TDEM and Aeromagnetic Airborne Survey Data Analyses and Modeling, Melgurd Lake Property for Boreal Gold Inc: Assessment Report

BOREAL GOLD INC.

Pelican Narrows Area
Saskatchewan
Northern Mining District-Saskatchewan NTS 63 M 1
Latitude 55°10’ 20” N
Longitude: 102°14’30” E

Boreal Gold Inc
12 Mitchell Rd. Box 306
Flin Flon, Manitoba
R8A 1N1

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September 5, 2024

BOREAL GOLD INC
2024 TDEM and AEROMAGNETIC AIRBORNE SURVEY REPORT
DATA ANALYSES and MODELING
ON THE MELGURD LAKE PROPERTY

1.0 INTRODUCTION

The Melgurd Lake property consists of 11 contiguous claims, comprising 7422 ha (Figure 1). The property was originally staked by Richard Masson in April 2022 and was optioned to Boreal Gold Inc. in May 2022. Under the terms of the agreement Boreal Gold can obtain 100% of the property by making escalating payments, issuing shares and work commitments to the vendors (Richard Masson and Mike Alexander) over a five-year period which, if completed, would consist of total work commitments of $1,010,000, payments of $130,000 and issuing of shares to the vendors totaling 1,150,000. Upon the completion of the payments, shares and the work commitments Boreal Gold Inc. will hold 100% of the property subject to the remaining NSR of 2%, one half of which can be purchased for $500,000. A list of claims is given in Table 1.
From December 1, 2022 to February 16, 2023 Axiom Exploration Group Ltd. carried out a TDEM Airborne Survey over the Fay Lake Project near Flin Flon, Manitoba. The TDEM survey consisted of 437.4 line-kms with a traverse line spacing of 100m and tie line spacing of 1000m.

This report includes the data analysis and modeling provided by Eikon Technologies Ltd. for the TDEM survey. The target commodity for this program is VMS hosted polymetallic copper-zinc-gold-silver deposits as well as gold.

1.1 Location and Access

The Melgurd Lake property is located in east central Saskatchewan approximately 50 km north northwest of the city of Flin Flon, MB and the adjacent town of Creighton, SK. The property is accessible via float or ski equipped, fixed wing aircraft to many of the larger lakes on the property including Melgurd Lake, Kakinagimak and Keep, plus several others or via helicopter from Flin Flon. Flin Flon and the adjacent community of Creighton, SK are serviced by daily scheduled flights from Winnipeg. Manitoba Highway 10 and Saskatchewan Highway 106 link Flin Flon and Creighton with Winnipeg and Prince Albert respectively. The area is covered by NTS Map Sheets 63 M 1. The center of the property lies at 54° 58’ 20” N Latitude and 101° 06’ 00” W Longitude / UTM Location (NAD 83, Zone 13) 675650E / 6117400N. An Electrical Power transmission line linking the Hydroelectric Power Generating Dam at Island Falls with Flin Flon lies 10 km to the east of the property.

1.2 Software Programs Used

EMIGMA: Processing, Plotting, Mapping, Modeling, Inversion
QCTOOL: data processing and mapping
Microsoft Word and Powerpoint

