

Geophysical Survey, Magnetometry

Azekah 2013

July 23 – August 14

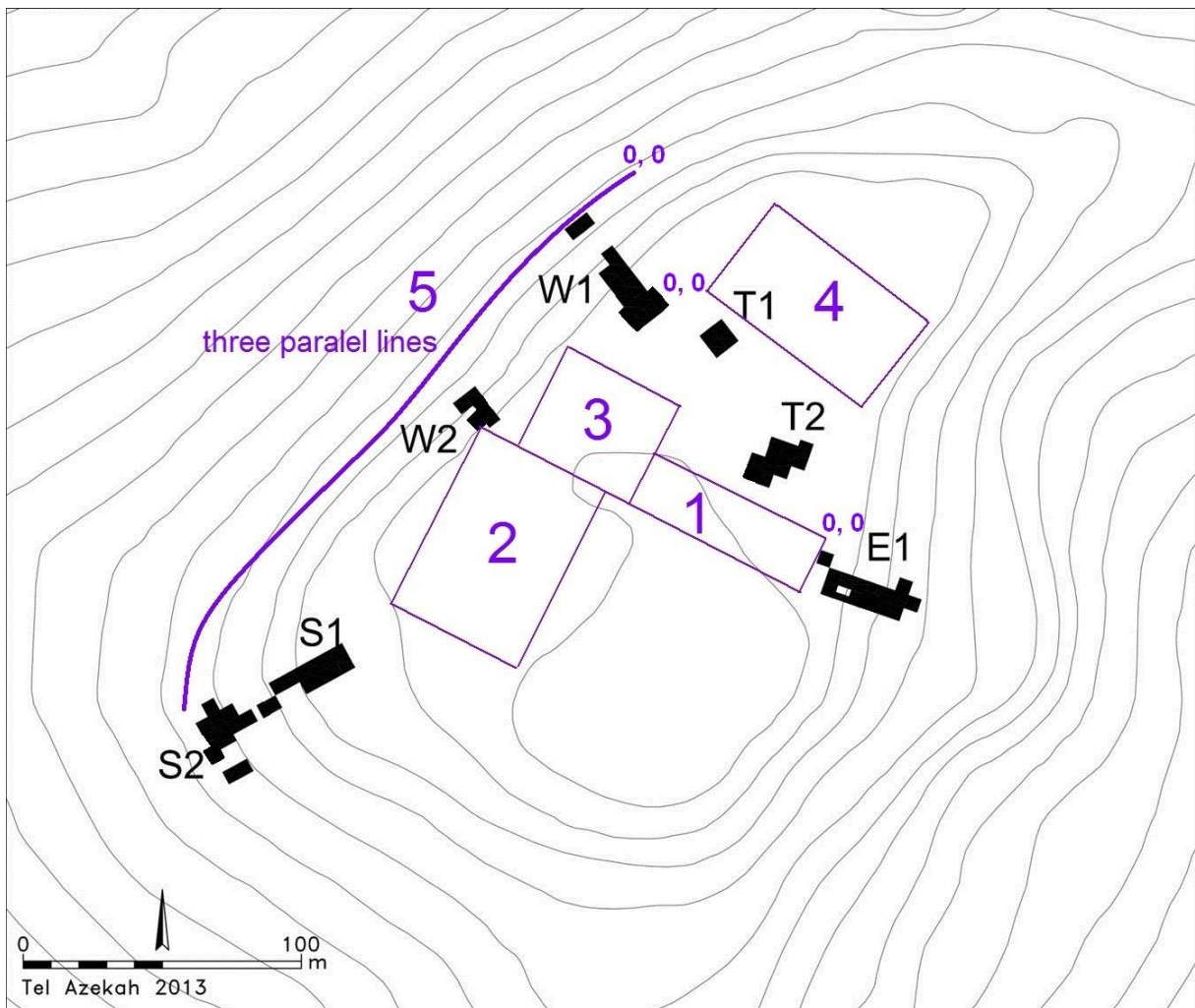
Jana Krizova

Instrument: Proton magnetometer PMG-2, SatisGeo

Measured quantity: Gradient of the magnetic field of the earth

Spacing 1 meter by 1 meter

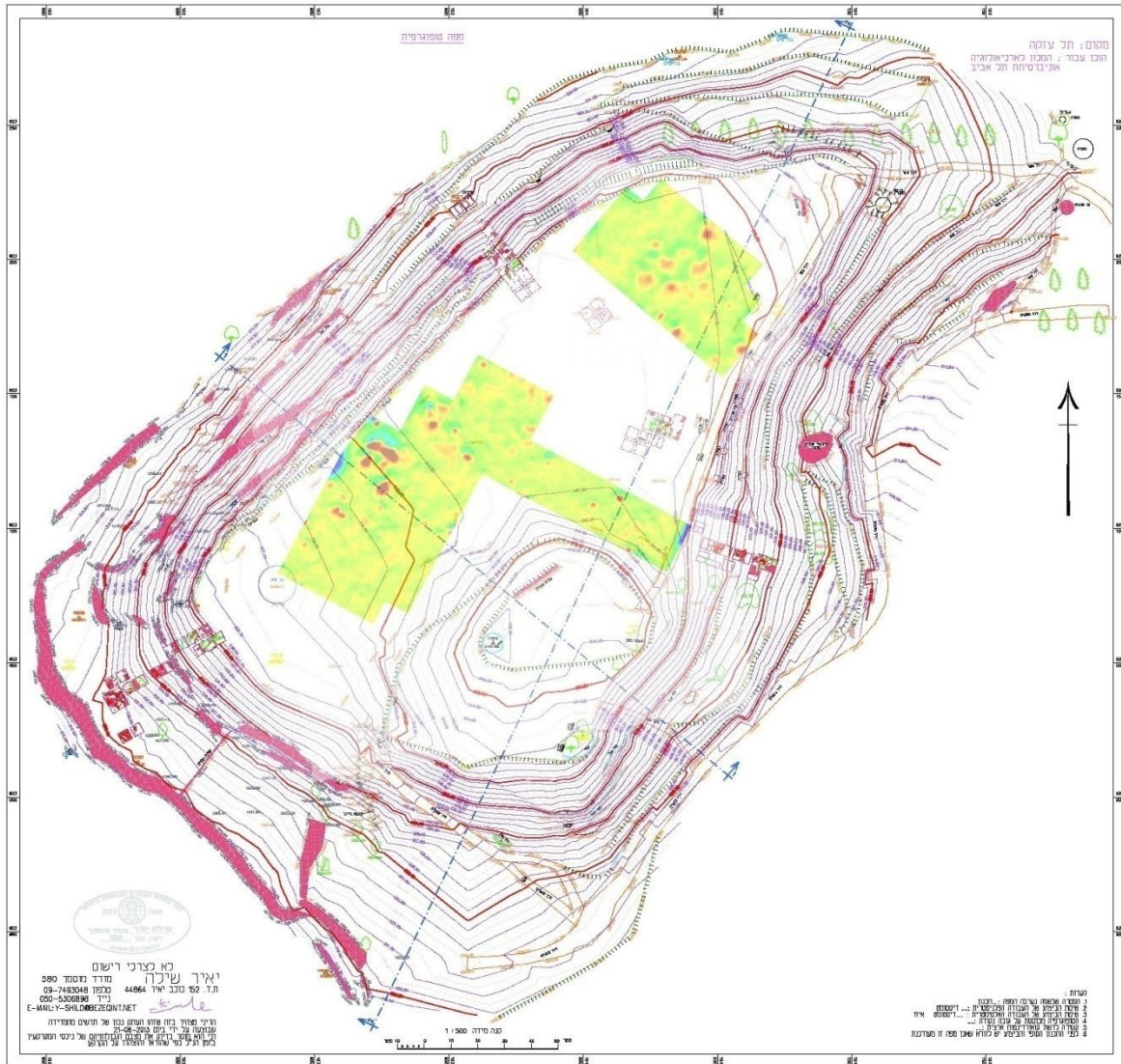
Location:



