DAVENPORT RESOURCES

SOUTHERN CROSS BORE PROJECT

MAGNETIC AND RADIOMETRIC INTERPRETATION

OCTOBER, 2017

SGC3262

SOUTHERN GEOSCIENCE CONSULTANTS

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ABBREVIATIONS

1VD	first vertical derivative
2VD	second vertical derivative
2D	two-dimensional
3D	three-dimensional
GPS	Global Positioning System
IP	induced polarisation
RTP	reduced-to-pole
SGC	Southern Geoscience Consultants
TMI	Total Magnetic Intensity
UTM	Universal Transverse Mercator

SUMMARY

7,290 line km of airborne magnetics and radiometrics was flown by MagSpec airborne surveys in July 2017 over the Southern Cross Bore project. The Southern Cross Bore Project includes one known deposit, Johnnies Reward, which is characterised by a discreet magnetic anomaly.

The new detailed magnetic and radiometric survey has delivered good quality data and has enhanced the understanding of the area. A new structural and lithological interpretation has been completed and has delivered a range of exploration leads.

Sixteen discreet targets have been highlighted, fourteen magnetic targets and two radiometric targets. All of these targets are recommended for field investigation, there are three high priority targets that are analogous to the Johnnies Reward deposit, and are recommended for high priority follow up. Additional to these targets, 5 broader areas of general exploration interest have been selected as areas for more regional exploration focus.

1 INTRODUCTION

Southern Cross Bore is located approximately 75km north-east of Alice Springs in the Northern Territory (Figure 1). 7,290 line km of airborne magnetics and radiometrics was flown by MagSpec airborne surveys in July 2017. The magnetics survey is comprised of 100m spaced lines on an east west bearing. This data was processed and used as the basis of the 1:25,000 scale interpretation.

The aim of the interpretation was to elucidate the magnetic and radiometric aspects of the geology to drive better understanding of structure, lithology and alteration in the project area. The detailed magnetics was also aimed at defining areas of potential exploration interest and direct targets for Cu, Au and any other possible mineralisation.

A previous interpretation was completed with the open file 400m line spaced magnetics data at 1:100,000 scale, but this interpretation showed that while there was significant lithological and structural information, the 400m data was not detailed enough to significantly improve on the understanding of the area and provide exploration targets.

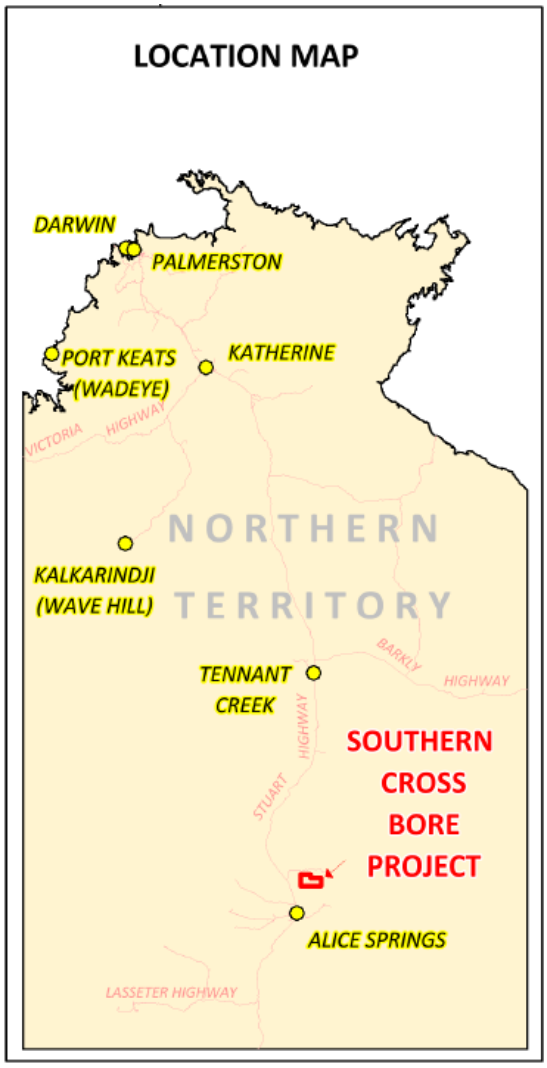

Figure 1. Southern Cross Bore Project location plan on Northern Territory Map.

