SHREE MINERALS LIMITED

SULPHIDE CREEK - MT SORELL AEROMAGNETICS/RADIOMETRICS REPROCESSING AND PRELIMINARY INTERPRETATION

By:

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1 Executive Summary

This report describes the results of data enhancement and preliminary interpretation of public domain aeromagnetic data and radiometric data covering the Shree Minerals Sulphide Creek and Mt Sorell tenements in northwest Tasmania. The two tenements are clearly located along the Harvey Creek Fault so have been interpreted together.

Both aeromagnetic and radiometric data play an important role in the interpretation. The aeromagnetic data provide definitive structural information, showing the continuity of the Harvey Creek Fault system from Sulphide Creek to Mt Sorell and highlighting a linear magnetic high in the west of the Mt Sorell tenement which is a potential gold target. The radiometric data provide better lithological information than the magnetics, especially at Sulphide Creek where there is limited response from the sediments.

The project has involved enhancement of magnetic signatures utilising the latest data enhancement and analysis techniques, estimation of magnetic source depths and mapping of major magnetic elements and lineaments. No single filter contains all the information on magnetic sources and a range of wavenumber and spatial filters were applied to both grid and profile data. A range of filters has been developed to try to overcome the limitations of conventional filtering and enhance tonal and textural attributes simultaneously. Separation (layer) filters, grey-level co-occurrence texture filters and the gradient tilt angle all perform better than conventional filters but have very different enhancement characteristics with varying degrees of tonal/textural information content amplification. Combining the separation and tilt angle filters in greyscale with the terraced total magnetic intensity data in colour adds another dimension to image interpretation, providing much sharper, clearer images than conventional techniques. Spatial domain Hanning residual filtering and wavenumber domain fractional order derivatives and profile curvature filtering provided the best separation of shallow sources. The terraced magnetic intensity provides an effective combination of amplitude in colour with good textural content. Gradient maxima/strike plotting provided excellent mapping of contact features, resulting in an objective magnetic lineament analysis. 3D Euler deconvolution provided source depth information.

The second part of the project involved a more quantitative approach, using magnetic profiles rather than gridded data. This has involved filter enhancement of magnetic profile data and modelling/inversion of selected profiles. Stacked profiles help resolve issues seen in images, as amplitudes are clearer. At sulphide Creek, modelling/inversion of the Harvey Creek Fault magnetic anomaly suggests a thin tabular source, dipping at moderate to steep angle to the west. The source of this magnetic anomaly is unknown but in view of its location along the Harvey Creek Fault is a possible gold and base metal target. The high amplitude magnetic anomalies along the Harvey Creek Fault on the slopes of Mt Sorell are possible gold targets. The aeromagnetic results, supported by geochemistry suggest that the eastern half of the Mt Sorell tenement has VHMS potential within both the Central Volcanic Complex and adjacent Western Sequence. The western sequence also has Cu-Au potential, including zones of porphyry and possible andesite. Unfortunately, the 1:25,000 geological mapping revision does not include the Mt Sorell tenement

The entire length of the Harvey Creek Fault at Sulphide Creek and adjacent fault systems are considered to be gold and base metal targets, especially if the low amplitude linear magnetic anomaly trend proves to be Mount Read Volcanics within the fault zone.

A total of six preliminary targets have been selected for Sulphide Creek and six targets for Mt Sorell

As a first step, a comprehensive phased program of integrating the magnetic and radiometric results with surface mapping is recommended. This should be supported by susceptibility measurements on outcrop and a geochemical program in the west of the EL42/2008 Mt Sorell tenement. Both wacker and stream sediment sampling would be useful.

Consideration should be given to a detailed helimag survey. The terrain is probably too severe for a low-level crop duster aeromagnetic survey and ground magnetic surveys would be difficult in steep heavily vegetated terrain.

2 Introduction

2.1 Introduction

The Shree Minerals Mt Sorell project consists of a single tenement, EL42/2008, located in the northwest of Tasmania, 20 km south of Queenstown. Access is difficult and little work appears to have been done in the past with the Garfield prospect, 5 km to the north, the nearest drilling. The Shree Minerals Sulphide Creek project consists of a single tenement, EL43/2004, located in the northwest of Tasmania, 5 km south of Queenstown. Previous work has outlined a significant sediment hosted gold reserve.

The two areas are clearly located along the Harvey Creek Fault so have been interpreted together to set the regional picture. The Harvey Creek Fault system can be traced along strike for at least 35 km and is clearly a major fault.

Figure 1 shows the location of the projects and Figure 2 an image of Landsat TM bands 7,4,2. The Landsat appears to be dominated by vegetation with any geological information likely to be subtle. Figure 3 shows the SRTM DTM with 10 m contours.

2.2 Regional Geology

Figure 4 shows the geology of the area from the Mount Read Volcanic Belt Report, TGS 2002/19 (Corbett, 2002). The Mt Sorell and Sulphide Creek tenements lie within the Dundas Stratotectonic Element, one of seven elements recognized by MRT. During the Cambrian, a rift structure developed in Tasmania's continental crust forming the Dundas Trough. A north-south trending arc of volcanoes developed along the eastern margin of the rift, forming the rhyolitic-andesitic Mount Read Volcanics. West of the volcanic arc, volcanic detritus accumulated in the Dundas Trough. During the late Cambrian-early Ordovician the Owen Conglomerate was deposited in fault controlled basins, the thickest accumulations overlying the Central Volcanics of the Mt. Read Volcanics. These conglomerates formed the West Coast Range or Owen Conglomerate.

The area has undergone Mid to Late Cambrian to earliest Ordovician Delamerian (or Tyennan) deformation (Seymour et al., 2002) but the effects are difficult to recognize from the Devonian Tabberabberan orogeny. The structures controlling Cambro-Ordovician sedimentation are primarily north trending and include the Harvey Creek Fault.

More laterally extensive sedimentation followed with the deposition of the Ordovician to Devonian age sandstone, shale and limestones. The growth faults which controlled basal Ordovician sedimentation remained active during this period and are interpreted to be associated with mineralisation in middle Ordovician Gordon Group limestone and shale such as that at Lynchford - Coupon Prospect.

Ordovician-Devonian sedimentation was followed by extensive Devonian granitoid intrusions and deformation associated with the Tabberabberan Orogeny.

2.3 Local Geology

Sulphide Creek (EL 43/2004) is located in a structurally complex area of Lower Paleozoic sediments, along the NNW Harvey Creek fault system (Newnham, 1995). The Harris syncline is the major structure east of the fault and the Coupon anticline west of the fault. Fold axes and faults are approximately NNW with fold plunge to the NNW. Some authors have interpreted the narrow linear magnetic high zone along the Harvey Creek Fault as a sliver of Mount Read Volcanics. Others have interpreted the narrow linear magnetic high zone along the fault as a sliver of Tyndalls Group. Modelling tends to support a volcanic source. Conglomerates and sandstones of the Owen Conglomerate outcrop on high ground west of the Harvey Creek Fault in the Coupon anticline and

are overlain by carbonates and siliclastics of the Gordon Group and Eldon Group. East of the Harvey Creek Fault, rocks of the Eldon Group are within the Haris Syncline.
The Coupon, anomaly 24-28 and the Davie gold prospects are hosted by Ordovician siliclastics and carbonates and are in close proximity to the Harvey Creek Fault.

Mt Sorell (EL42/2008) is located along the Clark River between the eastern slopes of Mt Sorell and the western slopes of Darwin Plateau. Previous work in the area included UTEM EM surveys by BHP and soil and rock chip geochemistry by Aberfoyle and RGC (Lewis, 1996, McNeill, 1996)). The available 1:25,000 geological mapping shows a north south striking, west facing sequence with Central Volcanic Complex in the east and Western sequence volcaniclastics in the centre, and sediments of the Tyndall Group in the west. A small area on the edge of Mt Sorell is the overlying Owen Conglomerate. Unfortunately, the 1:25,000 scale geological map of EL42/2008 has not been updated but mapping to the north shows a more complex situation in the Western Sequence with significant porphyry in the western part of the Western Sequence. Magnetic interpretation suggests that the Harvey Creek Fault cuts through the Tyndall Group, close to the contact with the overlying Owen Conglomerate.

The Central Volcanic Complex rhyolitic-dacitic lavas are interpreted as the oldest rocks in the area. These are interbedded with narrow bands of black siltstone and are locally intruded by the Cambrian Darwin Granite which outcrops less than 200 m from the eastern border of EL42/2008. Cambrian granites including the Darwin granite have been interpreted as extending below the Mount Read Volcanics arc and may have provided both fluids and a heat source. Modelling of regional gravity and magnetic data suggests that the Darwin granite underlies the Clark valley area (Leaman and Webster, 2002). Rocks of the Western Sequence outcrop west of the Central Volcanic Complex. These consist of west facing sequences of rhyolitic lavas, conformable sub-volcanic sills and volcaniclastics. Previous work has identified a 50-100m thick black shale unit at the base of the Western Sequence and this is considered a base metal target. Tyndall Group volcaniclastic conglomerates conformably overly the Western Sequence on the lower slopes of Mount Sorell and correlate with a distinctive magnetic anomaly zone with magnetic amplitudes up to 300 nT. This magnetic zone is interpreted as a continuation of the Harvey Creek Fault. A thick biotite porphyry unit at the top of the Western Sequence is considered to be a prime gold target. Siliciclastic conglomerate and sandstone of the Owen Conglomerate conformably overlies the Tyndall Group on the lower slopes of Mount Sorell. The Western Sequence has been mapped as a broad anticlinal structure to the north with suggestions that this may continue to the south. As well as the NNW Harvey Creek Fault, NW and NE faults have been mapped in the south of the area.

2.4 Airborne Survey Data

Geoinstruments were contracted to fly a semi-regional helimag survey covering the area of interest in 2001. The helimag/radiometric survey was flown along east–west lines with 200 m line spacing at a nominal flight height of 80 m. Tie line spacing was 2000 m. The magnetometer was mounted in a forward pointing boom in a Bell 206 helicopter platform. Navigation was GPS, differentially corrected in real time. The magnetometer system was a Geometrics G822A cesium vapour magnetometer with 0.001nT resolution and an AADC compensator operating in real time. The magnetometer was sampled 10 times a second corresponding to approximately 7 m sampling

The Exploranium GR-820 gamma ray spectrometer used 33.6 litres of detector crystal. The spectrometer sample interval was 1 second, corresponding to 70m sampling.

The field strength is approximately 61900 nT, inclination is -72° and declination –12°. Average terrain clearance was 74 m with a range of 22 to 467 m. The located data were gridded at 50 m mesh size using bi-directional spline gridding.

QC on the airborne data revealed few problems apart from some minor level issues, seen as flight line striping. The process of removing the flight line noise is called "decorrugation" and was corrected by wavenumber filtering.

2.5 Sources of Magnetic Anomalies

Magnetic petrology combines rock magnetism and petrology to help understand all the processes involved in creation, modification or destruction of magnetite in rocks that affect magnetic signatures. Unfortunately, we do not have access to any studies on rock magnetic properties from the area but we can expect magnetic signatures of the various lithologies and possible mineralisation targets to be quite variable. We can expect reasonable contrasts in magnetization between Mount Read Volcanics and adjacent metasediments and granitoids. There may be a possibility of potassic (biotite rich) alteration with secondary magnetite creation and significantly increased magnetization. Otherwise the main value of aeromagnetic interpretation is to locate magnetic anomalies that may be due to alteration related magnetite destruction, to provide structural information and to map small intrusions. Magnetic lows due to magnetite destruction along fracture systems are often an indicator of alteration.

In metamorphic rocks, rock magnetic properties are complex and result from both the primary composition of the rocks and the metamorphic history. Secondary magnetite is produced by breakdown of Fe-Mg silicates such as biotite during prograde metamorphism and depends mainly on composition and oxygen fugacity. Total iron places an upper limit on magnetite generation while the oxidation state controls partitioning of iron between oxide and silicate phases. Prograde metamorphism involves mechanical deformation as well as heating and this can cause primary opaque oxides to recrystallize to coarse textures. Coarsely crystalline magnetite has higher magnetic susceptibility and lower remanence than finely crystalline magnetite, due to the increased ease of magnetic domain boundary movement. The various mechanisms increase with metamorphic grade and have maximum effect in the upper amphibolite and lower granulite facies

Hydrothermal alteration can lead to either magnetite creation or destruction depending on conditions. Potassic (biotite rich) alteration around breccia pipes and plugs often involves magnetite creation and significantly increased magnetization. Alteration associated with epithermal systems tends to demagnetize the host rocks.

There is often a marked contrast in magnetic relief and magnetic texture between felsic volcanics and the coeval granitoids that can be explained by differences in cooling rates and conditions of formation. Unaltered intrusives tend to have moderate magnetic susceptibilities and low remanence due to their coarse grain size and prolonged cooling history, both of which tend to reduce remanence. In contrast, felsic extrusives are usually dominated by remanence due to their high oxidation states, compositions with significant Ti and small grain size.

3 Enhancement and Analysis Methods

3.1 Grid Analysis Techniques

Reduction to the pole has not been routinely applied to the data as there is clearly some remanent magnetization and reduction to the pole will distort anomaly shapes. At a field inclination of –72°, reduction to the pole has limited effect. Comparison of reduced to pole data, total magnetic intensity and 3D analytic signal suggests that reduction to the pole has had little overall effect on the data and the analytic signal amplitude centres anomalies over the source without any assumptions about magnetization directions.

Data enhancement and analysis were designed to assist in delineation of major magnetic domains and structures and estimation of magnetic source depths to assist the structural interpretation of the area and to provide a resource for future more detailed interpretation. The enhanced images and plots are available for further analysis when an area is being reinterpreted or new drillholes are completed etc.

A range of different spatial and wavenumber filters were applied to the data to try to deconvolve anomalies of interest. Derivatives are used routinely to highlight local anomalies and attenuate longer wavelength anomalies and as input to interpretation techniques such as location of gradient maxima. It is well known that derivatives of potential fields enhance the field component associated with shallow features and de-emphasize the field from deeper sources. Fractional vertical derivatives provide an objective, flexible approach to shallow layer separation filtering as the order of the fractional derivative can be selected to match the data and optimise enhancement of the shallow field component. Scalar horizontal gradient maxima of the TMI data have been plotted as magnetic strike symbols, colour coded to reflect relative amplitudes. The plots are an effective way of mapping contacts, faults etc. from aeromagnetic data and also map circular or elliptical anomalies as closed clusters of strike symbols. The plot highlights the main linear and curvilinear anomalies and also maps a number of discrete anomalies. The gradient maxima results are an important component of pluton and alteration anomaly target screening.