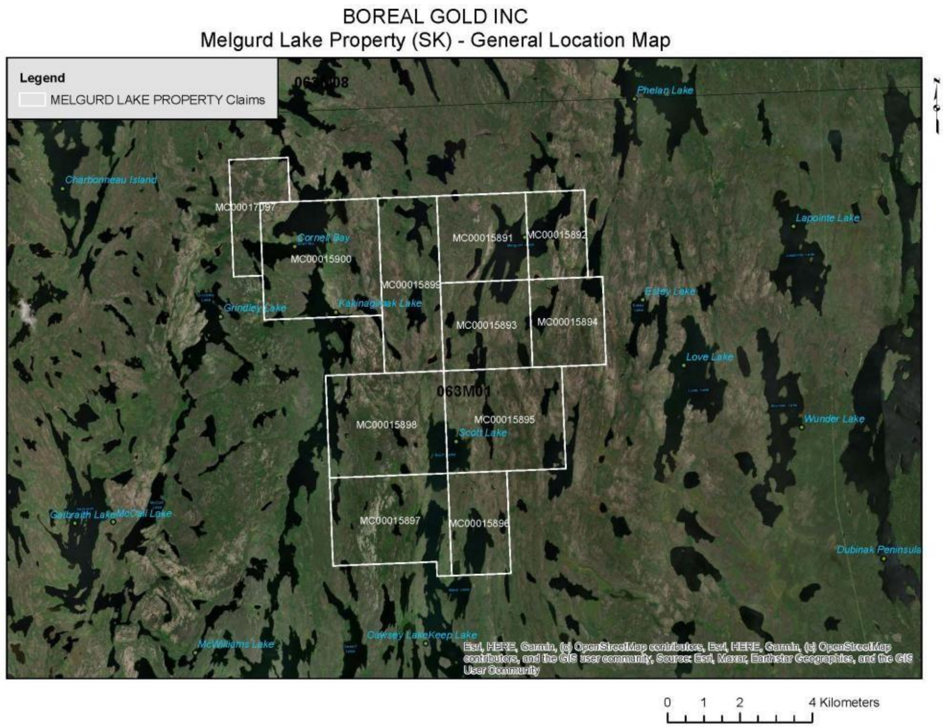


Figure 1: Melgurd Lake Property Claim Map

PRESENT CLAIM STATUS

The Melgurd Lake property consist of eleven claims totaling 7422 ha

Claim Number	Owner	Area (ha)
MC00015891	Richard Masson	593.390
MC00015892	Richard Masson	393.975
MC00015893	Richard Masson	598.663
MC00015894	Richard Masson	495.618
MC00015895	Richard Masson	926.893
MC00015896	Richard Masson	463.740
MC00015897	Richard Masson	812.125
MC00015898	Richard Masson	926.879
MC00015899	Richard Masson	791.436
MC00015900	Richard Masson	1057.236
MC00017097	Richard Masson	362.286
Total		7422 ha

Table 1: Claim Status for the Melgurd Lake Property

Xcite Airborne EM and Magnetics Analyzes, 2024,
Boreal Gold Inc
Melgurd Lake, SK, North West Portion

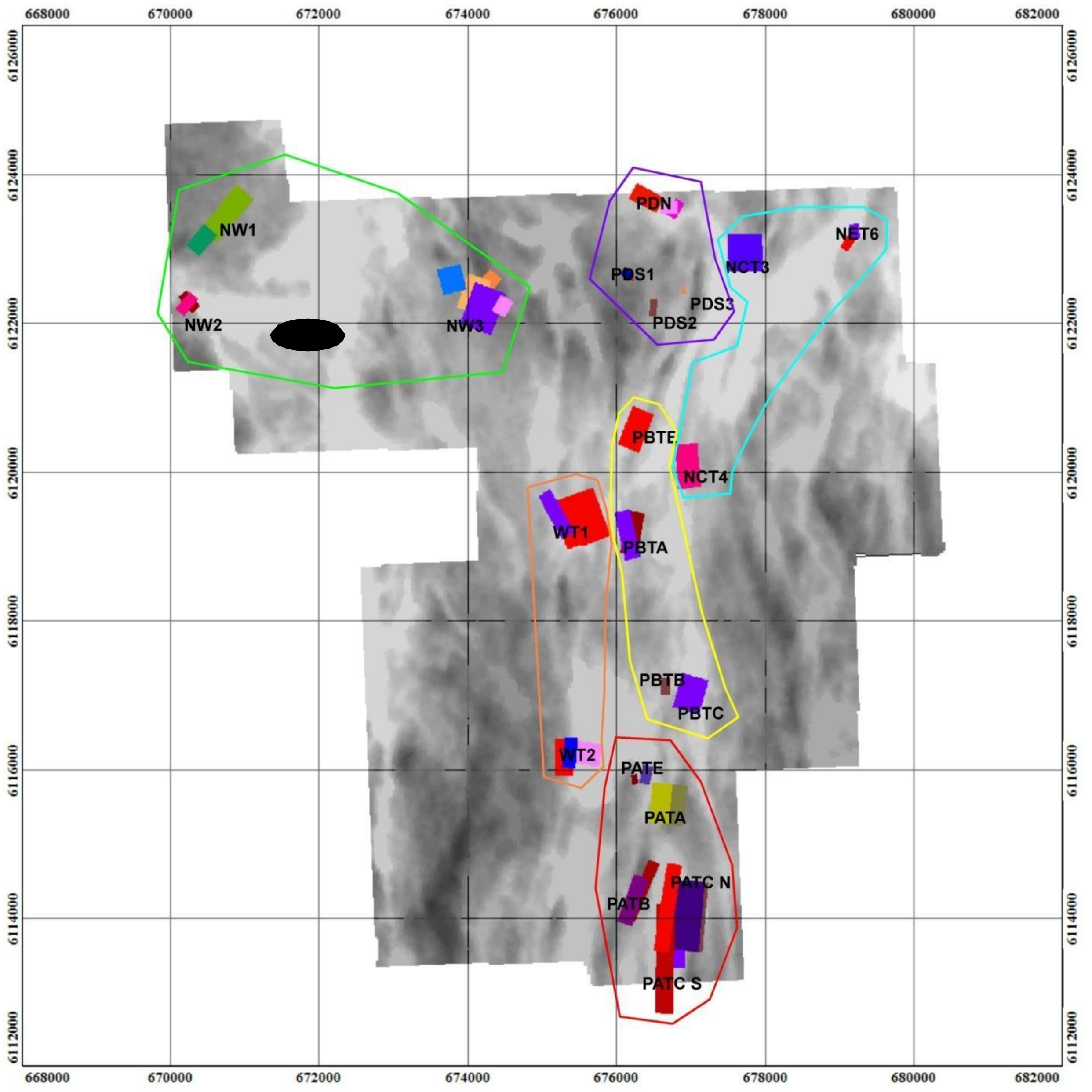
Introduction:

