

Balfour Project

Tasmania

Ground Gravity Survey Interpretation

Prepared for Pleiades Resources NL
by
Andrew Bisset

April 2009

Table of Contents

Table of Contents.....	i
List of Figures.....	ii
List of Tables.....	ii
List of Plates.....	ii
1. Summary.....	1
2. Introduction.....	2
3. Location.....	2
4. Data Processing.....	3
5. Discussion.....	10
Balfour.....	11
Roaring 41 S Anomaly.....	14
Sluiced Flat Region.....	15
6. Conclusions and Recommendations.....	17
7. References.....	18

List of Figures

Figure 1 - Balfour Project and gravity station locations	2
Figure 2 – Balfour gravity survey observation points	5
Figure 3 - Digital Terrain Model	6
Figure 4 – Bouguer anomaly (2.4 gms/cc) with terrain corrections applied	7
Figure 5 – Residual gravity anomaly calculated from the terrain corrected bouguer anomaly.....	8
Figure 6 - Airborne magnetic data (RTP) from the 1996 Arthur-Piemann survey.....	9

List of Tables

Table 1 - Mineralised localities around Balfour project area	4
--	---

List of Plates

Plan Number	Title	Scale
1	Interpretation Plan	1:25 000
2	Interpretation over Residual Gravity Anomaly	1:25 000
3	Interpretation over Airborne Magnetic Data	1:25 000

1. SUMMARY

Pleiades Pty Ltd acquired regularly spaced gravity observations over the Balfour Project area in north-west Tasmania with the intention of establishing a relationship between known tin/tungsten mineralisation at Balfour and the possible association of deep granitic bodies with near surface expressions. Data was collected and supplied by Haines Surveys with corrections included for terrain and earth curvature.

The Bouguer Anomaly shows a strong regional gravity gradient decreasing from the northwest towards the southeast with local, short wavelength perturbations visible across the survey. Calculation of the residual gravity anomaly highlights a structurally complex region around Balfour and to the south.

A prominent gravity ridge appears to be spatially associated with known mineralisation at Balfour, however conclusions were not reached about the relationship between the two. This same ridge is positioned along a prominent NNW-SSE magnetic body and generally follows the strike of the magnetic body.

Several residual gravity lows are mapped. These may be indicative of low density rock masses that have risen close to the surface. One such feature occurs south of Balfour around the Sluiced Flat locality and potentially represents a similar structural and geophysical setting to Specimen Hill.

A small, strongly magnetic body situated along a major northwest trending structure has a single elevated gravity observation associated with it (*Roaring 41 S*). Further work should be done to test this anomaly under the premise that a coincident magnetic and gravity anomaly would normally represent a priority target for base metal exploration.

2. INTRODUCTION

Pleiades Pty Ltd are searching the Balfour region of northwest Tasmania for tin and tungsten mineralisation thought to be intimately associated with buried granitic intrusions. Gravity readings were completed over portions of tenements E40/2007 and E27/2007 to primarily assess the relationship between known mineralisation at Balfour and its associated gravity anomaly. The aim of this interpretation was to qualitatively assess any gravitational anomaly at Balfour and provide a vector for an extension of any such anomaly. In-fill readings were taken over the area of known mineralisation immediately west of Balfour.

3. LOCATION

The project area is located in the northwest of Tasmania centred west of the town of Balfour on map sheet SK5520 as shown in Figure 1.

