresponds with a similar sized elevation (yellow line) in the contour image. These were not readily appreciated visually; with the level, the maximum height from the lowest to the highest points represented a range of approximately 46 cm.

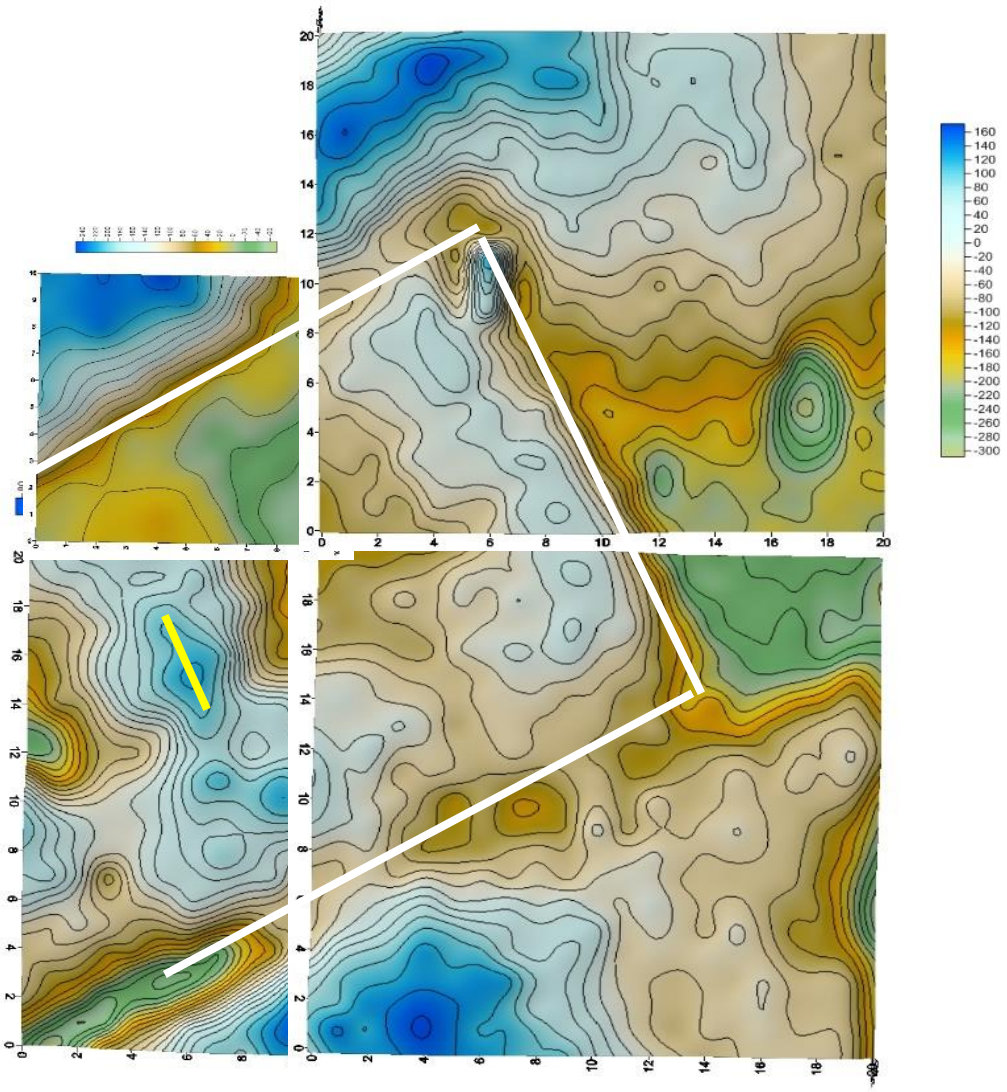

Fig 4: 3-dimensional representation of the feature. Compare Fig 3.

Feature 2

The location of this approximately rectangular feature in Grid 4, Apr 28 (appendix 5) is shown in Figure 2.

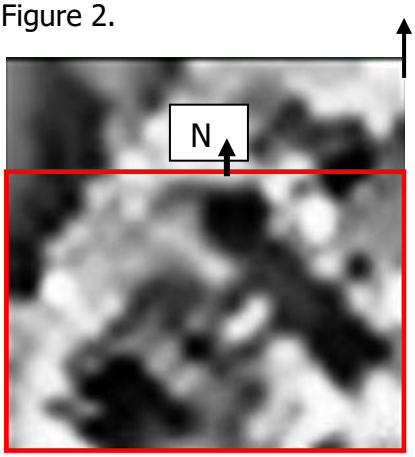

Fig 5: Grid 4 apr28.

