Geophysical Surveys at Moncrieffe Hill Fort, Perthshire

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Introduction

Moncreiffe Hill lies in southern Perthshire between Perth City and Bridge of Earn. Two forts have been identified on the hill. The larger of these is Moredun Top Fort, a major site covering about 3Ha. The other, Moncreiffe Hill Fort, sits on a local knoll above cliffs on the Southern edge of the Hill. It covers a comparatively small area (~0.5 Ha) and in fact there is some doubt as to whether any real archaeological features are present at all.

The Tay Landscape Partnership hopes to carry out excavations on Moncreiffe fort during the summer of 2014. To assist with the siting of possible trenches magnetic and resistivity surveys were carried out to see if any man-made structures could be delineated.

Moncreiffe Hill is formed from a series of lava flows of Devonian age. As such it is not a very promising site for carrying out archaeological magnetic surveys. The soil can be very thin and in fact is absent at the highest point of the fort. Elsewhere the fort area is mostly covered by thick tussocky grass which hides a variety of tree stumps and fallen branches, testament to the fact that the area was formerly covered in trees. A recent topographical survey of the fort area carried out by Oxford Archaeology was made available by Perth and Kinross Heritage Trust.

A baseline was created heading magnetic north from the centre of the north face of the Trig Pillar which stands within the fort area near the cliff edge. A local grid was established from this, using measuring tapes, in which the end of the baseline at the trig pillar has the coordinates (x=30m, y=0m)

Magnetic Survey 19/04/2013

As the area of interest is quite small, it was thought worthwhile to cover it with a quick magnetic survey despite the presence of highly magnetic bedrock

The site is scheduled: permission to conduct this work was obtained from Historic Scotland.

The instrument employed was a Bartington type 601 magnetic gradiometer. The data was acquired in a series of 23 blocks of side 10m. Survey lines 1m apart were walked zigzag in a N-S and S-N orientation. In line sample spacing was .25m.

After download from the meter the individual blocks of data were assembled into a single 'x,y,z' dataset. This was then input to Golden Software's 'Surfer' computer program for gridding (to a .25m grid) and display. No additional processing to improve the image quality seemed to be required. The final magnetic map is shown in Figs 2 and 3.

Resistivity Survey 23/04/2013

A resistivity survey covering more or less the same area as the magnetic survey was carried out using a TR Systems resistivity meter with a 0.5 m probe spacing. Data grids consisted of 10 lines 20 m long with an inline station spacing of 0.5 m. The lines were recorded zig zag in a E-W and W-E orientation.

A total of 9 grids were collected during the survey. The zone around the trig pillar with outcropping bedrock was not surveyed.

Some minor adjustments to the data were applied to bring all the grids to the same level. After this, as with the magnetics, an x,y,z dataset was produced which was loaded to Surfer for gridding (to a 0.5 m grid) before display using 'Surfer'.

Results

Magnetics

The magnetometer survey plot (fig 2) shows a variety of blobby anomalies but no linear, rectangular or circular features which might lead one to suspect that they were man-made. The amplitudes of the anomalies are also very high, perhaps 10 times as much as one would normally expect in an archaeological survey. The topographic map shows two features, here labelled A and B . It is possible to associate a magnetic anomaly with both of these but there is little to suggest that anything uncommon is present. There are a few extreme anomalies , (fig3), which may represent metal debris but for the rest the conclusion must be that they are most probably due to the underlying magnetic bedrock.

Resistivity

Fig 4 shows the resistivity results using three different displays; white –positive anomaly, black – positive anomaly, and colour shaded relief. As with the magnetics there is little obvious sign of human activity. Points A and B correspond to distinct high values but elsewhere there is little direct correlation that can be drawn between topography and resistivity. Neither does there seem to be much correlation between resistivity and magnetics.

The anomalies present in a resistivity plot can be related to a combination of physical changes in the near surface layers and in particular their moisture levels. The main anomalies in the plots are labelled C-F (Fig 5)

C and D are high resistance features – shallow bedrock or pile of stones??

E, F and G are all low resistance features. E is a possible arc of low resistivity anomalies, F is a large oval feature and G is a low resistivity area which appears to be related to the eastern flank of the knoll where it becomes more intense. It is tempting to put these down as 'damp patches'. Of these the oval area looks the most interesting though it is not obvious what it represents. Could some of the more intense patches of low anomaly, especially those within the arc E be related to the root system of the trees which once covered the knoll.

It must be concluded that without some excavation on the site we are unlikely to understand the resistivity data.

Conclusions

Neither the magnetic nor the resistivity data give any immediate indication that there have been human activities on site. The magnetic data is most likely related the highly magnetic bedrock.

Excavation of some of the main resistivity anomalies is required if we are to ever understand what the resistivity data represents.

