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Mitre Geophysics Pty Ltd

Interpretation of the January 2009 Zeehan SkyTEM Survey

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Date: 9 July 2009

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1. SUMMARY

A high resolution airborne electromagnetic (EM) and magnetic survey was flown in January 2009 over the Zeehan exploration licences EL18/2003, EL30/2002, and EL20/2002, located in Western Tasmania. The aim of the survey was to detect anomalous conductive response in the EM data that could be directly targeted for base metal mineralisation.

The primary advantage of airborne EM is that it enables rapid, systematic coverage over large areas for relatively low cost (certainly when compared to surface exploration), without causing ground disturbance. Two qualifications, however, must be applied when interpreting the results. First, the airborne platform means that airborne EM has trade-off in spatial resolution, near surface vertical resolution, and depth of penetration against the best possible ground based data. Secondly, not all styles of economic sulphide mineralisation give a recognizable EM response (e.g. broadly disseminated deposits can give no response), and some geological conditions produce anomalous EM responses that are not associated with economic sulphides. In this area particularly, economic mineralisation may be dominated by sphalerite, a sulfide mineral unresponsive to EM

The airborne survey produced many strong responses, but none of these could be attributed unequivocally to economic sulphides due to the confounding effects of highly conductive stratigraphic units. The main conductors fell into six areas named after local prospects: Tenth Legion, Comstock, Razorback, Evendine, East and Ainslie. The latter four are immediately east of Zeehan Zinc's tenements, but have many very interesting features worth further investigation. We recommend pursuit of a joint venture with the current leaseholder for this area.

The Comstock area is dominated by a 4 km long, moderate to high conductivity, WNW trending, near surface, stratigraphic conductor. This feature was apparent on previous EM surveys in this area, but is as yet unexplained. It is likely a graphitic sedimentary unit, but some lines across the anomaly show large spikes superimposed on the broader stratigraphic response. The source for these spikes is definitely worth investigation. We recommend ground reconnaissance and geochemistry followed by shallow drilling to finally determine the nature of the Comstock conductor and, more importantly, what is the source of the conductive spikes.

The Tenth Legion area is characterised by a series of buried, WNW trending, conductive zones. The line orientation is sub-parallel to the conductors, so they are not well defined, but conductivity-depth image (CDI) on the section suggests shallowly northeast dipping weak stratigraphic conductors, with high amplitude responses superimposed. The source of the two types of the response is very important to determine. It appears to be a different style of response than the Comstock area, because many of the conductors are associated with strong magnetic responses. We recommend ground reconnaissance on the lines where the features approach the surface, followed by geochemistry, ground EM and then drilling if warranted.

The area of sedimentary rock (Gordon Limestone, Crotty Quartzite, Moina Sandstone etc.) surveyed in the southeast portion of Zeehan Zinc's tenements produced no strong responses. Mariposa had no responses at all while Oceana had only weak responses, though they did coincide with approximate position of the ore. The lack of good responses significantly downgrades the prospectivity this area, mitigated by two factors: Firstly, pure sphalerite is effectively invisible to EM methods and certainly airborne EM. Secondly, disseminated or poorly connected mineralisation may not be sufficiently massive to produce an identifiable response.

This report describes processing and interpretation of SkyTEM EM data. The SkyTEM data have been interpreted with reference to other datasets available from the area, including airborne magnetics, radiometrics, Hummingbird helicopter frequency domain EM data, and known mineral occurrences. Please refer to the main body of the report for important discussion of the results. The attached DVD has the all important raw/processed data and images of CDI's and channel slices.

2. INTRODUCTION

From the 20th to the 31st of January 2009, a helicopter borne time-domain electromagnetic (EM) survey was flown for Zeehan Zinc Ltd. The survey was centered around the old mining township of Zeehan, and included the entire area held under tenements EL18/2003, EL30/2002, and EL20/2002 (Figure 1). The EM data acquisition system was SkyTEM, with a Scintrex CS-2 magnetometer attached to the frame. The survey was flown by Geoforce Pty Ltd for Zeehan Zinc Ltd, who are currently exploring the ground for Rosebery and Farrell style Pb-Zn-Ag-Au and Avebury style Ni mineralisation.

Airborne EM (AEM) has been the most successful mining geophysical technique ever developed, with approximately 80 major deposits discovered in Canada in the period 1950 to 2000 (Witherley, 1999) and uncounted others since. In the past five years the detection capabilities of AEM have been significantly improved by the development of helicopter time-domain EM (HTEM). One particular advantage of HTEM is the helicopter platform allows rapid, systematic coverage of very remote areas with difficult topography for relatively low cost, certainly when compared to ground based exploration.

The improvement of detection capabilities and ease of application led to the decision to fly HTEM Zeehan Zinc Ltd's tenements. The aim of the HTEM survey was to delineate anomalous EM responses that could be attributed to massive sulphide mineralisation, in particular sulphides associated with nickel mineralisation in the west and northern part of the survey area, and sulphides associated with Pb-Zn mineralisation in the central and south eastern area.

The region features rugged topography and difficult weather patterns which impeded the logistical aspects of data acquisition. The town of Zeehan, isolated buildings, power lines and the railroad caused strong cultural anomalies that were easily identified and accounted for. A total of 1572 kilometers were flown at 100m line spacing and 30m nominal terrain clearance, with 1000m spaced north-south tie lines (required to level the magnetic data). Data where sampled at 4Hz equating to 4-10m interval dependent on the helicopter ground speed. Total cost for data acquisition and processing was very approximately $175/line kilometer.

In 2000, Jacob Russell submitted an honours thesis to the University of Tasmania title *A Geophysical Investigation of the Comstock Prospect, Western Tasmania.* As the title suggests, geophysical surveys were undertaken at the Comstock prospect, 7km west of Zeehan in Western Tasmania, to evaluate the effectiveness of geophysical techniques for delineating sites of sulphide mineralisation in fine-grain clastic/carbonate host sequences. Apparent resistivity, magnetic susceptibility, sonic velocity, and density analysis established that ore and host sequences at Comstock have an overlapping range of physical properties. J. Russell attributed this to the presence of graphitic/pyrite shales in host sequences, and resistive sphalerite in ore material. Some ore (vein) was found to be essentially non-magnetic and resistive, while some ore (skarn) and host materials (dolomite) were found to exhibit low to very high magnetic susceptibilities.

3. ACQUISITION PARAMETER

SkyTEM is a helicopter-borne time-domain electromagnetic system. The system acquisition parameters are completely described in the survey data acquisition report already provided to Zeehan Zinc (Reid, 2009), and are summarized below:

Survey Company	Geoforce Pty Ltd
Dates Flown	20 – 31 January 2008
Client	Zeehan Zinc Ltd
Terrain Clearance	30 metres (nominal)

EM System	SkyTEM (High moment and low moment)
Sample Rate EM	4 Hz (~4-10m)
Magnetometer	Scintrex CS-2 Cesium vapour
Sample Rate mag	10 Hz
Peak transmitter moment	119,320 A.turns.m^2
Delay times	59.8 µs (SkyTEM channel 8) – 8.8 ms (SkyTEM channel 32)
Traverse Line Spacing	100 metres
Traverse Line Direction	E – W
Tie Line Spacing	1000 metres (required to level magnetics data)
Tie Line Direction	N – S
Datum	MGA55/GDA94 translated to AMG55/AGD66

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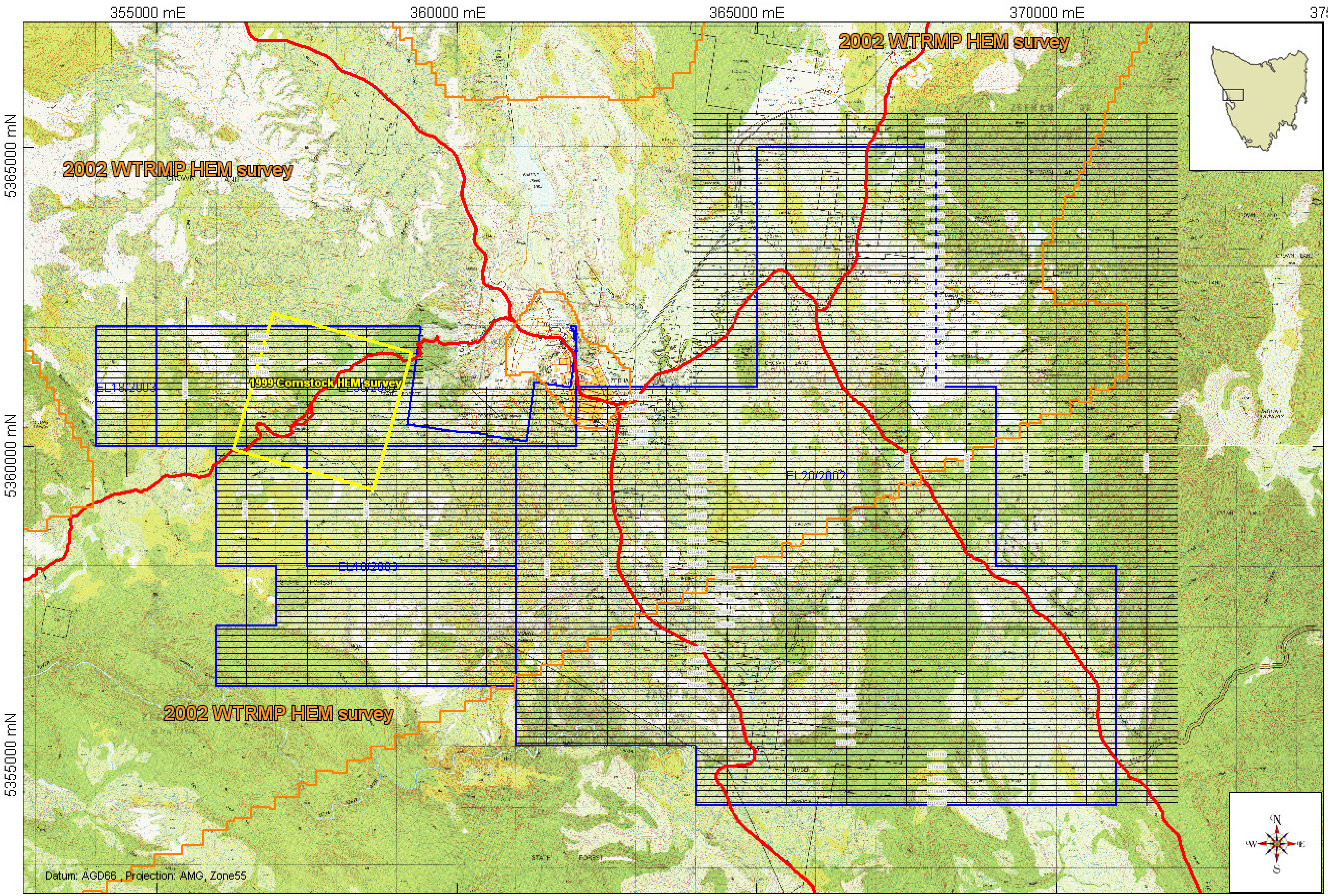


Figure 1: Line plan of January 2009 SkyTEM survey with outlines of the 2002 and 1999 HEM survey coverage. Line spacing 100m, tie line spacing 1000m.

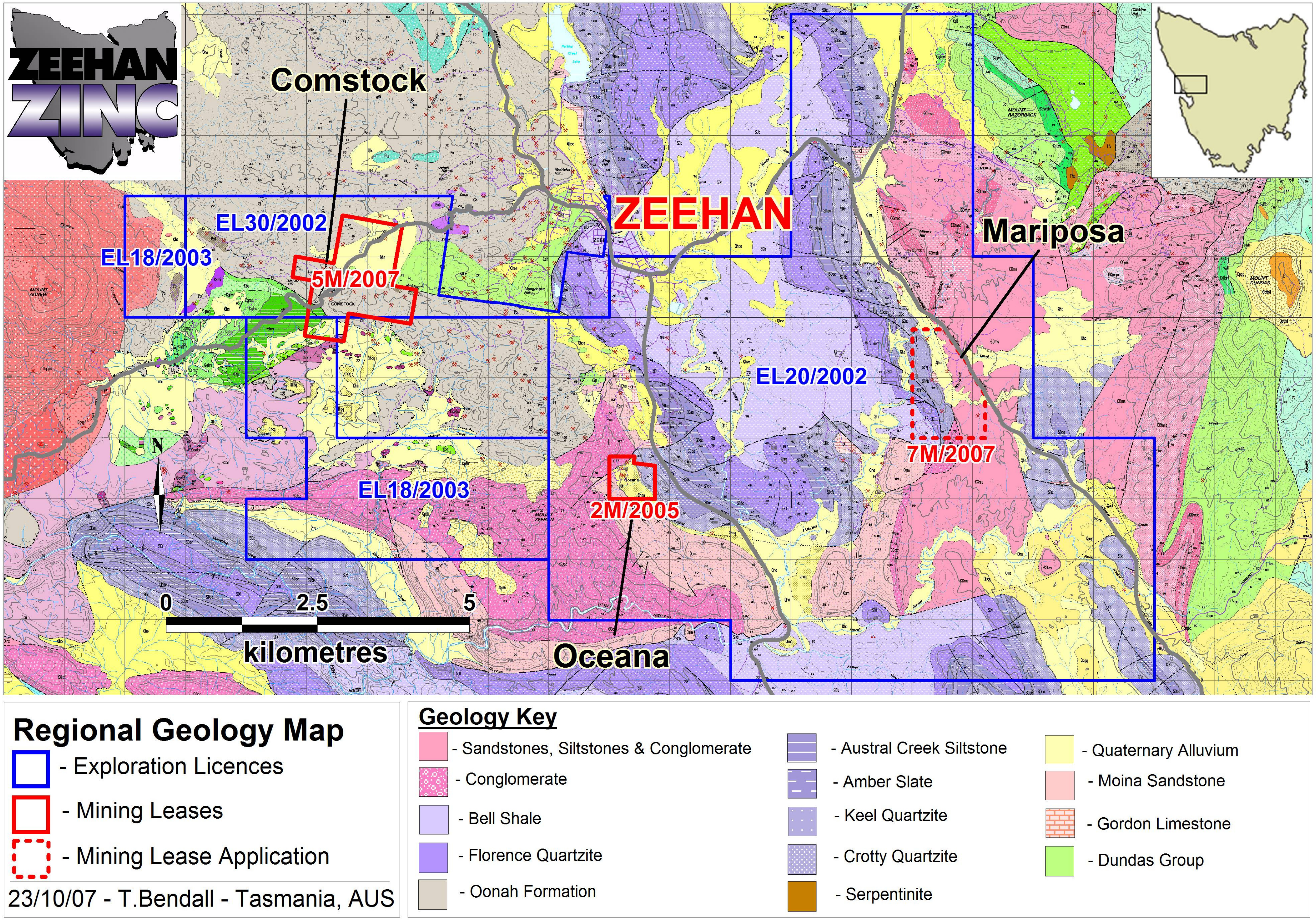


Figure 2: Regional geology over Zeehan Zinc Ltd's tenements.

4. PREVIOUS WORK

Many small and large companies have explored the Zeehan area, and several of these have conducted airborne geophysical surveys. Of greatest relevance to this project is the 1999 Comstock helicopter Hummingbird EM (HEM) survey (Figure 3) and the 2002 Western Tasmanian Regional Minerals Program (WTRMP) helicopter Hummingbird EM survey (Figure 4). The coverage of these surveys is shown in Figure 1, and several plan view depth slices are in Figure 3 and 4. The full survey reports are available from Mineral Resources Tasmania library.

The Hummingbird data was an important consideration when planning further exploration. However, newly developed helicopter time-domain EM (HTEM) offered several advantages over the frequency domain HEM method. The first advantage was greater depth penetration of time-domain systems such as SkyTEM, VTEM and GeoTEM when compared to HEM. The second advantage was full coverage of Zeehan Zinc's tenements on 100m spacing lines rather than partial coverage on 200m spaced lines. Finally, a new HTEM survey offered better resolution of a wider spectrum of targets to greater depths. The comparison was further weighted in the HTEM direction by the Reid (2003) report on the 2002 WTRMP HEM. Reid (2003) suggested that the Hummingbird depth penetration was probably closer to 100m rather than the theoretical 200m. This was the result of high ground resistivity causing low signal strengths for the low frequencies (880Hz-CP and 980Hz-CZ), and pervasive leveling errors.

The 1999 Comstock Geo-instruments Hummingbird HEM results were dominated a large and moderately good conductor, which we shall call the Comstock Conductive Zone. This anomaly is still unexplained, but may be caused by a graphitic schist or shale. This survey was flown for Oceana Pty Ltd and aimed to delineate conductive features associated with the Comstock mineralisation. The survey coverage and gridded data is in Figure 3.

The 2002 WTRMP HEM survey was on 200m spaced E-W lines and included the northwestern half of Zeehan Zinc's tenements (Figure1). The Hummingbird system is a frequency domain EM system that employs both horizontal coplanar and vertical coaxial transmitter-receiver geometries. Nominal bird height was 30m, though heavy forestation and steep terrain meant that the actual bird height was much greater.

The historical airborne magnetic surveys cover significant portions of ZZ tenements, particularly the western and northern sides. Whilst this data is still perfectly useable, it does not provide a complete and cohesive coverage of all the tenements. Mitre Geophysics therefore recommended the addition of the magnetometer to the SkyTEM rig, to provide (for little extra expense), a complete low altitude magnetic dataset.

The previous airborne geophysical surveys over Zeehan Zinc's tenements are listed below.