Fig 6. Grid, 4 Apr 28. Working in the long grass; features difficult to distinguish. Looking south east.

It was chosen because of its unusual RM 15 appearance (Figure 5). On the ground, the undulations were difficult to fully appreciate, partly because of the long grass (Fig 6).

The grid measured 20 x 15m. Heights were measured at 1m intervals along the X axis easterly and the Y axis, northerly. The zero point was 10m along the southern edge of the grid. The Z axis was the height above, (+), or below, (-), the zero point in mm. The results were recorded on paper. Maximum heights above or below the zero point were 61mm to -485mm (approximately 55cm). The raw data were processed electronically as described previously, and 3-dimensional images, including contours, were produced (Figure 7). There was good correlation between the terrain modelling and RM 15 results.

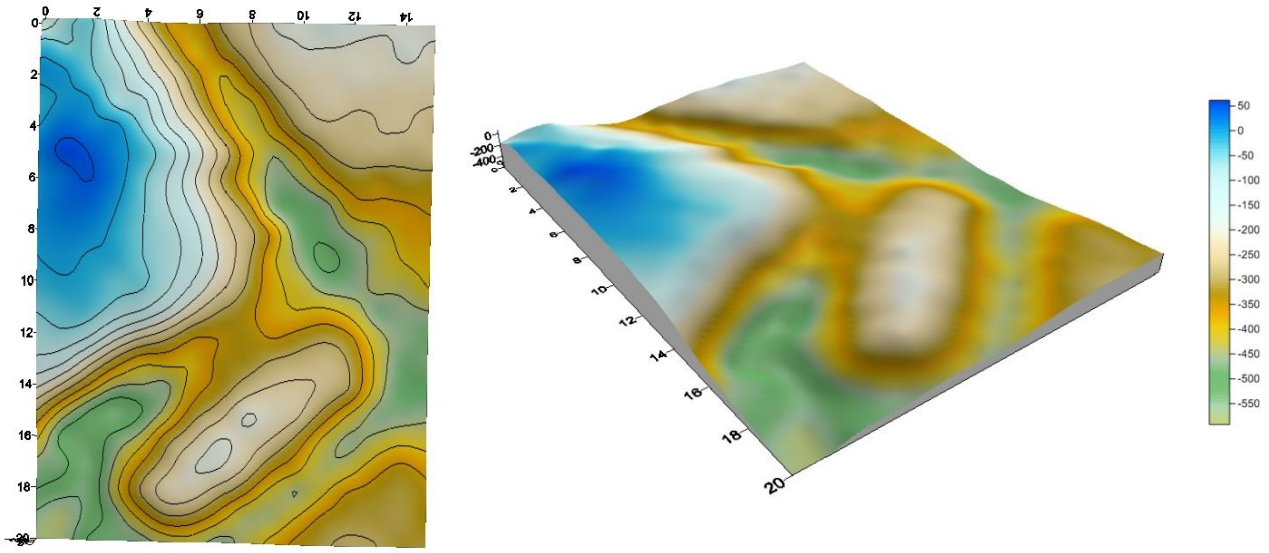

Fig 7: Contour image (left) and 3-dimensional representation (right) of the feature in Grid 4 Apr 28. Scale in mm.