Acknowledgements

I should like to thank Tony Simpson for his invaluable assistance in conducting the resistivity survey and Perth and Kinross Heritage Trust for their interest and encouragement during the course of this project.

P.Morris
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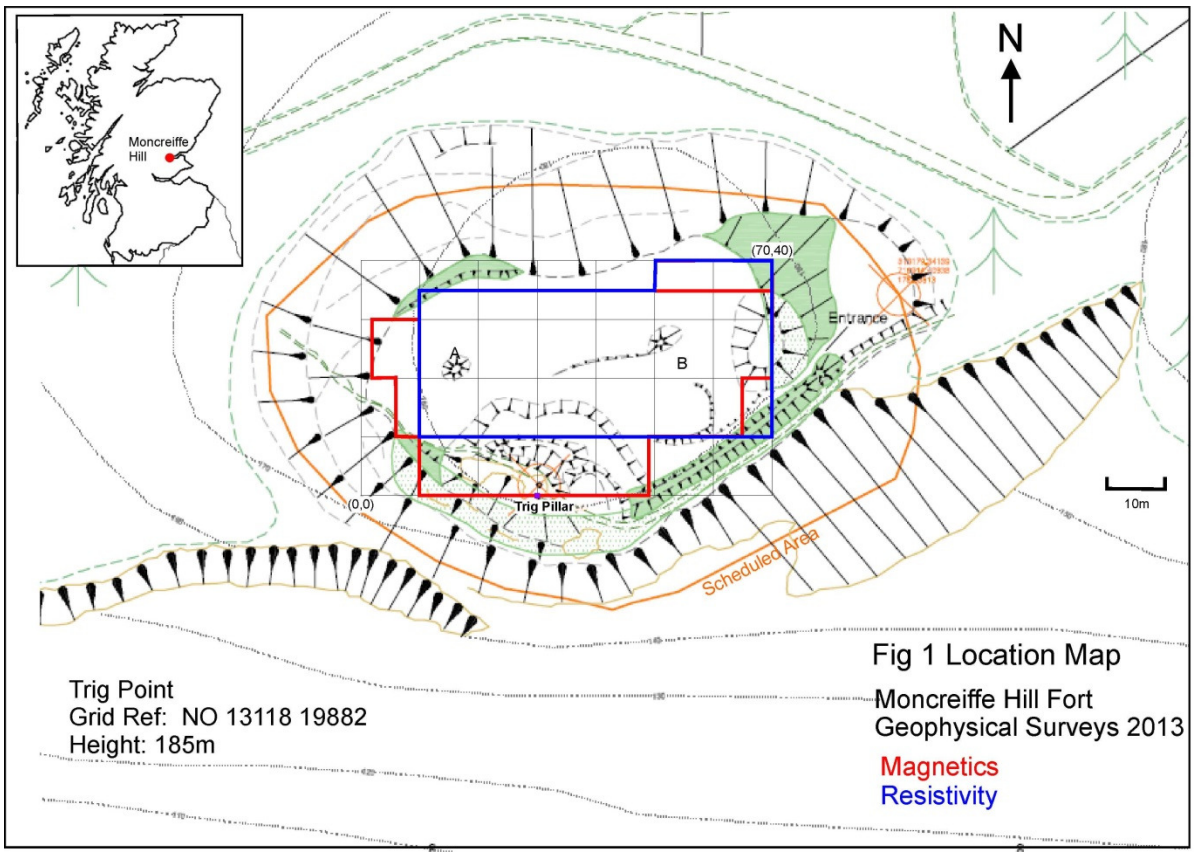