Initially, I have focused on areas which show both an anomalously high EM response as well as a magnetic response. This is in consideration of the known electrical and magnetic response of the four main sulfide minerals; pyrrhotite ($Fe_{1-X}S$), pyrite (FeS_2), chalcopyrite ($CuFeS_2$) and sphalerite (Zn_1FeS). Pyrrhotite and Chalcopyrite are good conductors while pyrrhotite, pyrite and chalcopyrite are weakly magnetic.

A common target for VMS from geophysical surveys is a target which is both magnetic and conductive.

NOTE: Survey company numbers the EM channels from 0-42. Channels 0-5 do not have data provided for either Bz or Bx. Our numbering uses Ch1 for the first actual data channel provided (Channel 6). Thus, in our numbering Ch37 is the last channel in the data set. Only the coil response is utilized in this survey, vertical response dBz/dt and the horizontal response dBx/dt. Thus, for simplicity, the vertical data is named Bz and the horizontal data Bx. While the surveyor uses units of voltage for the data, we utilize the normal units used in physics or picoTesta/second/Amp (pT/sec/A). Note that picovolts/(Amp x m^4) and pT/sec/A/m^2 are equivalent. When giving units, we also drop the fact that the data is normalized by current and we do not normalize by the area of the source as for modeling the size of the source is important.

Model Compilation



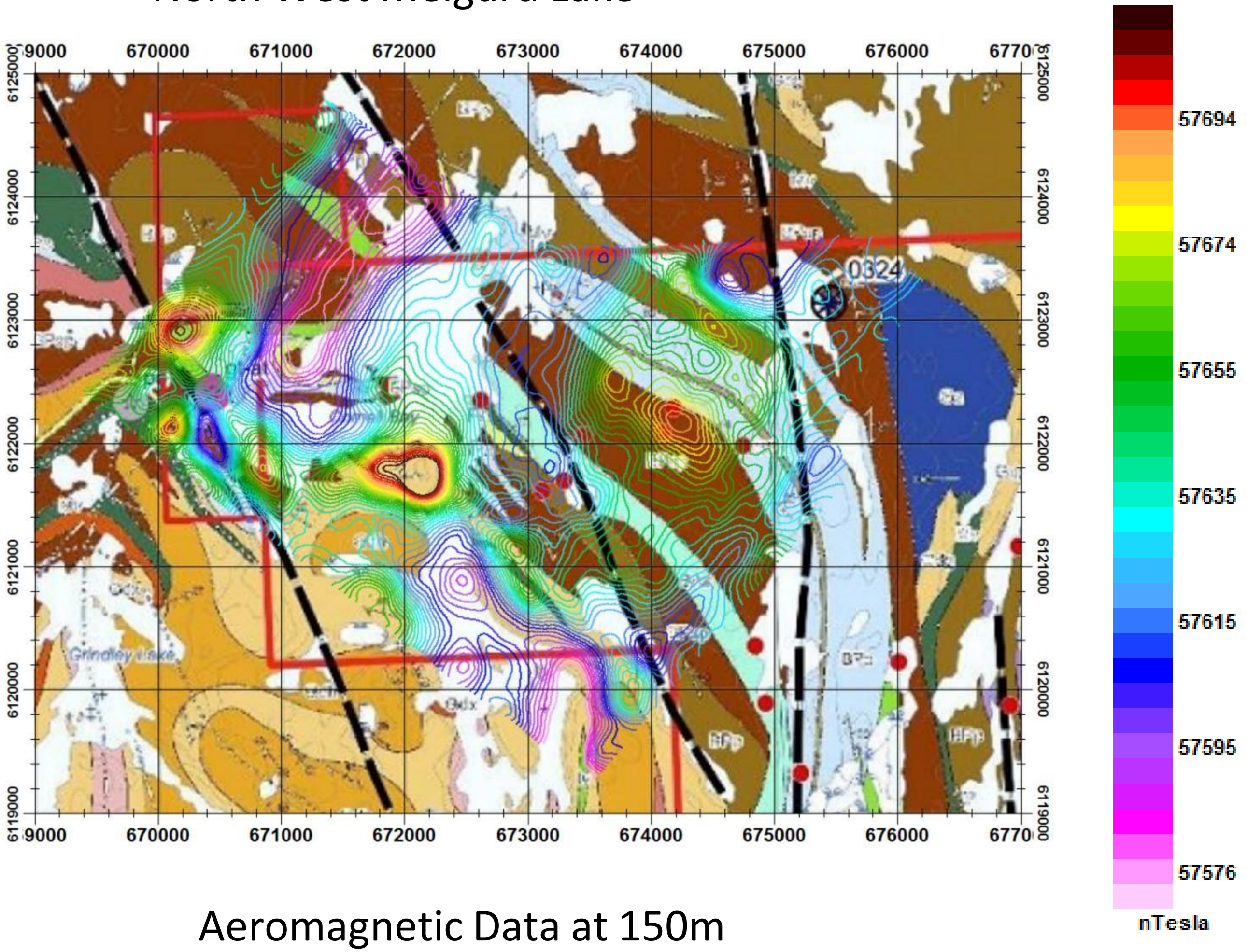
The survey is broken into 6 sections for modeling and analyzes

