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EL 2511

JUBILEE HILL

ANNUAL REPORTS TO LICENCE EXPIRY FOR THE PERIOD 22/4/98 TO 21/4/2003

Submitted by
Mount Gleam Mining Pty Ltd and Goldus Pty Ltd
2003

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Government of South Australia
Primary Industries and Resources SA

Mt. Gleam Mining Pty Ltd

Technical Report for the 2 Year Period
Ending 21st April 2000

Exploration Licence 2511

My Roebuck Area- Flinders Ranges
South Australia

D. C. Watkins, August 2000.

CONTENTS

LOCATION & ACCESS

Exploration Licence 2511 is located in the northern portion of the Flinders Ranges in South Australia, approximately 500 kilometres due north of Adelaide. The licence area is located primarily on Mulga View Station.
Travelling time by road is approximately 6 hours from Adelaide, and a distance of approximately 550 kilometres. The roads are variable in condition from smooth bitumen surfaces to rough and narrow bitumen south of Wilpena Pound with rough built up (sometimes graded) earth roads north of Wilpena Pound. The last 10 kilometres to the licence area is by rough un-maintained station track, prone to washouts and boggy conditions.

The boundaries are defined by the following latitudes and longitudes.
30° 50'-31° 00'
139° 00'- 139° 05'

Access within the licence area is very difficult because of the limited number of station tracks and because of the rugged nature of the ranges.

GEOLOGY

Primarily the area is covered by a block of Proterozoic Age siltstones and shales of the Brachina Formation. (The Brachina Formation is described as olive green and purple siltstones, red-brown, olive green and purple shales, and minor sandstones) A thin fringe of Bunyeroo Formation red-brown shales, carbonaceous shales and dolomites occur around the southern boundaries of the Brachina Formation. Recent drilling near the old Pinda Springs silver lead prospect indicated the presence of dark grey to black dolomitic limestone, which is presumed to be Bunyeroo Formation (EL 2226).
At the northern end of the licence area is Mt Roebuck. This area is one of considerable disturbance with a north east-south west trending prominent fault and a "diapiric" structure evident. Diapiric breccia is also evident.
The eastern side of the licence area is covered by Quaternary gravels in red-brown clay (Pooraka Formation) and gravels in red-brown clay (Arrowie Formation). These gravels and clays being derived from ranges to the west.
See Appendix, Miller's Report.

EXPLORATION TARGETS

Primarily three exploration targets were identified prior to the commissioning of Dr Miller to interpret the airborne geophysical data, which was flown in 1999.

(1) The obvious "diapiric" structure in the north of the licence area was the focus of potential alluvial gold and other heavy minerals weathering from the diapiric breccia and other sources within this structure. No historic record exists of alluvial gold in this area, but most alluvial gold occurrences within the Adelaidean are associated with these structures. Additionally these structures also host copper deposits.

(2) The southern end of the licence area around the Jubilee Mines, presumed mined for copper last century, appeared to be an obvious choice for further exploration because of the series of NE-SW faults and copper occurrences in the area. The copper occurrences occur within a thin band of Bunyeroo Formation, which fringes the larger area of Brachina Formation; again red-brown, green shales with minor carbonaceous shales and dolomites. The apparent vein system associated with the Jubilee Mine was an obvious simple exploration target.

(3) The other area of interest was the potential for heavy minerals associated with the drainage channels associated with easterly flowing creeks coming from within the area of brecciation associated with the "diapir". Diapiric structures tend to shed all sorts of rare earth minerals as well as various iron titanium minerals.

(4) The area around the Pinda Springs Ag-Pb prospect had been dismissed as unprospective because of previous earlier drilling, but also is located within EL 2226, which adjoins EL 2511, and will be mentioned in that report.

The airborne geophysical data gathered by AGSO became available during early 1999. Some difficulty arose in the supplying of this data by AGSO, which caused some delays, and even though the area was flown at a 200-metre line spacing the data had processing errors which were obvious but not addressed by AGSO. This data was provided to Dr Miller for basic geophysical interpretation and for site recommendation for further closer inspection as exploration targets.

The intention is to follow-up the recommendations from the Miller Report, Appendix 1. Where several area have been highlighted as areas where geophysical anomalies have been recognised. One area, which will receive particular attention, is the south-western end around the Jubilee Mines. This small circular subtle magnetic anomaly associated with known surface vein mineralisation is a particularly attractive exploration target; it is also near to the main road and is located in unspectacular country.

EXPLORATION DIFFICULTIES

The first problem encountered was AGSO and its poor service provided in supplying data from the airborne geophysical survey. This was particularly poor service as the data collection was in joint venture with AGSO and PIRSA and it was expected the end results would have been of the best quality possible.

The next serious problem is Native Title and associated negotiations. During the early phases of exploration Native Title considerations must be explored, but it seems a one sided effort. With petroleum licences, the "clock doesn't start ticking" until native title considerations are resolved, however no such considerations are given with mineral exploration licences. Native Title negotiators very often do not respond at all to letters or telephone calls. Now there has been an amalgamation of Native Title Claimants under one single claim "Adnyamathanha People SG6001/98"; this has again extended resolution of this issue and parties have until November 2000 to register. Resolution of this Native Title problem appears that it will never be resolved unless government intervenes.

The next problem is an access one. Access for drilling is virtually ruled out for most of the area because it will cause environmental disturbance in a picturesque area of the Flinders Ranges. PIRSA officials seem to be more worried about environmental issues than finding orebodies. In recent discussions I was informed to forget about any thoughts of mining in the Flinders Ranges because it was highly likely no approval will be given because of environmental concerns.

Raising funds from investors is difficult even at the best of times, but when PIRSA officials are stating that Native Title issues will be an unresolved issue in the foreseeable future and coupled with their reluctance to support mining in the scenic areas of the Flinders Ranges makes fundraising almost impossible.

CONCLUSIONS

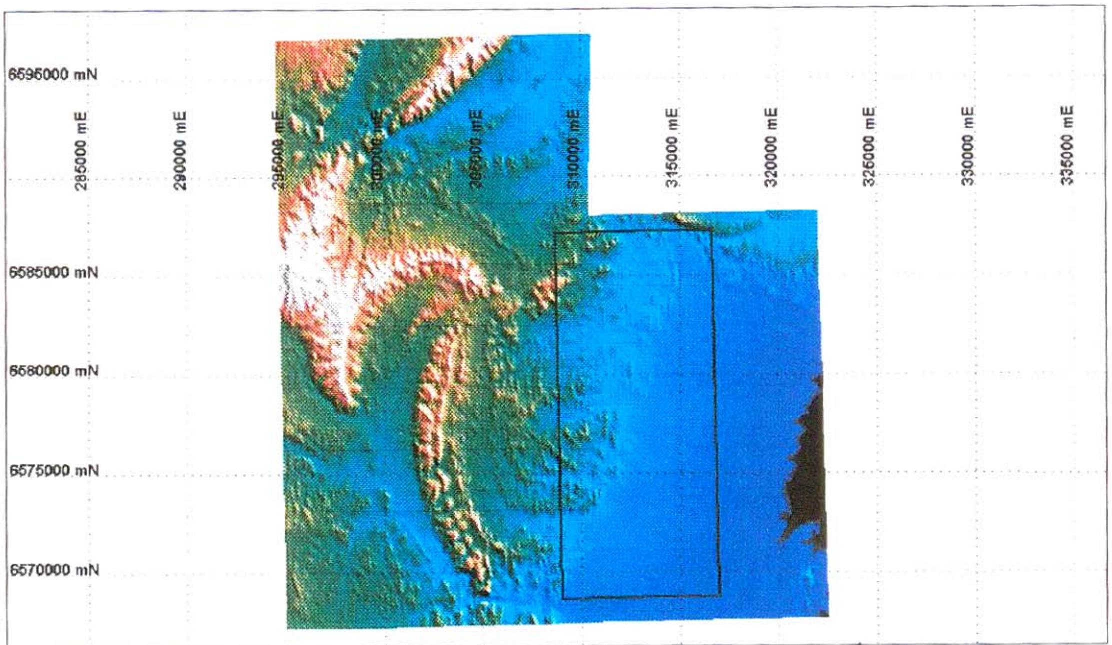
Of the three areas of immediate interest on this licence area as mentioned previously, the obvious area to focus on is the area to the south around the Jubilee Mines where access is not a problem and environmental issues should be minimal. An exploration program for this area is being formulated following a recent visit to the area.
The northern end around Mt Roebuck poses several problems and will be subjected to more geophysical evaluation to attempt to clarify some of the original observations.

APPENDIX 1.

D. Watkins 21.7.2000

INTERPRETATION OF MT ROEBUCK GEOPHYSICAL DATASET

Client: Mr Peter Lewis MP



Digital elevation model and Mt Roebuck tenement boundary (EL 2511) and. (EL 2226)

Geophysical consultant: Dr David T. Miller, December 1999

CONTENTS

Introduction

Location

Exploration licences 2511 and 2226 are located 65 km south east of Leigh Creek in the northern Flinders Ranges. The licence areas cover 315 km^2 which are composed of hilly terrain in the west and north, with open alluvial plains in the east.

Geology

The geology in this region is comprised of Cambrian and Neoproterozic sedimentary sequences. The strata are folded and faulted, and contain syn and post depositional diapiric structures[1]. The typically carbonate rich diapiric structures contain xenoliths of older Proterozoic (early Neoproterozoic, Mesoproterozoic and Palaeoproterozoic) metasediments, metamorphic and igneous rocks.

The emplacement of igneous and metamorphic basement geology into young sedimentary sequences has provided opportunities for base metals and gold deposits to form in the Cambrian and Neoproterozoic strata.

The region containing the exploration licence contains evidence of an active history of mineral exploration and the exploitation of copper, lead, zinc, gold and coal deposits. Electrolytic Zinc's willemite deposit to the west is an example of a current mine.

Local exploration

The exploration licence area has received various levels of mineral exploration in recent times. The main emphasis of exploration has been copper and gold exploration. Most mineralisation is reported to occur within diapiric strata or along faults emanating from the diapiric structures. Mineralisation along the Pinda Springs-Mt Roebuck fault has revealed low grade copper mineralisation within zones of ironstone, magnetite and siderite. Galena and silver have been reported to occur in quartz veins within bedding of the Wilpena Group strata 5 to 10 km west and south west of Mt Roebuck.

Alluvial gold occurs to the north west in the old Angepena gold field. Numerous attempts have been made to discover further occurrences of gold in this area but little success is reported. One micro-diamond was recovered in the Mt Roebuck area (Donnelly et al, 1991).

Aim

The job specification was to examine geophysical data (magnetic and radiometric) and identify exploration target areas. Priority was to be given to the area west of Mulga View station within EL 2511 with a lower priority to identify other areas of potential interest within EL 2226.

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[1] The term diapiric structure is used loosely in this report and doesn't imply a particular age or mechanism of emplacement.

Data supplied

The client has supplied located and grided magnetic, radiometric and elevation data in digital format from an airborne geophysical survey (200m-line spacing) conducted by AGSO during early 1999.

The located data was supplied as a simple ASCII file format with flight line, longitude, latitude, fiducial and corrected magnetics. The radiometric data contained the total count, potassium, uranium and thorium channels. Grids generated in ERmapper format were also supplied.

Method

The magnetic, radiometric and digital elevation data were interpreted using GIS (MapInfo/Discover) and geophysical software (Modelvision). The geophysical data were further processed and enhanced prior to producing images suitable for interpretation. The images were used to identify geophysical lineaments and structures. These features have, where possible, been correlated with known geology. Combinations of geophysical features and geological structures have been used to identify exploration target areas.

Data processing and enhancement

The supplied located data sets have received pre-interpretation processing and enhancements to improve the survey processing conducted by AGSO.

The supplied data contained only longitude and latitude on the WGS94 reference surface. For interpretation purposes and integration with the local coordinate system the long/lat data was converted to Easting and Northing (AGD84).

The magnetic data was supplied with no details of post-survey processing and didn't appear to have been micro-levelled to eliminate residual errors. The data was micro-levelled to minimise errors and enhance subtle anomalies.

Examination of the radiometric data[2] suggested that the U and Th channels were incorrectly labelled. Consequently all grids and images used in the interpretation were generated from the modified data set.

Prior to the interpretation process, various filters were applied to the magnetic and radiometric data. First and second vertical derivatives were applied to the magnetic line data to enhance short wavelength anomalies, while the radiometric data received low-pass filters to minimised short wavelength noise. The ratio of K to Th was also calculated to identify areas of radioelement depletion and enrichment.

Images of the enhanced data were produced from the data grids. Various colour schemes and balances have been applied to enhance the magnetic and radiometric features.

[2] A statistical examination of the count intensity of the three channels showed that the channel names for the Th and U channels were transposed.

Interpretation - Magnetic survey

Magnetic sources

Several near surface magnetic sources have been identified in the geology of the Flinders Ranges. There are strong correlations between dolerites within the diapiric strata and positive spot anomalies. Similar anomalies may also be caused by man-made structures and should be interpreted with caution.

Magnetite rich horizons are common in the Neoproterozoic Umberatana and Wilpena Group sediments. These layers are visible in the magnetic data within this exploration region. The geological boundaries between the carbonate and clastic strata are quite evident due to a moderate magnetic contrast.

Drainage patterns reflected in the magnetic data have been attributed to the dispersal of ironstone and magnetite from sedimentary units and fault zones.

Regional and deep magnetic structures

The regional magnetic field (Figure 1a) across the survey has a variation of 700nT. The total magnetic field shows deep magnetic basement shallowing to the east. It is possible that a major north-south basement structure lies along this magnetic gradient.

A north westerly trending magnetic ridge[3] is also apparent on the western side of the survey area. Several large isolated magnetic anomalies are situated along this trend. These isolated anomalies are likely to be related to a north westerly chain of diapiric structures including the Angepena gold field in the north west and Mt John diapir to the south east.

Shallow and localised magnetic anomalies

Three distinctive zones occur within the tenement. The most apparent zones are located in the south east (EL 2511) and north west (EL 2226) corners of the tenements. The south east feature is composed of numerous short wavelength linear structures that are sub-parallel and tend to fan out. These lineamants, in the most part, correlate well with the local drainage pattern. The magnetic pattern suggests the presence of high density magnetic and iron rich minerals, perhaps specularite. The mineralisation has probably originated from the Mt Roebuck-Pinda Spring's diapir-fault complex.

The NNE trending magnetic lineament (30-40nT) along the western side of the drainage pattern correlates in most places with a vermin proof fence. Even though this is a prominent linear feature, its strong correlation with the fence line suggests that it is not a geological feature.

Magnetic lineaments in the south west portion of the study area correlate well with lithological boundaries of the Neoproterozoic and Cambrian strata. This is also true for the dome structure around Mt Roebuck. The lithological boundaries of the Umberatana Formation are clearly visible in the magnetic signal.

Terminations in magnetic lineaments have highlighted several fault structures that are marked on the interpretive maps.

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[3] A subtle radiometric anomaly runs along the basement trend. See the following section.

The large amplitude magnetic anomalies in the central portion of the survey area are related to a north easterly trending fault structure. The anomalies themselves are likely to reflect a high level of BIF, micaceous haematite and igneous xenoliths within a diapiric matrix.

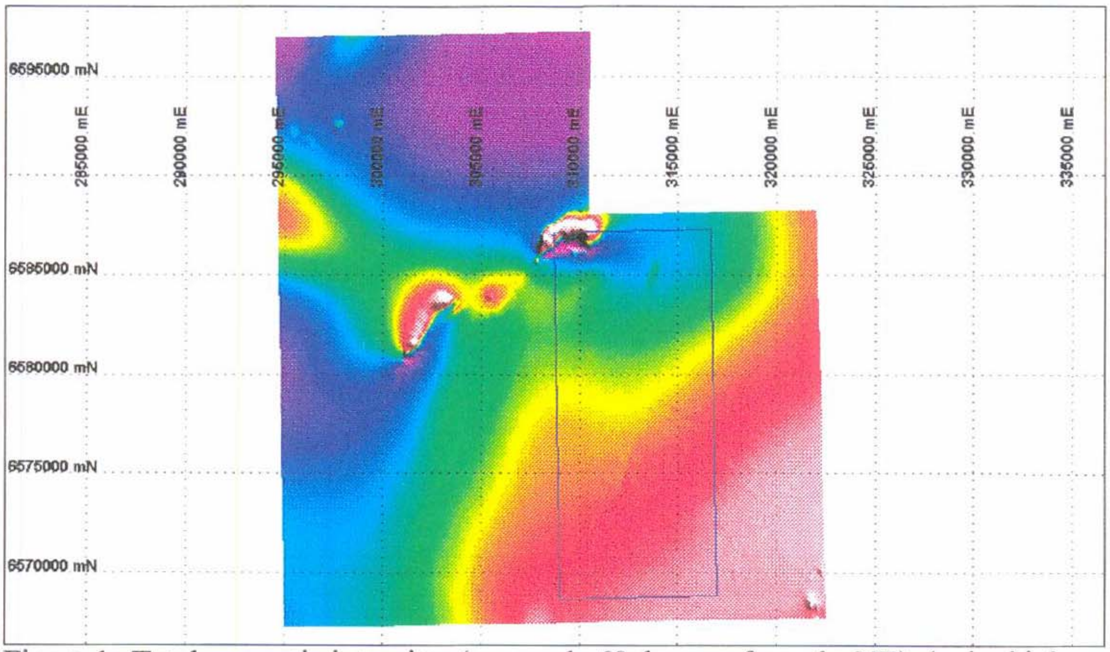

Figure 1a Total magnetic intensity; (sun angle 60 degrees from the NE), (red = high, purple = low).

Figures 1a and 1b show magnetic basement shallowing to the south east. A noticeable ridge, possible a basement horst, can also be seen running north west. Several isolated anomalies are located in the central and north western (small cluster of three anomalies) quadrants.

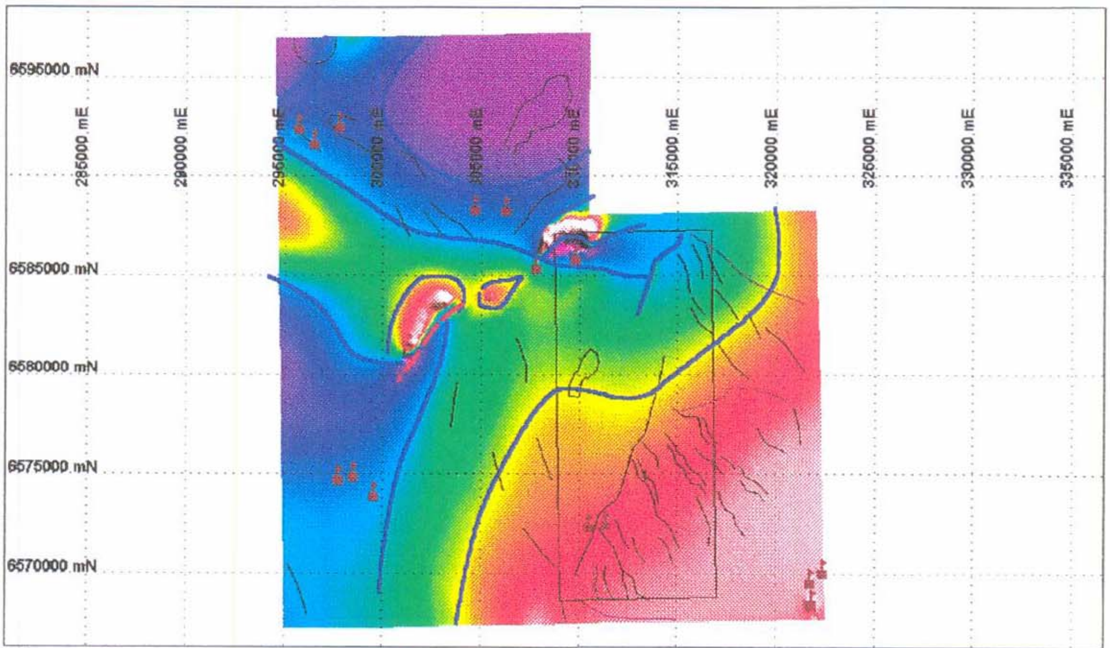

Figure 1b Interpretation of total magnetic field, lineaments and spot anomalies (squares with flags).

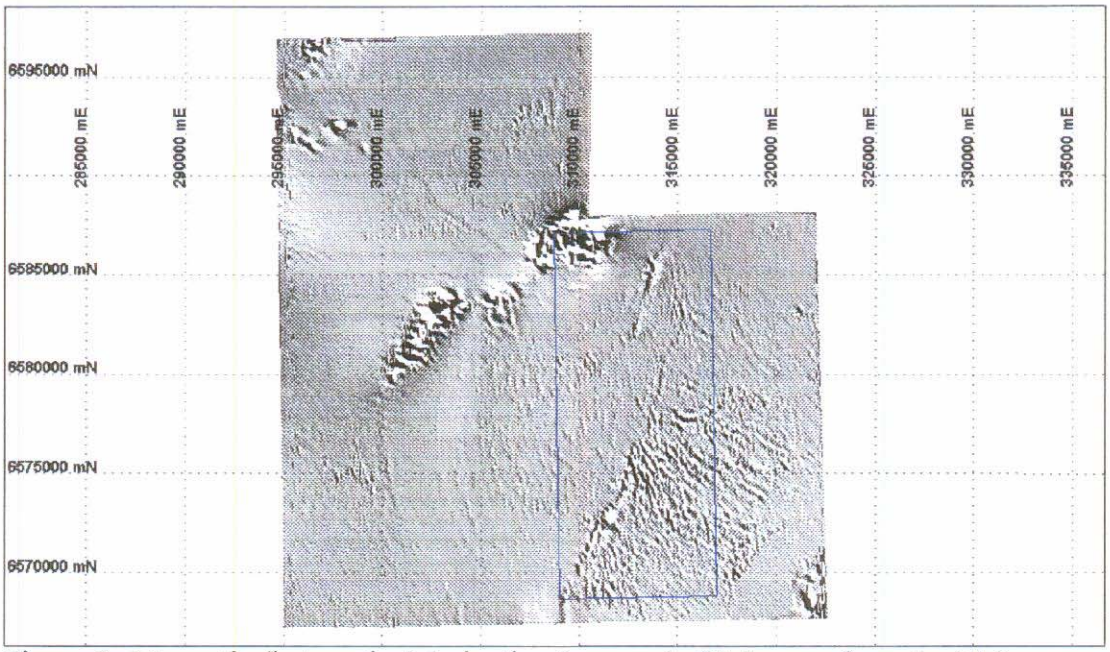

Figure 2a Magnetic first vertical derivative (sun angle 60 degrees from the NE).

Application of a first vertical derivative filter has highlighted short wavelength anomalies related primarily to near surface features (Figure 2a). A very prominent alluvial fan can be seen in the south east related to the outflow of magnetic minerals from the western highlands. Several narrow north west trending magnetic lineaments can be seen in the north west quadrant (Figure 2b).

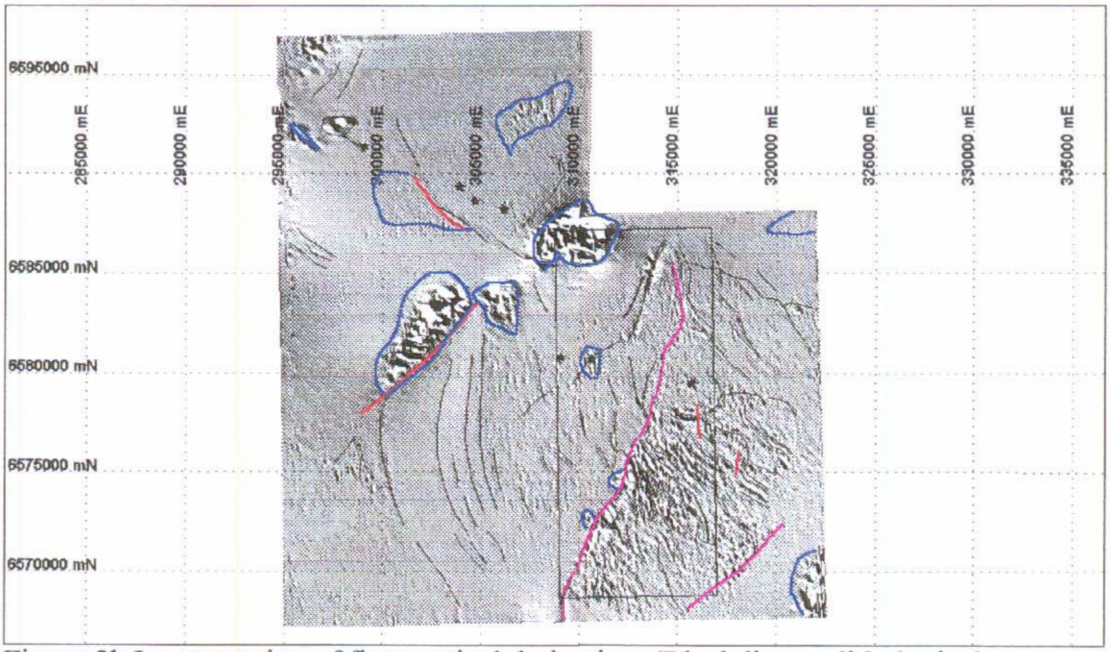

Figure 2b Interpretation of first vertical derivative. (Black lines = lithological boundaries, red lines = faults, blue features = magnetic highs, purples lines = cultural features, and black stars = either small magnetic highs related to small geological or cultural features).

Interpretation - Radiometric Survey

The radiometric data has been investigated by examining the separate K, Th and U channels and the total count.

The relative intensity over the survey area shows a variation of some 3500 counts. Attempts have also been made, without using any further processing, to remove background noise levels[4], to examine ratios of K/Th and U/Th to pinpoint areas of enrichment and depletion of these elements that may indicate area of alteration due to mineralisation.

Each of the separate channels and the total count have been interpreted separately. The anomalies identified have been combined with the magnetic interpretation to produce a composite interpretation.

Radiometric sources

Radiometric sources in this region are primarily related to outcropping geology, scree slope deposits and alluvial outwash. The semi arid to arid climate precludes the development of complex soils and consequently the majority of the radiometric signal reflects exposed rock in situ (down slope movement of rock can be seen). The Neoproterozoic units provide the strongest signal related to K, Th and U bearing minerals. The Neoproterozoic Rawnsley Quartzite and the Cambrian carbonates are for the most part depleted and consequently show as radiometric lows. Shale units in the carbonates show up as moderate highs.

Interpretation

A high/low colour scheme was applied to the potassium channel (Figure 3a) to highlight lithological boundaries and other surface features, including drainage patterns. The distinct colour contrast has sharpened lithological boundaries by de-emphasising the response from weathered material that is dispersed down-slope.

High potassium levels are clearly related to the Neoproterozoic strata, while Cambrian carbonates are low K (Figure 3b). Variations in K levels clearly show lithological boundaries. Alluvial outwash from the central highlands is exhibited clearly in this image. The Mount Roebuck-Pinda Springs fault is seen as a sharp discontinuity in the west-central portion of the image.

The distinct lineament cutting diagonally (north east trend) across EL 2511 (Figure 3b) is probably a reflection of the fence acting as a natural barrier to the migration of sediment down-slope.

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[4] A MNF (multi-channel noise reduction filter) would enhance the quality of the images produced and the occurrence of subtle structures.

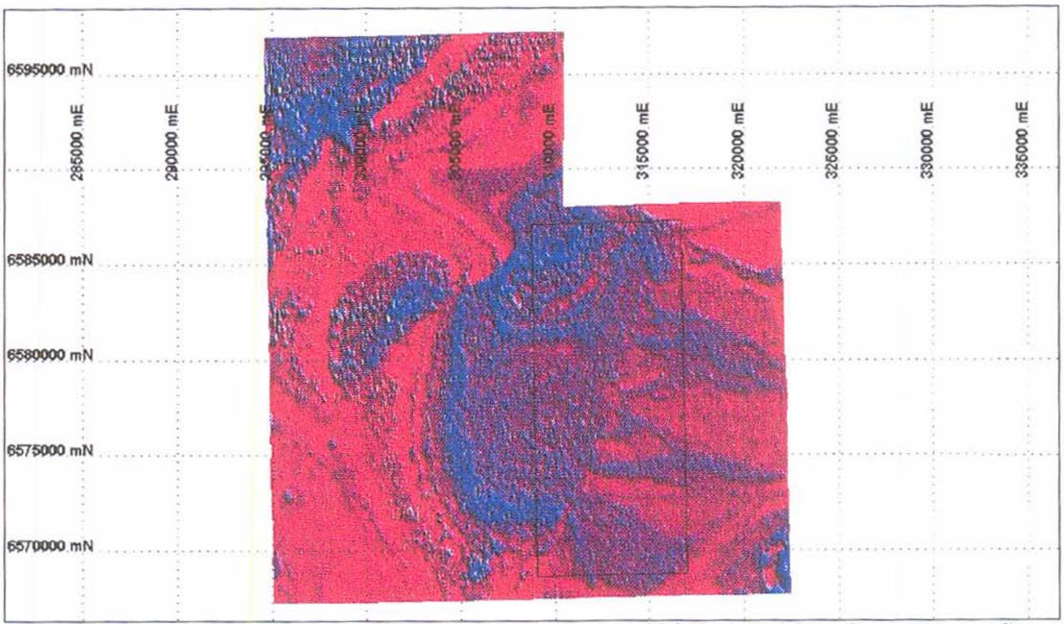


Figure 3a Radiometric potassium channel (areas of high K = blue, low K = red).

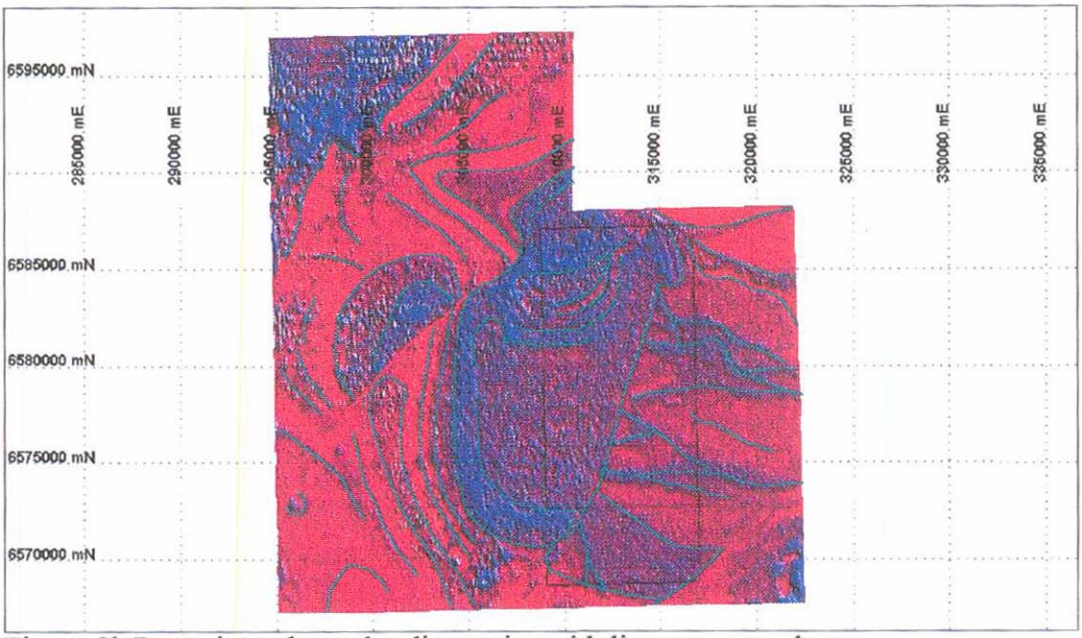


Figure 3b Potassium channel radiometrics with lineaments and zones

A reversed colour scheme has been applied to exaggerate the lithologies (Figure 4b) for the Th channel (Figure 4a). The thorium channel clearly shows higher levels within the Brachina Formation and the diapiric structures. Minerals such as monazite and zircon (containing thorium) liberated from the Brachina Formation shales can be seen washed out of the creeks onto the eastern plains. Lower levels of thorium rich mineral are contained within the Wilpena Group Rawnsley Quartzite and Cambrian strata.

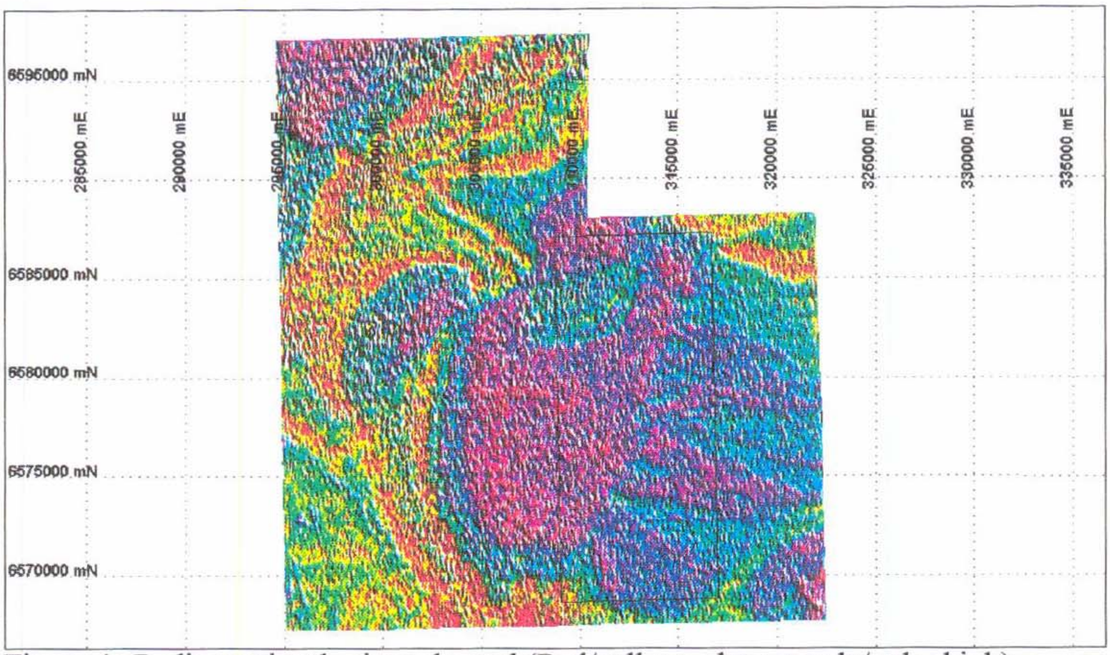


Figure 4a Radiometrics thorium channel (Red/yellow = low, purple/red = high).

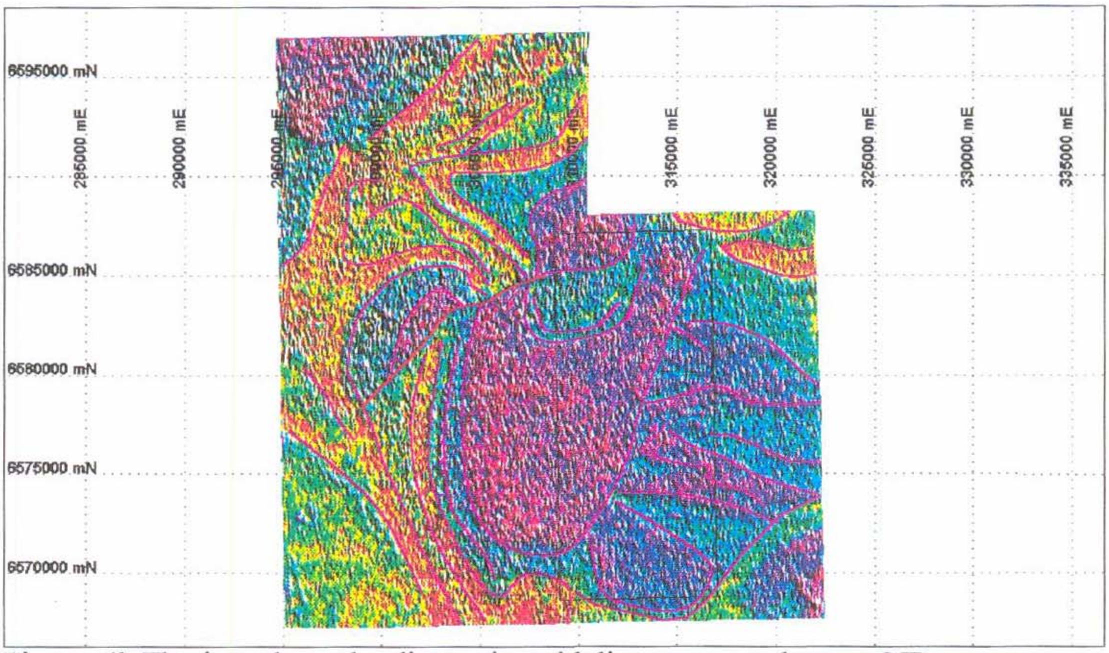


Figure 4b Thorium channel radiometrics with lineaments and zones. NB some structures are omitted since they have already been identified on the other channels.

The uranium data is less energetic and consequently doesn't exhibit the clarity afforded by the other channels (Figure 5a). However, it is possible to identify boundaries (Figure 5b) related to lithological changes. In general there is an expected similarity between the uranium and thorium patterns. Again the Brachina Formation contains the highests levels related to the presences of minerals such as monazite and zircon.

A small area of uranium concentration (thorium depletion) is located in the north west corner of EL 2511 at the edge of diapiric material. This may be related to a weathered igneous xenolith within the Mt Roebuck diapiric structure. The high uranium at this site may indicate the concentration of uranium released from weathered U-bearing minerals. Elevated uranium levels are associated with the exposed diapiric structures to the south east and north west corners of the survey area.

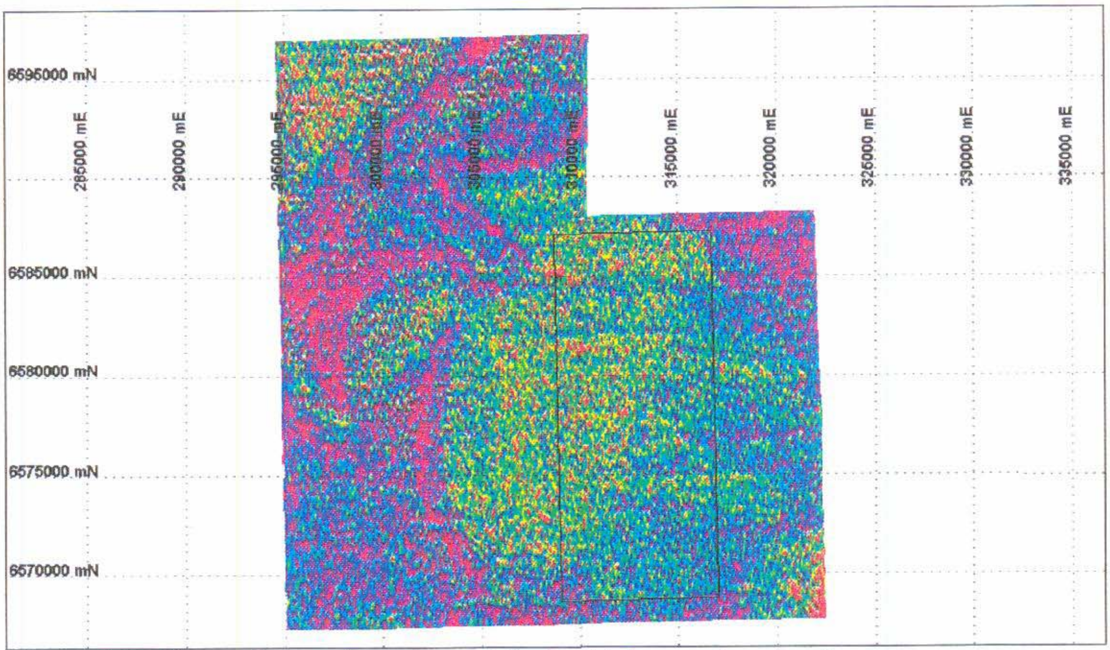


Figure 5 Radiometric uranium channel (red = high, purple = low).

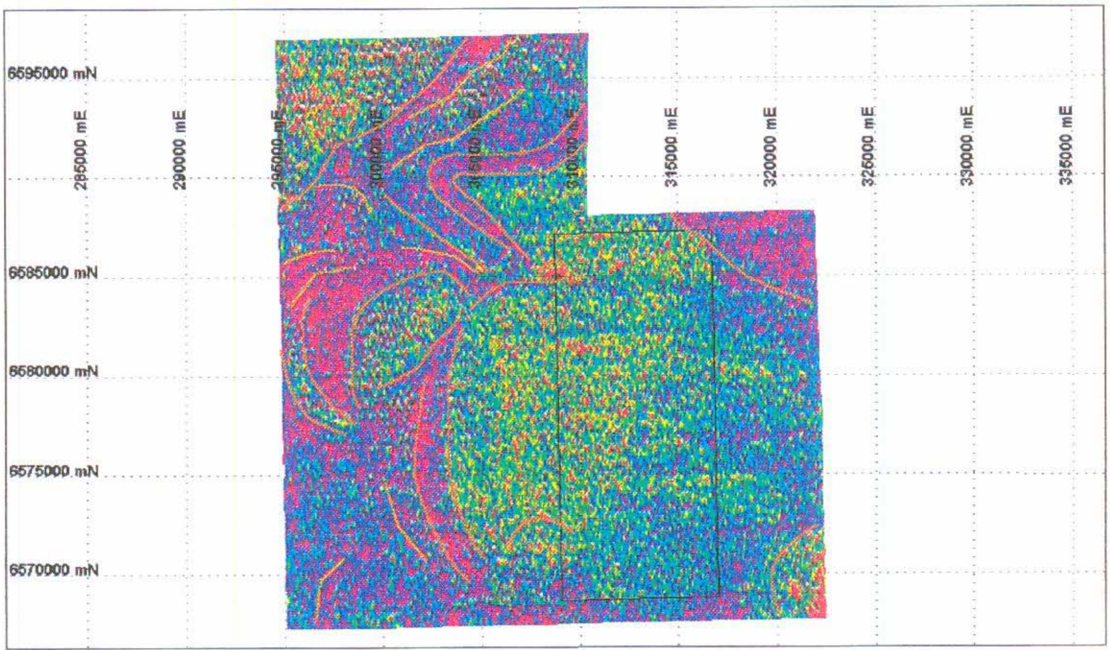


Figure 5b Uranium channel radiometrics with lineaments and uranium highs.

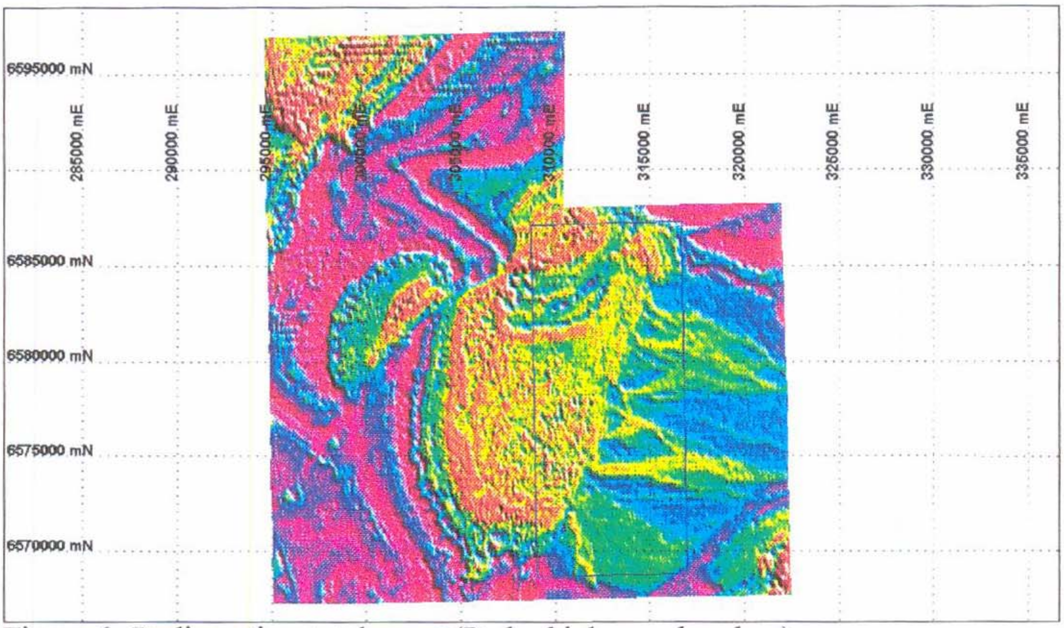


Figure 6a Radiometircs total count (Red = high, purple = low).