Survey Name	**1989 Zeehan Area Magnetics**
Operator	RGC Exploration Proprietary Limited
Processor	Geoterrex Pty Ltd
Start Date	19 March 1989
End Date	29 March 1989
Total Km	2155
Survey Type	Detailed
Vessel Name	VH-HQO AS-350B
Vessel Type	Helicopter
Mean AGL (m)	117.000
Description	Precise leveled version available. Line increment in 100.
Tie Spacing	1500m
Traverse Direction	90
Spacing	150m

Survey Name	**1993 Cuni Magnetics+Radiometrics**
Operator	CSR Limited
Contractor	Geometrics

Processor	Exploration Computer Services
Start Date	17 December 1985
End Date	31 December 1985
Total Km	358
Survey Type	Detailed
Vessel Name	VH-WJK Piper Chieftain
Vessel Type	Plane
Mean AGL (m)	105.000
Description	Precise leveled version available.
Tie Spacing	1000m
Traverse Direction	90
Spacing	100m

Survey Name	**1993 Ocean Mine Lease Magnetics**
Operator	Pasminco Exploration Limited
Contractor	Geoterrex Pty Ltd
Start Date	25 March 1993
End Date	25 March 1993
Total Km	130
Vessel Name	AS-350B
Vessel Type	Helicopter
Crystal Volume (l)	16.800
Mean AGL (m)	105.000
Description	Precise leveled version of radiometric data available.
Tie Spacing	1000m
Line direction	90
Spacing	100m

Survey Name	**1995 CRA Zeehan Areas 1, 4, and 5 Magnetics Area 1**
Operator	CRA Exploration Pty Ltd
Processor	UTS Geophysics
Custodian	Tasmanian Geological Survey
Start Date	14 March 1995
End Date	24 March 1995
Total Km	~1500
Survey Type	Detailed
Vessel Name	VH-HBA AS-350B
Vessel Type	Helicopter
Mean AGL (m)	32.000
Spacing	80

Survey Name	**1998 Trial Harbour Magnetics + Elevation**
Operator	Allegiance Mining NL
Contractor	UTS Geophysics Processor Baigent
Start Date	21 April 1998
End Date	23 April 1998
Total Km	1676
Survey Type	Detailed
Vessel Name	AS-350B
Vessel Type	Helicopter
Mean AGL (m)	67.000
Traverse direction	180

Survey Name	**2002 Mt Read Volcanics (WTRMP EM) FEM+Magnetics**
Processor	Geo Instruments Pty Ltd
Start Date	22 January 2001
End Date	07 April 2002
Total Km	7788
Vessel Name	VH-RTV AS-350B
Vessel Type	Helicopter
Mean AGL (m)	79.000
Data Sampled	Electromagnetics, Elevation, Magnetics
Tie Spacing	2000m
Traverse Direction	90
Spacing	200m

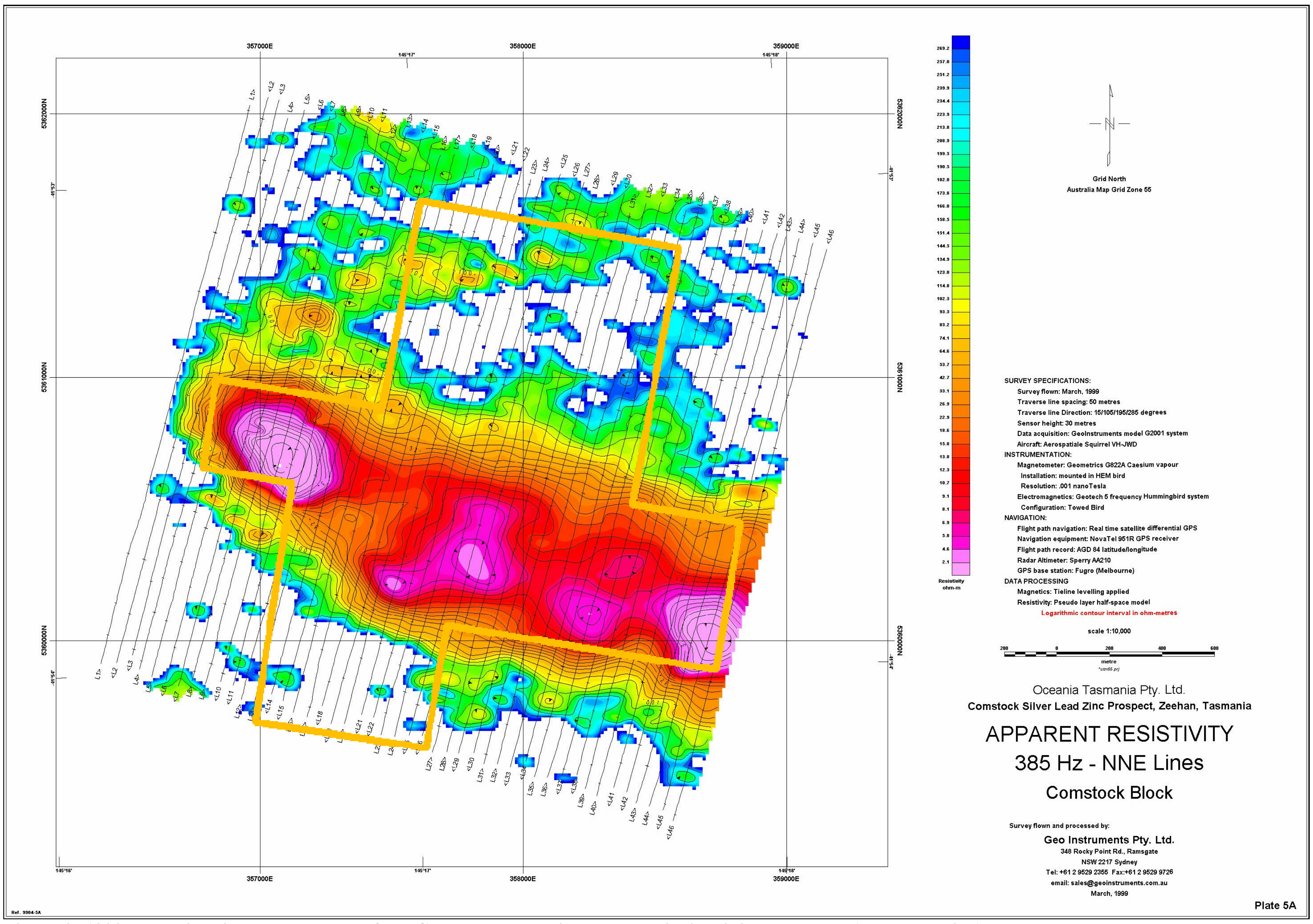


Figure 3: 1999 Hummingbird HEM survey of the Comstock area with Zeehan Zinc's mining tenement (orange outline).

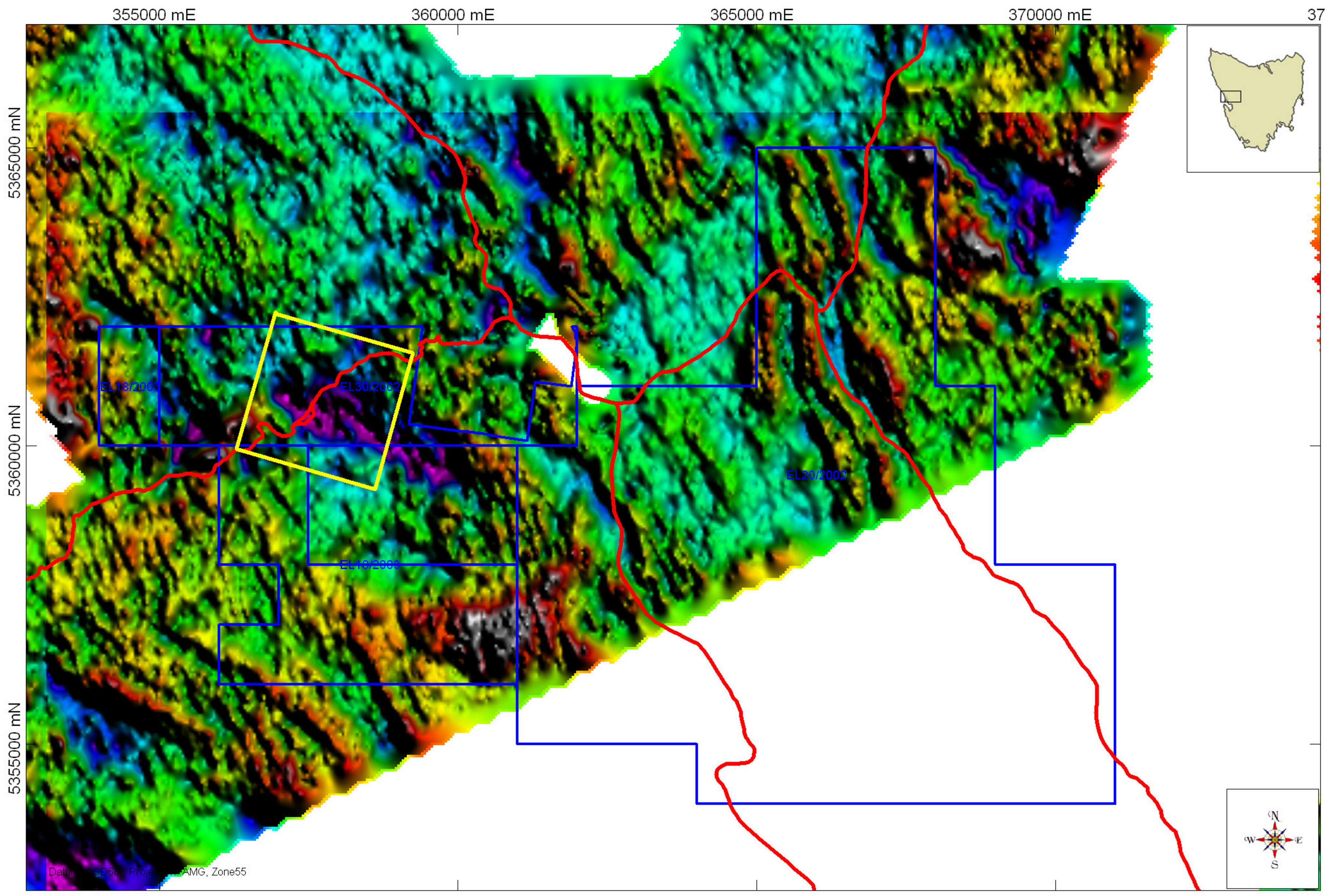


Figure 4: Logarithm of apparent resistivity derived from the 2002 WTMPT HEM survey, 880Hz co-planar apparent resistivity.

3. ELECTROMAGNETIC THEORY

Electromagnetic exploration involves setting up an alternating magnetic field from a closed loop of current. This magnetic field expands down into the earth and, if it passes through a conductor, will set up eddy currents within the conductive body as a response to the magnetic field. When the magnetic field (B) is switched off, secondary eddy currents oppose the change in magnetic field (~-dB/dt), and the magnetic field from the secondary currents can be measured either from the air, the surface or down a drill hole.

EM methods are used in massive sulphide exploration and have proved instrumental in discovery of many major deposits. Hellyer in western Tasmania was discovered by surface EM, airborne EM was instrumental in the discovery of Voisey's Bay and Que River, and down-hole EM delineated the blind lodes at Mt Isa. Drill hole electromagnetics is particularly useful because it expands the area of investigation of the drill hole by up to 200m for very large targets, and is effectively only limited in depth of investigation by the depth of the drill hole.

EM measurements can be made using ground-based instruments, but also using instruments mounted in specially adapted aircraft. The latter enables rapid systematic coverage over large areas for relatively low cost, without causing ground disturbance. In doing so, however, there is usually some trade-off in spatial resolution, near surface vertical resolution, and depth of penetration against the best possible ground based data. For this reason, airborne EM anomalies should usually be followed up with ground EM, to better determine size, nature and location prior to drilling.

Airborne EM (AEM) has been the most successful mining geophysical technique ever developed, with approximately major 80 deposits discovered in Canada in the period 1950 to 2000 (Witherley, 1999) and uncounted others since then. Airborne EM does, however, have very limited resolution capabilities imposed by the physical limitations of the airborne platform: For this reason, airborne EM should be considered first pass anomaly detection rather than sulphide delineation, and treated accordingly. Simply put, an airborne EM anomaly should not be drilled until further ground based evidence is acquired such as geochemistry, geology and ideally ground EM.

3.1 Forward modelling of detection limits

To help quantify to detection limits of the system, forward modeling of the SkyTEM system parameters was applied. The maximum depth of penetration in resistive areas was 300m. In areas with near surface conductors, the shielding effects of these conductors reduced the signal penetration to a minimum of 50m, though usually more.

Simple forward modeling is useful to estimate the detection limits of the SkyTEM system. Given a certain minimum size of ore body, the most important limit to establish is the depth of detection. This modeling assumes that the target mineralisation is interconnected to massive sulphides, and as such a good target for EM geophysics. Disseminated or oxides mineralisation often does not have good bulk conductivity, and therefore will not produce a good EM response.

The SkyTEM data for the Zeehan survey has a noise level of 0.3-0.4 nV/Am^2 for the Z component and 0.8nV/Am^2 for the x component. Therefore, a response of >0.5 nV/Am^2 is deemed to a recognisable above background noise. This noise level is actually relatively high, but is a product of the sampling windows of the SkyTEM system. Namely, late time channels average over a broader sample window than early time channels, so the noise levels in resistive ground (where the decays goes to 0 very quickly) are effected by these shorter window lengths.

For simplicities sake, we assumed two broad types of target mineralisation with variable geometry:

1) Lead-Zinc and/or base metal massive sulphide:
Conductivity: moderately low (200S) to moderate (500S)
Depth: 50-300m

2) Avebury-style Ni-sulphide mineralisation:
Minimum size: 50m long by 30m for mineralisation + haloe

Conductivity: High (1000S) to very high (2500S)
Depth: 0-300m

The detection limits for the various plates modeled are listed below

Depth	**100m**		**150m**		**200m**		**250m**	
Orientation	Hor	Vert	Hor.	Vert	Hor.	Vert	Hor.	Vert
1) 100x100m, 200S	Yes	Yes	Yes	Yes?	No	No	No	
1) 200x200m, 350S	Yes	Yes	Yes	Yes	Yes?	No	No	
1) 400x200m, 500S	Yes	Yes	Yes	Yes	Yes	Yes	No	
2)50x100m, 1000S	Yes	Yes	Yes	No	No		No	
2) 50x100,, 3000S	Yes	Yes	No		Yes?	No	No	
2) 100x100m, 1000S	Yes	Yes	Yes	Yes?	Yes	No	No	

Table 1: A rough resolution guide for the Zeehan SkyTEM survey. The modelling assumes massive, interconnected sulphides.

5. RESULTS

The EM data was generally good quality with low noise levels given the very resistive ground conditions, strong winds and steep topography. There is relatively little 'striping', even in very early time data. Preliminary data was delivered almost immediately after the completion of the survey, and final data were delivered somewhat more slowly in May.

The average depth of penetration was 150-250m in area with moderate ground conductivity, and up to 350 m in the most resistive zones. Depth of penetration was only significantly degraded below very strong near surface conductors such as the Comstock conductor. On average, this is 2 to 3-times greater depth investigation than the previous Hummingbird frequency EM, which in any case was only on 200m spaced lines over less than half of the Zeehan Zinc lease holding.

The EM profiles exhibited many examples of 'IP effects', an artefact in EM data which is very common in western Tasmania. These IP effects are real late time negative decays, cause by polarisation of chargeable material by the EM eddy currents. Whilst they may be caused by pans of clay at surface, they may also be related to disseminated sulphides. Disseminated pyrite is very common in the Zeehan area and not generally a good mineralisation indicator. Therefore, where present, these IP effects have been picked as (usually) low ranked anomalies. Ground investigation is not, however, entirely unwarranted because Russel (2000) reported strong chargeability values for Comstock vein and skarn style mineralisation. One anomaly which has a very strong IP effects which is worth further investigation is below:

Line	Description	ID#	Decay (ms)	Ranking	East	North
10040	mid time negative decay, peak at 0.2 ms, width 300m, stratigraphic?	1008	0.27	5	369837	5354247
10430	Early-t positive, mid-late time negative anomaly, near road – ip effects	1079	0.18	3	362785	5358151

Table 2: Two examples of very clear IP effect in the EM data. The profile data show confined features with a nearly exponential, strong, negative late-time decay. The anomaly ID# 1079 extends from line 10420 to 10430 only. Anomaly iD#1008 extends over 500m north-south and is not closed off to the south.

The magnetics data are high quality, but the magnetics images suffer from poor gridding algorithms. The gridding method used by Geoforce was minimum curvature on 25m sized grid cells with, most probably, significant smoothing applied. A great deal more magnetic information might be gained from re-gridding the data using something like a bi-directional spline.

Information relevant to the data acquisition, processing and data quality are reported and discussed in the Geoforce SK987MI_Final_Report.pdf by Reid *et. al.* (2009).