1. **Priority A** : Southern Northing, Central Easting: *pgs: 45-61*
2. Priority B: Mid-Northing, Central Easting: *pgs: 62-75*
3. **Priority C**: North West *pgs 4-24*
4. **Priority D**: Northern Northing, Central Easting: *pgs: 76-85*
4. **West** : Mid-Northing, West Easting : *pgs 31-38*
5. **North East**: North East and North Central *pgs 39-44*
6: **Cornell Bay Magnetics Anomaly**: *pgs: 25-29*

Model distribution on topography

Xcite Airborne EM and Magnetics Analyzes, 2024, Boreal Gold

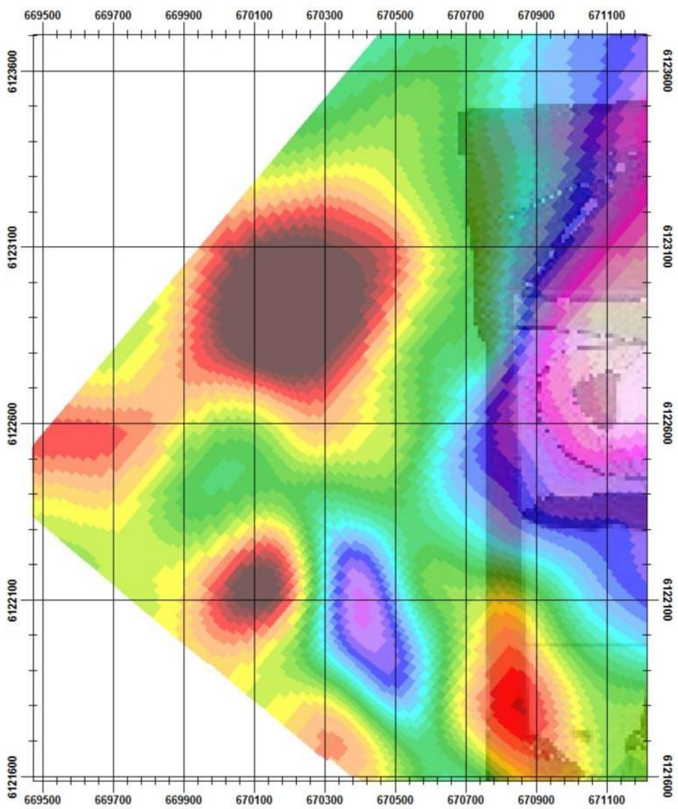
North West Melgurd Lake



Aeromagnetic Data at 150m

There are a number of unresolved concerns with the magnetic data from this survey. To overcome some of the issues, the data has been upward continued (altered to a higher flight altitude). This process does illuminate the 3 main magnetic features. The geology within the claim boundaries underlies the magnetic map.