The Hanning residual is a high gain 3x3 spatial filter, which produces output data with similar curvature to a second vertical derivative filter. The filter enhancement has no directional bias and is very effective in highlighting local detail in areas of subdued magnetic relief.

Separation or layer filtering of magnetic data allows deconvolution of the effects of causative sources occurring around a particular level.

3D Euler deconvolution results provide a good indication of depth to shallow magnetic source information as well as mapping the position of major features.

The terracing method is a technique for direct geological mapping from aeromagnetic or gravity data developed by USGS, which transforms pseudo-gravity or gravity data into a step function. The method transforms smoothly varying anomalous fields into domains of uniform properties separated by sharp boundaries, more like a geological map. Gradient information is shown as white lines.

Ridgelet analysis locates local extrema in a grid file using curvature analysis. In the example included, the results are colour coded with anomaly amplitude. Results are presented as a stand-alone ridgelet plot and the ridgelets can be incorporated in the magneto-tectonic overview.

New techniques such as ridgelet analysis have great potential for improving anomaly resolution and provide an objective method of locating the center of the anomaly.

Analytical operations on the gridded data included:

- ⇒ Horizontal gradient in x & y directions and vertical gradient
- ⇒ Fractional vertical derivatives.
- ⇒ Separation filtering
- ⇒ Profile curvature as an alternative to residual filters
- ⇒ Hanning residual total magnetic intensity to enhance shallow sources. This is a spatial filter so it does not suffer from the edge effects seen in the FFT methods.
- ⇒ AGC filter
- ⇒ Gradient maxima/strike vector plotting
- ⇒ 3D Euler deconvolution
- ⇒ Terracing
- ⇒ Magnetic Ridgelets

3.2 Profile Analysis Techniques

Analysis of the located data included:

- ⇒ Wavenumber filtering - various filters, high-pass, separation filter etc.
- ⇒ Spatial filters including non-linear filter
- ⇒ Modelling/inversion of selected profiles

4 Results

4.1 Aeromagnetics

Figure 5 shows a residual magnetic intensity (IGFR removed) colour shade image. Magnetic intensity data range from -672 nT to 5272 nT, a dynamic range of 5944 nT. The north south complex magnetic signature of the Mount Read Volcanics dominate the image while the Lower Palaeozoic sediments have generally subdued magnetic expression. Within the Lower Palaeozoic Dundas trough, the dominant magnetic trend is approximately north–northwest, with highest amplitudes at Mt Sorell, which has a well, defined north-northwest linear magnetic fabric, along the line of the Harvey Creek Fault zone. In the south of the area, the zone of Western Sequence appears as a magnetic low in the magnetic intensity image, contrasted against the Central Volcanic Complex to the east and the Harvey Creek Fault Tyndall Group anomaly zone to the west. The low amplitude north-northwest anomaly trend in the southeast of EL43/2004 is clear against the subdued background of the Lower Palaeozoic sediments.

The fractional order 0.5 vertical derivative colour shade image (Figure 6) provides better resolution of local anomalies than the total magnetic intensity. Figure 7 shows a Hanning residual filter as a greyscale image, which provides the best resolution of local sources. Unfortunately, the residual filter image is somewhat noisy and Figure 8 shows a profile curvature image, which provides better continuity of local anomaly trends. Both the residual and profile curvature images highlight the north–northwest Harvey Creek Fault Zone effectively. Figure 9 shows a GLCM texture transform greyscale image, designed to enhance low amplitude subtle anomalies within the sedimentary sequence. The image provides better resolution of faults within and around EL43/2004. The image is texture dominant with no clear tonal or amplitude information. 'Texture transforms' analyse the textural characteristics of a window, which is progressively moved over the dataset to be filtered. At each location the data within the window are analysed and a parameter calculated which represents the amount that a particular textural characteristic presents. The spatial variation in this parameter is used to generate a new image. The GLCM method was used for this study as it provides a wide range of parameters. Parameter F07, sum variance was used to generate Figure 9.The AGC filtered magnetic intensity greyscale image in Figure 10 also provides improved resolution of faults in the sedimentary sequence.

Figure 11 shows the results of terracing the vertical derivative as described in 3.1. Terracing preserves amplitude information while sharpening up anomaly responses. Terracing has significantly improved resolution of local anomaly trends compared to the original magnetic intensity, while preserving amplitude information in colour. Gradient maxima/strike vectors (MAXSPOT) shown separately in Figure 12 can be overlaid on the terraced TMI image to highlight edges. The gradient maxima plot maps contacts clearly and indicates more pervasive north–northwest lineaments than seen in most images. For local detail, the magnetic ridgelet image (Figure 13) is probably the best product.

Figure 14 shows a colour circle plot of 3D Euler deconvolution depths. The Euler results are colour coded in steps of 50 m, so results range from small black circles indicating depths in the 0-50m range to larger blue circles for depths greater than 300m. 3D Euler deconvolution suggests variable source depths for the Mount Read Volcanics. The Euler results clearly map the high amplitude (Tyndall Group) anomaly zone along the southern extension of the Harvey Creek Fault, indicating that the source should be close to outcrop. The 3D Euler depths should be an effective tool for selecting drill targets.

4.2 Radiometrics

The radiometric K, eU, eTh RGB composite (Figure 15) provides useful information on major rock units but requires ground truth to get full value from the data. Radioelement values are quite variable. K has a range of 0. –5.22%, eU a range of 0. -4.9 ppm, and eTh, a range of 0.1-18.9 ppm. The highest values are over the Central Volcanic Complex, imaging in white in Figure 15 with typical values in the range K=2-5%, eU=2-4 ppm and eTh=10-17ppm. The lowest values are over the Owen Conglomerate, which images in black, with typical values of K=0.2%, eU=0.3 ppm and eTh=1.5ppm. Overall, the ternary image provides excellent mapping of variations within the Lower Palaeozoic sediments, providing much more detail than the magnetics.

Figure 16 is a colour shade image of potassium. The image shows very high K values over the Central Volcanic Complex with good correlation between local magnetic high and K high values. The image suggests K enrichment along fault lines, including the Harvey Creek Fault. Again there is good magnetic high/K high correlation along the trend of the Harvey Creek fault zone Tyndall Group anomaly.

Finally, Figure 17 is an attempt to classify and simplify the radiometrics using k-means cluster analysis. The trend of the Harvey Creek fault zone Tyndall Group anomaly is classified in the same group as the Central Volcanic Complex (images in green).

4.3 Structural Synthesis

Filter enhancement of magnetic profile data provides a better display of anomaly amplitudes and shapes than filtered images. Stacked profiles help resolve issues seen in images as amplitudes are clearer. The 1st vertical derivative profiles (Figure 18) are dominated by the Central Volcanic Complex but also give a clear picture of amplitude variations along faults etc.

There is a need for an integrated interpretation of the aeromagnetic and radiometric data along with available geology to better define zones of interest. At this stage we have provided a structural framework based on the magnetics and selected some features of interest as preliminary targets. Figure 19 shows interpreted high and moderate amplitude magnetic domains and major faults and fractures superimposed on the AGC filter greyscale image.

4.4 Modelling/Inversion

Selected anomalies along the Harvey Creek Fault have been inverted using a single tabular body using the Geosoft Magmod3 software. This provides a quick estimate of body parameters but is limited to a single anomaly. Where there are clearly multiple bodies, results on body widths will only be approximate. Figure 20 shows Magmod3 inversion results for the EL43/2004 Harvey Creek Fault magnetic anomalies, which suggest a thin tabular source, dipping at moderate to steep angle to the east. The northern anomaly zone is shallow, close to outcropping, but the southern anomaly zone models at 120 m below surface. Magnetic susceptibility values are in the range expected for rhyolite. Figure 20 also shows modelling/inversion of the high amplitude Harvey Creek Fault anomaly close to the northwest corner of EL42/2008. The northern anomaly zone suggests a tabular source, dipping west at a depth of 10 m below surface. The zone to the south models with a flatter dip but still relatively shallow.

4.5 Helicopter Electromagnetics

Helicopter electromagnetic data is available for Mt Sorell as part of the Mount Read Volcanics survey flown by GeoInstruments using a hummingbird 5-frequency system (Reid, 2003). There are no obvious conductive zones within the Mt Sorell tenement, which has apparent resistivities around 100 ohm-m. BHP failed to find any conductive zones from the UTEM survey of the Clark Valley.

4.6 Introduction to Preliminary target Generation

Preliminary targets have been picked based on aeromagnetics, airborne radiometrics, structural interpretation and available geochemistry. Results are listed in Table 1 and plotted in Figure 21.

4.7 Preliminary Target Generation EL42/2008

Targets MTS-001 and MTS-002 are local magnetic highs along the linear magnetic high within the Harvey Creek fault. In fact, the entire zone is probably a target for gold, especially the shallow high amplitude, western anomaly. The high amplitude magnetic anomaly trend in EL42/2008 is mainly within mapped Tyndall Group but crosses over into Owen Conglomerate along strike. The shallow magnetic anomaly corresponds in part to the Jukes Breccia and Google Earth photography shows extensive outcrop and evidence of a vertical fault scarp so field checking should be relatively easy. The magnetic anomaly also corresponds to a potassium high zone. The critical issue is whether the coincident magnetic/potassium anomaly zone is due to breccia derived from the central Volcanic Complex or whether it is a fault breccia. In any case, assuming mineralisation is Devonian, the Harvey Creek Fault zone is a potential gold target.

Target MTS-003 is a discrete magnetic high within the Western sequence and may be associated with an andesite body.

Target MTS-004 is within a base metal target zone (Pb, Zn), following a black shale unit along the contact between Central Volcanic Complex and Western Sequence. The zone corresponds to a magnetic low zone over Western Sequence stratigraphy. Available geochemistry shows slightly elevated Zn and Cu values along this trend, up to 185 ppm Zn with 40 ppm Pb. The entire strike length of the black shale is probably a base metal target

Target MTS-005 is part of a linear magnetic anomaly trend within porphyry of the Western Sequence. The magnetic anomaly is close to the contact with the overlaying Tyndall Group. The entire strike length of the porphyry unit is probably a Cu target.

4.8 Preliminary Target Generation EL43/2004

Simon Tear (2011) has recently provided a comprehensive review of EL43/2004 geology and Au mineralisation, including a new geological map and recommendations for further work. The targets discussed below are additional features, which need to be reconciled with the new geological map.

Targets SC-001, SC-002 and SC-003 cover the magnetic highs along the Harvey Creek Fault. The magnetic anomaly zone is probably due to a sliver of Mount Read Volcanics in the fault zone and may be a target for Cu and Au. The feature corresponds to potassium high. The fault zone separates the Harris Syncline to the east from the Coupon anticline to the west.

Target SC-004 is the intersection of the Harvey Creek Fault with a subtle ENE lineament between anomaly 24-28 and Coupon. The target zone is on the edge of alluvium cover but corresponds to a subtle ENE ridge. It is probably close to the contact between the Gordon Group and the overlying Eldon Group. The target zone has weak magnetic expression and a potassium anomaly. It may be a Pb-Zn or Au target

Target SC-005 is a weak magnetic low, west of Coupon. This also has clear potassium high but this may just reflect alluvium cover. It may be a Pb-Zn or Au target

Target SC-006 is a subtle north south magnetic feature, interpreted as a fault/fracture. The zone has a potassium anomaly but this may reflect alluvium cover. It is probably close to the contact between the Gordon Group and the overlying Eldon Group.

5 Conclusions and Recommendations

A program of data enhancement and preliminary interpretation of public domain aeromagnetic data and radiometric data covering the Shree Minerals Sulphide Creek and Mt Sorell tenements in northwest Tasmania has been completed. The two tenements are clearly located along the Harvey Creek Fault so have been interpreted together.

Both aeromagnetic and radiometric data play an important role in the interpretation. The aeromagnetic data provide definitive structural information, showing the continuity of the Harvey Creek Fault system from Sulphide Creek to Mt Sorell and highlighting a linear magnetic high in the west of the Mt Sorell tenement which is a potential gold target. The radiometric data provide better lithological information than the magnetics, especially at Sulphide Creek where there is limited response from the sediments.

The project has involved enhancement of magnetic signatures utilising the latest data enhancement and analysis techniques, estimation of magnetic source depths and mapping of major magnetic elements and lineaments. No single filter contains all the information on magnetic sources and a range of wavenumber and spatial filters were applied to both grid and profile data. A range of filters has been developed to try to overcome the limitations of conventional filtering and enhance tonal and textural attributes simultaneously. For Sulphide Creek, the GLCM texture transform, Hanning residual, profile curvature and AGC filters provide the best resolution of the subtle magnetic anomalies. For Mt Sorell, a range of filters contributed to the interpretation. Combining the separation and tilt angle filters in greyscale with the terraced total magnetic intensity data in colour provides a good balance with amplitude information in colour but with good textural information to enhance more subtle anomalies. Spatial domain Hanning residual filtering and wavenumber domain separation filter and fractional order derivatives and profile curvature filtering provided the best separation of shallow sources. Gradient maxima/strike plotting provided excellent mapping of contact features, resulting in an objective magnetic lineament analysis. 3D Euler deconvolution provided source depth information.

The second part of the project involved a more quantitative approach, using magnetic profiles rather than gridded data. This has involved filter enhancement of magnetic profile data and modelling/inversion of selected profiles. Stacked profiles help resolve issues seen in images, as amplitudes are clearer. At Sulphide Creek, modelling/inversion of the Harvey Creek Fault magnetic anomaly suggests a thin tabular source, dipping at moderate to steep angle to the west. The source of this magnetic anomaly is unknown but in view of its location along the Harvey Creek Fault is a possible gold and base metal target. The high amplitude magnetic anomalies along the Harvey Creek Fault on the slopes of Mt Sorell are possible gold targets. The aeromagnetic results, supported by geochemistry suggest that the eastern half of the Mt Sorell tenement has VHMS potential within both the Central Volcanic Complex and adjacent Western Sequence. The western sequence also has Cu-Au potential, including zones of porphyry and possible andesite. Unfortunately, the 1:25,000 geological mapping revision does not include the Mt Sorell tenement

The entire length of the Harvey Creek Fault at Sulphide Creek and adjacent fault systems are considered to be gold and base metal targets, especially if the low amplitude linear magnetic anomaly trend proves to be Mount Read Volcanics within the fault zone.