6. INTERPRETATION

The EM interpretation was performed as follows:

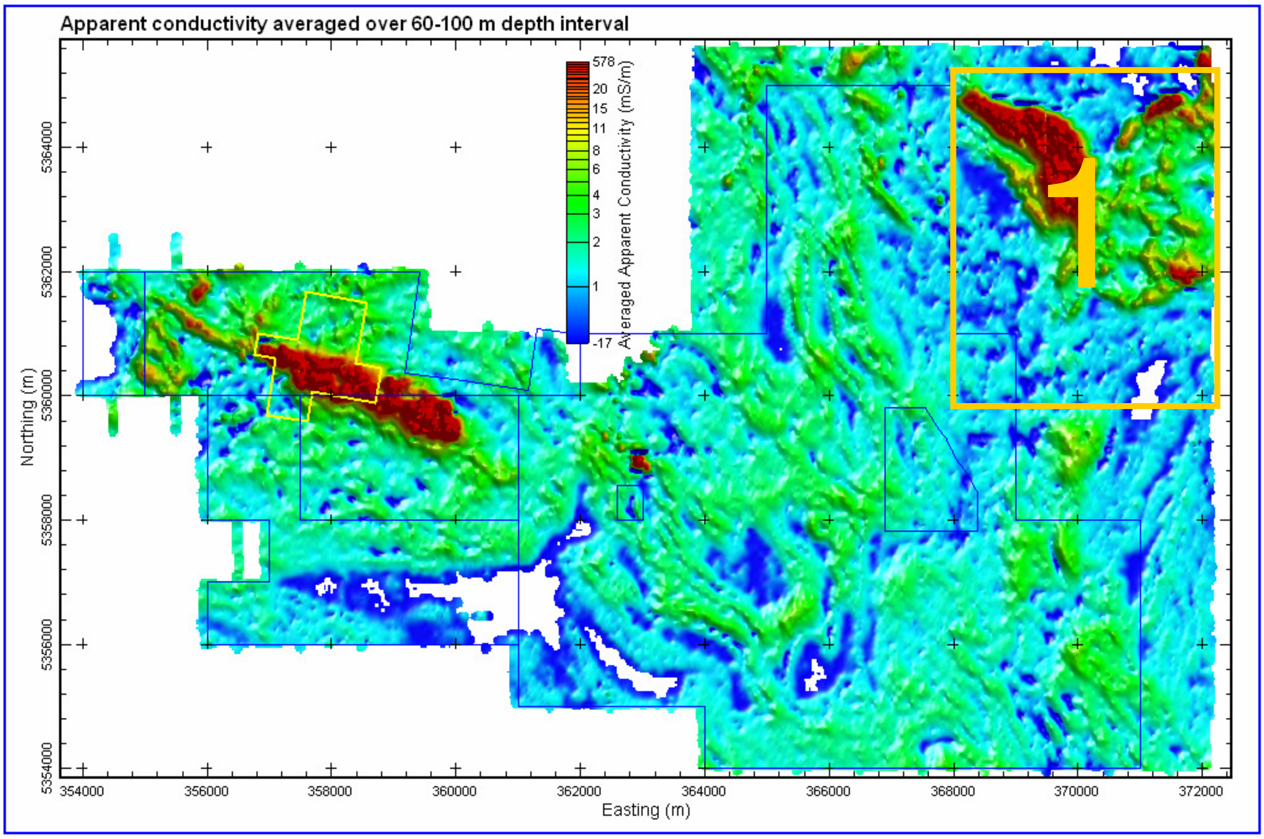
Profiles of the raw SkyTEM data were inspected to pick and rank conductors into six categories:

1) Strong, clear profile response, limited strike extent (i.e. not stratigraphic), may or may not be near known mineralisation
2) Clear profile response, may have some strike extent, possibly near known mineralisation
3) Weak profile response, near known mineralisation
4) Weak profile response
5) Very weak profile response, invisible on conductivity-depth image, no nearby mineralisation
6) Cultural anomaly.

The CDI sections were then visually inspected and these compared to the conductors from the profile data. The conductors were either upgraded or downgraded based on this inspection. These anomalies are recorded in Appendix 1: List of Ranked Anomalies

Major features identified in the interpretation are discussed below:

6.1 Northeast Area



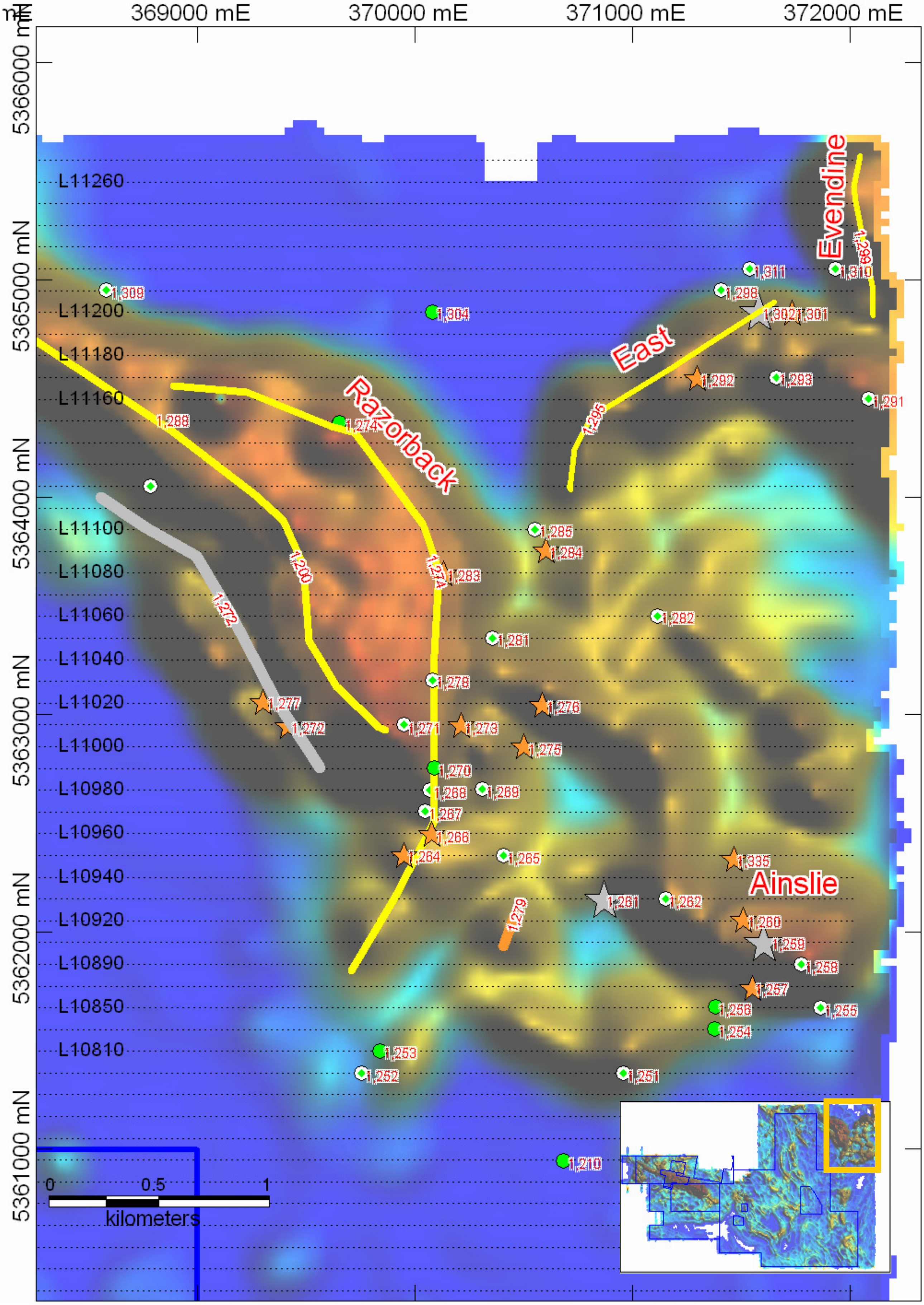


Figure 5: Map of the averaged apparent conductivity (mS/m) in the 100-150 m depth interval from the northeastern corner of the Zeehan Zinc SkyTEM survey. Four large, probably stratigraphic, conductors are labeled. Namely Razorback, Ainslie, East and Evendine.

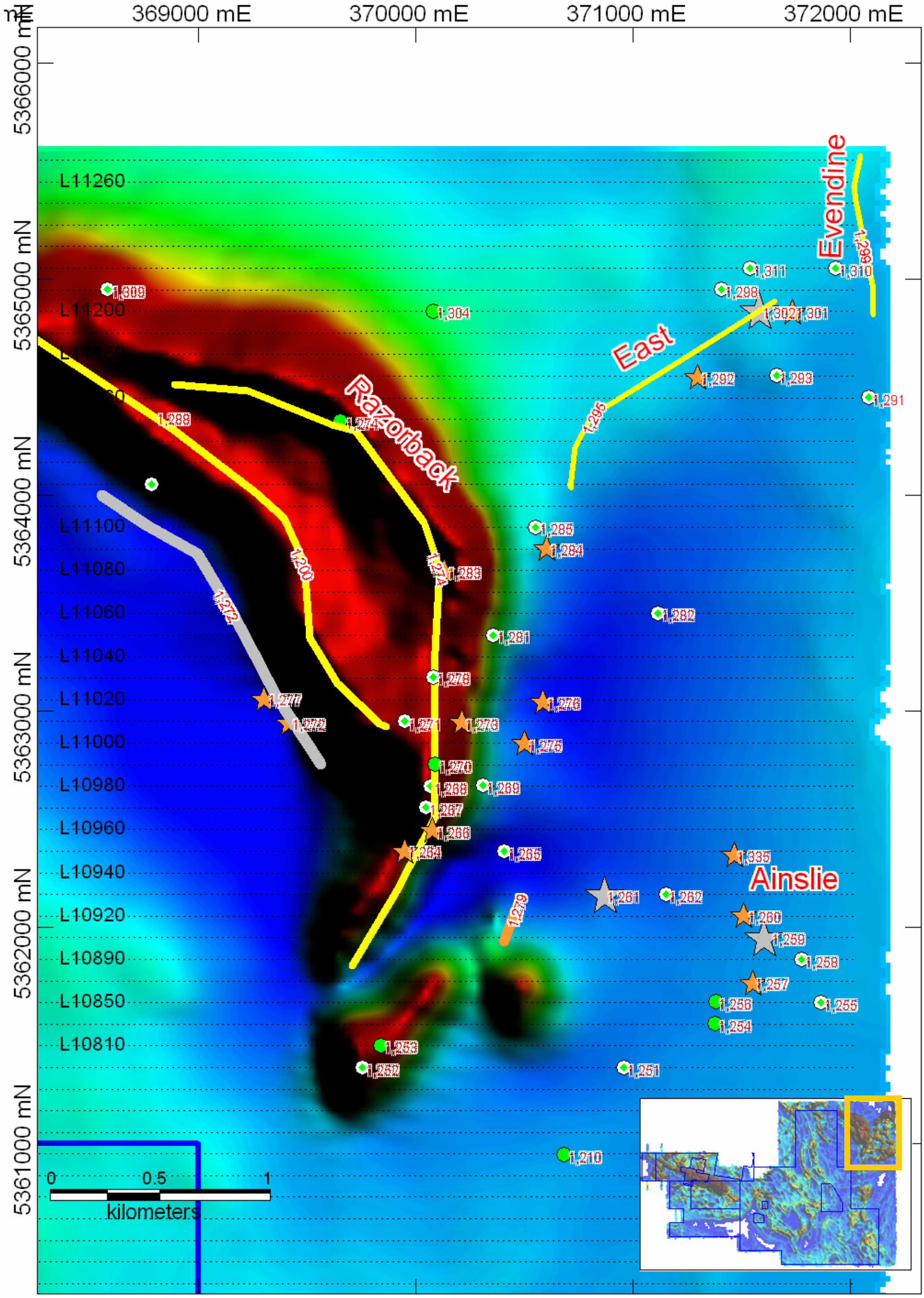


Figure 6: Map of the total magnetic intensity over the Razorback area.

Razorback Conductive Zone – Lines 11210-10960

The Razorback Conductive Zone is a very large, distinct, 3.5km long, apostrophe shaped, magnetic, and conductive anomaly in the northeast of the survey area (Figure 5). It is, by far, the largest magnetic response and strongest conductor in the eastern half of the survey. The CDI on line 11170 over the northern end of the Conductive Zone shows a large conductor and very large magnetic response (Figure 7). The boundaries of the anomaly closely match the mapped occurrence of layered peridotite, serpentinite and associated rocks.

The outcrop geology and magnetics indicate the ultramafic source rocks extending further south and west than the conductivity anomaly. Since the main mine prospects in this unit seem to have some correlation with the EM responses, the cause for this discrepancy should be investigated. Possibly some form of alteration of the ultramafics may be found to explain the resistive patches in the otherwise conductive ultramafics.

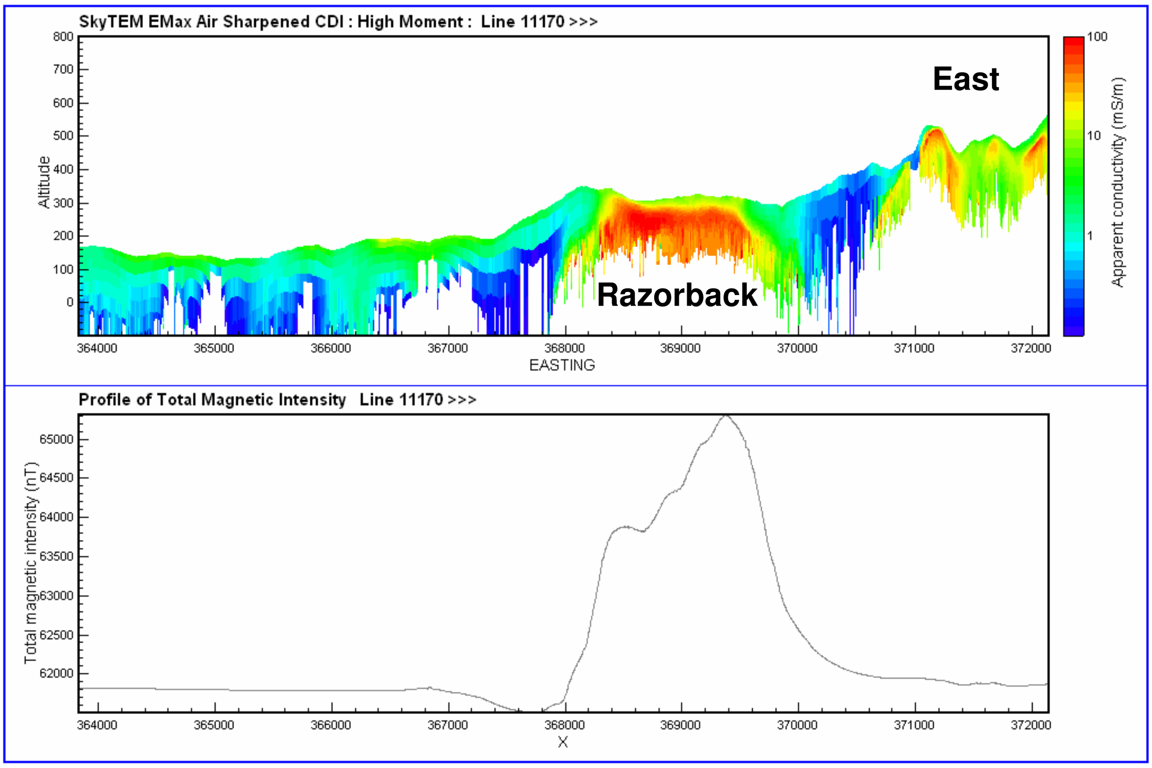


Figure 7: CDI of Line 11170 showing the Razorback and East Conductive Zones. The bottom panel shows the very large 3000nT magnetic response from the ultramafics. There is no comparable magnetic response from the East Conductive Zone, which is part of the Dundas volcano-sedimentary sequences.

The connection between iron-oxide rich ultramafics and strong magnetic responses is well established, however there is no clear reason for the correlation between the ultramafics and high conductivity. The simplest interpretation is graphite along shear planes, which is not uncommonly associated with serpentinisation and deformation. It is interesting to note that the Comstock Conductive Zone, whilst sourced from non-magnetic carbonaceous meta-sediments, also has a (weaker) magnetic anomaly.

The Razorback Conductive Zone, in particular the resistive parts of the Razorback Conductive Zone, deserves further attention. The first step should be sampling and ground geological mapping, with special attention to magnetite, sulphide, graphite, and alteration distribution. This should help explain the link between high conductivity/high magnetic response and whether this relationship is important. Ground magnetics would be largely useless due to the very high signal amplitudes and steep magnetic gradient caused by the magnetite-rich ultramafics. Please refer to Appendix 1 for the complete list of EM anomalies.

Evendine Conductive Zone - Lines 11270 – 11230

The Evendine Conductive Zone is a non-magnetic, moderately strong, EM anomaly on the eastern end of lines 11270 to 11230. It is clearly visible in the plan apparent conductivity (Figure 5) and profile Z+X component data as a high amplitude anomaly in the midst of a relatively low response area.