Measured areas 1 to 4 are located at the terrace. Area 5 is three parallel lines 1 m apart. They follow an old path climbing slowly from the bottom of S2 to the bottom of W1 and behind.

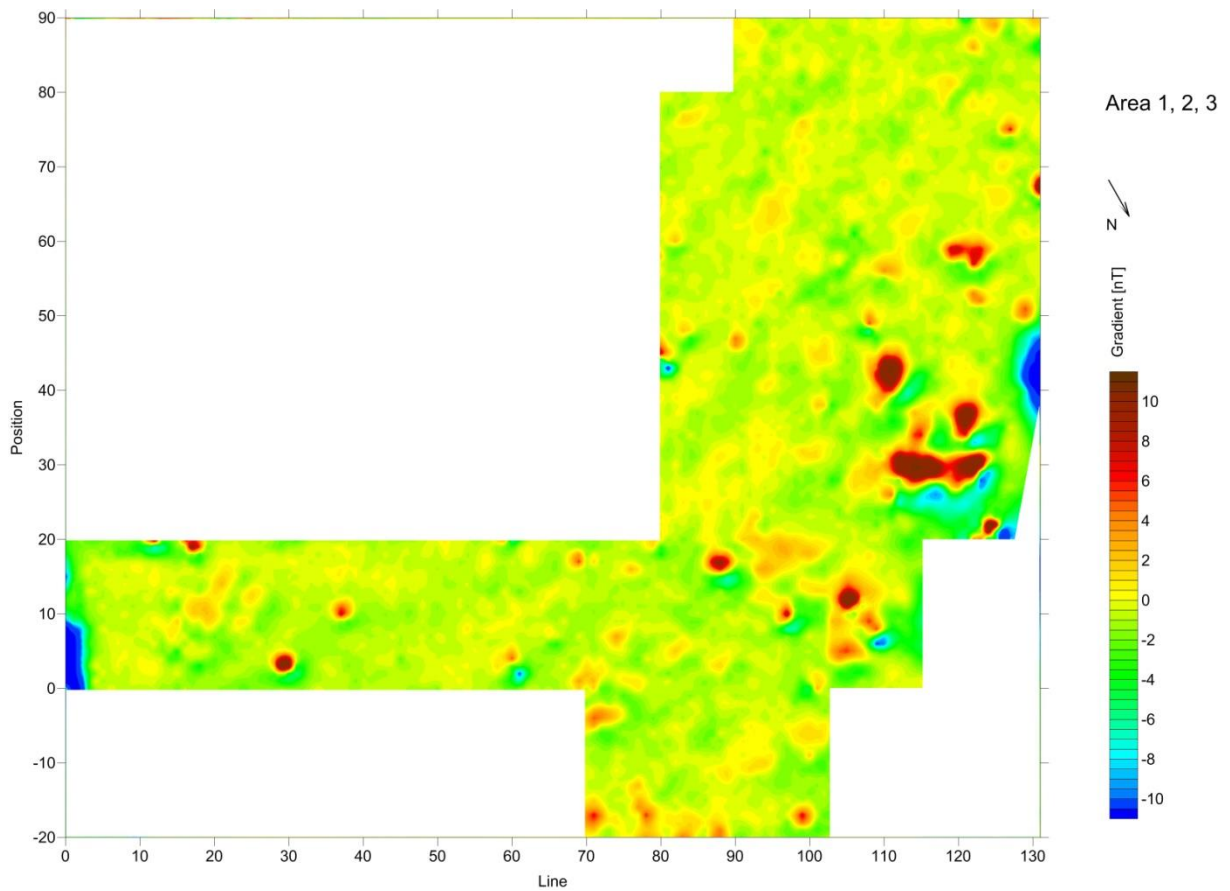
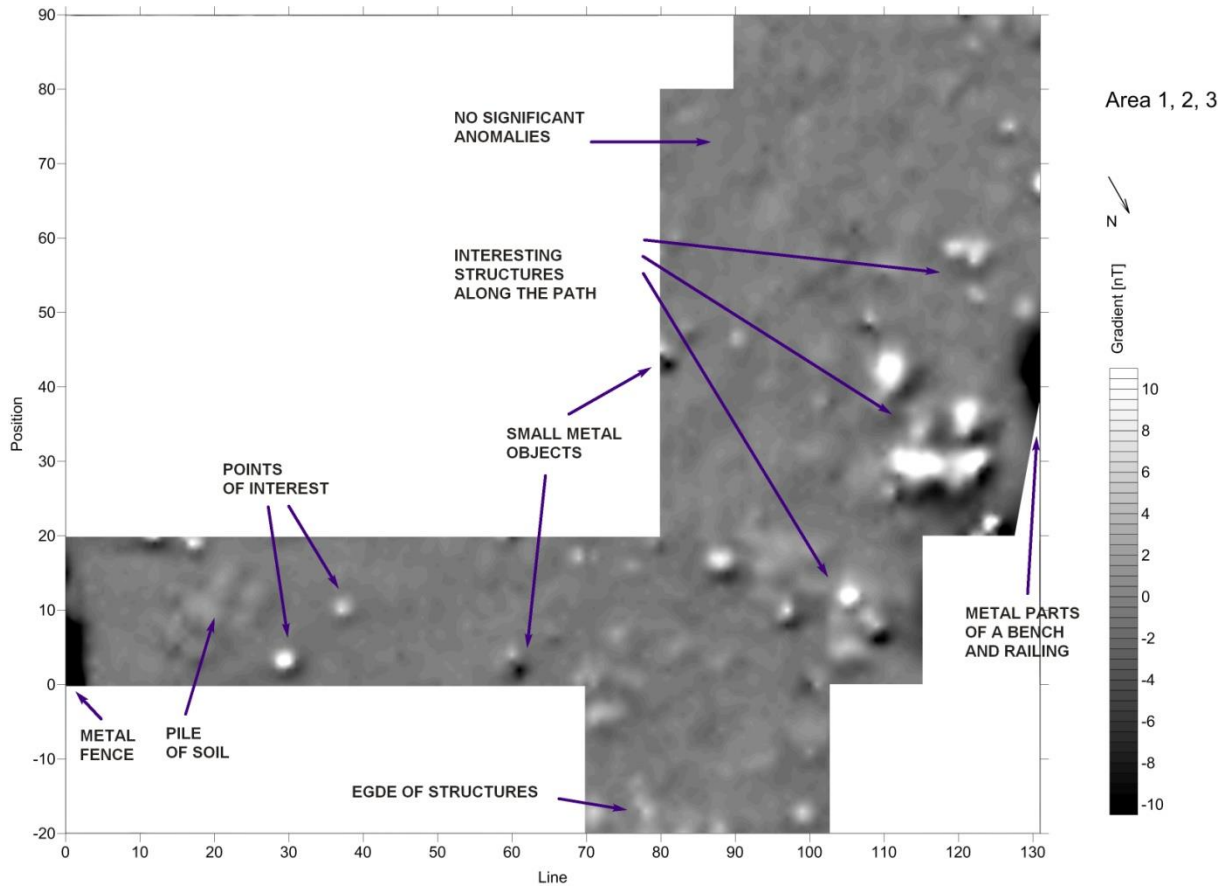
Overview of results