The full radiometric spectrum (Figure 6a) highlights the lithological boundaries associated with the exposed geology within the survey area. Higher counts are associated with the Neoproterozoic strata and the diapiric structures. Lower counts are attributed to the Cambrian carbonates and sediments. The drainage pattern to the east is distinctive and depicts a major alluvial flood plain.

Several radiometric lineaments trend north west across the survey area following the chain of diapiric structures associated with the magnetic basement ridge discussed in the previous section.

The Mt Roebuck-Pinda Springs fault zone is clearly visible in the radiometric total count, truncating and displacing the strata.

A faint circular structure is evident in the south west corner of the survey area and has no definite correlation with mapped Cambrian geology. Another circular structure, 3 km to the north west, is truncated by the Mt Roebuck-Pinda Springs fault.

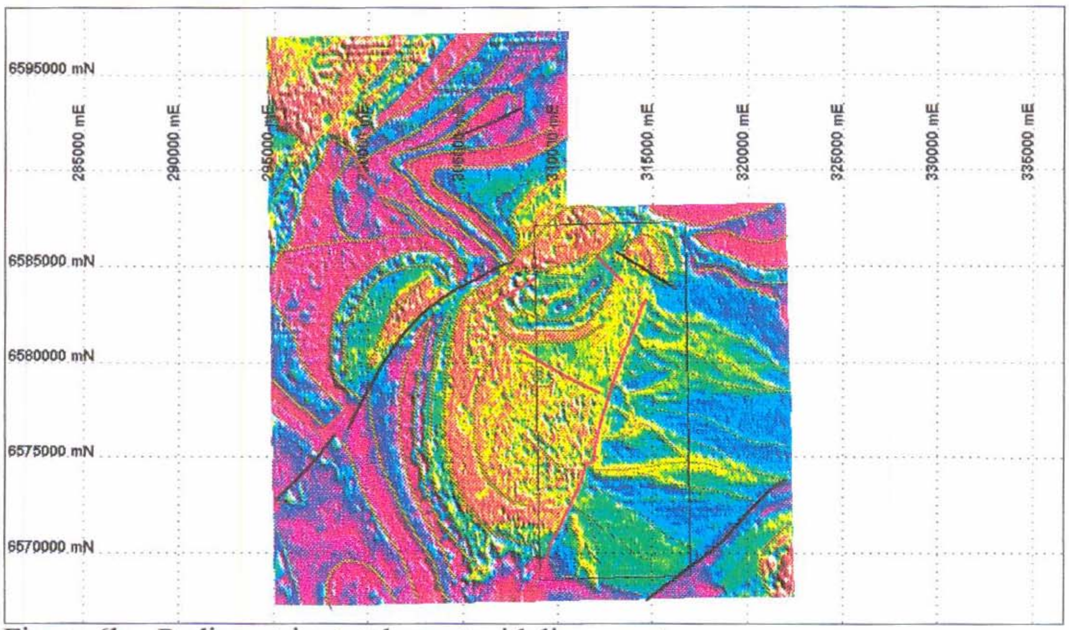


Figure 6b Radiometrics total count with lineaments

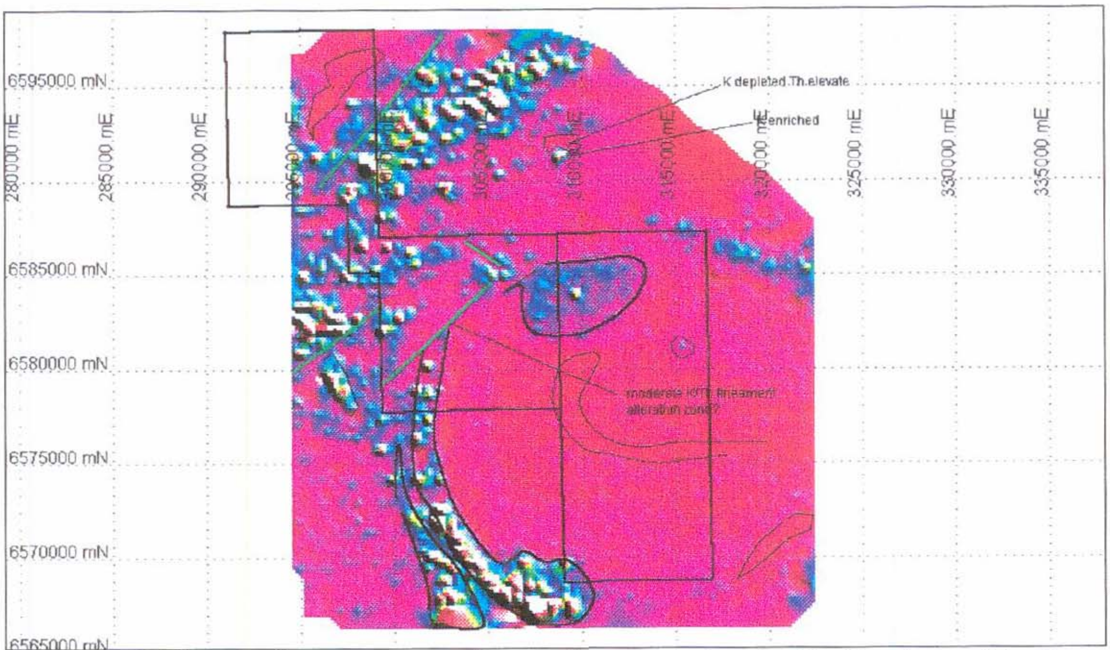


Figure 7 K/Th ratio showing areas of potassium depletion (red/yellow/green/blue).

The image derived from the K/Th ratio (Figure 7) reveals a strong correlation with the Wilpena Group (Rawnsley Quartzite) and the Cambrian carbonates due to their lack of thorium bearing minerals.

The dome structure at Mt Roebuck is clearly evident (marked in Figure 7) and shows several spot anomalies that correlate with the elevated uranium anomalies. A smaller spot anomaly is situated 5 km to the south east (circled). These radiometric features are likely to be associated with weathered exposures of basement igneous xenoliths within the local diapiric structures.

Integration of data

The lineaments and anomalies identified within the geophysical data have been combined to identify structural trends and anomalous areas worthy of mineral exploration. The lineaments and anomalies have been compared with the local mapped geology in an attempt to eliminate geophysical features that have a non-economic interest. Geophysical features that are associated with man-made structures such as fences, water bores and buildings have been highlighted (Figure 9a and 9b).

Exploration targets and recommendations

The integrated interpretation shown in Figure 8a and 8b incorporates significant anomalies and structure identified on the magnetic and radiometric images.

The intersection and grouping of geophysical features has been used to select exploration target areas. Each exploration target area has been ranked and will be discussed from highest to lowest priority.

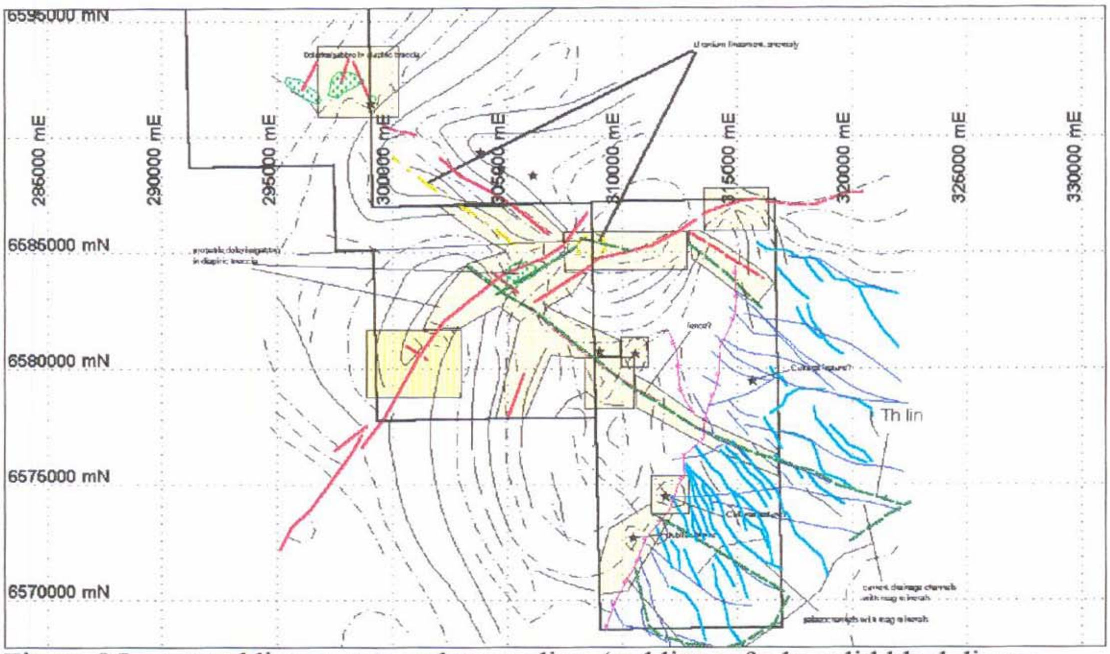


Figure 8 Integrated lineaments and anomalies. (red line = fault; solid black line = lithological boundary; dashed black line = geological trend; dashed green-yellow lines = radiometric lineaments; black stars = small magnetic highs; blue lines = magnetic and radiometric lineaments associated with drainage; cyan lines = magnetic anomalies associated with shallow features possible palaeo-channels; purple lines = magnetic lineaments correlated with fence line; yellow areas = zones of exploration interest).

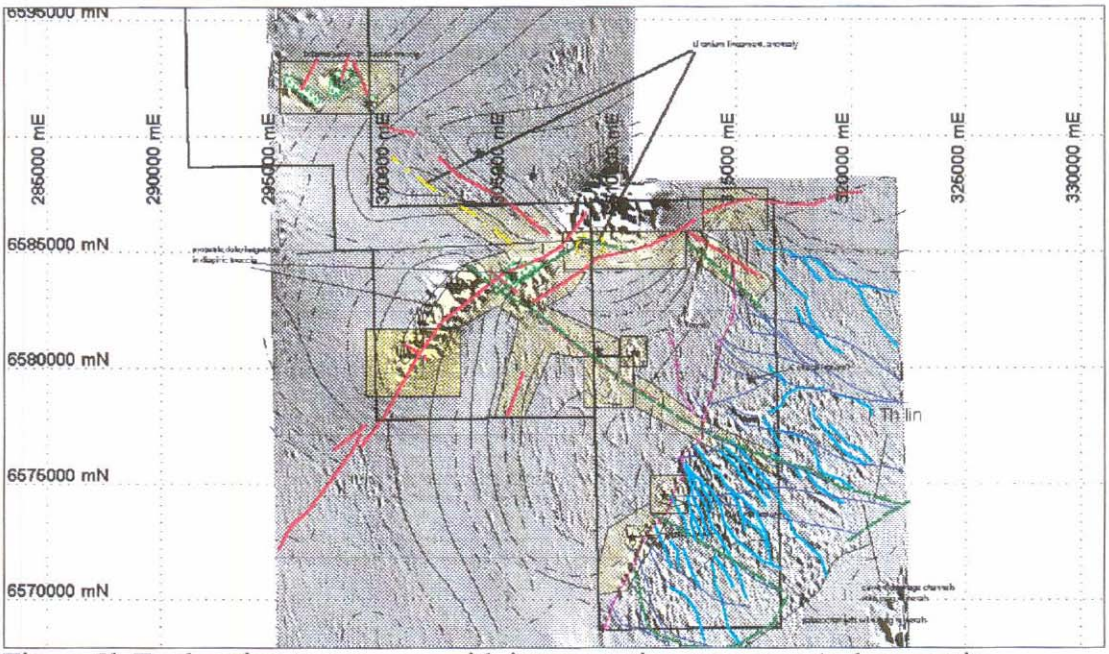


Figure 8b Exploration target areas with interpretation map over 1vd magnetic backdrop.

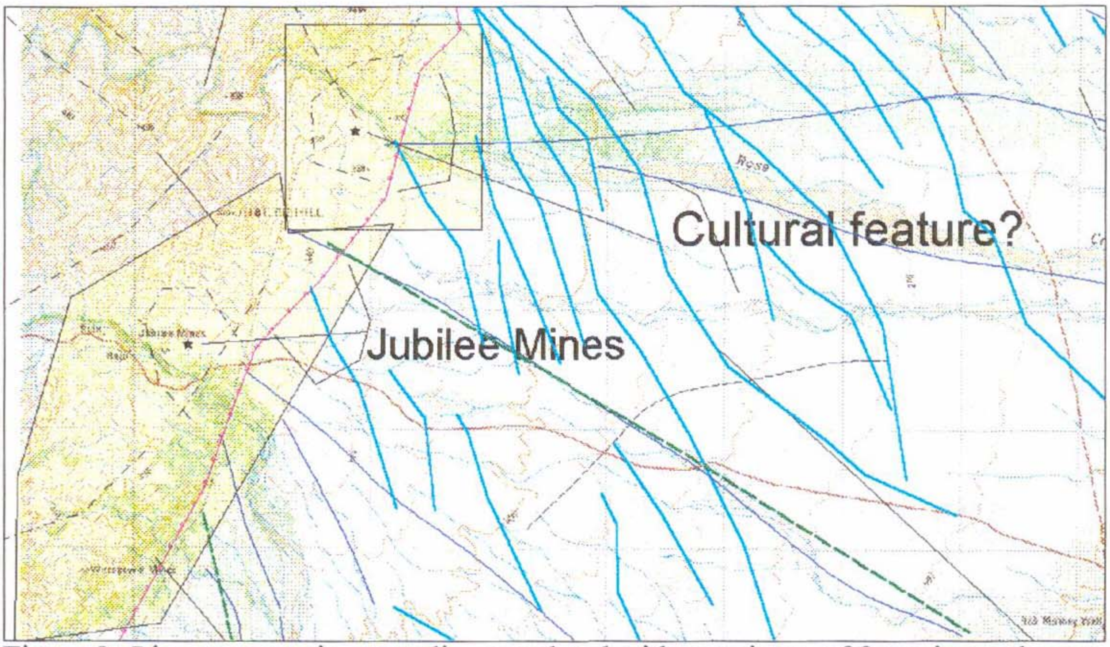


Figure 9a Linear magnetic anomalies correlated with vermin proof fence in south east; correlation of some magnetic/radiometric lineaments (blue lines) with recent stream patterns and magnetic lineaments (cyan lines) crossing recent drainage pattern (old dunes or palaeo stream channels).

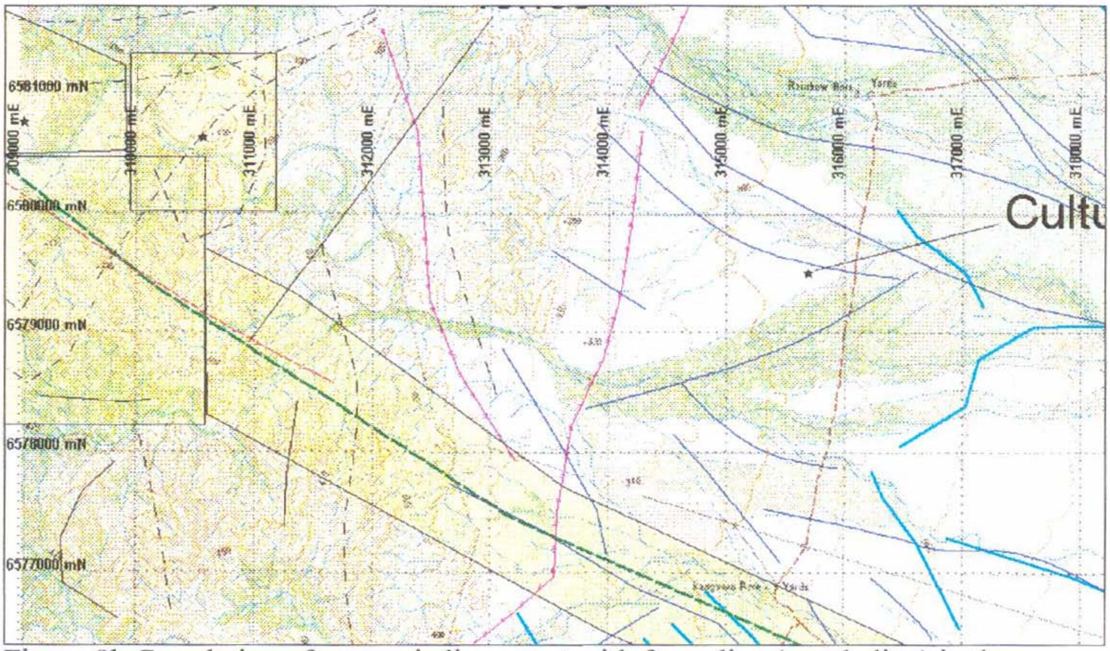


Figure 9b Correlation of magnetic lineament with fence line (purple line) in the central east; radiometric and magnetic lineaments correlated with stream pattern (blue and cyan lines). Exploration area along northwest trending radiometric lineament (green dashed line) and magnetic spot anomaly associated with bald hill (black star).

Exploration target areas

Summary for area A

The Mt Roebuck region (Figure 10a and 10c) contains several geophysical features that are significant. This area lies above a major north west trending magnetic basement ridge associated with several diapiric structures.

The importance of the diapiric structures lies in the placement of Meso and Palaeoproterozoic basement material (pre-Neoproterozoic basement is typically at > 5 km) at the surface within the local Neoproterozoic and Cambrian strata. The rafts of basement geology can potentially contain precious metals and stones. The possibility that base metals have been leach out and concentrated in the local geology is an important exploration model in this area. The many small mineral deposits (see the geology map) in close proximity to the diapirs supports this mechanism.

This exploration target also resides in a complex fault system. The Pinda Springs-Mt Roebuck Fault, which contains mineralised veins intersects with geophysical lineaments trending north west into geology hosting the gold at Angepena.

A small uranium anomaly (Figure 10b) within the Mt Roebuck fracture zone suggest the presence of igneous basement rafts. It is important to note that this uranium anomaly lies within and adjacent to diapirc material and in close proximity to several small magnetic anomalies (Figure 10a, 10b and 10h).

Another striking feature is the major magnetic anomaly north of Mt Roebuck. This anomaly (Figure 10h and 10i) lies on the north north western side of a dome structure composed primarily of Umberatana and Wilpena Group sediments. Limited exposure of magnetic lithologies occurs south east of the anomaly. The amplitude of the anomaly can not be simply explained by the fault placement of the Brachina Formation against the Cambrian carbonates along the axis of the anomaly (the magnetic susceptibilities are similar in this area). It is likely that the Mt Roebuck dome contains a significant core of diapiric material with magnetic rich units.

Recommendations

The Mt Roebuck exploration target area warrants detailed follow up groundwork. In particular the immediate area containing the uranium-fault-magnetic anomaly requires surface sampling and geological mapping.

It is certainly reasonable to consider a bulk stream sediment sampling program (Figure 10f) within the creek system of the dome complex as the next exploration step. If positive results are located a more detailed assessment of the area including geophysical modelling and drilling would be necessary.

The recovery of one diamond in this area justifies considering the possibility of kimberlites within the structural weaknesses provided by the diapiric structures.

An area directly south (approx. 2km) of Mt roebuck (Figure 10c and 10g) exposes diapiric material adjacent to what is mapped as Quaternary sediments. These sediments may host concentrations of heavy minerals derived from the diapiric intrusive. It would be sensible to test this location.

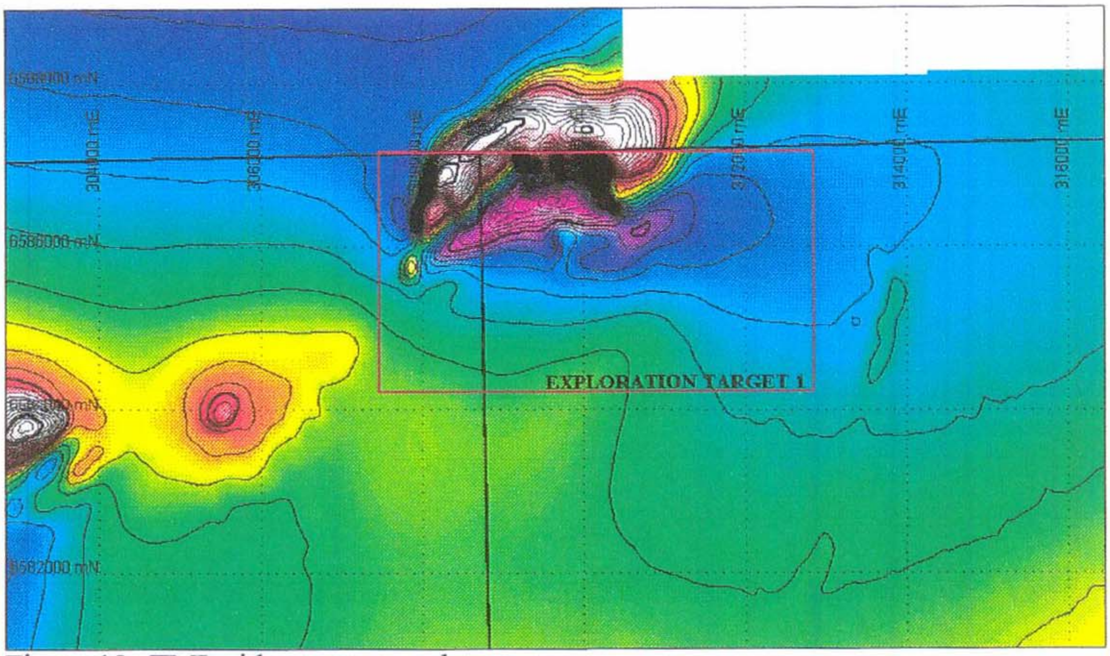


Figure 10a TMI with contour overlay.

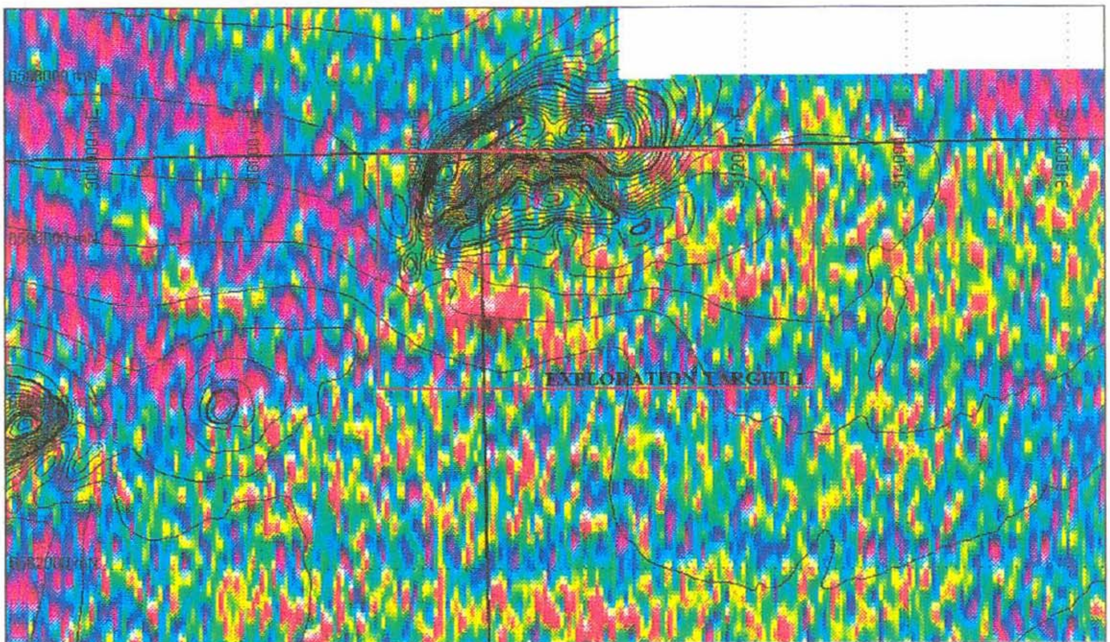


Figure 10b TMI contours over uranium channel radiometrics showing the uranium anomaly

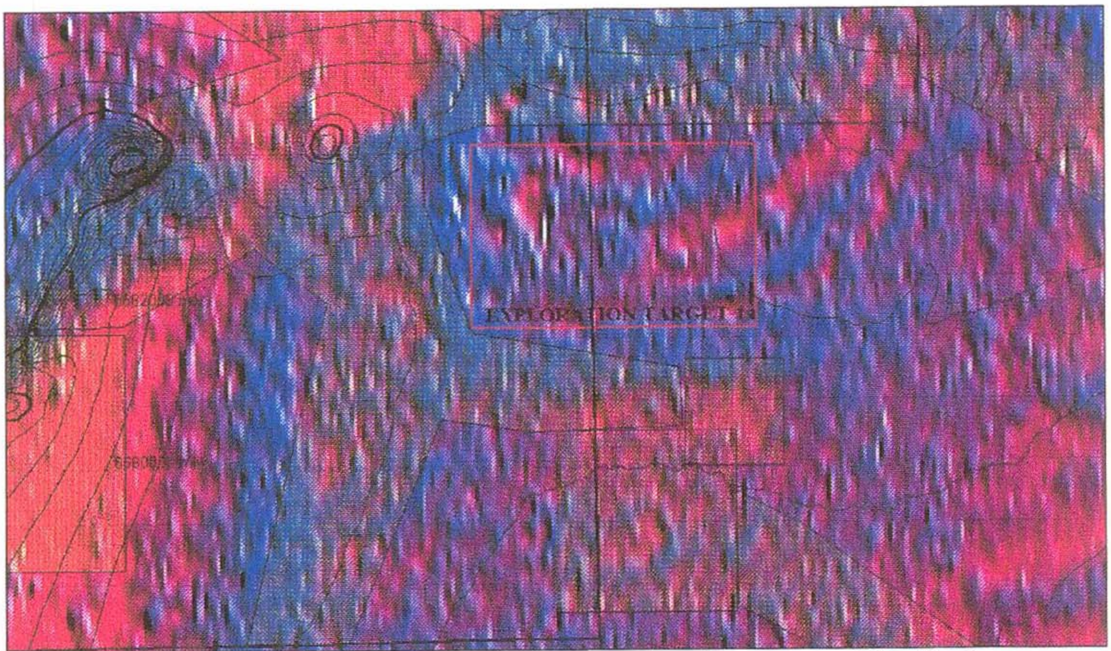


Figure 10c Potassium depleted zone - (western and north western side of red rectangle) associated with complex faulting, diapiric intrusives and Quaternary sediments.

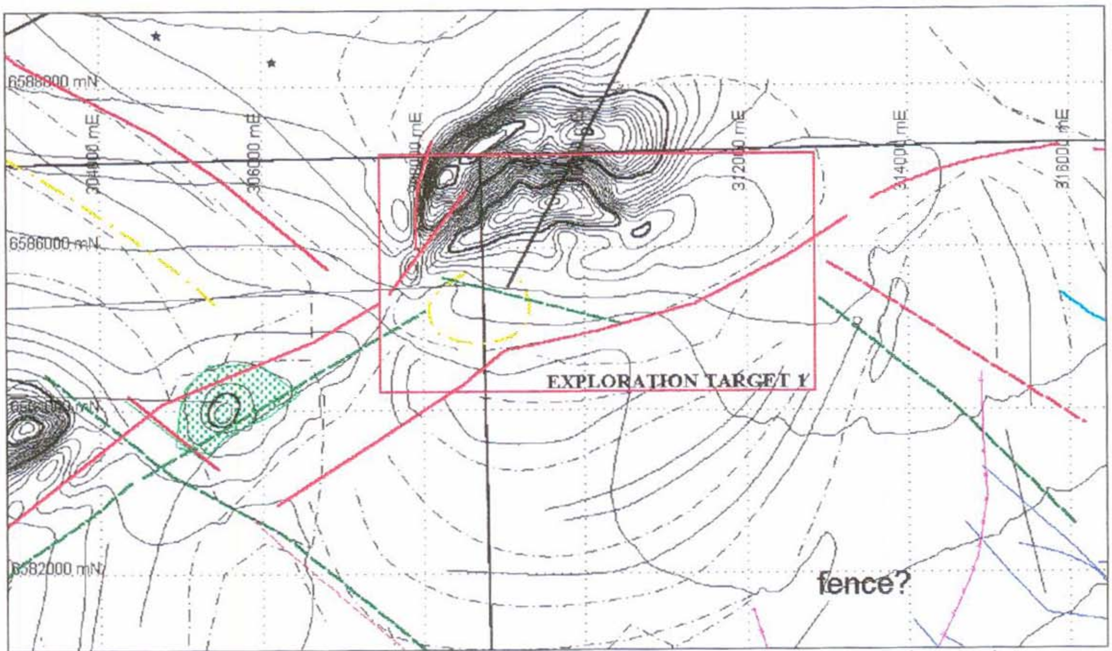


Figure 10d Composite map showing magnetic contours, faults, and radiometric anomalies (green cross hatched area interpreted dolerite).

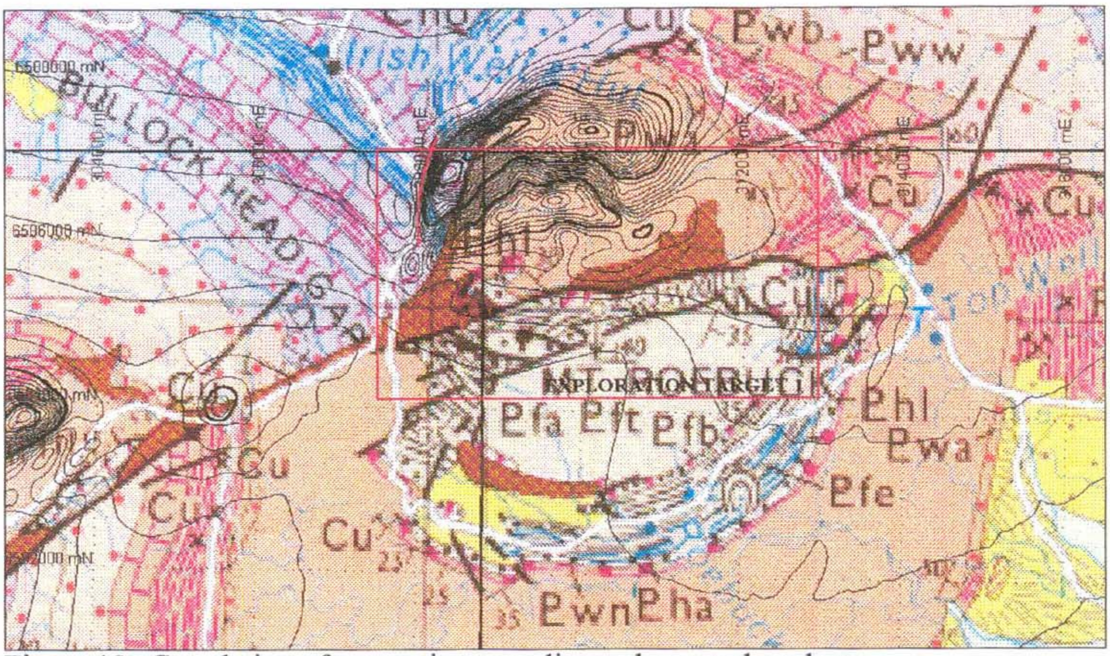


Figure 10e Correlation of magnetic anomalies and mapped geology.

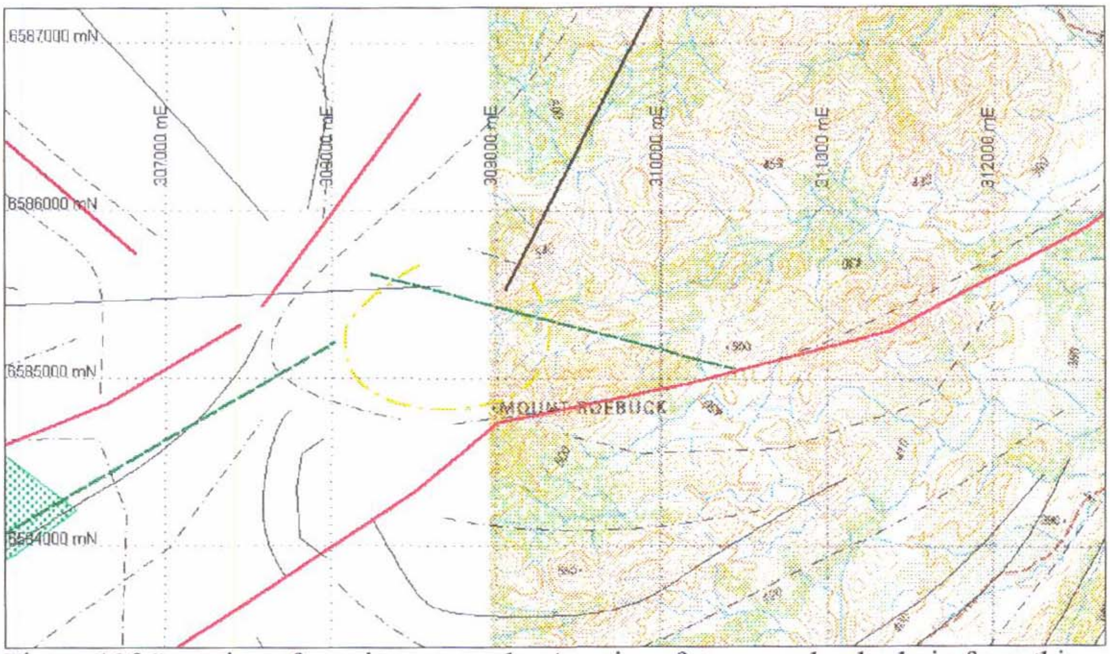


Figure 10f Location of uranium anomaly. A series of streams clearly drain from this area and may provide a suitable starting point for sampling to test for the presence of gold, base metals and precious stones.

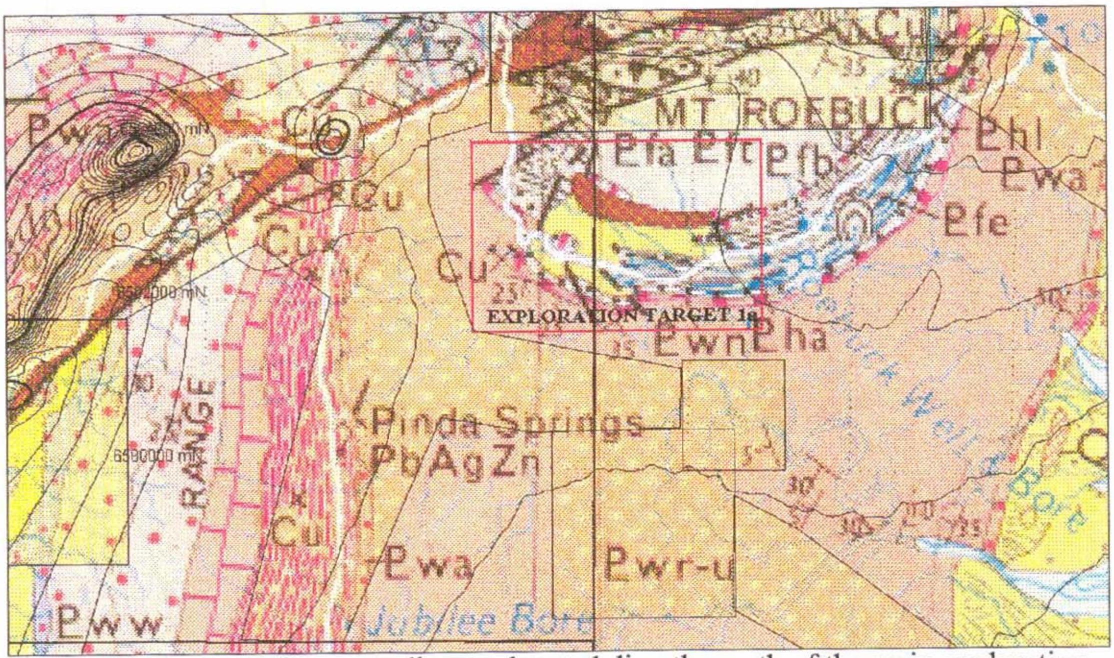


Figure 10g An area of cover sediments located directly south of the main exploration target.

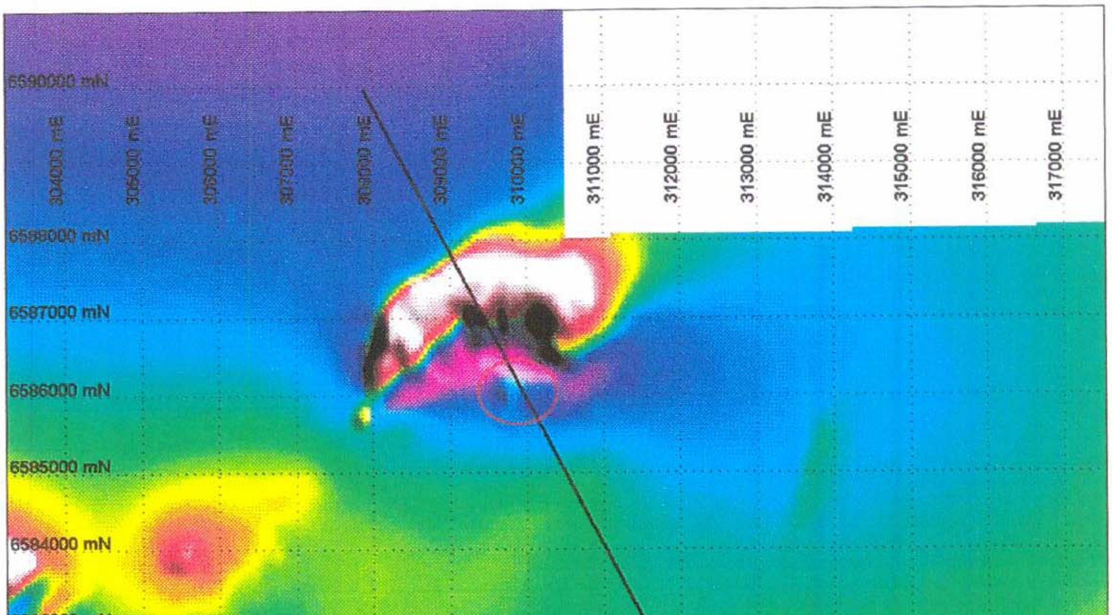


Figure 10h Location of recommended line for geophysical modelling (line orientation 152 degrees, length 7.8 km). Note also small magnetic high in red circle (dolerite intrusive?)

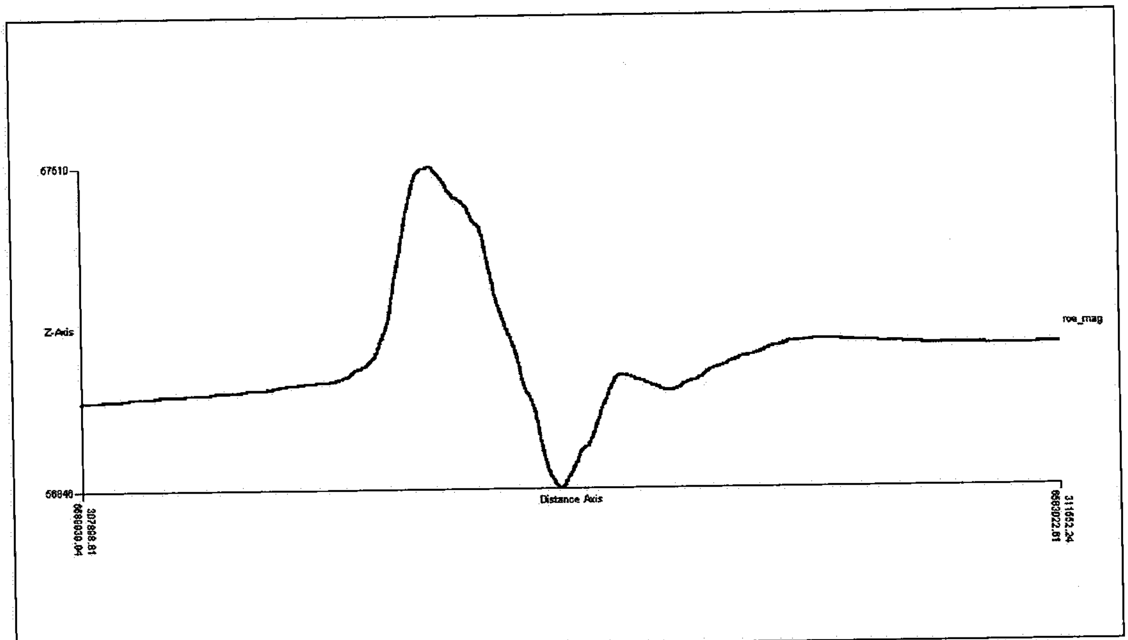


Figure 10i Profile of magnetic intensity through the Mt Roebuck diapiric structure.

Summary for area B and B1

The regions south west and north west of exploration target area A provide similar geophysical features (Figure 10g, 11a and 11b). They do, however, lack the presence of a distinctive uranium anomaly.

The south west zone again lies over the Mt Roebuck-Pinda Springs fault system (Figure 10g). The main fault zone is very distinct on the magnetic and radiometric images (Figure 2b,3b and 6b). A very prominent K/Th lineament is associated with the fault (figure 7). The presence of copper, silver and lead mineralisation (eg Pinda Springs mine) in lithologies that truncate against this feature suggest that it may have acted as a source for the mineralisation.

A positive magnetic anomaly located on the fault line (305500E, 6584000N) correlates with mapped diapiric rocks. The anomaly is very similar to anomalies to the north west associated with dolerite plugs. The presence of copper mineralisation (Figure 10e) in the Bunyeroo Formation has probably been derived from the intrusive body.

The north west area (Figure 11b) contains doleritic xenoliths within brecciated diapiric material. Magnetic anomalies in this area correlate with mapped dolerite plugs. The presence of igneous rocks within the diapir carbonates may be involved in the evolution of the Angepena gold field further to the north west.

Recommendations

The presence of diapiric material within, and mineralisation adjacent, to a major fault system such as the Mt Roebuck-Pinda Springs fault provides a worthy exploration target. Small mineral deposits within the Neoproterozoic shales adjacent to faults are common throughout this region. The main targets should be structural features such as drag folds and shears. The truncation of the Cambrian carbonates along the Mt Roebuck-Pinda Springs fault (Figure 10g) is a likely location for deposits of copper and zinc carbonates. Economic deposits within the Bunyeroo and Wonoka Formation are less likely unless associated with crosscutting fractures and shear systems.

The area to the north west warrants examination in light of the close proximity to the Angepena gold field. It is possible that the diapiric structure is associated with the gold mineralisation. If this were the case it would make the other diapiric structures to the south east favourable for gold exploration.

