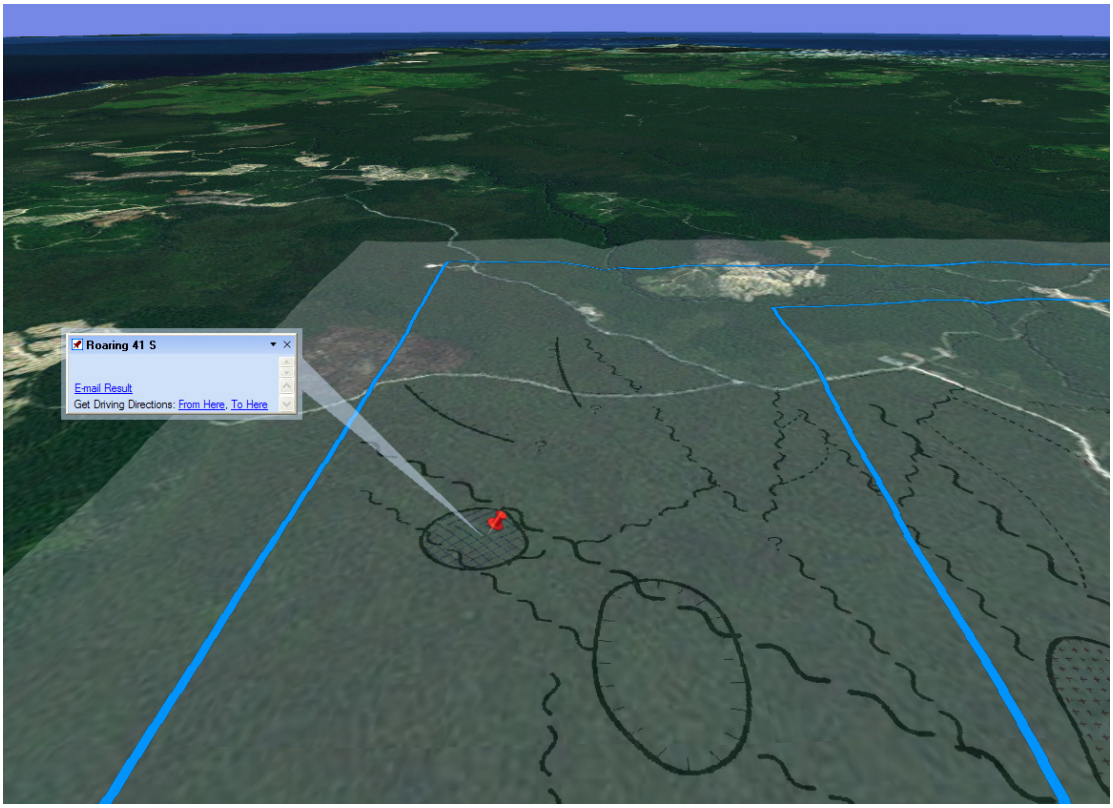
Balfour Project

Tasmania

Roaring 41 S
Magnetic Data Modelling



Prepared for Pleiades Resources Pty Ltd
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1. SUMMARY

A single, elevated gravity observation in the far north-west of the Balfour Project was noted to be coincident with a magnetic bullseye feature. Due to the general enigmatic nature of coincident magnetic-gravity anomalies, modelling of magnetic data over this body was undertaken to determine the depth to source.

Magnetic data for modelling was sourced from the Arthur-Pieman survey flown in 1996. Details of this survey are presented in Table 1. Data from this survey had no altitude data and consequently an assumption has been made for a constant sensor altitude of 90 metres above ground level as per the flight record specifications. This is a critical assumption as it affects depth estimates for any subsequent modelling.

Table 1: Arthur-Pieman geophysical survey specifications

Survey Name	Arthur-Pieman
Date Acquired:	April 1996
Flight Line Spacing:	200 m
Flight Line Direction:	East-West
Magnetic Sensor Height:	90 metres AGL

Summary findings from the modelling are;

- Source is probably close to outcropping given the depth to top models around 17 metres below surface.
- Body is estimated to dip to the south east at approximately 150^0 (caution needs to be exercised when considering the accuracy of dips in modelling)
- Body models with a high magnetic susceptibility of order $12{,}000 \times 10^{-5}$ SI units, or 0.12 SI Units.
- Centre point of top surface is at 318000mE, 5435800mN MGA Zone 55
- There is a small topographic rise directly over the magnetic source which may reflect the actual source given the shallow depth of body.