Anomalies of the gradient of the magnetic field in measured areas 1 – 4



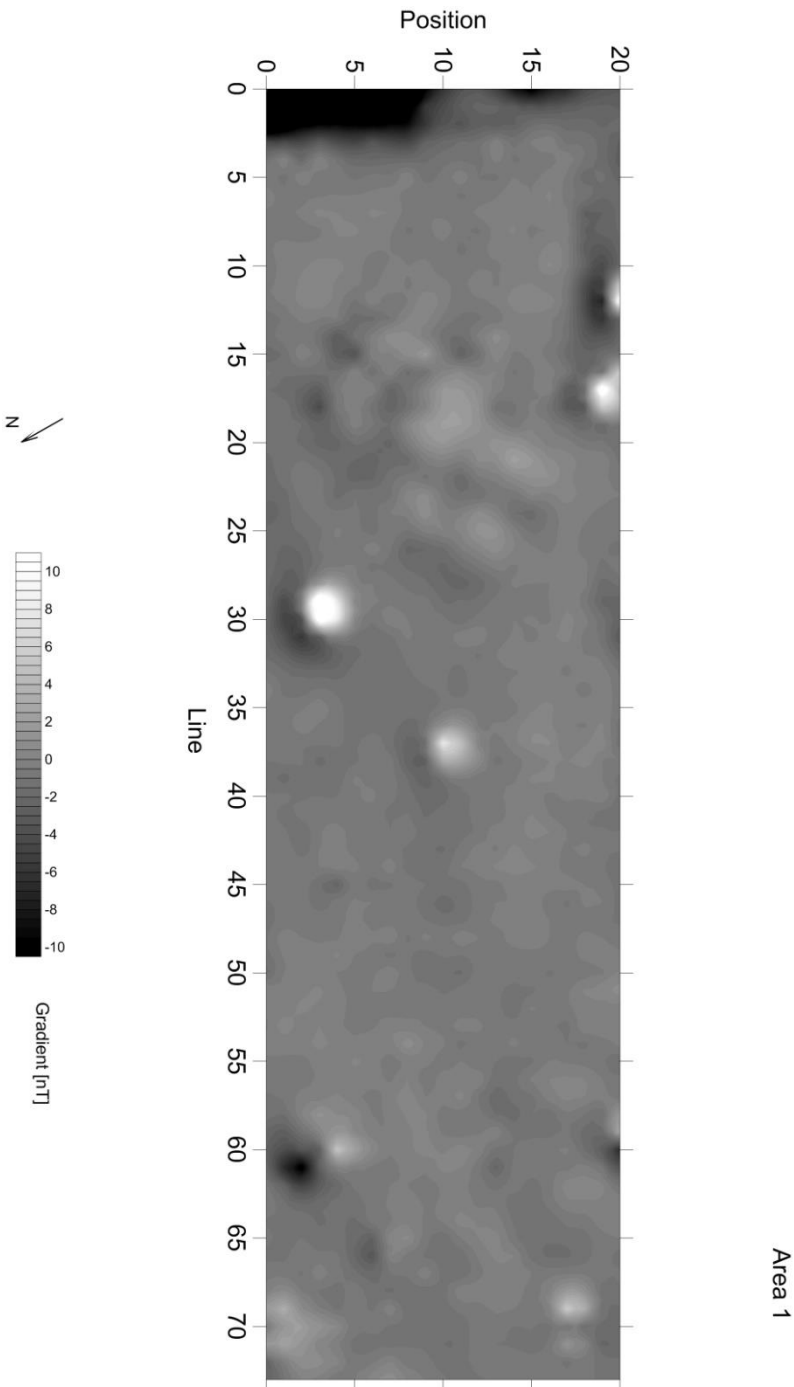
Maps of isolines are created by Surfer 12, Golden Software using local coordinates in meters. Colorful pictures with a rainbow scale look nice, however a gray scale is more suitable for interpretation of the anomalies.