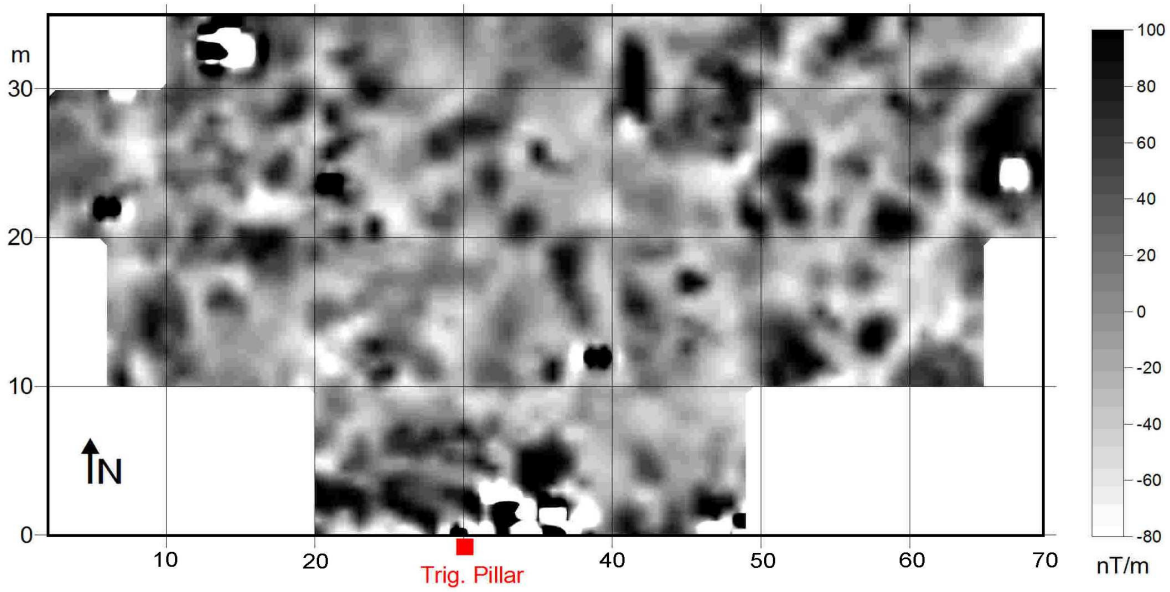

Fig 2 Moncreiffe Hill Fort Magnetic Gradiometer Survey

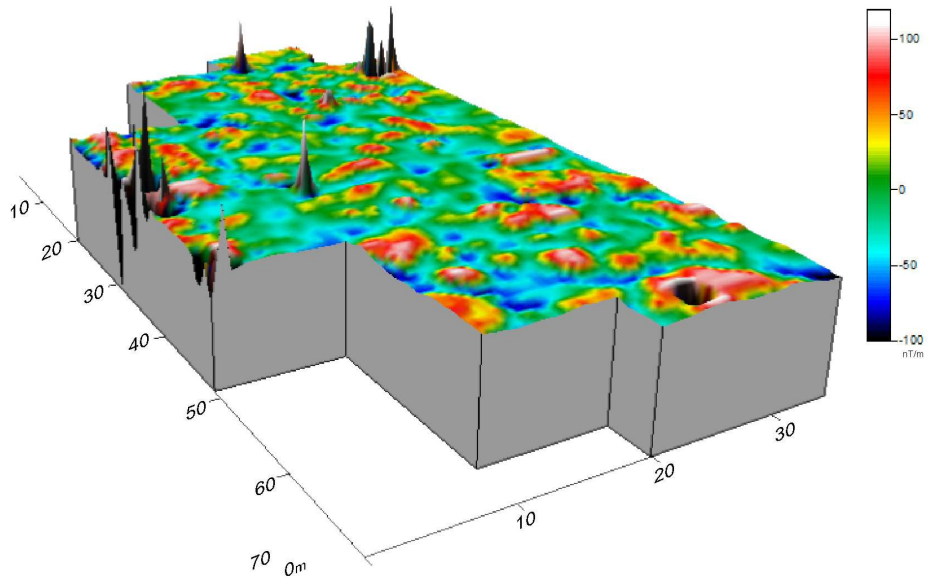

Fig 3 Moncreiffe Hill Fort Magnetic Gradiometer Survey
Colour shaded relief display