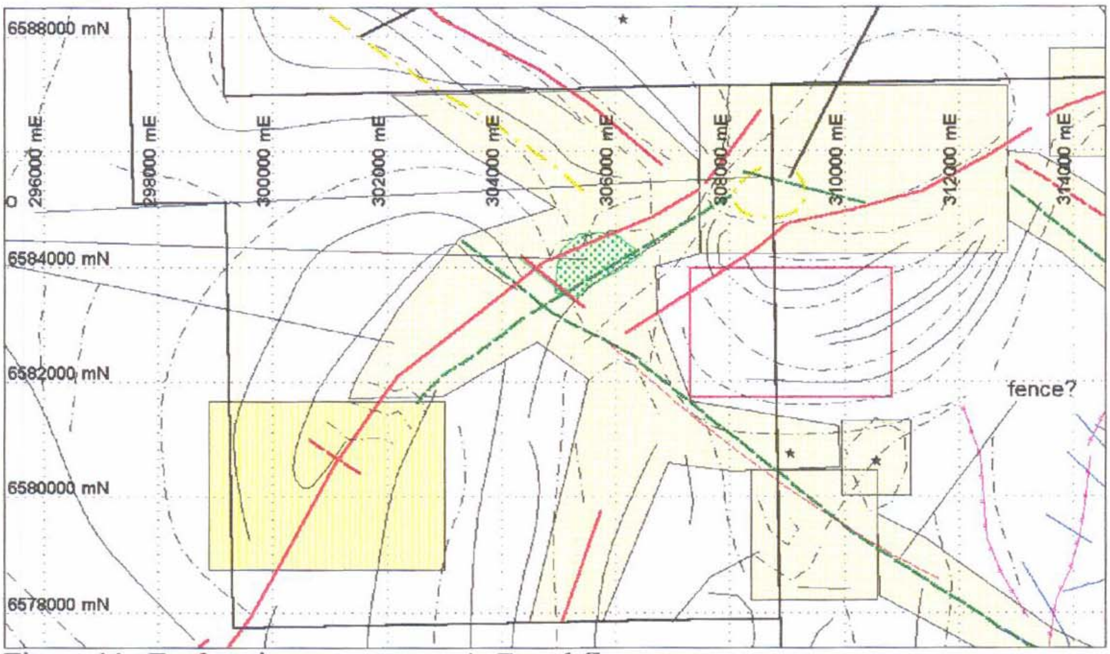


Figure 11a Exploration target areas A, B and C

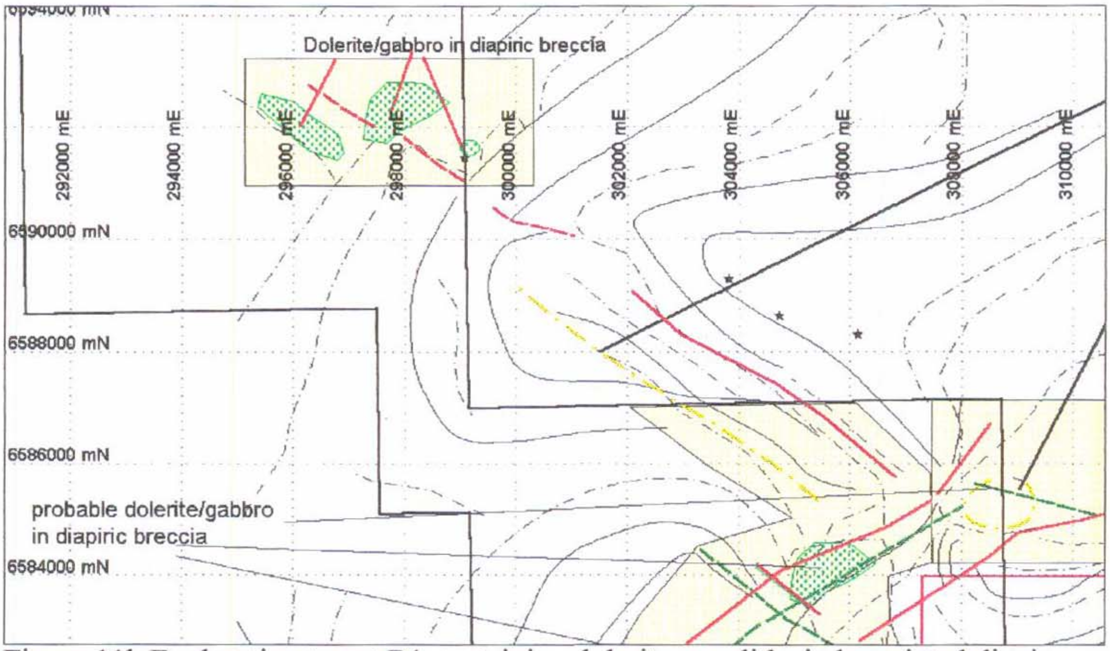


Figure 11b Exploration target B1 containing dolerite xenoliths in brecciated diapir.

__Summary for area C__

A subtle thorium lineament runs northwest across the exploration tenements (Figure 11, green dashed line). This lineament has the same trend as the basement magnetic anomaly and chain of diapiric structures. It also intersects with the Mt Roebuck-Pinda Spring fault system. Although this feature doesn't constitute a major exploration target it lies in close proximity to two small magnetic anomalies (Figure 11, black stars) directly south (310000E, 6581000N) of area A. The eastern magnetic anomaly lies over a bald hill suggesting the possible presence of an iron rich gossan or dolerite plug.

Recommendations

It would be prudent in the first instance to confirm what is located at the magnetic anomaly site and to determine if there is any surface feature that can explain the linear thorium anomaly (Fence line accumulating wind blown and water deposited thorium rich sand).

__Summary for area D__

A prominent set of short wavelength magnetic and radiometric anomalies reside along the eastern side of EL 2511(Figure 12a and 12b). The majority of these linear features correlate with the alluvial streams draining away from the hills to the west.

The edge of the alluvial plain is characterised by a distinct lineament running approximately north-south. This perturbation can be seen in both the magnetics and radiometrics. The correlation of the magnetic anomaly with a vermin proof fence and the likelihood that sediments from the hills have accumulated along the fence downgrades this geophysical anomaly from being a geological structure. It must be remembered that geophysical signatures are not necessarily associated with geological features.

The remaining magnetic anomalies located over the alluvial plain have a pattern similar to the present drainage pattern but with a southerly orientation. These anomalies may be associated with palaeo-drainage channels.

The south western corner of EL 2511 contains an area of faulted Neoproterozoic Bunyeroo and Wonoka Formation. A subtle magnetic anomaly is associated with the Wirrapowie and Jubilee mines. The anomaly may reflect the disturbance of the ground due to mining operations or possible reflects magnetic minerals associated with the faults. A similar magnetic signature is situated several kilometres to the north east along the strike of the fault system. It is likely that further mineralisation may occur at this location beneath a thin cover of Quaternary sediments.

Recommendations

If gold and precious stones have been liberated from the intrusive features in the Mt Roebuck area it is possible that they have accumulated in the present or palaeo-channel deposits. The ability to map the general pattern of the channels makes this a possible exploration target. Stream sediment sampling up stream may provide evidence of the presence of gold and precious stones in this region.

The area north east of the Wirrapowie- Jubilee mines (Figure 12b) warrants further investigation. This site would lend it self to surface sampling and shallow drilling to test for the presence of mineralisation.

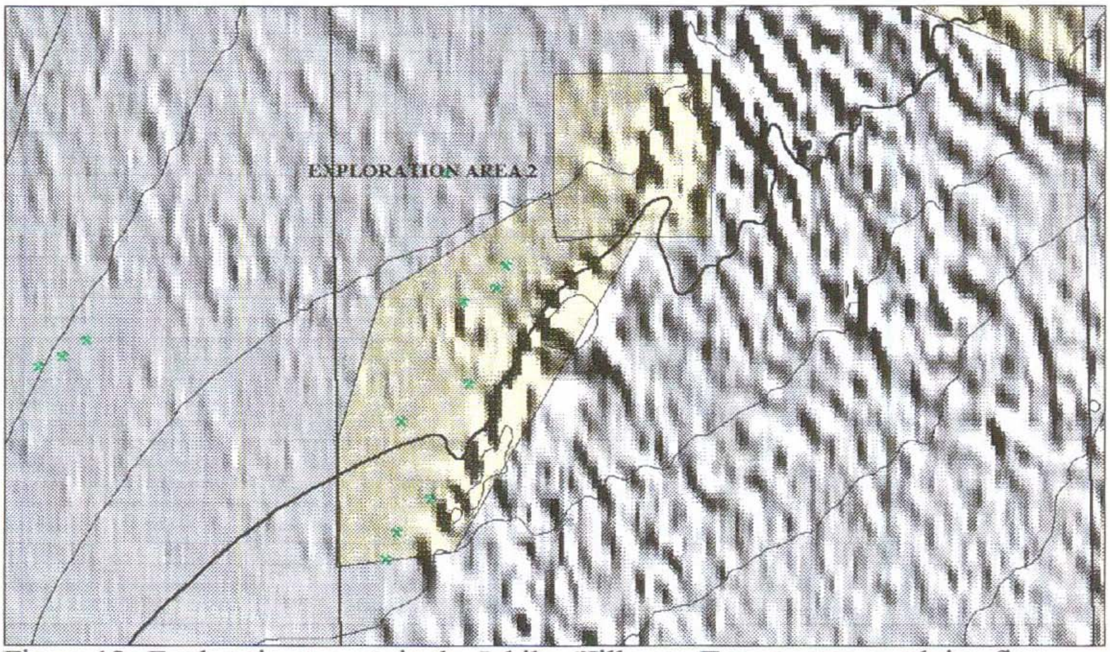


Figure 12a Exploration targets in the Jubilee Hill area. Target areas overlying first vertical derivative and TMI contours- magnetic data (green symbols = old mines).

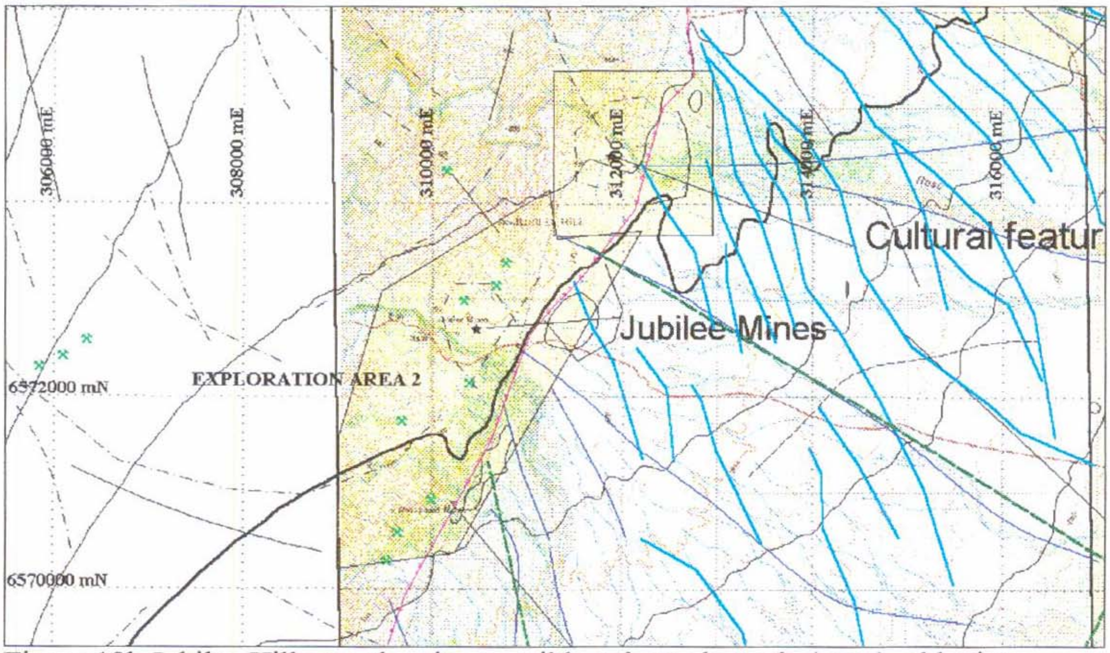


Figure 12b Jubilee Hill area showing possible palaeo-channels (cyan), old mines (Wirrapowie Mines) and subtle magnetic anomalies.

Conclusion

The geophysical data covering EL's 2511 and 2226 contains several regions of exploration potential. The most promising of these lies in the area surrounding Mt Roebuck. The combination of magnetic, radiometric and geological anomalies in this area provides strong justification for follow up ground exploration. This location is the focus of numerous intersecting geological structures. It also resides along a geophysical corridor that appears to control the placement of the diapiric structures. The presence of the Angepena gold field along this tend increase the prospectivity of the Mt Roebuck exploration target.

The presence of mineralised brecciated diapiric material along the Mt Roebuck-Pinda Springs fault system provides excellent opportunities for the existence of hidden concentrations of base metals in the Neoproterozoic strata.

Several zones of Quaternary sediments are situated adjacent to diapiric breccia and may host precious stones derived from basement intrusives.

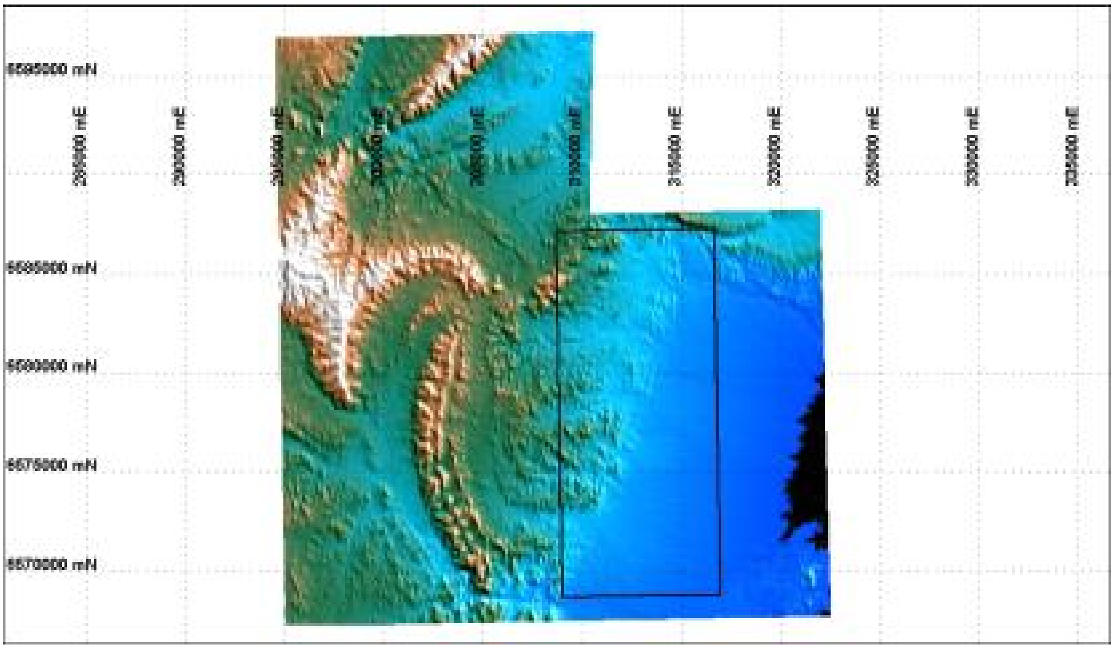
The other target areas discussed above have merit and should be considered for further investigation.

If positive results are derived from the exploration targets it is recommended that areas such as Mt Roebuck are investigated with geophysical modelling to determine the sub-surface structure and depth to mineralisation.

Click to return to
tenement map

INTERPRETATION OF
GEOPHYSICAL DATA-SET EL 2511

Client: Mr Peter Lewis MP



Digital elevation model and Mt Roebuck tenement boundary (EL 2511)

Geophysical consultant: Dr David T. Miller, August 2000

NB This report supersedes any previous reports on this area

CONTENTS

Introduction

Location

Exploration licence 2511 is located approximately 65 km south east of Leigh Creek in the northern Flinders Ranges. The licence areas cover 147km^2, composed of hilly terrain in the west and north, with open alluvial plains in the east.

Geology

The geology in this region is comprised of Cambrian and Neoproterozic sedimentary sequences. The strata are folded and faulted, and contain syn and post depositional diapiric structures[1]. The typically carbonate rich diapiric structures contain xenoliths of older Proterozoic (early Neoproterozoic, Mesoproterozoic and Palaeoproterozoic) metasediments, metamorphic and igneous rocks.

The emplacement of igneous and metamorphic basement geology into young sedimentary sequences has provided opportunities for base metals and gold deposits to form in the Cambrian, Neoproterozoic and younger strata.

The region containing the exploration licence contains evidence of an active history of mineral exploration and exploitation of copper, lead, zinc, gold and coal deposits. Electrolytic Zinc's willemite deposit to the west is an example of a current mine.

Local exploration

The exploration licence area has received various levels of mineral exploration in recent times. The main emphasis of exploration has been copper and gold exploration. Most mineralisation is reported to occur within diapiric strata or along faults emanating from the diapiric structures. Mineralisation along the Pinda Springs-Mt Roebuck fault has revealed low grade copper mineralisation within zones of ironstone, magnetite and siderite. Galena and silver have been reported to occur in quartz veins within bedding of the Wilpena Group strata 5 to 10 km west and south west of Mt Roebuck.

Alluvial gold occurs to the north west in the old Angepena gold field. Numerous attempts have been made to discover further occurrences of gold in this area but little success is reported. One micro-diamond was recovered in the Mt Roebuck area (Donnelly et al, 1991).

Aim

The job specification was to perform basic processing and examine the geophysical data (magnetic and radiometric) to identify mineral exploration target areas.

Data supplied

The client has supplied located and grided magnetic, radiometric and elevation data in digital format from an airborne geophysical survey (200m-line spacing) conducted by AGSO early in 1999.

[1] The term diapiric structure is used loosely in this report and doesn't imply a particular age or mechanism of emplacement.

The located data were supplied in a simple ASCII file format with flight line, longitude, latitude, fiducial and corrected magnetics. The radiometric data contained the total count, potassium, uranium and thorium channels. Grids generated in ERmapper format were also supplied.

Method

The magnetic, radiometric and digital elevation data were interpreted using GIS (MapInfo/Discover) and geophysical software (Modelvision). The geophysical data were further processed and enhanced prior to producing images suitable for interpretation. The images were used to identify geophysical lineaments and structures. These features have, where possible, been correlated with known geology. Combinations of geophysical features and geological structures have been used to identify exploration target areas.

Data processing and enhancement

The supplied located data sets have received pre-interpretation processing and enhancements to improve the preliminary survey processing conducted by AGSO.

The supplied data contained only longitude and latitude on the WGS94 reference surface. For interpretation purposes and integration with the local coordinate system the long/lat data was converted to Easting and Northing (AGD84).

The magnetic data was supplied with no details of post-survey processing and didn't appear to have been micro-levelled to eliminate residual errors. The data was micro-levelled to minimise errors and enhance subtle anomalies.

Examination of the radiometric data[2] suggested that the U and Th channels were incorrectly labelled. Consequently all grids and images used in the interpretation were generated from the modified data set.

Prior to the interpretation process, various filters were applied to the magnetic and radiometric data. First and second vertical derivatives were applied to the magnetic line data to enhance short wavelength anomalies, while the radiometric data received low-pass filters to minimised short wavelength noise. The ratio of K to Th was also calculated to identify areas of radioelement depletion and enrichment.

Images of the enhanced data were produced from the data grids. Various colour schemes and balances have been applied to enhance the magnetic and radiometric features.

Interpretation - Magnetic survey

Magnetic sources

Several magnetic sources occur in the strata exposed in the northern Flinders Ranges. Magnetite rich horizons are common in the Neoproterozoic Umberatana and

[2] A statistical examination of the count intensity of the three channels showed that the channel names for the Th and U channels were transposed.

Wilpena Group sediments. These layers are visible in the magnetic data within this exploration region. The geological boundaries between the carbonate and clastic strata are quite evident due to a moderate magnetic contrast. There are also strong magnetic correlations with dolerites located within the diapiric strata[3].

Drainage patterns reflected in the magnetic data have been attributed to the dispersal of ironstone and magnetite from sedimentary units and fault zones.

Regional and deep magnetic structures

The regional magnetic field (Figure 1a) displayed in the survey has a variation of 700nT. The regional trend of the total magnetic field shows deep magnetic basement in the west shallowing to the east. It is possible that a major north-south basement structure lies along this magnetic gradient.

A north westerly trending magnetic ridge[4] is also apparent on the western side of the survey area. This trend contains several large isolated magnetic anomalies that are likely to be related to a north westerly chain of diapiric structures, including the Angepena gold field in the north west and Mt John diapir to the south east.

Shallow and localised magnetic anomalies

Three distinctive zones occur within the tenement. The most apparent zones are located in the south east and north west corners of the tenement. The south east feature is composed of numerous short wavelength linear structures that are sub-parallel and tend to fan out. These lineaments, in the most part, correlate well with the local drainage pattern. The magnetic pattern suggests the presence of heavy minerals such as magnetite and haematite, perhaps specularite. The mineralisation has probably originated from the Mt Roebuck-Pinda Spring's diapir-fault complex.

The NNE trending magnetic lineament (30-40nT) along the western side of the drainage pattern (orientated diagonally across the southern part of the tenement) correlates in most places with a vermin proof fence. Even though this is a prominent linear feature, its strong correlation with the fence line suggests that it is not a geological feature.

Magnetic lineaments in the south west portion of the study area correlate well with lithological boundaries of the Neoproterozoic and Cambrian strata. This is also true for the dome structure around Mt Roebuck. The lithological boundaries of the Umberatana Formation are clearly visible in the magnetic signal.

Terminations in magnetic lineaments have highlighted several fault structures that are marked on the interpretive maps.

The large amplitude magnetic anomalies in the central portion of the survey area are related to a north easterly trending fault structure (Mt Roebuck-Pinda Springs Fault). The anomalies themselves are likely to reflect a high level of BIF, micaceous haematite and igneous xenoliths within a diapiric matrix.

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[3] Similar anomalies may also be caused by man-made structures and should be interpreted with caution.

[4] A subtle radiometric anomaly runs along the basement trend. See the following section.

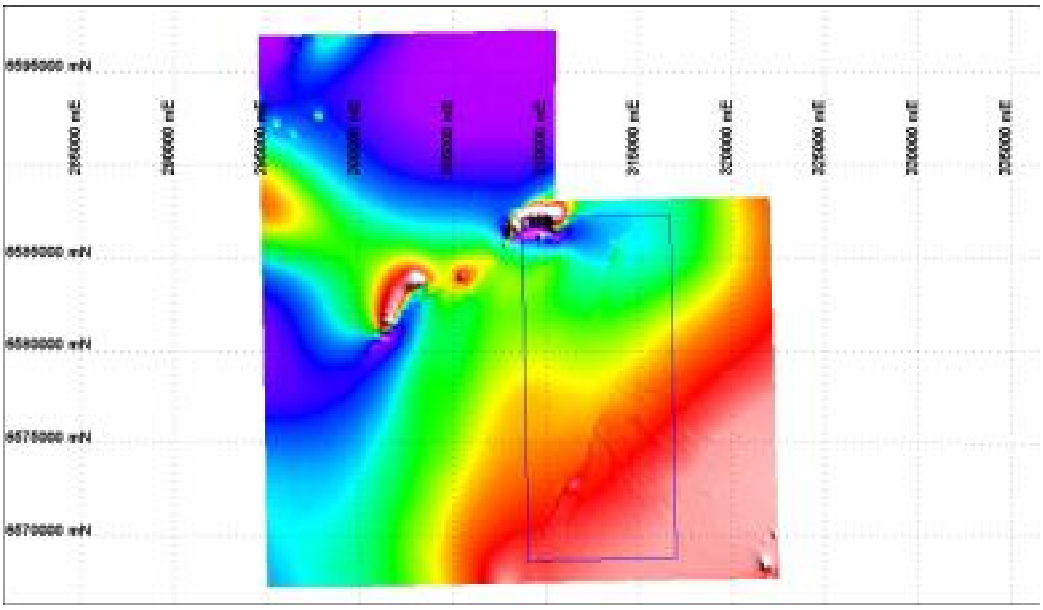

Figure 1a Total magnetic intensity; (sun angle 60 degrees from the NE), (red = high, purple = low).

The TMI images in Figures 1a and 1b show magnetic basement shallowing to the south east. A noticeable ridge, possibly a basement horst, can also be seen to extend to the north west. Several isolated anomalies are located in the central, north western and southeatern (small cluster of three anomalies) quadrants. The magnetic anomalies in the south east corner of the survey are related to the Mt John diapir.

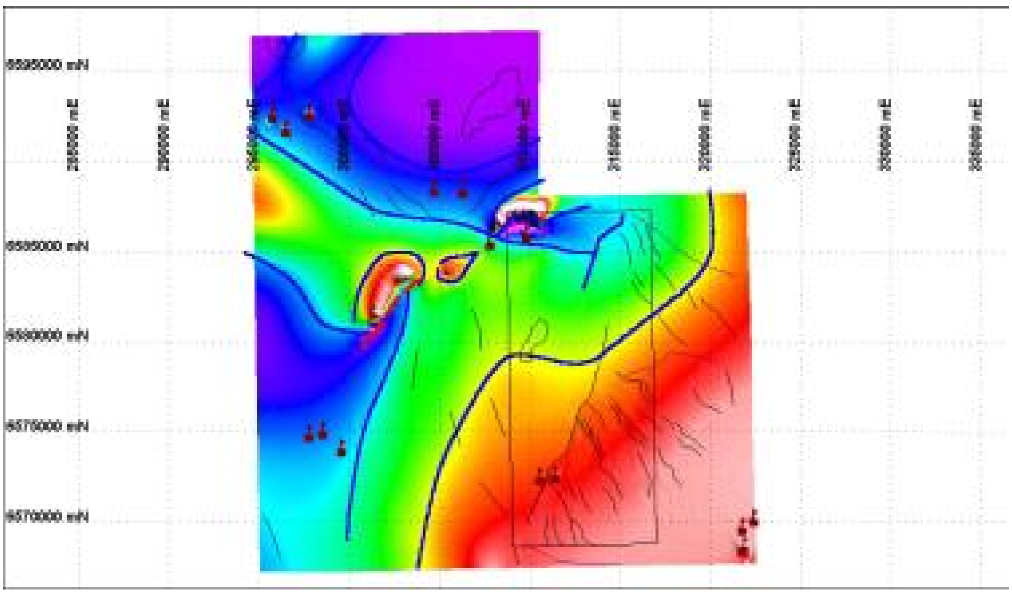

Figure 1b Interpretation of total magnetic field, lineaments and spot anomalies (squares with flags).

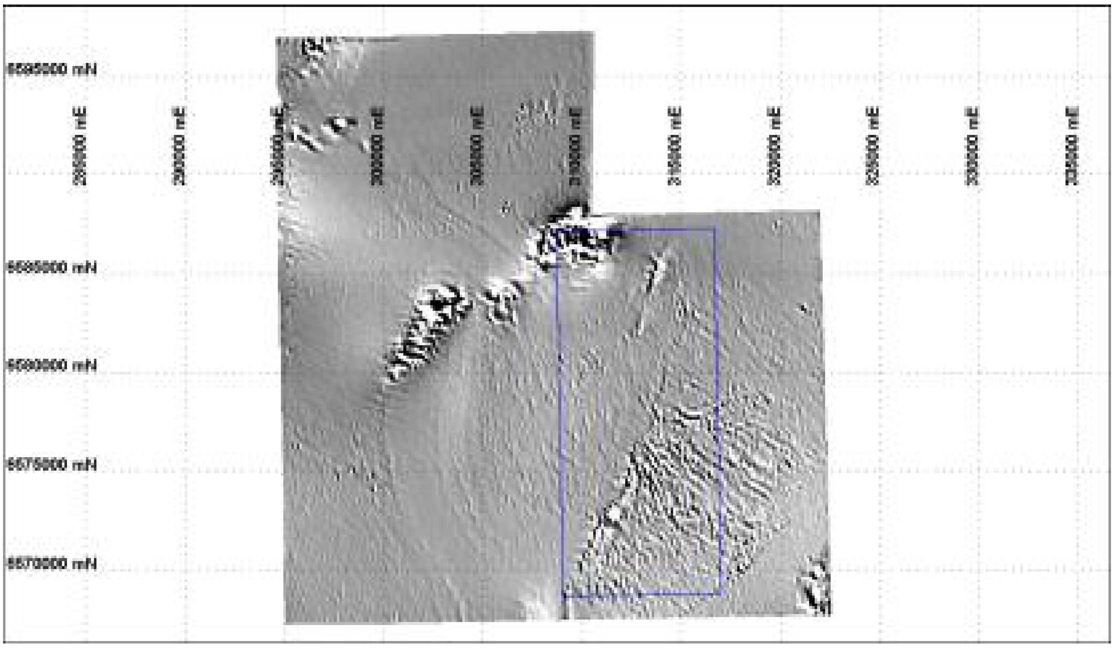

Figure 2a Magnetic first vertical derivative (sun angle 60 degrees from the NE).

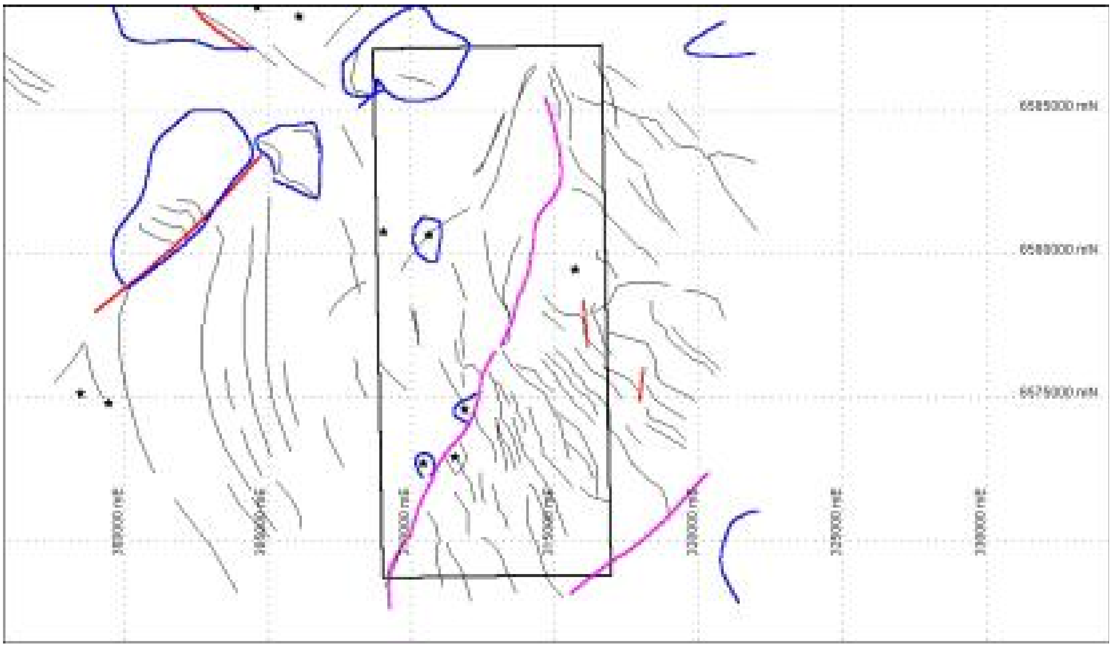
Figure 2b Interpretation of first vertical derivative - spot anomalies and major lineaments. (Black lines = lithological boundaries, red lines = faults, blue features = magnetic highs, purples lines = cultural features, and black stars = either small magnetic highs related to small geological or cultural features).

The application of a first vertical derivative filter has highlighted short wavelength anomalies related primarily to near surface features, Figure 2a. A very prominent alluvial fan can be seen in the magnetic signal (Figure 2b and 2c) in the south east corner of the tenement. This signal is related to the outflow of magnetic minerals from the western highlands in current exposed and ancient buried drainage channels[5].

[5] The shot wavelength magnetic signal appears to be very successful in identifying shallow depth palaeochannels.

Figure 2b summarises magnetic signal interpretation. The coordinates (E/N GDA 84) of the spot anomalies are located in Table 1.

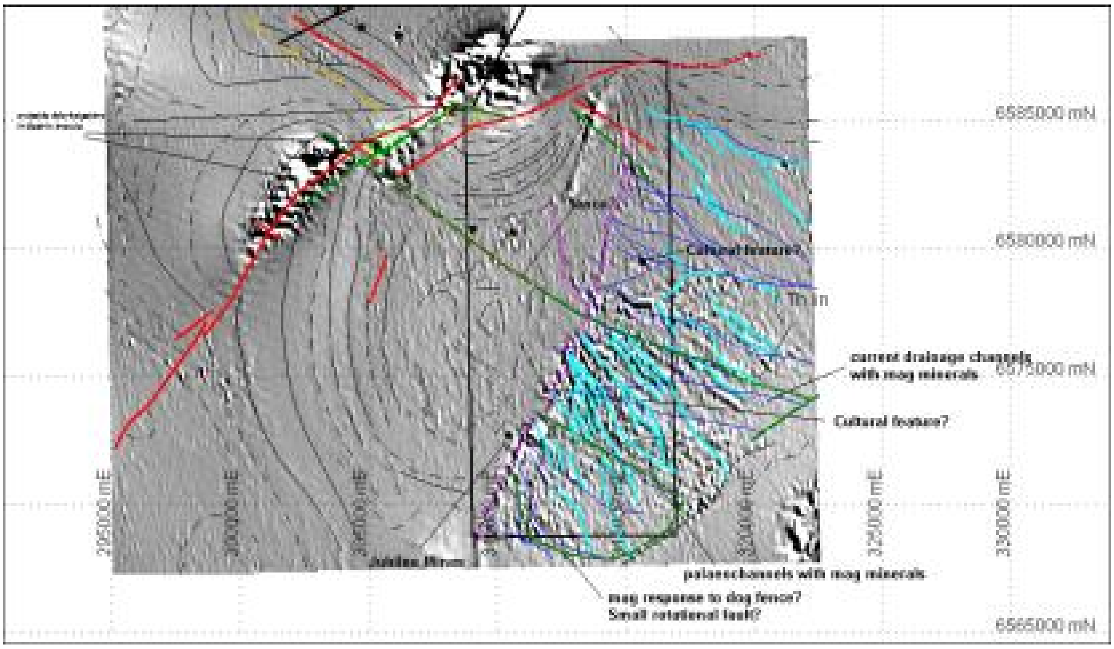

Figure 2c Interpretation of first vertical derivative - lithological boundaries and palaeochannels. (Black lines = lithological boundaries, red lines = faults, blue features = magnetic highs, purples lines = cultural features, and black stars = either small magnetic highs related to small geological or cultural features).

Interpretation - Radiometric Survey

The radiometric data has been investigated by examining the separate K, Th and U channels and the total count.

The relative intensity over the survey area shows a variation of some 3500 counts. Attempts have also been made, without using any further processing, to remove background noise levels[6], to examine ratios of K/Th and U/Th to pinpoint areas of enrichment and depletion of these elements that may indicate areas of alteration due to mineralisation.

Each of the separate channels and the total count were interpreted separately. The anomalies identified have been combined with the magnetic interpretation to produce a composite interpretation.

Radiometric sources

Radiometric sources in this region are primarily related to outcropping geology, scree slope deposits and alluvial outwash. The semi arid to arid climate precludes the development of complex soils and consequently the majority of the radiometric signal reflects exposed rock in-situ (down slope movement of rock can be seen). The Neoproterozoic units provide the strongest signal related to K, Th and U bearing

[6] Additional filter such as an (MNF) multi-channel noise reduction filter would enhance the quality of the images produced and the occurrence of subtle structures.

minerals. The Neoproterozoic Rawnsley Quartzite and the Cambrian carbonates are, for the most part, depleted and consequently present as radiometric lows. Shale units in the carbonates show up as moderate highs.

Interpretation

The various radiometric channels were examined to identify anomalies and discontinuities in the recorded spectrum. A summary of the main anomalies and lineaments is provided in Figure 3.

A high/low colour scheme was applied to the potassium channel (Figure 3a) to highlight lithological boundaries and other surface features, including drainage patterns. The distinct colour contrast afforded by the high/low colour scheme has sharpened lithological boundaries by de-emphasising the response from weathered material that is dispersed down-slope.

High potassium levels are related to the Neoproterozoic strata, while Cambrian carbonates are low K (Figure 3b). Variations in K levels clearly show lithological boundaries. Alluvial outwash from the central highlands is exhibited clearly in this image. The Mount Roebuck-Pinda Springs fault is seen as a sharp discontinuity in the west-central portion of the image.

The distinct lineament cutting diagonally (north east trend) across EL 2511 (Figure 3b) is probably a reflection of the fence acting as a natural barrier to the migration of sediment down-slope.

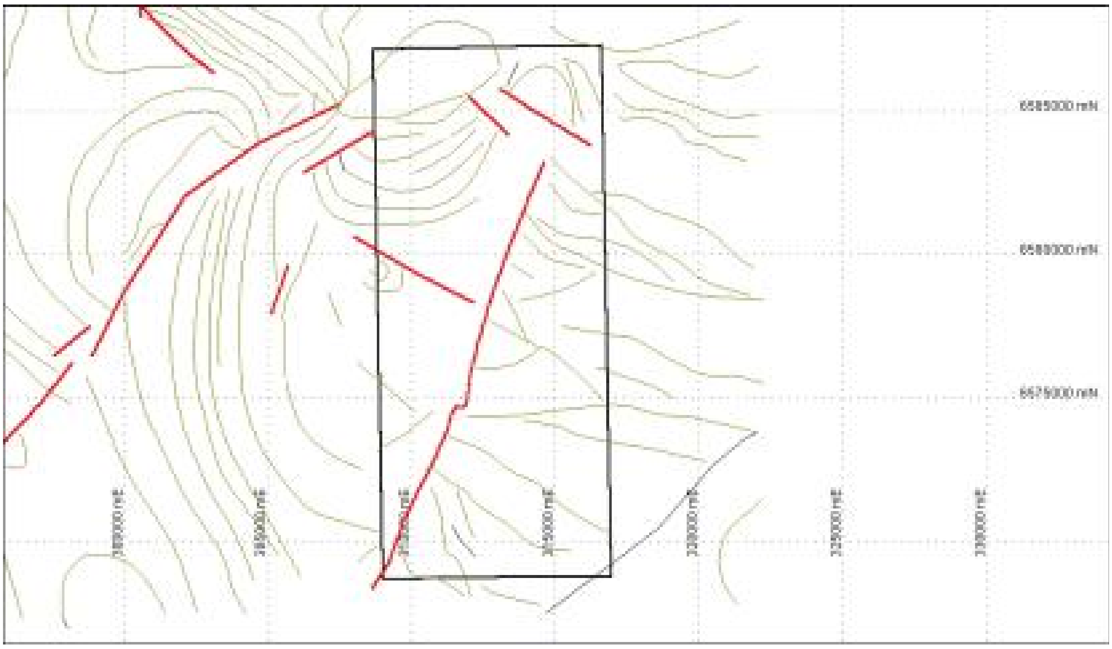

Figure 3 Summary of radiometric lineaments and discontinuity's derived from the radiometric data.

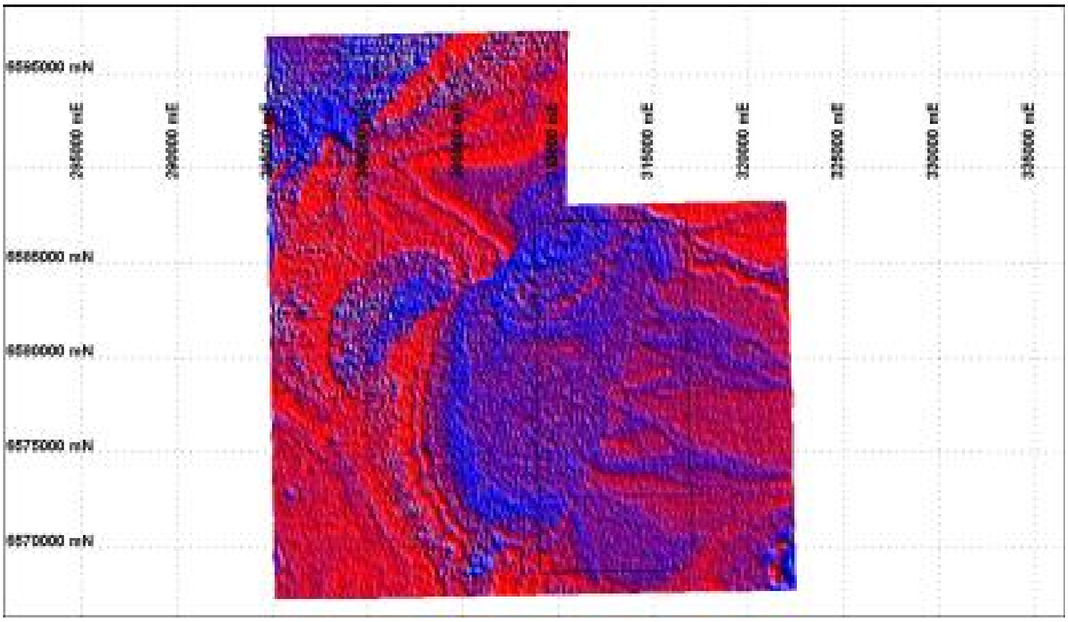

Figure 3a Radiometric potassium channel (areas of high K = blue, low K = red).

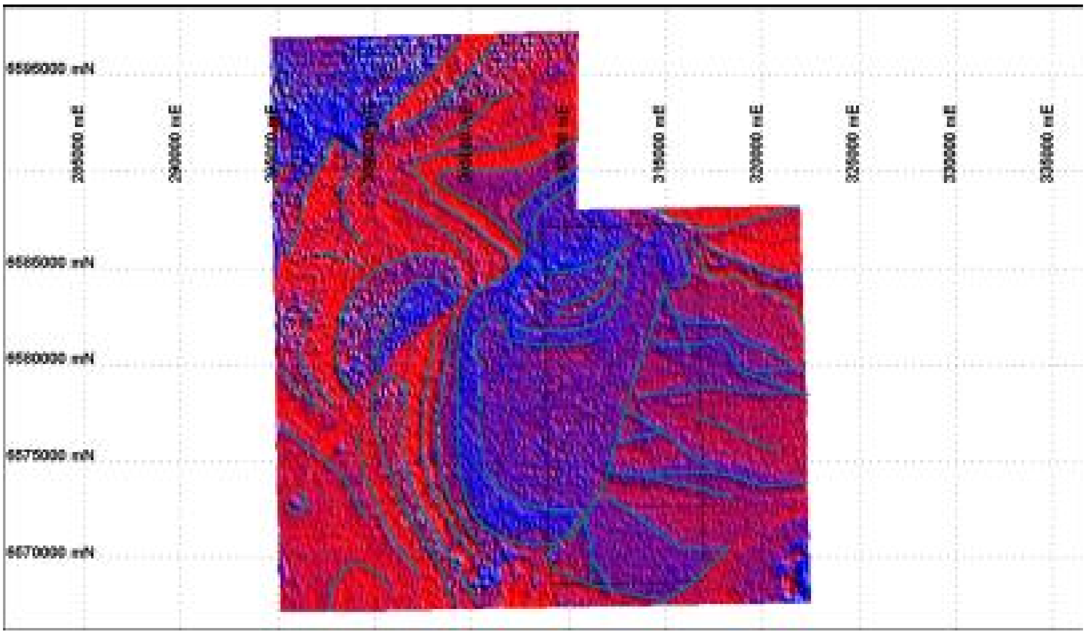

Figure 3b Potassium channel radiometrics with lineaments and zones

A reversed colour scheme has been applied to exaggerate the lithologies (Figure 4b) for the Th channel (Figure 4a). The thorium channel clearly shows higher levels within the Brachina Formation and the diapiric structures. Minerals such as monazite and zircon[7] (containing thorium) liberated from the Brachina Formation shales probably account for the radiometric signal from the creeks onto the eastern plains. The lower thorium counts within the Wilpena Group - Rawnsley Quartzite and Cambrian strata suggest low levels of thorium rich minerals.

[7] Samples from the Brachina Formation should be tested to confirm the presence of these minerals.

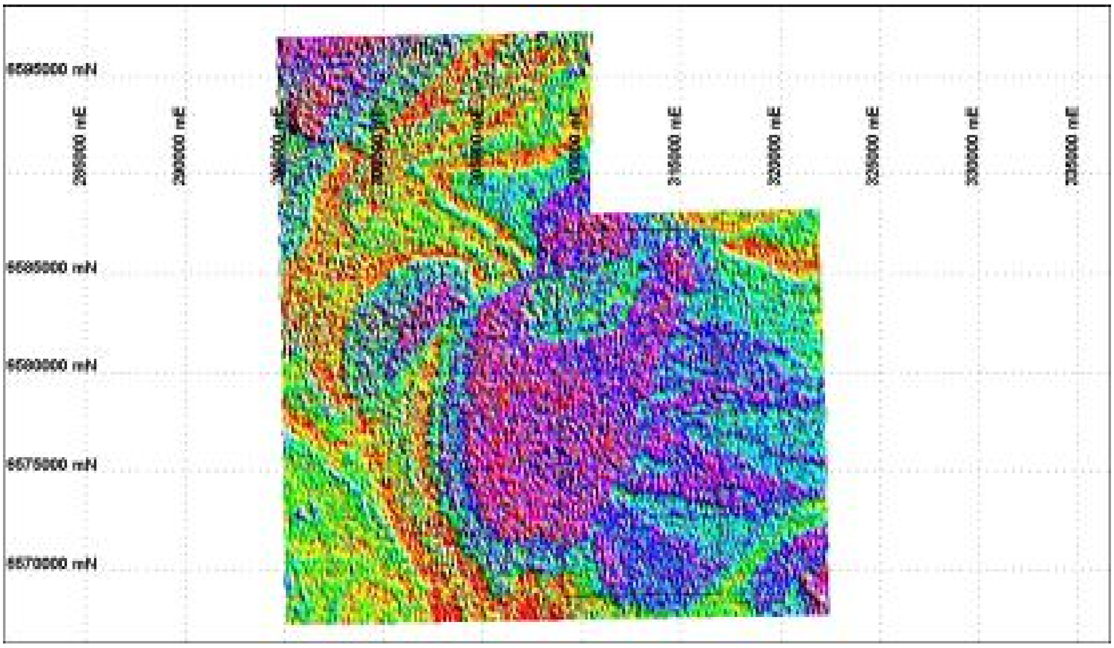

Figure 4a Radiometrics thorium channel (Red/yellow = low, purple/red = high).