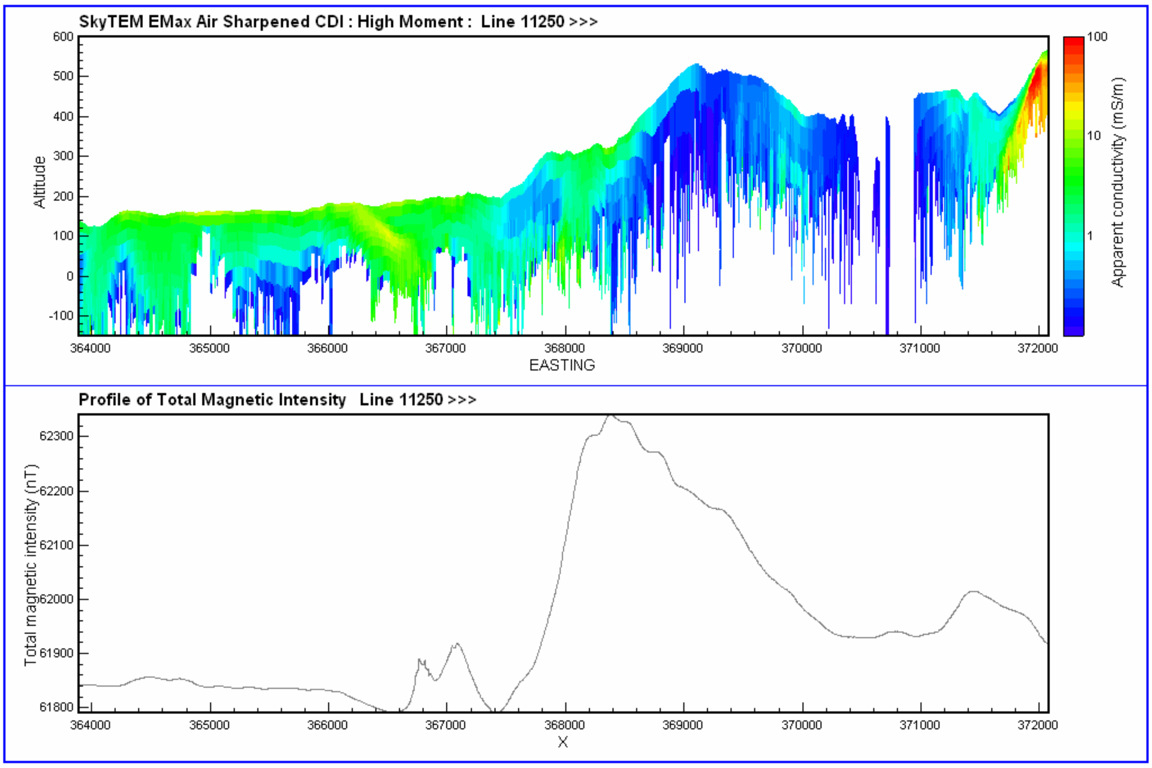


Figure 8: CDI and magnetic profile for line 11250 showing the Evendine Conductive Zone at the extreme eastern end of the line. Unlike the Razorback Conductive Zone, the Evendine Conductive Zone does not have a clear magnetic response. Also of note is the east-dipping conductive stratigraphy at 366500mE.

The CDI on the section data produces a moderately strong conductive zone, shallowing towards the east (Figure 8). It is closest to the surface at 372900mE on line 11250. The Conductive Zone extends approximately north-south starting on line 11270 and terminating on line 11230. There is no associated magnetic response.

The source is interpreted to be stratigraphic sedimentary (i.e. conductive shales) based on its large size, moderate apparent conductivity, lack of magnetic response, and position within a large sedimentary-volcanic sequence of the Dundas group(?). Several factors, however, elevate the priority of this target. Firstly, the 1:25000 surface geology shows no clear explanation for such a strong change in ground conductivity (in fact, the rest of the geological unit is uniformly resistive), and secondly the Evendine Mine prospect occurs within the conductive zone. These two factors make this feature worthy of further investigation. See ID #1299 in Appendix 1.

It is also worthwhile to mention the weak conductor visible around 366500mE in Figure 8. This conductor is a good example of the ability for airborne EM to map geological boundaries, rather than just ‘bump detection’. This conductive unit is delineated to nearly 200m below surface in an area of relatively poor rock outcrop exposure.

East Conductive Zone – Lines 11210- 11170

The East Conductive Zone is a 700m long by 300m wide, northeast elongated, non-magnetic, conductive anomaly northeast of the Razorback Conductive Zone (Figure 5). The CDI on line 11170 over the southern end of the conductive zone shows a patchy series of conductors on the eastern end. These are much smaller and lower amplitude than Razorback, but possibly more interesting for this very reason.

This feature is very like the Evendine Conductive Zone in all aspects of shape, conductivity, (lack of) magnetic response, and apparent size. The suggests that the two anomalies may be caused by the same source lithology. The CDI (Figure 7) shows the contrast between the resistive background (<5mS/m) and the conductive (apparent conductivity >800m/mS+) zone. The conductor resides within the volcano-sedimentary Dundas group sequence, but there is no change in surface geology to explain the change from resistive the conductive.

The profile analysis on these lines resulted in a 'flock' of subtle anomalies over this conductor, but none of these show a clear 'basement conductor' response. Therefore, the East Conductive Zone requires more conventional ground work to follow up the source of the anomaly. Specifically, mapping to determine the presence/absence of carbonaceous sedimentary units, and if no stratigraphic conductor is identifiable, surface geochemistry, and possibly surface EM if warranted. See ID # 1311, 1298, 1302, 1306, 1296, 1295, 1292 in Appendix 1.

Ainslie Conductive Zone – Lines 10920-10850

The Ainslie Conductive Zone is a moderately low magnetic response but high conductivity EM anomaly on the eastern end of lines 10920-10850. The CDI of line 10890 returns a >100mS/m westward dipping zone, depth to top 50-100m, width 400-800m. The conductive zone approaches the surface at 371600mE on line 10910. The surface geology shows no geological units to explain the anomaly, but there are several known mineral occurrences.

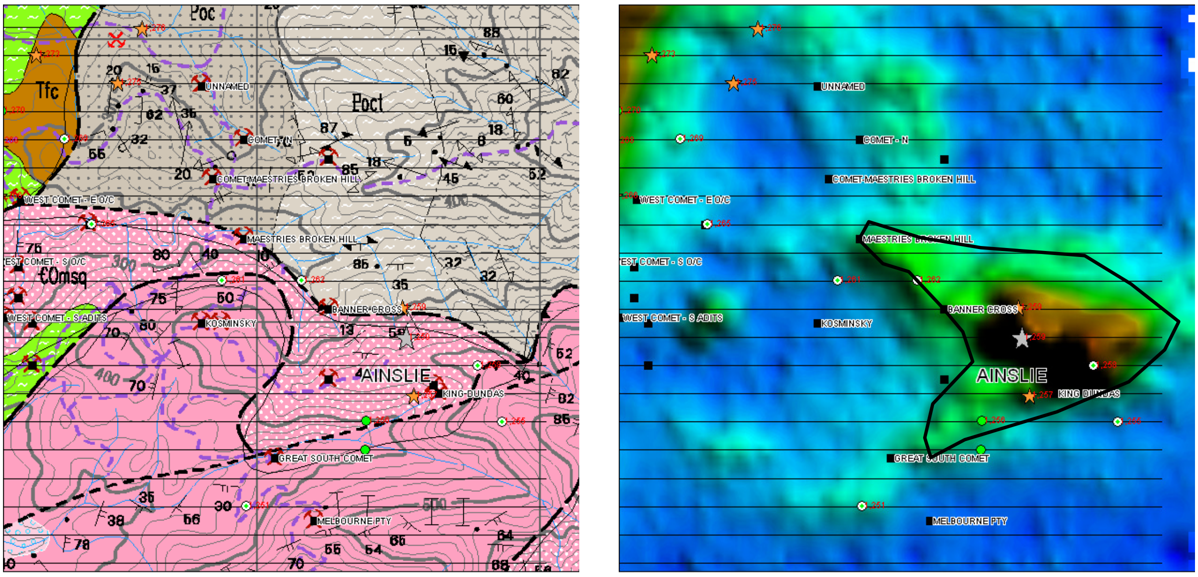


Figure 9: Ainslie Conductive Zone. Image of the geology and channel 25 Z-component EM response with picked and ranked profile EM anomalies and known mineral occurrences.

The combination of anomalous conductivity with nearby mineral occurrences raises the prospectivity of this area. It is unlikely that the conductor itself is base-metal mineralisation, but the correlation with mineralisation (e.g. the Ainslie Mine, King Dundas, and Banner Cross) should be investigated. Ground mapping, Ainslie Mine records, and geochemistry are all good points to start investigating this area.

Of particular interest is the north-western corner of the Ainslie Conductive Zone. This ridge extends under Maestries Broken Hill, which is a lead mineral occurrence. The CDI on line 10940 over this conductor produces a deep (>80m) moderate conductive zone at approximately 371000mE. Ground investigation is warranted. See anomaly ID # 1261 in Appendix 1.

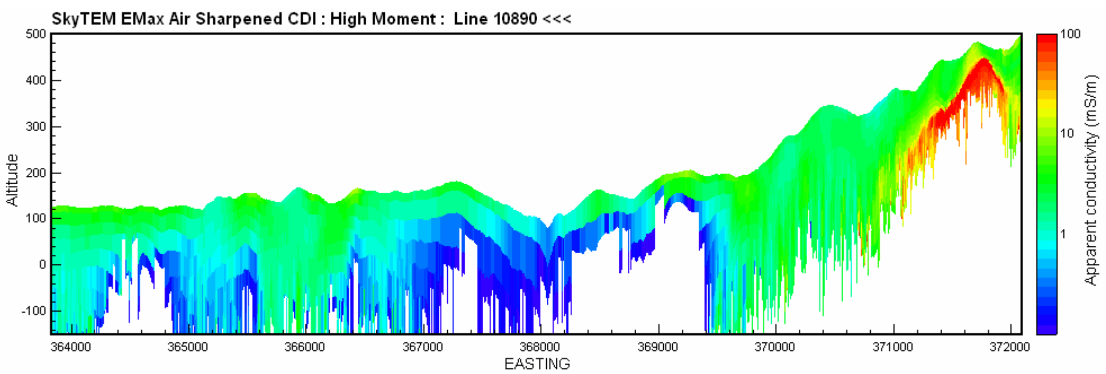
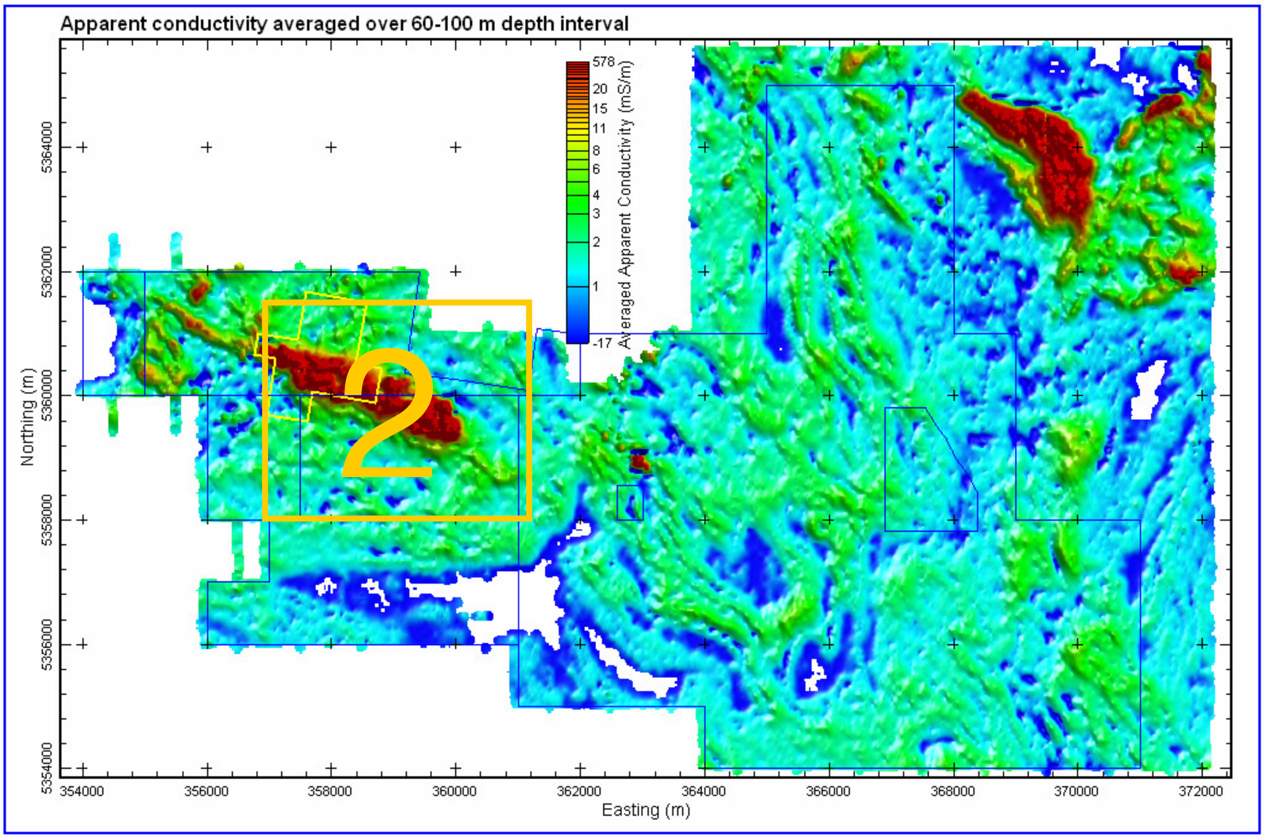


Figure 10: CDI on line 10890 over the Ainslie Conductive Zone. The conductor itself has characteristics of stratigraphic conductors, i.e. carbonaceous meta-sediments.

6.2 Comstock Area



Comstock

The geology of the Comstock prospect and its immediate surrounds consists of three major lithologies. The prospect itself is located within a series of complexly faulted and folded Pre-Cambrian fine-grained clastics and carbonates known as the Oonah Formation. These Proterozoic rocks thrust over Cambrian mafic/ultramafic rocks in the south by the northwest trending, northeast dipping Tenth Legion Fault. In the northern extremities of the prospect, the overlying volcanics and sediments of the Cambrian Crimson Creek Formation are in faulted contact with the Oonah Formation.

Drilling on the Comstock prospect (Figure 12) intersected three major Oonah formation units:

1. Interbedded graphitic and carbonaceous siltstones and shales with occasional fine grained sandstone.
2. Thick recrystallised carbonatee units often occurring as a skarn, interbedded with fine-grained siliciclastics including carbonaceous and pyritic siltstones/shales.
3. Interbedded siltstones and micaceous sandstones.

The Cambrian McIvor Hill complex mafic/ultramafic intrusives are present south of the prospects. The northern section of the complex is partially serpentinised, dolomitised and contains magnetite bodies.

The Comstock prospect has been investigated by several authors, the most comprehensive of which is J. Russell, in his thesis *A Geophysical Investigation of the Comstock Prospect,* submitted to the University of Tasmania in 2000. J. Russell reported all previous geophysical surveys, and the bulk of the next two paragraphs is derived from his thesis.

Comstock Conductive Zone

The Comstock Conductive Zone is a ~4 km long by 900 m wide, WNW striking, highly conductive anomaly directly under the Comstock prospect and EL 30/2002. It overlies a deep magnetic feature (McIvor Hill Complex), but is probably much shallower than the magnetic source. The Comstock Conductive Zone is by far the largest conductor in the Zeehan Zinc SkyTEM survey. At early times/high frequencies (shallow depths), the Comstock Conductive Zone is a large zone of very high, variable amplitude responses. At progressively later times/lower frequencies, the anomaly coalesces into a WNW trending conductive zone with very sharp boundaries on its north, south, and east sides, and a complicated termination on the western and eastern ends (Figure 11).

Frequency domain EM
The western half of this interesting feature was first revealed in the 1999 Geoinstruments Hummingbird EM survey, flown for Oceania Tasmania Pty Ltd. The Hummingbird survey was a frequency domain airborne EM survey with the same equipment as the 2002 WTRMP EM survey, but only covered a 2.2x2.4km square immediately over Comstock. The survey was flown twice: Once on 50m spaced WNW lines, and a second time on 50m spaced ENE lines. The 2002 and 1999 surveys returned fairly comparable results, given that the surveys were flown in different directions with different line spacing. Both surveys showed a very strong WNW trending conductor, thenceforth called the Comstock Conductive Zone.

Transient (time-domain) EM
A comparison between the 1999 frequency-domain data and 2009 time-domain data shows a better than expected correlation (Figure 11), despite differing line directions, recording systems, line spacing, and processing (the former is 385Hz apparent resistivity, the latter is the average of the apparent resistivity over the 100-160 m depth slice). The new time-domain data resolves the Comstock conductor to the same lateral extent as the Hummingbird survey, and almost certainly to greater depth extent (though this is harder to ascertain exactly without running the EM inversion).

RGC conducted seven dowhnhole TEM surveys during the 1990's. R. Deakin modeled the TEM data using his quantitative current filament modeling algorithms. Several good responses were modeled, but there is no record of these targets being tested. This may have been because of the large depth and/or uncertainty in position.

Western Metals conducted downhole and surface TEM surveys during 1999. 13 line kilometers of fixed-loop EM data was acquired, and 4 drill holes were surveyed using the downhole EM method to confirm the source of targets and identify off-hole conductors. Several conductors were drilled, with some bad and some good results. Of particular interest is a mineralised skarn intersected in SY019. The off-hole response of this skarn suggested that the unit had some strike length and may warrant further investigation, as did a mid-time off-hole response interpreted as being due to a target located 50m above hole SY019 (Figure 12) at a depth of 100m (Thompson, 2000).

Interpretation
The sheer size of the conductor requires a stratigraphic source, with the most likely candidate the interbedded graphitic and carbonaceous siltstones/shales from the Oonah Formation. There appears to be some correlation between the broad mapped apparent resistivity and the major geological blocks in the Comstock area. However, I could find no clear relationship between confined responses superimposed on the broader conductive zone, and known mineral prospects or geology. These confined responses have not been tested by any of the pre-existing drilling so until surface exploration provides an explanation, the short wavelength anomalies are prospective. With additional processing and interpretation, the EM data may prove more useful for direct detection of ore mineralisation.

The Comstock Conductive Zone poses an obstacle to exploration, but also provides useful information. I suggest a detailed examination of the EM data (including 3D inversion), followed by comparison with J. Russells geological sections modeled from the potential field data. This approach would yield information about the major and minor fault structures and their relationship with confined EM responses, and hopefully provide a simple method to target the most prospective of the EM responses.