2 GEOLOGICAL SETTING

The area is extraordinarily complex due to high grade metamorphism and multiple complex deformation events. The government mapping of the project area is of high quality and is shown at 1:250,000 scale in Figure 2 and 1:100,000 scale in Figure 3. The Strangways Metamorphic Complex is the dominant suite/group in the project area. The most extensive formation present is the Cadney Metamorphics which are present over most of the eastern half of the tenements and is highlighted in cyan in Figure 2. The only known deposit in the immediate area is Johnnies Reward, which is characterised by a discrete magnetic anomaly. Johnnies Reward is also located within the Cadney Metamorphics. Other formations present include; Erontonga Metamorphics, Yambah Granulite, Southern Cross Schist Zone, Utnalanama Granulite, and Wuluma Granitoid. Each of these formations contains multiple lithologies. The lithologies are highlighted in the 1:100,000 scale mapping in Figure 3, this mapping shows the complexity of the geology.

The controls on mineralisation are not well understood in the area due to the complexity and relatively limited exploration in the area. Calc-silicate lithologies and magnetic alteration are common and potentially important for exploration. 'Magnetite-creative' alteration is a feature of much (but not all) of the mineralisation in the Arunta region.

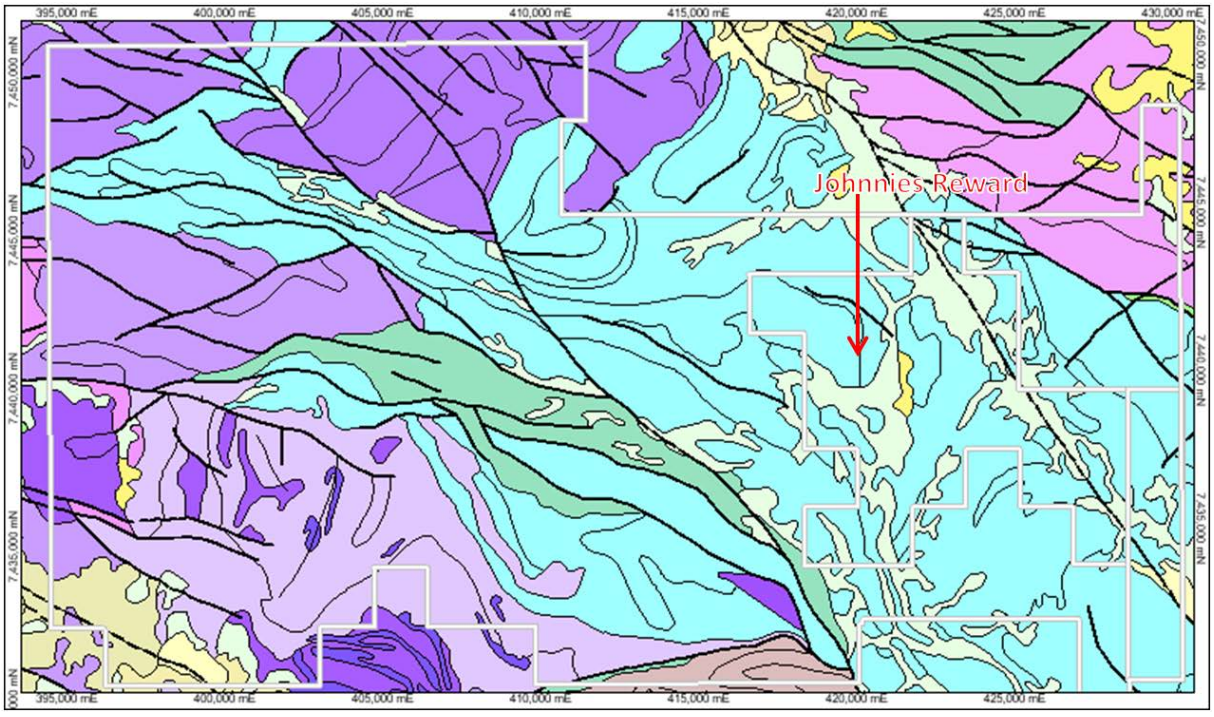

Figure 2. 1:250,000 scale Geology from the digital Alice Springs sheet, highlighting the location of Johnnies Reward.