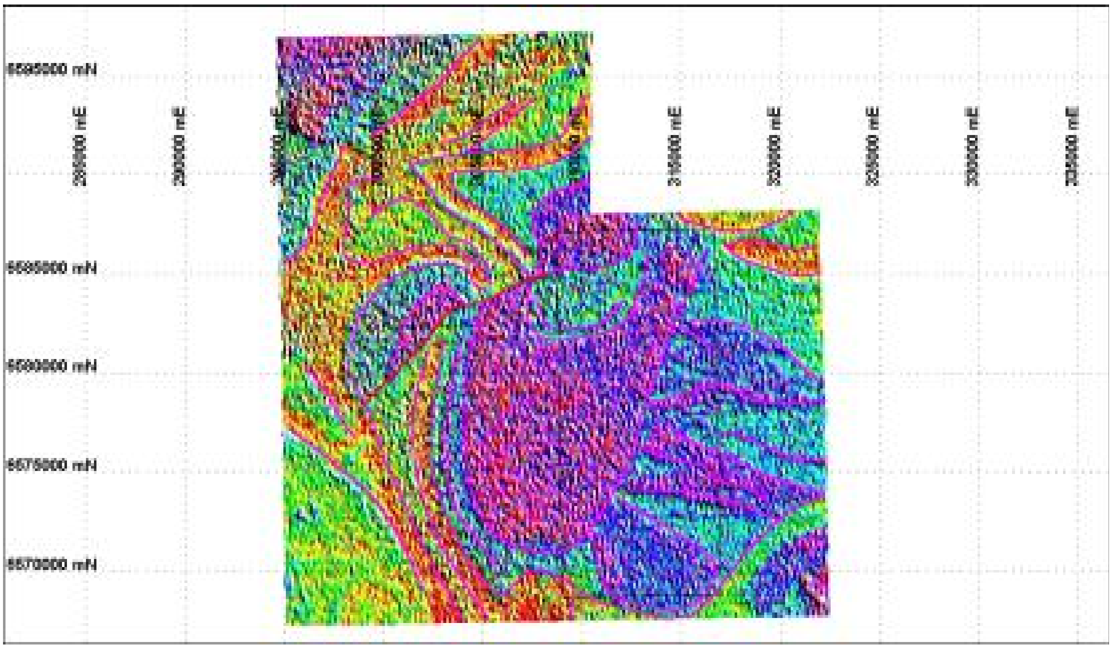

Figure 4b Thorium channel radiometrics with lineaments and zones. NB some structures are omitted since they have already been identified on the other channels.

The uranium data (Figure 5) is less energetic and consequently doesn't exhibit the clarity afforded by the other channels. However, it is possible to identify some boundaries related to lithological changes. In general there is an expected similarity between the uranium and thorium patterns. Again the Brachina Formation contains the highests levels related to the likely presence of minerals such as monazite and zircon.

A small area of uranium concentration (thorium depletion) is located in the north west corner of EL 2511 at the edge of diapiric material. This may be related to a weathered igneous xenolith within the Mt Roebuck diapiric structure. The high uranium at this site may indicate the concentration of uranium released from weathered U-bearing minerals. Elevated uranium levels are associated with the exposed diapiric structures to the south east and north west corners of the survey area.

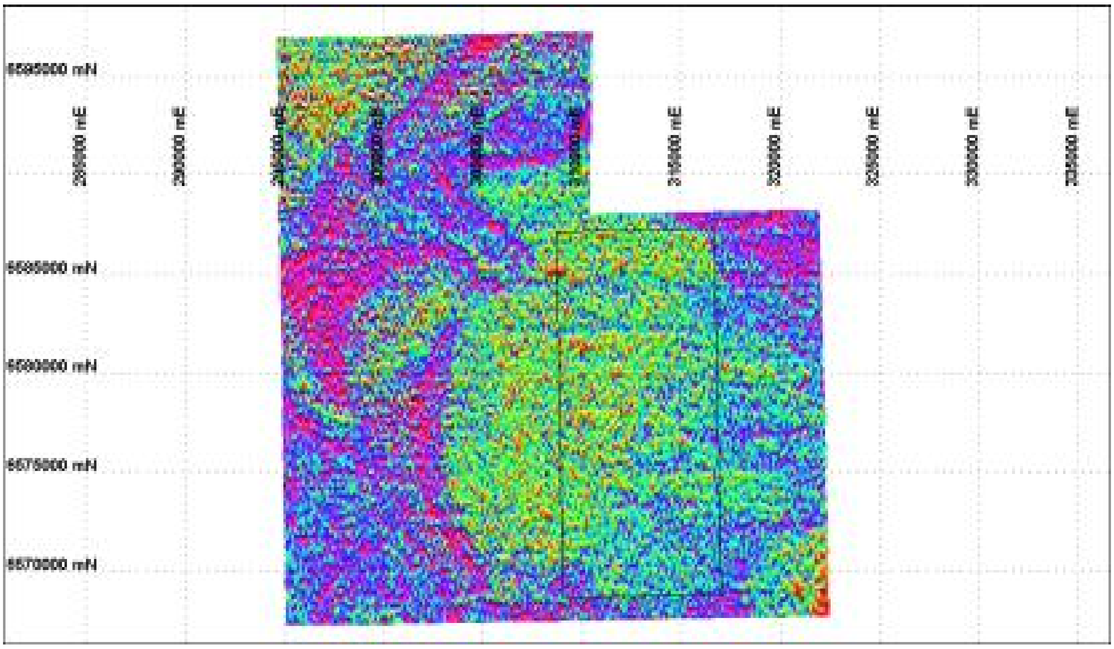

Figure 5 Radiometric uranium channel (red = high, purple = low) showing several highs in the north west corner of the tenement.

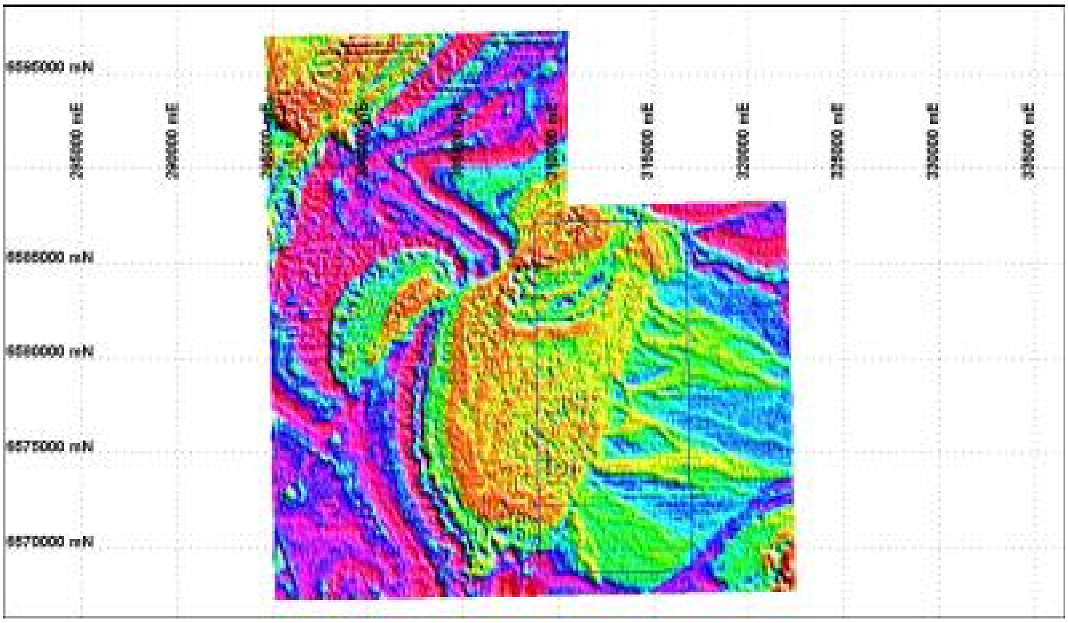

Figure 6a Radiometircs total count (Red = high, purple = low).

The full radiometric spectrum (Figure 6a) highlights the lithological boundaries associated with the exposed geology within the survey area. Higher counts are associated with the Neoproterozoic strata and the diapiric structures. Lower counts are attributed to the Cambrian carbonates and sediments. The drainage pattern to the east is distinctive and depicts a major alluvial flood plain.

The Mt Roebuck-Pinda Springs fault zone is clearly visible in the radiometric total count. The radiometric signal shows the fault truncating and displacing the exposed strata.

A faint circular structure (E295200/N6573000) is evident in the south west corner of the survey area (Figure 6b) and has no definite correlation with mapped Cambrian geology. Another circular structure, 3 km to the north east, is truncated by the Mt Roebuck-Pinda Springs fault.

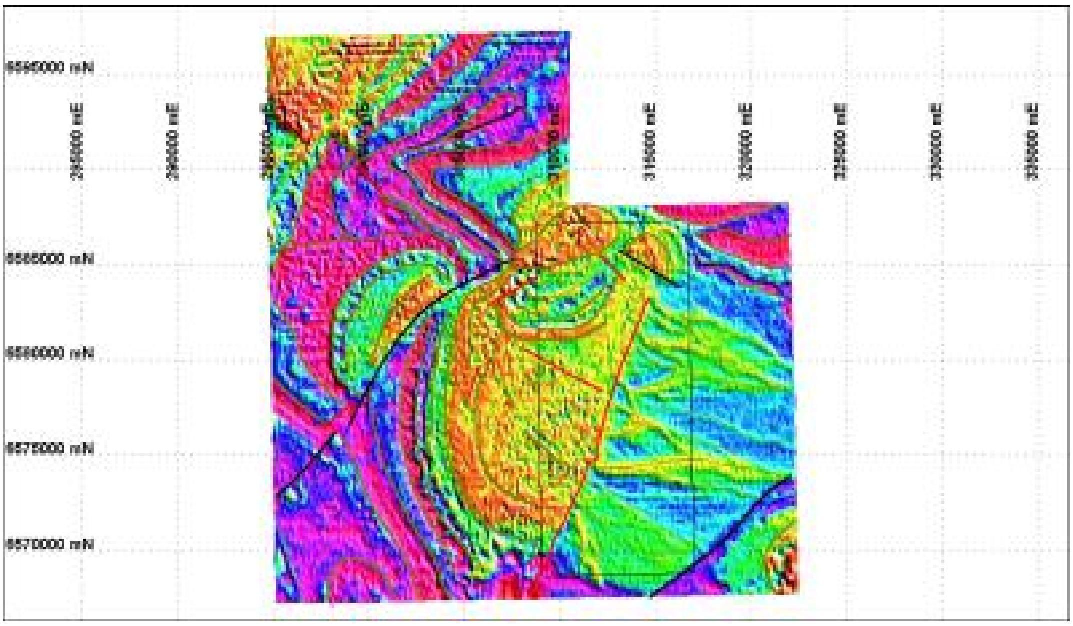

Figure 6b Radiometrics total count with lineaments

Integration of data

The lineaments and anomalies identified within the geophysical data have been combined to identify structural trends and anomalous areas worthy of mineral exploration. The lineaments and anomalies have been compared with the local mapped geology in an attempt to eliminate geophysical features that have a non-economic interest. Geophysical features that are associated with man-made structures such as fences, water bores and buildings have been highlighted (Figure 8a and 8b).

Exploration targets and recommendations

The integrated interpretation shown in Figure 7a and 7b incorporates significant anomalies and structures identified on the magnetic and radiometric images.

The intersection and grouping of geophysical features has been used to select exploration target areas. Each exploration target area has been ranked and will be discussed from highest to lowest priority.

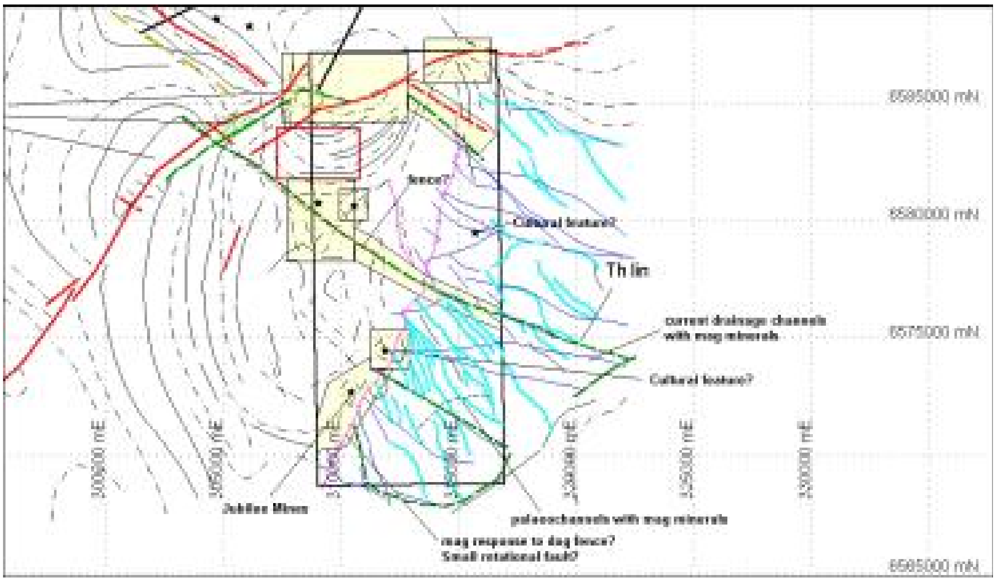

Figure 7 Integrated lineaments and anomalies including selected target areas. (polygons yellow dots = target areas; red line = fault; solid black line = lithological boundary; dashed black line = geological trend; dashed green-yellow lines = radiometric lineaments; black stars = small magnetic highs; blue lines = magnetic and radiometric lineaments associated with drainage; cyan lines = magnetic anomalies associated with shallow features possible palaeo-channels; purple lines = magnetic lineaments correlated with fence line).

Easting	Northing	Comments
309000	6580800	Magnetic anomaly
310600	6580700	Magnetic anomaly
315700	6579400	Magnetic anomaly
311900	6574500	Magnetic anomaly
310400	6572700	Magnetic anomaly
311500	6572900	Magnetic anomaly
298500	6575100	Magnetic anomaly, Off tenement
299400	6574800	Magnetic anomaly, Off tenement
308700	6585200	Uranium anomaly

Table 1

Anomalies considered related to cultural features

The obvious northeasterly trending lineament observed in both the magnetic and radiometric signal has been found to correlate well with a vermin proof fence (Figure 8a). The distinct change in the radiometric signal across the fence line would suggest that the fence is acting as a barrier to down slope sediment flow with a greater accumulation of radioactive minerals on the western side of the fence line.

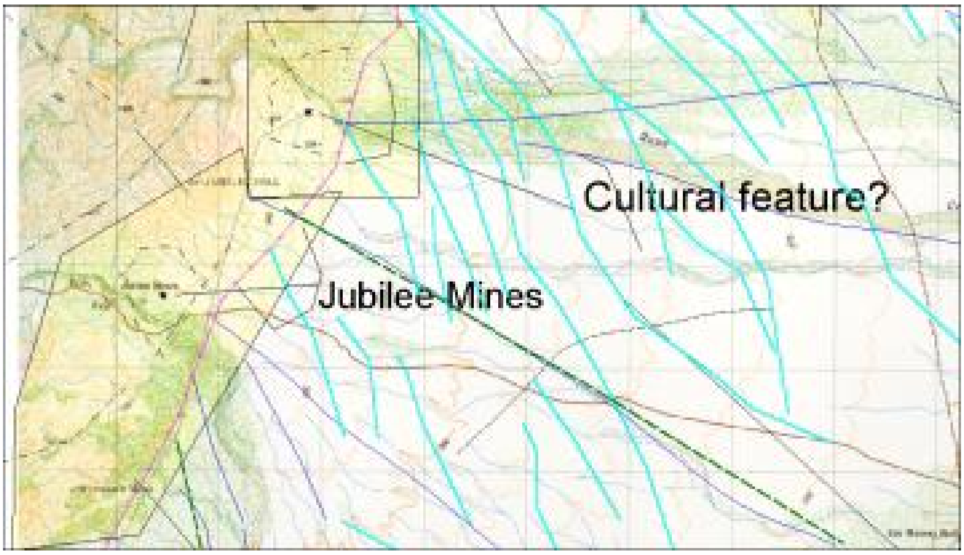

Figure 8a Linear magnetic anomalies correlated with vermin proof fence in south east; correlation of some magnetic/radiometric lineaments (blue lines) with recent stream patterns and magnetic lineaments (cyan lines) crossing recent drainage pattern (old dunes or palaeo stream channels).

Exploration target areas

A number of exploration target areas have been identified within EL 2511 (Figure 9). Details of the exploration potential of each area are discussed in the following section. A prospectivity rating has been provided for each area (s) based on a statistical method developed by the author[8].

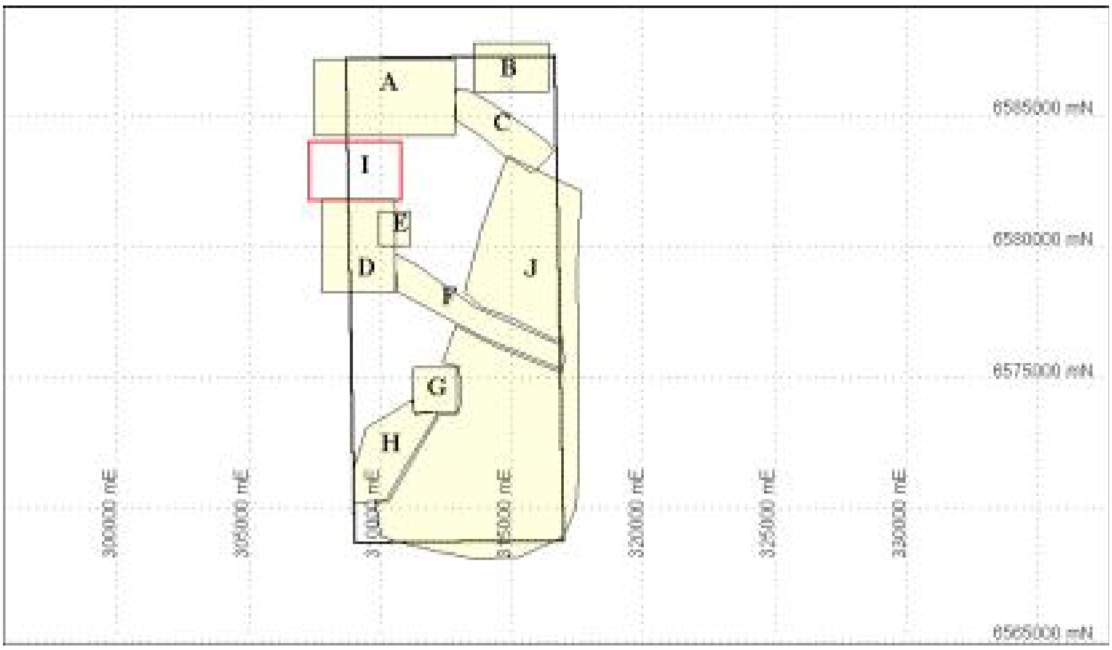

Figure 9 Selected exploration areas.

[8] Statistical prospectivity rating is based on the number of geologic and geophysical features, their spatial relationships and their degree of correlation. Low prospectivity (*) - high prospectivity (*****).

Summary for area A and I ***Prospectivity rating *******

The Mt Roebuck region (Figure 10a and 10c) contains several geophysical features that are significant. This area lies above a major north west trending magnetic basement ridge associated with several diapiric structures.

The importance of the diapiric structures lies in the placement of Meso and Palaeoproterozoic basement material (pre-Neoproterozoic basement is typically at > 5 km) at the surface within the local Neoproterozoic and Cambrian strata. The rafts of basement geology can potentially contain precious metals and stones. The possibility that base metals have been leach out and concentrated in the local geology is an important exploration model in this area. The many small mineral deposits (see the geology map) in close proximity to the diapirs supports this mechanism.

This exploration target also resides in a complex fault system. The Pinda Springs-Mt Roebuck Fault, which contains mineralised veins intersects with geophysical lineaments trending north west into geology hosting the gold at Angepena.

A small uranium anomaly (Figure 10b) within the Mt Roebuck fracture zone suggest the presence of igneous basement rafts. It is important to note that this uranium anomaly lies within and adjacent to diapirc material and in close proximity to several small magnetic anomalies (Figure 10a, 10b and 10h).

Another striking feature is the major magnetic anomaly north of Mt Roebuck. This anomaly (Figure 10h and 10i) lies on the north north western side of a dome structure composed primarily of Umberatana and Wilpena Group sediments. Limited exposure of magnetic lithologies occurs south east of the anomaly. The amplitude of the anomaly can not be simply explained by the fault placement of the Brachina Formation against the Cambrian carbonates along the axis of the anomaly (the magnetic susceptibilities are similar in this area). It is likely that the Mt Roebuck dome contains a significant core of diapiric material with magnetic rich units.

Recommendations

The Mt Roebuck exploration target area warrants detailed follow up groundwork. In particular the immediate area containing the uranium-fault-magnetic anomaly requires surface sampling and geological mapping (Table 1).

It is certainly reasonable to consider a bulk stream sediment sampling program (Figure 10f) within the creek system of the dome complex as the next exploration step. If positive results are located, a more detailed assessment of the area including geophysical modelling and drilling would be necessary.

The recovery of one diamond in this area justifies considering the possibility of kimberlites within the structural weaknesses provided by the diapiric structures.

Area I, directly south (approx. 2km) of Mt Roebuck (Figure 10c and 10g), exposes diapiric material adjacent to what is mapped as Quaternary sediments. These sediments may host concentrations of heavy minerals, including gold, derived from the diapiric intrusives. It would be sensible to test this location.

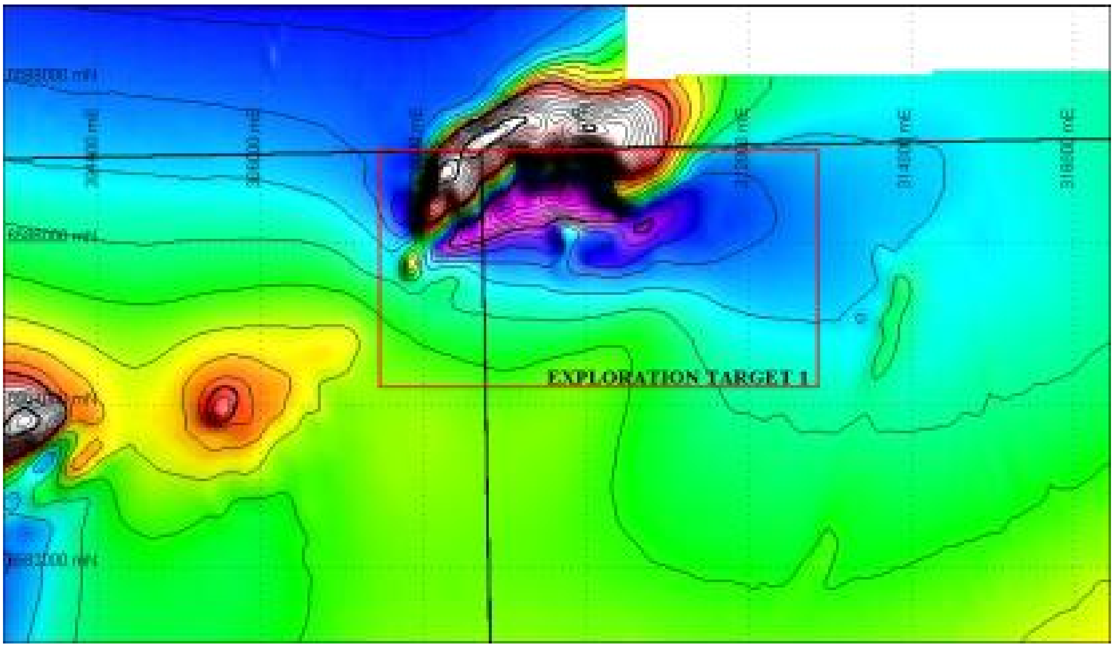

Figure 10a TMI with contour overlay.

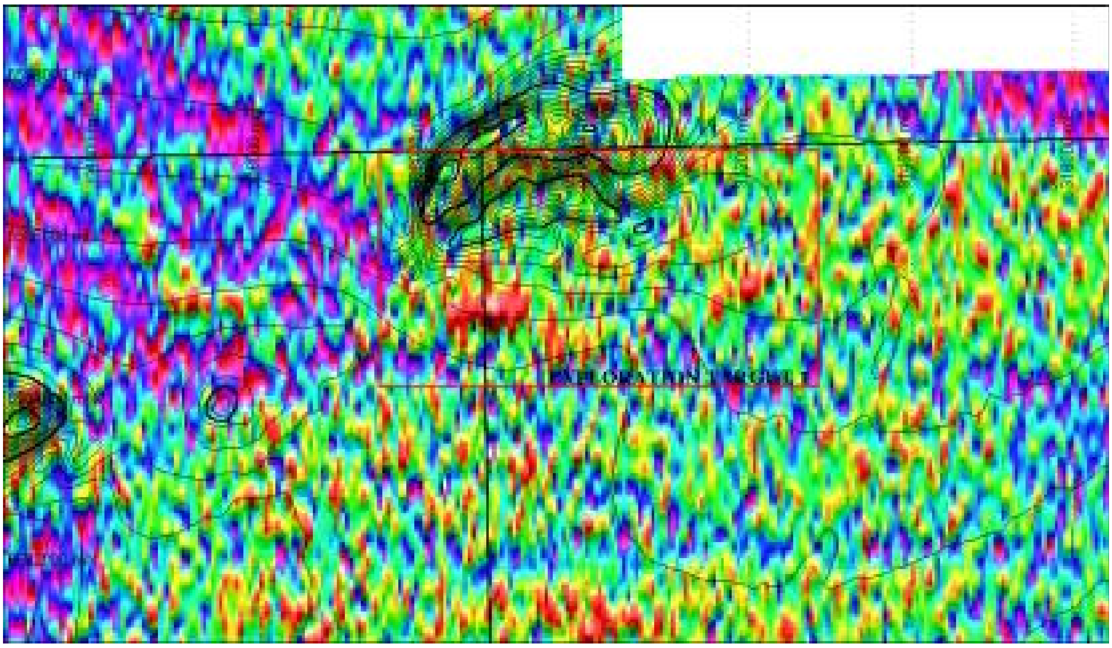

Figure 10b TMI contours over uranium channel radiometrics showing the uranium anomaly, coordinates are located in Table 1.

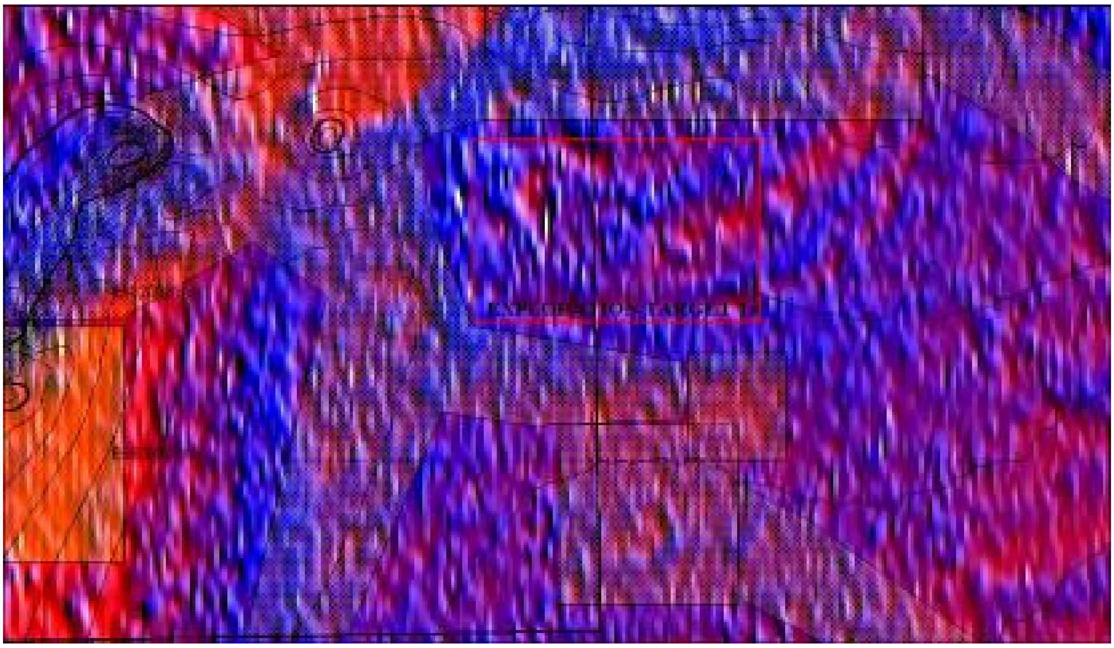

Figure 10c Potassium depleted zone - (western and north western side of red rectangle) associated with complex faulting, diapiric intrusives and Quaternary sediments.

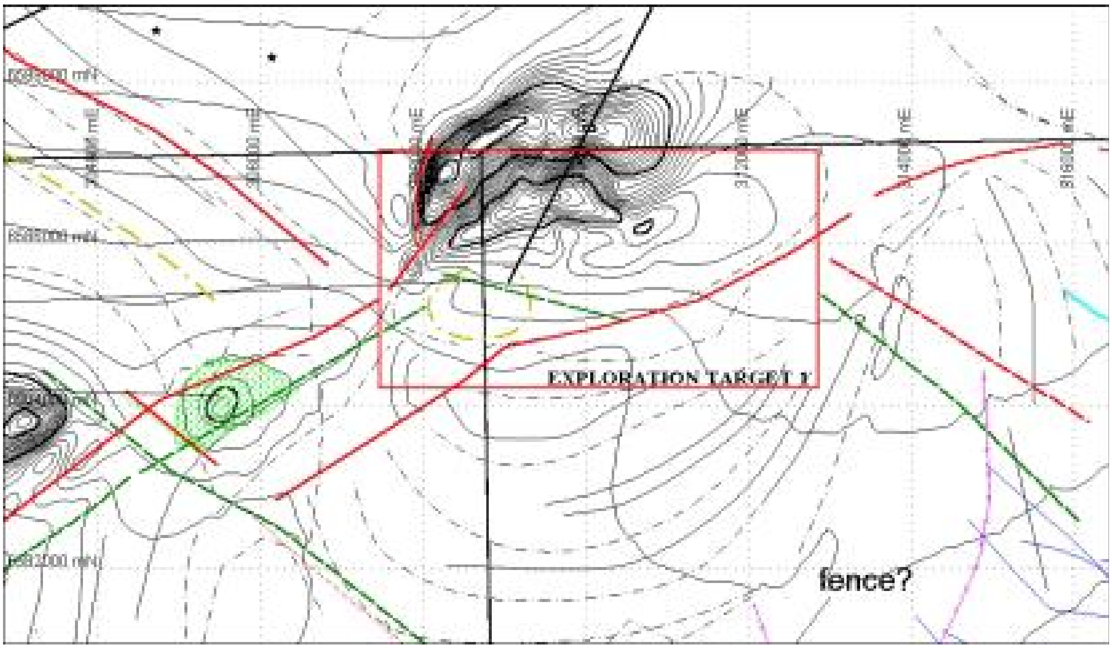

Figure 10d Composite map showing magnetic contours, faults, and radiometric anomalies (green cross hatched area interpreted dolerite).

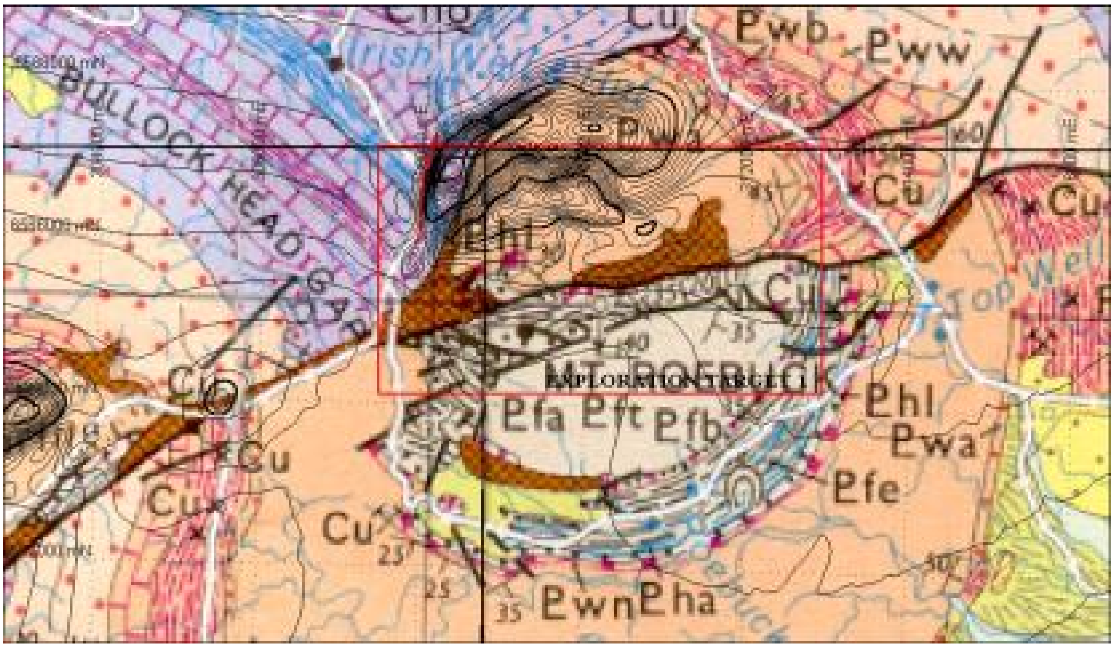

Figure 10e Correlation of magnetic anomalies and mapped geology.

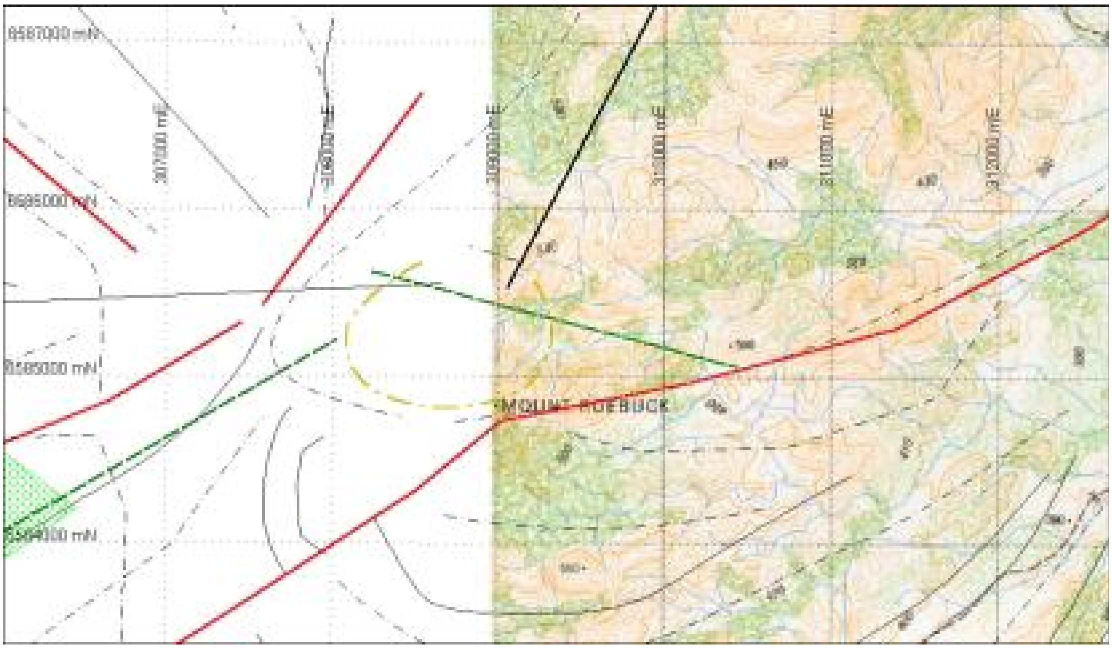

Figure 10f Location of uranium anomaly. A series of streams clearly drain from this area and may provide a suitable starting point for sampling to test for the presence of gold, base metals and precious stones.

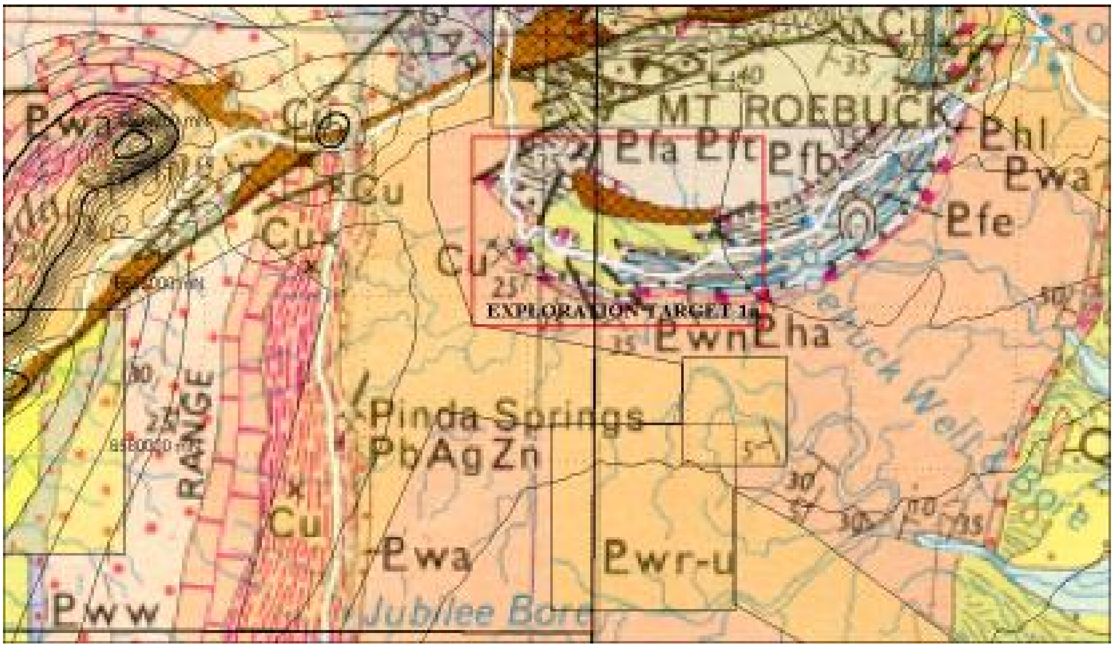

Figure 10g Area I includes a region of cover sediments located directly south of the main exploration target.

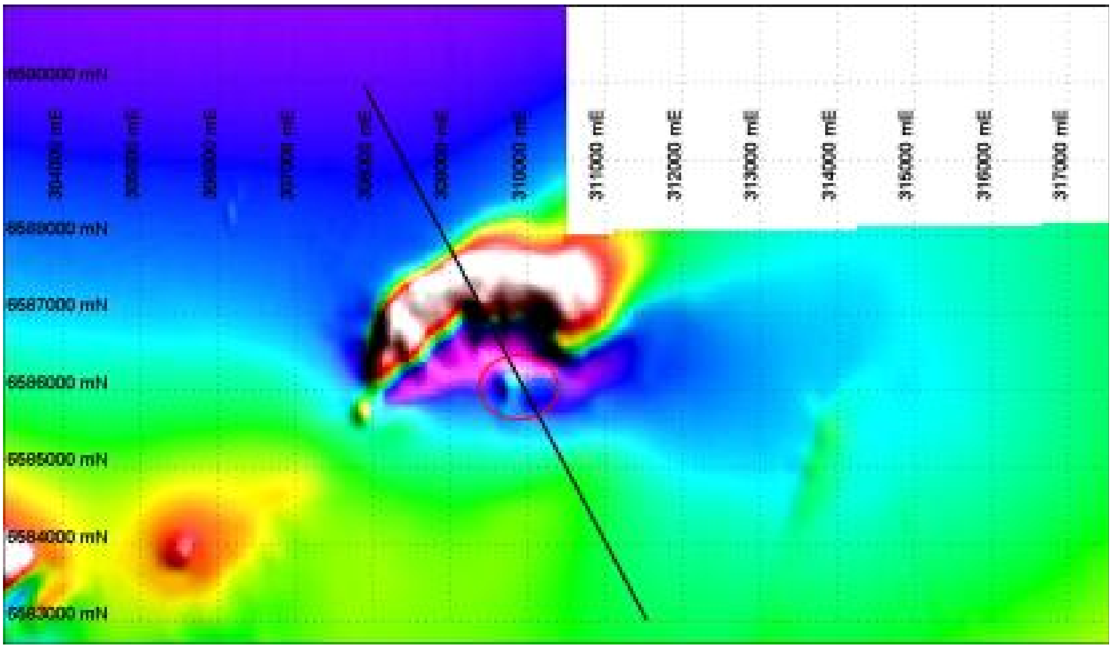

Figure 10h Location of recommended line for geophysical modelling (line orientation 152 degrees, length 7.8 km). Note also small magnetic high in red circle (dolerite intrusive?)

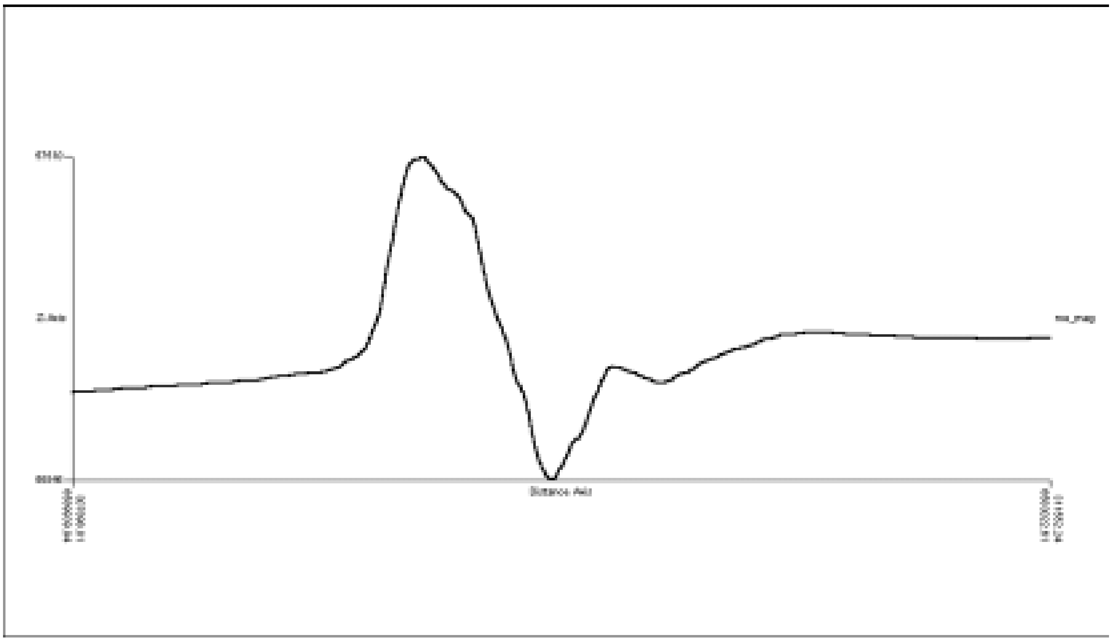

Figure 10i Profile of magnetic intensity through the Mt Roebuck diapiric structure.

<u>Summary for area Band C</u> prospectivity rating **

Areas B and C lie within a region of faulting adjacent to the Mt Roebuck anomaly. Area B lies along the northeastern extension of the Mt Roebuck-Pinda Springs Fault. The fault at this locality truncates Umberatana and Wilpena Group Strata, the fault incorporating lower Neoproterozoic diapiric material.