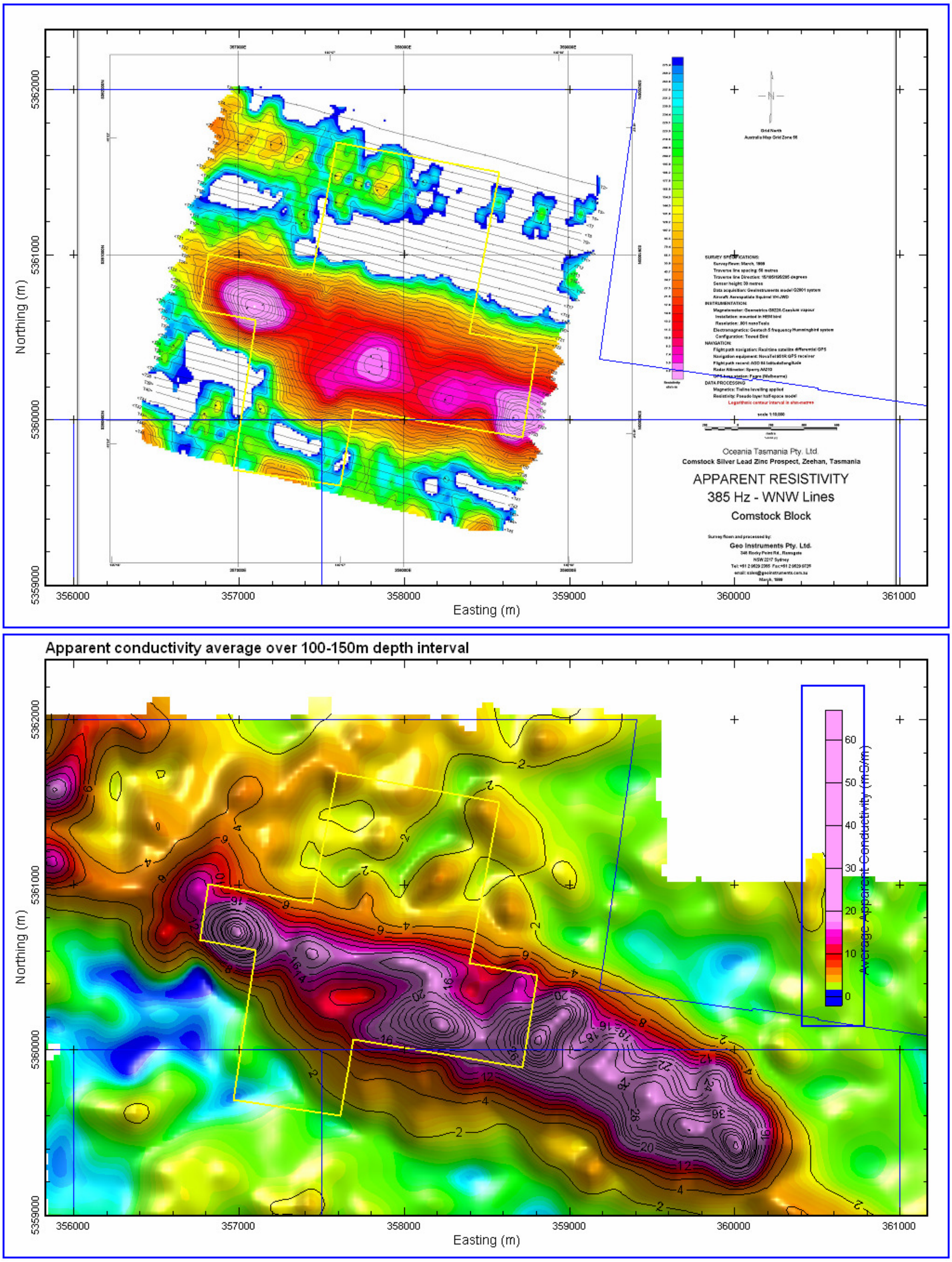


Figure 11: Comparison of the 1999 Hummingbird EM 385Hz data and the 2009 SkyTEM apparent conductivity for the interval 100-150m below surface.

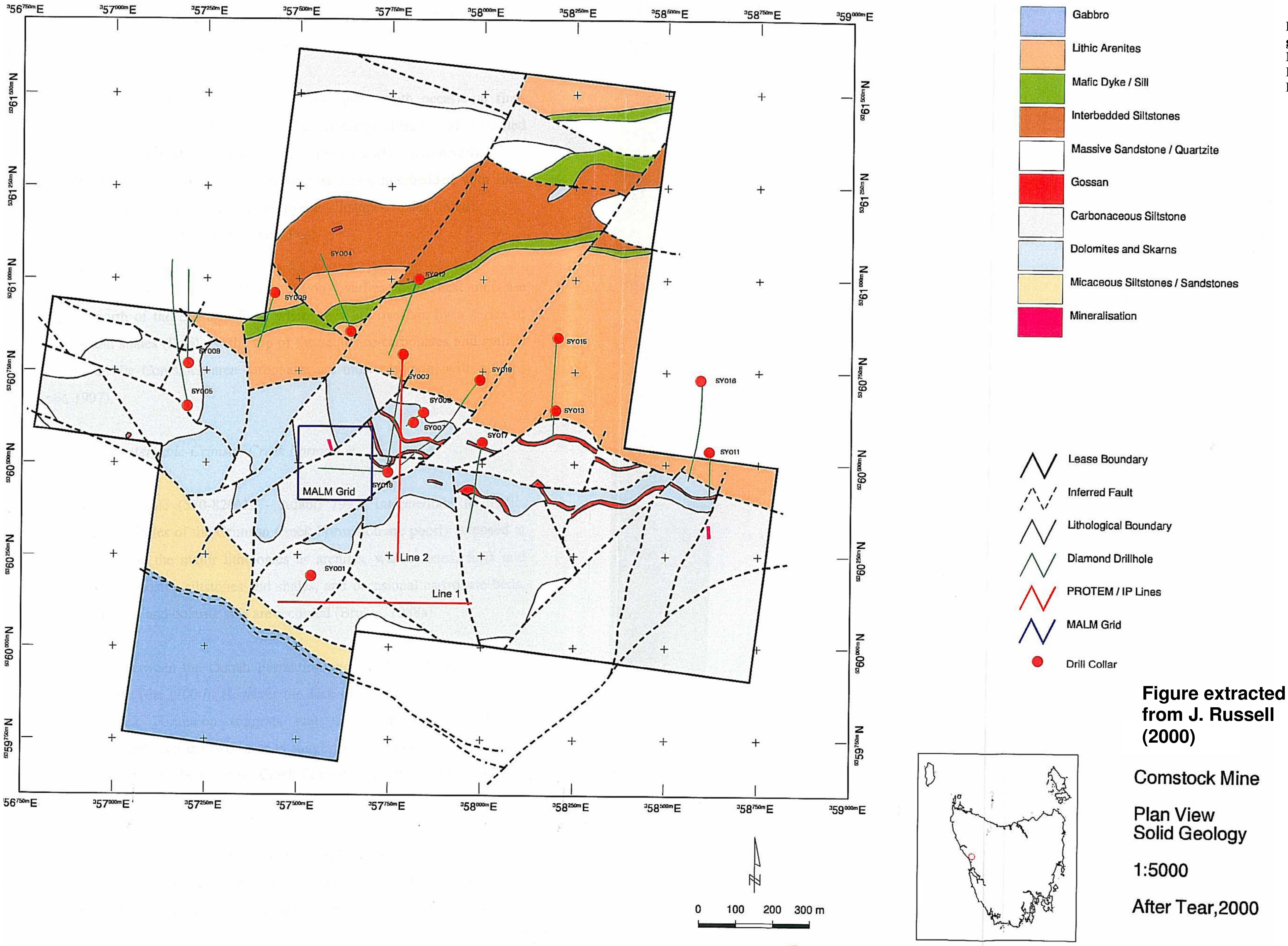


Figure 12: Plan view geology of the Comstock Mine including J. Russell's MALM, IP and EM lines.

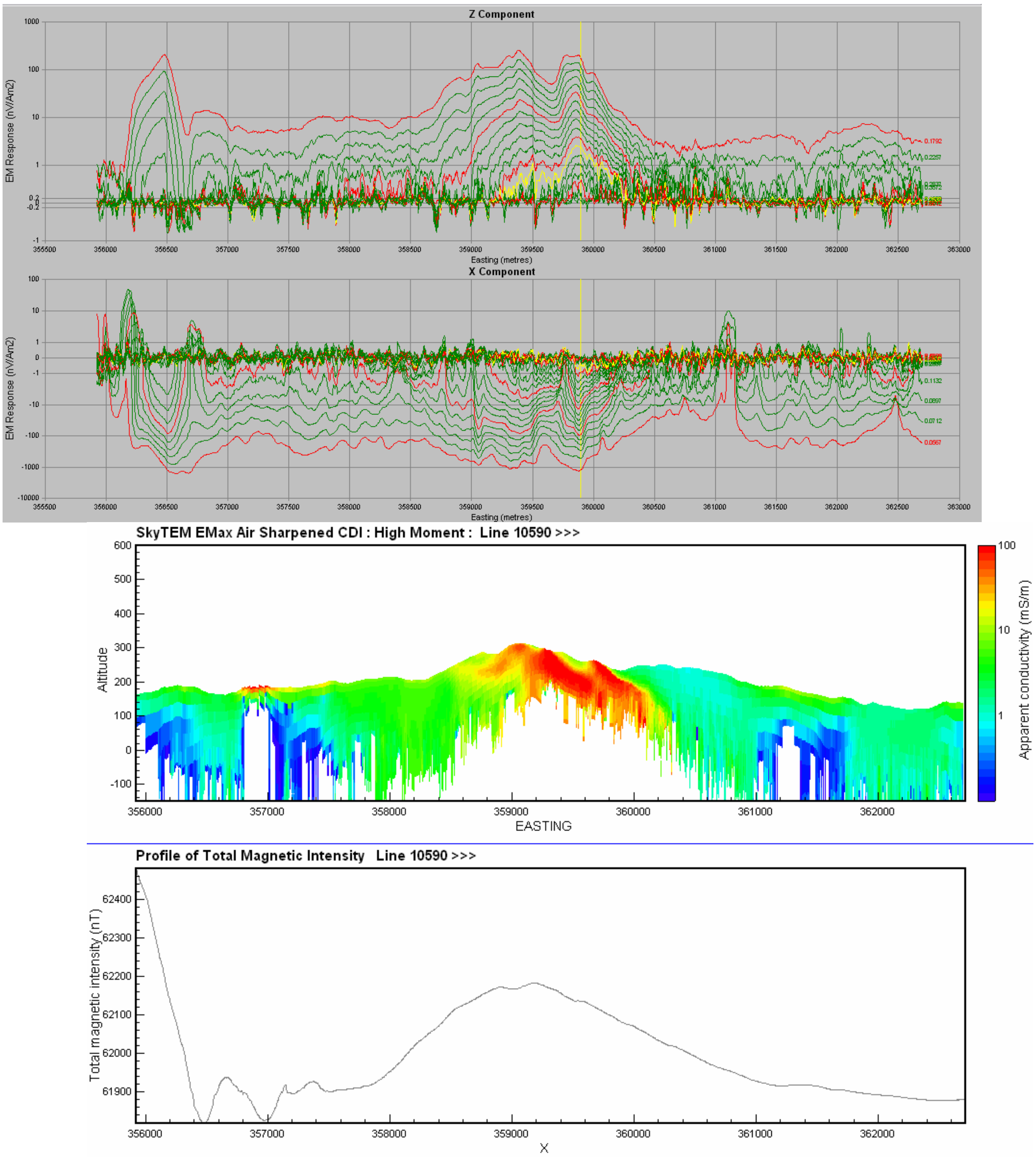
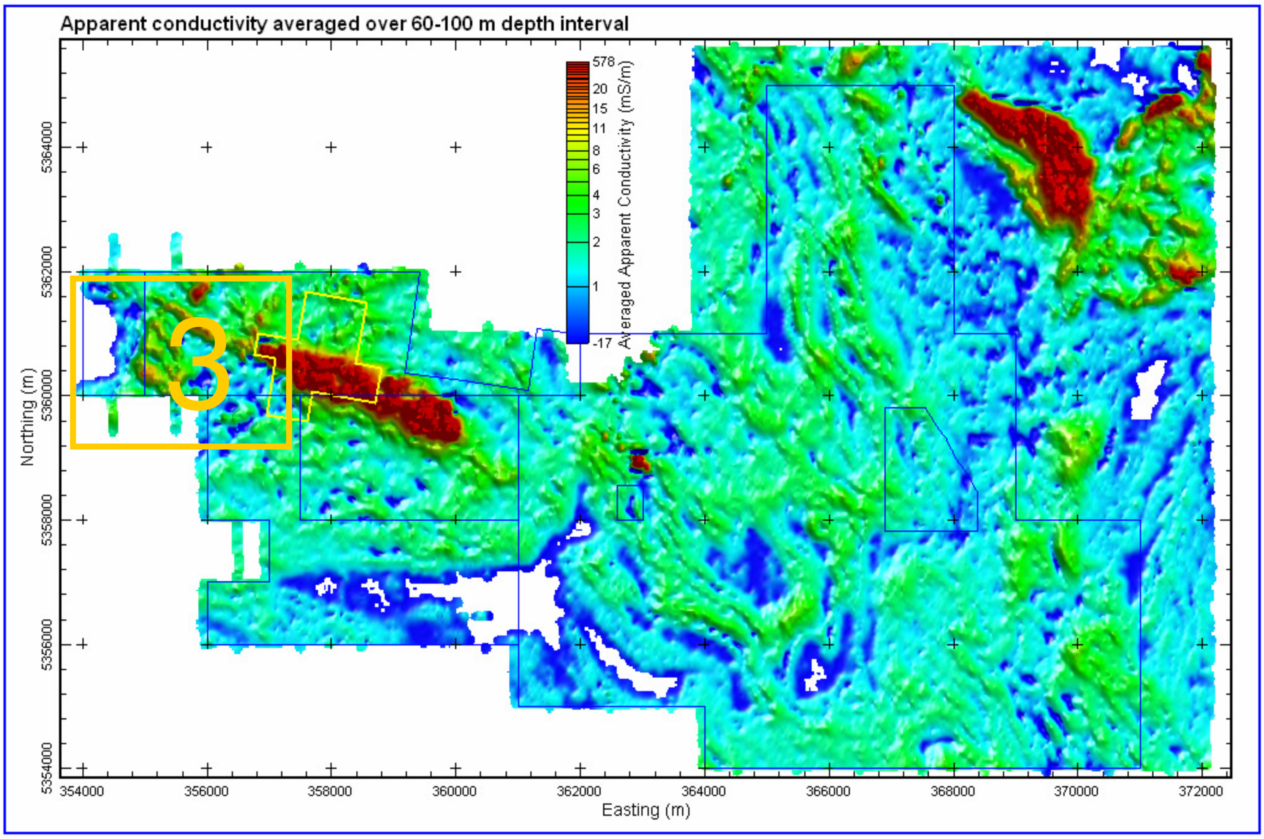


Figure 13: Comstock Conductor in Profile. SkyTEM response profiles from Line 10590 (top), conductivity-depth image of 10590 (middle), and magnetic profile (bottom).

6.3 Tenth Legion



Tenth Legion

Tenth Legion is distinguished by a large number of good anomalies in a structurally complex area. Ignoring the effect of the power line (labeled in Figure 14), second and third class anomalies cluster in the area of the Tenth Legion/Kynance mineral occurrences. Detailed examination of the CDI's shows large easterly dipping conductive layers are the source or some of these, others are deep confined conductors, and the remainder have features similar to the Comstock Conductor. A good example of a dipping stratigraphic conductor is shown on Figure 16 between 355800mE and 356400mE on line 10840, anomaly reference ID# 1241 and 1234. The interpreted source is a N-S striking, shallowly easterly dipping carbonaceous shale which extends continuously under lines 10820 to 10900.

Surface magnetic data obtained over the Comstock Prospect by RGC in 1991 identified four large, tabular, magnetic bodies with an approximate strike of 285° dipping 75° north (coincident with major regional fault trends). These bodies were identified as sulphide bearing magnetite+pyrrhotite that Deakin (1992) interpreted as being associated with the Balstrup Fault. The bodies were found to vary from moderately to non-conductive by later downhole transient electromagnetic (TEM).

Three distinct WNW-trending stratigraphic conductors in Tenth Legion area as well, shown as orange lines on Figure 14 (reference anomaly ID# 1239, 1237, 1220 and 1241), and these lie directly along strike from Deakin's Comstock pyrrhotite+magnetite bodies, so there is good geophysical and geological reasons to infer a similar origin. Such concentration of sulphide and magnetite is commonly and indicator of nearby mineralisation in other geological terrains, and accordingly worth further investigation here.

The clearest basement conductor and top priority anomaly in the Tenth Legion area is anomaly ID #1166&1167 on line 10640 (Figure 17). This anomaly plots on the CDI as a confined conductor which does not appear to be strike extensive.