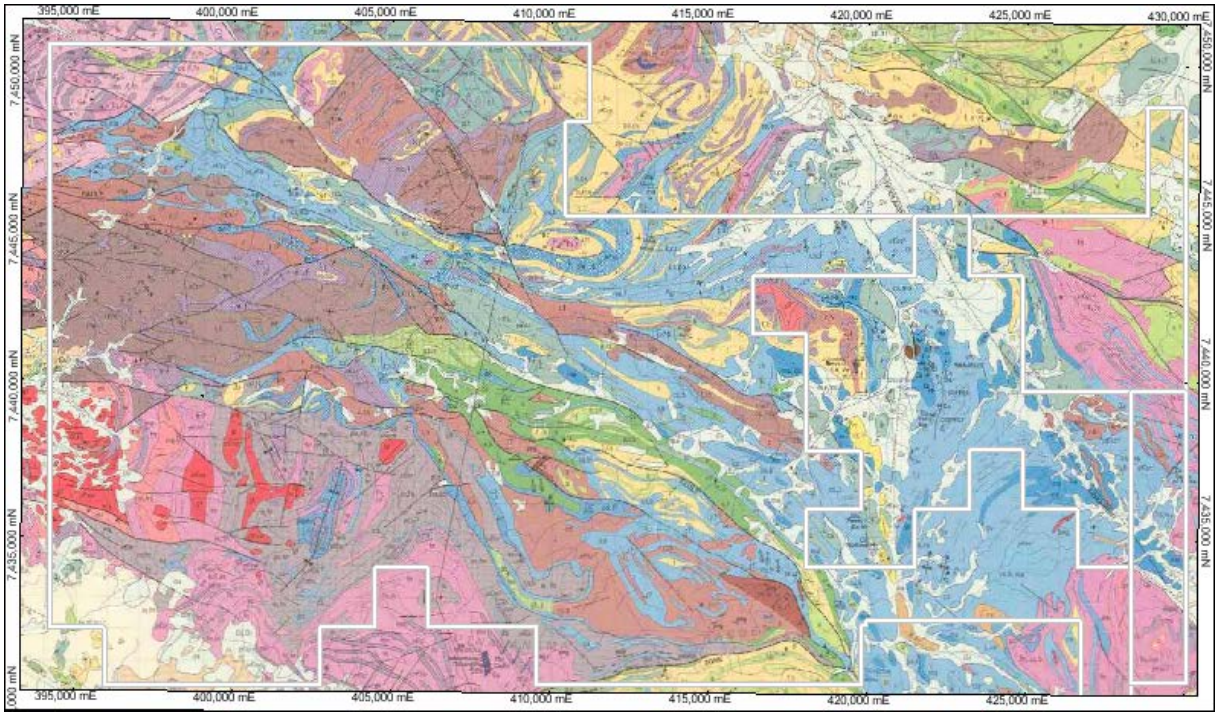

Figure 3. 1:100,000 scale Geology from the scan of the Strangways Range sheet.

3 DATA QC AND PROCESSING

All airborne survey data was of high quality and has significantly improved the understanding of the radiometric and magnetic character of the area. All data was processed in GDA94 MGA zone 53.

The survey details are shown in Table 1, while a summary of magnetic and radiometric imagery is shown respectively in Figure 4 and Figure 5.

Table 1. Airborne magnetic survey information for the merged imaging and the data used for the interpretation.

SURVEY NAME	METHODS	JOB #	CONTRACTOR	SURVEY YEAR	FLIGHT LINE SPACING (metres)	MEAN TERRAIN CLEARANCE (metres)	FLIGHT LINE DIRECTION (degrees)	DATA STATUS
Southern Cross Bore (SC1)	MAG RAD DEM	1060	MagSpec Airborne Surveys	2017	100	50	090 – 270	Confidential