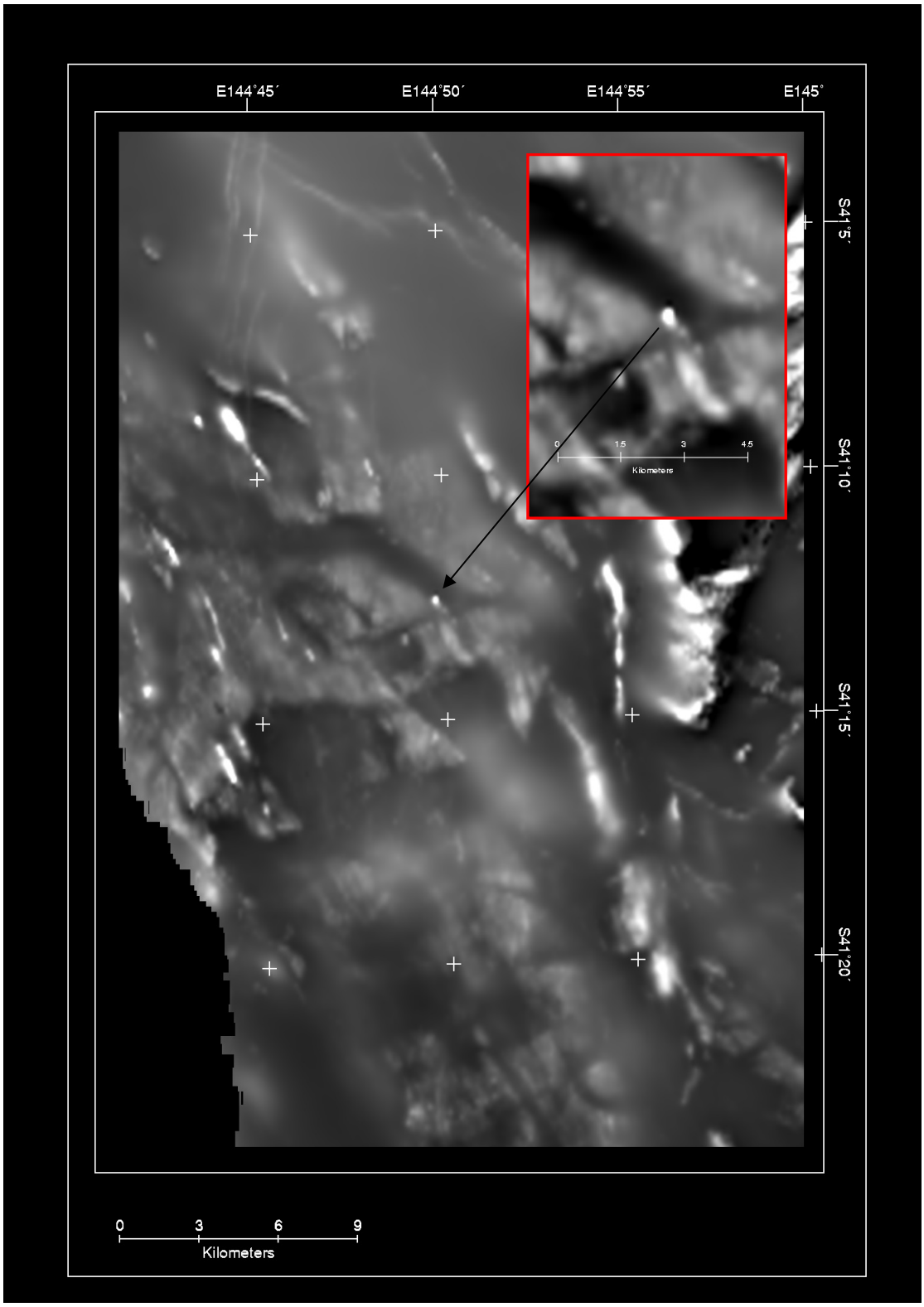


Figure 1: Regional magnetic image (RTP) of the Balfour region with inset showing the Roaring 41S anomaly