Combined areas 1, 2 and 3

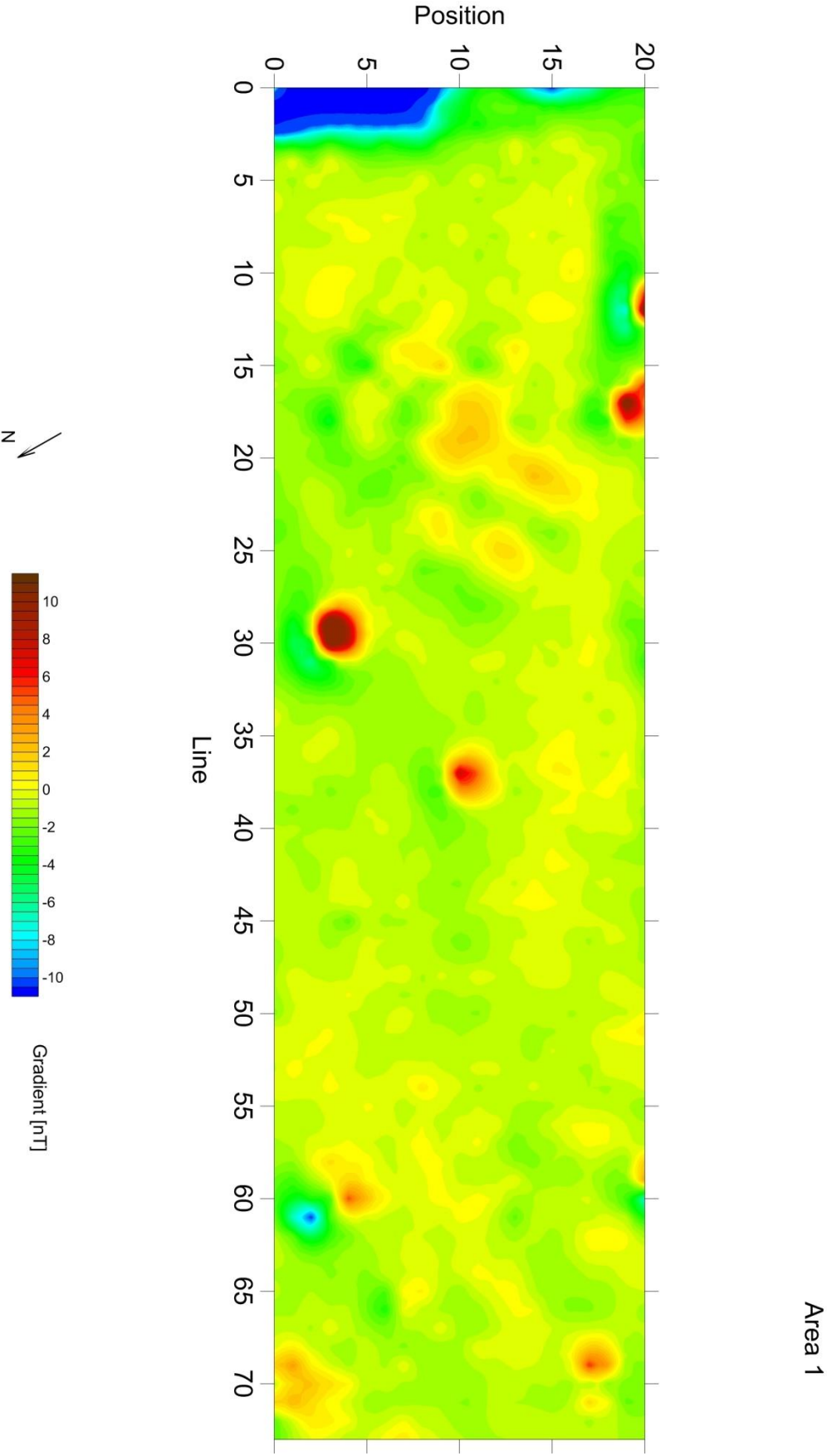


Area 1

Area 1 is a narrow strip located between E1 and W2 along the Macalister’s ditch. The strong positive anomaly around (0, 0) is caused by a metal fence of the area E1. The larger anomaly around (20, 10) is caused by soil piled up from excavation of T2. The conspicuous double anomalies with striking negative parts (60, 3) and (12, 19) are caused by small metal objects, their position is between the negative and positive peaks. No large structures are expected along the ditch, however, it would be good to measure a larger area because of the context.