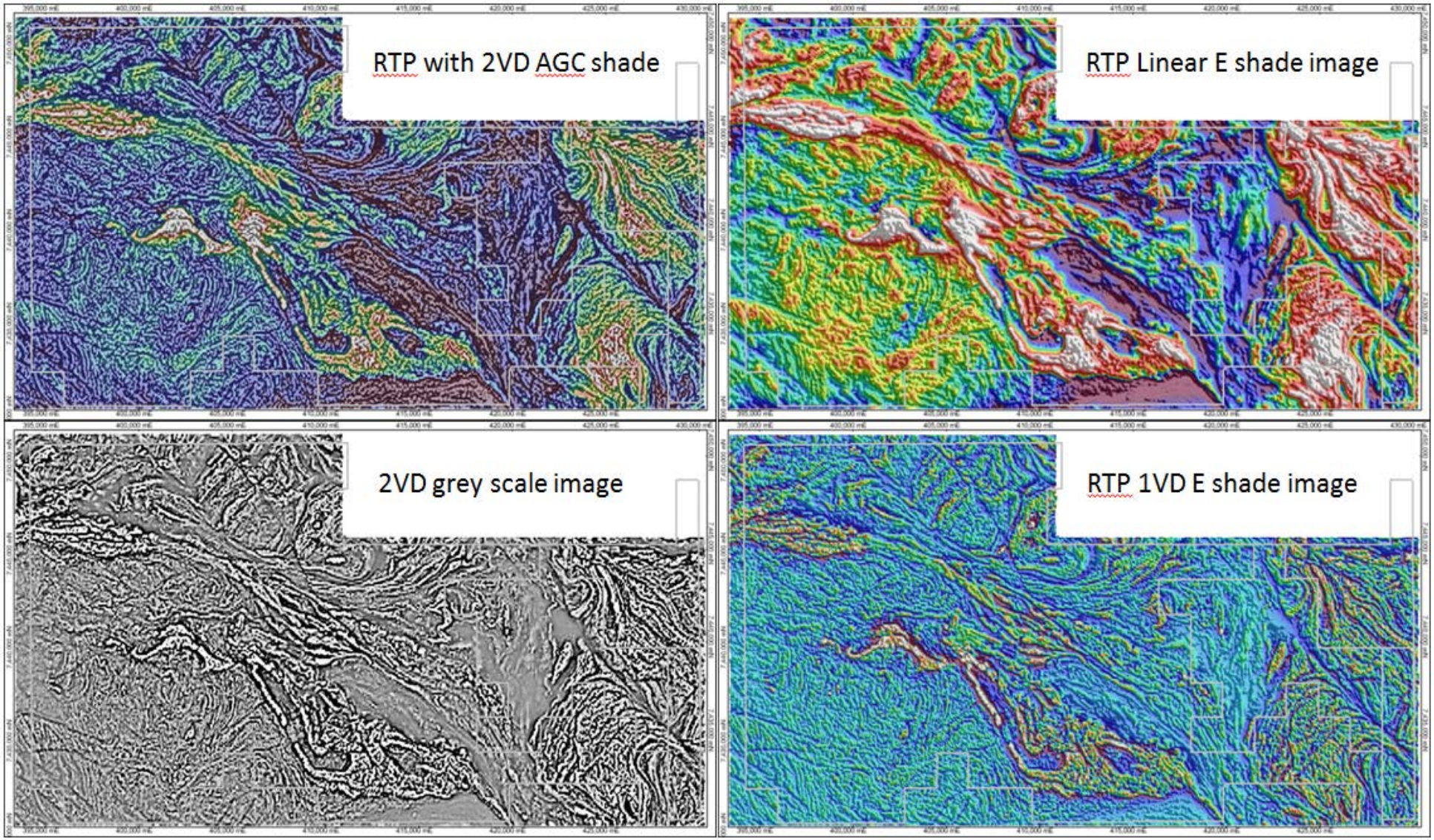

Figure 4. Summary of magnetics images used for interpretation.