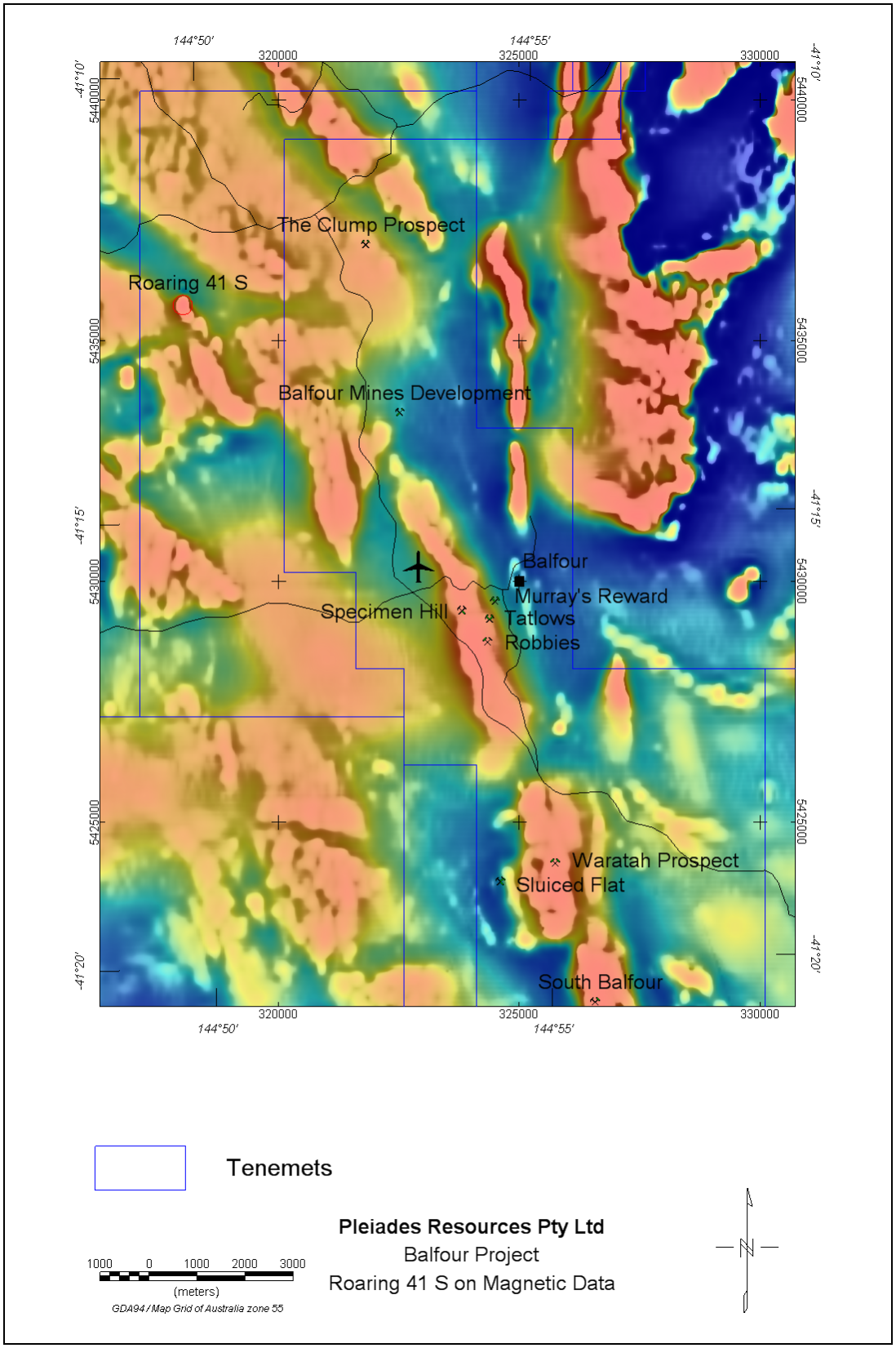


Figure 2: Colour magnetic image (TMI) with a first vertical derivative added back in as intensity

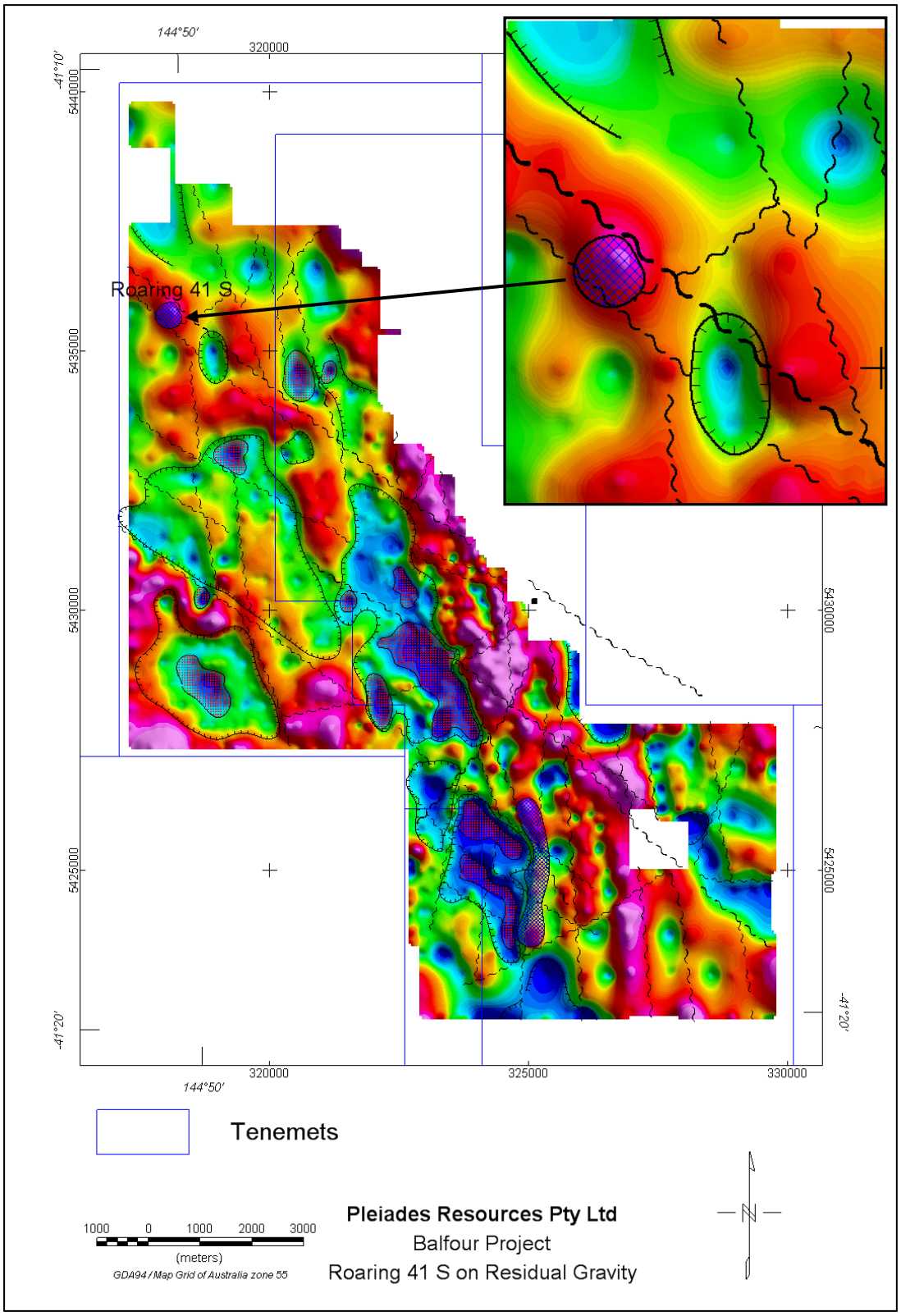


Figure 3: Residual gravity image with interpretation overlain showing location of Roaring 41 S (inset).