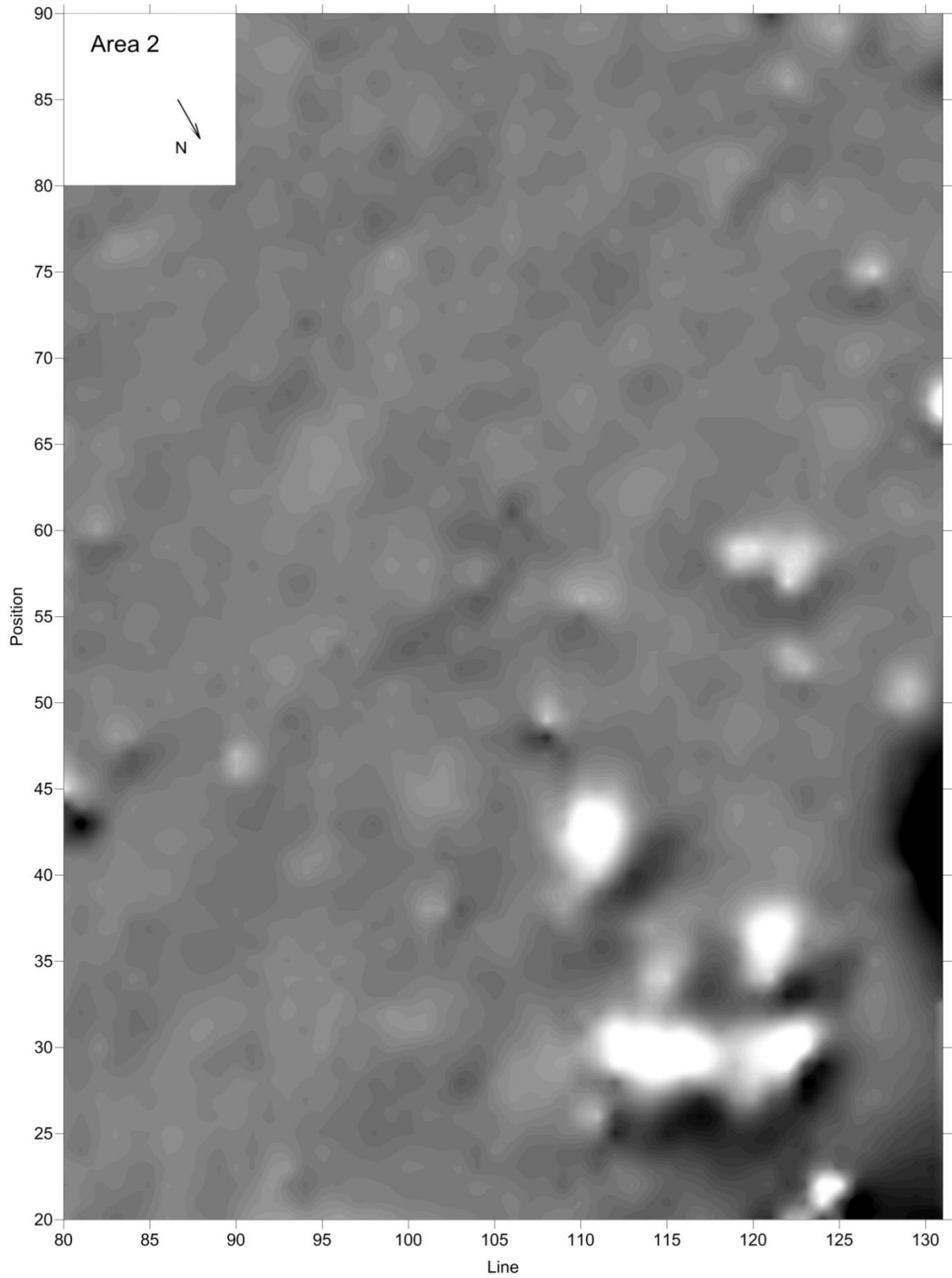


Small anomalies (17, 19), (30, 4), (38, 11), (69, 17) and (70, 1) might be a matter of interest if detailed survey is needed.



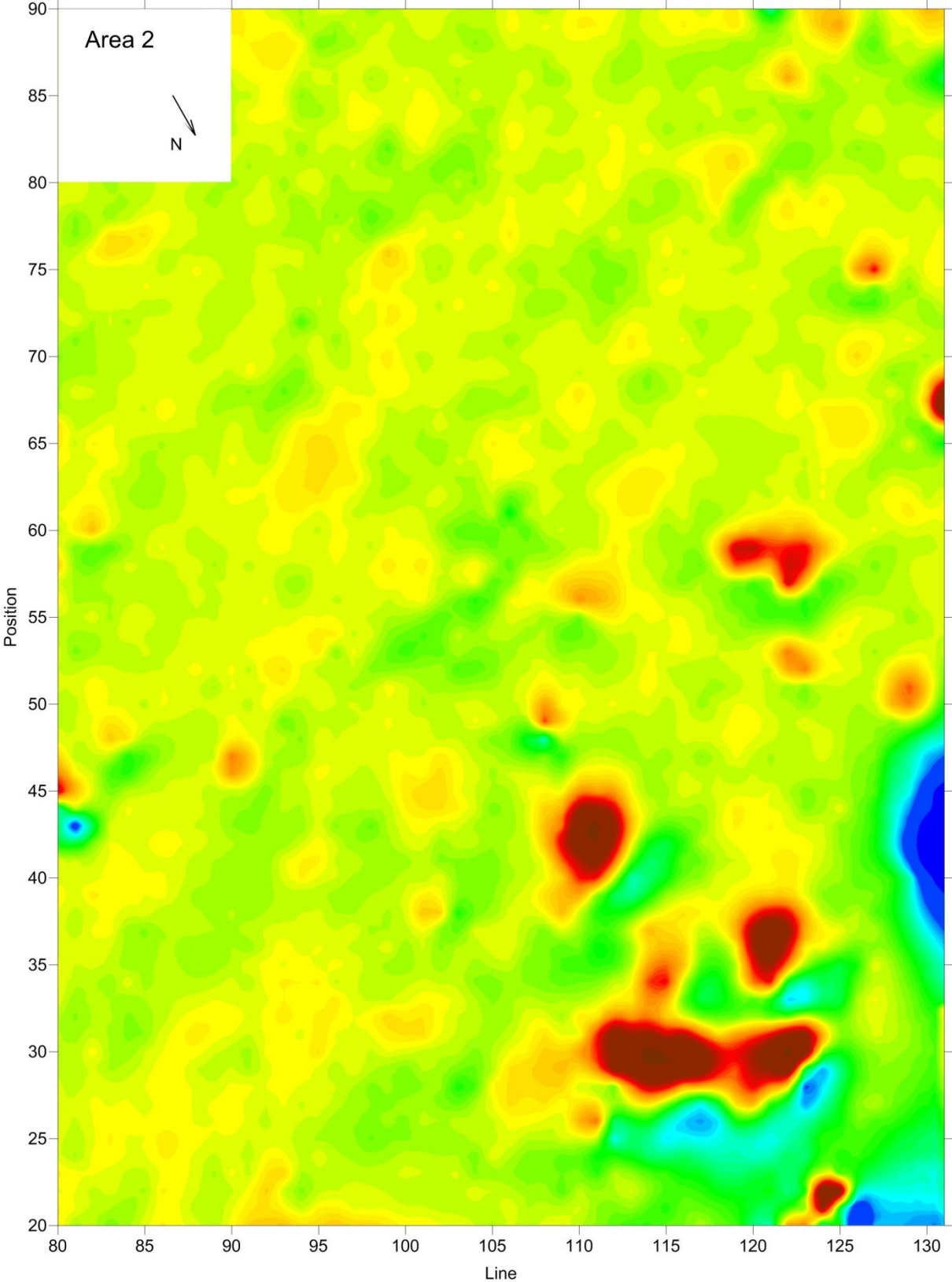
Area 2

Area 2 is located next to a main path. The strong anomalies between (110, 20) and (130, 60) follow the path and indicate larger structures.



The anomaly near (130, 40) is caused by metal parts of a bench and a nearby railing.