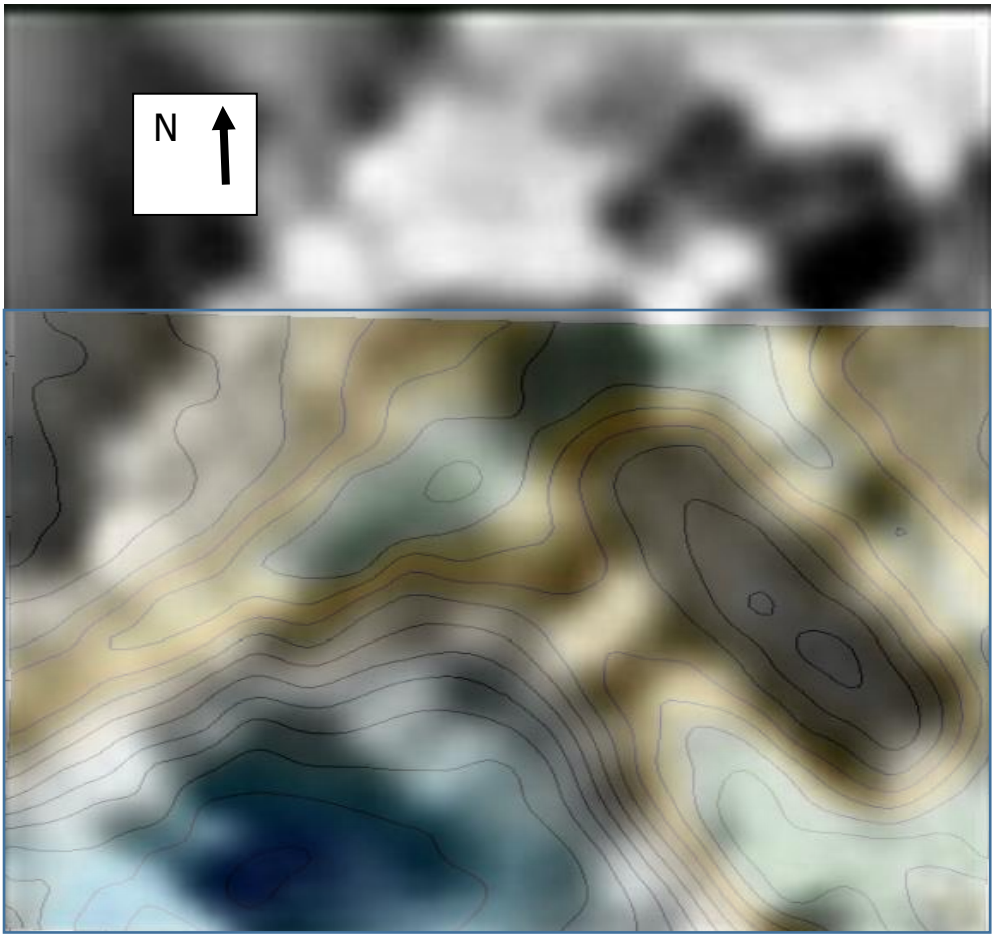

Fig 8: Overlay of contour and RM15 images.

Using PowerPoint (Microsoft), the contour image was overlaid on the RM 15 result (Fig 8), confirming the striking correlation between the RM1 results and surface features plotted using the electronic level and Surfer software.

Simmons 2

Feature 1

The location of this irregular feature is shown in Figure 2. Five grids (designated G1 J2, G1 J2A, G3 J9, G3 J9A and Grid 2 Jul 21; Appendices 6 - 10) covering eight RM15 grids, were used to cover the feature (Figure 9). These were then combined, making the final grid approximately 55 x 30m. The terrain was gently undulating (Figure 10).

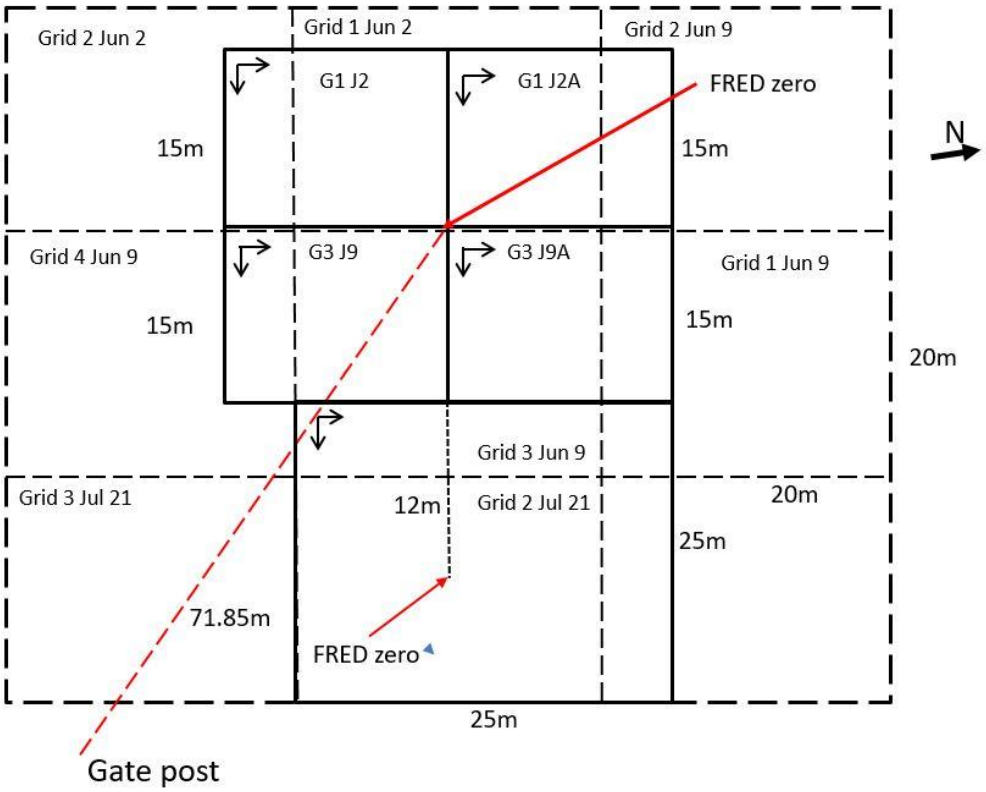

Fig 9: Grids used for terrain modelling relative to RM 15 grids.