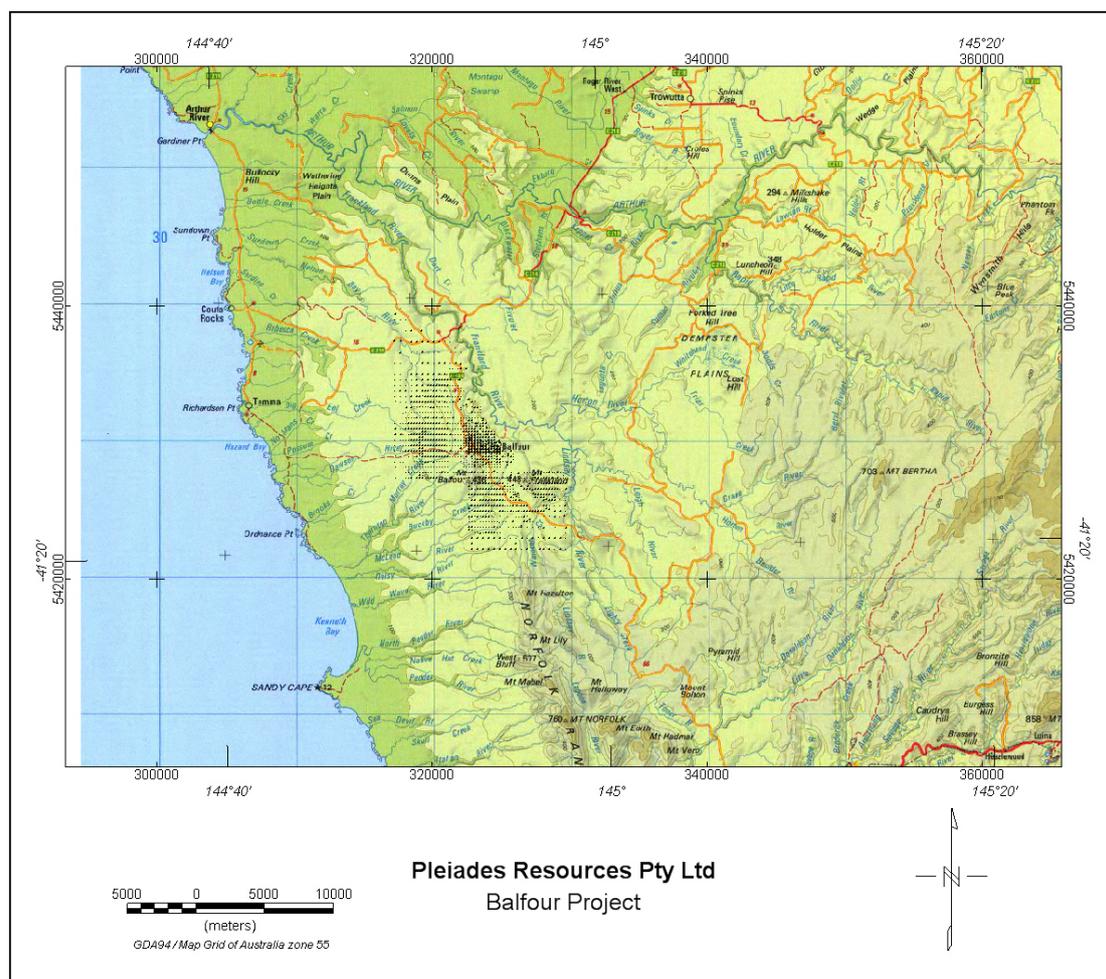


Figure 1 - Balfour Project and gravity station locations

4. DATA PROCESSING

Located data was received from Haines Surveys on CDROM as ASCII files. Data was collected and processed by Haines Surveys on the AGD84 datum (original client specification) however after discussion with the Pleiades representative it was decided that all data should be presented on the GDA94 datum. Consequently all images and maps in this report are for the GDA94 datum unless otherwise noted. All station coordinates were converted to MGA Zone 55 projection.

No additional processing of gravity data was undertaken except for the purpose of generating a residual grid from which most of the interpretation was completed. The residual grid was calculated by upward continuation of the fully corrected Bouguer anomaly (terrain and curvature corrections already applied) and then subtracting this grid from the original to yield a residual. This method although very simple, is very effective at highlighting near surface anomalies. Upward continuation was to 200m using a BA density of 2.4gms/cc.

Station locations are presented in Figure 2. Images of digital terrain (survey derived), Bouguer Anomaly (terrain corrected), and the residual gravity anomaly are presented in Figure 3, Figure 4, and Figure 5 respectively on the following pages. These last three figures also show the main track access, a local airfield and significant occurrences of tin and copper.

Open file magnetic data for the project was acquired to assist in the interpretation. Data obtained came from the 1996 Arthur-Pieman survey flown at 200m line spacing for the Tasmanian Geological Survey and is shown in Figure 6.

All data used in this interpretation is included on a CD ROM with this report.

Included on each plan and figure are locations for selected major occurrences of tin, tungsten and copper. Coordinates and names of prospects are given below in Table 1.

Table 1 - Mineralised localities around Balfour project area

AMG East (mE)	AMG North (mN)	Name	Commodity
323800	5429400	Specimen Hill	Sn-W
324374	5429218	Tatlovs	Sn-W
324335	5428750	Robbies	Sn-W
324600	5423777	Sluiced Flat	Sn-W
321800	5437000	The Clump Prospect	Cu
322510	5433515	Balfour Mines Development	Cu
324490	5429590	Murray's Reward	Cu
325738	5424156	Waratah Prospect	Cu
326567	5421274	South Balfour	Cu