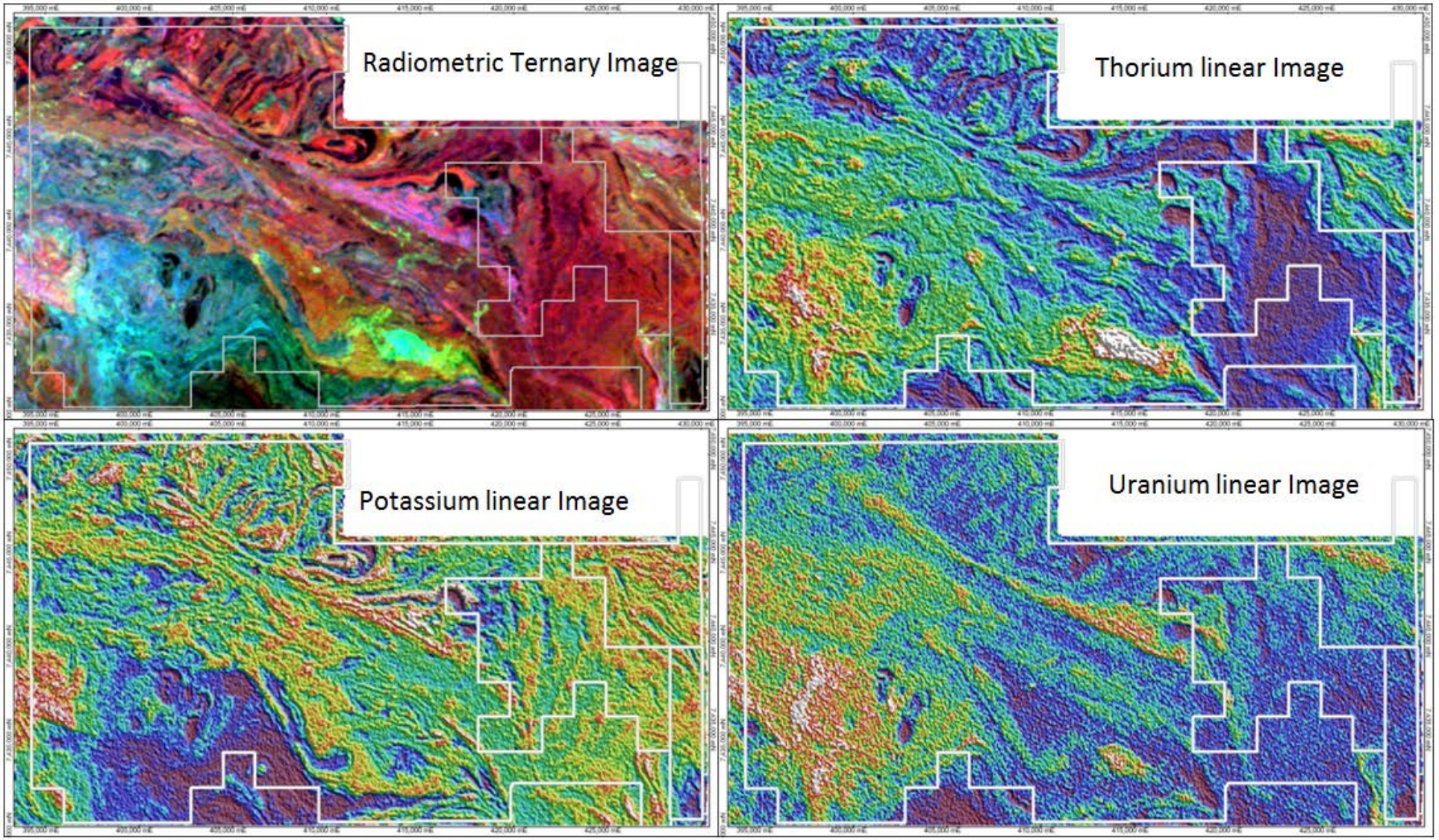

Figure 5. Summary of radiometric images used for interpretation.

4 MAGNETIC AND RADIOMETRIC INTERPRETATION

The interpretation is highly complex, and the geology is interesting. The airborne survey data has provided both an expansion and simplification of the geological picture.

Our approach to the integration of geological and airborne geophysical data centres on a stage of observation, followed by integration and interpretation.

The initial step in the interpretation is to make basic observations of:

- Magnetic rock units,
- Faults, contacts, trends
- Radioelement zones and contacts

Some of these basic observations are retained in the final interpretation plan and are presented as mapinfo layers, shown in Plan 1 and 2:

Magnetic rock units - the lines on this layer represent our best estimate of the shape and position of the coherent rock units that contain magnetite and/or pyrrhotite. The dominant highly magnetic rock units are likely magnetite-bearing lithologies and or alteration. The strong and moderate magnetic rock units are highlighted as thick units while low amplitude units are denoted by thin units.

Major faults – Major breaks in magnetic character, with significant offset and large strike extent, are likely to be recent, as they predominately appear to be post deformation.

Fault with displacement discontinuity – significant faults or breaks that are depicted by significant unit terminations or offsets.

Minor fault or fracture – These magnetic lows or breaks represent possible minor faults with limited displacement or possible fracture zones.

The next step of the interpretation process is the integration with the geology, this was primarily achieved through:

- Cross-reference mapped rock units
- Generalise, redefine units with mag/rad
- Consolidate fault structure

The area has undergone significant deformation and metamorphism and has strong structural complexity, therefore, there is a huge amount of lithological and structural information present in the magnetics and

radiometric data. The radiometric and magnetic signature is cross-referenced with mapped rock units that are used to interpret lithology in conjunction with the 1:250,000 and 1:100,000 geological mapping. A summary of the radiometric and magnetic signatures are presented in Table 2. The magnetic and radiometric signatures have been used to adjust the mapped lithologies in places where the mapping and interpreted signatures do not match. In areas where there are subtle, but desirable differences within a lithology, the internal subdivisions have been retained to highlight the variations. When numerous lithologies had similar magnetic and radiometric signatures, existing mapping was used to indicate which lithology was most likely. For example, mafic granulite, amphibolite, marble and mafic calc-silicate rocks all have low radiometric signals and variable magnetic signals. Future field mapping can be used to update the current interpretation.

Table 2. Summary of magnetic and radiometric signatures of various lithological units.