A total of six preliminary targets have been selected for Sulphide Creek and six targets for Mt Sorell

As a first step, a comprehensive phased program of integrating the magnetic and radiometric results with surface mapping is recommended. Getting Simon Tear to carry out a desk study of Mt Sorell, similar to Sulphide Creek would be useful. This should be supported by susceptibility measurements on outcrop and a geochemical program in the west of the EL42/2008 Mt Sorell tenement. Both wacker and stream sediment sampling would be useful.

6 References

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7 List of Figures

Figure	Description	Image & Vector Files
	(Regional A4 Figures)	**=SulphideCreek-MtSorell
1	Location	**_Topo
2	Landsat TM, bands 7,4,2	**_L742
3	Altimetric DTM image and contours	**_SRTM+Contours
4	Geology (From Corbett, 2002) see for legend	**_Geology
5	Magnetic intensity colour shade image	**_TMI
6	Fractional order vertical derivative colour shade image	**_Dz05
7	Hanning residual filter greyscale image	**_Residual
8	Profile curvature filter greyscale image	**_Profilecurvature
9	Grey-level Coocurrence greyscale image	**_GLCM
10	AGC filtered magnetic intensity greyscale image	**_AGC
11	Terraced magnetic intensity colour image	**_Terrace
12	MAXSPOT gradient maxima/strike plot	**_MAXSPOT
13	Magnetic Ridgelets	**_Ridgelets
14	3D Euler deconvolution source depth plot	**_EUL3D
15	K, eTh, eU RGB radiometric ternary image	**_RadTernary
16	Radiometric K image	**_K
17	Radiometric cluster analysis thematic image	**_Radclust
18	1st vertical derivative stacked profiles	**_1VDPRF
19	Major magnetic elements and lineaments	HCFetc, Fractures, High, moderate
20	Magmod3 modelling/inversion	--
21	Preliminary targets	Table 1, SC-Targets, MTS-Targets

Figure 1

Sulphide Creek - Mt Sorell
N.W Tasmania
Location Map

Cowan Geodata Services

Shree Minerals
Mt Sorell-Sulphide Creek
Geophysical Interpretation

Date:11/7/2011
Author: DRC
Office: Perth
Drawing: SC
Scale: 1:100000
Projection: UTM Zone 55, Southern Hemisphere (WGS 84)

0 1 2 4
kilometres

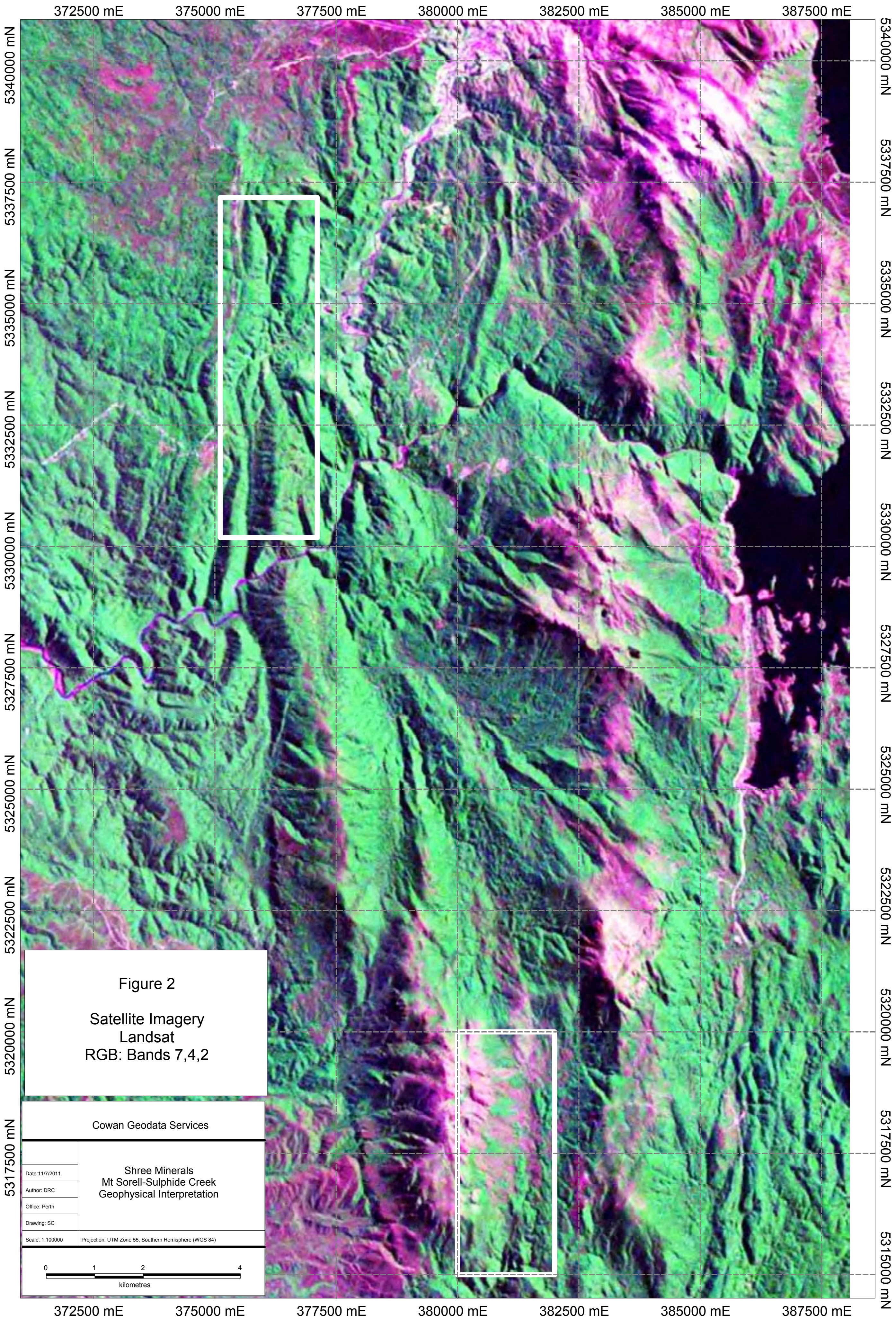


Figure 2

Satellite Imagery
Landsat
RGB: Bands 7,4,2

Cowan Geodata Services

Date:11/7/2011
Author: DRC
Office: Perth
Drawing: SC
Scale: 1:100000

Shree Minerals
Mt Sorell-Sulphide Creek
Geophysical Interpretation

Projection: UTM Zone 55, Southern Hemisphere (WGS 84)