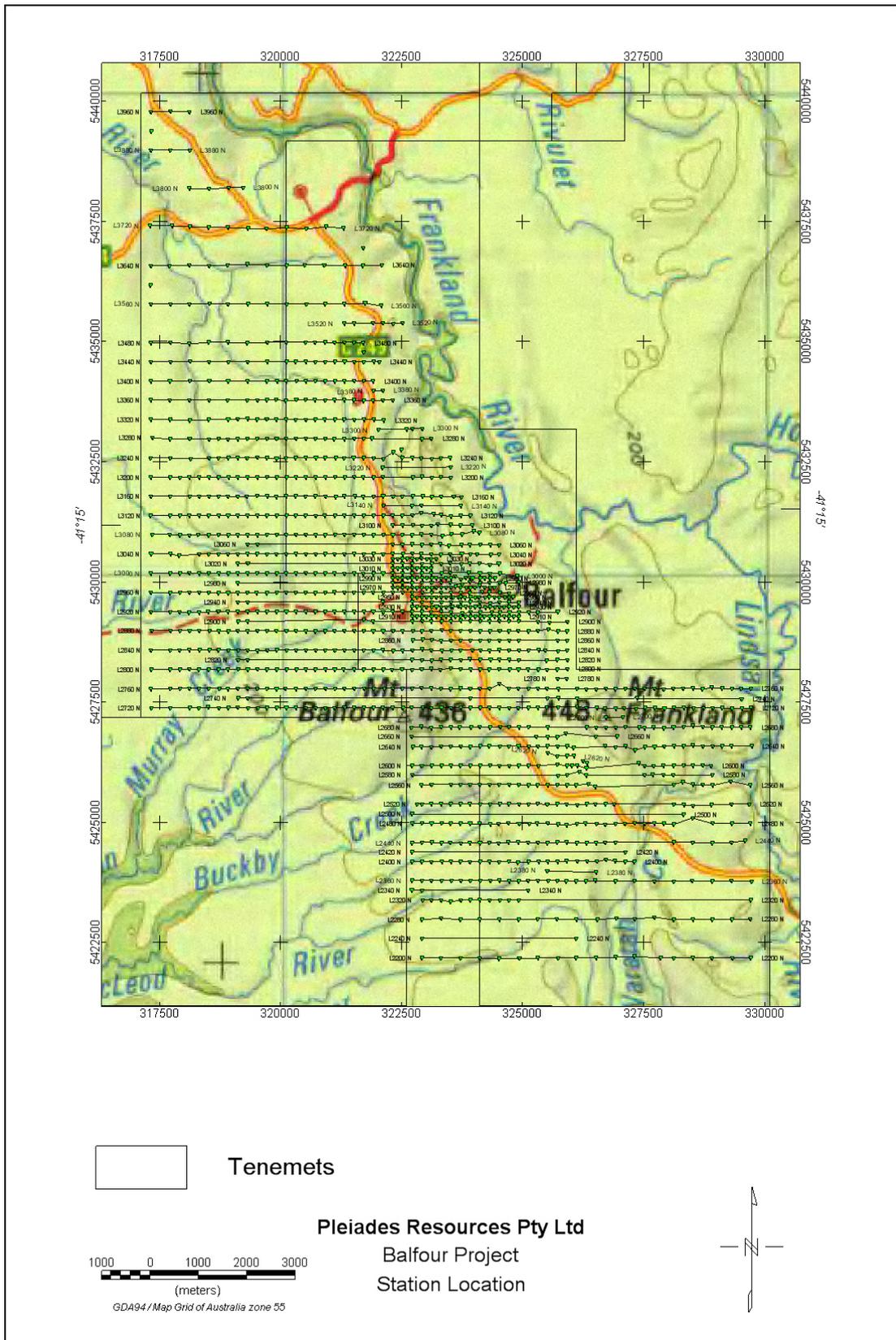


Figure 2 – Balfour gravity survey observation points

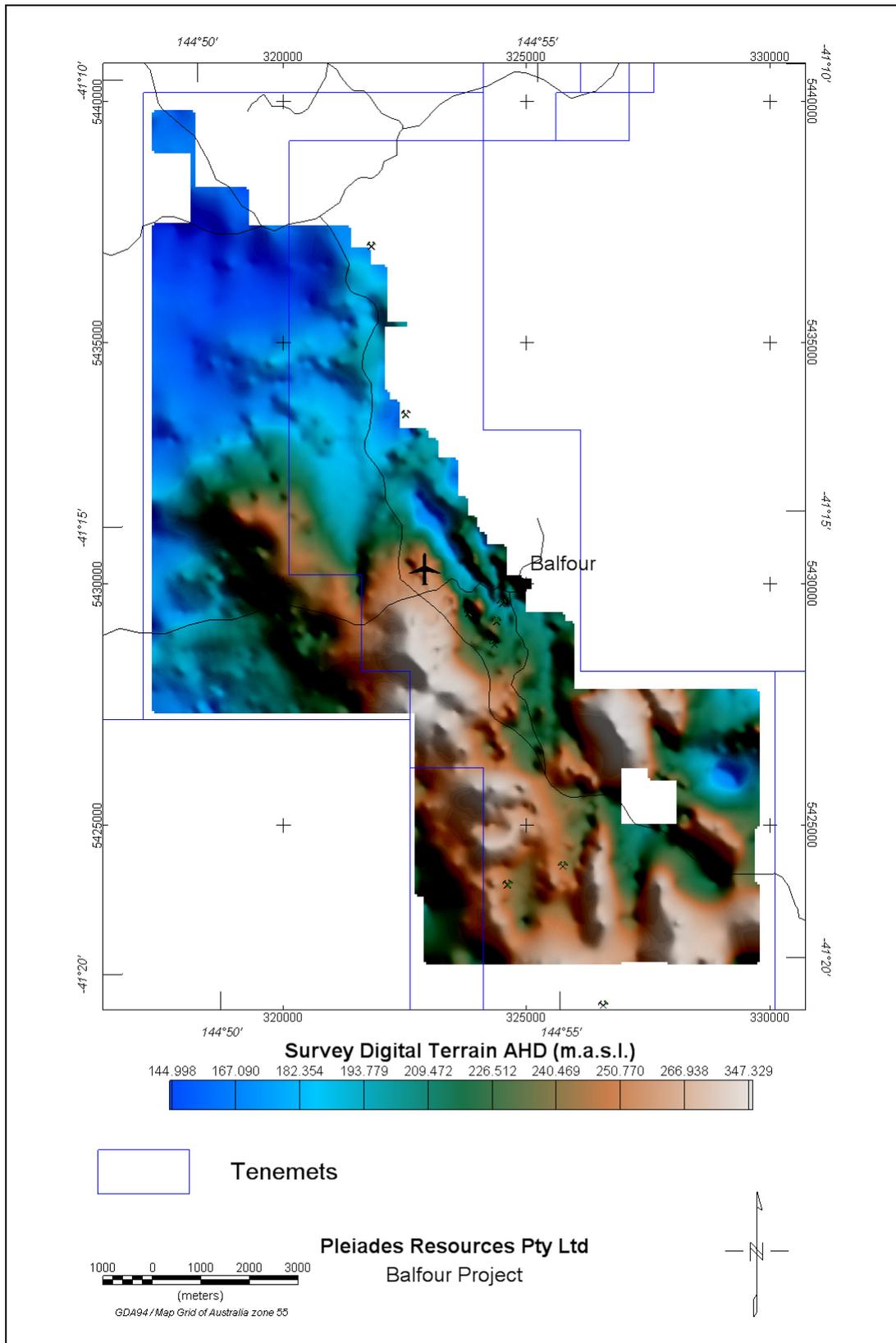


Figure 3 - Digital Terrain Model

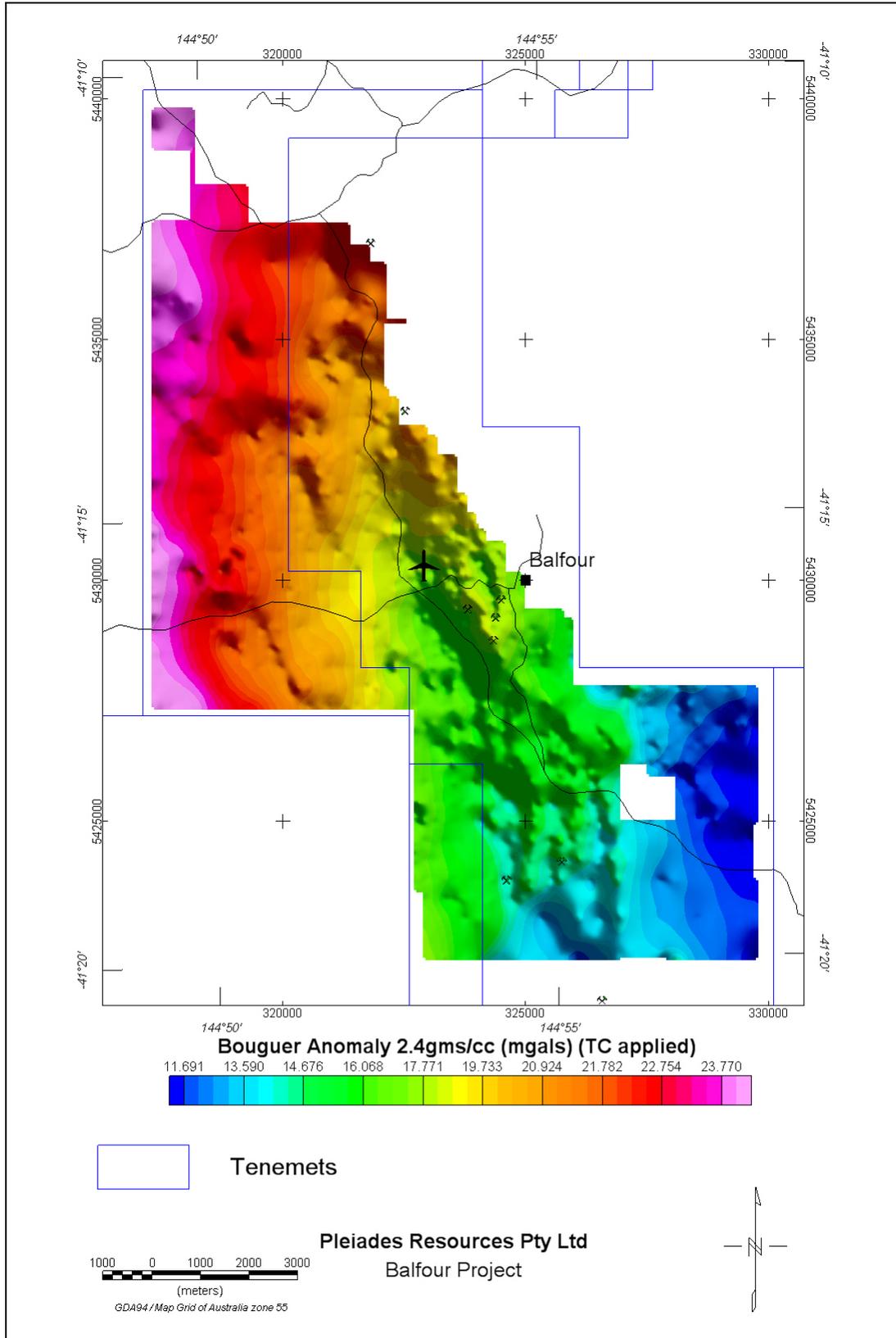


Figure 4 – Bouguer anomaly (2.4 gms/cc) with terrain corrections applied

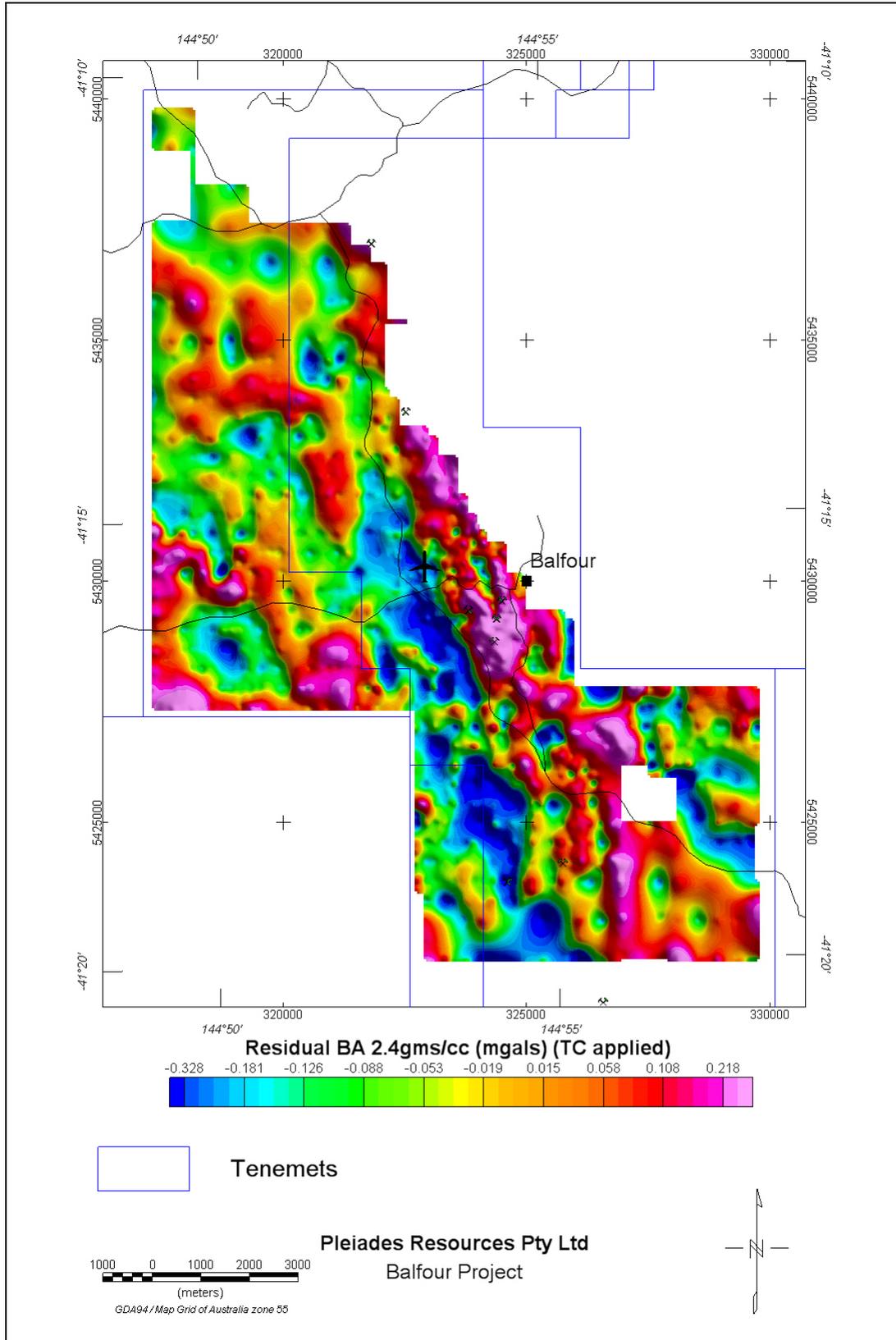


Figure 5 – Residual gravity anomaly calculated from the terrain corrected bouguer anomaly

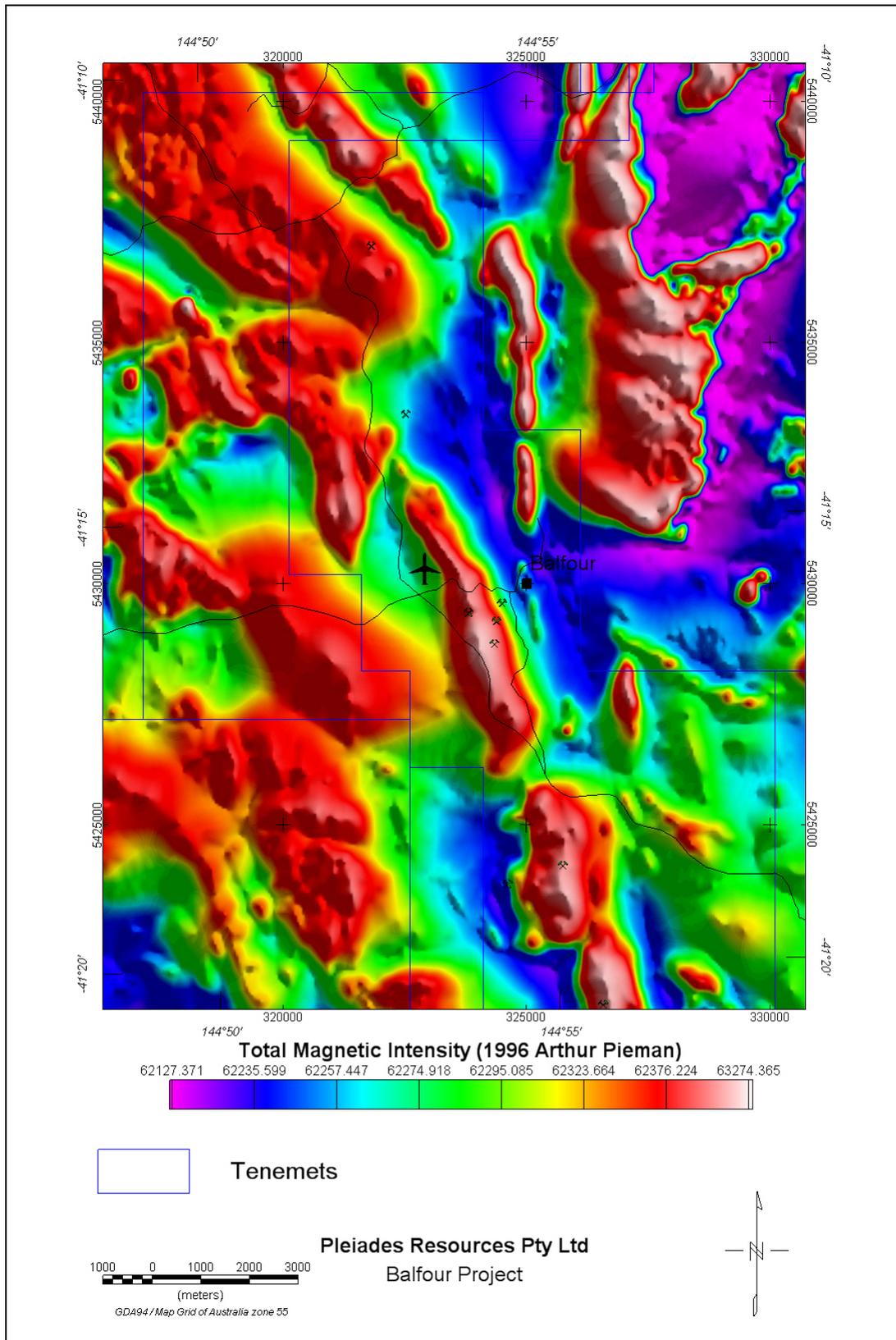


Figure 6 - Airborne magnetic data (RTP) from the 1996 Arthur-Piemann survey

5. DISCUSSION

Interpretation of data was carried out principally using the residual gravity anomaly although some use was made of open file aeromagnetic data as well. An interpretation plan is presented as Plan 1. The residual anomaly presents a data set in which the effects of larger/deeper regional gravitational responses have been removed. The resulting anomaly patterns can be thought of as originating from the near surface.

Published geology indicates much of the outcrop in this area consists of interbedded sandstones, siltstones and quartzites (Taheri and Bottrill, 2004). A density of 2.4gms/cc was thus assumed for all Bouguer Anomaly (BA) calculations with the residual anomaly calculated from the BA using this density. It should be noted that a range of densities were tested before settling upon 2.4gms/cc. Little variation was observed in the residual anomaly for densities up to 2.5gms/cc, however using a density of 2.67gms/cc and higher resulted in significant changes to the residual anomaly with some anomalies in the survey changing from a strong gravity high to a strong low. These unusual changes are thought to be related to the magnitude of terrain corrections applied although this cannot be confirmed.

The interpretation focuses on identifying the locality of possible near surface granitic intrusions and structural features. The data supports a significantly more structurally complex domain over what has been previously mapped.