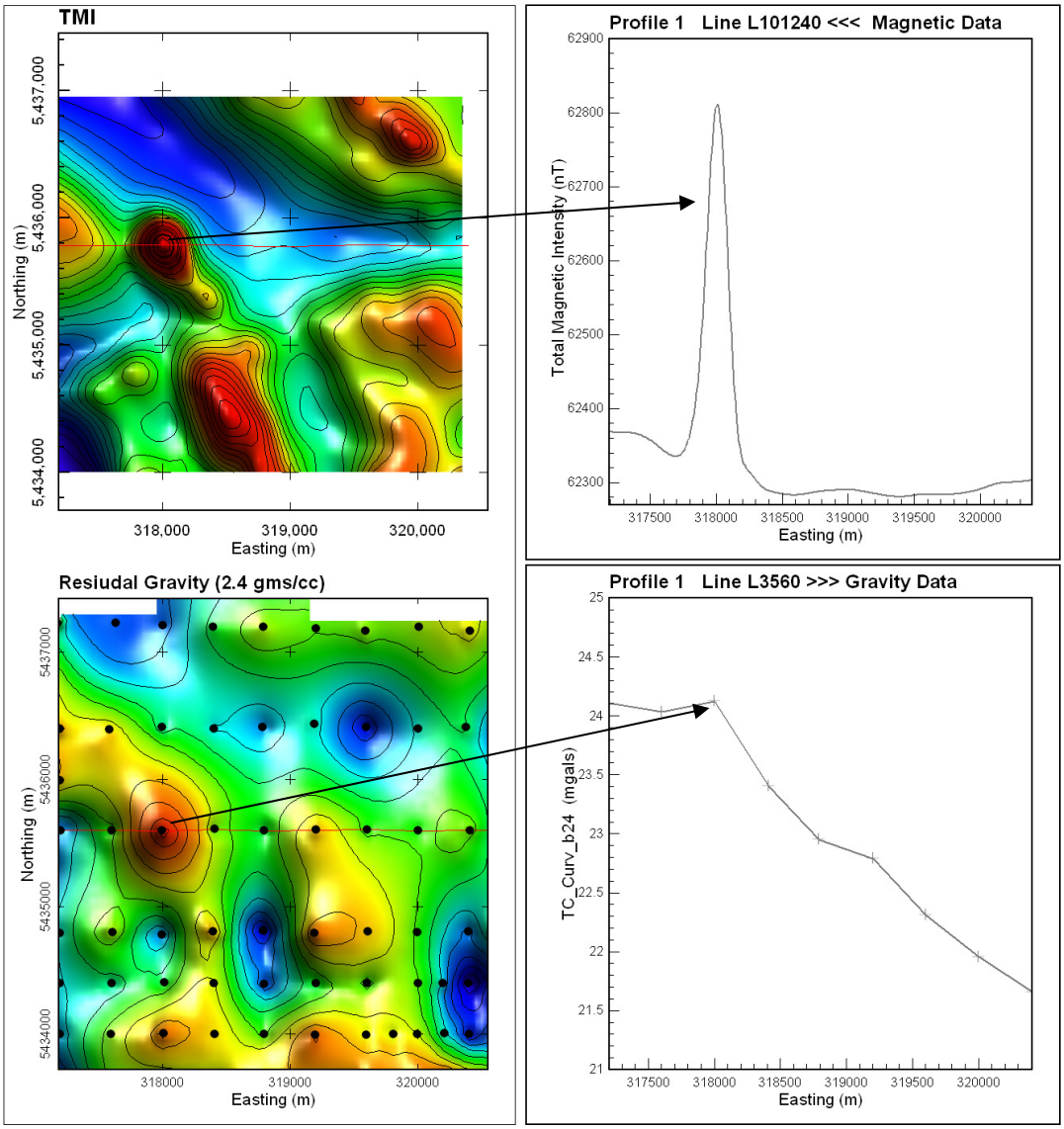


Figure 4: Magnetic anomaly (top) and residual gravity anomaly (bottom).

Figure 4 shows the relationship between magnetic and gravity anomalies. Magnetic data (top left) shows an isolated anomaly coincident with a single gravity observation (bottom left) which is also anomalously high. The graphs on the right show two profiles, a magnetic profile (top right) and the Bouguer Anomaly (bottom right) with arrows pointing to the anomalous points.