Lithology	Magnetic and radiometric signature summary
Garnet-biotite gniess	Predominantly weakly magnetic with moderate to high radiometric signature and some high thorium anomalies.
Cordierite gneiss	Predominantly weakly magnetics and moderate radiometric signature, (predominantly turquoise in ternary).
Cordierite granulite	Predominantly weakly magnetic with moderate to high radiometric signature, including some high thorium and uranium response (predominantly bright turquoise in ternary).
Quartzofeldspathic gneiss	Predominantly weakly magnetic, some moderate high magnetic areas; moderate to high potassium signature, (predominantly pink in ternary).
Felsic granulite	Weakly to highly magnetic; moderate to high potassium signature, (predominantly pink in ternary).
Sillmanite-bearing gneiss	Moderate to highly magnetic, and moderate to high radiometric signature, including some thorium anomalies.
Biotite gneiss	Variable magnetic response, low to high amplitude, moderate radiometric signature.
Granite gneiss	Low magnetic signature, moderate to high radiometric signature.
Migmatite	Variable magnetic signature, moderate radiometric response.
Amphibolite	Very low radiometric response, variable magnetic response.
Calc-silicate	Variable magnetic and predominantly low radiometric signature, very low thorium, some potassium, (dark pink in ternary).
Marble	Very low radiometric response, variable magnetic response
Mafic calc-silicate rock	Very low radiometric response, variable magnetic response

5 TARGETS

Targeting was undertaken based on the magnetic and radiometric data, and have been processed and analysed to identify unusual or unexplained features. Broad areas of interest have been identified within 'anomalous' magnetic, radiometric and geological areas. Magnetic alteration is known to be important in some mineralisation styles, and the known deposit of Johnnies Reward is a discrete, strong magnetic anomaly. Similar local magnetic highs are therefore of interest. The highest intensity parts of the magnetics within lithological and alteration zones have also been targeted as areas of interest. Unusual or unexplained radiometric anomalies are also considered to be targets and are generally small, discrete and unusual zones of enhanced thorium and or uranium. These anomalies appear unrelated to the underlying lithology, and are not fully understood in terms of how they may relate to a mineralising system. The anomalies may potentially be related to alteration.

The targets are based on the geophysical interpretation and their assessment will require new field geological/geochemical observation. Ranking and prioritisation of targets will benefit from specialist geological input and this input is likely to identify additional target areas in the SGC interpretation map.

Three categories of targets have been interpreted:

1. Magnetic Targets; discrete magnetic anomalies or highest amplitude zones of magnetic units.
2. Radiometric Targets; unusual discrete high amplitude radiometric signature.
3. Broad areas of interest; combining lithologies and radiometric/magnetic signatures.

Fourteen magnetic targets (three of which are high priority) are based on knowledge at Johnnies Reward. Two radiometric targets were selected with thorium and uranium anomalies that have no apparent cause in the geological mapping. Five broad areas of general exploration interest were chosen, based on presence of reactive lithologies (like calc-silicates) and evidence of 'unusual' magnetic alteration. These are proposed as areas of reconnaissance.

All of these targets deserve further investigation. The targets chosen as the highest priority are the three discreet high amplitude magnetic targets T1, T2, and T3, which are most analogous to Johnnies Reward, only larger in size and amplitude.

All targets are summarised in Table 2 and in Plan 2.

Table 3. Target summary.

Target name	X_MGA94	Y_MGA94	Target Type	Priority	Description
Johnnies Reward	419779	7440568	Magnetic		Known mineralisation, high amplitude discreet magnetic anomaly.
T1	409563	7446803	Magnetic	1	High amplitude discreet magnetic anomaly, slightly smaller but similar size and amplitude to Johnnies Reward deposit, mapped as quartzofelspathic gneiss, but this looks unlikely based on radiometrics, more likely to be within calc-silicates or mafic calc-silicate rock.
T2	409599	7446346	Magnetic	1	Very high amplitude discreet magnetic anomaly. Larger in size and higher magnetic amplitude than Johnnies Reward deposit. Mapped in 100k scale mapping as mafic granulite's.
T3	408862	7446171	Magnetic	1	Very high amplitude discreet magnetic anomaly. Larger in size and higher magnetic amplitude than Johnnies Reward deposit. Mapped in 100k scale mapping as mafic granulite's.
T4	407999	7444997	Magnetic	3	Moderate amplitude magnetic anomaly, appears to be locally discreet but could be related to elevated magnetic alteration within the calc-silicate lithology.
T5	404656	7444372	Magnetic	3	Moderate amplitude magnetic anomaly, appears to be locally discreet but could be related to elevated magnetic alteration within the lithology. Located in zone area between major structures.
T6	401985	7440140	Magnetic	2	Highest amplitude centre of a high magnetic alteration zone (Target Zone TA1).
T7	405879	7439400	Magnetic	2	Highest amplitude centre of a high magnetic alteration zone.
T8	406236	7439149	Magnetic	2	Highest amplitude centre of a high magnetic alteration zone.
T9	406979	7438657	Magnetic	2	Highest amplitude centre of a high magnetic alteration zone.
T10	408526	7434444	Magnetic	3	Local discreet magnetic high within a regional to moderate to high magnetic alteration.
T11	417810	7438143	Magnetic	3	Local (possibly discreet) weak to moderate magnetic anomaly within a weak to moderate magnetic unit.
T12	417551	7433104	Magnetic	3	Local discreet magnetic high within a regional to moderate to high magnetic alteration.
T13	420752	7430704	Magnetic	3	Local weak to moderate magnetic anomaly within a weakly magnetic area.