Two perspective targets

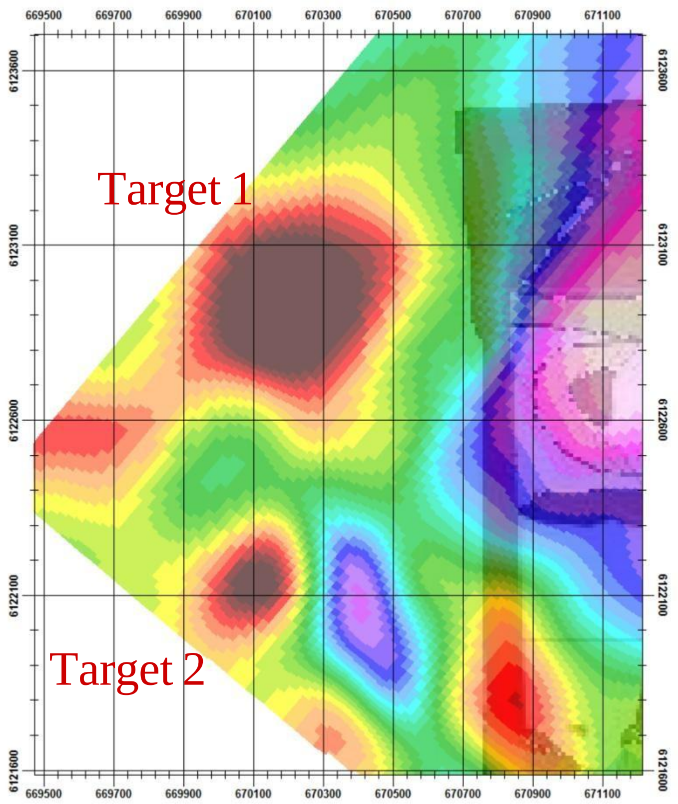


These two possible targets are just inside the latest claim boundaries.

Xcite Airborne EM and Magnetics Analyzes, 2024,   Boreal Gold

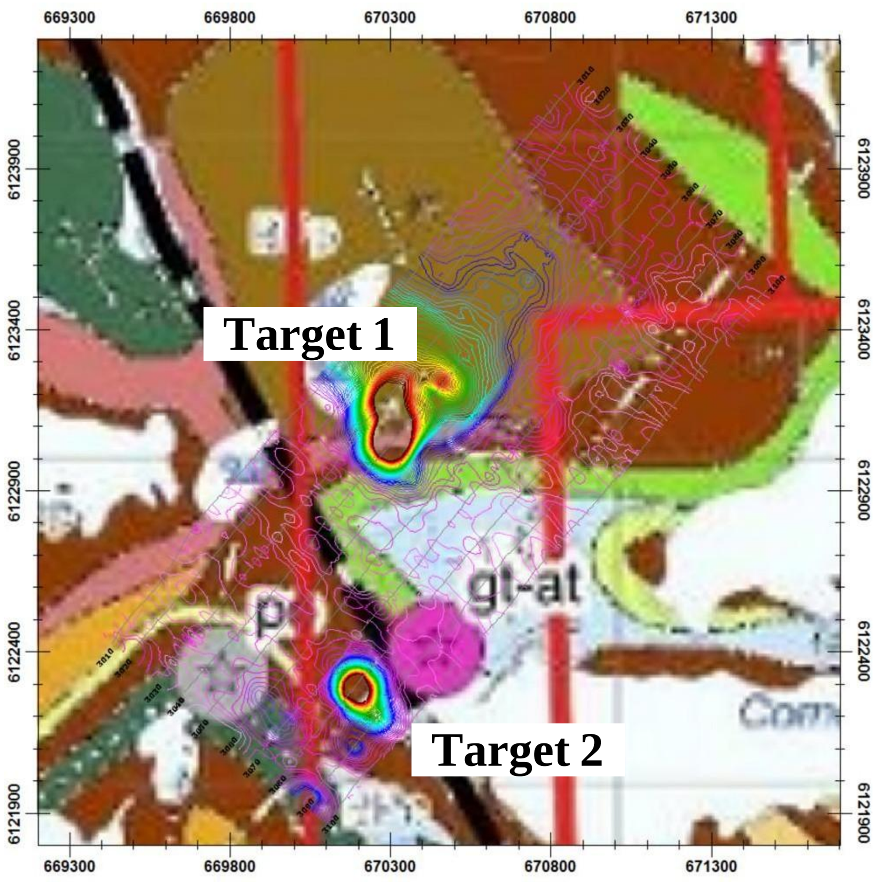
NW Melgurd Lake

Two perspective targets



Aeromagnetic Data at 150m

There are two significant magnetic features in the very NW of the survey area. Both of these features are just inside the claims area.