A magnetic anomaly cluster occurs at the northeast end of a mapped fault (Figure 11) within the Umberatana and lower Wilpena Group rocks. The magnetic anomaly appears to be, in part, strata bound and may indicate the presence of diapiric material within a fracture extending from the Mt Roebuck-Pinda Springs fault. Copper mineralisation is indicated in the Umberatana group sequences adjacent to the south west extension of the fracture.

<u>Recommendations</u>

The presence of diapiric material within the fault zone in both areas B and C suggests that similar mineralisation, to that found to the southwest on the Mt Roebuck-Pinda Springs fault, could exist. Small diggings in this region support this hypothesis.

Area C holds greater potential where the mapped fault intersects with a group of small magnetic anomalies. This anomaly and the fault should be investigated to establish what the true geology is in this area and to identify any unusual features previously missed by geologists.

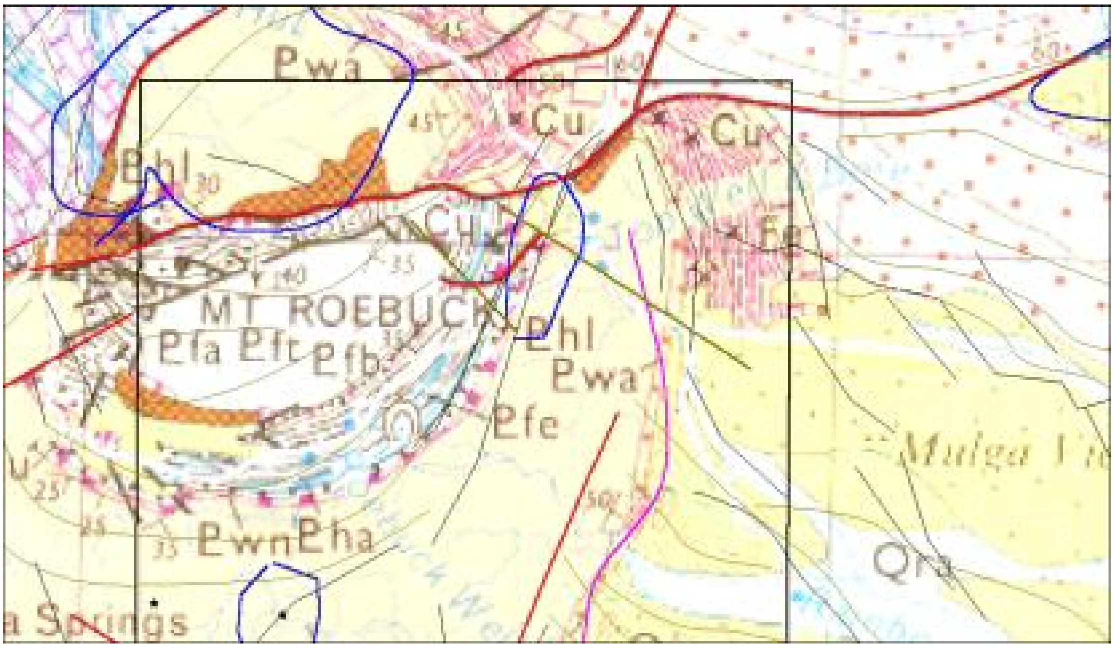

Figure 11 Location of the magnetic anomalies in Area C.

Summary for area D, E and F ***Prospectivity rating *****

A subtle thorium lineament runs northwest across the exploration tenement (Figure 12a - green dashed line and 12b). This lineament has the same trend as the basement magnetic anomaly and chain of diapiric structures. It also intersects with the Mt Roebuck-Pinda Spring fault system. Even though this feature doesn't constitute a major exploration target, it lies in close proximity to two small magnetic anomalies directly south of area A (see Table 1 for coordinates). The eastern magnetic anomaly, Area E, lies over a bald hill suggesting the possible presence of an iron rich gossan or dolerite plug.

Recommendations

It would be prudent in the first instance to confirm what geology is located within Area E and to determine if there is any surface feature that can explain the linear thorium anomaly (Fence line accumulating wind blown and water deposited thorium rich sand? Or processing artefact).

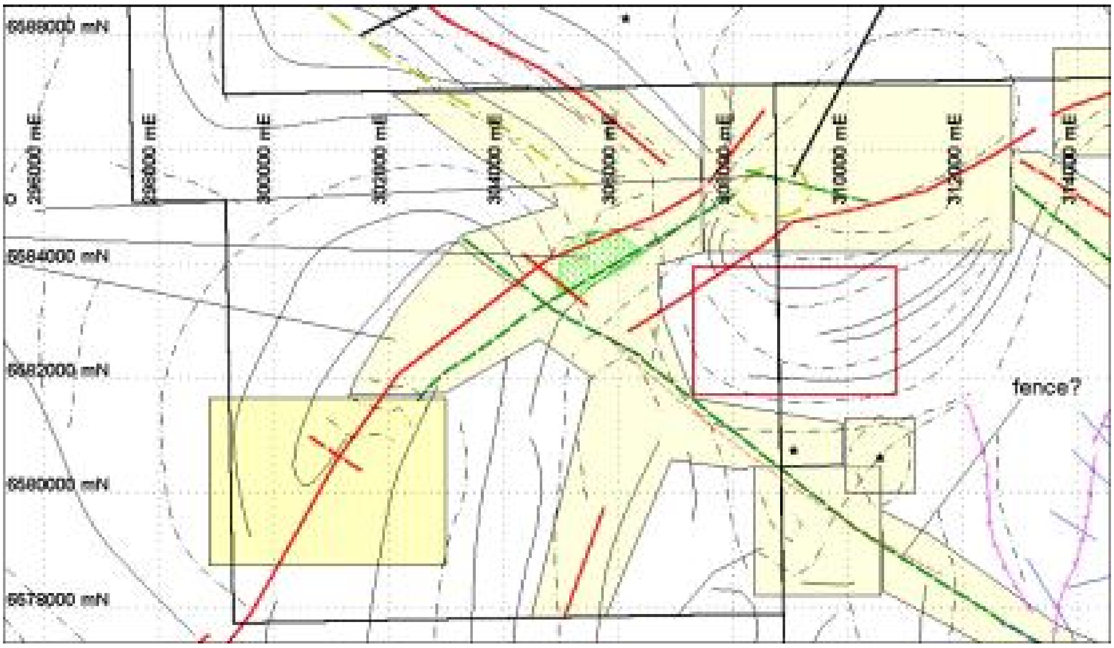

Figure 12a Exploration target areas A, B and C

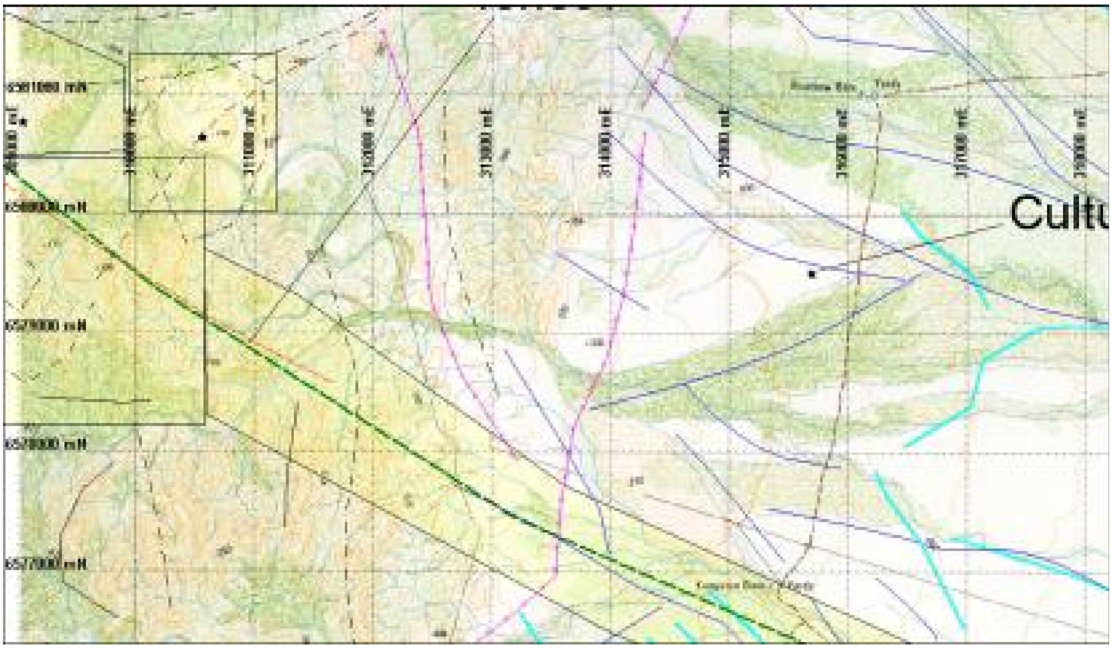

Figure 12b Correlation of magnetic lineament with fence line (purple line) in the central east; radiometric and magnetic lineaments correlated with stream pattern (blue and cyan lines). Exploration area along northwest trending radiometric lineament (green dashed line) and magnetic spot anomaly associated with bald hill (black star).

Summary for area G and H ***Prospectivity rating *****

The south western corner of EL 2511 contains an area of faulted Neoproterozoic Bunyeroo and Wonoka Formation. A subtle magnetic anomaly is associated with the Wirrapowie and Jubilee mines (Figure 13a). The anomaly may reflect the disturbance of the ground due to mining operations or possible reflects magnetic minerals associated with the faults. A similar magnetic signature is situated several kilometres to the north east along the strike of the fault system. It is likely that further mineralisation may occur at this location beneath a thin cover of Quaternary sediments.

Recommendations

The area north east of the Wirrapowie- Jubilee mines (Figure 13b) warrants further investigation. This site, located in area with conformed copper mineralisation, would lend it self to surface sampling and shallow drilling to test for the presence of additional mineralisation. The linear magnetic features through this area may reflect the presence of structural - fault related shearing.

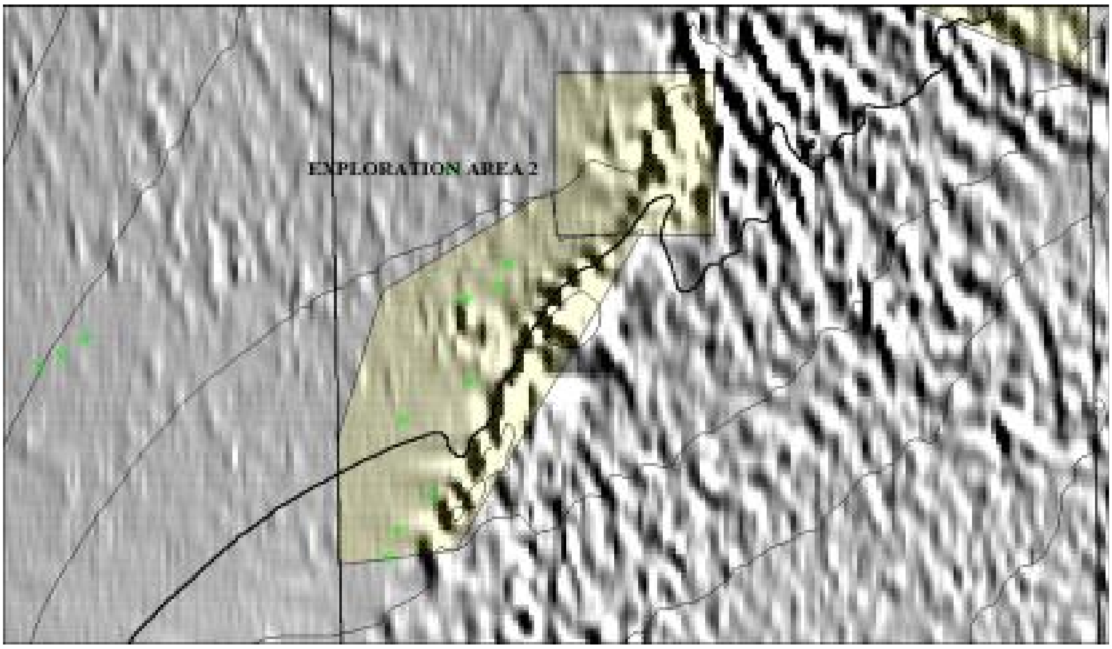

Figure 13a Exploration targets in the Jubilee Hill area. Target areas overlying first vertical derivative and TMI contours- magnetic data (green symbols = old mines).

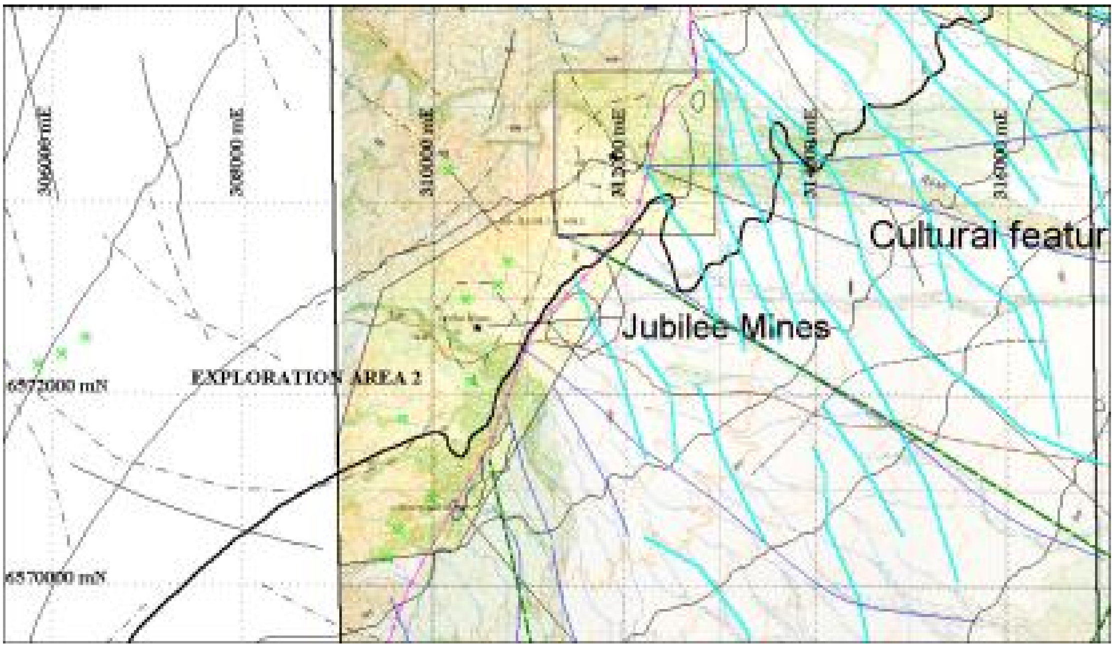

Figure 13b Jubilee Hill area showing possible palaeo-channels (cyan), old mines (Wirrapowie Mines) and subtle magnetic anomalies. NB Black wavy lines are contour lines showing drainage direction to the south east.

<u>Summary for area J</u> Prospectivity rating ***

A prominent set of short wavelength magnetic and radiometric anomalies reside along the eastern side of EL 2511 (Figure 13a and 13b). The majority of these linear features correlate with the alluvial streams draining away from the hills to the west.

The edge of the alluvial plain is characterised by a distinct lineament running approximately north-south. This perturbation can be seen in both the magnetics and radiometrics. The correlation of the magnetic anomaly with a vermin proof fence and the likelihood that sediments from the hills have accumulated along the fence downgrades this geophysical anomaly from being a geological structure. It must be remembered that geophysical signatures are not necessarily associated with geological features.

The remaining magnetic anomalies located over the alluvial plain have a pattern similar to the present drainage pattern but with a southerly orientation. These anomalies may be associated with palaeo-drainage channels.

<u>Recommendations</u>

If gold and precious stones have been liberated from the intrusive features in the Mt Roebuck area it is possible that they have accumulated in the present or ancient palaeo-channel deposits. The ability to map the general pattern of the buried palaeo-channels channels with the magnetic signal makes this a worthy exploration target. Stream sediment sampling within this area and up stream may provide evidence of the presence of gold and precious stones.

Conclusion

The geophysical data covering EL's 2511 contains several regions of exploration potential. The most promising of these lies in the area surrounding Mt Roebuck. The combination of magnetic, radiometric and geological anomalies in this area provides strong justification for follow up ground exploration. This location is the focus of numerous intersecting geological structures. It also resides along a geophysical corridor that appears to control the placement of the diapiric structures. The presence of the Angepena gold field along this tend increase the prospectivity of the Mt Roebuck exploration target.

The presence of mineralised brecciated diapiric material along the Mt Roebuck-Pinda Springs fault system provides excellent opportunities for the existence of hidden concentrations of base metals in the Neoproterozoic strata, perhaps in areas similar to B and C.

The presence of the gold mineralisation in Neoproterozoic - Umberatana Formation adjacent to the Pinda diapir needs careful structural and stratigraphic study. The northwest syncline containing the Angepena Gold field is similar to mini-basins formed by salt withdrawal adjacent to the Beltana Diapir (Dyson, 1999)[9]. An understanding of the evolution and associated tectonism of the diapirs within the tenement may provide a greater insight to locatilities of mineralisation.

Several zones of Quaternary sediments are situated adjacent to diapiric breccia and may host precious stones derived from basement intrusives.

The other target areas discussed above have merit and should be considered for further investigation. Of particular interest is the possibility of economic heavy minerals within paeleo-channels in area J. The linear structures revealed in the magnetic data within this area provides numerous targets that would be otherwise hidden.

If positive results are derived from the exploration targets it is recommended that additional geophysical processing and modelling could be used to determine the sub-surface structure and depth to mineralisation.

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[9] Dyson I., 1999, The Beltana diapir - a salt withdrwal minibasin in the northern Flinders Ranges. MESA Journal 15 pp 40 - 46

Goldus Pty Ltd

ABN 67 076 662 149

Sole Director

Peter Lewis AFAIM, MAIAST, RDA (Hort), JP, MP

29th June.

Mr. George KWITKO,
Mineral Tenements, Mineral Resources,
PIRSA Office of Minerals + Energy Resources,

Dear George,

re Technical Report for EL 2511 for the 12 month period ending 21 April 2001.

The report has not been prepared as the technical work program ~~we~~ proposed to undertake was not completed. This arose because to extra ordinarily wet weather we have had at the Teetulpa Mine site prevented us from generating a sufficient cash flow/profit from mining operations to finance it. The most part of our work has been directed at raising further equity and loans. This has been moderately successful and the $250,000+ raised has enabled us to re-commence mining as well as this technical work program on all our EL's.

(The plant has been moved to the location in Queensland where it last worked successfully and where there is greater certainty with the weather - and mining admin - than Teetulpa)

We are very confident of our results shortrun, because the grade of refined gold per loose cubic metre on which we are going to work is 0.33gm per l.c.m.

We will file completed Technical reports before Dec. 2001 on the programme. See proposed reduced area EL2511. attached.

Peter Lewis
Sole Director

Registered Office: 161 Marion Road, Richmond, SA, Int Telephone: + 61 + 8 8234 0240
Postal Address: PO Box 21, WEST RICHMOND, SA, 5033

G O L D U S P T Y L T D

ANNUAL TECHNICAL REPORT FOR EL 2511

PIRSA TECHNICAL REPORT FOR 12-MONTH PERIOD ENDING 21 APRIL 2002

TECHNICAL REPORT FOR EL 2511

PIRSA TECHNICAL REPORT FOR 12 MONTH PERIOD ENDING 21 APRIL 2002

INTRODUCTION

The following is an annual technical report for EL 2511, which is currently under investigation by Goldus Pty Ltd.

Exploration licence 2511 is located approximately 65 km south east of Leigh Creek in the northern Flinders Ranges. The licence areas cover 147km^2, composed of hilly terrain in the west and north, with open alluvial plains in the east.

The exploration licence area has received various levels of mineral exploration in recent times. The main emphasis of exploration has been copper and gold exploration. Most mineralisation is reported to occur within diapiric strata or along faults emanating from the diapiric structures. Mineralisation along the Pinda Springs-Mt Roebuck fault has revealed low-grade copper mineralisation within zones of ironstone, magnetite and siderite. Galena and silver have been reported to occur in quartz veins within bedding of the Wilpena Group strata 5 to 10 km west and south west of Mt Roebuck.

Alluvial gold occurs to the northwest in the old Angepena gold field. Numerous attempts have been made to discover further occurrences of gold in this area but little success is reported. One micro-diamond was recovered in the Mt Roebuck area (Donnelly et al, 1991).

GEOLOGY

The geology in this region is comprised of Cambrian and Neoproterozoic sedimentary sequences. The strata are folded and faulted, and contain syn and post depositional diapiric structures1. The typically carbonate rich diapiric structures contain xenoliths of older Proterozoic (early Neoproterozoic, Mesoproterozoic and Palaeoproterozoic) metasediments, metamorphic and igneous rocks.

The emplacement of igneous and metamorphic basement geology into young sedimentary sequences has provided opportunities for base metals and gold deposits to form in the Cambrian, Neoproterozoic and younger strata. The region containing the exploration licence contains evidence of an active history of mineral exploration and exploitation of copper, lead, zinc, gold and coal deposits. Electrolytic Zinc's willemite deposit to the west is an example of a current mine..

GEOPHYSICS

DATA SUPPLIED

Goldus supplied located and grided magnetic, radiometric and elevation data in digital format from an airborne geophysical survey (200m-line spacing) conducted by AGSO early in 1999.

The located data were supplied in a simple ASCII file format with flight line, longitude, latitude, fiducial and corrected magnetics. The radiometric data contained the total count, potassium, uranium and thorium channels. Grids generated in ERmapper format were also supplied.

METHOD

The magnetic, radiometric and digital elevation data were interpreted using GIS (MapInfo/Discover) and geophysical software (Modelvision). The geophysical data were further processed and enhanced prior to producing images suitable for interpretation. The images were used to identify geophysical lineaments and structures.

These features have, where possible, been correlated with known geology. Combinations of geophysical features and geological structures have been used to identify exploration target areas.

DATA PROCESSING AND ENHANCEMENT

The supplied located data sets have received pre-interpretation processing and enhancements to improve the preliminary survey processing conducted by AGSO.

The supplied data contained only longitude and latitude on the WGS94 reference surface. For interpretation purposes and integration with the local coordinate system the long/lat data was converted to Easting and Northing (AGD84).

The magnetic data was supplied with no details of post-survey processing and didn't appear to have been micro-levelled to eliminate residual errors. The data was micro-levelled to minimise errors and enhance subtle anomalies.

Examination of the radiometric data2 suggested that the U and Th channels were incorrectly labelled. Consequently all grids and images used in the interpretation were generated from the modified data set.

Prior to the interpretation process, various filters were applied to the magnetic and radiometric data. First and second vertical derivatives were applied to the magnetic line data to enhance short wavelength anomalies, while the radiometric data received low-pass filters to minimised short wavelength noise. The ratio of K to Th was also calculated to identify areas of radioelement depletion and enrichment.

Images of the enhanced data were produced from the data grids. Various colour schemes and balances have been applied to enhance the magnetic and radiometric features.

Interpretation - Magnetic survey

MAGNETIC SOURCES

Several magnetic sources occur in the strata exposed in the northern Flinders Ranges. Magnetite rich horizons are common in the Neoproterozoic Umberatana and Wilpena Group sediments. These layers are visible in the magnetic data within this exploration region. The geological boundaries between the carbonate and clastic strata are quite evident due to a moderate magnetic contrast. There are also strong magnetic correlations with dolerites located within the diapiric strata3.

Drainage patterns reflected in the magnetic data have been attributed to the dispersal of ironstone and magnetite from sedimentary units and fault zones.

REGIONAL AND DEEP MAGNETIC STRUCTURES

The regional magnetic field (Figure 1a) displayed in the survey has a variation of 700nT. The regional trend of the total magnetic field shows deep magnetic basement in the west shallowing to the east. It is possible that a major north-south basement structure lies along this magnetic gradient.

A north westerly trending magnetic ridge4 is also apparent on the western side of the survey area. This trend contains several large isolated magnetic anomalies that are likely to be related to a north westerly chain of diapiric structures, including the Angepena gold field in the north west and Mt John diapir to the south east.

SHALLOW AND LOCALISED MAGNETIC ANOMALIES

Three distinctive zones occur within the tenement. The most apparent zones are located in the south east and north west corners of the tenement. The south east feature is composed of numerous short wavelength linear structures that are sub-parallel and tend to fan out. These lineaments, in the most part, correlate well with the local drainage pattern. The magnetic pattern suggests the presence of heavy minerals such as magnetite and haematite, perhaps specularite. The mineralisation has probably originated from the Mt Roebuck-Pinda Spring's diapir-fault complex.

The NNE trending magnetic lineament (30-40nT) along the western side of the drainage pattern (orientated diagonally across the southern part of the tenement) correlates in most places with a vermin proof fence. Even though this is a prominent linear feature, its strong correlation with the fence line suggests that it is not a geological feature.

Magnetic lineaments in the south west portion of the study area correlate well with lithological boundaries of the Neoproterozoic and Cambrian strata. This is also true for the dome structure around Mt Roebuck. The lithological boundaries of the Umberatana Formation are clearly visible in the magnetic signal.

Terminations in magnetic lineaments have highlighted several fault structures that are marked on the interpretive maps.

The large amplitude magnetic anomalies in the central portion of the survey area are related to a north easterly trending fault structure (Mt Roebuck-Pinda Springs Fault). The anomalies themselves are likely to reflect a high level of BIF, micaceous haematite and igneous xenoliths within a diapiric matrix.

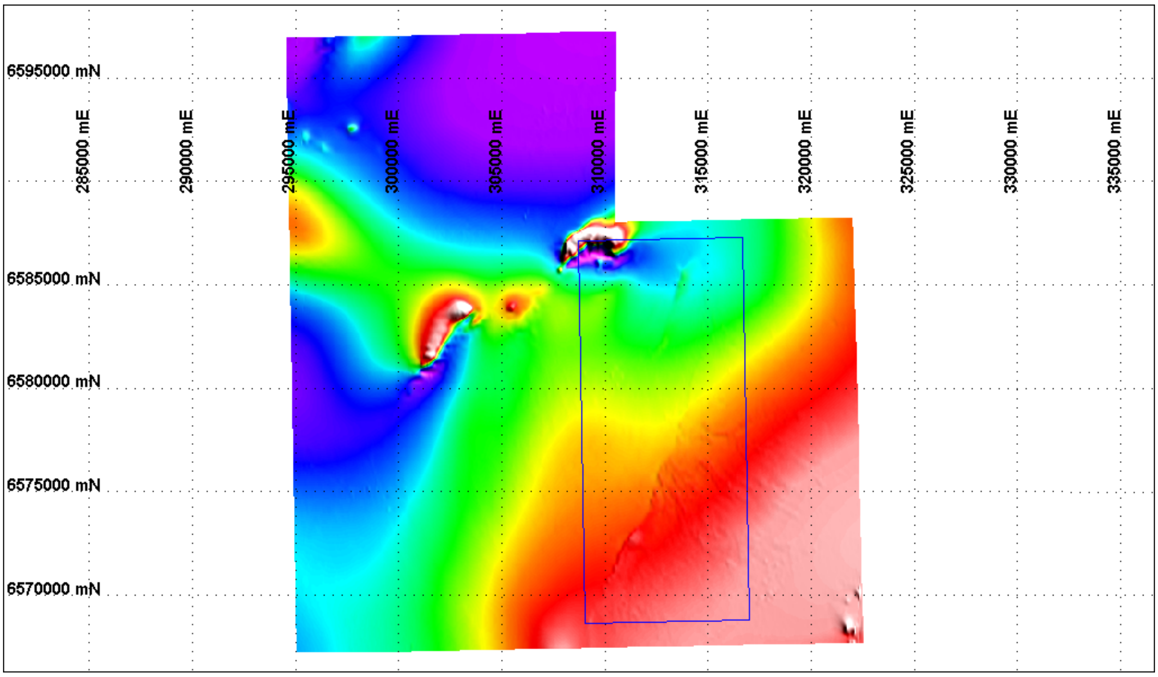

Figure 1a Total magnetic intensity; (sun angle 60 degrees from the NE), (red = high, purple = low).

The TMI images in Figures 1a and 1b show magnetic basement shallowing to the south east. A noticeable ridge, possibly a basement horst, can also be seen to extend to the north west. Several isolated anomalies are located in the central, north western and southeatern (small cluster of three anomalies) quadrants. The magnetic anomalies in the south east corner of the survey are related to the Mt John diapir.

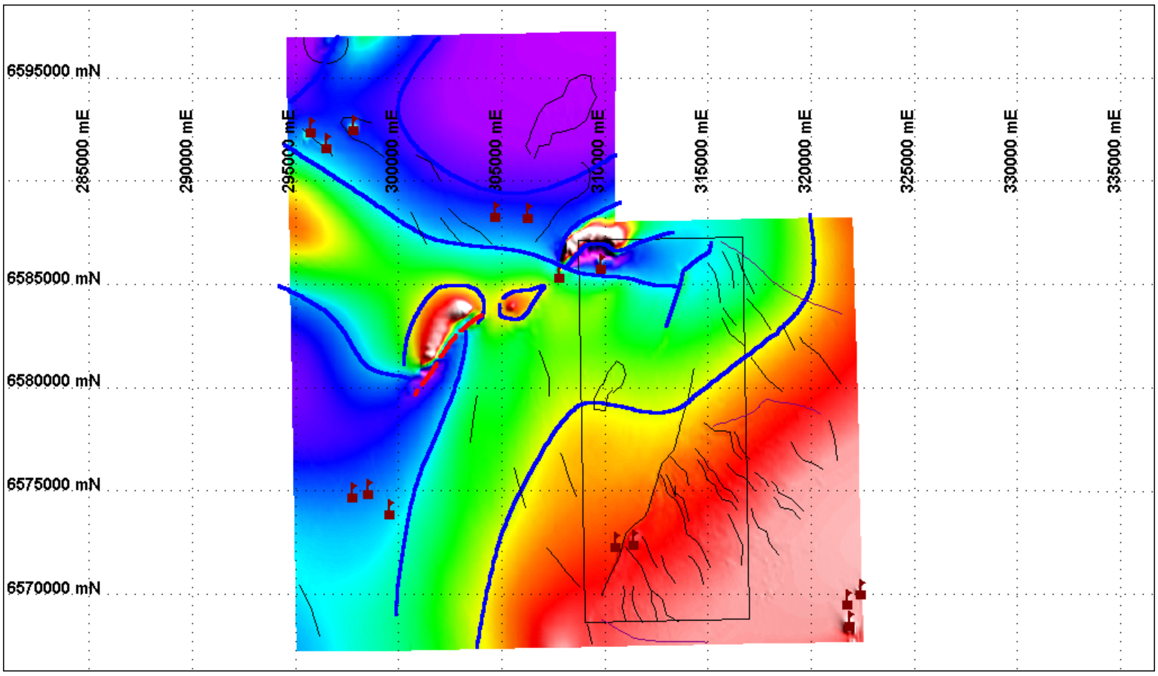

Figure 1b Interpretation of total magnetic field, lineaments and spot anomalies (squares with flags).

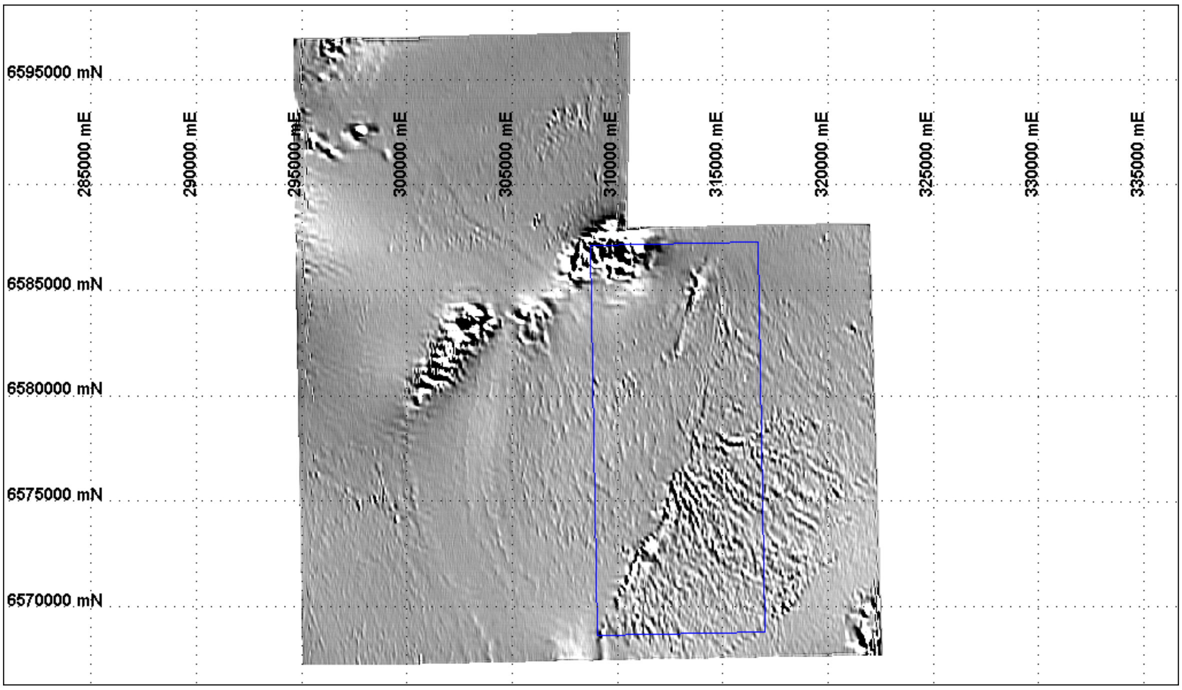

Figure 2a Magnetic first vertical derivative (sun angle 60 degrees from the NE).

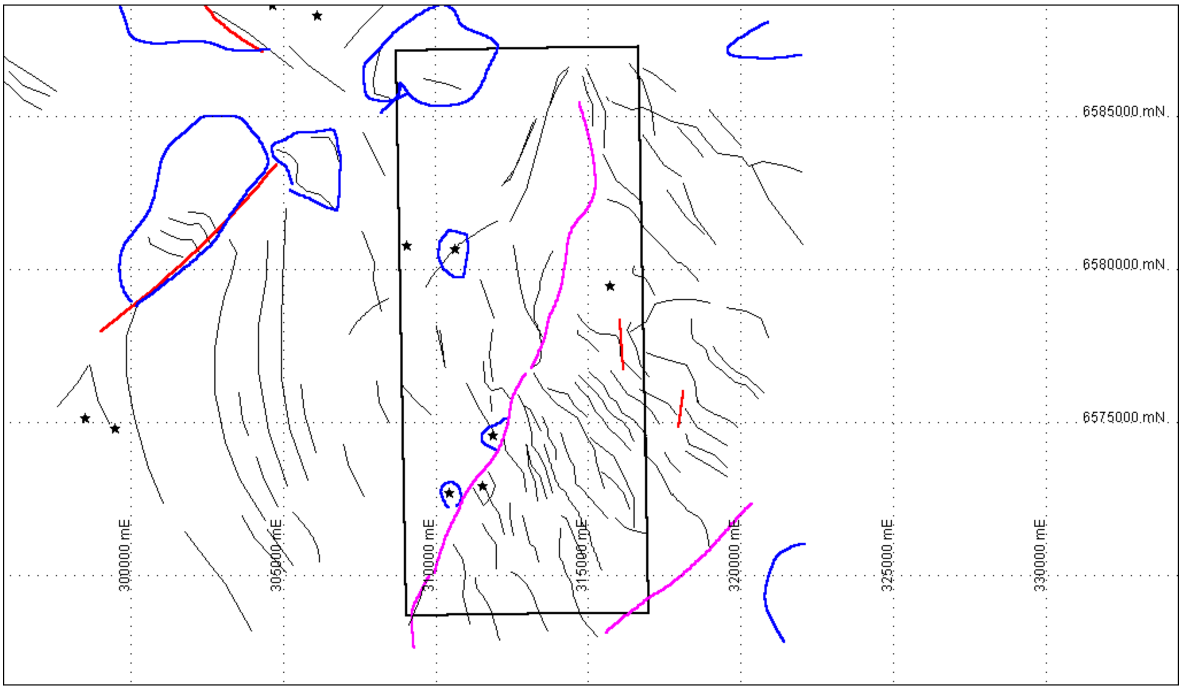

Figure 2b Interpretation of first vertical derivative - spot anomalies and major lineaments. (Black lines = lithological boundaries, red lines = faults, blue features = magnetic highs, purples lines = cultural features, and black stars = either small magnetic highs related to small geological or cultural features).

The application of a first vertical derivative filter has highlighted short wavelength anomalies related primarily to near surface features, Figure 2a. A very prominent alluvial fan can be seen in the magnetic signal (Figure 2b and 2c) in the south east corner of the tenement. This signal is related to the outflow of magnetic minerals from the western highlands in current exposed and ancient buried drainage channels5. Figure 2b summarises magnetic signal interpretation. The coordinates (E/N GDA 84) of the spot anomalies are located in Table 1.

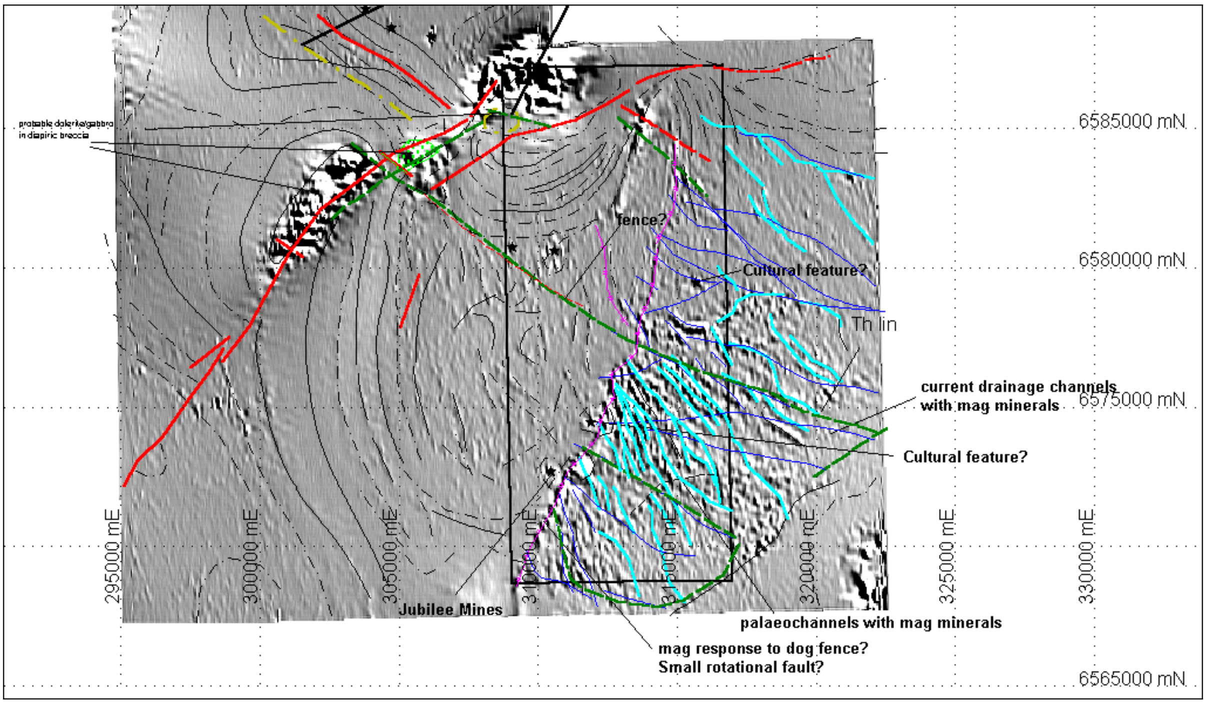

Figure 2c Interpretation of first vertical derivative - lithological boundaries and palaeochannels. (Black lines = lithological boundaries, red lines = faults, blue features = magnetic highs, purples lines = cultural features, and black stars = either small magnetic highs related to small geological or cultural features).

Interpretation - Radiometric Survey

The radiometric data has been investigated by examining the separate K, Th and U channels and the total count.

The relative intensity over the survey area shows a variation of some 3500 counts. Attempts have also been made, without using any further processing, to remove background noise levels6, to examine ratios of K/Th and U/Th to pinpoint areas of enrichment and depletion of these elements that may indicate areas of alteration due to mineralisation.

Each of the separate channels and the total count were interpreted separately. The anomalies identified have been combined with the magnetic interpretation to produce a composite interpretation.

RADIOMETRIC SOURCES

Radiometric sources in this region are primarily related to outcropping geology, scree slope deposits and alluvial outwash. The semi arid to arid climate precludes the development of complex soils and consequently the majority of the radiometric signal reflects exposed rock in-situ (down slope movement of rock can be seen). The

Neoproterozoic units provide the strongest signal related to K, Th and U bearing minerals. The Neoproterozoic Rawnsley Quartzite and the Cambrian carbonates are, for the most part, depleted and consequently present as radiometric lows. Shale units in the carbonates show up as moderate highs.

INTERPRETATION

The various radiometric channels were examined to identify anomalies and discontinuities in the recorded spectrum. A summary of the main anomalies and lineaments is provided in Figure 3.

A high/low colour scheme was applied to the potassium channel (Figure 3a) to highlight lithological boundaries and other surface features, including drainage patterns. The distinct colour contrast afforded by the high/low colour scheme has sharpened lithological boundaries by de-emphasising the response from weathered material that is dispersed down-slope.

High potassium levels are related to the Neoproterozoic strata, while Cambrian carbonates are low K (Figure 3b). Variations in K levels clearly show lithological boundaries. Alluvial outwash from the central highlands is exhibited clearly in this image. The Mount Roebuck-Pinda Springs fault is seen as a sharp discontinuity in the west-central portion of the image.

The distinct lineament cutting diagonally (north east trend) across EL 2511 (Figure 3b) is probably a reflection of the fence acting as a natural barrier to the migration of sediment down-slope.

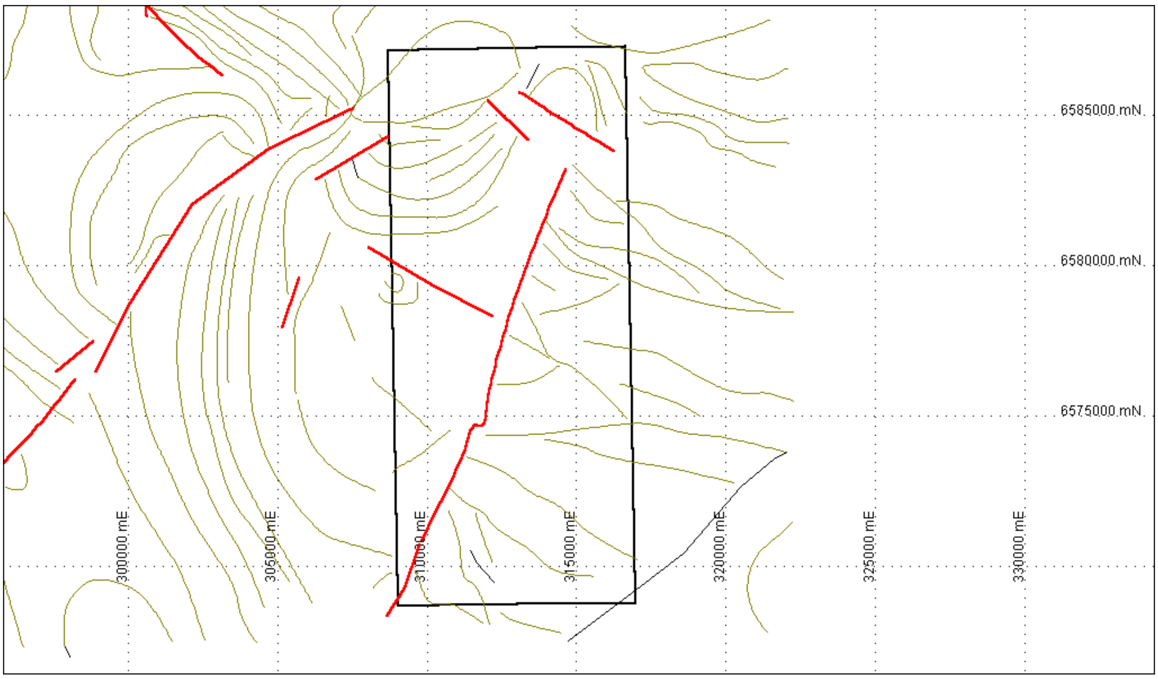

Figure 3 Summary of radiometric lineaments and discontinuity's derived from the radiometric data.