The upper left part of the area does not show significant anomalies, it is mostly bedrock very near the surface or at the surface. An experienced interpreter knowing the site might evaluate significance of the diagonal trend of isolines.



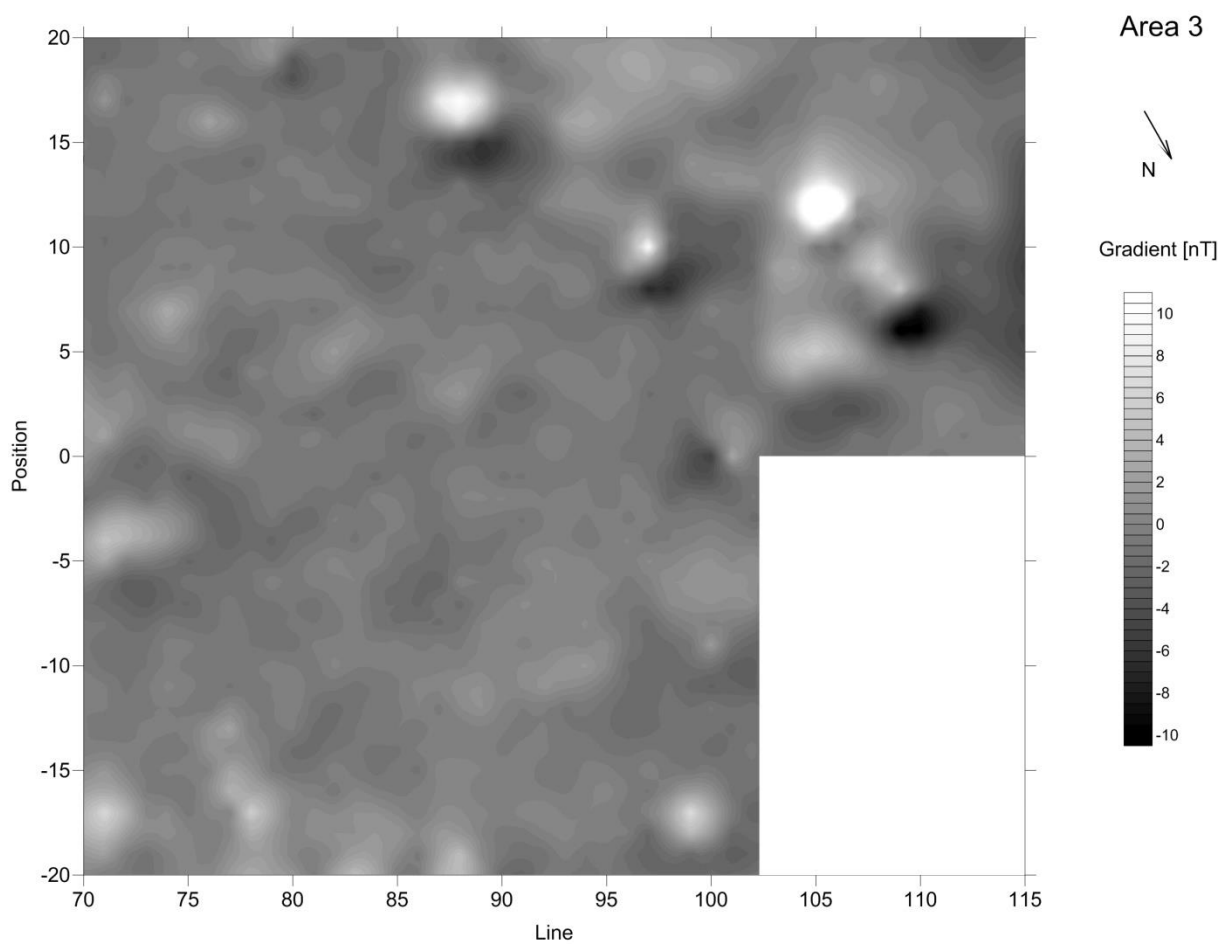
Area 3

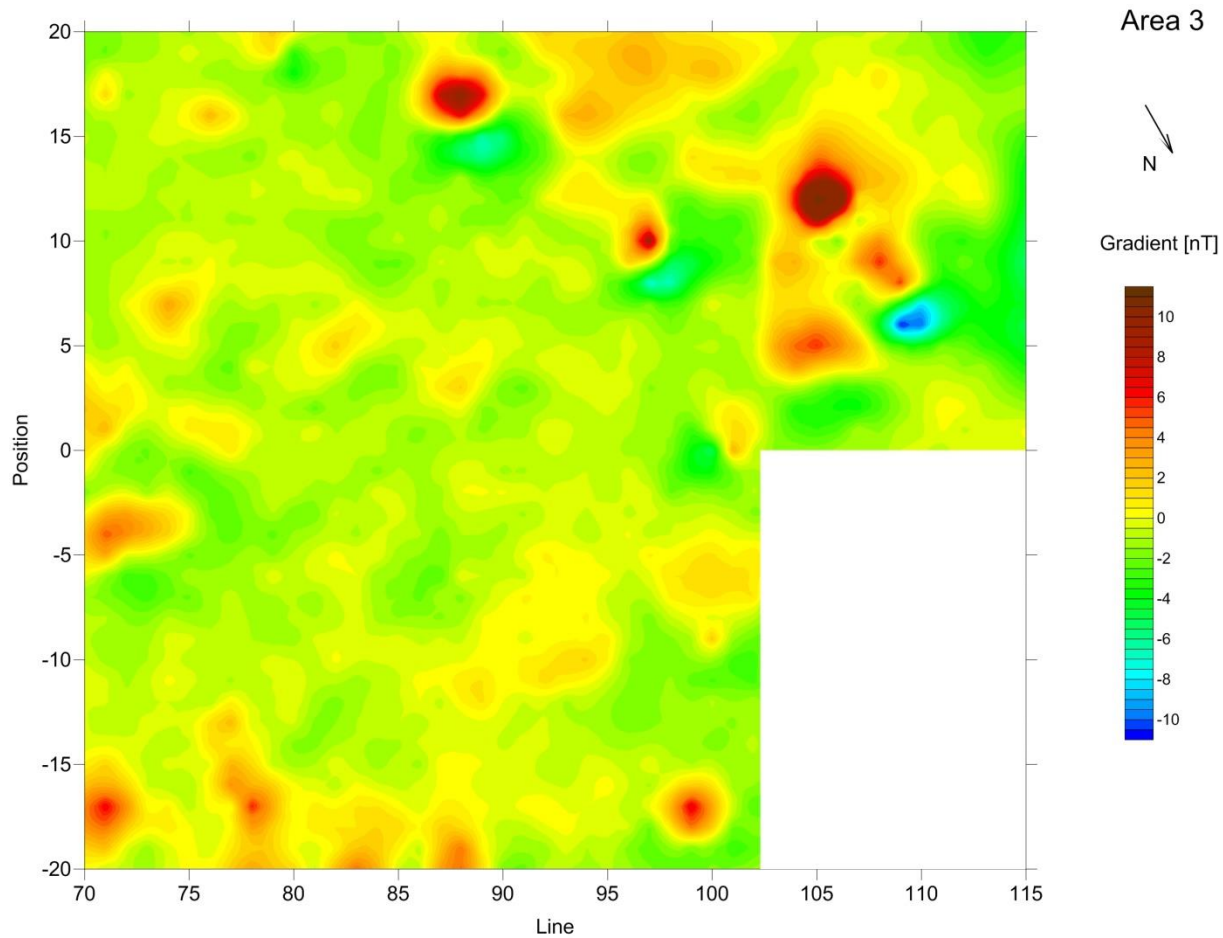
Area 3 is limited by excavations at W1, W2 and T1 as well as piles of soil next to them.