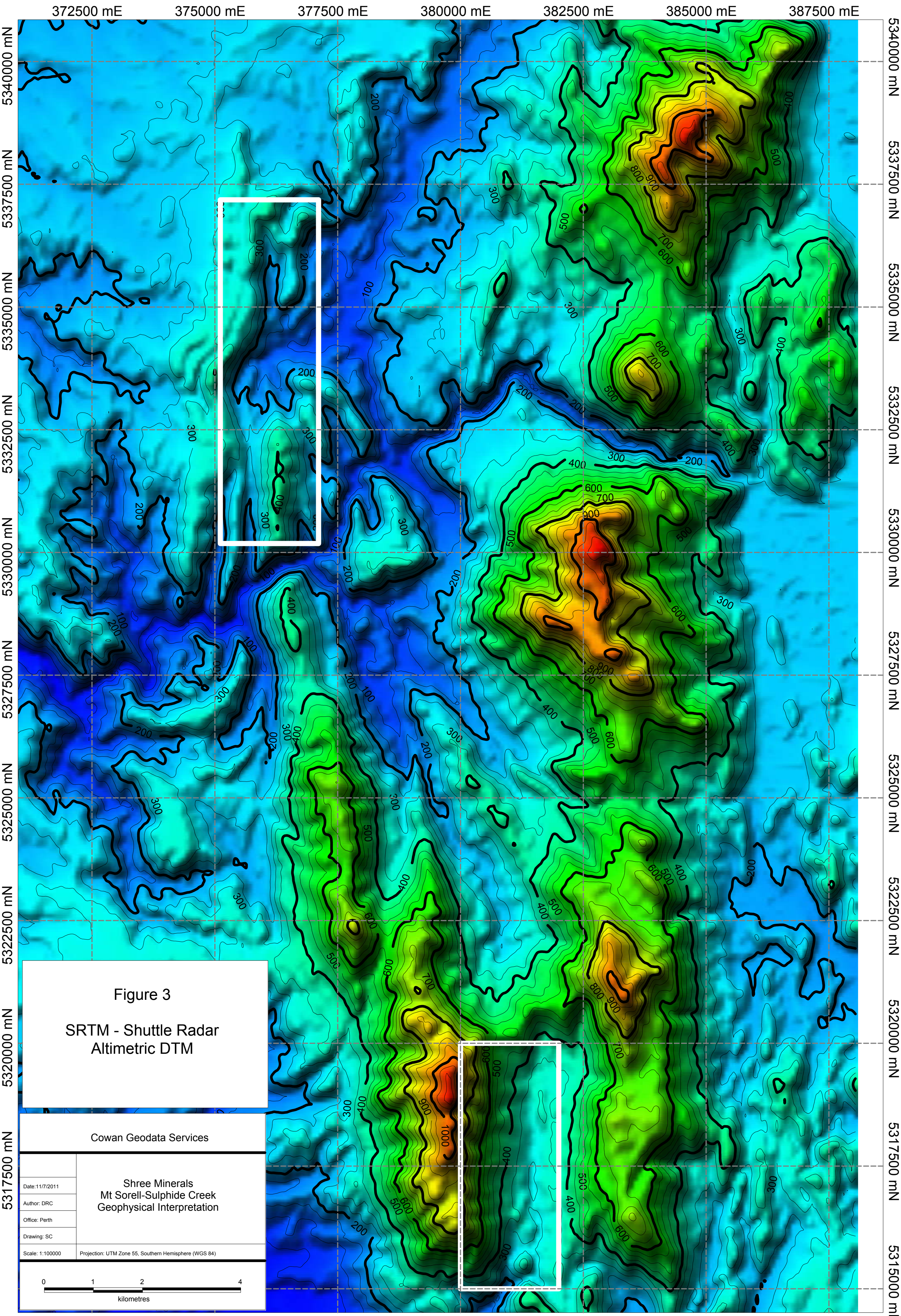


Figure 3

SRTM - Shuttle Radar Altimetric DTM

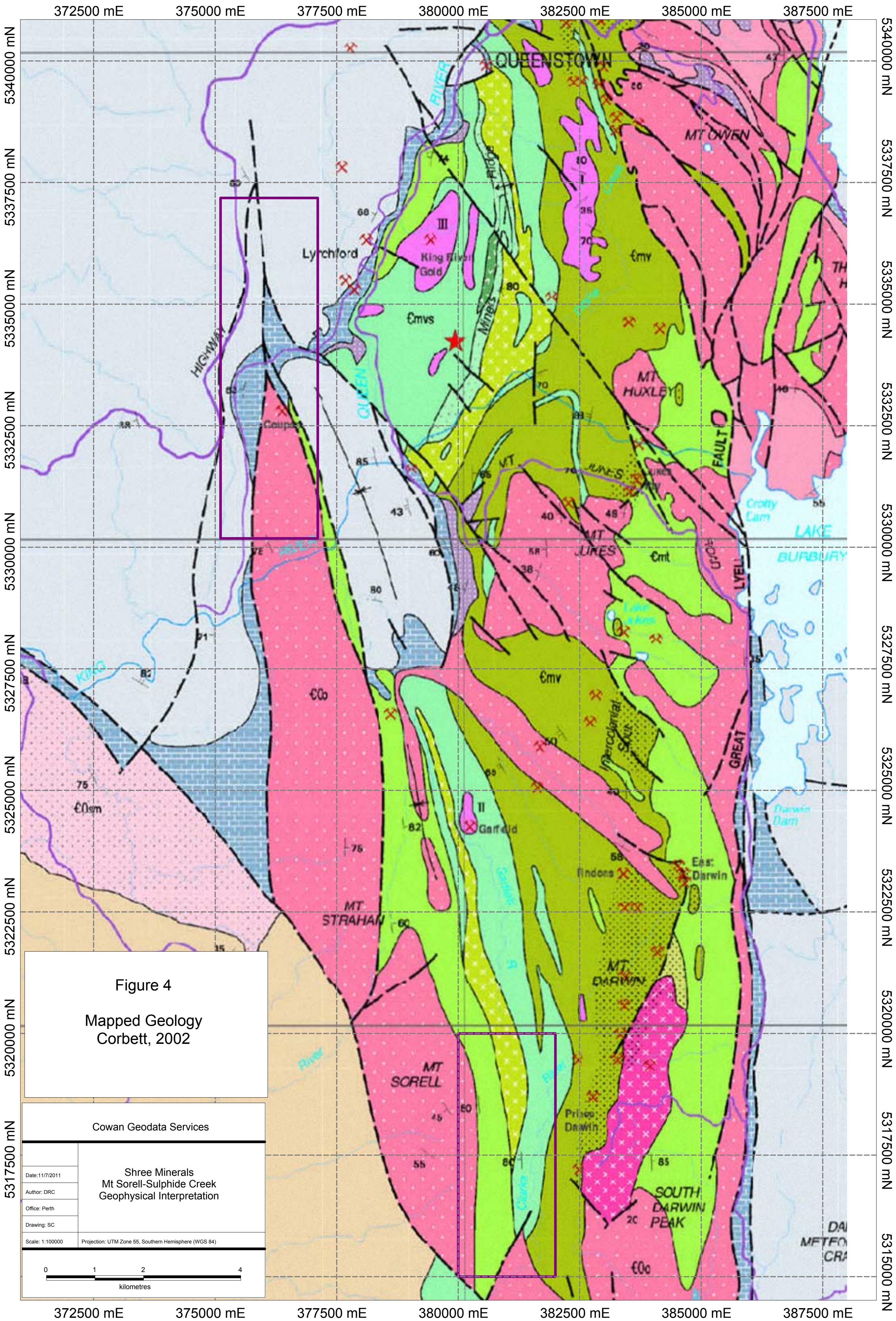
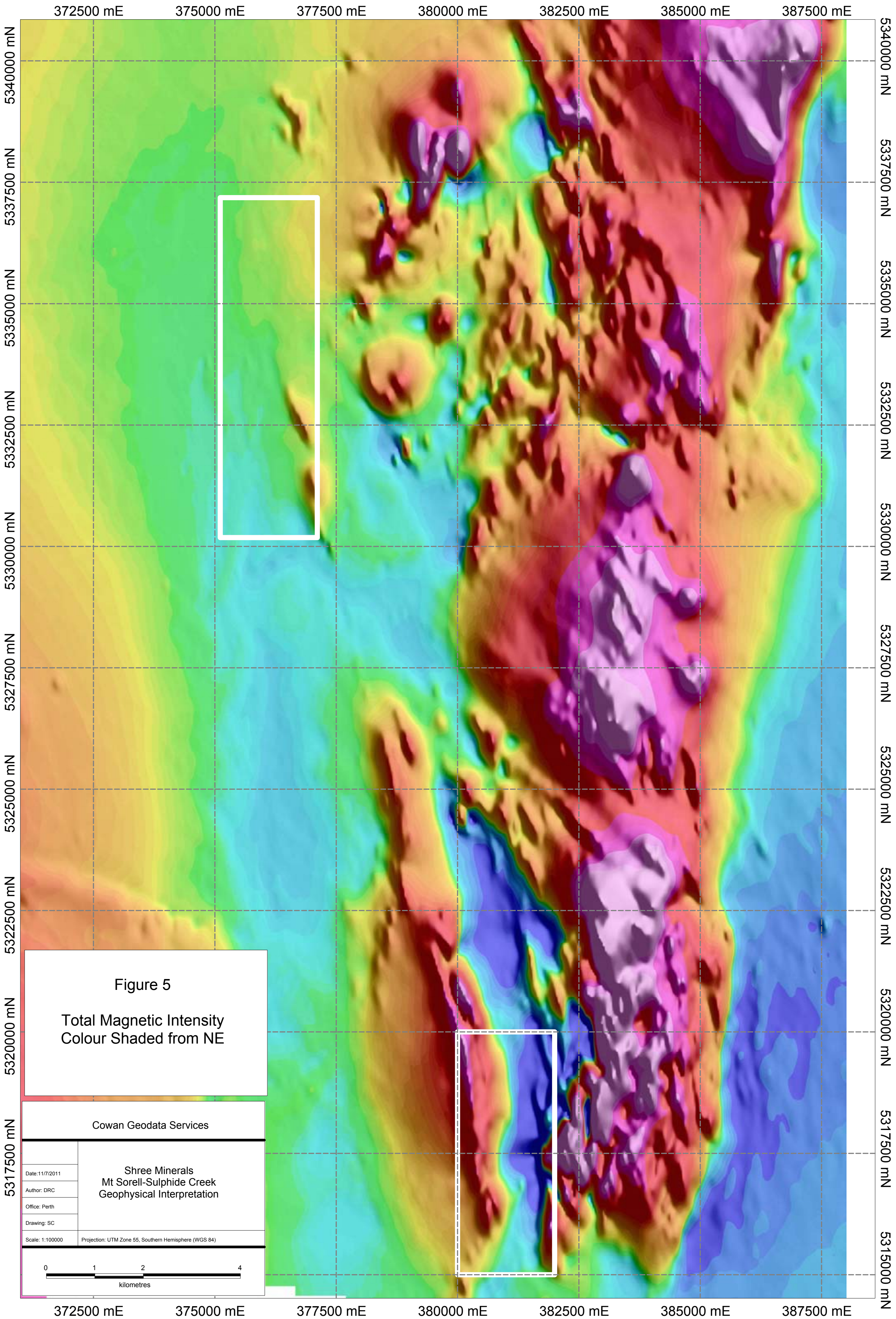


Figure 4

Mapped Geology
Corbett, 2002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5317500 mN
5315000 mN
Figure 5
Total Magnetic Intensity
Colour Shaded from NE
Cowan Geodata Services
Date:11/7/2011
Author: DRC
Office: Perth
Drawing: SC
Scale: 1:100000
Shree Minerals
Mt Sorell-Sulphide Creek
Geophysical Interpretation
Projection: UTM Zone 55, Southern Hemisphere (WGS 84)
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2
4
kilometres

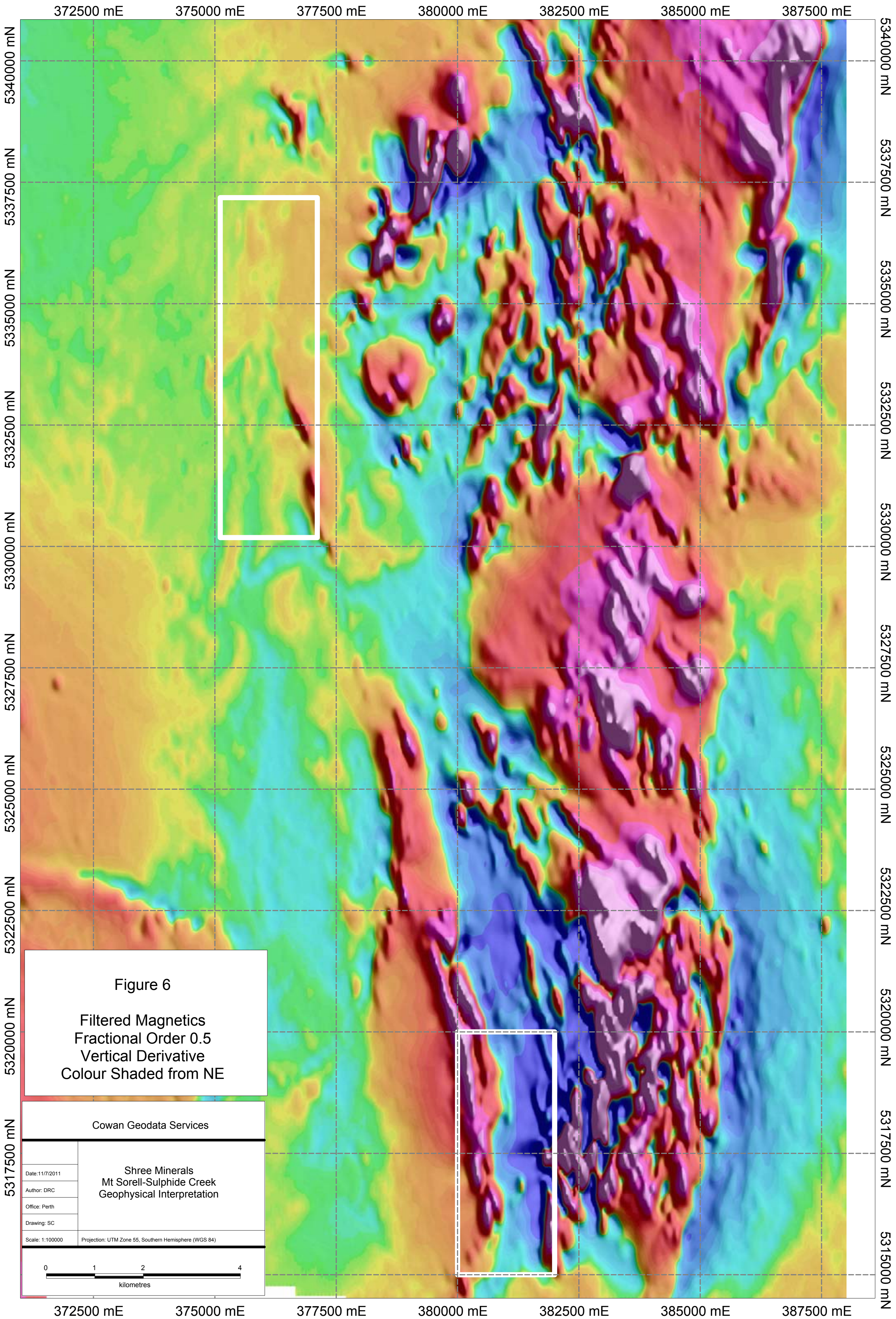
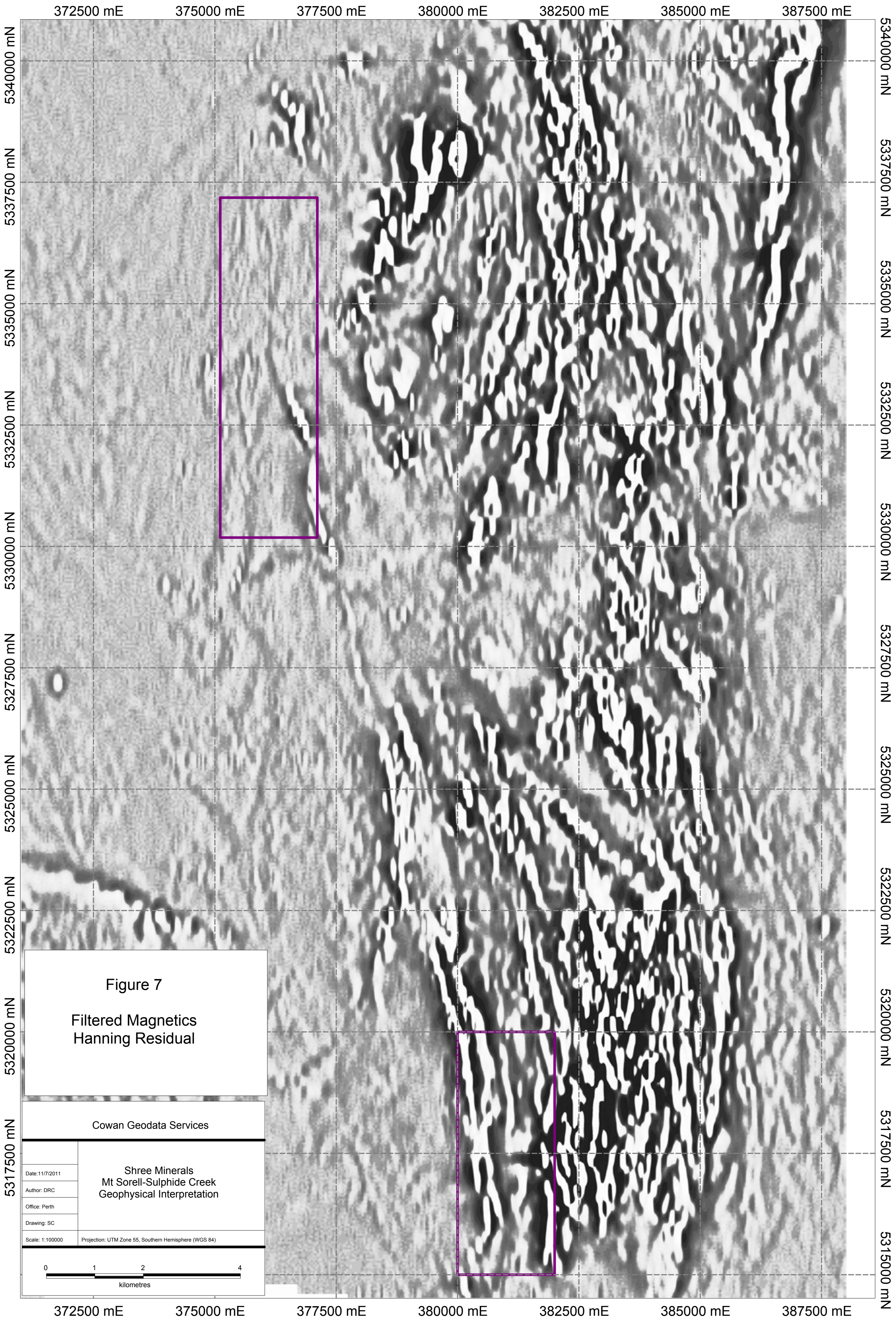