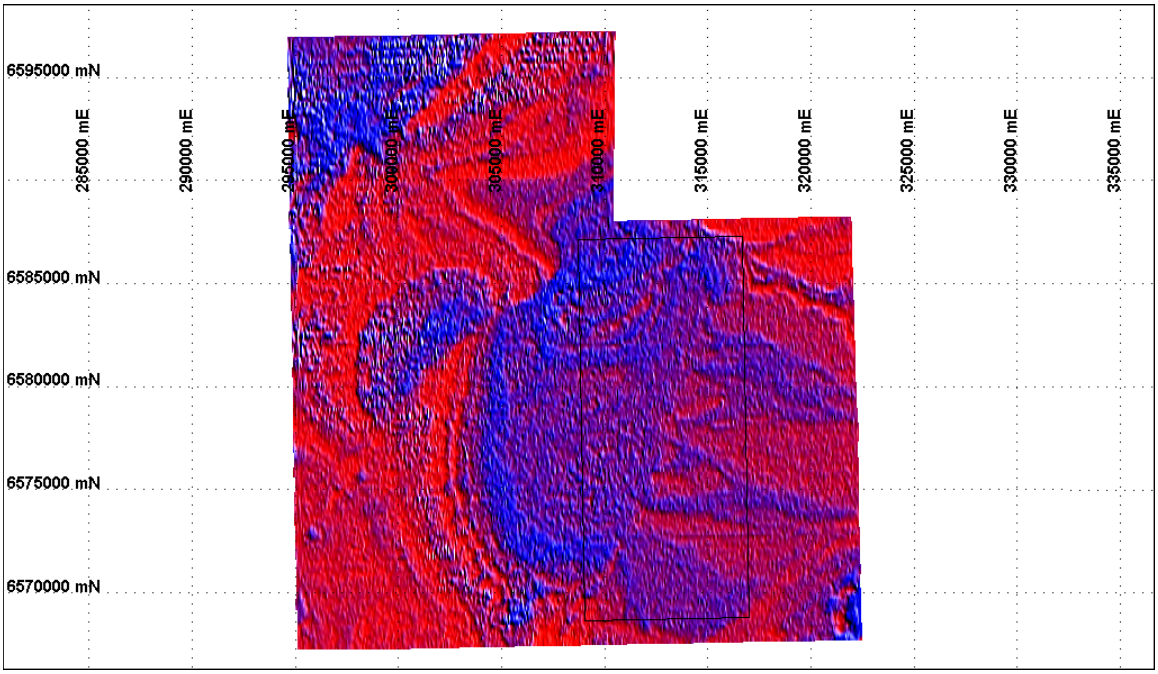

Figure 3a Radiometric potassium channel (areas of high K = blue, low K = red).

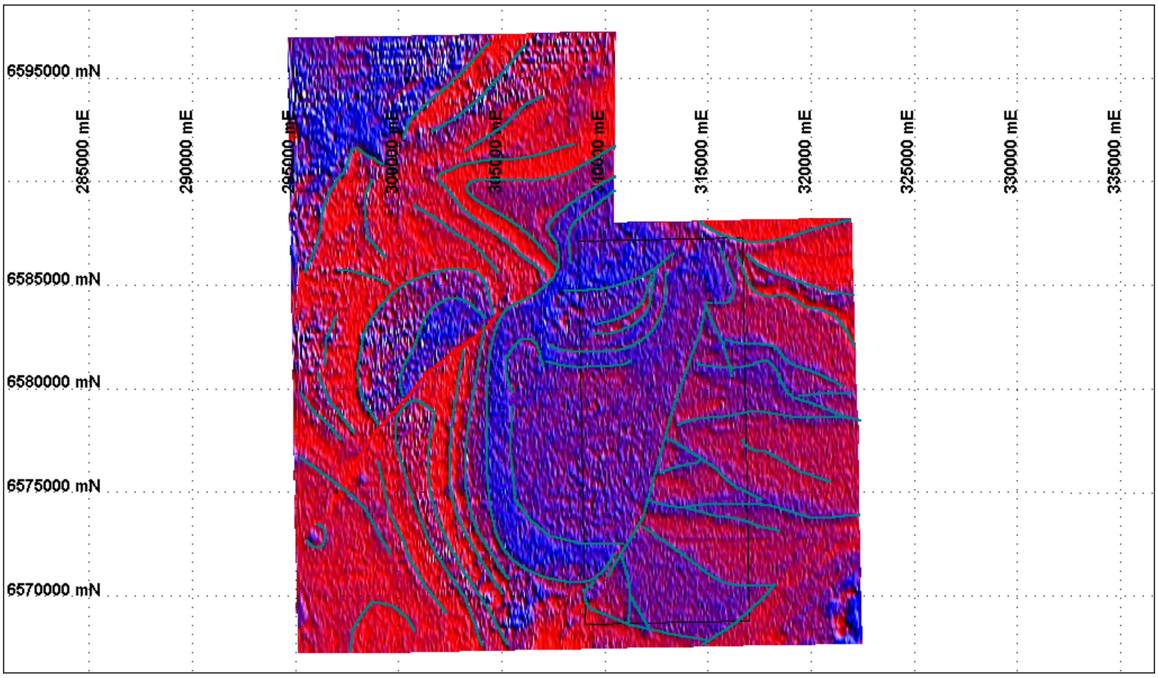

Figure 3b Potassium channel radiometrics with lineaments and zones

A reversed colour scheme has been applied to exaggerate the lithologies (Figure 4b) for the Th channel (Figure 4a). The thorium channel clearly shows higher levels within the Brachina Formation and the diapiric structures. Minerals such as monazite and zircon7 (containing thorium) liberated from the Brachina Formation shales probably account for the radiometric signal from the creeks onto the eastern plains. The lower thorium counts within the Wilpena Group - Rawnsley Quartzite and Cambrian strata suggest low levels of thorium rich minerals.

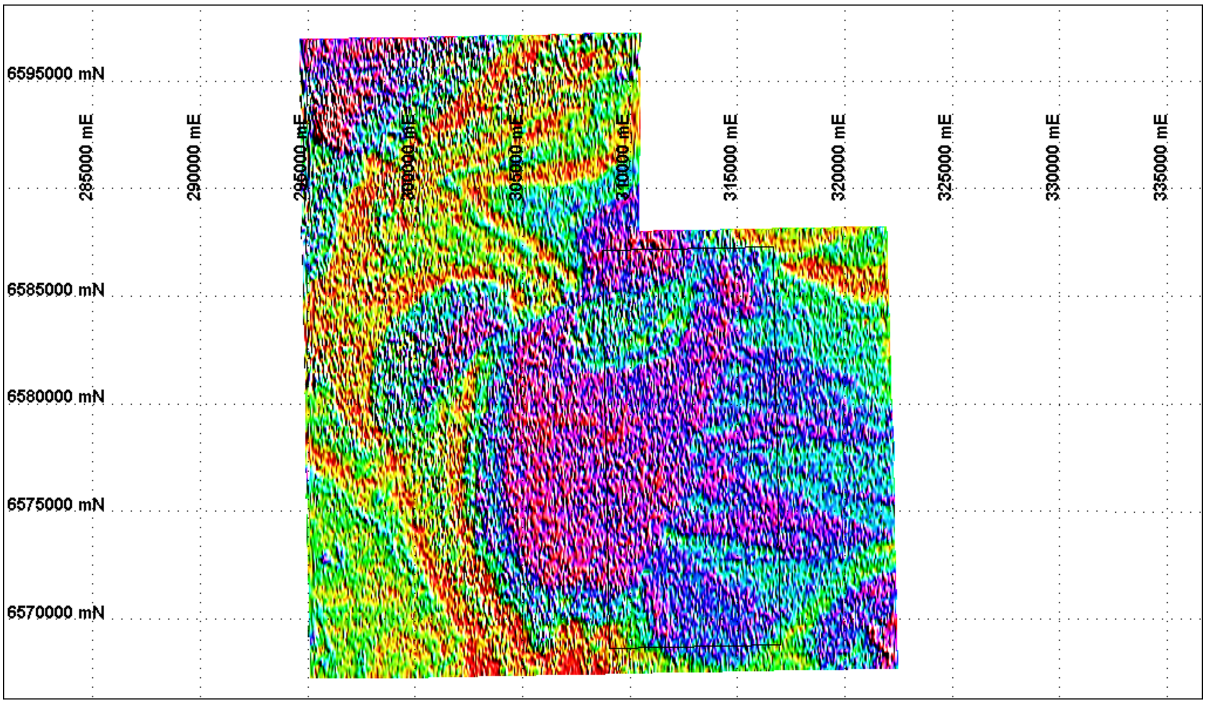

Figure 4a Radiometrics thorium channel (Red/yellow = low, purple/red = high).

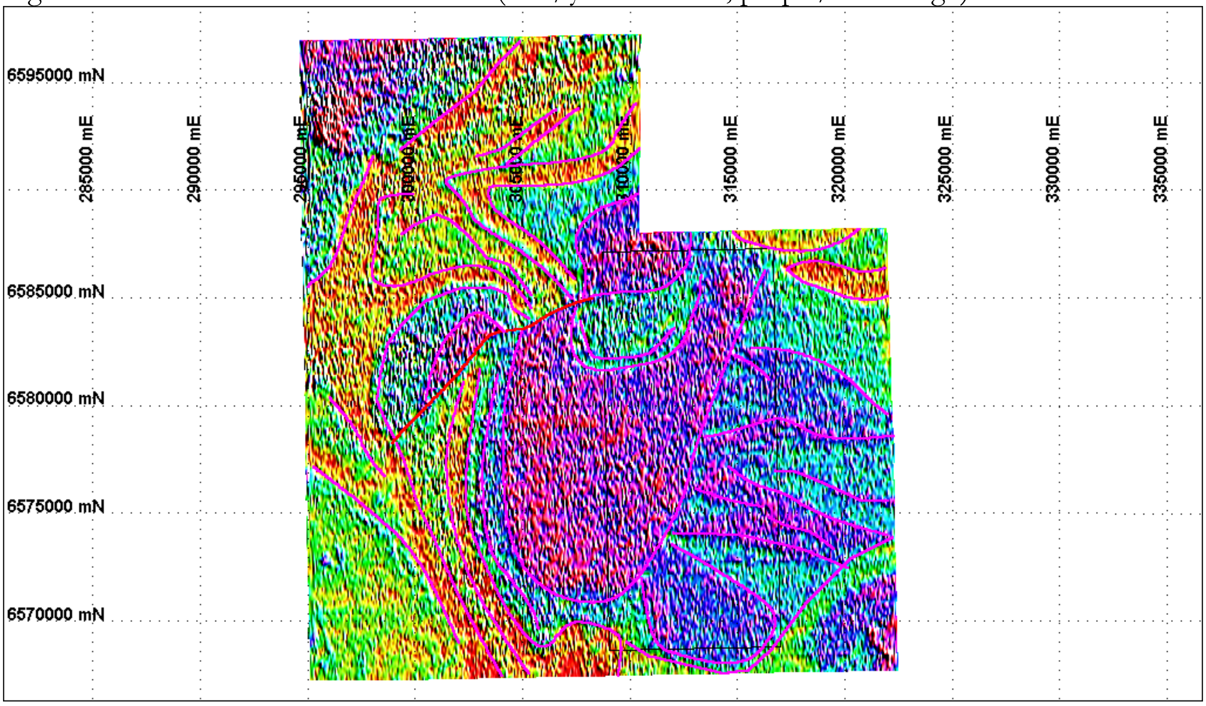

Figure 4b Thorium channel radiometrics with lineaments and zones. NB some structures are omitted since they have already been identified on the other channels.

The uranium data (Figure 5) is less energetic and consequently doesn't exhibit the clarity afforded by the other channels. However, it is possible to identify some boundaries related to lithological changes. In general there is an expected similarity between the uranium and thorium patterns. Again the Brachina Formation contains the highest levels related to the likely presence of minerals such as monazite and zircon.

A small area of uranium concentration (thorium depletion) is located in the north west corner of EL 2511 at the edge of diapiric material. This may be related to a weathered igneous xenolith within the Mt Roebuck diapiric structure. The high uranium at this site may indicate the concentration of uranium released from weathered U-bearing minerals. Elevated uranium levels are associated with the exposed diapiric structures to the south east and north west corners of the survey area.

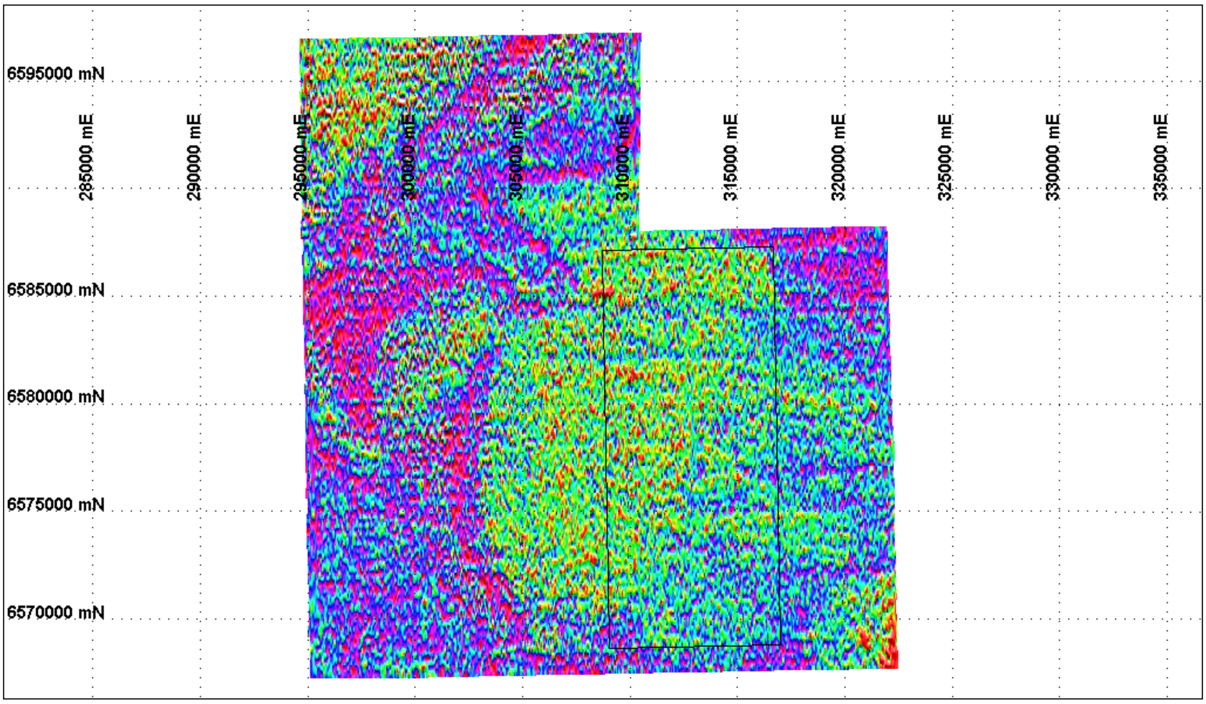

Figure 5 Radiometric uranium channel (red = high, purple = low) showing several highs in the north west corner of the tenement.

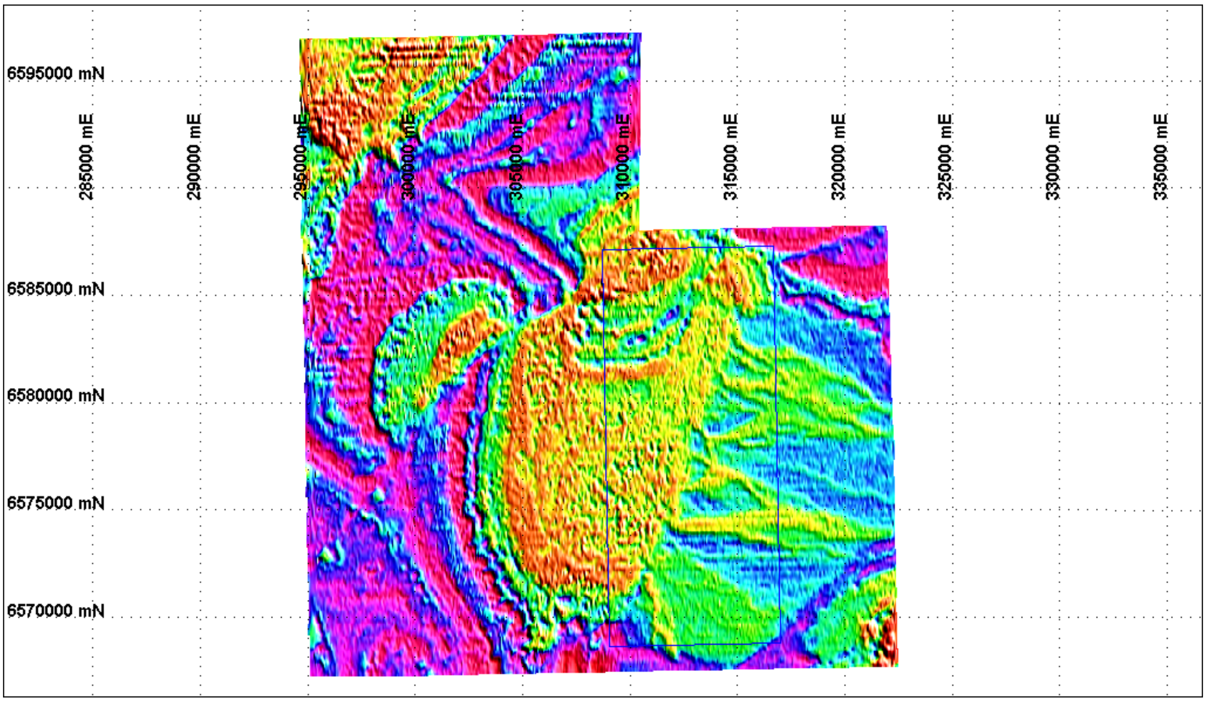

Figure 6a Radiometrics total count (Red = high, purple = low).

The full radiometric spectrum (Figure 6a) highlights the lithological boundaries associated with the exposed geology within the survey area. Higher counts are associated with the Neoproterozoic strata and the diapiric structures. Lower counts are attributed to the Cambrian carbonates and sediments. The drainage pattern to the east is distinctive and depicts a major alluvial flood plain.

The Mt Roebuck-Pinda Springs fault zone is clearly visible in the radiometric total count. The radiometric signal shows the fault truncating and displacing the exposed strata.

A faint circular structure (E295200/N6573000) is evident in the southwest corner of the survey area (Figure 6b) and has no definite correlation with mapped Cambrian geology. Another circular structure, 3 km to the north east, is truncated by the Mt Roebuck-Pinda Springs fault.

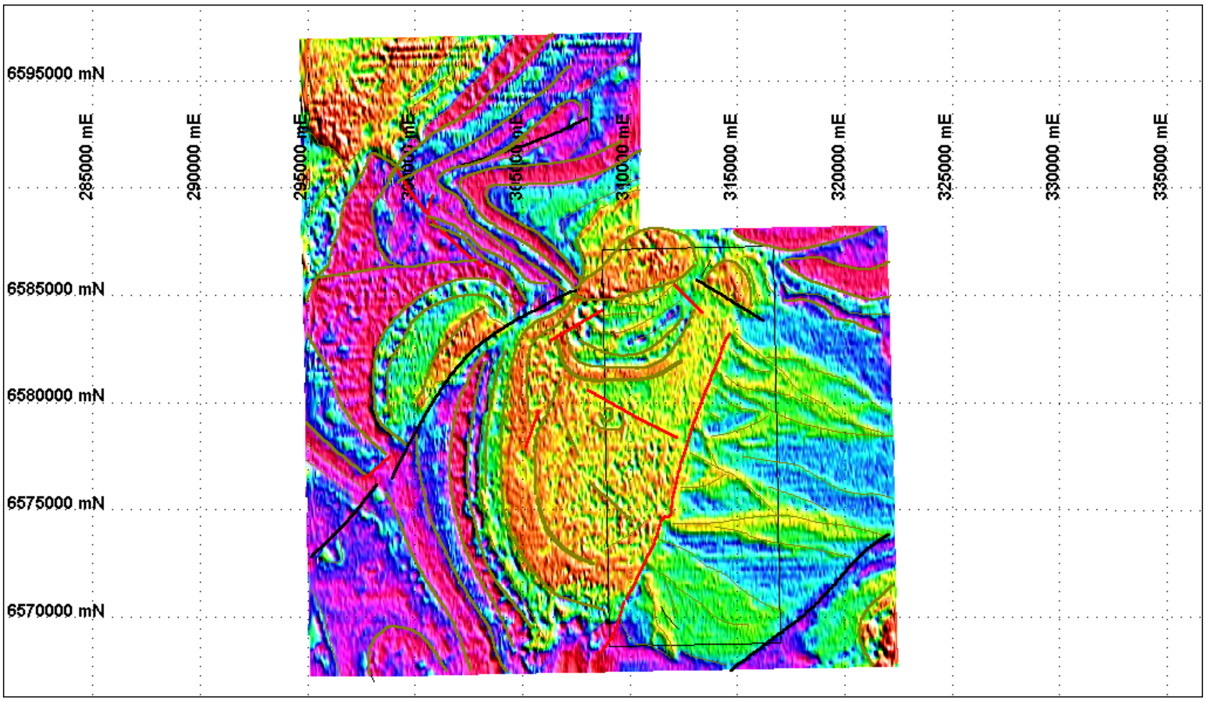

Figure 6b Radiometrics total count with lineaments

Integration of data

The lineaments and anomalies identified within the geophysical data have been combined to identify structural trends and anomalous areas worthy of mineral exploration. The lineaments and anomalies have been compared with the local mapped geology in an attempt to eliminate geophysical features that have a non-economic interest. Geophysical features that are associated with man-made structures such as fences, water bores and buildings have been highlighted (Figure 8a and 8b).

EXPLORATION TARGETS ?

The integrated interpretation shown in Figure 7a and 7b incorporates anomalies and structures identified on the magnetic and radiometric images.

The intersection and grouping of geophysical features has been used to select exploration target areas.

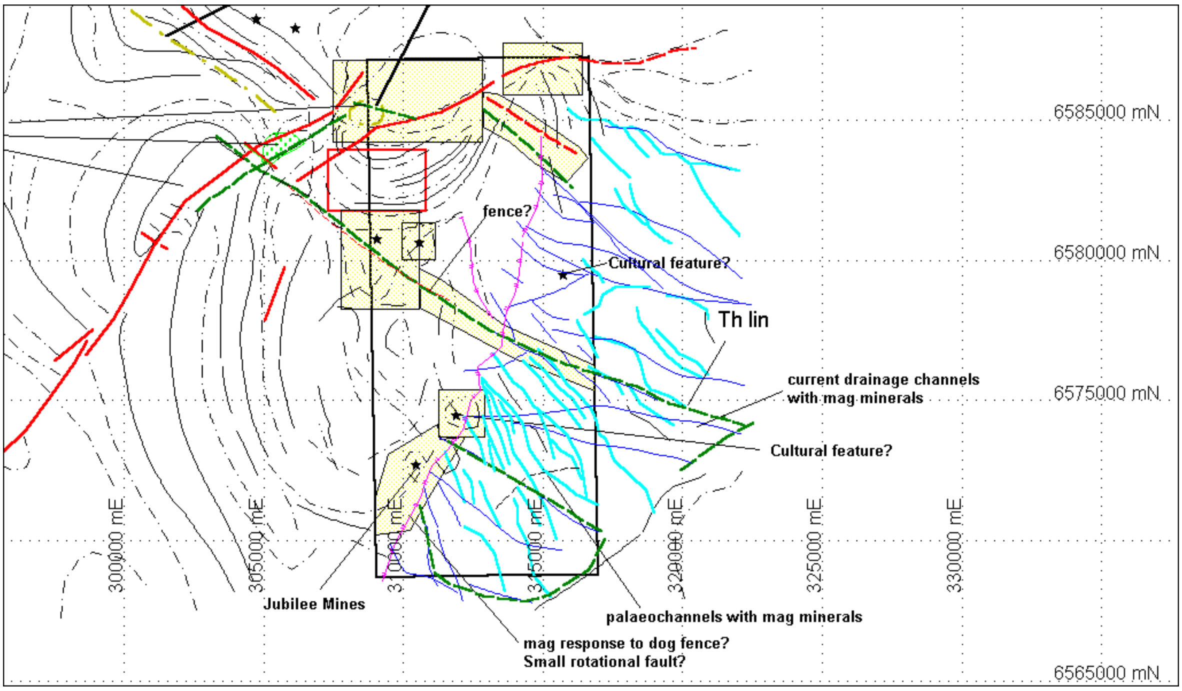

Figure 7 Integrated lineaments and anomalies including selected target areas. (polygons yellow dots = target areas; red line = fault; solid black line = lithological boundary; dashed black line = geological trend; dashed green-yellow lines = radiometric lineaments; black stars = small magnetic highs; blue lines = magnetic and radiometric lineaments associated with drainage; cyan lines = magnetic anomalies associated with shallow features possible palaeo-channels; purple lines = magnetic lineaments correlated with fence line).

Easting	Northing	Comments
309000	6580800	Magnetic anomaly
310600	6580700	Magnetic anomaly
315700	6579400	Magnetic anomaly
311900	6574500	Magnetic anomaly
310400	6572700	Magnetic anomaly
311500	6572900	Magnetic anomaly
298500	6575100	Magnetic anomaly, Off tenement
299400	6574800	Magnetic anomaly, Off tenement
308700	6585200	Uranium anomaly

Table 1

ANOMALIES CONSIDERED RELATED TO CULTURAL FEATURES

The obvious northeasterly trending lineament observed in both the magnetic and radiometric signal has been found to correlate well with a vermin proof fence (Figure 8a). The distinct change in the radiometric signal across the fence line would suggest that the fence is acting as a barrier to down slope sediment flow with a greater accumulation of radioactive minerals on the western side of the fence line.

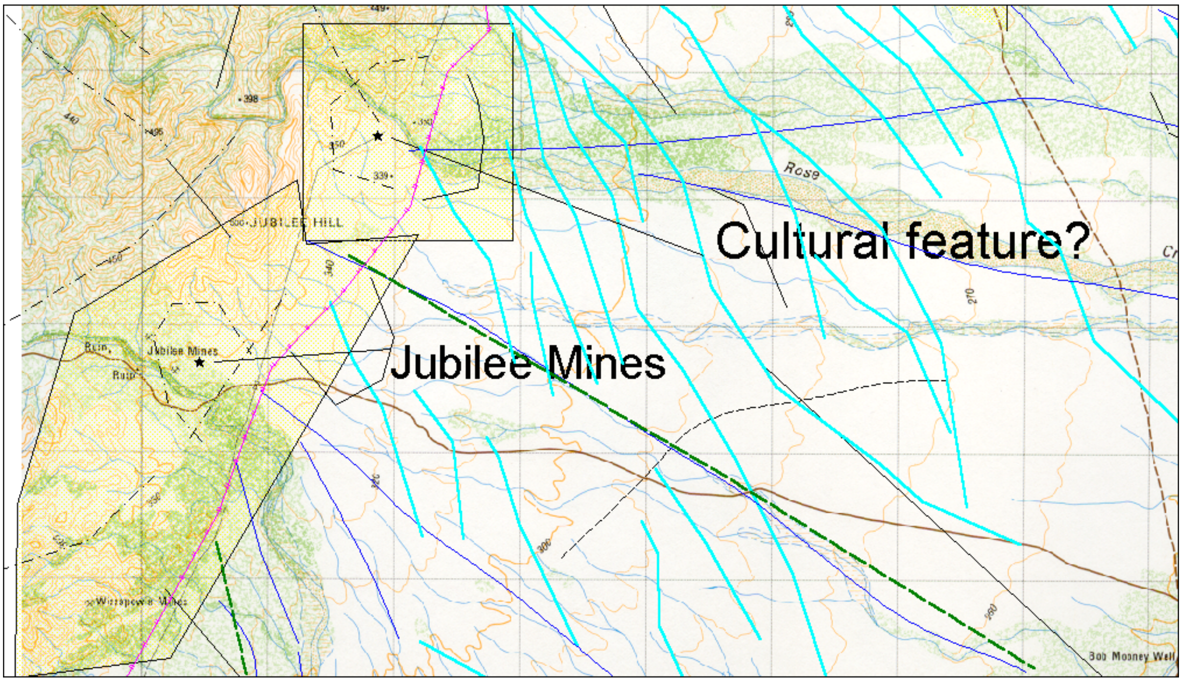

Figure 8a Linear magnetic anomalies correlated with vermin proof fence in south east; correlation of some magnetic/radiometric lineaments (blue lines) with recent stream patterns and magnetic lineaments (cyan lines) crossing recent drainage pattern (old dunes or palaeo stream channels).

FURTHER INVESTIGATION

The Mt Roebuck exploration target area warrants detailed follow up groundwork. In particular the immediate area containing the uranium-fault-magnetic anomaly requires surface sampling and geological mapping (Table 1).

It is certainly reasonable to consider a bulk stream sediment-sampling program (Figure 10f) within the creek system of the dome complex as the next exploration step. If positive results are located, a more detailed assessment of the area including geophysical modelling and drilling would be necessary.

The recovery of one diamond in this area justifies considering the possibility of kimberlites within the structural weaknesses provided by the diapiric structures.

Area directly south (approx. 2km) of Mt Roebuck (Figure 10c and 10g), exposes diapiric material adjacent to what is mapped as Quaternary sediments. These sediments may host concentrations of heavy minerals, including gold, derived from the diapiric intrusives. It would be sensible to test this location.

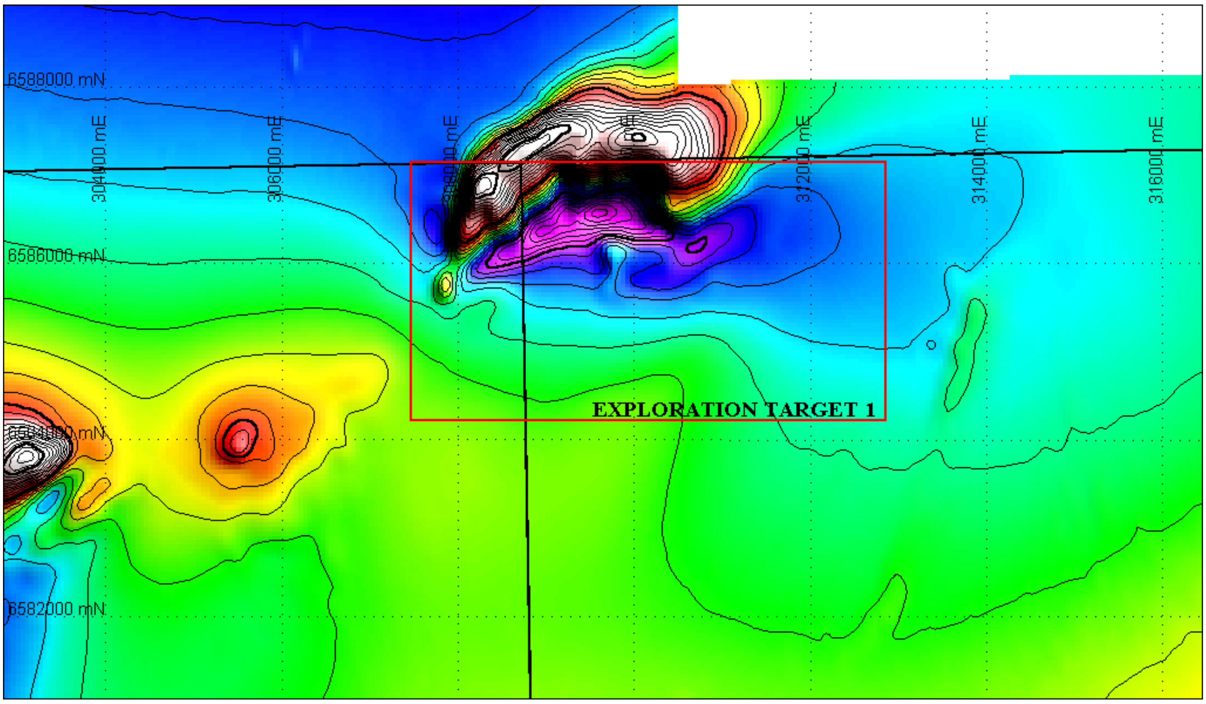

Figure 10a TMI with contour overlay.

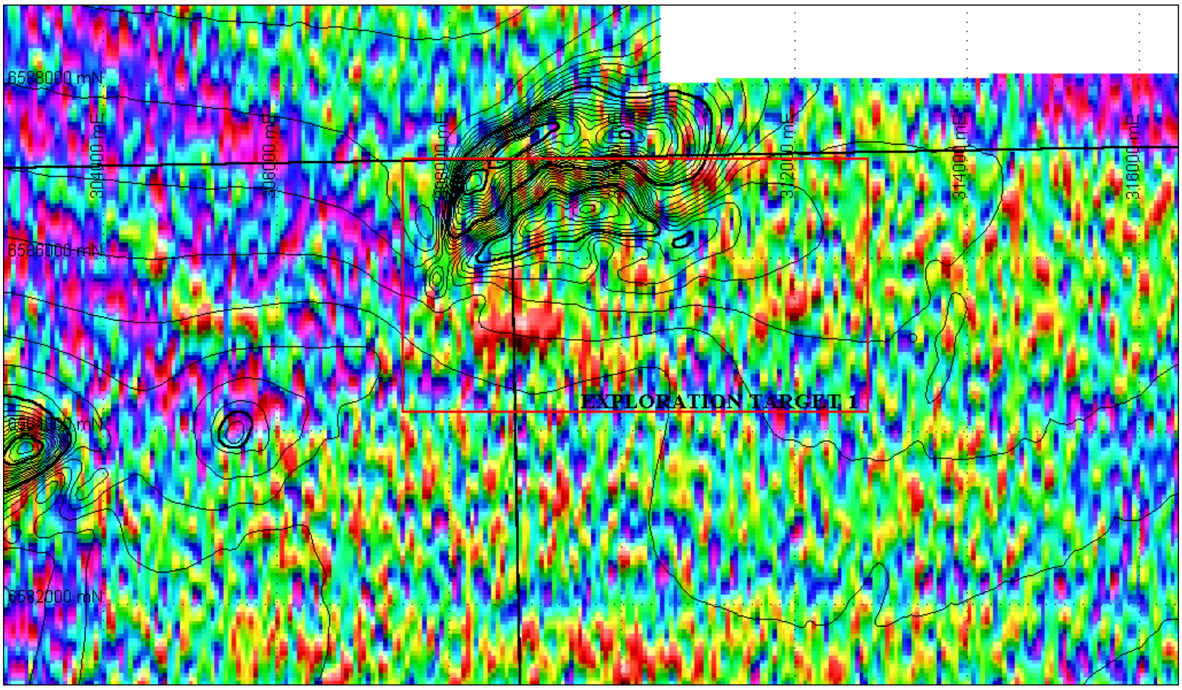

Figure 10b TMI contours over uranium channel radiometrics showing the uranium anomaly, coordinates are located in Table 1.

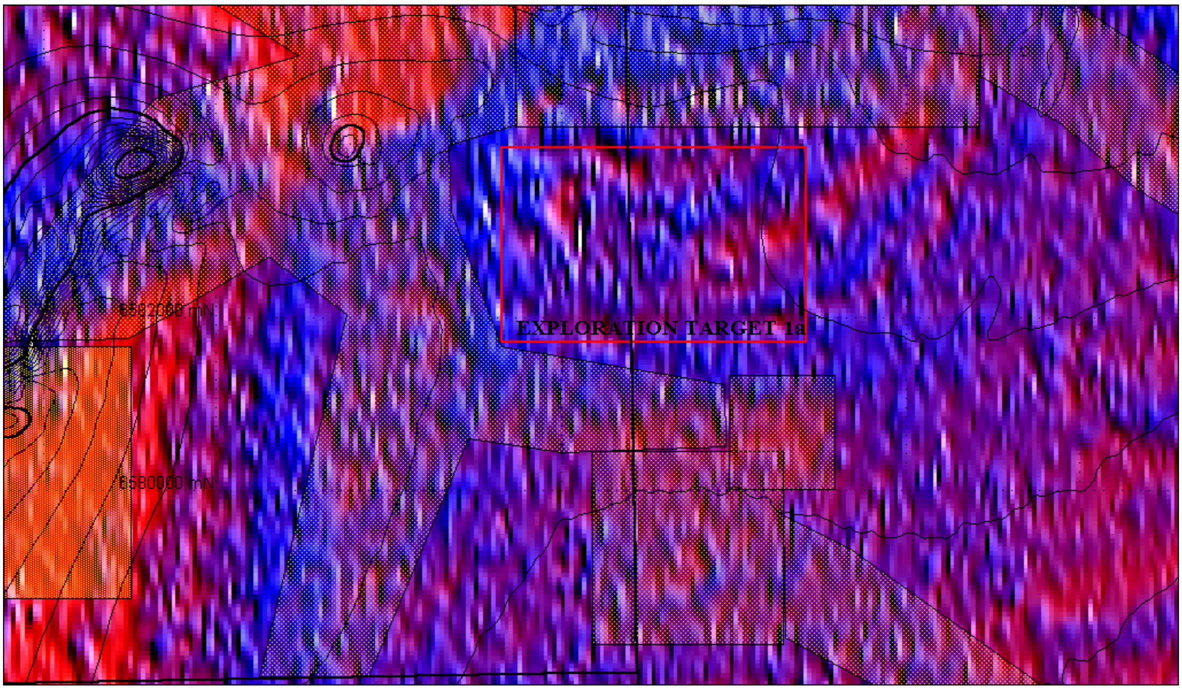

Figure 10c Potassium depleted zone - (western and north western side of red rectangle) associated with complex faulting, diapiric intrusives and Quaternary sediments.

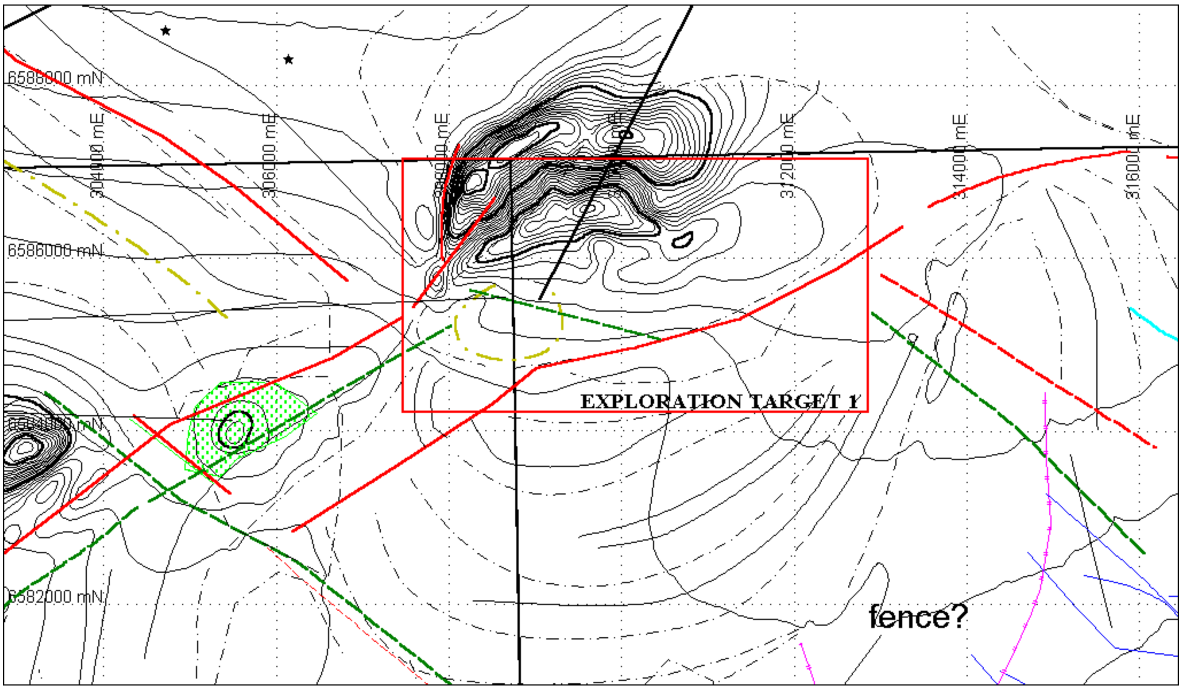

Figure 10d Composite map showing magnetic contours, faults, and radiometric anomalies (green cross hatched area interpreted dolerite).

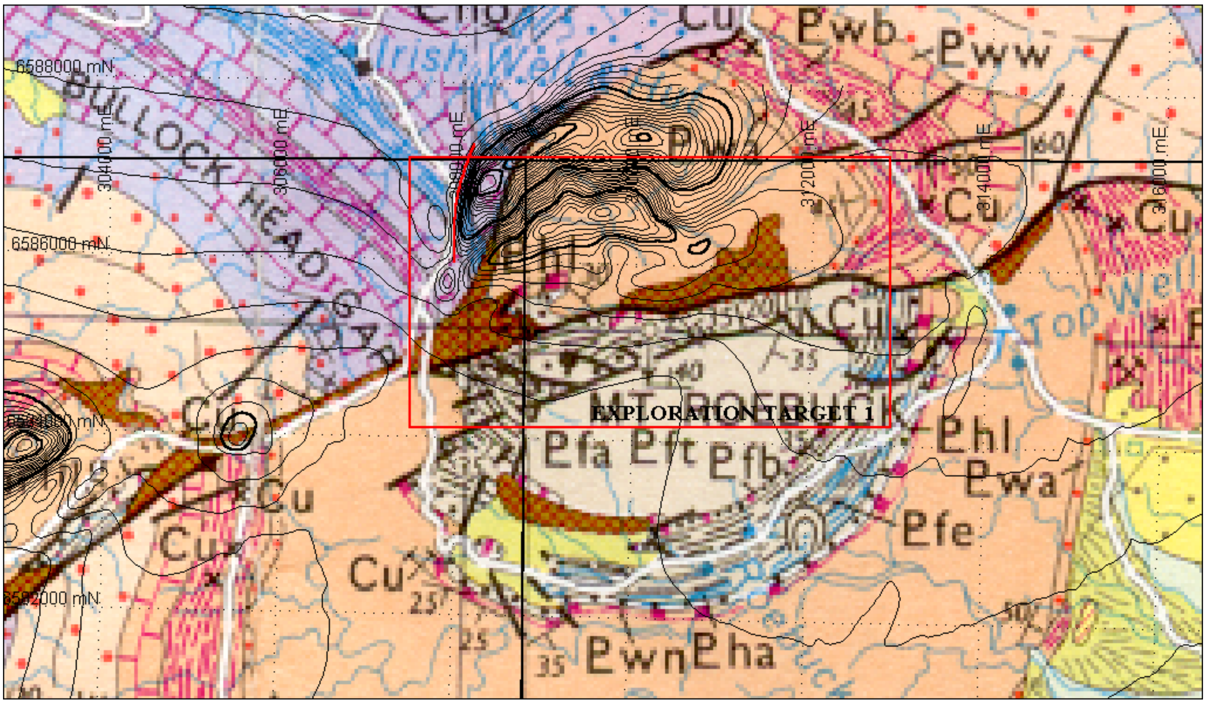

Figure 10e Correlation of magnetic anomalies and mapped geology.