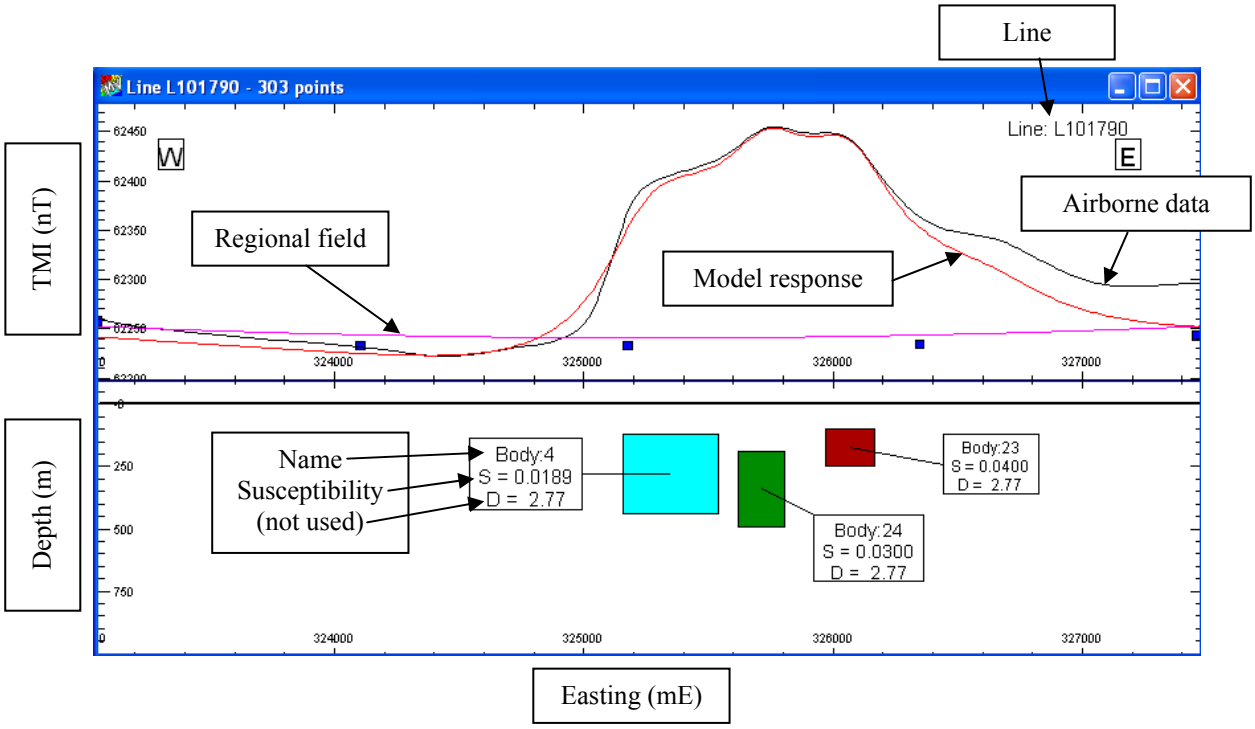
2. MODELLING RESULTS

Modelling of the magnetic anomaly was achieved with one body as shown in Figure 6. Excluding regional variations, the fit with airborne data is considered quite good. It is important to note that a critical assumption of the aircraft altitude was made in the modelling software, this value being set to 90 metres above ground level. Significant inaccuracies in this value will have a direct impact on the true depth to source.

The following images (Figure 7, Figure 8, Figure 9) are of cross-sections along selected flight lines of the airborne survey. Each cross-section shows;

- a regional magnetic field (pink line),
- the airborne survey profile (black line),
- the magnetic profile generated from the models (red line),
- the models themselves as they intersect the cross-section

Terrain variations within the localised area were considered minimal. Due to a lack of any flight altitude information it was impossible to accurately generate models that included the surface terrain.



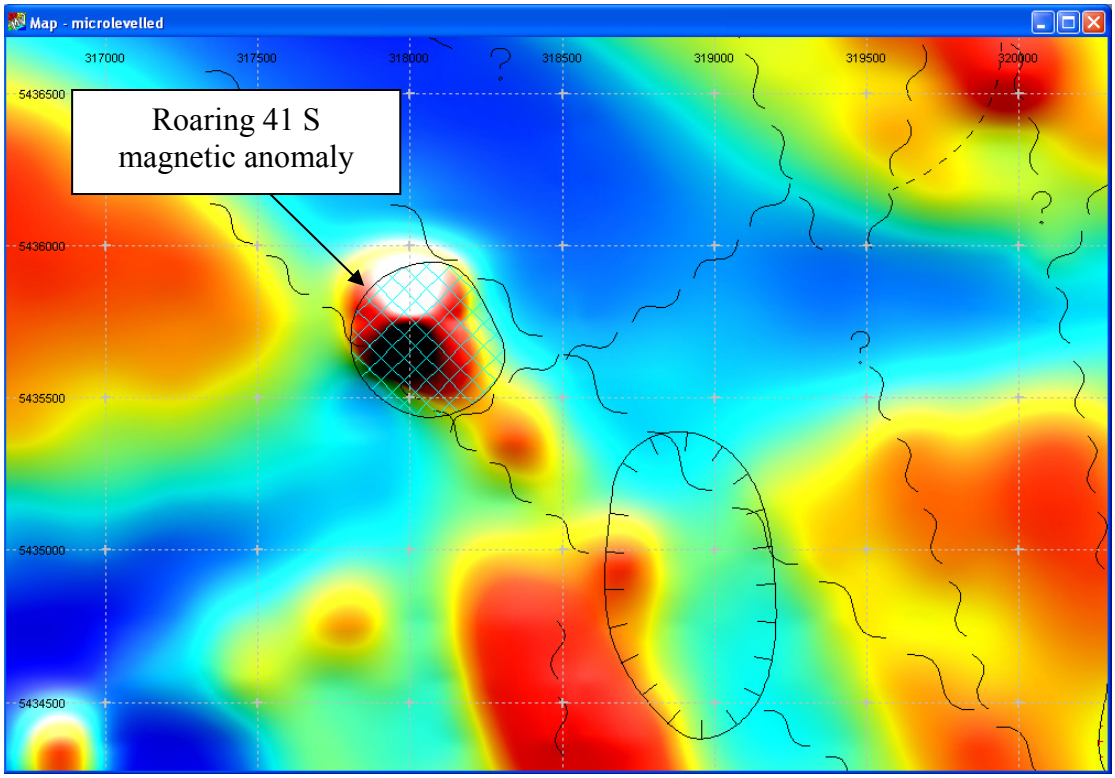


Figure 5: Plan view of TMI image with gravity interpretation. Roaring 41 S anomaly is cross-hatched.