Figure 6

Filtered Magnetics
Fractional Order 0.5
Vertical Derivative
Colour Shaded from NE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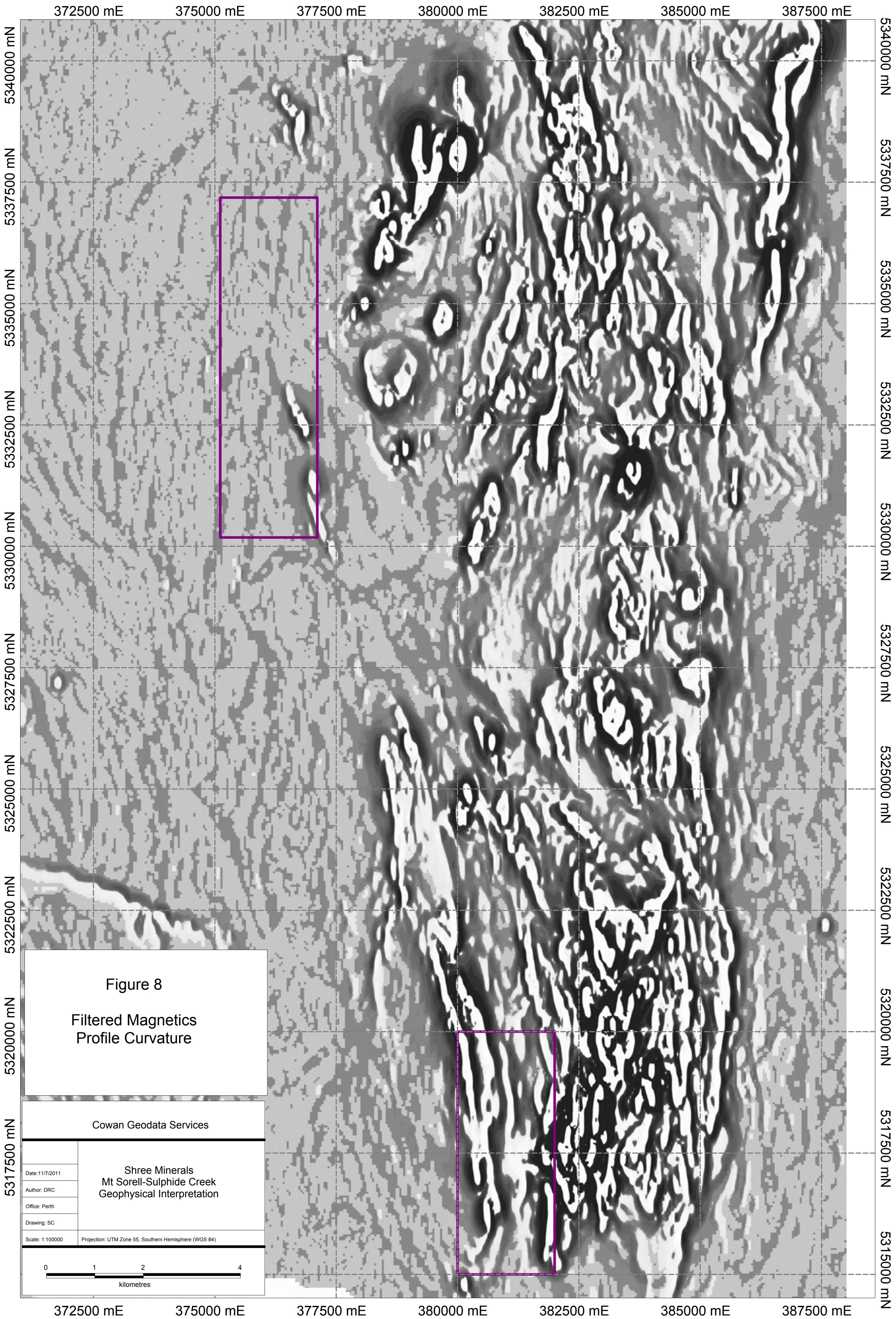
5327500 mN
5325000 mN
5322500 mN
5320000 mN
5317500 mN
5315000 mN
Figure 7
Filtered Magnetics
Hanning Residual
Cowan Geodata Services
Date:11/7/2011
Author: DRC
Office: Perth
Drawing: SC
Scale: 1:100000
Shree Minerals
Mt Sorell-Sulphide Creek
Geophysical Interpretation
Projection: UTM Zone 55, Southern Hemisphere (WGS 84)
0
1
2
4
kilometres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5317500 mN
5315000 mN
Figure 8
Filtered Magnetics
Profile Curvature
Cowan Geodata Services
Date:11/7/2011
Author: DRC
Office: Perth
Drawing: SC
Scale: 1:100000
Shree Minerals
Mt Sorell-Sulphide Creek
Geophysical Interpretation
Projection: UTM Zone 55, Southern Hemisphere (WGS 84)
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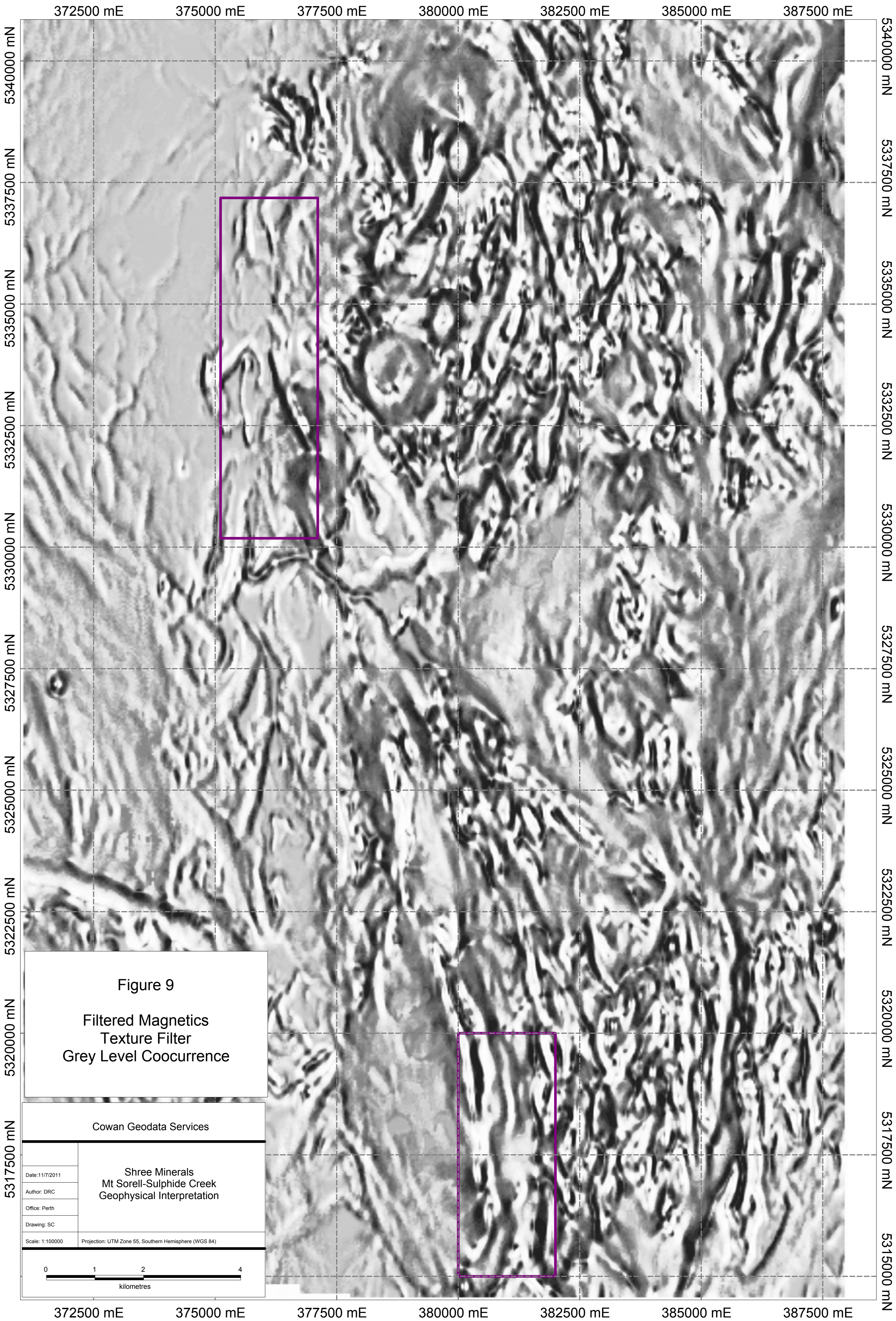
1
2
4
kilometres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5315000 mN
Figure 9
Filtered Magnetics
Texture Filter
Grey Level Coocurrence
Cowan Geodata Services
Date:11/7/2011
Author: DRC
Office: Perth
Drawing: SC
Shree Minerals
Mt Sorell-Sulphide Creek
Geophysical Interpretation
Scale: 1:100000
Projection: UTM Zone 55, Southern Hemisphere (WGS 84)
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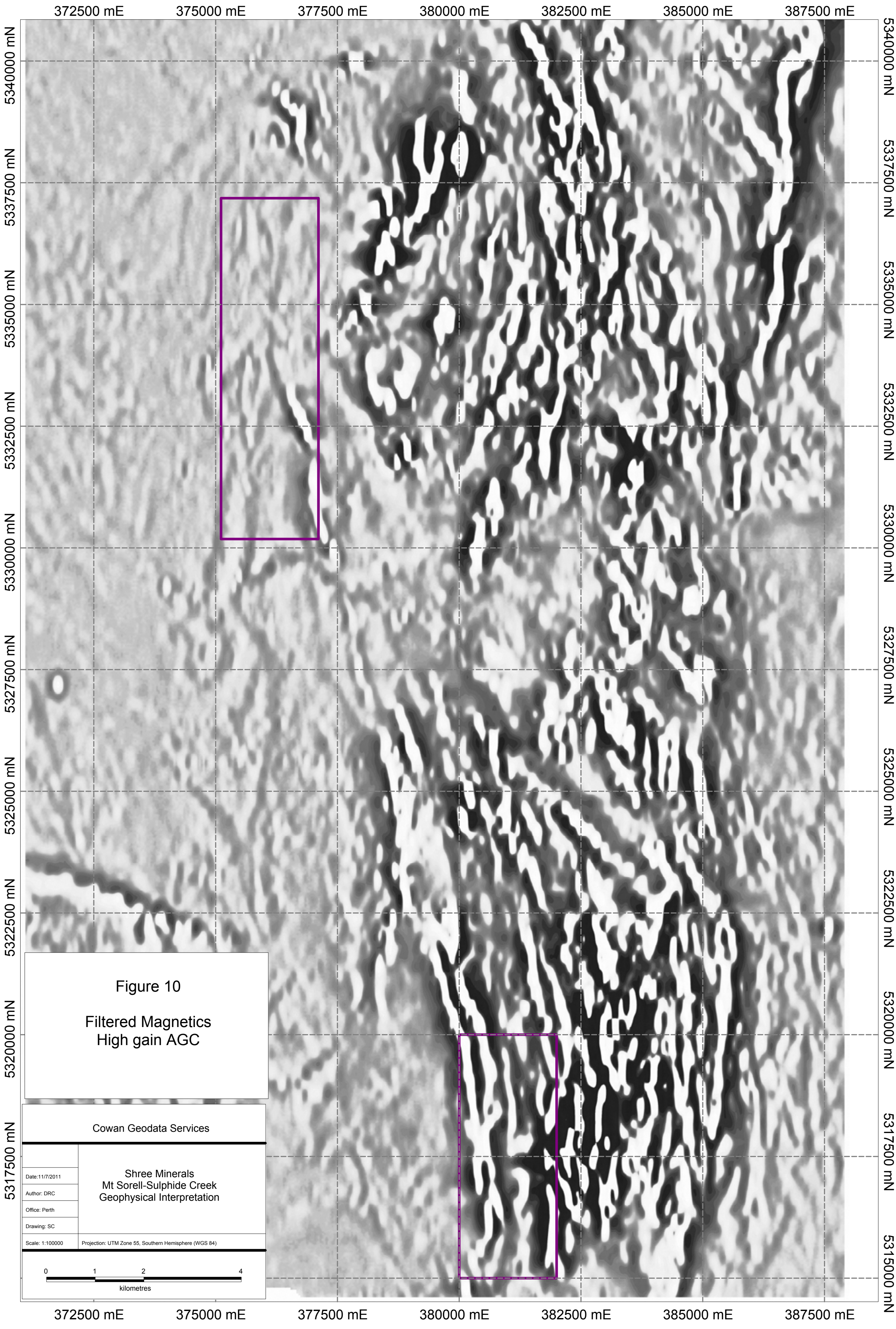
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5317500 mN
5315000 mN
Figure 10
Filtered Magnetics
High gain AGC
Cowan Geodata Services
Date:11/7/2011
Author: DRC
Office: Perth
Drawing: SC
Shree Minerals
Mt Sorell-Sulphide Creek
Geophysical Interpretation
Scale: 1:100000
Projection: UTM Zone 55, Southern Hemisphere (WGS 84)
0 1 2 4
kilometres