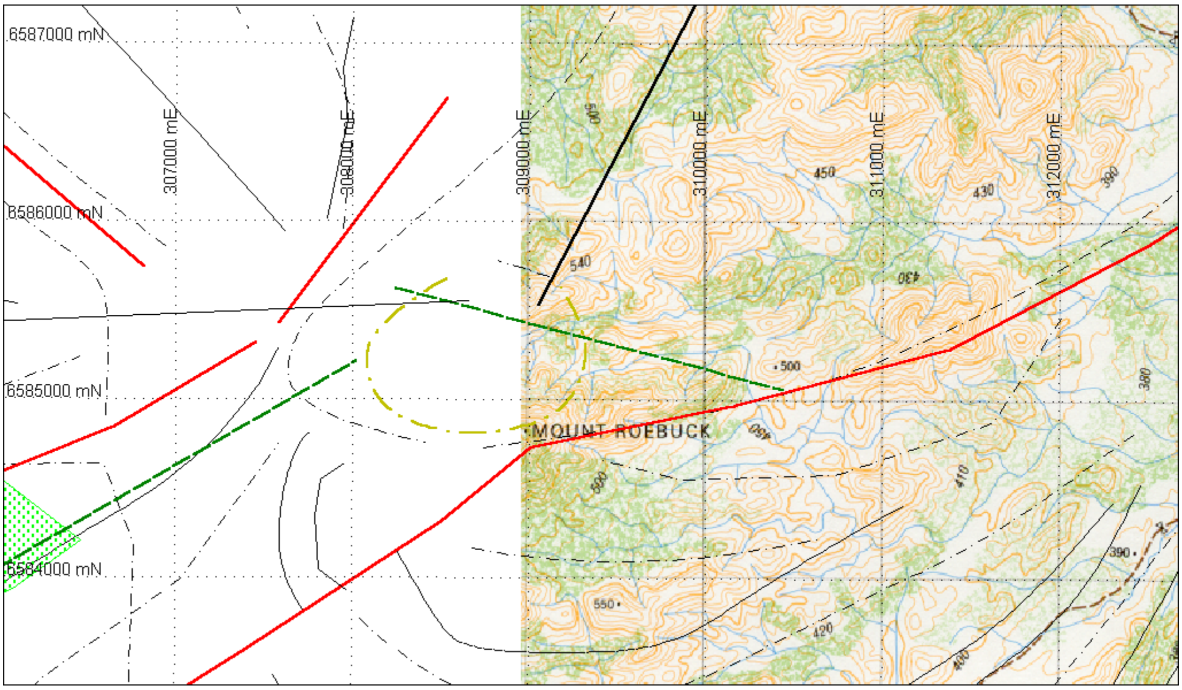

Figure 10f Location of uranium anomaly. A series of streams clearly drain from this area.

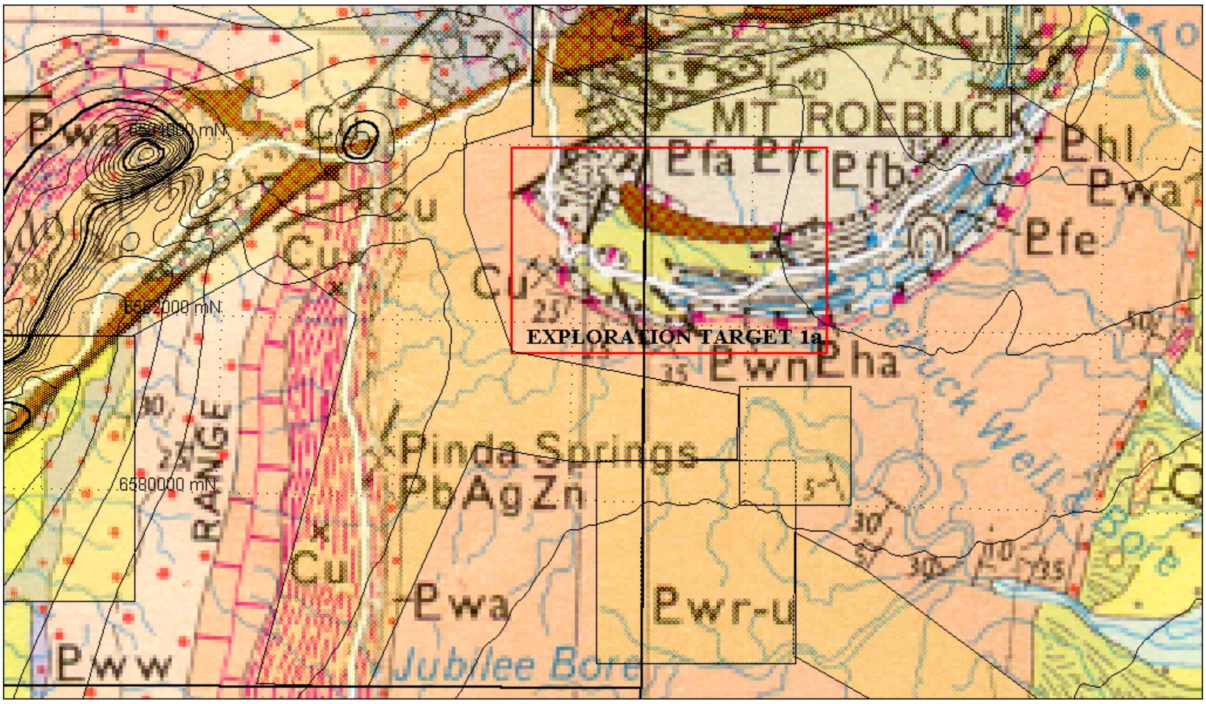

Figure 10g Area I includes a region of cover sediments located directly south of the main exploration target.

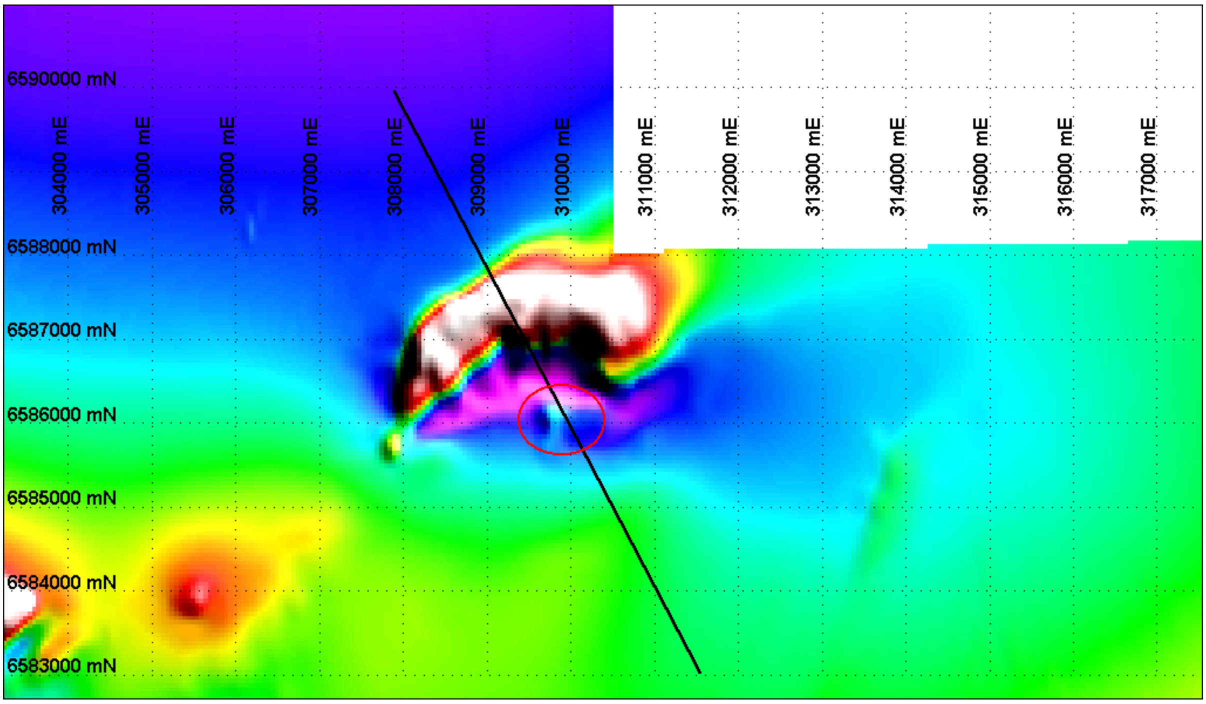

Figure 10h Location of recommended line for geophysical modelling (line orientation 152 degrees, length 7.8 km). Note also small magnetic high in red circle (dolerite intrusive?)

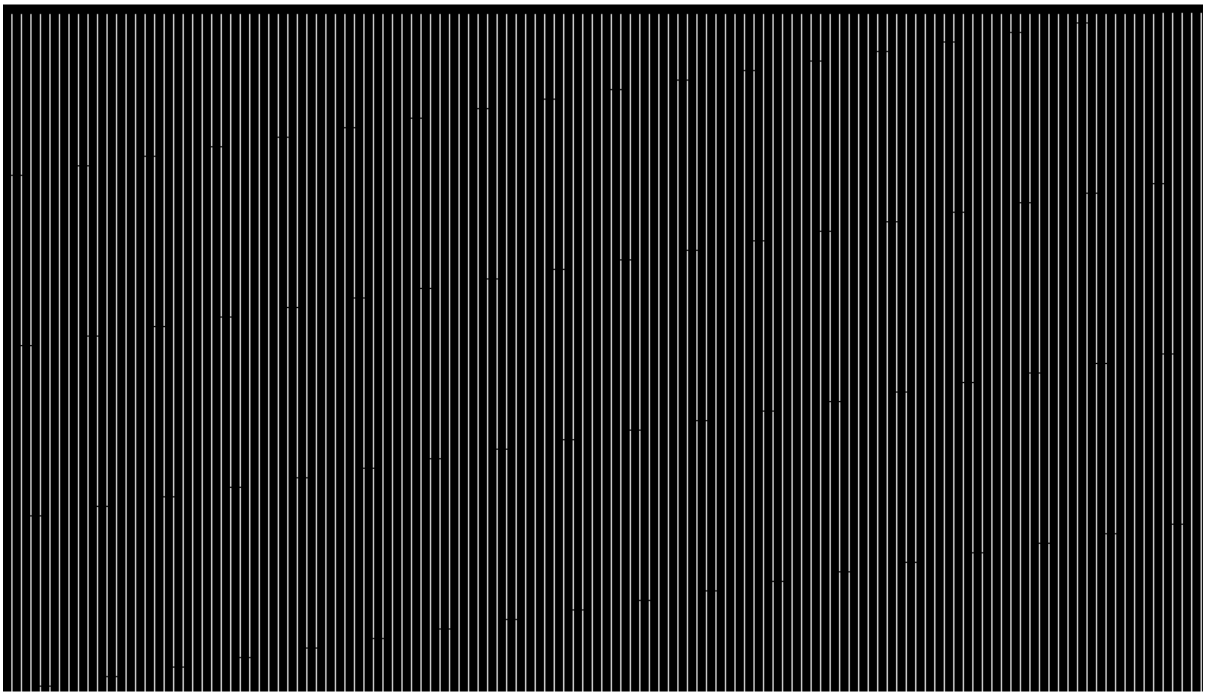

Figure 10i Profile of magnetic intensity through the Mt Roebuck diapiric structure.

SURFACE GEOCHEMISTRY

No geochemical surveys have yet been undertaken in the EL.

It is anticipated that a survey will be conducted in the next six months to identify correlations between geophysical interpretations and possible mineralisation.

DRILLING

A drilling program has yet to be programmed for this Exploration Lease.

It is anticipated that a drilling program will be considered once further geochemical data becomes available and discussions with consulting geologists have identified target zones for such a program.

OTHER STUDIES OR WORK

No other studies such as metallurgical and mineral processing studies, mining feasibility studies or hydrogeological studies etc. have taken place in this Exploration Lease.

ENVIRONMENT

No environmental management studies have been conducted in this Exploration lease to date.

Such studies together with agreements with landowners, stakeholders shall form part of the ongoing exploration program for this area over the next twelve months.

REPORTING ON ORE RESERVES & RESOURCES

To date it is not possible to state ores present or reserves under the "Australasian Code for Reporting of Identified Mineral Resources and Ore Reserves" and "Australian Code for Reporting of Identified Coal Resources and Reserves" as issued by the Joint Ore Reserves Committee (JORC) of The Australian Institute of Mining and Metallurgy, Australian Institute of Geochemists and Australian Mining Industry Council.

EXPENDITURE STATEMENT

The following is a detailed expenditure statement of total expenditure for EL 2511 up to and including 21st April 2002.

Description	Amount
Geological Consultancy	$16,650.00
Geophysical Consultancy	$6,250.00
Administration Costs	$3,790.00
Printing Costs	$300.00
Total Expenditure	**$26,990.00**

CONCLUSION

The geophysical data covering EL's 2511 contains several regions of exploration potential. The most promising of these lies in the area surrounding Mt Roebuck. The combination of magnetic, radiometric and geological anomalies in this area provides strong justification for follow up ground exploration. This location is the focus of numerous intersecting geological structures. It also resides along a geophysical corridor that appears to control the placement of the diapiric structures. The presence of the Angepena gold field along this tend increase the prospectivity of the Mt Roebuck exploration target.

The presence of mineralised brecciated diapiric material along the Mt Roebuck-Pinda Springs fault system provides excellent opportunities for the existence of hidden concentrations of base metals in the Neoproterozoic strata.

The presence of the gold mineralisation in Neoproterozoic - Umberatana Formation adjacent to the Pinda diapir needs careful structural and stratigraphic study. The northwest syncline containing the Angepena Gold field is similar to mini-basins formed by salt withdrawal adjacent to the Beltana Diapir (Dyson, 1999)[8]. An understanding of the evolution and associated tectonism of the diapirs within the tenement may provide a greater insight to locatilities of mineralisation.

Several zones of Quaternary sediments are situated adjacent to diapiric breccia and may host precious stones derived from basement intrusives.

If positive results are derived from the exploration targets further geophysical processing and modelling could be used to determine the sub-surface structure and depth to mineralisation.

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1 The term diapiric structure is used loosely in this report and doesn't imply a particular age or mechanism of emplacement.

2 A statistical examination of the count intensity of the three channels showed that the channel names for the Th and U channels were transposed.

3 Similar anomalies may also be caused by man-made structures and should be interpreted with caution.

4 A subtle radiometric anomaly runs along the basement trend. See the following section.

5 The shot wavelength magnetic signal appears to be very successful in identifying shallow depth palaeochannels.

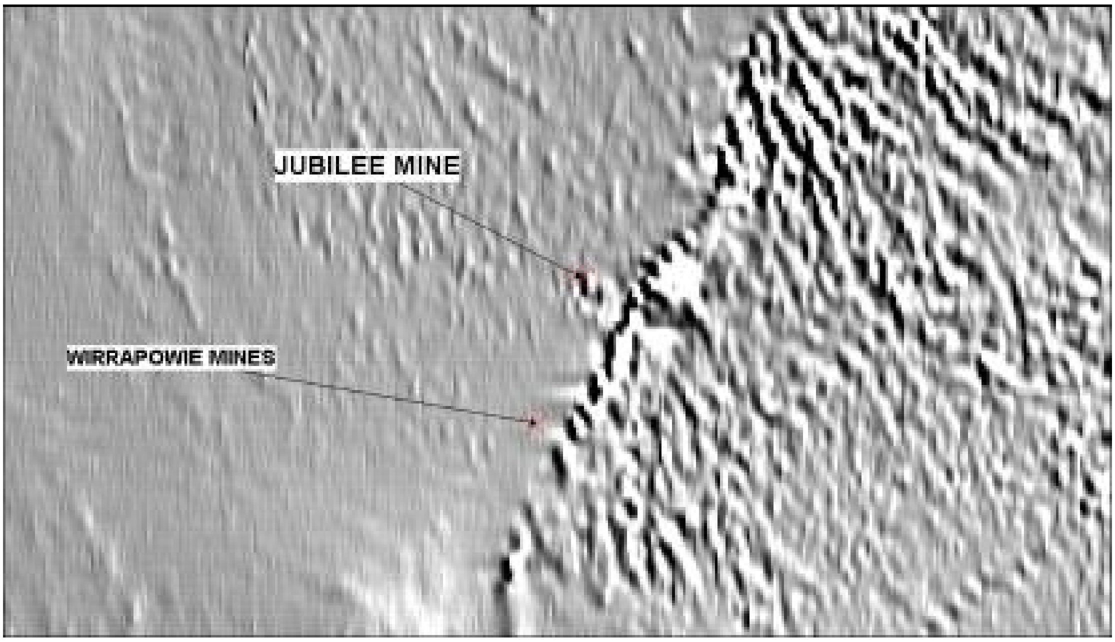
6 Additional filter such as an (MNF) multi-channel noise reduction filter would enhance the quality of the images produced and the occurrence of subtle structures.

7 Samples from the Brachina Formation should be tested to confirm the presence of these minerals.

8 Dyson I., 1999, The Beltana diapir - a salt withdrawal minibasin in the northern Flinders Ranges. MESA Journal 15 pp 40 - 46

Geologic model for the Jubilee magnetic anomaly - EL 2511

Client: Mr Peter Lewis MP



Magnetic image 1st VD showing relationship of Jubilee copper mine to subtle magnetic anomalies (EL 2511)

Geophysical consultant: Dr David T. Miller, March 2002

NB This report supersedes any previous reports on this area

CONTENTS

Project name: Geologic model for the Jubilee magnetic anomaly - EL 2511

Client: Mr Peter Lewis MP

Job Specification: Modelling of a small magnetic anomaly in the vicinity of the old Jubilee Mines within EL2511. Emphasis is to be given to developing a simple geologic model for the anomaly and local mineralisation.

Job profile:
1. Gather necessary details from previous reports completed for the client
2. extract magnetic data required to facilitate modelling
3. determine possible constraints for modelling
4. develop preliminary geologic models
5. test models for fit to observed magnetic data
6. summarise findings in a report.

Data supplied by client:

The client has previously supplied located data and magnetic grids, radiometric and elevation data in digital format from an airborne geophysical survey (200m-line spacing) conducted by AGSO early in 1999.

The located data were supplied in a simple ASCII file format with flight line, longitude, latitude, fiducial and corrected magnetics. The radiometric data contained the total count, potassium, uranium and thorium channels. Grids generated in ERmapper format were also supplied.

Data processing

Previous processing was adequate for the current job. The magnetic data was imported into the modelling program (ModelVision Pro V3) and the flight line over the Jubilee anomaly was utilised for 2D modelling.

Introduction

This report summarises the development of a geologic model to explain the subtle magnetic anomaly and coincident surface copper mineralisation east of the Jubilee Copper Mine (pers. comm., D. Watkins, 2002).

Location

The Jubilee Mines occur within the south-west corner of Exploration Licence 2511. This tenement is located approximately 65 km south east of Leigh Creek in the northern Flinders Ranges. The licence areas covers 147km^2, composed of hilly terrain in the west and north, with open alluvial plains in the east.

Regional Geology and mineralisation

The geology in this region is comprised of Cambrian and Neoproterozic sedimentary sequences. The strata are folded and faulted, and contain syn and post depositional diapiric structures[1]. The typically carbonate rich diapiric structures in this region contain xenoliths of older Proterozoic (early Neoproterozoic, Mesoproterozoic and Palaeoproterozoic) metasediments, metamorphic and igneous rocks.

Syn and post-depositional development of diapiric structures appear to have a significant influence on the formation of base metal deposits in the northern Flinders Ranges. The refined diapiric models proposed by Dyson (1992, 1996, 1998, 1999 and 2001) have provided an additional exploration tool for the northern Flinders Ranges. One of the key features of the diapiric model is the provision of pathways for basement derived metal brines to migrate into suitable sediment hosts. The Wilpena and Hawker Group sedimentary sequences in the northern Flinders Ranges provide ideal hosts for base metal and gold deposits.

Local geology and exploration

The exploration licence contains evidence of an active history of mineral exploration and exploitation of copper, lead, zinc and gold. One area that holds promise for further exploration success is the Wirrapowie - Jubilee Mine area in the south-west corner of the tenement. These mines were exploited for copper and lead mineralisation between 1890 and 1908 when limited amounts of ore were removed.

The mineralisation is reported to occur in quartz-ironstone-siderite veins along a north-easterly trending fault zone (Mansfield, Mining Review 87). The main copper minerals are primary sulphides, azurite and malachite.

The mineralisation characteristics exhibited at the Jubilee - Wirrapowie mines are similar to the mineral occurrences found along the Pinda Springs-Mt Roebuck fault[2] and within bedding of the Wilpena Group[3] strata 5 to 10 km west and south west of Mt Roebuck.

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[1] The term diapiric structure is used loosely in this report and doesn't imply a particular age or mechanism of emplacement.

[2] low grade copper mineralisation within zones of ironstone, magnetite and siderite

[3] Galena and silver have been reported to occur in quartz veins).

The Jubilee - Wirrapowie Mine area - Summary of previous work

Regional interpretation

Previous work conducted for the client included a regional interpretation of the magnetic (Figure 1b, 1c) and radiometric data. Geophysical features and geological structures were used to identify potential exploration target areas (Figure 2 and 3). A number of anomalous areas were identified (Figure 3) and given an exploration priority ranking.

The client has selected the Jubilee - Wirrapowie Mine area (Figure 4) as a suitable target for further investigation.

Jubilee - Wirrapowie Mine area

The south western corner of EL 2511 contains an area of faulted Neoproterozoic lower Wilpena Group strata that contains several minor occurrences of copper mineralisation. The faults and mineralisation associated with the Wirrapowie and Jubilee mines parallel an irregular north-east trending magnetic lineament (Figure 4). The source of the anomaly appears to be associated with iron-magnetite mineralisation hosted within a structural - fault related shear zone.

A subtle small semi-circular anomaly located to the east of the Jubilee Mine forms part of the north-east trending magnetic lineament. It is possible that this discrete anomaly reflects the presence of an intrusive body and possibly the source of the exposed copper mineralisation.

The anomaly east of the Jubilee Mine was recommended as an area worthy of further investigation.

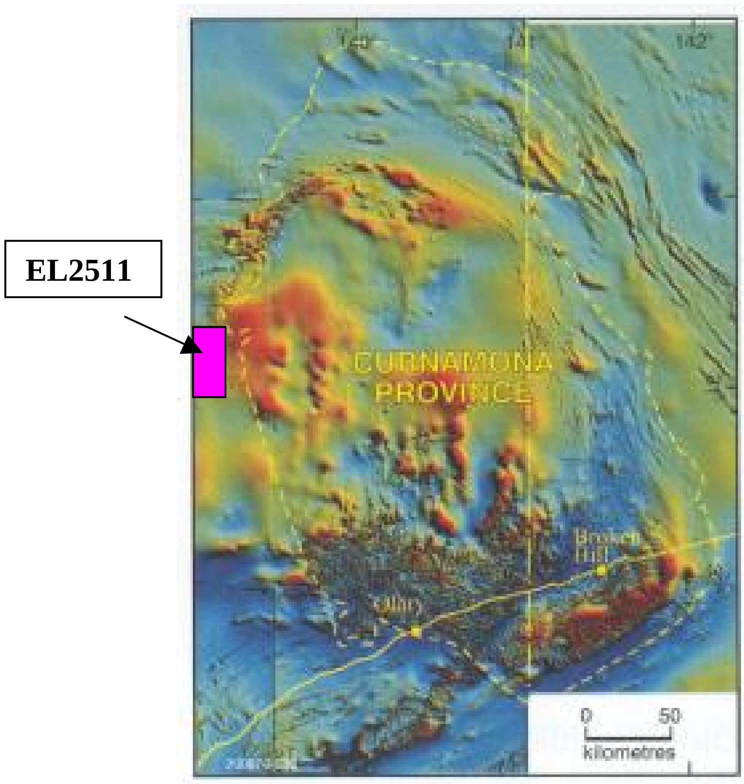


Figure 1a EL 2511 is located on the western edge of the Curnamona Province (TMI image from MESA Journal 21 April 2001, Preiss & Conor)

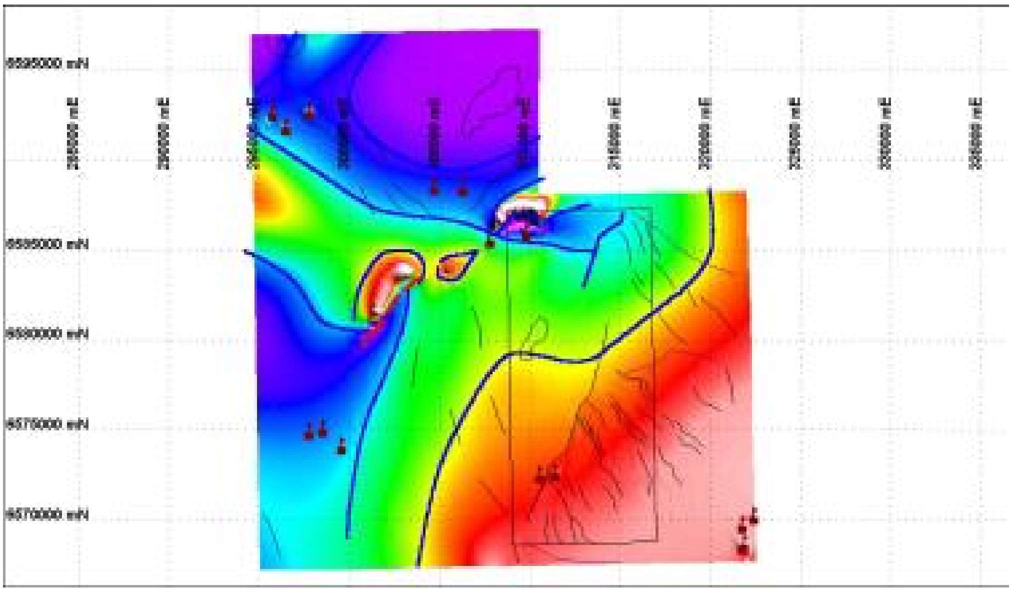


Figure 1b Interpretation of total magnetic field, lineaments and spot anomalies (squares with flags).

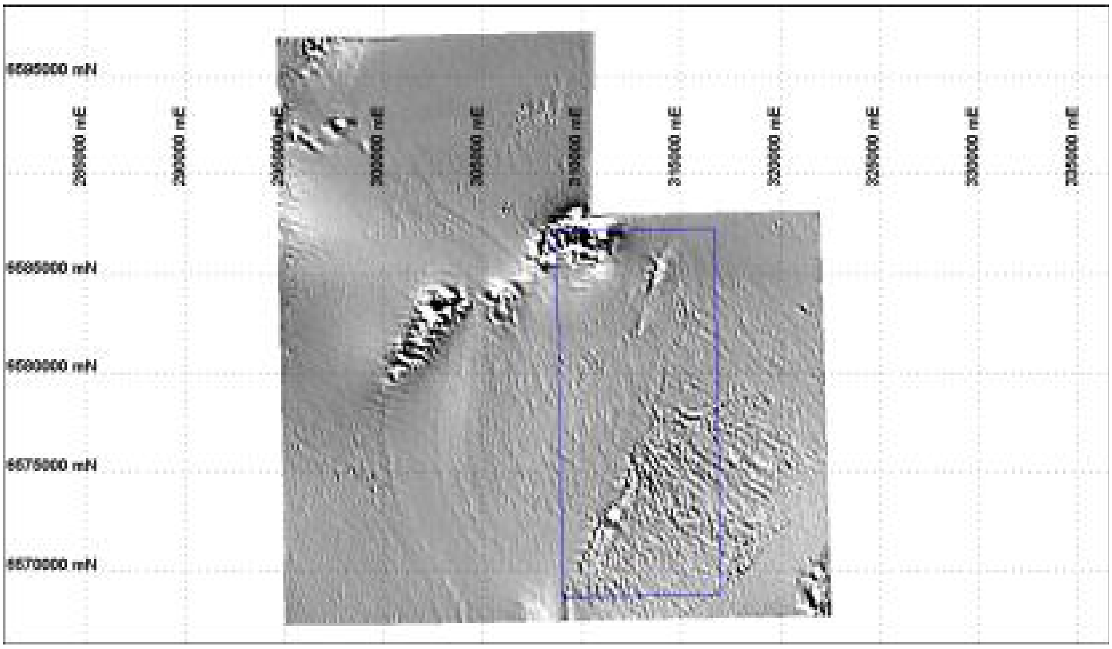


Figure 1c Magnetic first vertical derivative (sun angle 60 degrees from the NE).

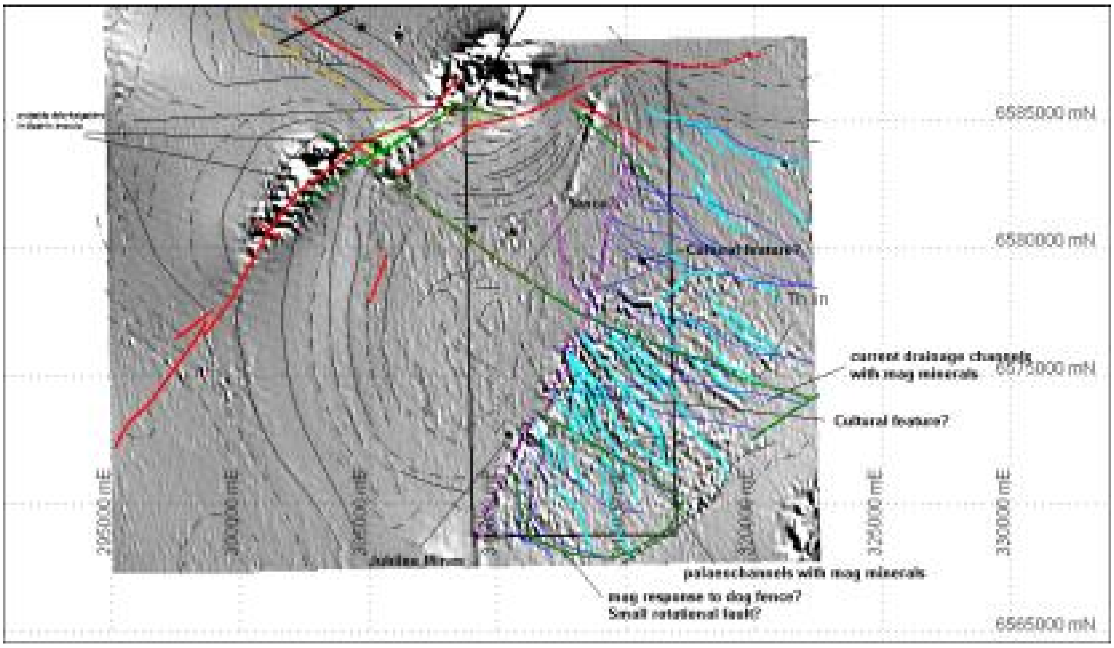


Figure 2 Interpretation of first vertical derivative - *lithological boundaries and palaeo-channels. (Black lines = lithological boundaries, red lines = faults, blue features = magnetic highs, purples lines = cultural features, and black stars = either small magnetic highs related to small geological or cultural features).*

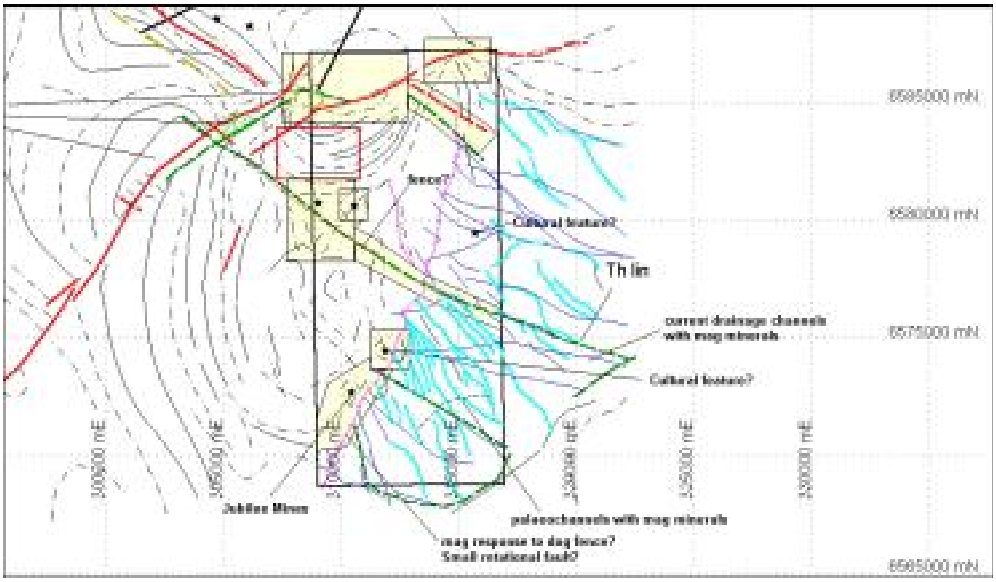


Figure 3 Integrated lineaments and anomalies including selected target areas. *(polygons yellow dots = target areas; red line = fault; solid black line = lithological boundary; dashed black line = geological trend; dashed green-yellow lines = radiometric lineaments; black stars = small magnetic highs; blue lines = magnetic and radiometric lineaments associated with drainage; cyan lines = magnetic anomalies associated with shallow features possible palaeo-channels; purple lines = magnetic lineaments correlated with fence line).*

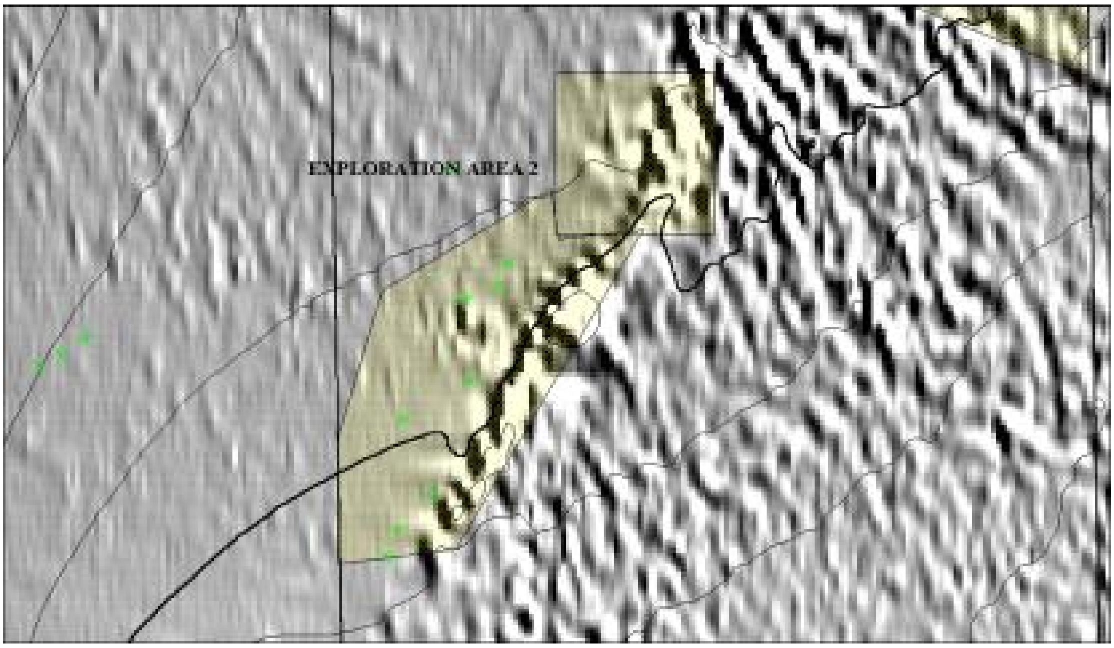


Figure 4 Exploration targets in the Jubilee Hill area. Target areas overlying first vertical derivative and TMI contours- magnetic data (green symbols = old mines).

Geophysical modelling

Jubilee magnetic anomaly

The Jubilee anomaly is asymmetric, approximately 1 kilometre wide, has amplitude of approximately 60 nT and is centre on AMG84 311380 east, 6572740 north. Even though the amplitude of the anomaly is small it is 60 times that of adjacent short wavelength magnetic anomalies. Its surface expression is semi-circular in shape being elongate in a N-S direction. Subtle continuances of the magnetic anomaly north and south suggest that the Jubilee magnetic source may be more extensive at depth.

Line 502350 was selected as the most appropriate line to use for modelling (Figure 5). Modelling was completed in two phases. The first investigation examined the anomaly in isolation to determine the likely geometry of the magnetic source (Figure 6, 7 and 8 Appendix A). A second modelling session was devoted to developing a more complex model. This model incorporates several magnetic bodies to explain the broad wavelength anomalies adjacent to the Jubilee anomaly (Figure 9 and 10 Appendix A).

Modelling - constraints

Magnetic sources and geology

Several magnetic sources occur in the strata exposed in the northern Flinders Ranges. Magnetite rich horizons are common in the Neoproterozoic Umberatana and Wilpena Group sediments. These layers are visible in the magnetic data within this exploration region. The geological boundaries between the carbonate and clastic strata are quite evident due to a moderate magnetic contrast. There are also strong magnetic correlations with dolerite and gabbro rafts located within the diapiric strata.

Magnetic susceptibilities for the various lithology's, likely to be encountered within the Jubilee anomaly can be grouped into three broad ranges.

1. The Wilpena and Hawker Group siltstone, sandstone and carbonate are estimated to have a maximum susceptibility of 0.0001 CGS units;
2. the Callanna Group is estimated to have a maximum susceptibility of 0.0004 CGS units;
3. and the igneous bodies found within the Callanna Group succession to have an estimated maximum susceptibility of 0.0008 CGS units

NB these susceptibility estimates are based on direct measurements by the author of similar strata within the Flinders Ranges

Regional and deep magnetic structures

The regional magnetic field (Figure 5 and 6) displayed in the survey area has a variation of 700nT. The regional trend of the total magnetic field shows deep magnetic basement in the west shallowing to the east. The regional magnetic field across the tenement is considered by this author to represent Willyama Subgroup metamorphic basement along the western edge of the Curnamona Province (Mt Painter Complex). The response from this deep-seated magnetic source has been incorporated in the modelling as a regional magnetic gradient.

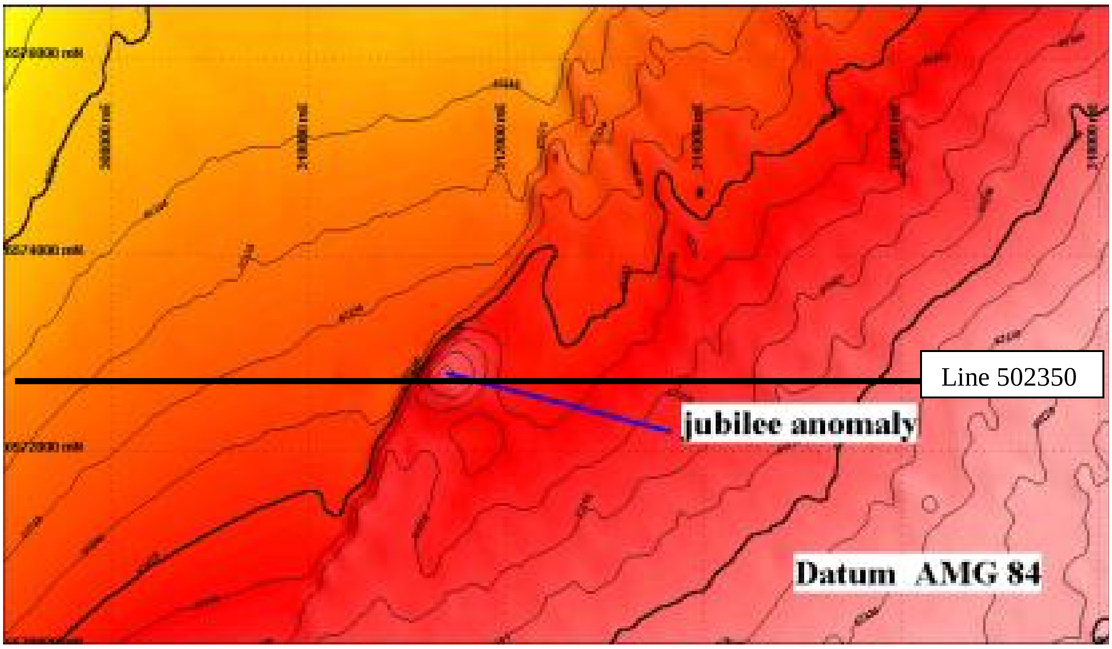


Figure 5 magnetic contours on TMI image showing the location and magnetic response from the Jubilee magnetic source.

Geophysical modelling results for the Jubilee anomaly

In summary the source of the Jubilee anomaly appears to be related to a narrow tabular body of limited lateral extent. The body geometry, based on the limited constraints available, is that of a tabular prism approximately 300m wide at a depth (to the upper surface) of 150 to 200m. The body also dips moderately to the east and has a limited lateral extent of approximately 1 kilometre to the north and south.

Geophysical refinements and geological model

The geophysical model was improved by incorporating additional magnetic sources. These were added to account for the broader anomalies surrounding the Jubilee feature. The geometry of the additional bodies were designed to reflect the possible sub-surface geology.

Interpretation of the surface geology for this region indicates gently folded Hawker and Wilpena Group sediments underlain by fairly extensive and thick sequences of Callanna Group (containing meta -sediments and possible volcanic and intrusive strata) resting unconformably on Curnamona basement complexes. The resulting models shown in Figures 9 and 10 depict a moderately magnetic sub-basement of Callanna Group underlying gently folded low magnetic Wilpena-Hawker Group stratigraphy.

The shallow depth to Callanna Group strata west of the Jubilee anomaly fits well with the observed out-crops of Callanna Group at Mt Roebuck.

The geophysical modelling suggests that the strata surrounding the Jubilee anomaly is likely to be faulted and deformed. It is also probable that there is significant diagenetic alteration around the magnetic body.

The regional gravity data set was examined as an additional constraint to the model. The regional gravity data[4] indicated only a 1 mGal variation along the modelling line suggesting little variation in the density of the underlying geology. Even though this data is sparse it tends to exclude near surface features such a felsic or basic plutons.

Geologic Model

The composite 2D magnetic model developed for the Jubilee magnetic anomaly has been used to develop a simple sub-surface geologic cross section.

The Jubilee anomaly is interpreted to have the following characteristics:

1. an igneous body with magnetic characteristics similar to a basalt or gabbro. Both of these rock types have been documented within the Callanna Group. The occurrence of copper bearing gabbro-dolerite 20 kilometres west of the Jubilee anomaly, in a similar geologic setting, makes this a favourable model.

[4] It must be noted that the broad spacing of the gravity data provided only a few reading around the modelled line.

2. The modelling exercise and the surface geology indicates that the zone above and surrounding the Jubilee anomaly is structurally complex and is likely to be composed of tightly folded and faulted strata.
3. The sub-surface structure to the east is more difficult to predict due to alluvial cover. The magnetic modelling and surface geology suggests that a much thicker sequence of Hawker Group carbonates may abut the Jubilee magnetic body and forms part of a major syncline.

The Jubilee magnetic anomaly may not be a discrete lithology such as a dolerite and may instead represent a strongly mineralised zone containing primary sulphides and magnetic minerals within in a faulted and folded zone. The mineralised veins directly east of the anomaly certainly makes this a compelling model.

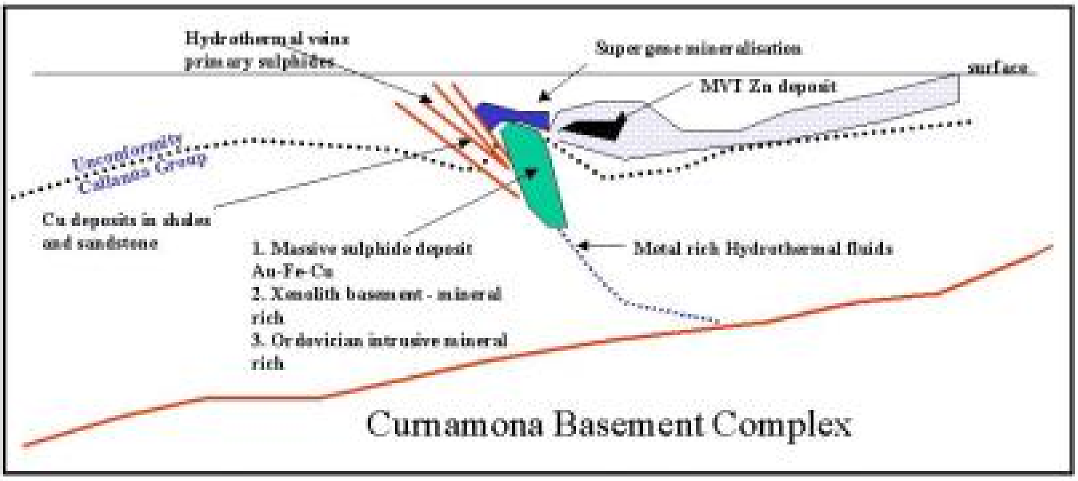
Mineralisation

Various models can be invoked to explain the mineral occurrences in the northern Flinders Ranges. Dyson (MESA Journal 22, 2001) has provided some insight into a possible diapir related mechanism for mineral deposit formation (Figure 12) within the Wilpena and Hawker Group sediments. If the Jubilee anomaly is considered to be part of a diapiric structure it is quite possible that the shales and carbonates proximal to the anomaly may host Mississippi Valley type carbonate hosted zinc deposits or copper and lead mineralisation within shales and sandstones.