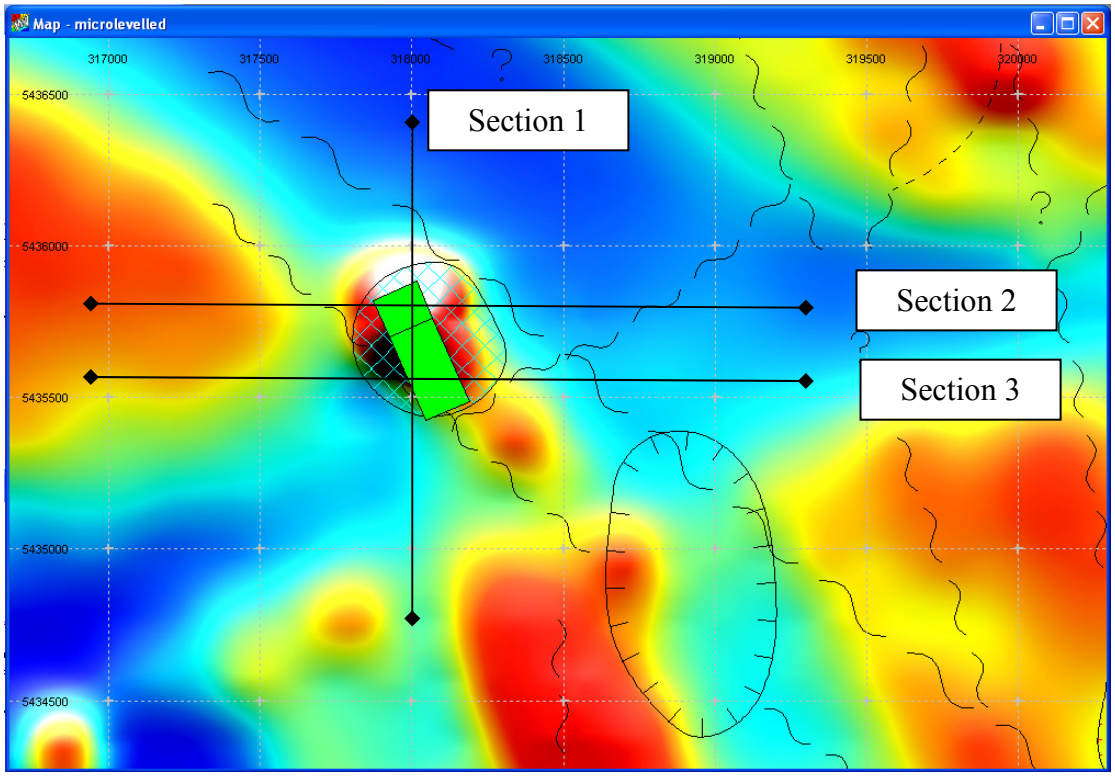


Figure 6: Plan view of model with TMI image and gravity interpretation with cross-section locations shown.

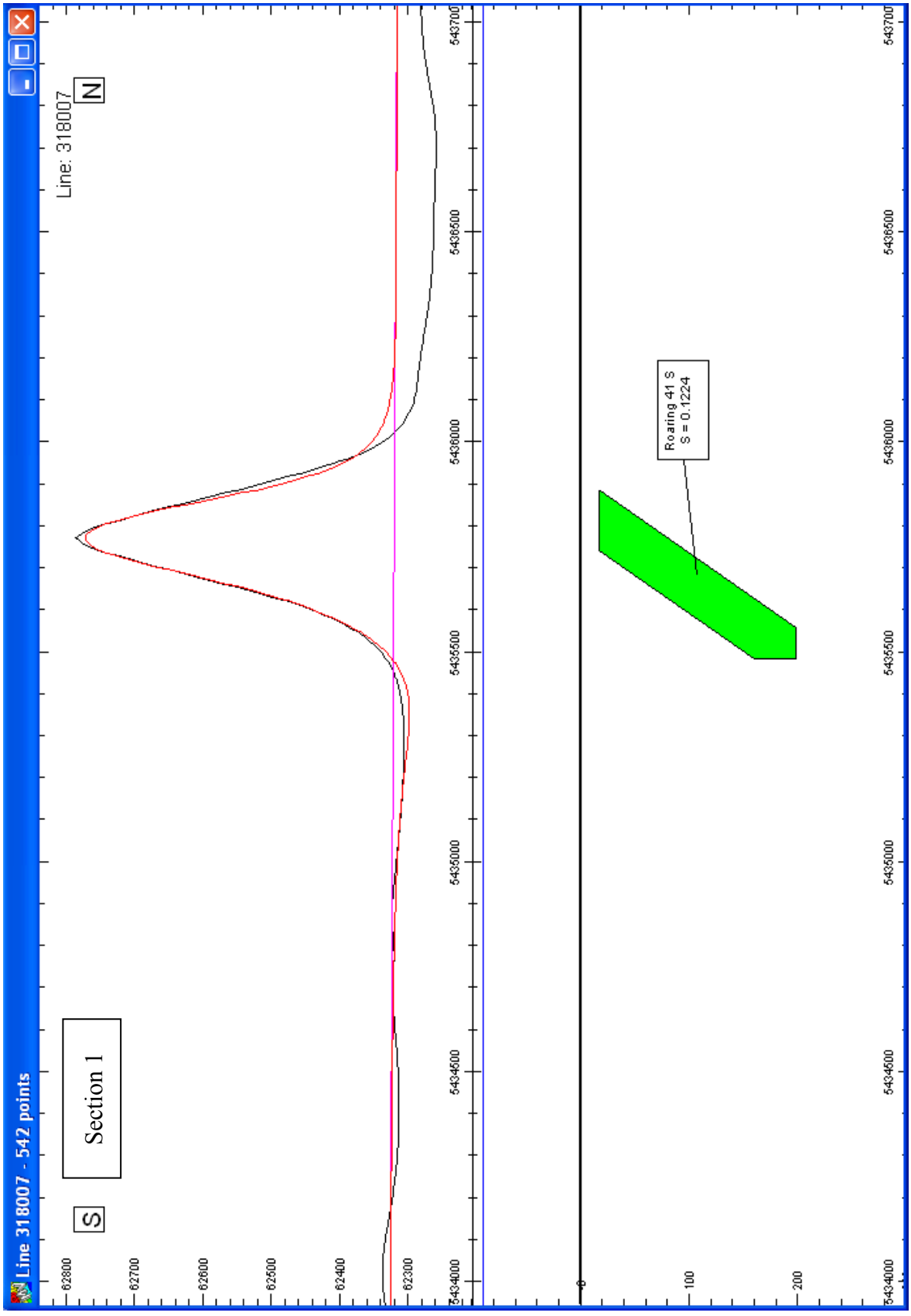


Figure 7: Cross-section (1) along a north-south profile showing model as it intersects the line. Magnetic body dips to the south east with a modelled susceptibility of order 12,000x10^{-5} SI.