T14	429010	7438338	Magnetic	3	Local discreet magnetic high within a regional to moderate to high magnetic alteration.
T15	406241	7438368	Thorium	2	Discreet thorium anomaly, minor discreet uranium anomaly and in area of moderate magnetic alteration. Thorium and uranium do not appear related to drainage or obvious lithological variation.
T16	409460	7437705	Thorium	2	Discreet thorium anomaly in area of high magnetic alteration. Thorium is not apparently related to drainage or obvious lithological variation.
AOI-1	402302	7439681	Area Of Interest		Region of high magnetic alteration, and area directly south of main alteration but within the same Cadney Metamorphics Formation. This includes the location of known gossan approximately 200m south of main magnetic alteration within the mafic granulite's or the mafic calc-silicate rock.
AOI-2	409614	7437216	Area Of Interest		This is a distinct magnetic zone containing highly magnetic alteration, including the 4 targets T7, T8, T9, T10 that are related to the most highly magnetic parts as discussed previously. It also includes the thorium and uranium targets T15 and T16. It is mapped as a likely mixture of Cadney Metamorphics Formation and Southern Cross Schist Zone in the 1:100k scale mapping (Shaw, et al, 1976).
AOI-3	417543	7439510	Area Of Interest		Radiometrically distinct unit, (significantly higher uranium than in surrounding units) that appears to be related to Cadney metamorphic formation with, quartzofelspathic gneiss, calc-silicate and marbles, predominantly weakly to non-magnetic with some moderately magnetic units, possible shear zone.
AOI-4	418199	7441584	Area Of Interest		Radiometrically distinct, structurally complex unit, mapped as Cadney metamorphic formation with, quartzofelspathic gneiss, sillimanite and biotite gneiss, calc-silicate and mafics granulites lithologies. Predominantly weakly to non-magnetic with some moderately magnetic units. Includes the highly magnetic known deposit, Johnnies reward.
AOI-5	422093	7440780	Area Of Interest		Radiometrically distinct, structurally complex unit, has variable magnetic signature from high to very weakly magnetic in different regions. Mapped as Cadney metamorphic formation with main lithologies present calc-silicate and marbles. Directly east of the known deposit, Johnnies Reward.

6 CONCLUSIONS AND RECOMMENDATION

The new airborne survey was very successful and has delivered good quality data and a range of new exploration leads.

Three styles of targets have been selected, discreet magnetic targets, radiometric targets and broad areas of interest. Sixteen discreet targets and five broad areas of interest have been selected. These targets are recommended for further investigation. Field follow up, including mapping and geochemistry, will drive more rigorous ranking and prioritisation of targets. The highest priority targets recommended for ground follow up are the high amplitude magnetic targets T1, T2, and T3 which are most analogous to Johnnies Reward, only larger in size and amplitude.

Analysis of Landsat and Aster data in the project area should also be considered to enhance geology and targeting. A specialist in the economic geology of high grade metamorphic terrains may add significant value to the work compiled.

There remains scope for more detailed scale analysis of the airborne survey data, including modelling and inversion, but this is best suited to small areas of specific interest with confirmed priority. Geophysical follow up would be recommended for confirmed target areas; suitable methods include electromagnetics and IP, depending on the style of mineralisation expected.

7 REFERENCES

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Shaw, R.D., Langworthy, A.P., Stewart, A.J.,Pillinger, D.M., 1984. Geology of the Stangways Range Region , N.T.: Bureau of Mineral Resources, 1:100,000 Geological Map.

Shaw, R.D., and Wells, A.P., 1983. Alice Springs, N.T.: Bureau of Mineral Resources, 1:250,000 Geological Series Explanatory Notes.