Fig 10: Grid 2 Jul 21. The undulating nature of the terrain, looking west.

For each individual grid, a tape grid was laid out using the RM15 survey baseline. Grids G1 J2 – G3 J9A were 15 x 15 m and Grid 2 Jul 21 was 25 x 25m. Heights were measured at 1m intervals for grids G1 J2 – G3 J9A, and 2m intervals for Grid 2 Jul 21 along the X axes northerly and the Y axes southerly. The zero point for grids G1 J2 – G3 J9A was in the south east corner of G1 J2A; for Grid 2 Jul 21 it was 7m east of the west edge of the grid. The reading was zero for both points. The Z axis for both grids was the height above, (+), or below, (-), the zero point in mm. The results were recorded on paper. Maximum heights above or below the zero point were 86 to -410 mm (approximately 50 cm). The raw data were processed electronically as described previously, and 3-dimensional images, including contours (Fig 11), were produced.

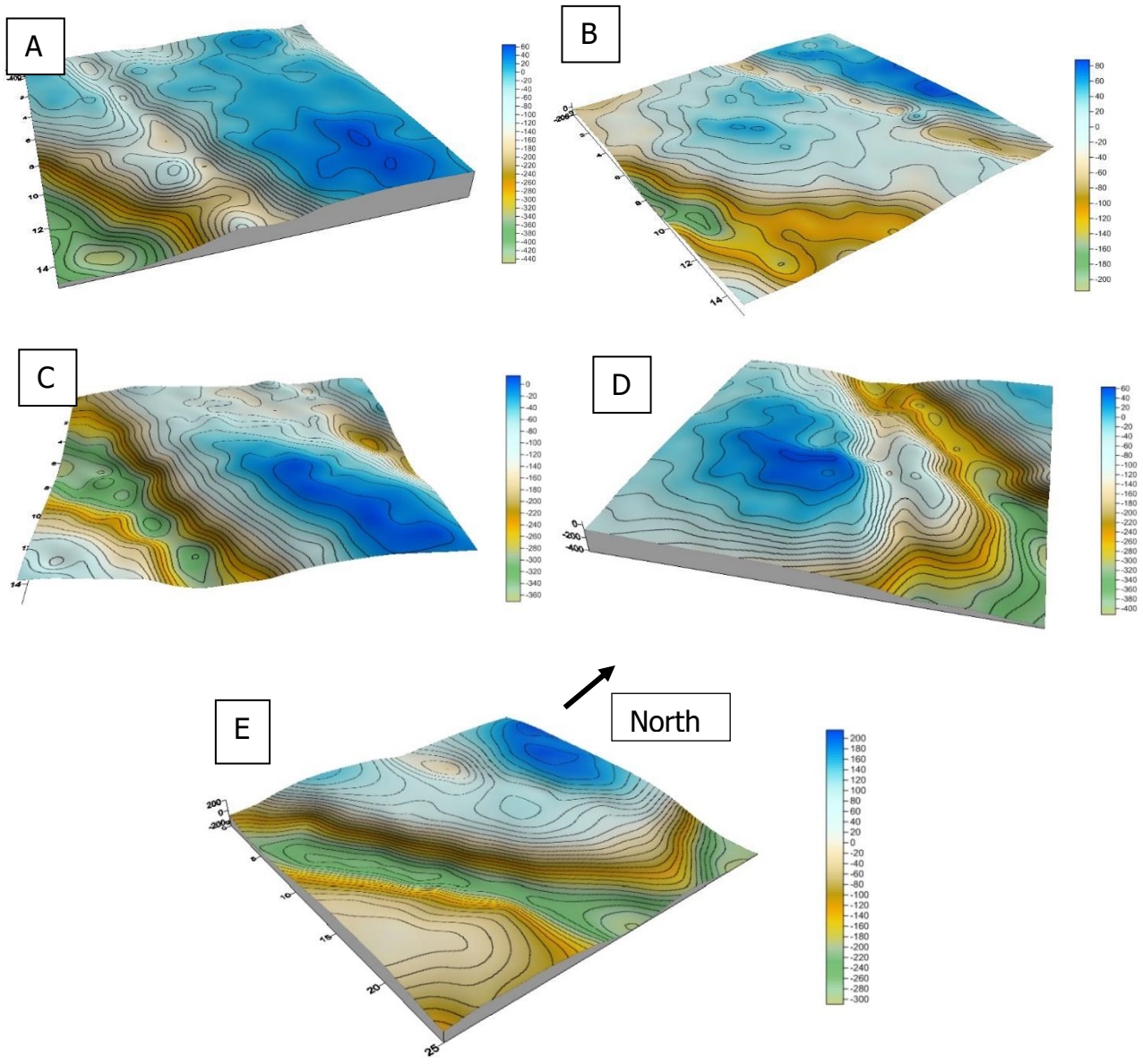

Fig 11: 3-dimensional, contoured images of grids GI J2, (A), G1J2A, (B), G3 J9,(C), G3 J9A (D), and Grid 2 Jul21 (E) are seen in various orientations. North is included for E.

The surface undulations corresponding to the contours, showing raised and depressed areas, are clearly visible. Using PowerPoint (Microsoft), the contour image was overlaid on the RM 15 result (Fig 11). There was some correlation between the RM15 and surface features plotted using the electronic