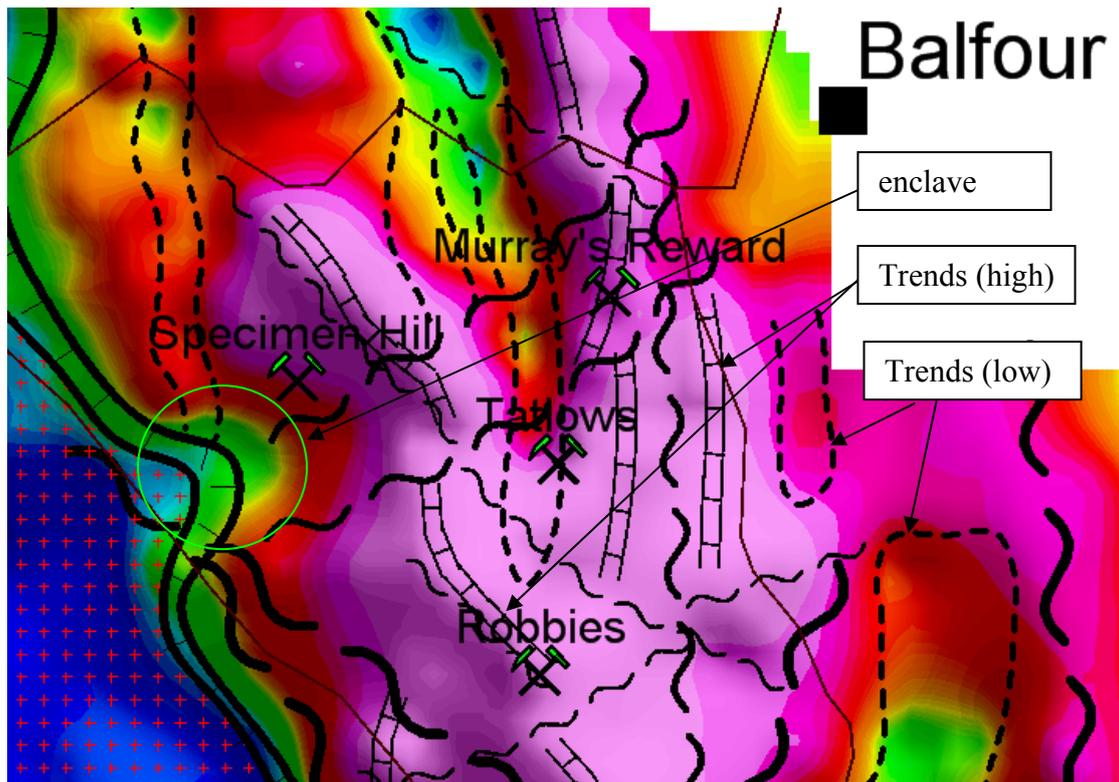
Balfour

The residual anomaly around Balfour shows an unusual increase in near surface densities to the south around most of the known mineralised occurrences (Specimen Hill, Murray's Reward, Tallows and Robbies). This same region is interpreted as being at the intersection of multiple major structural trends. The structures are mostly interpreted from the gravity data with some input from the magnetics. Specimen Hill is located immediately east of an interpreted granite margin where a small enclave (gravity low) appears to follow a NE structure joining Specimen Hill and Murray's Reward. The implication here could be a small part of the intrusive mass is nearer to the Specimen Hill locality with mineralisation emplacement being facilitated by the major NE trending fault.

The source of the increased densities in this area is enigmatic and may, or may not be intimately tied to mineralisation. Given the abundance of known mineralisation there is a compelling argument to look for an association between density changes in near surface lithologies and the mineralising events however this is beyond the scope of the present work. Caution should be exercised in trying to find an association as one may not exist and the presence of mineralisation may have more to do with proximity of near surface granites than it does with the near surface density variations.

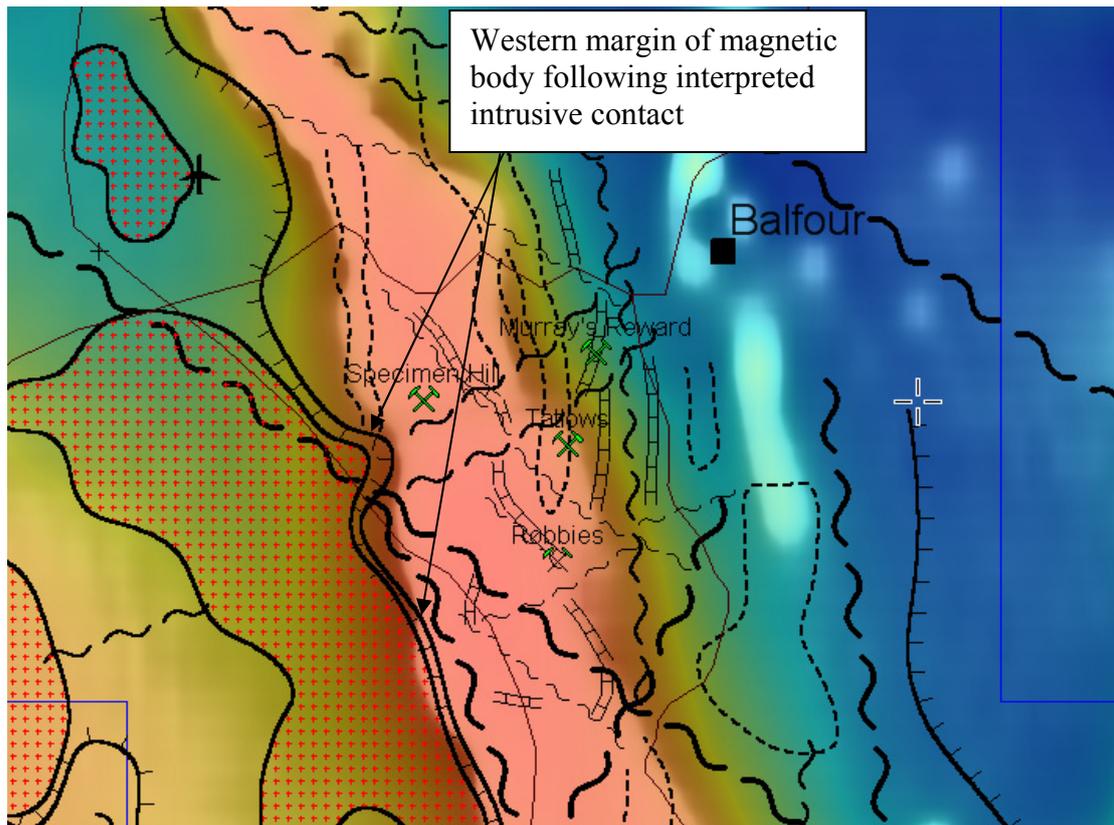
The interpretation shows several gravity trends that follow localised highs and lows. These trends were picked by inspecting profile data from line to line rather than using just the gridded information. The geological association of these trends is unclear, however they could be checked in the field as most seem to be very near surface.