PLANS

LEGEND

GENERALISED METAMORPHIC ROCK UNITS

The subdivisions below are driven by the mapped geology, but detailed form and location are derived from the aeromagnetic and radiometric data. Note that many units have internal subdivisions defined by subtle, but recognisable changes in magnetic or radiometric character. These are preserved in the interpretation for possible future reference. Expanded descriptions of these rock units can be found in the accompanying report.

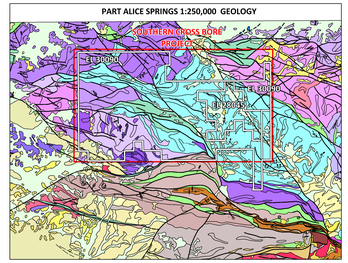
- v | Garnet-biotite gneiss
- | | Cordierite gneiss, sillimanite-cordierite gneiss
- in | Cordierite granulite, cordierite quartzite
- z | Sillimanite-bearing gneiss, garnet sillimanite gneiss.
- b | Biotite gneiss
- s | Muscovite-biotite schist or gneiss
- f | Quartzofeldspathic gneiss
- fn | Felsic granulite
- gg | Grandic gneiss
- gt | Granitoid
- mi | Migmatite
- mnn | mn | Mafic granulite, pattern indicates moderate to high magnetic response.
- a | Amphibolite
- ccm | cs | Calc-silicate rock, pattern indicates moderate to high magnetic response.
- mam | ma | Marble, pattern indicates moderate to high magnetic response.
- pam | pa | Mafic calc-silicate rock, layered amphibolite, pattern indicates moderate to high magnetic response.

STRUCTURE

- Major fault
- Fault with displacement or discontinuity
- Minor fault or fracture
- Magnetic rock unit trace, moderate to high amplitude; low amplitude

Interpreted by Karen Gilgallon, SGC from Airborne survey by MupSpec (100m NS lines, 50m height), geological control from 1:250,000 Alice Springs and 1:100,000 Strangeways Range regional map sheets

PART ALICE SPRINGS 1:250,000 GEOLOGY



LOCATION MAP

N

0 1,250 2,500

metres

SCALE 1:25 000

DATUM: GDA94
GRID: MGA ZONE 53

SOUTHERN GEOSCIENCE CONSULTANTS

DAVENPORT RESOURCES LIMITED

ALICE SPRINGS REGION, NT

SOUTHERN CROSS BORE PROJECT

SOLID GEOLOGY INTERPRETATION

FROM AIRBORNE MAGNETIC & RADIOMETRIC SURVEY

SCALE: 1:25 000	GEO: K. GILGALLON
DATE: 09-10-2017	GIS: T. STOYANOV
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LEGEND

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- gg | Granitic gneiss
- gt | Granitoid
- mi | Migmatite
- mvm | mn | Mafic granulite, pattern indicates moderate to high magnetic response.
- a | Amphibolite
- cpm | cs | Calc-silicate rock, pattern indicates moderate to high magnetic response.
- mam | ma | Marble, pattern indicates moderate to high magnetic response.
- pam | pa | Mafic calc-silicate rock, layered amphibolite, pattern indicates moderate to high magnetic response.

STRUCTURE

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- Fault with displacement or discontinuity
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AREAS OF EXPLORATION INTEREST

- Broad area of interest
- Discrete magnetic targets
- Discrete radiometric targets

Interpreted by Karen Gilgallon, SGC from Airborne survey by MagSpec (100m NS lines, 50m height). geological control from 1:250,000 Alice Springs and 1:100,000 Strangways Range regional map sheets

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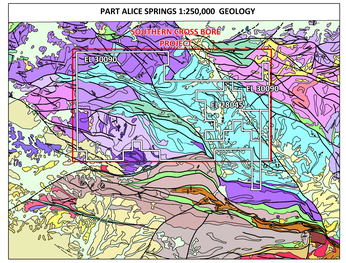
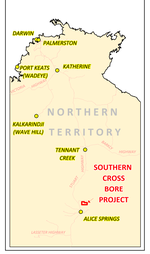


LOCATION MAP



N

0 1,250 2,500 metres

SCALE 1:25 000

DATUM: GDA94
GRID: MGA ZONE 53

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SOUTHERN CROSS BORE PROJECT

EXPLORATION TARGETS OVER

SOLID GEOLOGY INTERPRETATION

FROM AIRBORNE MAGNETIC & RADIOMETRIC SURVEY

SCALE: 1:25 000	GEO: K. GILGALLON
DATE: 09-10-2017	GIS: T. STOYANOV
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