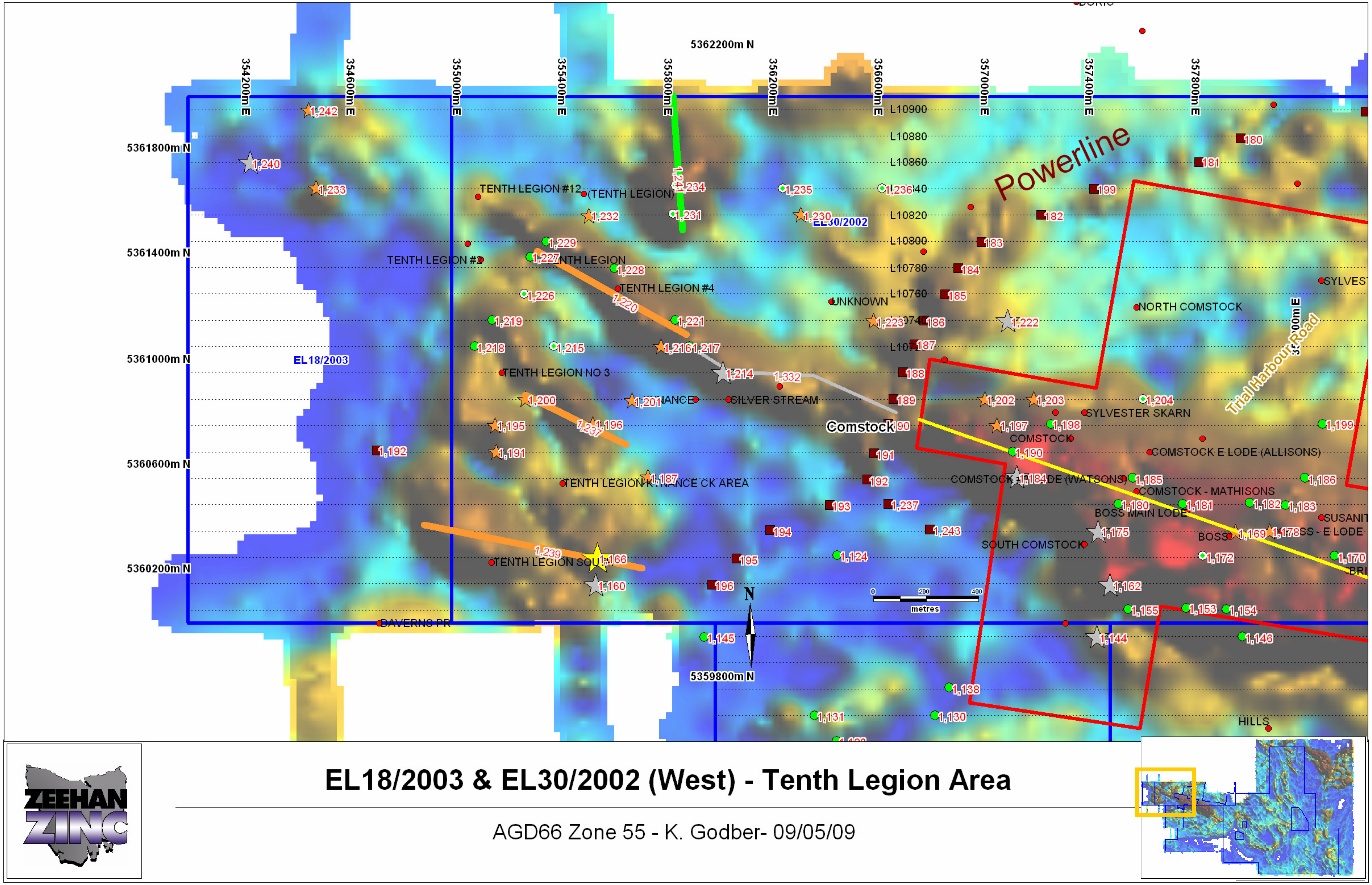


Figure 14: High moment channel Z20 EM response showing interpreted conductors, conductive trends, power line, and Comstock Conductor.

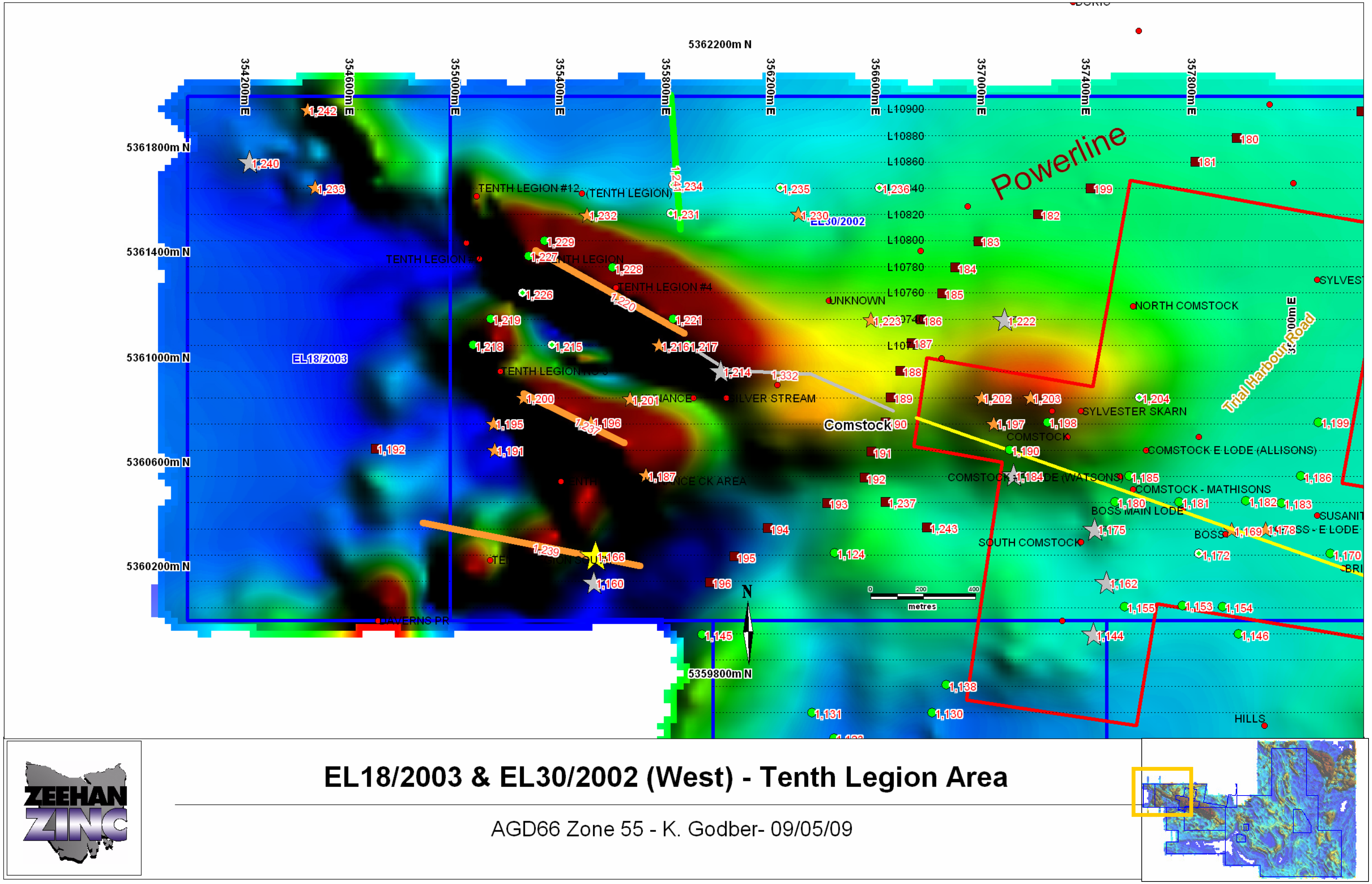


Figure 15: Total magnetic intensity data from SkyTEM survey showing interpreted conductors, conductive trends, power line, and Comstock Conductor.

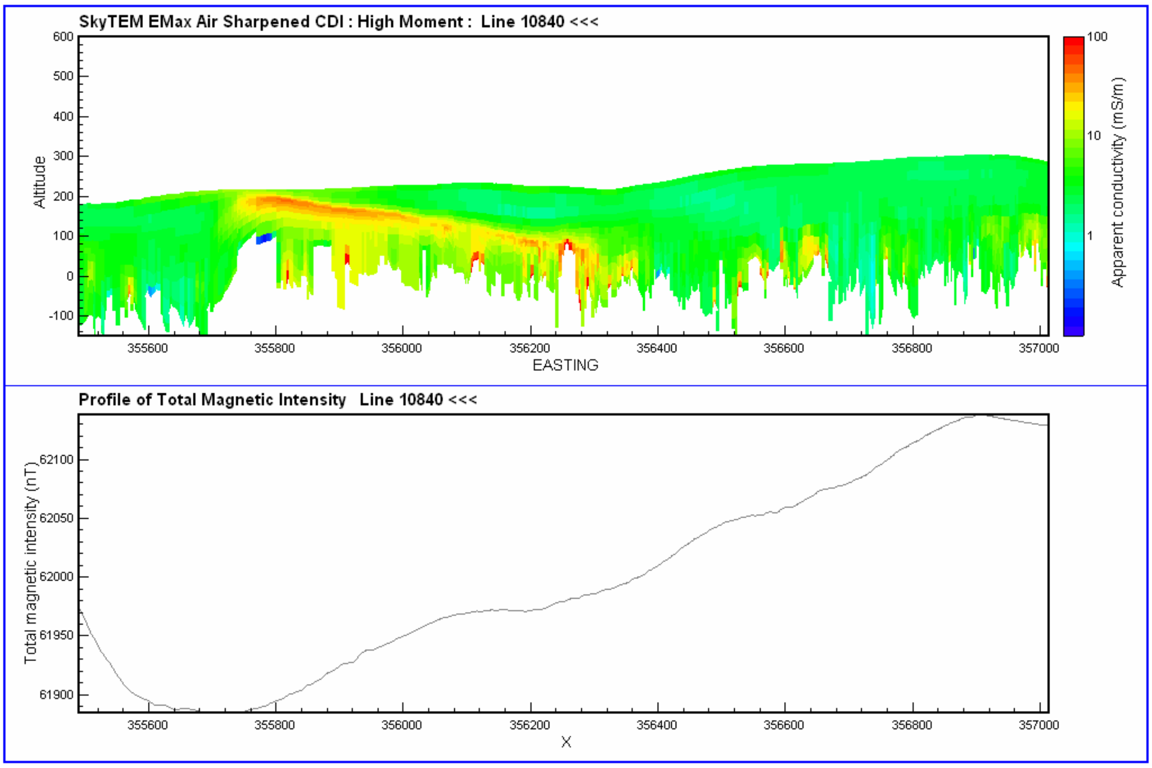


Figure 16: Example of CDI showing a conductive stratigraphic unit. In this case the conductor corresponds to anomaly ID # 1241 & 1243, strikes north-south, and is clearly visible on lines 10820 through to 10900 .

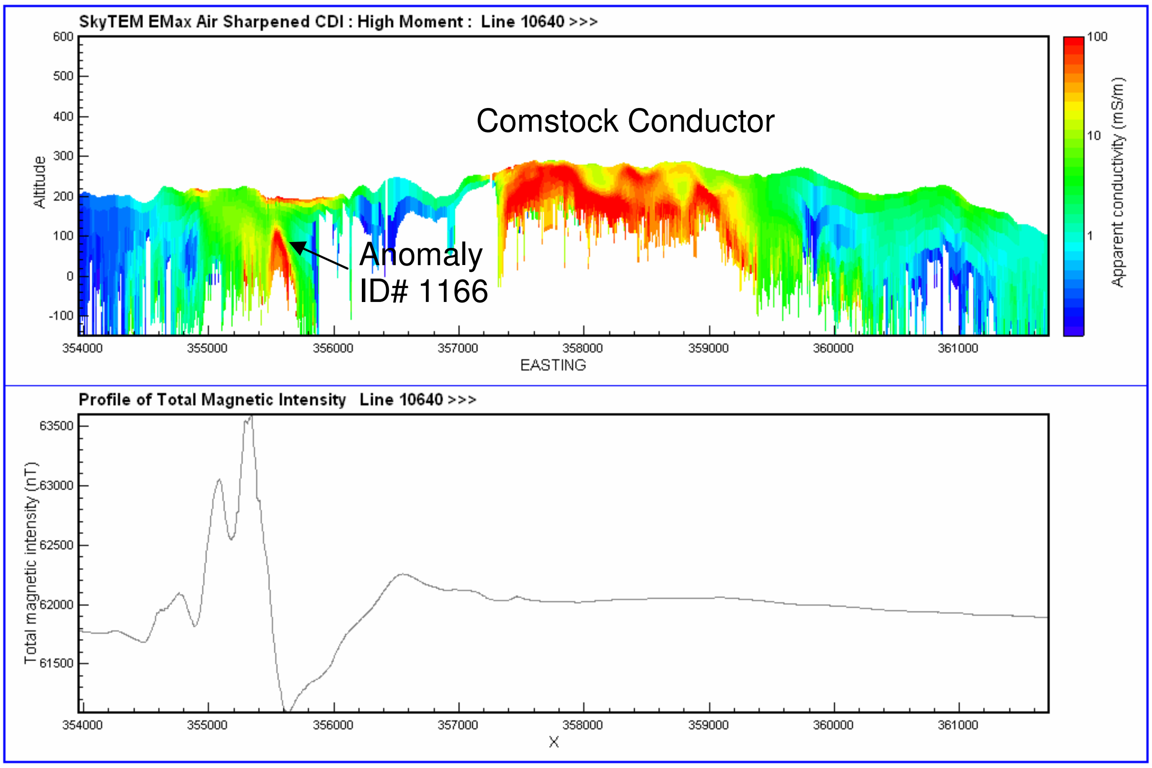


Figure 17: Line 10640 showing anomaly 1166 and the Comstock Conductor.

Oceana Prospect

The Oceana Prospect has a very interesting, but subtle, EM and magnetic response. The early (Z6 and Z10) and mid (Z15) time channels show a NW-SE, 200m x 800m, very weak anomaly (Figure 18). This anomaly is confined to the valley floor, so may be topography related, but it also nicely overlaps the mapped granite alluvium (key 'Qhog', MRT Tas 1:250,000 map series). The CDI's shed no light as the feature is too subtle. However, the profile analysis returned 3 very weak conductive spikes within the broader conductive zone. Anomalies ID# 1060, 1062 and 1321 are almost vanishingly small, but their position very close to the Oceana mineralisation significantly raises their prospectivity. These anomalies were picked without the prior knowledge of the mineralisation location.

Mariposa Prospect

No interesting EM responses were observed within the Mariposa Prospect.

Cultural Anomalies

It is important to note the anomalies due to culture, to avoid future confusion. These are listed in the Table of Anomalies, and can roughly be divided according to source. The main sources are as follows:

1) The power line along the road from Queenstown, apparent on the plan and profile data as sharp positive/negative spikes with very noisy decays.
2) Tramway into Zeehan.
3) Power line (un-verified) running NE-SW north of Comstock to southwest of Comstock
4) Buildings around Zeehan
5) **Tip refuse**

The last of these sources is the most important to recognise as it produces very misleading anomalies. The tip about 1.6km south-southeast of Zeehan on the road to Zeehan. It appears that several sheds and other surface objects are responsible for the very good and clean responses at approximately 36300mE on lines 10500 to 10560, and probably also line 10580.

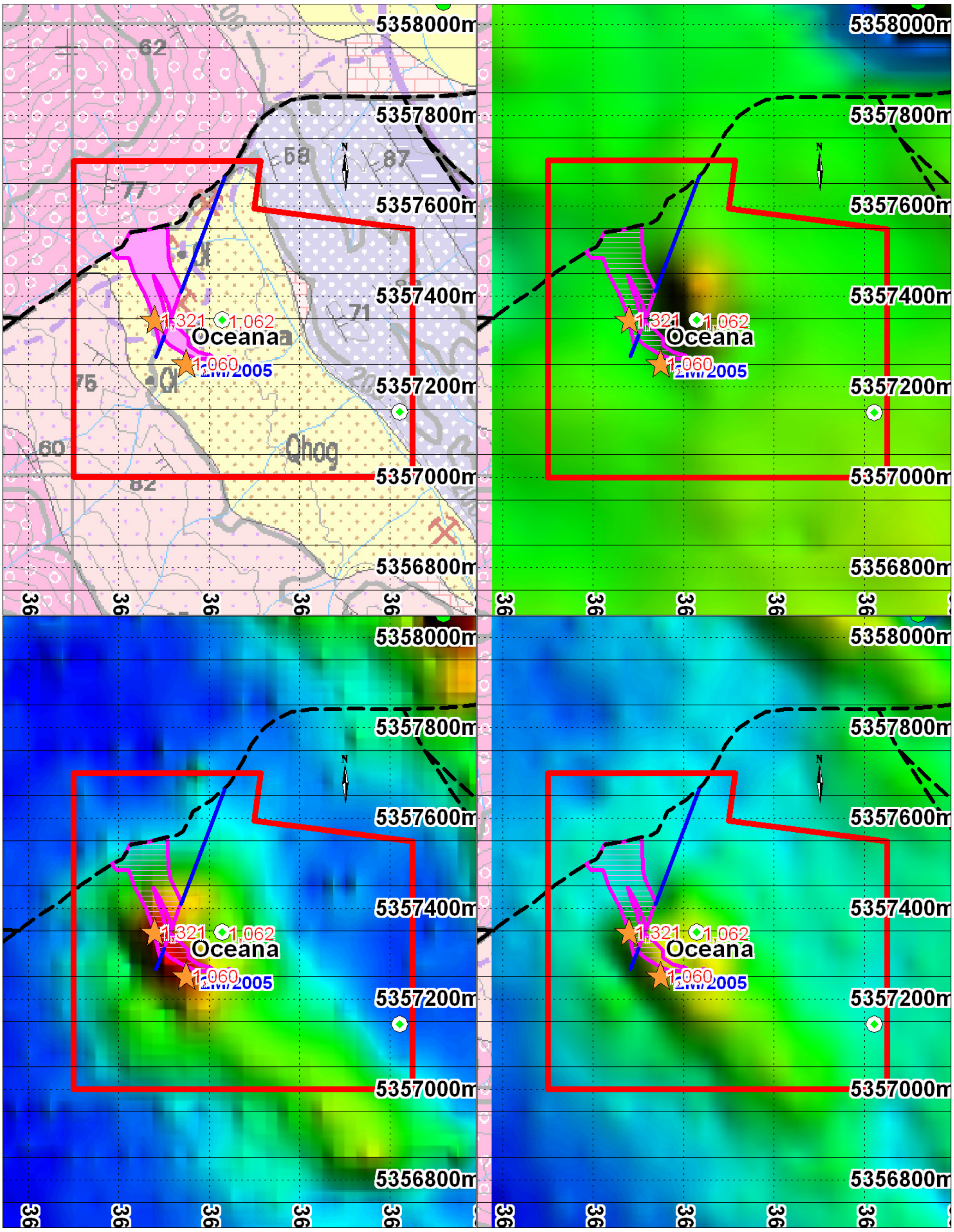


Figure 18: Clockwise from top left: Geology, magnetic, channel Z15 and channel Z10 EM response over the Oceana Prospect. The EM seems to map the prospective horizon, but that is difficult to determine beyond doubt.