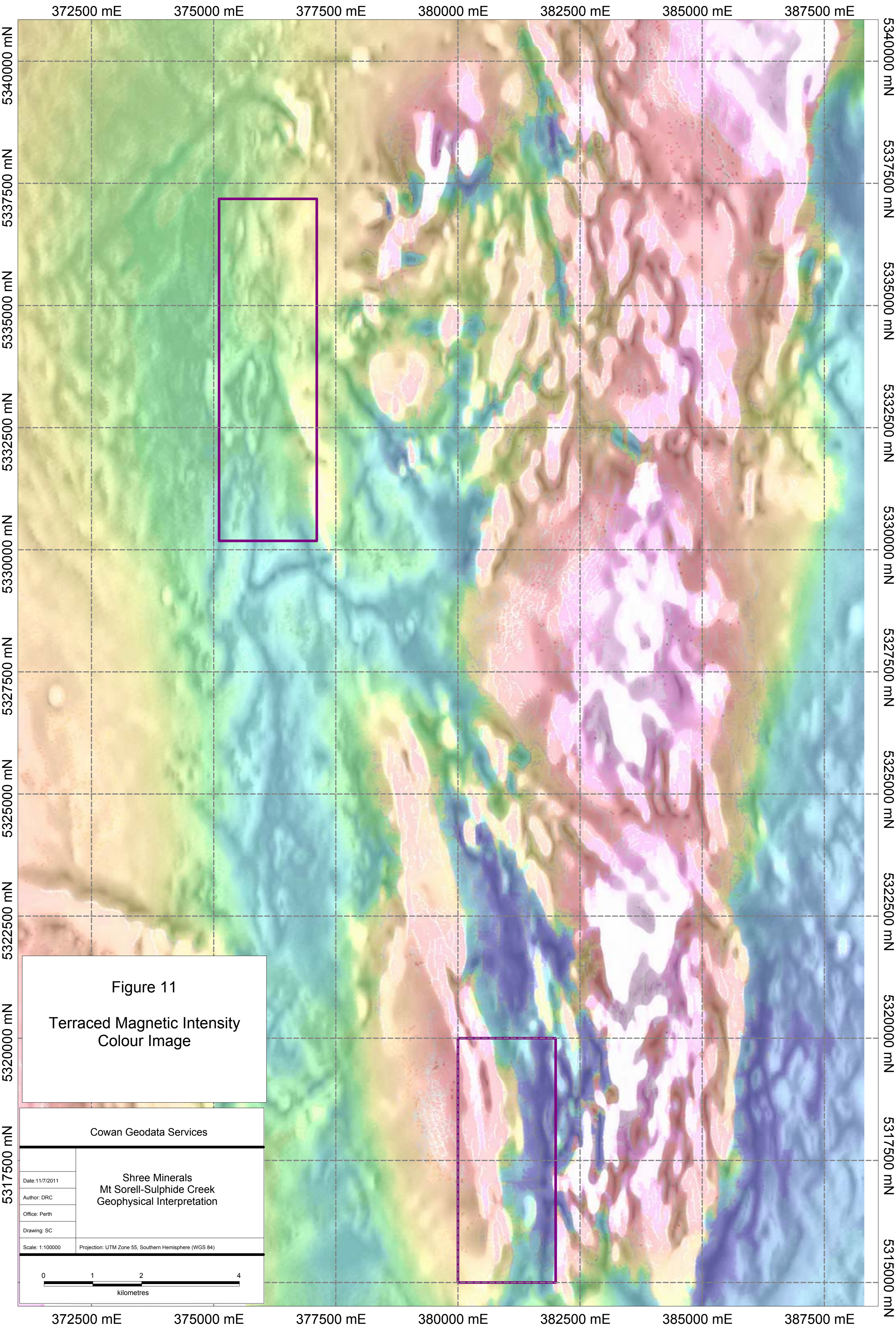


Figure 11

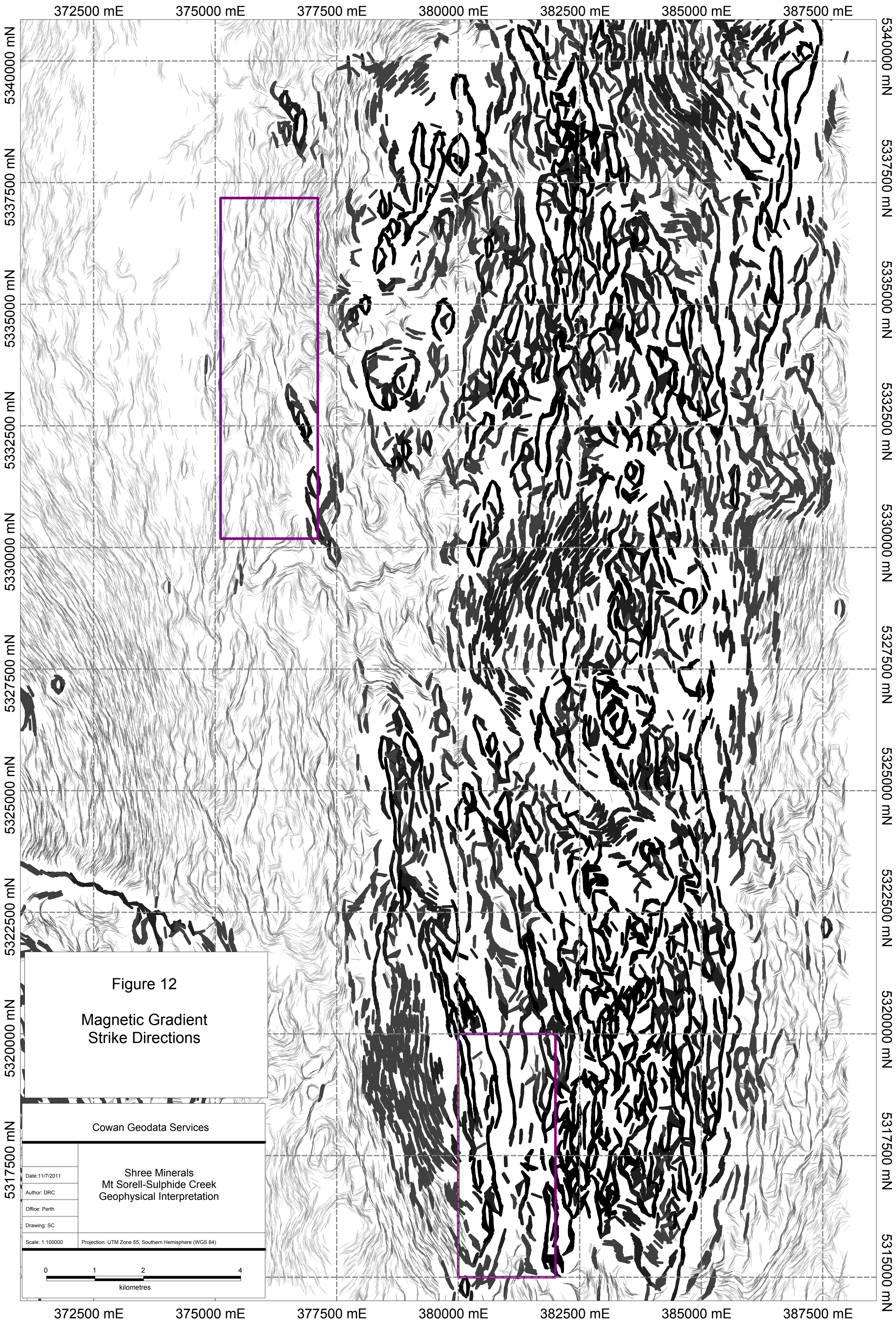
Terraced Magnetic Intensity Colour Image

Cowan Geodata Services

Date:11/7/2011
Author: DRC
Office: Perth
Drawing: SC
Scale: 1:100000

Shree Minerals
Mt Sorell-Sulphide Creek
Geophysical Interpretation

Projection: UTM Zone 55, Southern Hemisphere (WGS 84)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5327500 mN
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5317500 mN
5315000 mN
Figure 12
Magnetic Gradient
Strike Directions
Cowan Geodata Services
Date:11/7/2011
Author: DRC
Office: Perth
Drawing: SC
Shree Minerals
Mt Sorell-Sulphide Creek
Geophysical Interpretation
Scale: 1:100000
Projection: UTM Zone 55, Southern Hemisphere (WGS 84)
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kilometres

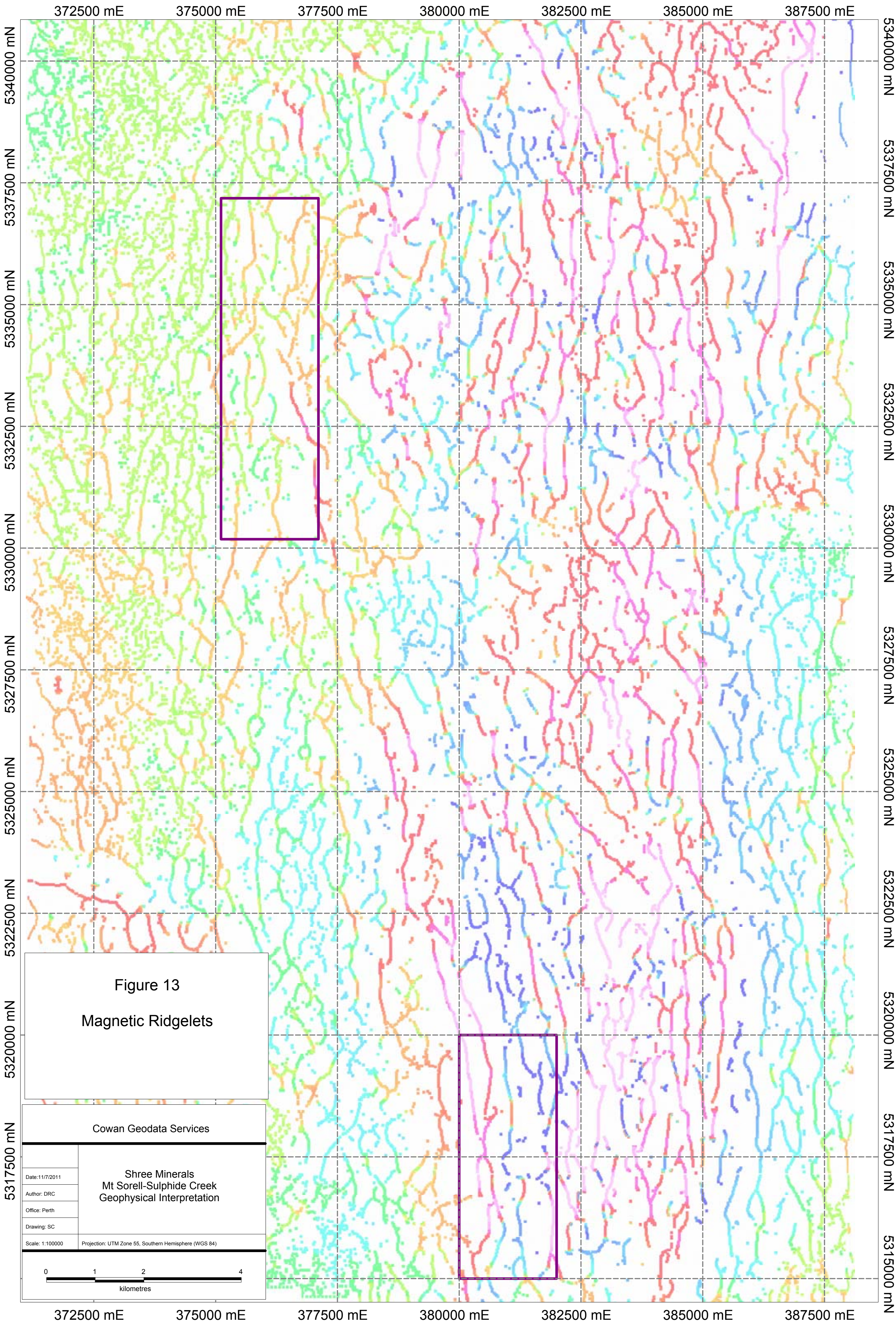
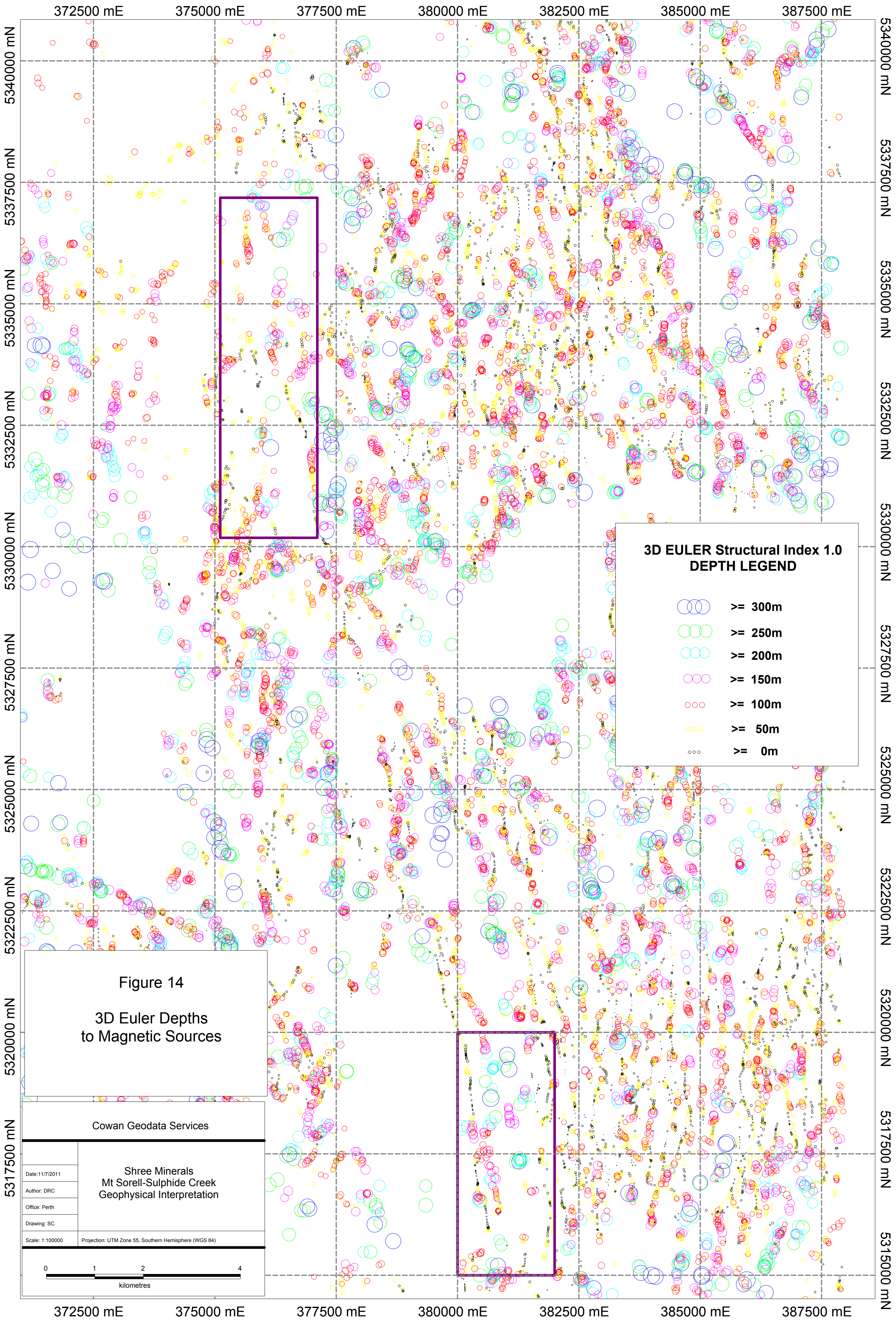


Figure 13

Magnetic Ridgelets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5330000 mN
5327500 mN
5325000 mN
5322500 mN
5320000 mN
5317500 mN
5315000 mN
3D EULER Structural Index 1.0
DEPTH LEGEND
>= 300m
>= 250m
>= 200m
>= 150m
>= 100m
>= 50m
>= 0m
Figure 14
3D Euler Depths
to Magnetic Sources
Cowan Geodata Services
Date:11/7/2011
Author: DRC
Office: Perth
Drawing: SC
Scale: 1:100000
Shree Minerals
Mt Sorell-Sulphide Creek
Geophysical Interpretation
Projection: UTM Zone 55, Southern Hemisphere (WGS 84)
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kilometres