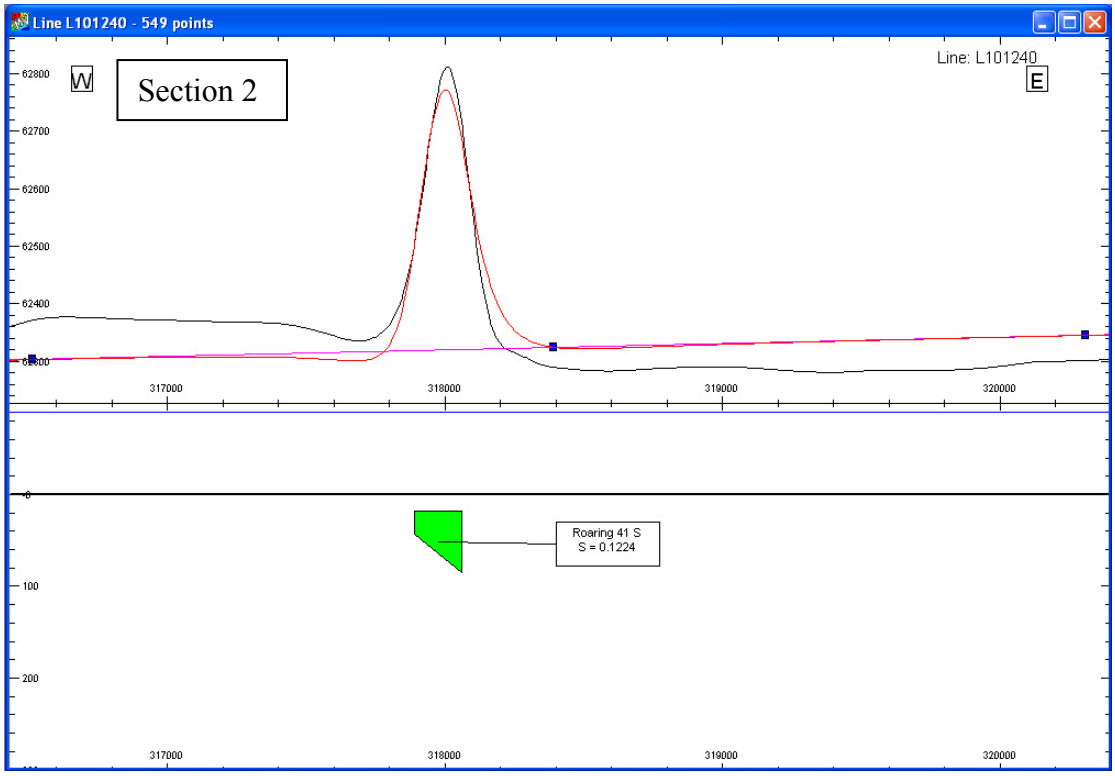


Figure 8: Cross-section (2) along an east-west traverse.

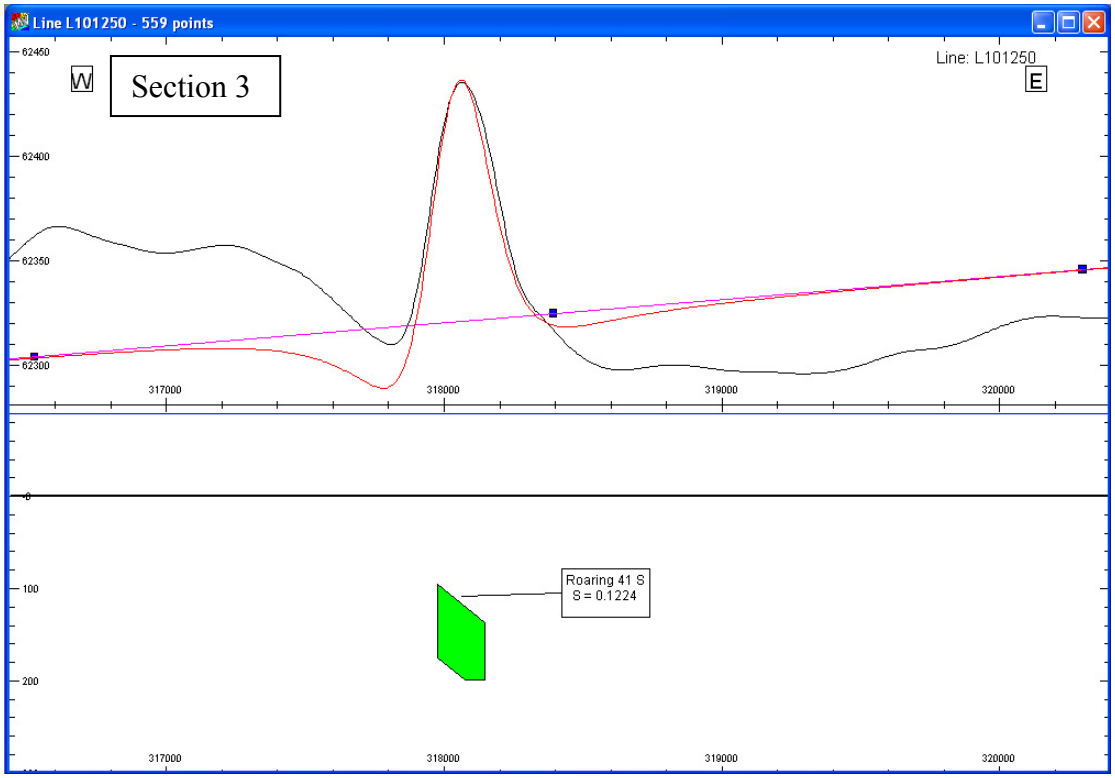


Figure 9: Cross-section (3) along an east-west traverse approximately 200m south of section 2.