6. DISCUSSION

The results of the AEM offer a new and powerful tool to aid exploration over this prospective area. The survey has the same convenience as airborne magnetics, but the data is much more functional in the search of conductive sulphides. Of particular interest is the previously un-identified, huge, stratigraphic conductor at Razorback, and the strong magnetic + conductive features in the Tenth Legion area. The resemblance between the Razorback and Comstock conductors may be just superficial, but is worth further scrutiny nonetheless.

There is a very encouraging correlation between magnetic/conductive zones and groups of mineral occurrences which can be best exploited by detailed examination of each of the listed ranked anomalies. The ranking of the SkyTEM anomalies is certainly not fixed, and should be continually update as exploration progresses. More information about the source of certain conductors can significantly downgrade or upgrade others and change exploration priorities

Some quality control for the SkyTEM data is provided by comparison with the 1999 frequency-domain hummingbird EM data. There is very good correlation, despite differing line directions, recording systems, line spacing (50m vs 100m), units (the former is 385Hz apparent resistivity, the latter channel amplitude or average apparent resistivity), and processing.

The most common problem with the use of AEM is exaggeration of the results. At a line km rate of $160 to $220, AEM is certainly incredibly cost effective compared to ground exploration or drilling, but there are large drawbacks: The airborne platform means significant trade-offs in spatial resolution, near surface vertical resolution, and depth of penetration against the best possible ground based data. For this reason, airborne EM anomalies should always be followed up with the straightforward combination of ground mapping, basic geochemistry and, if warranted, ground EM, to better determine size, nature and location prior to drilling.

The nature of mineral deposits and geophysics is that no single geophysical method can be expected to respond to every style of mineral deposits, and this is doubly the case for equipment suspended from a helicopter. Therefore, while the absence of geophysical response is discouraging for prospectivity, it does not necessarily sterilise the area.

7. CONCLUSIONS AND RECOMMENDATIONS

The Zeehan Zinc SkyTEM survey produced many encouraging response, but none of these could be attributed unequivocally to economic sulphides due to the confounding effects of highly conductive stratigraphic units. The SkyTEM data is insufficient determine the nature of the anomalies, and indeed this is beyond the capabilities of AEM except in very simple geological settings.

The following are high priority tasks to best use SkyTEM results:

- Using the CDI profiles to determine coordinates where conductors approach the surface, investigate the possible source of anomalies within the Tenth Legion area, including magnetic and non-magnetic conductors. Of particular importance are magnetic rocks, sulphides and carbonaceous or graphitic areas.
- Ground investigation on anomaly ID #1166.
- Find historical DHEM data from SY001 to SY018 and remodel the DHEM/surface EM to give better constrained drilling targets. Resurvey if necessary.
- Explore all first and second priority anomalies.
- Investigate Tenth Legion Conductive Trends. That is, the clear WNW trending conductors which appear to be associated with the Tenth Legion mineral prospects.
- Ground reconnaissance on anomaly ID # **1129**, 1119, 1118, 1113, 1104, 1100, 1098, 1099, 1092 to determine finally that these conductors are actually man-made structures around the old tip.

- Pursue a joint venture with Rubicon Minerals Pty Ltd to explore the Razorback area (east of Zeehan Zinc's current lease holding).

Long terms tasks:

- Develop a comprehensive rock property database for the Zeehan Zinc lease areas, in particular rock magnetic susceptibility, mineralogy, and conductivity. Reference J. Russell (2000)
- Systematically investigate then confirm or reject the airborne EM anomalies using a combination of ground mapping, geochemistry and ground EM.

Appendix 1

Table of Ranked EM anomalies

line number	anomaly description	ID	~time constant	Priority	AMG East	AMG_North
10640	more conductive patch in large stratigraphic conductor	1166	0.8	1	355552	5360249
10700	Comstock Conductor	1333	>2	1	358590	5360133
11080		1334	>2	1	360625	5358862
11080	Razorback conductive zone	1200	>1	1	369441	5363788
11080	East Razorback	1274	>1	1	370074	5363765
11270	Evendine Conductor	1299	>1	1	372045	5365263
11180	East Conductor	1295	>2	1	370773	5364292
10550	noisy data, surface conductor, un-explained, 100-200m wide, 300m long	1321	<<1	1	370030	5359354
10610	very high conductor to late time - not just shale?	1143	2.75	2	358658	5359948
10610	moderate positive anomaly on flank of Comstock	1144	<2	2	357449	5359949
10620	isolated conductor	1157	0.757	2	360488	5360051
10630	moderate sized late time positive anomaly	1160	1.2?	2	355547	5360147
10630	late time conduct conductor, Comstock conductor	1162	<1.5	2	357499	5360147
10630	along strike from 1152	1163	<2	2	358968	5360151
10640	positive conductor within Comstock conductor	1173	1.21	2	358970	5360252
10650	very highly conductive zone, double peaked	1175	>4	2	357453	5360349
10670	sharp conductor within the Comstock conductor	1184	1.1	2	357145	5360557
10710	high amplitude conductor	1214	0.1?	2	356030	5360953
10740	isolated subtle anomaly, positive, mid-late time	1222	1	2	357111	5361149
10860	along strike from 1233, similar character, conductive	1240	0.7?	2	354235	5361751
10910	near Ainslie prospect	1259	1.5	2	371603	5361952
10940	conductive spike in large conductive zone in V	1261	0.9	2	370870	5362152
11200	very strong late time conductor	1302	2	2	371581	5364854
10530	late time positive anomaly	1318		2	371751	5359087
11050	conductor on western side of Razorback conductor	1272	>1	2	369078	5363588
10490		1090	>1.6	2	370907	5358751
10740	western end of Comstock Conductor	1332	>1	2	356215	5360913
10540	stratigraphic conductor? Early and late time	1105	1.6	2	359685	5359251
10580	positive late time anomaly, possibly cultural, v. strong	1129	1.1	2	362612	5359650
10600	interesting high conductive feature and margin of	1139	1.392	2	358606	5359853

	stratigraphic conductor					
10250	negative anomaly with -vex decay, channels 15-30	1052	0.682	3	363929	5356350
10340	very weak anomaly, highest point in a broad conductor, along Oceana conductor	1060	<0.1	3	362250	5357253
10410	interesting anomaly within the Oceania lease	1073	0.3	3	367654	5357954
10430	early time positive, mid-late time negative anomaly, near road	1079	0.3	3	362785	5358151
10450	sharp negative feature, along strike from 1078	1082		3	362823	5358352
10480	interesting late time negative anomaly	1087	0.127	3	359279	5358644
10510	interesting negative anomaly	1094	<0.5	3	365722	5358950
10570	large stratigraphic conductor	1125	<1	3	359898	5359553
10600	late time channel Z30+ conductor on Comstock conductor	1136	>2	3	359384	5359851
10620	along strike from 1143, late time conductor	1150	1.7	3	358636	5360051
10620	isolated conductor	1158	0.15	3	359988	5360054
10630	along strike from 1152	1164	<2	3	358625	5360153
10650	stratigraphic conductor	1169	1.25	3	357975	5360347
10650	conductive feature on flank of Comstock control	1178	1.95	3	358104	5360350
10670	weak conductor	1187	0.4	3	355745	5360557
10680	deep anomaly, interesting late time conductor on margin of regional low	1191	<2	3	355169	5360652
10690	deep conductor, mid-to-late time anomaly in western conductor	1195	0.2	3	355165	5360752
10690	conductive zone in western conductive area	1196	0.36	3	355536	5360757
10690	confined conductive, interesting but too wide - 500m wide	1197	1.88	3	357069	5360753
10700	odd negative anomaly within otherwise positive zone	1200	0.19	3	355278	5360851
10700	noisy anomaly within broad high	1201	0.19	3	355684	5360847
10700	late time conductor, probably stratigraphic	1202		3	357023	5360851
10700	part of 1202	1203		3	357210	5360851
10710	isolated feature, mostly positive, no clear source	1211		3	363688	5360950
10710	mid to mid-late time anomaly, 100m wide, slow decay	1216	0.5-1.13?	3	355794	5361052
10740	odd conductor, noisy decay, near power line	1223	0.4	3	356600	5361149
10820	very weak isolated late time anomaly	1230	0.8	3	356324	5361552
10820	anomaly on flank of stratigraphic conductor	1232	1.1	3	355521	5361550

	1231					
10840	isolated stratigraphic positive anomaly on western side	1233	0.2?	3	354485	5361653
10750	isolated very weak late time anomaly, noise coherent	1250	0.5	3	367664	5361152
10870	along strike from 1258 and 1259	1257	1.6	3	371552	5361745
10920	near Ainslie prospect, most conductive part of large conductor	1260	0.6	3	371511	5362057
10950	conductive spike, nice decay within broader conductor	1264	2	3	369948	5362356
10960	conductive spike with larger conductor, along strike from 1264	1266	1.7?	3	370079	5362450
11010	conductor on western of side of broad conductor, large x component	1272	1.2	3	369416	5362947
11010	conductor on eastern side of broad conductor	1273	1.8	3	370212	5362952
11000	oval anomaly between 2 larger conductors	1275		3	370502	5362852
11020	conductor on limb of broad conductor	1276	1	3	370587	5363046
11020	conductor on western limb on broad conductor	1277	1.5	3	369303	5363058
11070	most conductive part of broad conductor	1283		3	370132	5363651
11090	isolated 100m wide anomaly on east flank of a broad conductor	1284	1.1?	3	370603	5363756
11130	late time anomaly, noisy decay	1289		3	366021	5364155
11130	noisy zone within centre of resistive area	1290	0.1	3	367973	5364150
11170	very subtle positive anomaly at base of stratigraphic conductor	1292	1?	3	371300	5364551
11200	subtle anomaly on east flank of stratigraphic conductor	1301	0.8-2	3	371734	5364853
11270	subtle anomaly extending southward	1315	0.15	3	366448	5365559
10920	confined conductor	1279	<1	3	370433	5362005
10760	shallowly east dipping cond., >400m long, including 1225	1220	<1	3	355607	5361254
10690	shallowly east dipping conductor	1237	<1	3	355470	5360772
10650	50-150m mod. conductive layer	1239	<1	3	355308	5360290
10350	very weak early time anomaly directly over Oceana prospect	1321	<0.5	3	362180	5357350
10160	isolated +positive anomaly, channels 14-21, near road, cultural?	1037	0.434	3	370714	5355456
10170	sharp negative response	1042	<0.1	3	371893	5355546
10680	30-40m deep weak	1330		3	366859	5360653

	conductor near Black Jacks					
0	60-100m weak conductor	1331		3	369780	5357457
10260	60-100m deep weak conductor	1332		2	365436	5356450
10950	very late time feature, noise?	1335	>2	3	371468	5362336
10160	interesting isolated but weak anomaly	1040	0.4	3	361167	5355449
10180	isolated positive anomaly, channels 16-20, within larger +ve feature	1044	<0.2	3	370400	5355649
10200	isolated moderate weak anomaly, channels 15-30	1046	<1.5?	3	370438	5355848
10090	mid time, -ve late time, resistive ground, IP effects, stratigraphic	1022	<0.5	4	369688	5354744
10090	weak early time strong x component	1023	0.131	4	370058	5354749
10100	broad, -ve, earl time positive	1028		4	364688	5354851
10120	channel of conductive sediments	1032	<0.02	4	365138	5355051
10120		1033	0.25	4	368958	5355147
10130	negative early time low conductive zone	1034		4	363623	5355051
10140	elevated background conductivity	1035	0.3	4	366000	5355249
10160	interesting isolated but weak anomaly	1039	0.3	4	361988	5355443
10190	very weak isolated noisy patch	1045	0.143	4	366466	5355751
10200	isolated moderate weak anomaly, channels 15-30	1047	<1.0?	4	370215	5355850
10220	negative anomaly, +ve decay, late times are -ve	1050		4	356217	5356049
10220	zone of elevated background conductivity	1051	<0.3	4	356046	5356051
10250	Zone of elevated noise, no x response	1053		4	361388	5356351
10310	noisy decay, chan 12-25 in middle of stratigraphic conductor	1057	1.6?	4	356005	5356943
10330	very small positive anomaly superimposed on broader conductor	1059	0.21	4	362723	5357144
10350	very weak but distinct feature near Oceania prospect	1062	1.68	4	362330	5357347
10360	chn 12-30, large early time positive feature	1065	1	4	361044	5357451
10410	noisy zone, slow decay, chan 14-28	1070	<0.5	4	371718	5357947
10410	positive anomaly within larger high	1074		4	361368	5357947
10500	interesting positive anomaly	1093	<0.5	4	370269	5358853
10520	interesting negative anomaly	1095		4	365722	5359052
10550	early time positive, late time negative anomaly, strong x component	1109	0.668	4	357429	5359350

10550	strong mid to late time conductor, stratigraphic?	1114	0.2	4	369302	5359343
10560	narrow negative anomaly, negative decay, along shale	1115	<0.4	4	369386	5359450
10570	confined negative early time anomaly	1126	0.12	4	363388	5359554
10540	late time narrow weak conductor	1130	<0.5	4	356339	5359248
10610	stratigraphic conductor	1147	1.02	4	359004	5359951
10610	late time feature within larger Comstock conductor	1149	>1.5	4	359488	5359949
10620	continuation of 1150 anomaly	1151	2.65	4	358726	5360053
10550	confined conductor on edge of stratigraphic conductor	159	1	4	359419	5359350
10620	very late time, conductor on flank of Comstock conductor	1156	2	4	359469	5360054
10640	weak positive conductor within Comstock conductor	1172	1.02	4	357850	5360256
10700	flank of regional high	1204		4	357623	5360852
10710	mid to late time, very subtle anomaly, 50m wide, slow decay	1215	<0.2	4	355386	5361052
10760		1226		4	355274	5361251
10820	stratigraphic conductor? Smaller, easier to see	1231	0.5	4	355838	5361556
10880	shallow east dipping strat. cond. cond, along strike from 1231&1241	1234	0.4?	2	355825	5361855
10840	along strike from 1230	1235	0.4?	4	356256	5361651
10840	very subtle late time anomaly, noisy decay	1236	0.9	4	356634	5361651
10900	negative at centre of local high, low time tau	1242	0.2	4	354456	5361950
10030	Edge of resistive zone with slightly higher time constant, 100m wide, stratigraphic?	1251	<0.1	4	367682	5354150
10790	very weak peak in stratigraphic conductor	1251		4	370957	5361351
10790	negative in middle of wide stratigraphic cond	1252	0.3	4	369754	5361350
10850	part of large conductor with long time constant	1255	0.1-0.7	4	371865	5361651
10890	along strike from 1257, most conductive part of large conductor	1258	0.8	4	371778	5361849
10930	broad conductive high within broader conductor	1262	3?	4	371152	5362152
10950	very strong x-response anomaly	1265	0.9	4	370407	5362351
10970	late time conductor within larger conductor, along strike from 1266	1267	3?	4	370047	5362554
10980	late time conductor in broad conductive feature	1268	1.5	4	370067	5362649
10980	conductive on edge of large conductive feature	1269	0.6	4	370311	5362654
11010	broad conductor along	1271	1	4	369952	5362952

	strike from 1270					
11030	conductor within broad conductive zone	1278	1	4	370083	5363155
11050	spike on eastern edge of large conductor	1281		4	370357	5363349
11060	broad conductor with sharp positive anomaly	1282	0.5	4	371114	5363453
11100	isolated 100m wide anomaly on east flank of a broad conductor	1285	0.67	4	370551	5363852
11120	very subtle anomaly on west flank of broad conductor	1288	2?	4	368786	5364050
11160	anomaly on western end of line	1291	0.4	4	372088	5364453
11170	200m wide, good conductor, confined, probably stratigraphic	1293	0.7	4	371663	5364552
11210	conductor on west side of stratigraphic conductor	1298	1.1	4	371409	5364951
11190	odd shaped anomaly, maybe noise	1308		4	366385	5364755
11210	stratigraphic conductor	1309	2?	4	368579	5364951
11220	late time conductor in large stratigraphic conductor	1310	1.17	4	371935	5365052
11220	late time conductor in larger stratigraphic conductor	1311	1.7	4	371541	5365050
10860	shallowly east dipping strat. cond. conductor, >500 long, >500m wide	1241	<1	4	355858	5361749
10020	Edge of resistive zone with slightly higher time constant, 100m wide, stratigraphic	1001	<0.1	4	367688	5354048
10020	mid time -ve decay, peak 0.25 ms, width 400m, stratigraphic?	1003	<0.247	4	369778	5354048
10030	mid time -ve decay, peak 0.3ms, width 400m, stratigraphic conductor?	1005	0.3	4	369842	5354144
10080	early time, v. strong +ve x response, stratigraphic?	1020	<0.1	4	369788	5354656
10050	mid time negative decay, peak at 0.25 ms, width 300m, stratigraphic?	1009	0.25	5	369842	5354343
10050	early time negative decays, peak at 0.17ms, stratigraphic?	1010	0.17	5	367578	5354355
10060	mid time, negative decay, peak at 0.2ms, width 100m, stratigraphic?	1011	<0.3	5	369871	5354453
10060	early time, negative decay, very weak	1012	<0.1	5	367788	5354447
10060	early time, +ve decay	1013		5	369517	5354453
10070	early time, +ve decay, very weak	1014	<0.1	5	364238	5354550
10070	early time, +ve decay, very weak, stratigraphic	1015	<0.3	5	367789	5354550
10070	early time, +ve decay, very weak, odd shape, probably confined surface conductor	1016	<0.2	5	369638	5354548