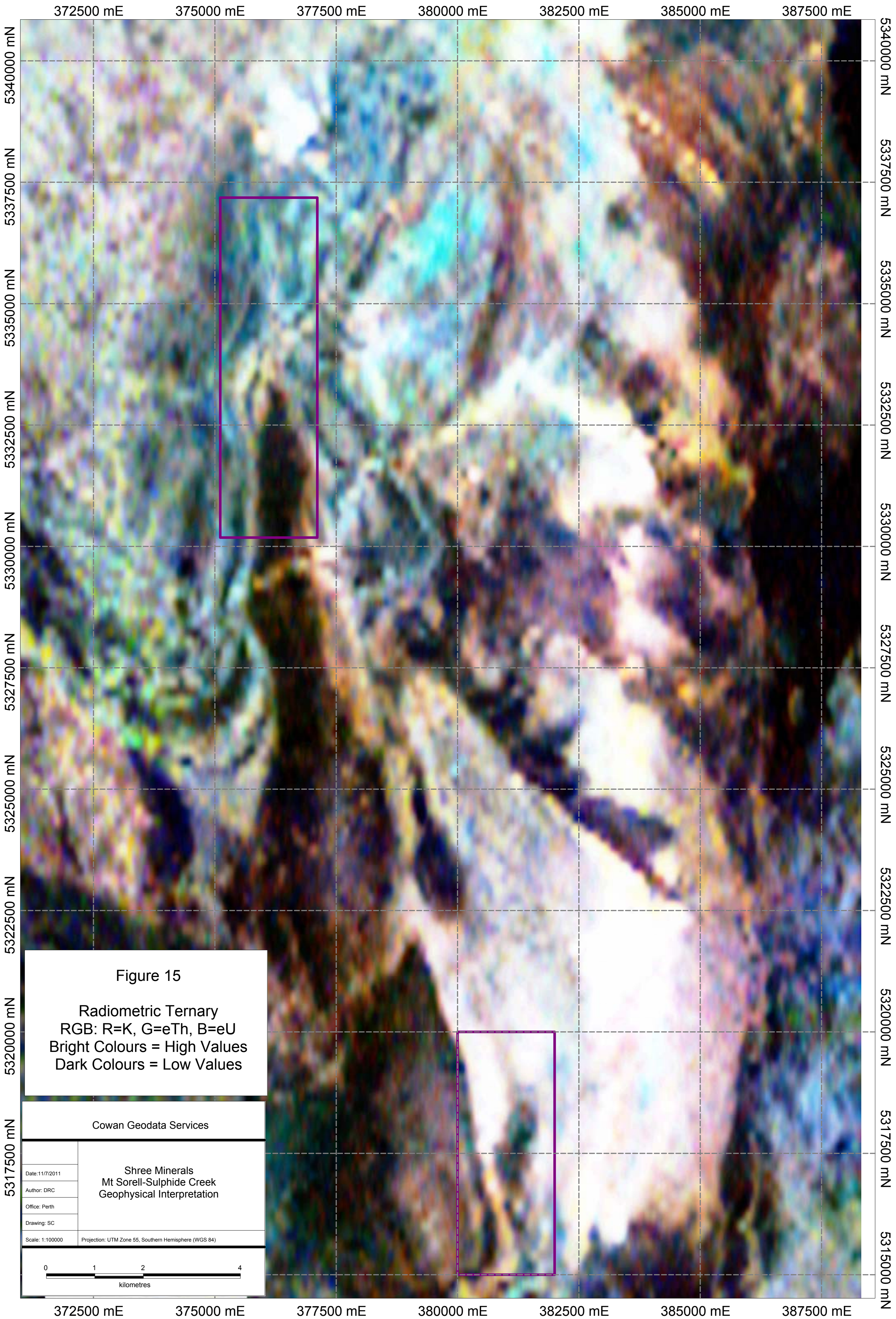

Figure 15

Radiometric Ternary
RGB: R=K, G=eTh, B=eU
Bright Colours = High Values
Dark Colours = Low Values

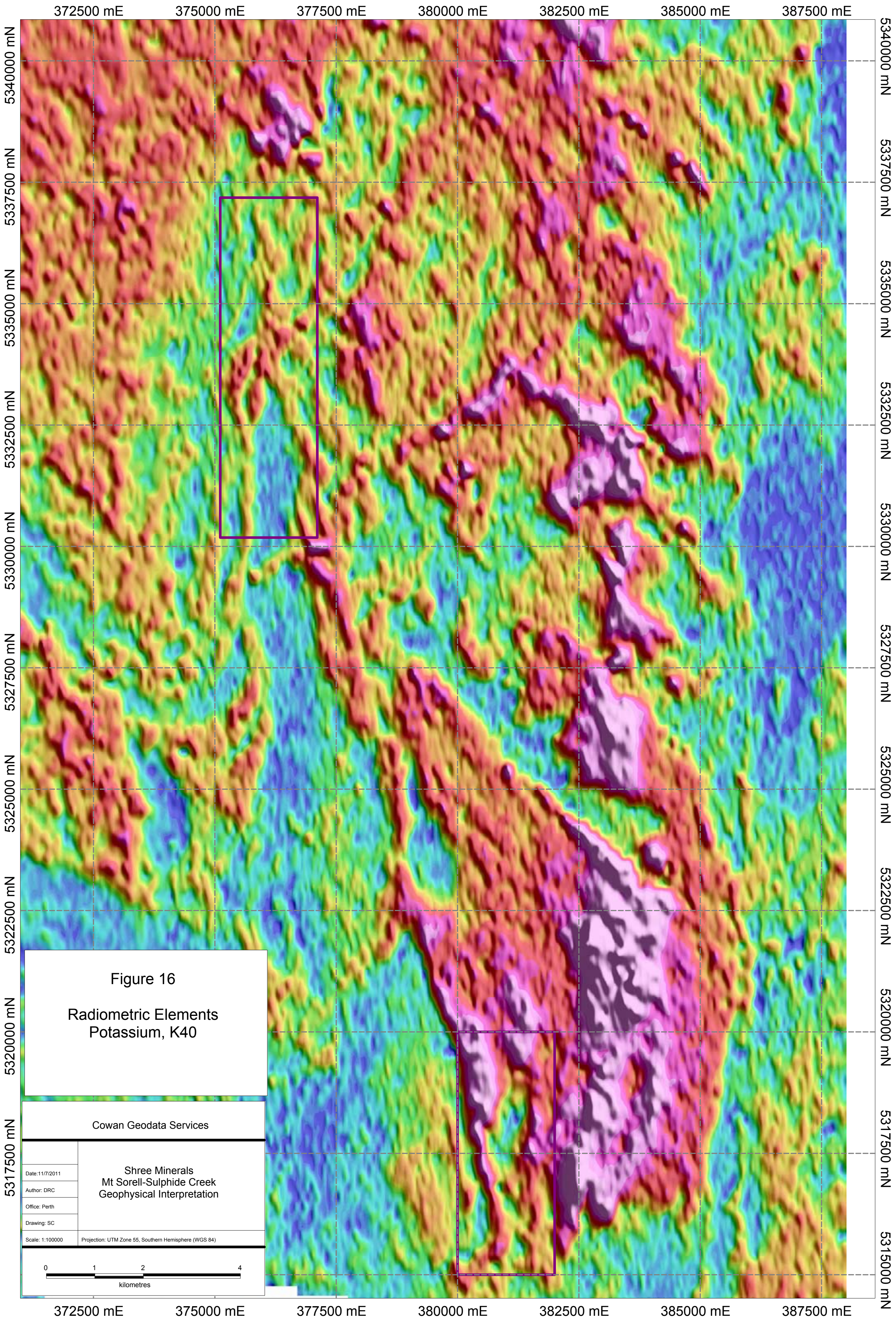

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Figure 16
Radiometric Elements
Potassium, K40
Cowan Geodata Services
Date:11/7/2011
Author: DRC
Office: Perth
Drawing: SC
Scale: 1:100000
Shree Minerals
Mt Sorell-Sulphide Creek
Geophysical Interpretation
Projection: UTM Zone 55, Southern Hemisphere (WGS 84)
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kilometres

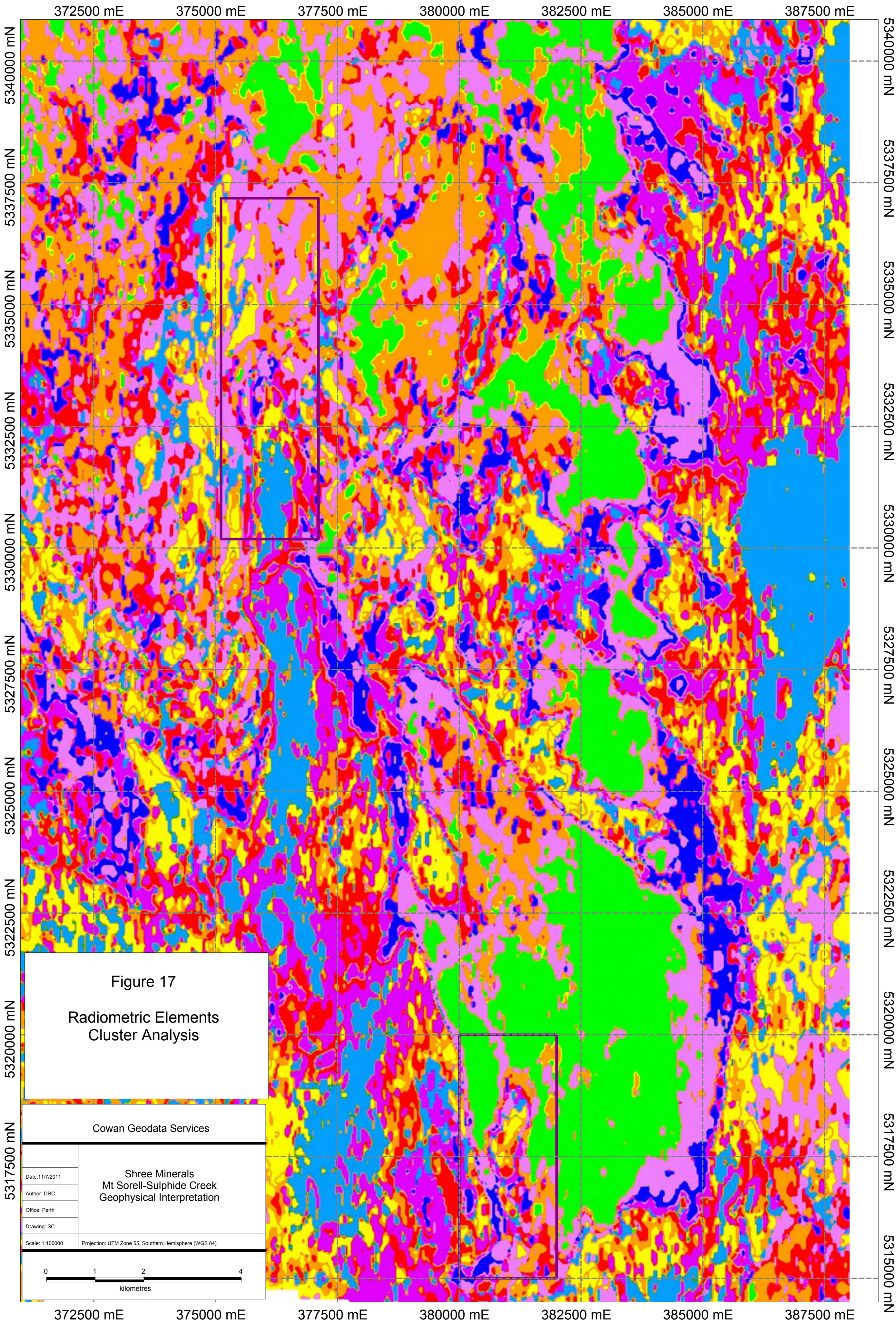

Figure 17

Radiometric Elements Cluster Analysis

Cowan Geodata Services

Shree Minerals
Mt Sorell-Sulphide Creek
Geophysical Interpretation

Date:11/7/2011
Author: DRC
Office: Perth
Drawing: SC
Scale: 1:100000
Projection: UTM Zone 55, Southern Hemisphere (WGS 84)