The region immediately south of Balfour is likely to be more structurally complex than what is shown on the interpretation.

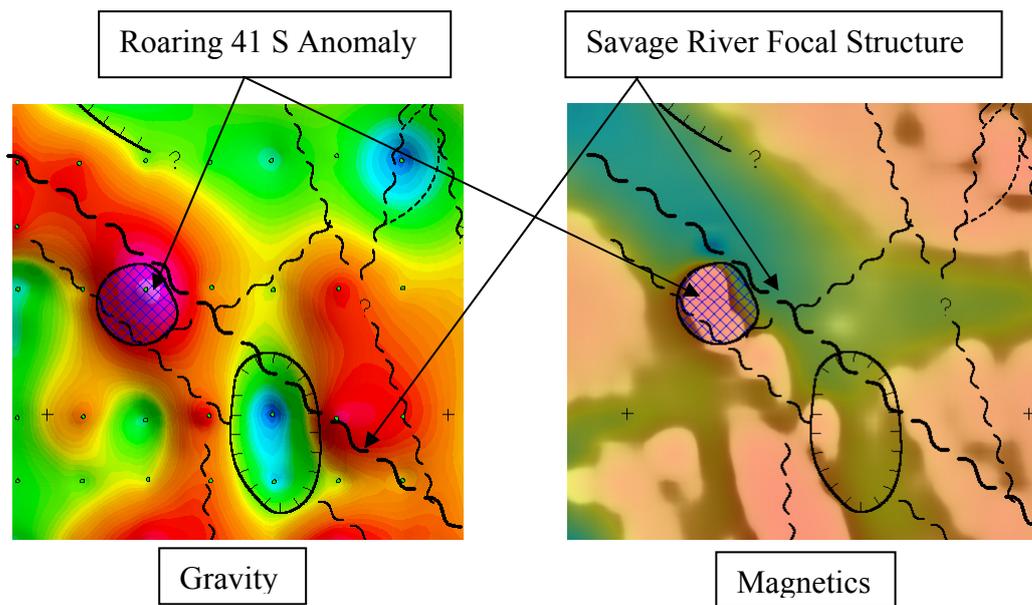
A prominent, NNW trending magnetic body is present between the eastern granitic contact margin (near Specimen Hill) and Robbies (Plan 3). This body appears to follow the same direction as the residual gravity anomaly at surface but the width of these two features is quite different suggesting they may not be related. The western margin of the magnetic body is interpreted to reflect the intrusive contact margin. Further work should be done to estimate depth to this magnetic body and ascertain if the gravity responses observed around Balfour can be related to the magnetic source.



Ground checking of this magnetic anomaly was carried out by the Tasmanian Geological Survey (Bottrill and Taheri, 2003) but they failed to find any rocks with sufficient magnetic susceptibility to explain the magnetic source.

Roaring 41 S Anomaly

A coincident magnetic-gravity anomaly is identified in the far north west of the survey area along a major NW-SE structural corridor called the Savage River Focal Structure. Rocks in this area are mapped as quartz siltstones, carbonaceous siltstones, sandstones and quartzarenites of the Mesoproterozoic Rocky Cape Group (Taheri and Bottrill, 2004).