EM Data at late time.

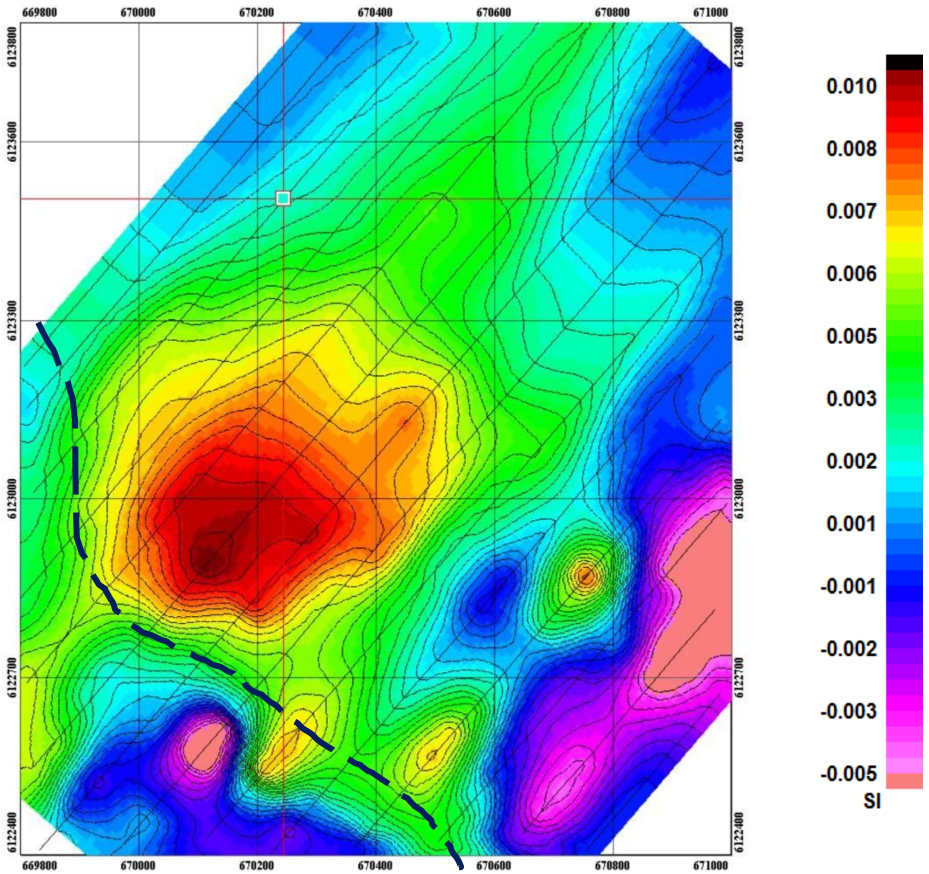
Felsic volcanics

These two targets are chosen due to the coincidence of a strong magnetic response and a healthy late time EM response. Such conditions suggest a possible combination of at least two sulfide minerals. Pyrite is magnetic but weakly conductive while pyrrhotite and chalcopyrite are good conductors. Sphalerite is normal compositions is neither magnetic nor conductive.