The strong anomalies near (105, 10) are located at the main path. The anomalies at (88, 15) and (97, 10) are located along another path, the perpendicular to the main one.

The inconspicuous anomalies around (97, 20) might be interesting as well as (72, -4).

The anomalies between (70, -20) and (100, -15) may be an edge of a larger structure, but it is difficult to say because the measured area does not cover enough.

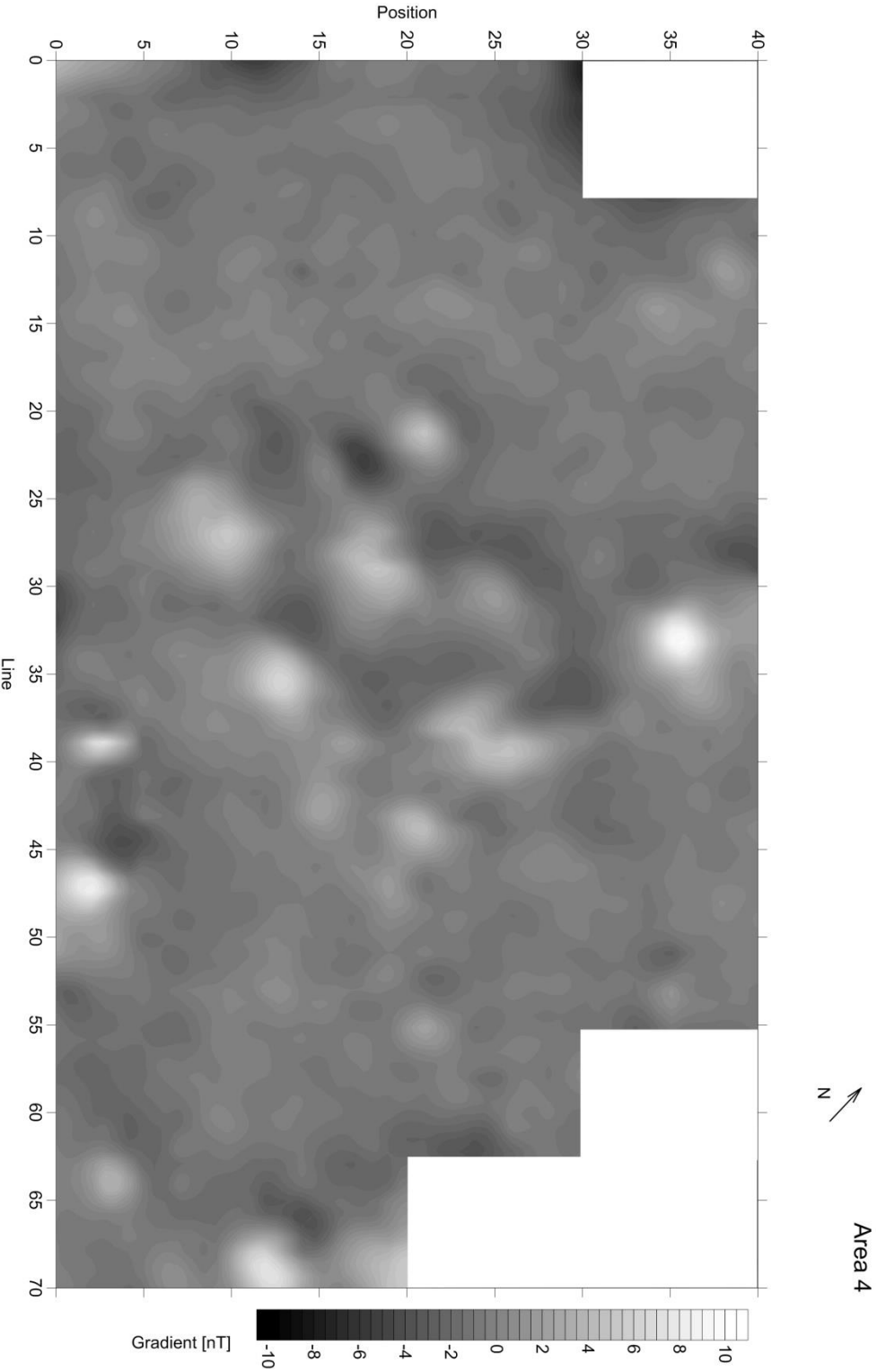


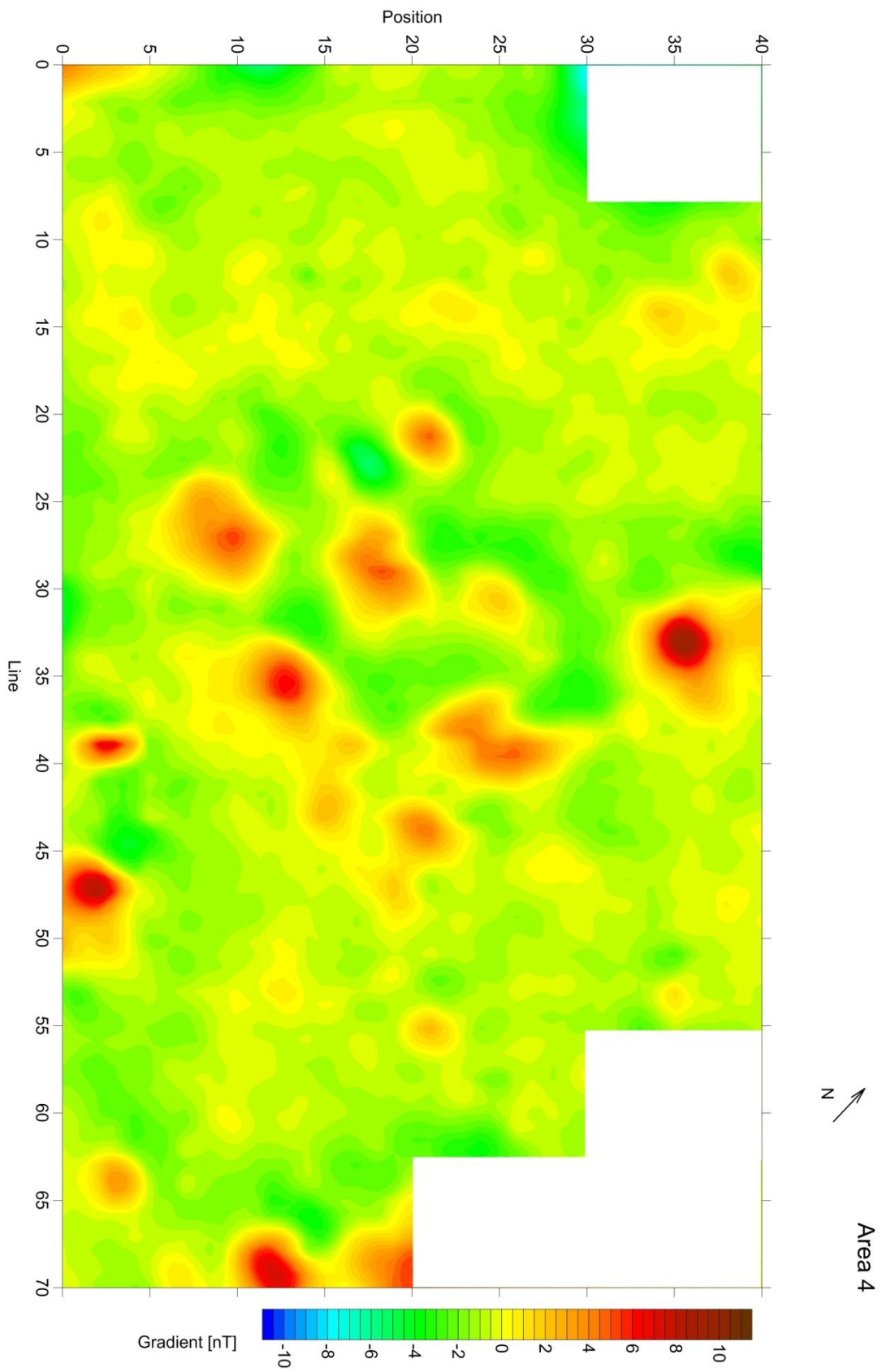


Area 4

Area 4 is located between paths following the edge of the terrace. It is limited by T1, piles of soil and metal benches along the path.

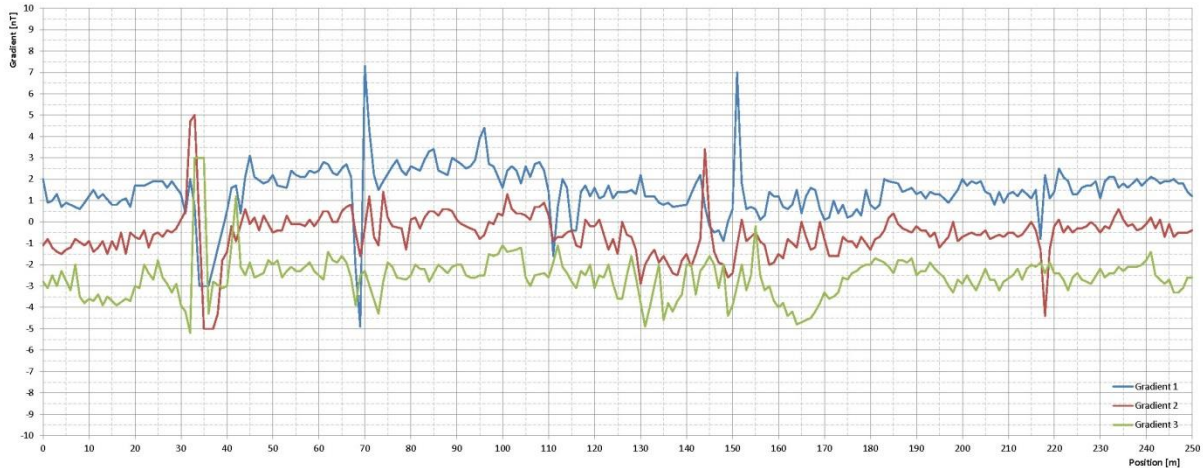
The most interesting part is the group of anomalies in the middle of the area probably copying a large structure.





Area 5

Three parallel lines 1 m apart, spacing 1m follow an old path.



The anomalies at 30 – 40 m are caused by metal rods placed at the bottom of W1.

The anomalies at 70 m and at 220 m are probably disturbances caused by small metal objects.

The anomalies between 140 m and 160 m look like a response to a larger structure.

Conclusion

Use of magnetometry at the top of the Tel Azekah is limited by metal rods placed around the excavating areas. The measuring areas between are not large enough to provide context and allow better interpretation. Magnetometry is usually used for an initial survey of large areas and shows places of interest that may be subsequently measured by other methods, mostly by ground penetrating radar.

Contrast between buried walls and surrounding bedrock in Azekah is relatively small. The structures do not show clearly.

Results from areas 4 and 5 suggest that magnetometry would be more usable for larger areas, and especially for areas at slopes of the tel because of the thicker layer of soil.

Magnetometry on its own does not provide information of what exactly is under the surface and how deep it is. Generally speaking, a sharp peak suggests a shallow source and vice versa. Magnetometry can contribute to the information about the site gathered from various sources. An interpreter who knows the site can connect the map of isolinies to areas already excavated and make more use of the results of magnetometry.