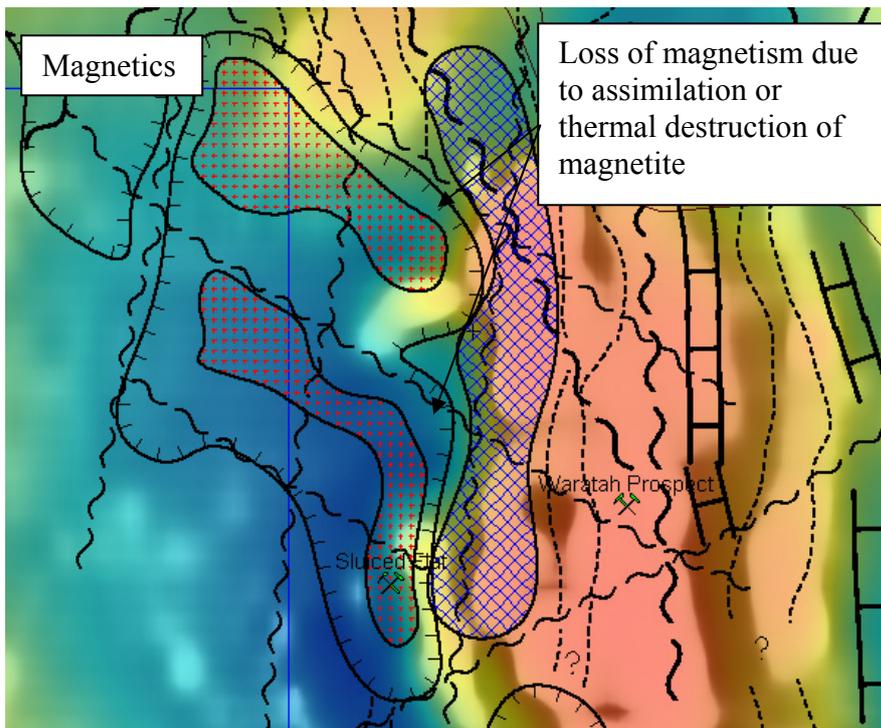
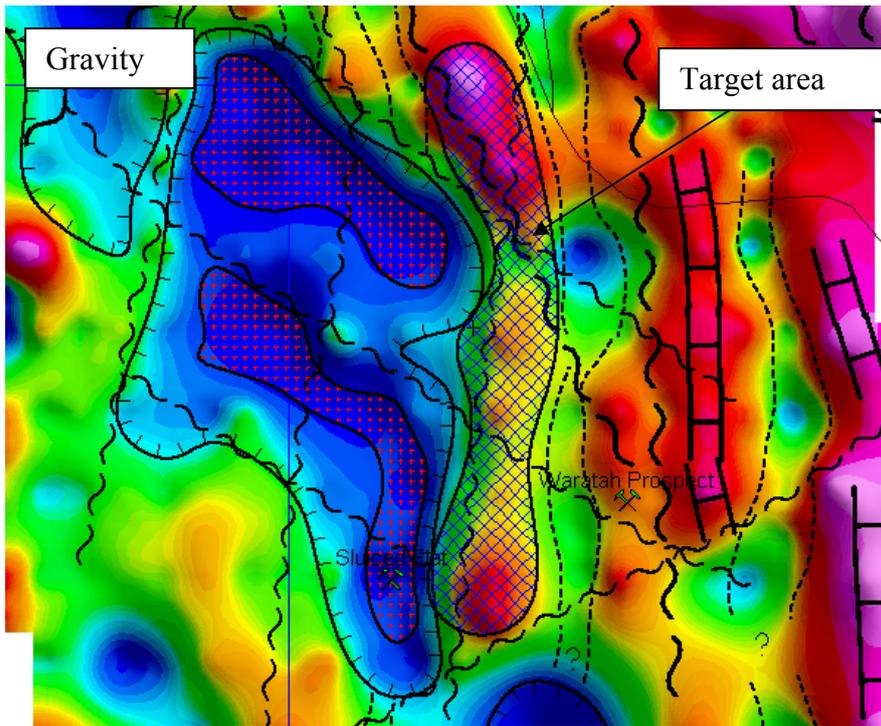


This anomaly is quite limited in spatial extent with only a single gravity station being recorded over the anomaly however that one station is anomalously high, which coupled with the very strong bulls-eye magnetic response and it's proximity to a major structural corridor represents a priority target for base metals mineralisation. Further work should be done to accurately model depth to top of magnetic source and checking of open file company reports to determine if this target has been previously identified or tested by other explorers.

Sluiced Flat Region

This area is recorded as having shallow pits with exposed erratic quartz veins with cassiterite, pyrite and chalcopyrite in siltstone (Taheri and Bottrill, 2004). The workings are positioned over an interpreted, near surface intrusive which may have some relationship to the surficial mineralisation. What is interesting about this area is the similar geophysical setting it bears to the Specimen Hill area in that like Specimen Hill, there are abrupt, steep gravity gradients with significant structural complications. This area doesn't have the enigmatic gravity highs to the east and south of Specimen Hill but the relationship between mineralisation and these highs is not yet established so it shouldn't be an overriding target criteria. Instead, it may be proximity to the intrusive contact and the presence of major structures that determines the emplacement of mineralisation. With that concept, the eastern margins of the contact have been selected as potential target areas and in particular, where major faults are present.

The eastern margin contact between the interpreted intrusive and magnetic unit displays signs of either assimilation (by an intrusive) or thermal destruction of magnetite with the western boundary of the magnetic body apparently wrapping around the gravity low. Contacts of the intrusive appear to be structurally controlled around all boundaries. The relatively straight edges around the interpreted intrusion suggest a strong structural control to its emplacement.



6. CONCLUSIONS AND RECOMMENDATIONS

Based on gravity data there is good evidence to support the presence of near surface granitic intrusives. The depth to these intrusives cannot be accurately determined but it is likely they are within a few hundred metres of the surface. The contact boundaries should not be taken literally as there is likely to be significant variation between the position of the interpreted contact and the real contact.

The region as a whole, is structurally very complex with the foci for a number of major intersecting structures occurring immediately south of the Robbies Prospect. Many more structures/faults are present than what is shown, as the interpretation was largely completed from the gravity data with only limited input from the open file magnetic survey data. More structures will be evident in the magnetic data than can be seen in the gravity data set. Conversely, several major structures have been identified in gravity data that are not evident in magnetic data.

The elevated gravity signature around Balfour is enigmatic. It may or may not have a bearing on why the mineralisation is present in this region. There is some geological factor resulting in an increased density of the near surface rocks but its cause remains unknown.

Intrusive contact margins have been associated with known mineralisation and offered as further targets around Sluiced Flat however consideration should also be given to further exploration over the body of the interpreted intrusion as this may be the point where tops of the intrusion rise closest to surface.

Magnetic data over the Roaring 41 S anomaly should be modelled to determine depth to source. This feature is considered particularly enigmatic and if not previously tested, should be given priority consideration for drill testing. The target is a highly magnetic, dense body at a reasonably shallow depth along a major mineralising trend.

7. REFERENCES

Bottrill, R.S., and Taheri, J., 2003, Ground truthing of Western Tasmanian regional minerals program geophysical data in the Balfour-Temma area: *Tasmanian Geological Survey Record* **2003/18**

Taheri, J.; and Bottrill, R.S. 2004, The nature and origins of copper and tin-tungsten deposits in the Balfour – Temma area, northwest Tasmania: *Tasmanian Geological Survey Record* **2004/05**