10070	early time, strong +ve x response	1017	<0.1	5	369787	5354549
10070	early time, mod-strong X +ve response, near road, cultural?	1018	<0.1	5	371140	5354549
10080	early time, -ve decay, more resistive area, near road, cultural?	1019	<0.1	5	371044	5354653
10080	early time, strong +ve x response, stratigraphic?	1021	<0.1	5	369438	5354652
10080		1025	<0.1	5	369388	5354749
10100	late time -ve decay, stratigraphic?	1027		5	369566	5354845
10110	stratigraphic conductor	1029		5	369571	5354953
10120	mid-time negative feature	1030	0.145	5	364518	5355044
10120	channel of conductive sediments	1031	0.2	5	369086	5355051
10150	very subtle background anomaly, Z component only	1036	<0.2	5	361331	5355351
10160	isolated weak anomaly	1038	<0.181	5	363722	5355449
10170	conductive zone on edge of larger conductive zone	1041	0.4	5	365455	5355550
10170	edge of large conductive zone	1043	<0.2	5	371388	5355555
10200	sharp boundary, no basement conductors	1048	<0.1	5	365338	5355850
10550	late time 'noisy' response	1049	<0.1	5	356115	5359350
10200	stratigraphic conductor	1049	<0.5	5	363419	5355852
10260	near Pyramid deposit	1054	<0.1	3	363857	5356450
10280	most conductive are on this line	1055	<0.2	5	364321	5356648
10300	near road, noisy zone, cultural?	1056	<0.2	5	363948	5356858
10310	weak anomaly on edge of large conductor	1058	<0.3	5	357425	5356949
10340	very very weak anomaly, near road	1061	<0.1	5	369552	5357248
10350	early time positive anomaly	1064	0.14	5	366534	5357447
10360	weak late time anomaly	1066	1>t<0.3	5	365940	5357453
10370	area of greater noise	1067	0.1	5	369988	5357549
10370	very small weak positive anomaly	1068	0.1	5	360179	5357548
10390	possible anomaly	1069		5	359988	5357749
10410	noisy zone, slow decay, chan 20-28	1071	<0.5	5	370255	5357947
10410	sharp negative response with negative decays, prob stratigraphic	1072	0.6	5	368209	5357938
10410	very weak positive anomaly	1075	?0.15	5	359938	5357954
10420	clear negative anomaly, noisy decay	1076	1.25	5	358479	5358051
10420	clear positive anomaly, noisy decays	1077	1.16	5	360684	5358054
10420	clear early time negative anomaly with negative decay	1078		5	362753	5358051
10430	very weak positive late time anomaly	1080	???3????	5	360382	5358151
10470	isolated negative anomaly	1085	0.144	5	366283	5358552

10500	tip refuse	1089	>1	5	363087	5358850
10490	very subtle positive x and z anomaly	1091	<0.1	5	359727	5358754
10520	broad negative zone	1096	0.2	5	364027	5359044
10520	broad negative zone	1097	0.2	5	363784	5359047
10530	large negative response	1101	0.252	5	364088	5359154
10530	large negative response	1102	0.23	5	363629	5359150
10540	large negative response	1103	0.18	5	363519	5359251
10560	part of 1321 trend	1116	<0.1	5	370022	5359451
10560	500m wide negative anomaly mid-to-late time	1117	<0.2	5	363388	5359451
10560	300m wide negative around mid to late time	1118	<0.24	5	365383	5359452
10560	stratigraphic conductor	1120	0.7?	5	356388	5359445
10560	stratigraphic conductor	1121		5	359745	5359445
10560	stratigraphic conductor	1122		5	359910	5359451
10570	large stratigraphic conductor	1123	<0.5	5	356461	5359553
10560	Power line to Comstock	1124		5	356463	5360260
10570	large stratigraphic conductor	1124	<1	5	359384	5359551
10570	negative early time anomaly, - shale?	1127	<-0.3	5	365388	5359552
10580	negative early time anomaly, stratigraphic	1128	0.3	5	365438	5359646
10580	stratigraphic	1130	0.15	5	356835	5359650
10580		1131	1.1-0.5	5	356377	5359650
10580		1132		5	359335	5359650
10580		1133		5	359742	5359650
10580		1134		5	358957	5359654
10590		1135	0.5	5	359049	5359749
10550	stratigraphic conductor	1136	1	5	359733	5359351
10590		1137	1.0?	5	359738	5359746
10590		1138	0.1	5	356887	5359756
10600	stratigraphic conductor	1140		5	358691	5359848
10600	stratigraphic conductor	1141		5	358820	5359853
10610	stratigraphic conductor	1145		5	355958	5359948
10610	stratigraphic conductor, relatively low conductance	1146	0.5	5	358001	5359949
10610	stratigraphic conductor, directly north of 1143	1148	1	5	359695	5359949
10620	stratigraphic conductor	1152	1.2	5	358980	5360056
10620	stratigraphic conductor	1153	0.6	5	357787	5360058
10620	stratigraphic conductor	1154	0.6	5	357940	5360053
10620	stratigraphic conductor	1155	1.03	5	357567	5360053
10640		1170	1.3	5	358350	5360256
10640		1171		5	358601	5360252
10660	stratigraphic conductor	1180	1	5	357531	5360453
10660	stratigraphic conductor	1181	0.7	5	357775	5360453
10660	stratigraphic conductor	1182	0.6	5	358029	5360458
10660	stratigraphic conductor	1183	0.4	5	358165	5360448
10670	stratigraphic conductor	1185	1	5	357584	5360552
10670	stratigraphic conductor	1186	0.4	5	358238	5360552
10670	noisy decay, may be cultural	1188	0.6	5	363189	5360552
10680	very conductive stratigraphic conductor	1190	<2	5	357129	5360652

10690	strongest part of broad anomaly	1198		5	357273	5360757
10690	subtle late time feature	1199	0.2	5	358306	5360758
10710	isolated noisy conductor	1210	0.23	5	370684	5360948
10710	noisy zone	1213		5	360958	5360952
10720	peak of stratigraphic conductor	1217	0.1	5	355901	5361052
10720	peak of stratigraphic conductor	1218	0.15	5	355086	5361052
10740	peak of local stratigraphic conductor along from 1218 (-> NE)	1219		5	355153	5361151
10740	peak of stratigraphic conductor along strike from 1217 (-> NE)	1221	0.8	5	355848	5361151
10780	peak of stratigraphic conductor, along strike from 1226 (-> N)	1227	0.1?	5	355297	5361391
780	peak of strat. cond conductor north of 1225	1228	0.5	5	355618	5361348
10800	peak of stratigraphic conductor, along strike from Tenth Legion	1229	0.1	2	355359	5361450
10830	late time very large conductor, very conductive, late time anomaly inside	1253		5	369841	5361452
10810	sharp boundary between different rock types	1254		5	371380	5361551
10850	part of large conductor, may not be strat. cond along	1256	0.1-0.7	5	371382	5361655
10940	spike conductor, probe noise	1263	0.3-4	5	366383	5362251
10540	clear early time anomaly, part of 1321	1266		5	370040	5359242
10990	broad conductor along strike from 1268	1270	1.2	5	370091	5362753
11150	broad conductor with spike in middle	1274	1.2	5	369654	5364342
11040	interesting negative anomaly within relative resistive zone, extends across 3 lines	1279	0.3	5	365021	5363251
11200	zone of increased noise	1304		5	370083	5364853
11230	noise?	1312		5	367662	5365148
10440	very weak early time to late time positive anomaly, along strike from 1078	1081	0.13	5	362786	5358250
10020	noisy area, 150m, isolated anomaly	1004		5	370888	5354048
10030	noisy area, 150m, isolated anomaly	1006	<0.1	5	370742	5354144
10030	area of greater noise, 200m wide, may be related to the road	1007	0.2	5	371538	5354160
10040	mid time negative decay, peak at 0.2 ms, width 300m, stratigraphic?	1008	0.25	5	369837	5354247
11230	power line along road into Zeehan from Q'town #104	104	?	6	366970	5365154

11220	power line along road into Zeehan from Q'town #105	105	?	6	366912	5365047
11210	power line along road into Zeehan from Q'town #106	106	?	6	366879	5364940
11200	power line along road into Zeehan from Q'town #107	107	?	6	366863	5364832
11190	power line along road into Zeehan from Q'town #108	108	?	6	366838	5364725
11180	power line along road into Zeehan from Q'town #109	109	?	6	366838	5364651
11170	power line along road into Zeehan from Q'town #110	110	?	6	366838	5364552
11160	power line along road into Zeehan from Q'town #111	111	?	6	366838	5364453
11150	power line along road into Zeehan from Q'town #112	112	?	6	366855	5364354
11140	power line along road into Zeehan from Q'town #113	113	?	6	366871	5364255
11130	power line along road into Zeehan from Q'town #114	114	?	6	366871	5364148
11120	power line along road into Zeehan from Q'town #115	115	?	6	366846	5364049
11110	power line along road into Zeehan from Q'town #116	116	?	6	366805	5363950
11100	power line along road into Zeehan from Q'town #117	117	?	6	366772	5363851
11090	power line along road into Zeehan from Q'town #118	118	?	6	366789	5363752
11080	power line along road into Zeehan from Q'town #119	119	?	6	366764	5363645
11070	power line along road into Zeehan from Q'town #120	120	?	6	366731	5363554
11060	power line along road into Zeehan from Q'town #121	121	?	6	366730	5363455
11050	power line along road into Zeehan from Q'town #122	122	?	6	366690	5363356
11040	power line along road into Zeehan from Q'town #123	123	?	6	366681	5363249
11030	power line along road into Zeehan from Q'town #124	124	?	6	366681	5363141
11020	power line along road into Zeehan from Q'town #125	125	?	6	366657	5363051
11010	power line along road into Zeehan from Q'town #126	126	?	6	366624	5362952
11000	power line along road into Zeehan from Q'town #127	127	?	6	366467	5362844
10990	power line along road into Zeehan from Q'town #128	128	?	6	366417	5362754
10980	power line along road into Zeehan from Q'town #129	129	?	6	366409	5362663
10970	power line along road into Zeehan from Q'town #130	130	?	6	366343	5362539
10960	power line along road into Zeehan from Q'town #131	131	?	6	366293	5362447
10950	power line along road into Zeehan from Q'town #132	132	?	6	366203	5362333
10940	power line along road into Zeehan from Q'town #133	133	?	6	366111	5362250
10950	power line along road into Zeehan from Q'town #134	134	?	6	365972	5362349
10960	power line along road into Zeehan from Q'town #135	135	?	6	365908	5362446

10970	power line along road into Zeehan from Q'town #136	136	?	6	365741	5362556
10980	power line along road into Zeehan from Q'town #137	137	?	6	365683	5362646
10990	power line along road into Zeehan from Q'town #138	138	?	6	365609	5362745
11000	power line along road into Zeehan from Q'town #139	139	?	6	365510	5362828
11010	power line along road into Zeehan from Q'town #140	140	?	6	365419	5362919
11000	power line along road into Zeehan from Q'town #141	141	?	6	365279	5362828
10990	power line along road into Zeehan from Q'town #142	142	?	6	365163	5362745
10980	power line along road into Zeehan from Q'town #143	143	?	6	365048	5362655
10970	power line along road into Zeehan from Q'town #144	144	?	6	364941	5362539
10960	power line along road into Zeehan from Q'town #145	145	?	6	364875	5362465
10950	power line along road into Zeehan from Q'town #146	146	?	6	364776	5362325
10940	power line along road into Zeehan from Q'town #147	147	?	6	364748	5362242
10930	power line along road into Zeehan from Q'town #148	148	?	6	364742	5362151
10920	power line along road into Zeehan from Q'town #149	149	?	6	364688	5362061
10910	power line along road into Zeehan from Q'town #150	150	?	6	364597	5361945
10890	power line along road into Zeehan from Q'town #151	151	?	6	364499	5361846
10870	power line along road into Zeehan from Q'town #152	152	?	6	364398	5361755
10850	power line along road into Zeehan from Q'town #153	153	?	6	364271	5361648
10830	power line along road into Zeehan from Q'town #154	154	?	6	364208	5361551
10810	power line along road into Zeehan from Q'town #154	155	?	6	364009	5361449
10790	power line along road into Zeehan from Q'town #154	156	?	6	363906	5361346
10900	Power line to Comstock	179	?	6	358469	5361942
11210	tramway into Zeehan	157	?	6	364681	5364950
10880	Power line to Comstock	180	?	6	357993	5361843
10860	Power line to Comstock	181	?	6	357838	5361752
11190	tramway into Zeehan	159	?	6	364685	5364752
11180	tramway into Zeehan	160	?	6	364681	5364661
10820	Power line to Comstock	182	?	6	357238	5361551
11170	tramway into Zeehan	161	?	6	364681	5364554
10800	Power line to Comstock	183	?	6	357011	5361446
11150	tramway into Zeehan	162	?	6	364673	5364451
10780	Power line to Comstock	184	?	6	356923	5361347
11140	tramway into Zeehan	163	?	6	364689	5364352
10760	Power line to Comstock	185	?	6	356872	5361248
11130	tramway into Zeehan	164	?	6	364702	5364253
10740	Power line to Comstock	186	?	6	356792	5361149
11120	tramway into Zeehan	165	?	6	364718	5364154
10720	Power line to Comstock	187	?	6	356757	5361058
11110	tramway into Zeehan	166	?	6	364710	5364047

10710	Power line to Comstock	188	?	6	356714	5360953
11100	tramway into Zeehan	167	?	6	364698	5363952
10700	Power line to Comstock	189	?	6	356677	5360851
11090	tramway into Zeehan	168	?	6	364693	5363849
10690	Power line to Comstock	190	?	6	356657	5360757
11080	tramway into Zeehan	169	?	6	364648	5363750
10680	Power line to Comstock	191	?	6	356603	5360644
11070	tramway into Zeehan	170	?	6	364565	5363651
10670	Power line to Comstock	192	?	6	356578	5360546
11070	tramway into Zeehan	171	?	6	364487	5363552
10660	Power line to Comstock	193	?	6	356434	5360449
11060	tramway into Zeehan	172	?	6	364380	5363457
10650	Power line to Comstock	194	?	6	356208	5360353
11050	tramway into Zeehan	173	?	6	364306	5363346
10640	Power line to Comstock	195	?	6	356080	5360246
11040	tramway into Zeehan	174	?	6	364215	5363251
10630	Power line to Comstock	196	?	6	355988	5360146
11030	tramway into Zeehan	175	?	6	364128	5363156
11020	tramway into Zeehan	176	?	6	364046	5363053
11010	tramway into Zeehan	177	?	6	363955	5362941
11000	tramway into Zeehan	178	?	6	363905	5362855
10090	very weak early time	1024	0.201	6	370088	5354652
10090	cultural?	1026		6	370982	5354749
10840	Power line to Comstock	199	?	6	357438	5361650
10490	tip refuse	1092	>1.5	6	363077	5358850
10520	tip refuse	1098		6	362682	5359055
10510	tip refuse	1099	>1	6	362913	5358952
10530	tip refuse	1100		6	362669	5359156
10540	tip refuse/road	1104		6	362588	5359250
10550	tip refuse	1113	1.5	6	362638	5359353
10550	tip refuse	1118	1.5	6	362404	5359355
10560	tip refuse	1119	1.6?	6	362526	5359451
10680	cultural?	1192		6	354715	5360656
10680	cultural?	1193		6	363119	5360656
10830	Power line to Comstock	1237		6	356656	5360453
10770	Power line to Comstock	1243		6	356815	5360356
11270	power line along road into Zeehan from Q'town #100	100	?	6	367088	5365542
11260	power line along road into Zeehan from Q'town #101	101	?	6	367088	5365451
11250	power line along road into Zeehan from Q'town #102	102	?	6	367056	5365344
11240	power line along road into Zeehan from Q'town #103	103	?	6	367011	5365237
10280	60-100m deep weak conductor	1335		2	365596	5356649

Appendix 2: References

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Appendix 3: Plans of apparent conductivity with ranked EM anomalies

Figure 19: A0 plan of 60-100 m depth slice of apparent conductivity with ranked EM anomalies.

Figure 20: A0 plan of 100-150 m depth slice of apparent conductivity with ranked EM anomalies.

Figure 21: A0 plan of total magnetic intensity with ranked EM anomalies.