The copper sulphides and oxides occurring in iron rich veins within the Bunyeroo shales (Wilpena Group) west of the Jubilee magnetic anomaly suggests that the mineralisation within this locality has a hydrothermal (low or high temperature??) origin. The presence of the Jubilee anomaly provides a possible source of the metalliferous fluids. Following this line of thought, it is possible that the Jubilee anomaly is not an old igneous xenolith with the Callanna Group but represent a recent, perhaps Ordovician, intrusive. This scenario would also provide metal brines to the host rocks mentioned above.

Each of the possibilities discussed so far in this section, could lead to the development of a zone of supergene enrichment above the Jubilee anomaly.

It is also worth considering the fact that this area lies over the western extension of the Curnamona Province, an area that is currently receiving considerable mineral exploration attention and is viewed as a strong contender for world class mineral deposits. The high-grade metamorphic basement complexes of the Curnamona Province may be a direct source of hydrothermal fluids into the overlying sequences within the eastern side of the Flinders Ranges or may be the source of large rafts of basement material brought close to the surface during diapiric events.



Composite diagram of mineralisation models.

Conclusion

The Jubilee anomaly is probably an igneous body with affinities to a basalt, gabbro or dolerite. Its upper surface is at a depth of some 150 metres and its tabular form dips moderately to the east. It is probable that this body is associated with mineralising events in this area and may have proximal mineralisation yet to be discovered.

Irrespective of the exact nature of the Jubilee anomaly there is a strong possibility that further mineralisation may occur over, surrounding or within the anomalous feature. The area of potential mineralisation is less than 500 metres, making this a prospective area to test for economic mineral deposits.

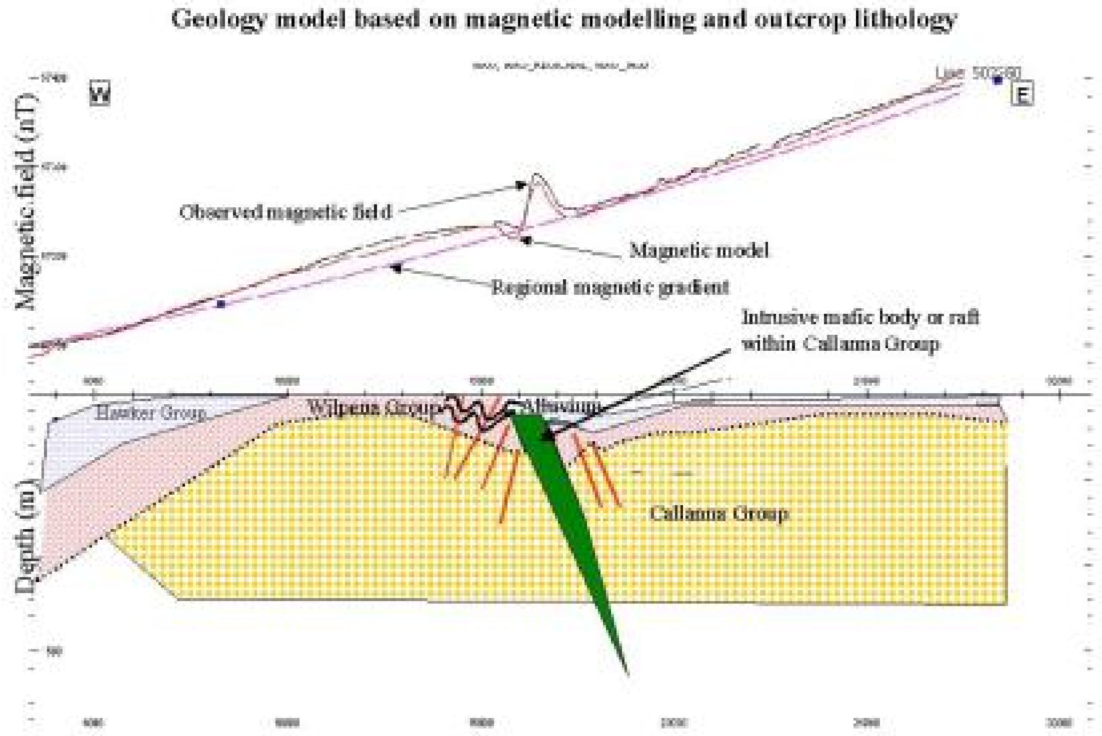


Figure 11 Geologic model based on geophysical modelling and surface geology.

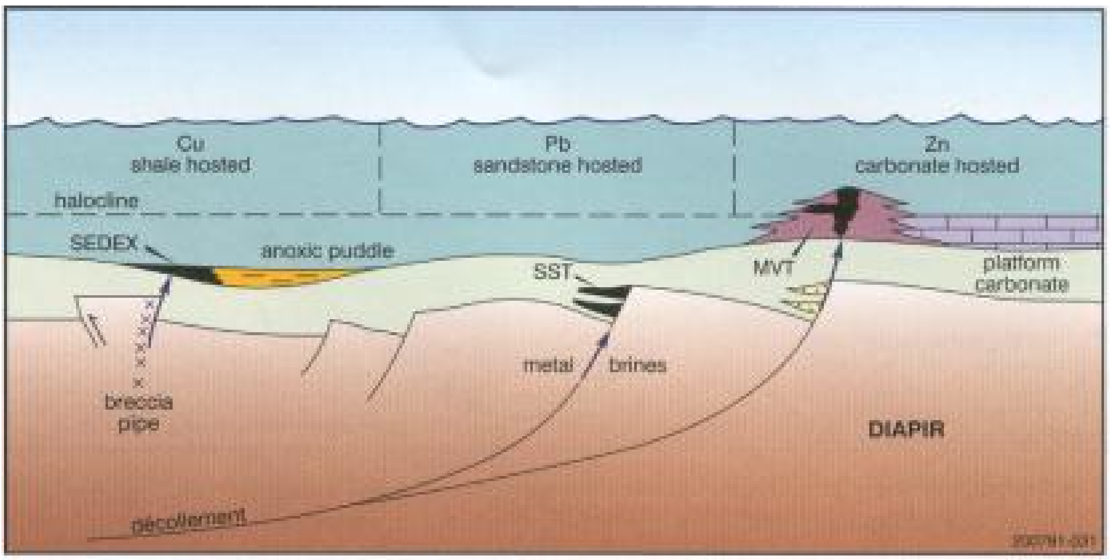
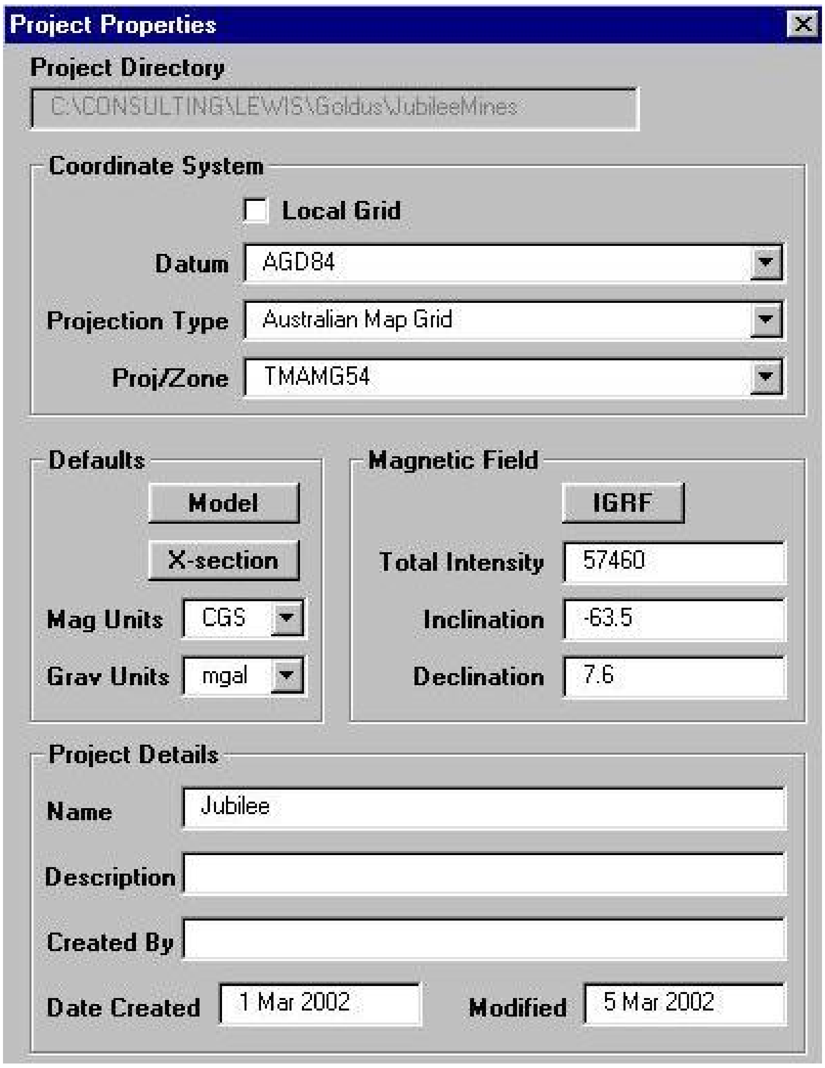


Figure 12 After Dyson IA, MESA journal 22, July 2001

Appendix A- Geophysical models

Geophysical modelling project properties



Geophysical modelling sessions

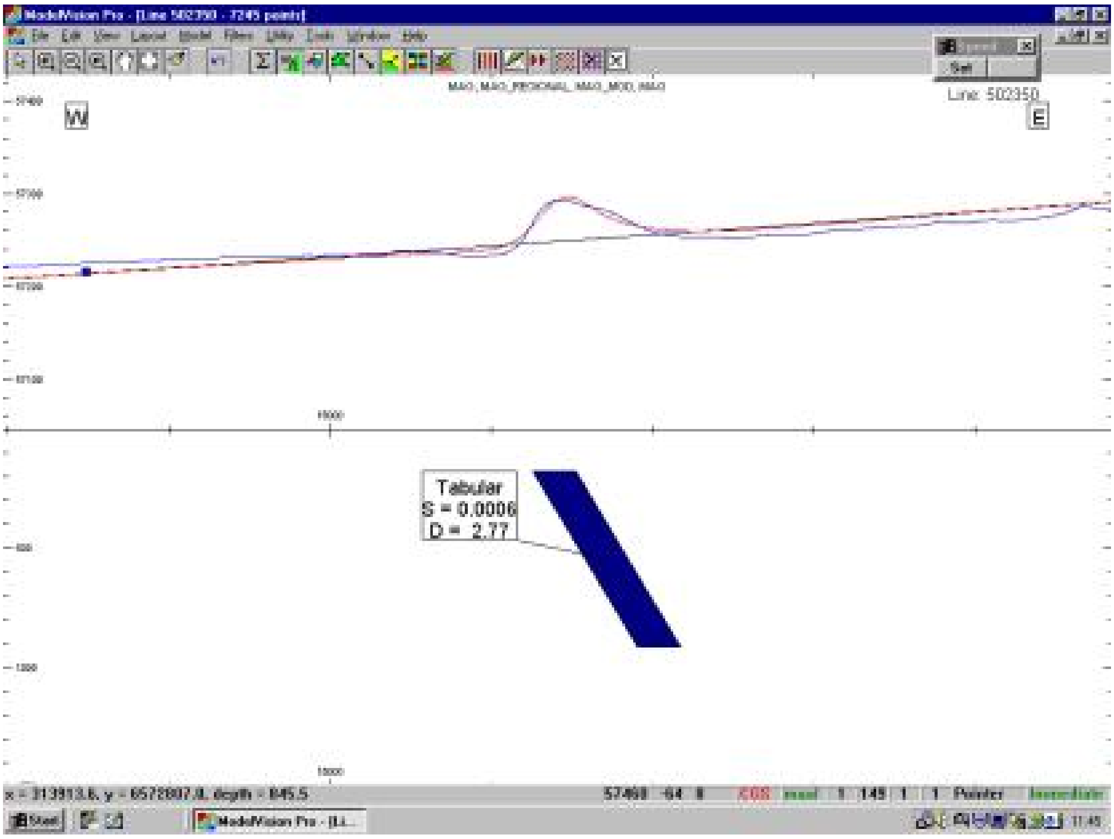


Figure 6

Model 1

Model parameters	**values**
Body type	tabular
Depth to top of body	175m
Thickness of body	260m
Depth extent	740m
Dip	50^0
Strike length	2000m
Azimuth	15^0
Magnetic susceptibility	0.0006 cgs units

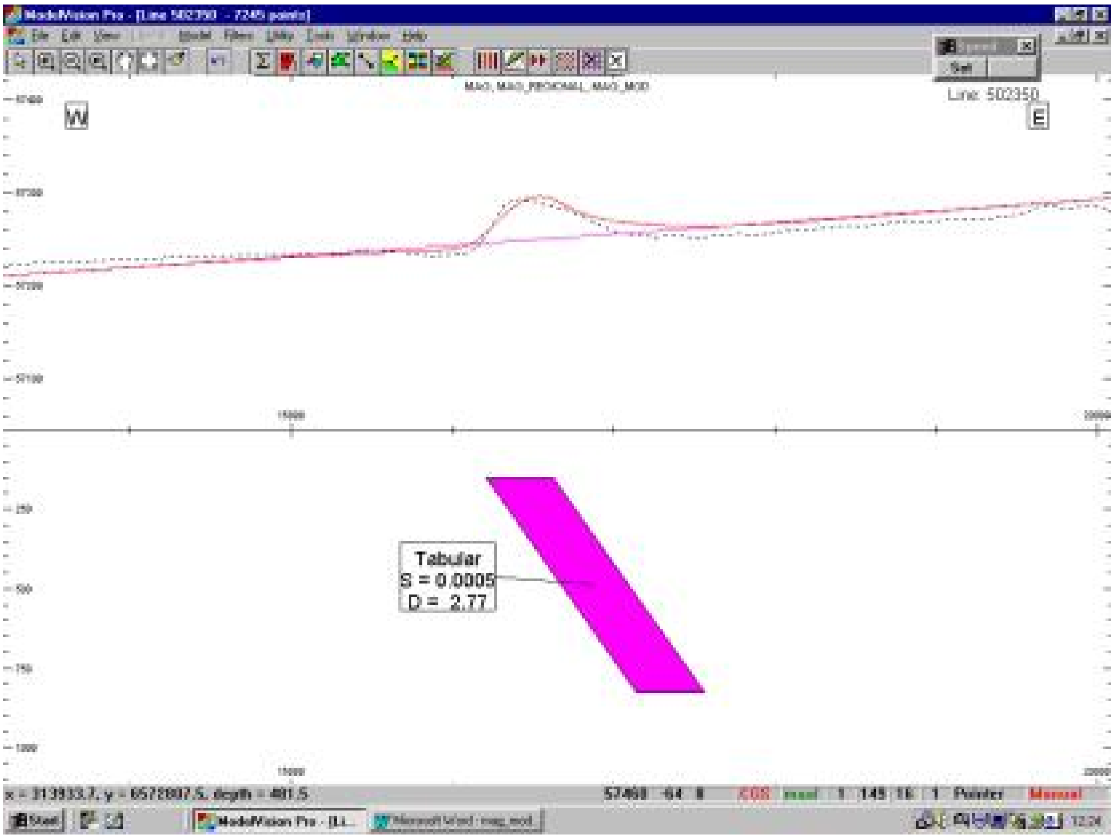


Figure 7

Model 2

Model parameters	**values**
Body type	tabular
Depth to top of body	150m
Thickness of body	360m
Depth extent	675m
Dip	40^0
Strike length	1000m
Azimuth	30^0
Magnetic susceptibility	0.0005 cgs units

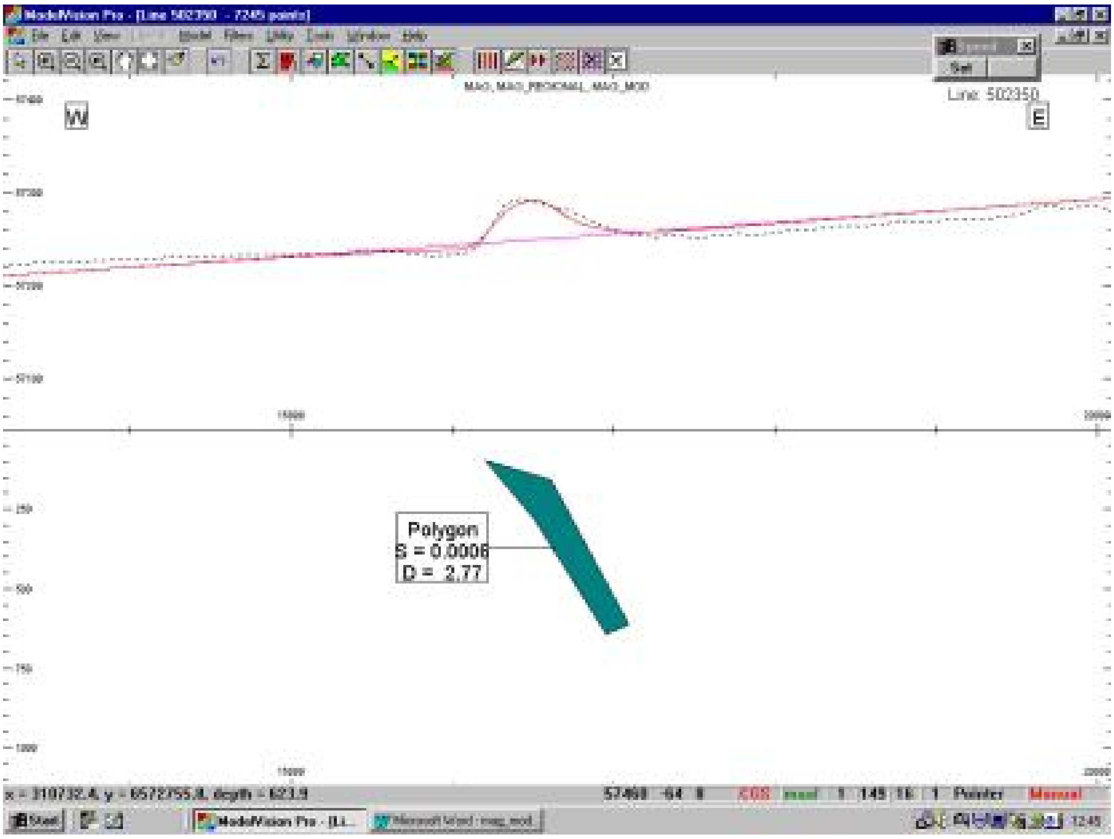


Figure 8

Model 3

Model parameters	**values**
Body type	polygon
Depth to top of body	Minimum 100m to 220m
Thickness of body	Approx 400m
Depth extent	750m
Dip	Approx 40^0
Strike length	1000m
Azimuth	25^0
Magnetic susceptibility	0.0006 cgs units

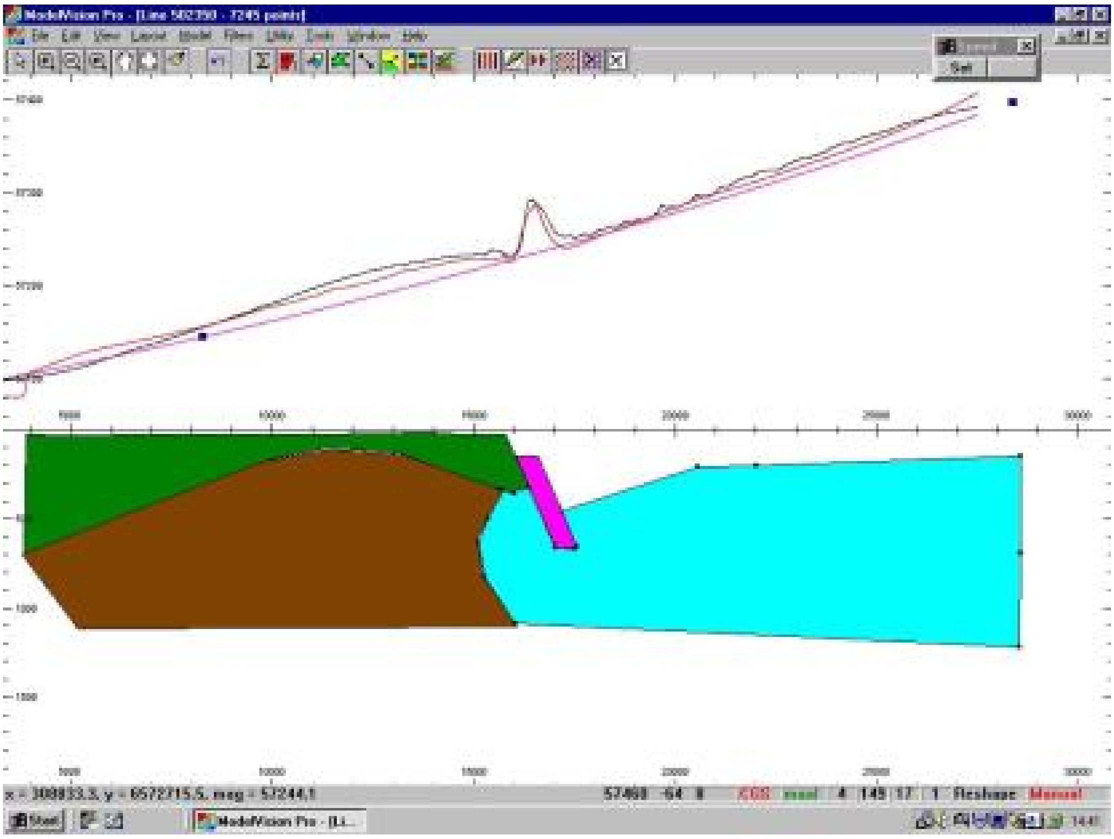


Figure 9

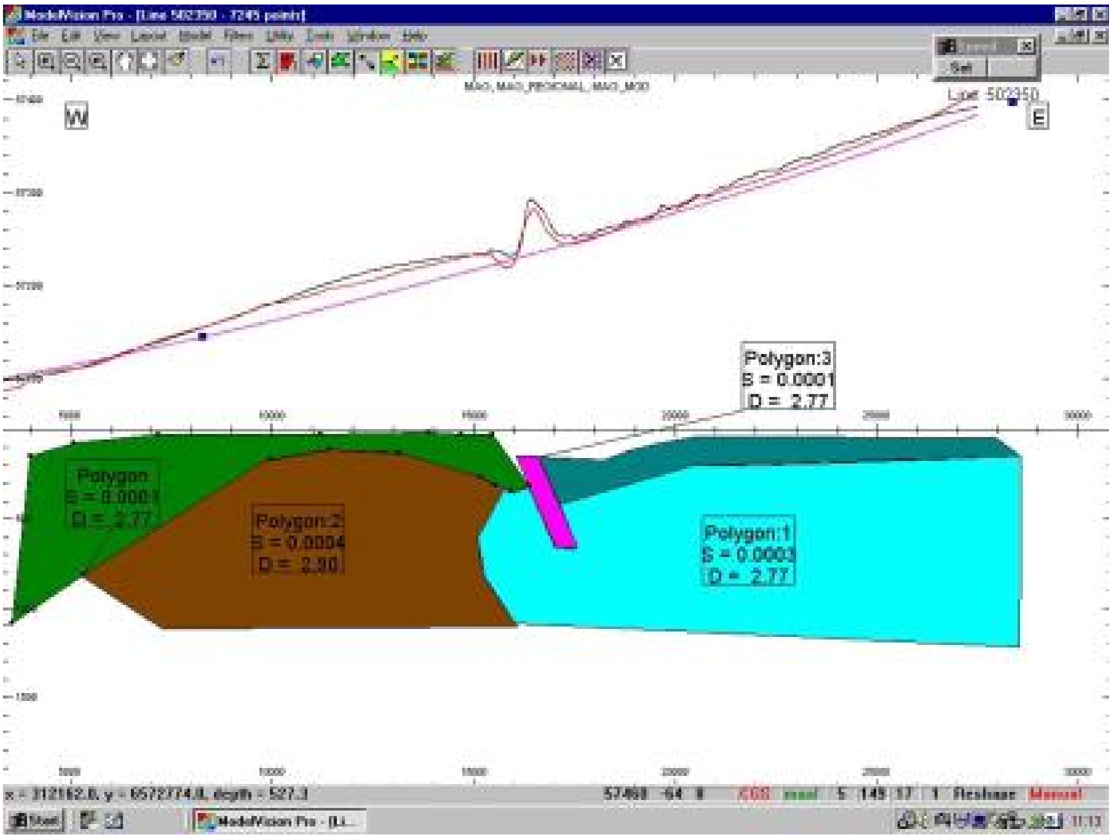


Figure 10

GOLDUS PTY LTD

ANNUAL TECHNICAL REPORT FOR EL2511

PIRSA TECHNICAL REPORT FOR 12-MONTH PERIOD ENDING 20 APRIL 2003

TECHNICAL REPORT FOR EL 2511

PIRSA TECHNICAL REPORT FOR 12 MONTH PERIOD ENDING 20 APRIL 2003

INTRODUCTION

There is no additional technical data to present for this reporting period

Although a geophysical program was planned for this reporting period, the company decided to delay further exploration until late 2003. It is also envisaged that a Geotechnical survey be the follow up process after the geophysical program has been assessed.

Native Title has been triggered on this and other Exploration Leases owned by the Goldus Group of Companies and the process should enable key areas in these leases to be cleared in order to continue our exploration program.

GEOPHYSICS

No geophysical surveys have been undertaken by Goldus in this EL to date.

It is anticipated that a survey will be conducted following the renewal of the Exploration Licence to identify correlations between historical and any recent geophysical data obtained to define geophysical interpretations and possible mineralisation.

SURFACE GEOCHEMISTRY

No geochemical surveys have yet been undertaken by Goldus in the EL to date.

It is anticipated that a survey will be conducted following a geophysical survey to identify correlations between historical and any recent data obtained to enhance geophysical interpretations and possible mineralisation.

DRILLING

A drilling program will be programmed for this Exploration Lease.

It is anticipated that a drilling program will be considered once further geochemical data becomes available and discussions with consulting geologists have identified target zones for such a program. It is anticipated that a drilling program will commence in 2004.

OTHER STUDIES OR WORK

NATIVE TITLE

Native title has been triggered for this exploration lease. Under Section 63N of the Mining Act 1971, notification has been advertised regarding several leases owned by Goldus Pty Ltd. The Goldus Group has employed the services of an Anthropologist/Geologist/Legal Adviser to assist through the negotiated process of Native Title. Negotiations were put "on hold" until a relevant matter on Native Title was settled in the High Court in September 2003.

The Goldus Group intends to take a proactive stance in its dealings with Native Title. We will take advice from PIRSA during your development of new processes and formats to assist clear and equitable outcomes for both the miner and Native Title claimants.

This process will assist Goldus Pty Ltd in identifying areas of geological interest and in planning and commencing a substantial exploration program which will focus on potential prospects within the defined area of the exploration lease.

No other studies such as metallurgical and mineral processing studies, mining feasibility studies or hydro-geological studies etc. have taken place in this Exploration Lease.

ENVIRONMENT

No environmental management studies have been conducted in this Exploration lease to date.

Such studies together with agreements with landowners, stakeholders shall form part of the ongoing exploration program for this area over the next twelve months.

REPORTING ON ORE RESERVES & RESOURCES

To date it is not possible to state ores present or reserves under the "Australasian Code for Reporting of Identified Mineral Resources and Ore Reserves" and "Australian Code for Reporting of Identified Coal Resources and Reserves" as issued by the Joint Ore Reserves Committee (JORC) of The Australian Institute of Mining and Metallurgy, Australian Institute of Geochemists and Australian Mining Industry Council.

EXPENDITURE STATEMENT

The following is a detailed expenditure statement of total expenditure for EL 2511 up to 20 April 2003.

Details	Amount
Aerial Geophysical Survey	$0.00
Administration Costs	$8,420.00
Accommodation, Field Trips	$1,950.00
Geological Consultancy	$20,870.00
Geophysical Consultancy	$0.00
Management Consultancy	$21,575.00
Sundry Items	$2,595.00
PIRSA Fees	$540.00
Total Expenditure	**$55,950.00**

CONCLUSION

It has been the aim of Goldus Pty Ltd to spend a considerable amount of money in exploration once this lease is renewed. The combination of the magnetic, radiometric geophysical exploration will assist us to correlate known geological anomalies in this area, thus giving strong justification for a comprehensive follow up ground exploration program.

Respectfully

Neil Russell-Taylor

CEO, Goldus Pty Ltd

Gravity Surveys

Survey Design 2003

Feasibility and preliminary findings

Part A EL 2799 *Teetulpa*

Part B EL 2511, 2822 *(Jubilee Mine, Wagstaff, Bonnie Brae, Lewis, Southerncross Bore & Manna Hill)*

[1]

Report No. 001/2003
Gravity Survey Design
EL 2511, 2822 (*Lewis, Sotherncross Bore & Manna Hill?),*
2799(*Teetulpa, Wagstaff & Bonnie Brae*)

[1] Image from www.smoy.fi/suomi/images/ equipm/CG3.jpg

Contents

Client request: N. Taylor – design a possible gravity survey over the Teetulpa area
J. Fryar – look at other tenements and recommend any localities suitable for gravity surveys

1 Introduction

Exploration work within the Goldus tenements (Figure 1) has highlighted several geologically interesting areas. Goldus has increased the potential of its exploration success by utilising geophysical techniques in both its regional and detailed assessment of its tenements.

Preliminary interpretation of airborne magnetic and radiometric data has resolved several targets. Two of these were selected for further scrutiny with 3D magnetic modelling exercises in 1999-2001. The modelling attempts were conducted on the Jubilee Mine and Wagstaff anomalies. A broad gravity anomaly near the Southern Cross Bore was also modelled using a 3D-gravity algorithm. Depth to target was calculated in each case to assess the potential for future exploratory drilling. Several holes were placed on a smaller anomaly delineated in the Wagstaff modelling exercise. Only one hole was drilled to test the anomaly but was terminated before the estimated target depth.

A major problem associated with geophysical modelling completed to date has been the lack of modelling constraints. The absence of detailed information including surface geology, old exploration data and additional geophysical methods has produced models that are poorly constrained. To minimise the inherent modelling errors and improve the target accuracy Goldus is considering the application of the gravity method to supplement the magnetic data over selected target areas.

This document discusses the location of potential gravity lines within Goldus's tenements. The discussion will focus on the suitability of the gravity method and detail some basic survey parameters.

2 Justification for the gravity method

The following questions need to be discussed at management level to justify proceeding with a gravity survey.

2.1 Questions to consider

a. Why do a gravity survey?
b. Where should the lines be placed?
c. What reading spacing should be employed?
d. Will follow up surveys be required?
e. Is geological data available to indicate density contrasts in the area in question; what geology is associated with any anomaly put forward for additional work; will the anomaly have a detectable density contrast?
f. Should gravity line be placed over magnetic anomalies or in other quiet magnetic regions? What geological-geochemical evidence is available?
g. Are the gravity lines best placed where preliminary magnetic modelling has been done?
h. Does the regional gravity (PIRSA) indicate a local variation or is the 8km reading spacing too large?
i. What depth of target is sought? Shallow means close readings.
j. Where are the best places to start?
k. Details to be supplied to the contractor
    - maps and coordinates for the lines
    - requirements for station spacing
    - presentation of data including heights, gravity readings corrections applied
    - if no DTM available will contractor take height reads off-to sides of the gravity line (for hilly terrain)
l. Will the contractor do post survey processing ie bouguer correction or will this be done in house.
m. The gravity data will require modelling to calculate depths to target, identify lithological changes and be incorporated with magnetic modelling
n. Post gravity-magnetic modelling integrated with exploration model and determination of drill hole siting

2.2 Summary and preliminary thoughts

My thoughts based on the questions posed above indicates that the recommendation of any gravity lines in this report are only initial proposals and will require modification once the questions highlighted through out this document have been pondered and discussed.

The application of the gravity method to assist in resolving drilling targets within the tenements is likely to be justifiable if the questions and requirements alluded to in this report are adequately answered.

I would suggest that the best exploration approach would involve several lines over specific anomalies that have received some preliminary work ie-magnetic modelling and geological study.

I have attempted to look at each of the main areas of interest and propose some possible gravity lines and the parameters to use. The merits of each area need to be examined and assessed on all available data and no action should be taken until the questions posed in this document have been answered.

NB *I have not been in a position to answer most of the questions I have posed as the client has not provide it and hence answering the questions is beyond the remit of this exercise.*

3 Regional gravity data

The regional gravity data shown in Figure 1 provides a broad summary of gravity variations within the tenements. The gravity field within the tenements needs to be examined to ascertain what gravity variation exists and to provide some indication of what results may arise from the gravity surveys. It must be noted that the readings are on an 8 km grid (*for the most part – some company surveys have been appended to the regional survey data*) and hence provide only a regional sense of the gravity fluctuations.

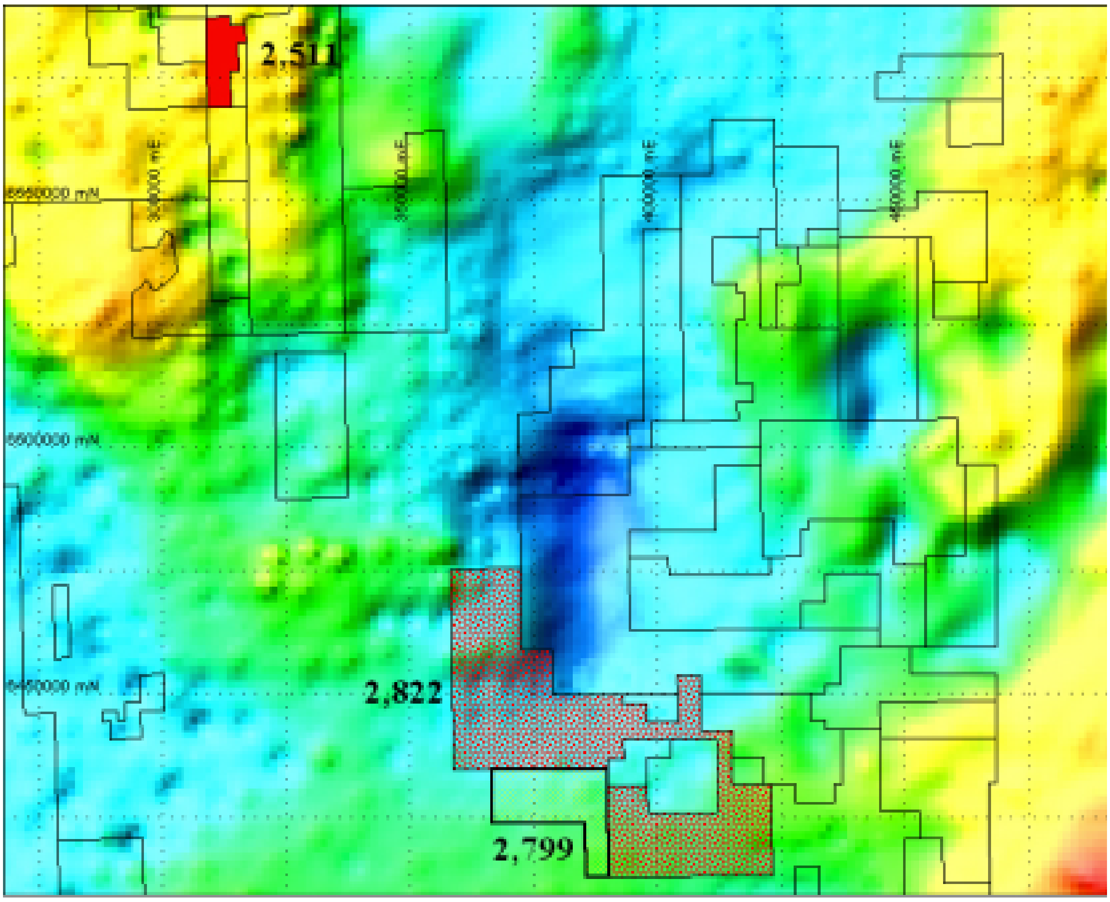


Figure 1 Goldus tenements in relation to regional bouguer gravity. *(red high, blue low)*

Tenement	Gravity field comments
EL2799	Small variations 2-3mGals max
EL2511	Small variations max 2mGals
EL2822	Northern – max 6mGals over a gravity high (broad ridge) Southern max 2 mGals small variations
EL2823	Large variations max 17mGals – highs and regional low

Table 1 Approximate gravity variations within Goldus tenements.

Figure 9 Possible plan for gravity contractor for a gravity line over the northern Wagstaff anomaly.

5.3 EL2511 - Jubilee Mine magnetic anomaly

Previous work on the Jubilee Mine anomaly indicated the presence of a small magnetic body at a depth greater than 150 metres. Additional data gathered from a gravity survey would provide an additional constrain on geophysical modelling thereby improving the estimated depth to the top of the target. This location would still need to be scrutinised using the set of questions outline previously in this document.

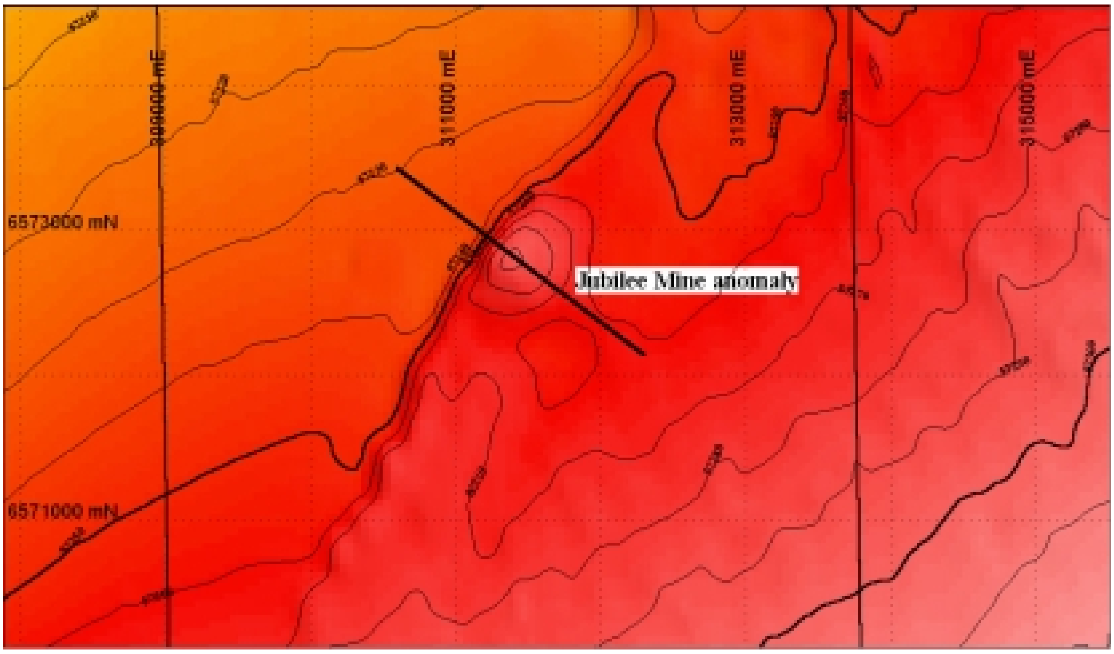


Figure 10 Jubilee Mine magnetic anomaly with a possible gravity line.

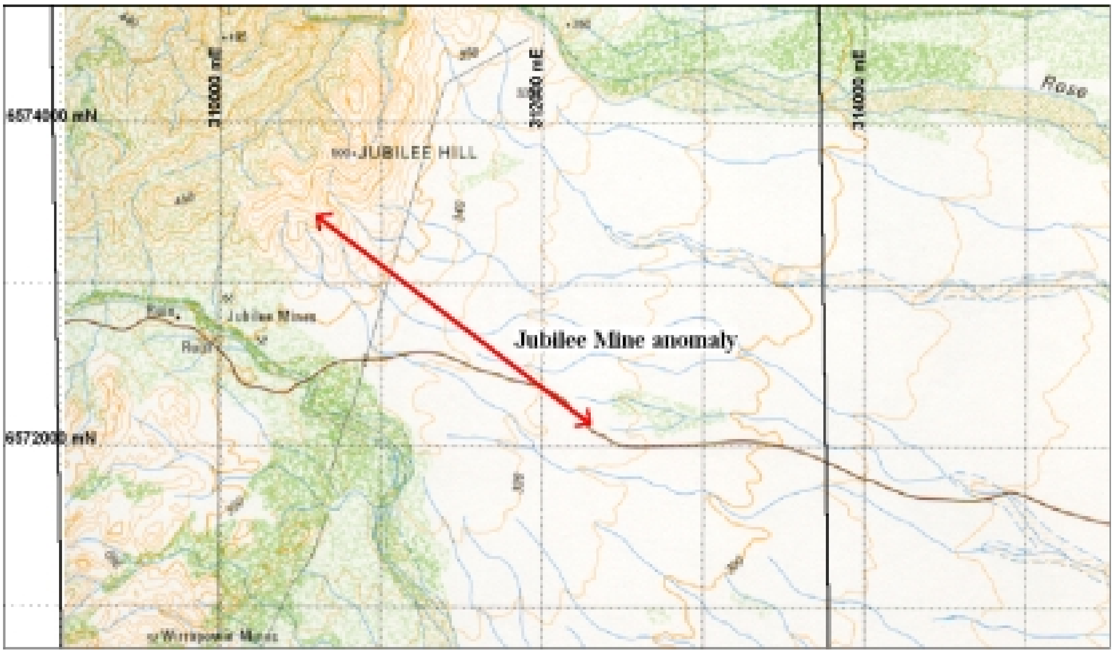


Figure 11 Contractor map for Jubilee Mine anomaly.

5.5 Southerncross Bore

Previous work on the Southern cross Bore area included an attempt to model the regional gravity with the aim to propose a broad geological model for the area. The modelling certainly indicated a possible basement ridge. The extreme distance between the gravity readings only provided a deep look at the structure through this part of the Nackara Arc.

A detailed assessment of possible exploration targets/models and appropriate exploration methods would be required before committing to a gravity survey proposal.

5.6 Bonnie Brae and Manna Hill

There is no data readily available[9] to assess these locations for gravity work. The absence of detailed assessment of these areas with techniques such as ultra low level magnetic/radiometric surveys or ground magnetic work combined with geological/geochemical (Au detection) surveys precludes any comment on siting gravity lines. A detailed look at the magnetic data sets may provide some clues.

[9] No work has been commissioned to examine older geophysics or geology data from these areas.

6 Survey parameters

This section is incomplete and reflects the type of data that would be required by the contractor including maps of the details tabulated in the example table below.

Contractor	Haines Survey
Gravity meter	Sintrex ????
Reading accuracy	0.01mGals
Position accuracy	
Height accuracy	
Terrain measurements	
Survey dates	
Land access	

Line number-name	Line length (km) approx	Start/Finish points AMG 84
Line 1 Teetulpa	7	372950/6427045 to 377910/6432265
Line 2 Teetulpa	7	373025/6431995 to 378300/6426945
Line 3 Teetulpa	6	372645/6430960 to 377095/6426670
Line 4 Teetulpa	4	373295/6429435 to 375960/6432175
Line 5 Jubilee Mine	2	310600/6573400 to 312300/6572100
Line 6 Lewis	3	369765/6434570 to 367785/6437020
Line 7 Lewis	2	370540/6435985 to 369000/6437485
Line 8 Wagstaff	8	379130/6437600 to 373865/6431720
Line 9 Southern cross	23	323440/6443415 to 346775/6444357

Table 2 Possible line details for contractor

Line number	Line segment @ 100m	Line segment @ 50m
Line 1		

Table 3 Details of possible variations in reading spacing

7 Conclusion

The only location that has, what I perceive, as adequate preliminary work is the Wagstaff anomalies. With some justification, it may be prudent to undertake a gravity survey over these anomalies with emphasis on determining more accurately the geometry and depth of the bodies.

I feel that a secondary site may exist at the Jubilee Mine anomaly.

The Teetulpa area would be further delineated by the gravity method but without additional ground work and detailed assessment of the high quality magnetic data it would be extremely difficult to define any discrete drill sites from the proposed gravity lines.

Yours Sincerely

Dr David Miller 02/02/03