elevation device and Surfer software. Some correlation between the surface contours and the RM 15 results could be recognised (Figure 212). In particular, the contours clearly followed the feature running SW to NE (black arrow) in Grid 2 Jul 21 and the 'bulge' in the north east corner (red arrow).

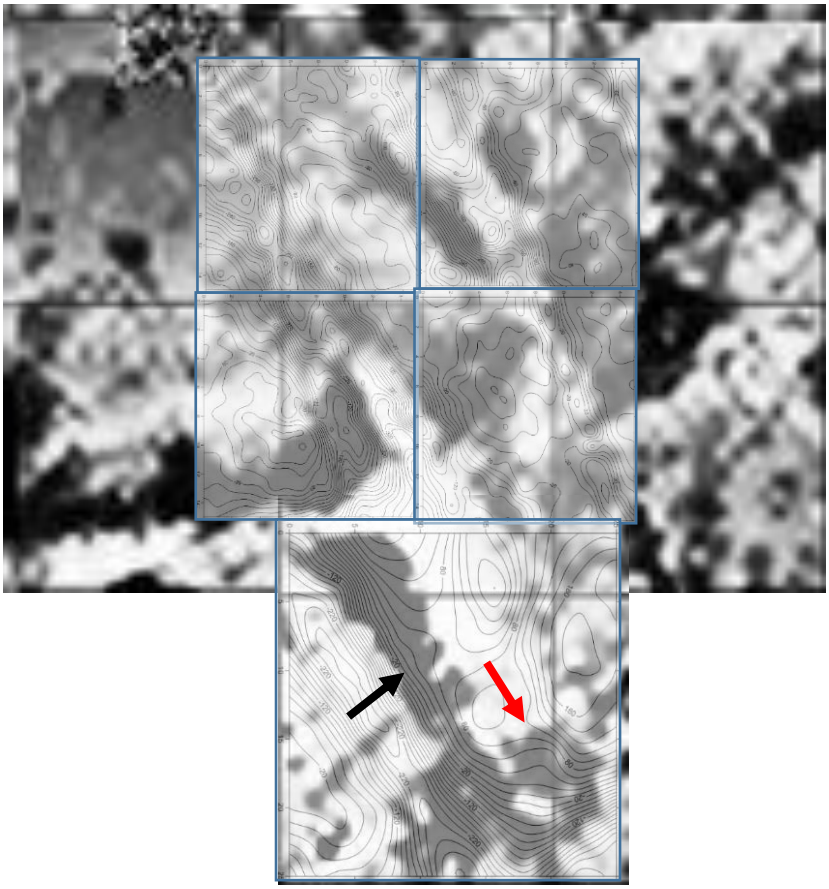

Fig 12: Overlay of contour and RM15 images. Feature running SW to NE (black arrow); 'bulge' in north east corner (red arrow).

Conclusions

For the features, the range of measurements was between 46 and 55 cm, indicating that the undulations are subtle, and not readily appreciated on the ground. However, in Simmons 1, good correlation between the RM15 results and terrain modelling, particularly evident in Grid 4 Apr 28, was observed. In Simmons 2, some correlation between the RM 15 and terrain modelling surveys was seen.

Recommendations for further work

Trial, evaluation excavation might be carried out to specifically target some of the features shown above that have some correlation with the RM15 results.

References

YCCCART Report, (2012/Y4). *Cadbury Congresbury Hill Fort: Use of an electronic, hydrostatic level as an aid to manual surveying.*

YCCCART Report (2017/Y3), *Gradiometry and resistivity surveys off Ham Lane, Yatton:*

(Mr Simmons 1 & 2).

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Date

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