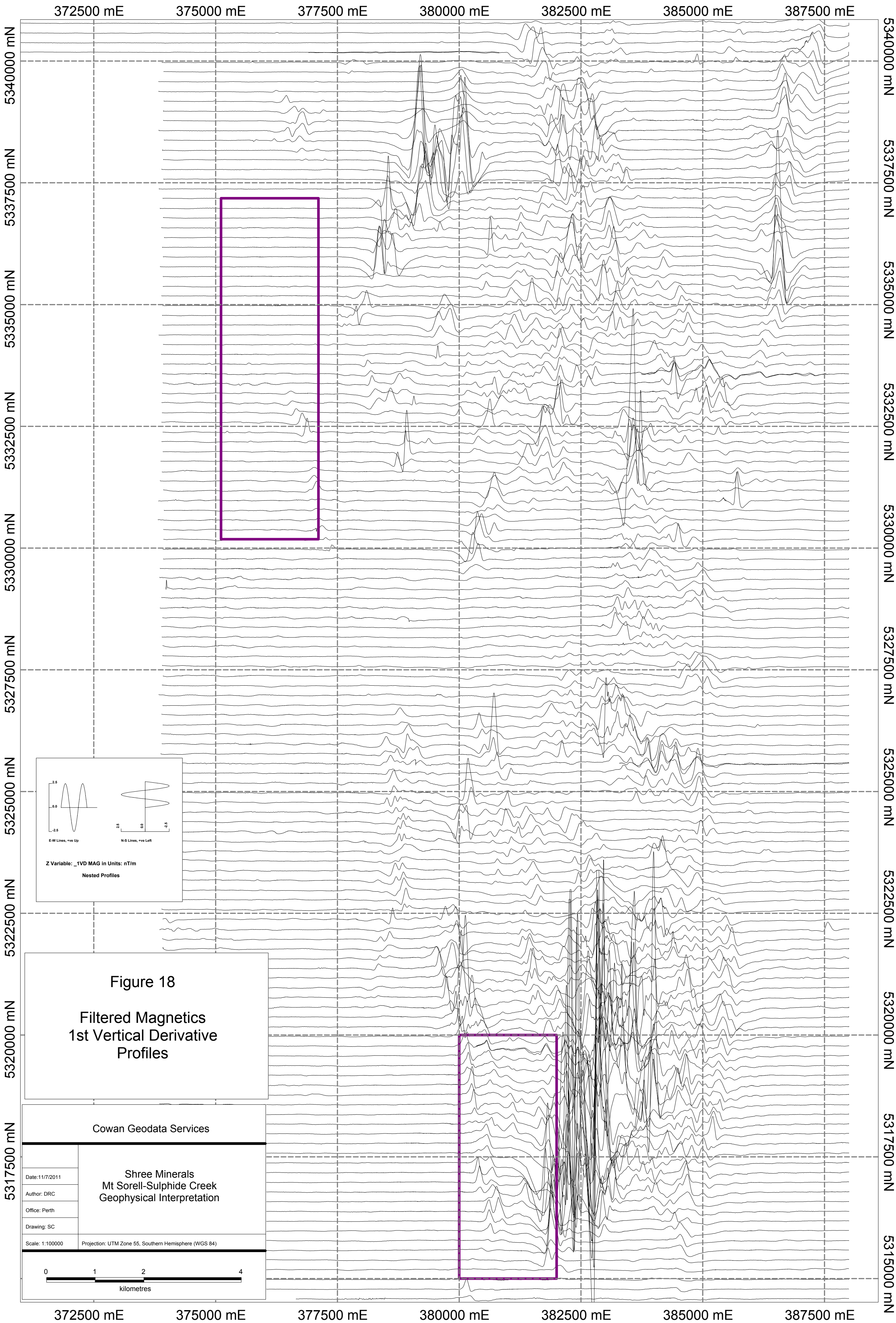

Figure 18

Filtered Magnetics
1st Vertical Derivative
Profiles

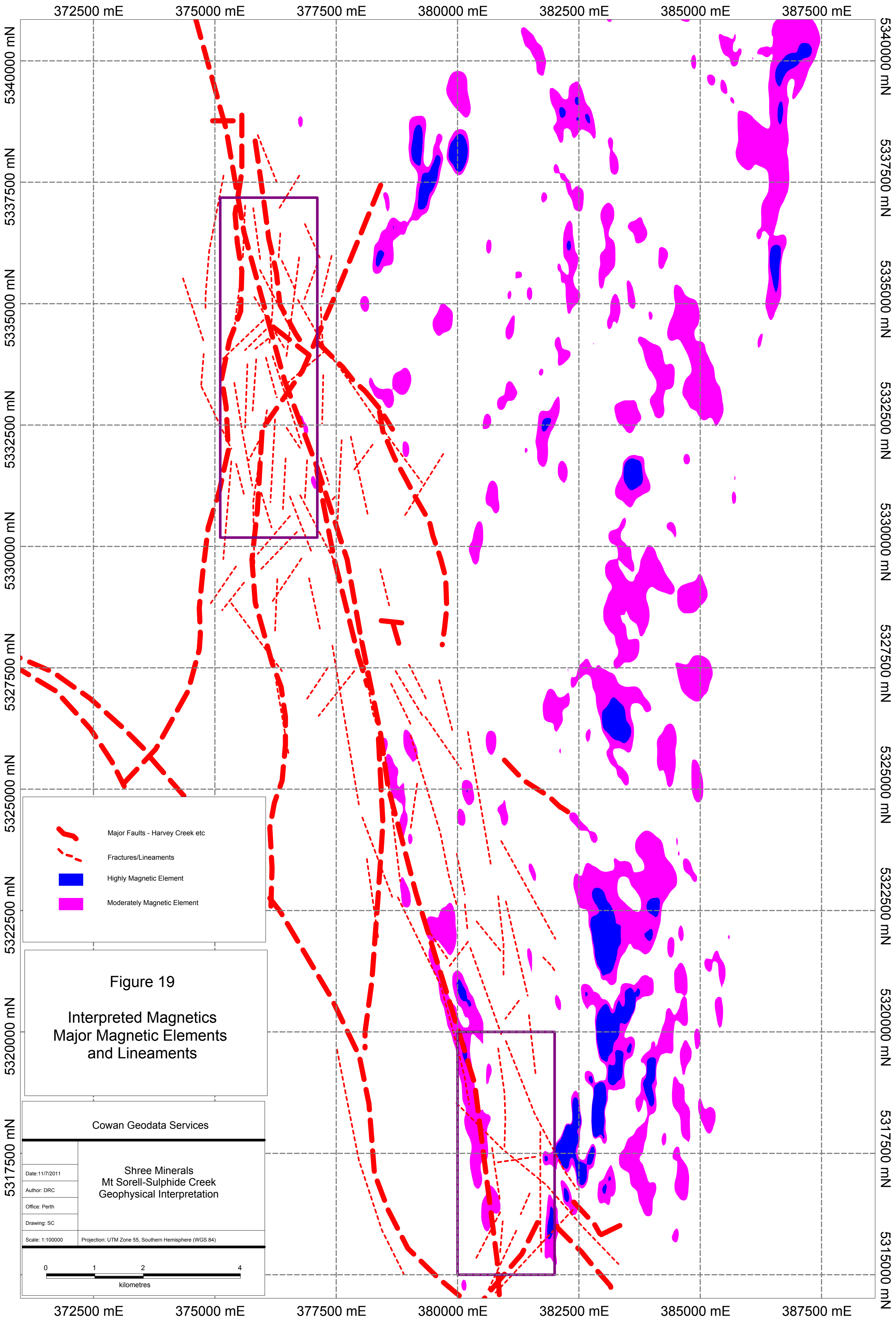

Figure 19

Interpreted Magnetics
Major Magnetic Elements
and Lineaments

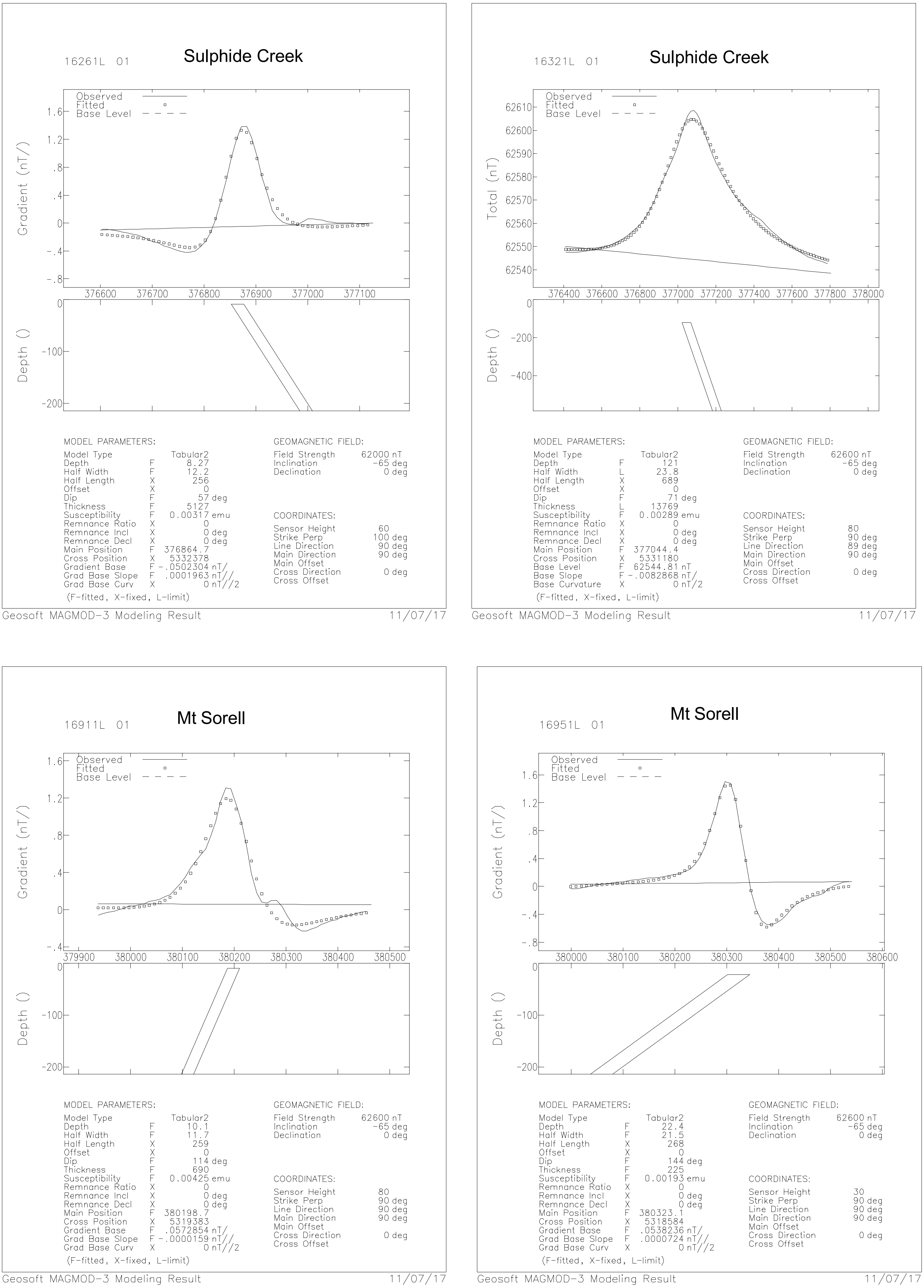

Figure 20 Magmod3 modelling/inversion
Sulphide Creek Harvey Creek fault anomalies
Mt Sorell Harvey Creek Fault anomalies

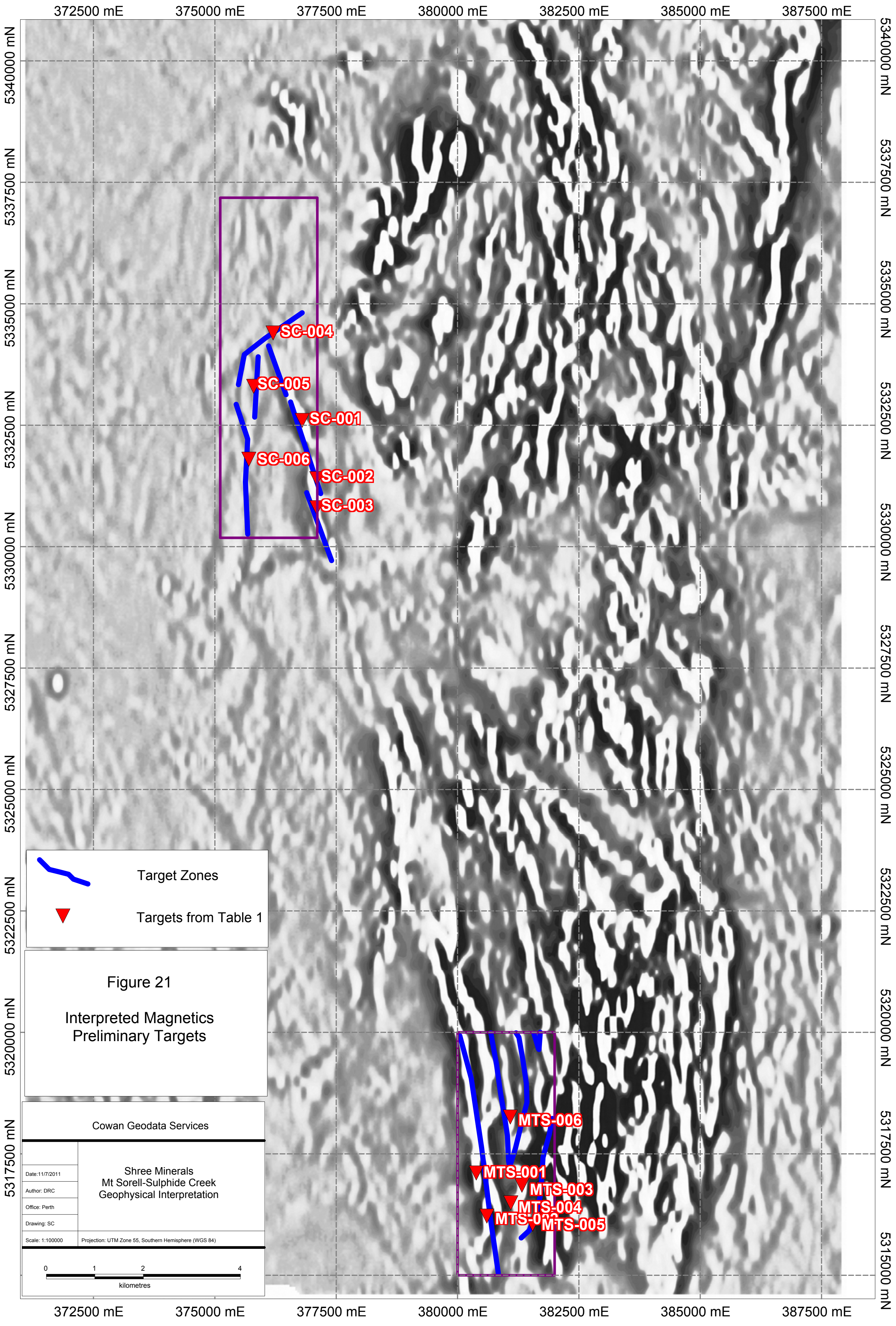

Figure 21

Interpreted Magnetics
Preliminary Targets

Table 1 - Shree Minerals - Sulphide Creek-Mt Sorell - Geophysical Target								
Target ID	**EASTING**	**NORTHING**	**PRIORITY**	**TYPE**	**MAGNETIC**	**FAULT**	**POTASSIUM**	**COMMENT**
MTS-001	380385.0	5317104.0	Moderate	Au	High	Yes	High	
MTS-002	380605.0	5316217.0	Moderate	Au	High	Yes	High	
MTS-003	381327.0	5316852.0	High	Cu-Au	Moderate	No	Low	
MTS-004	381098.0	5316490.0	Low	Cu-Zn	Moderate	No	High	
MTS-005	381546.0	5316052.0	Moderate	Pb-Zn	Low	Yes	High	
MTS-006	381088.0	5318257.0	Moderate	Cu-Au	Moderate	Yes	Low	
SC-001	376800.0	5332600.0	Moderate	Cu-Au	subtle	Yes	High	
SC-002	377100.0	5331400.0	Moderate	Cu-Au	subtle	Yes	High	
SC-003	377100.0	5330800.0	Moderate	Cu-Au	subtle	Yes	High	
SC-004	376200.0	5334400.0	Low	Pb-Zn	subtle	Yes	High	
SC-005	375800.0	5333300.0	Low	Pb-Zn	subtle	Yes	High	
SC-006	375700.0	5331800.0	Low	Pb-Zn	subtle	Yes	High	