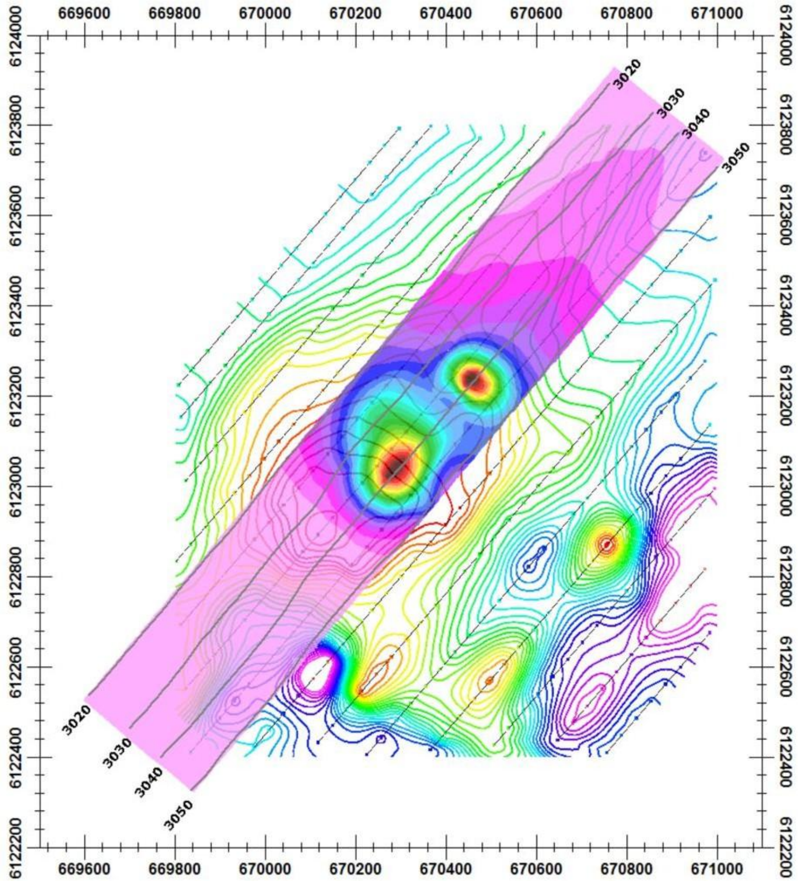
Both target areas suggest more mineralization at depth but this EM system has a much shallower exploration depth than the VTEM system. This aspect will be explained further.

TARGET NW 1

Note: The blue contours represent regions with no susceptible (magnetic) rocks. Pink indicates de-magnetized (paramagnetic) rocks which is a common property of granitoids (coarse grained igneous rocks).

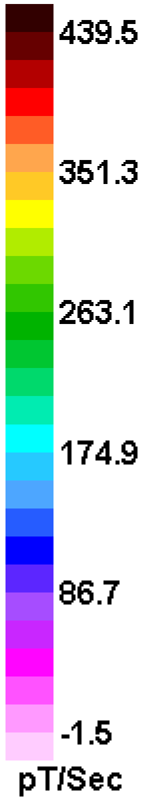


Aeromagnetic Model –Contours of Magnetic Susceptibility
- *Sliced at 175m Depth*



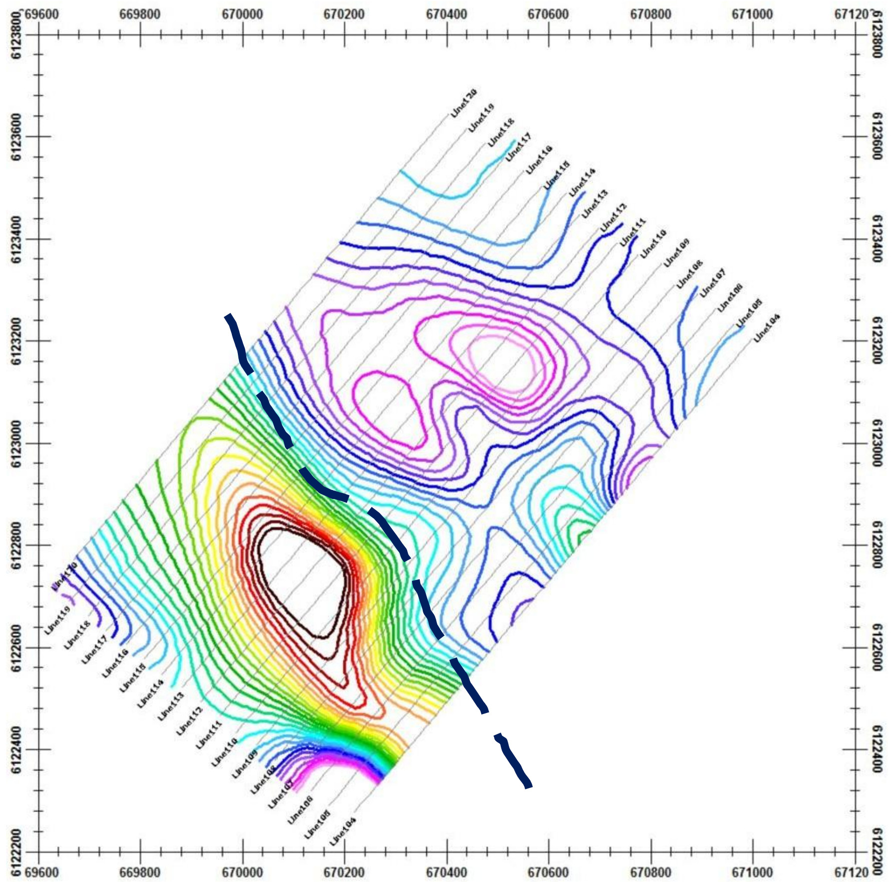
Bz (vertical field) EM contours underlain with magnetic model at 175m depth.