3. ARCGIS IMAGES

The following images were generated using ArcGIS and show the slightly raised topography around Roaring 41 S. In both images, topography has been greatly exaggerated but there appears to be a definite rise over the magnetic anomaly.

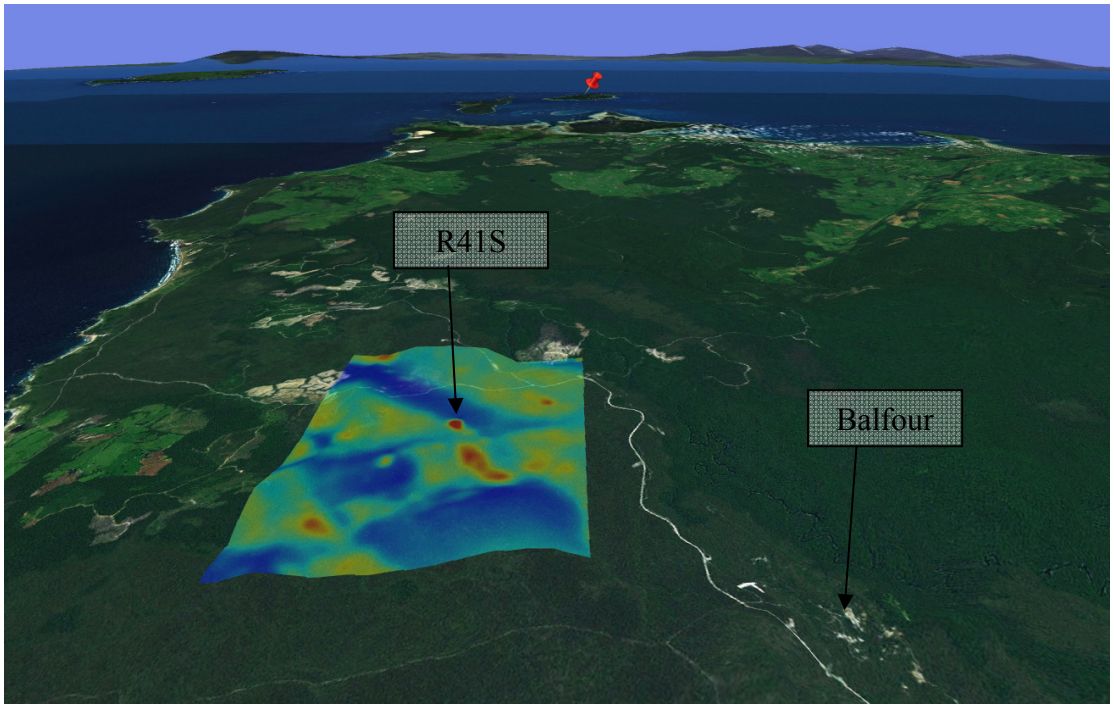


Figure 10: View looking north with magnetic data (RTP) draped over topography

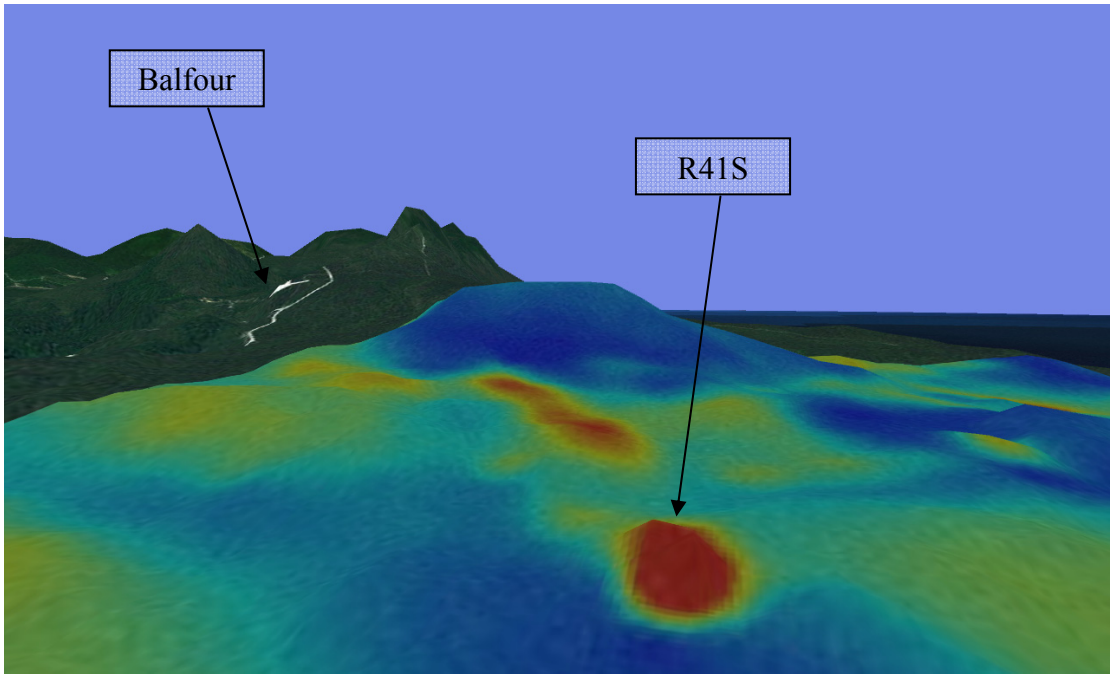


Figure 11: View looking south with Roaring 41 S magnetic anomaly (RTP) in the foreground. A small rise is present over the anomaly