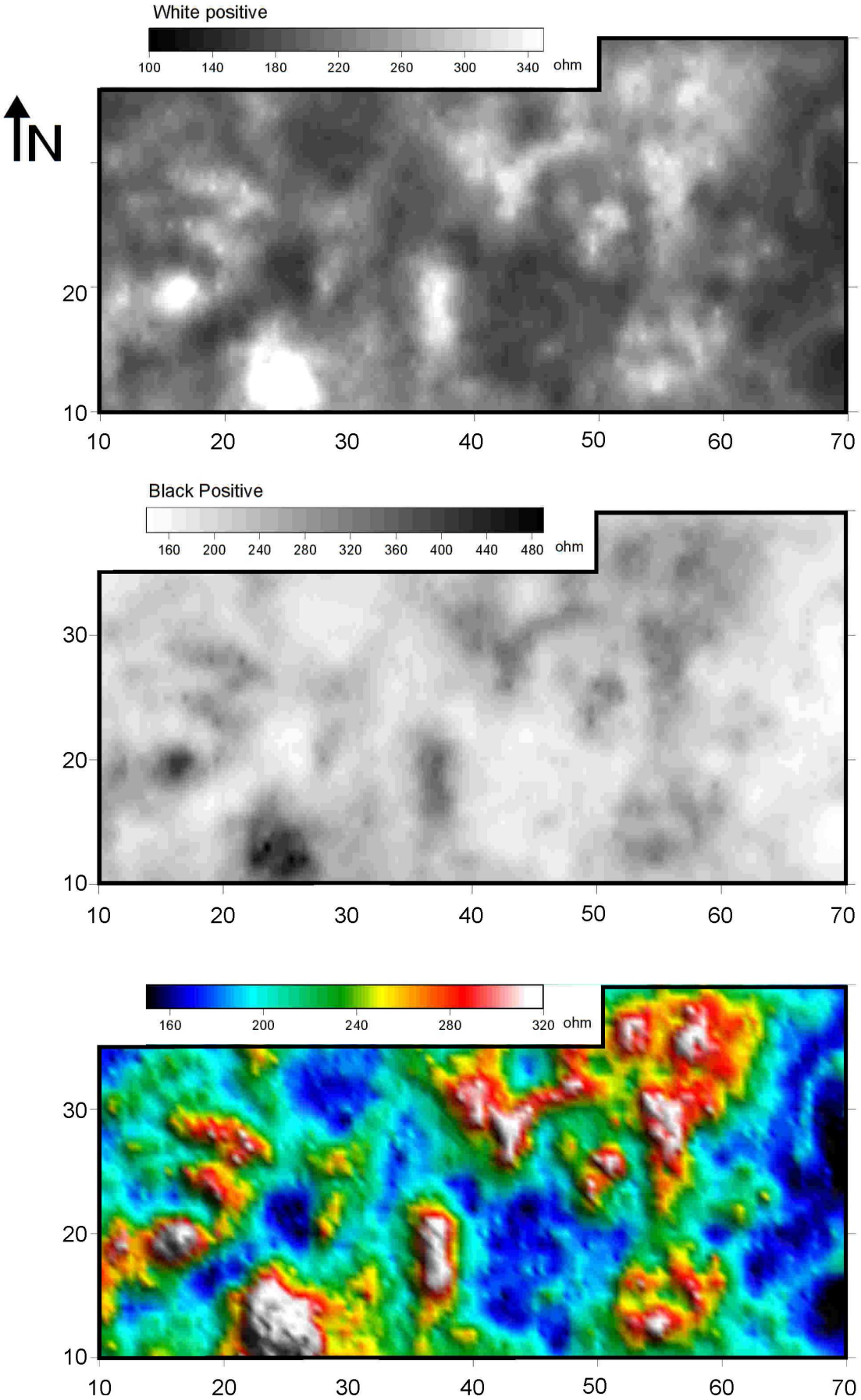

Fig 4 Moncreiffe Hillfort Resistivity Survey

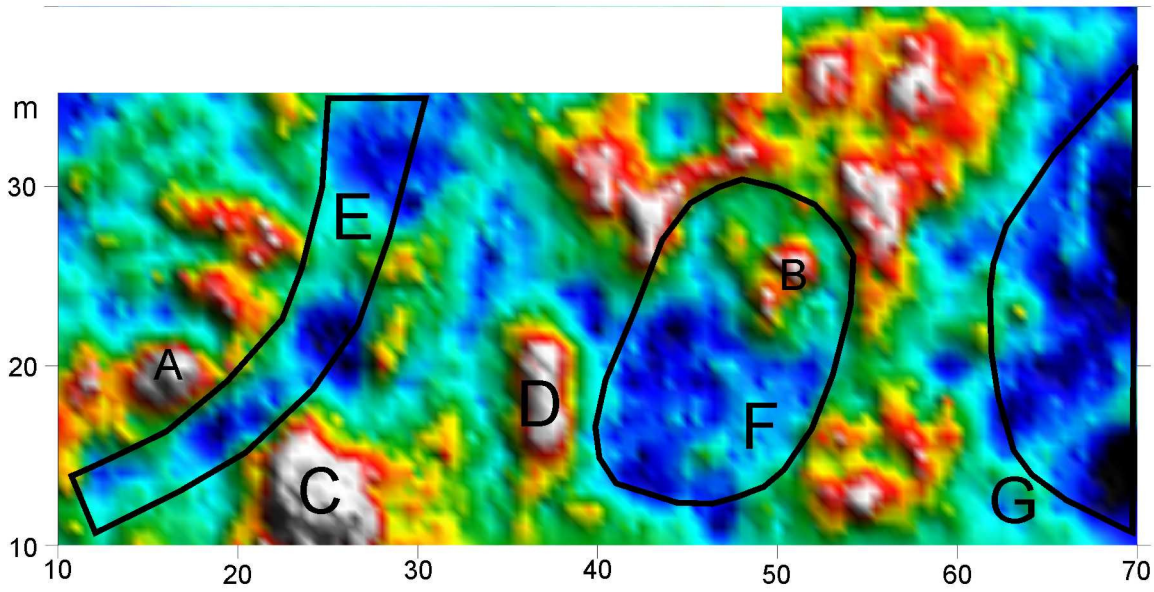

Fig 5 Moncreiffe Hillfort - Interpretation Map