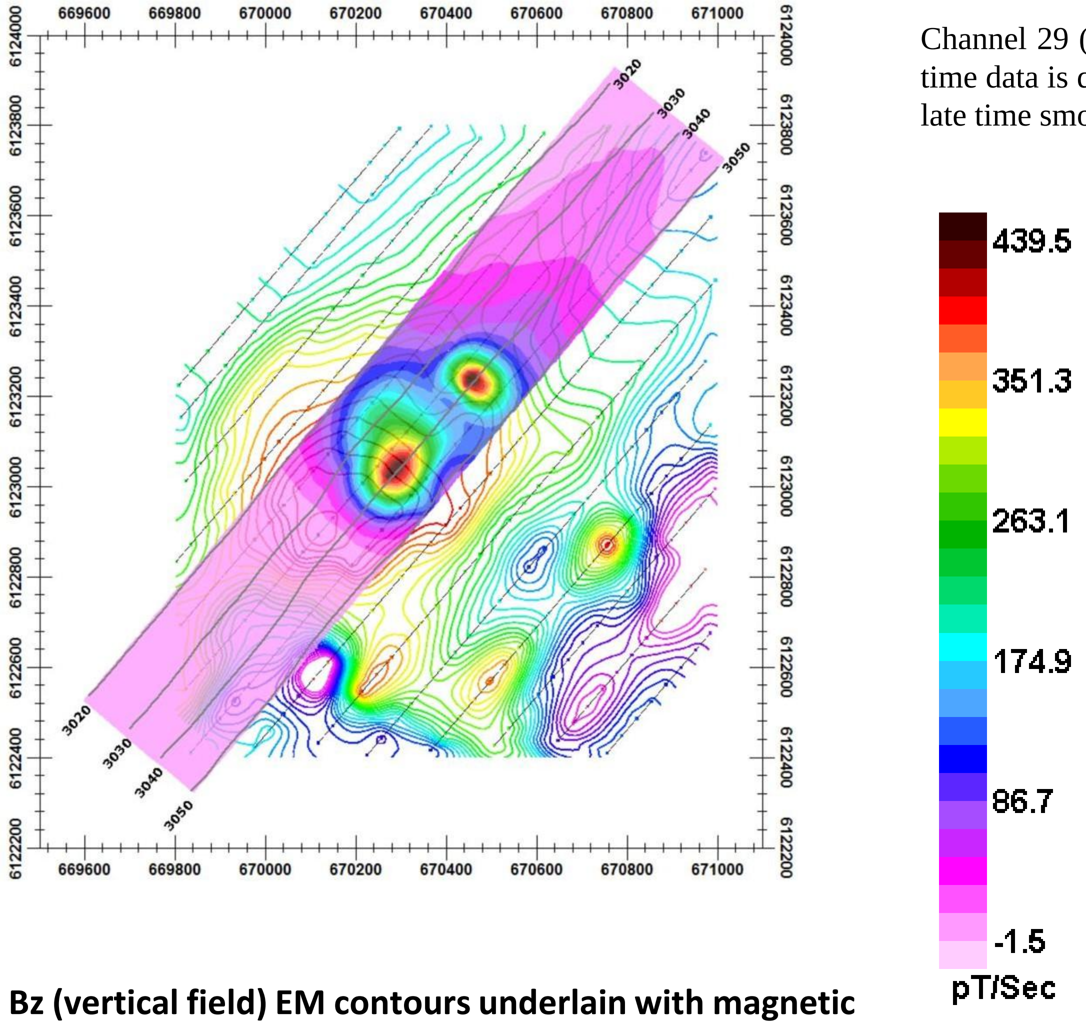
Channel 29 (1msec) is contoured. Later time data is questionable due to obvious late time smoothing filters.



TARGET NW 1

dBt/dx contoured





Channel 29 (1msec) is contoured. Later time data is questionable due to obvious late time smoothing filters.

Bz (vertical field) EM contours underlain with magnetic model at 175m depth.

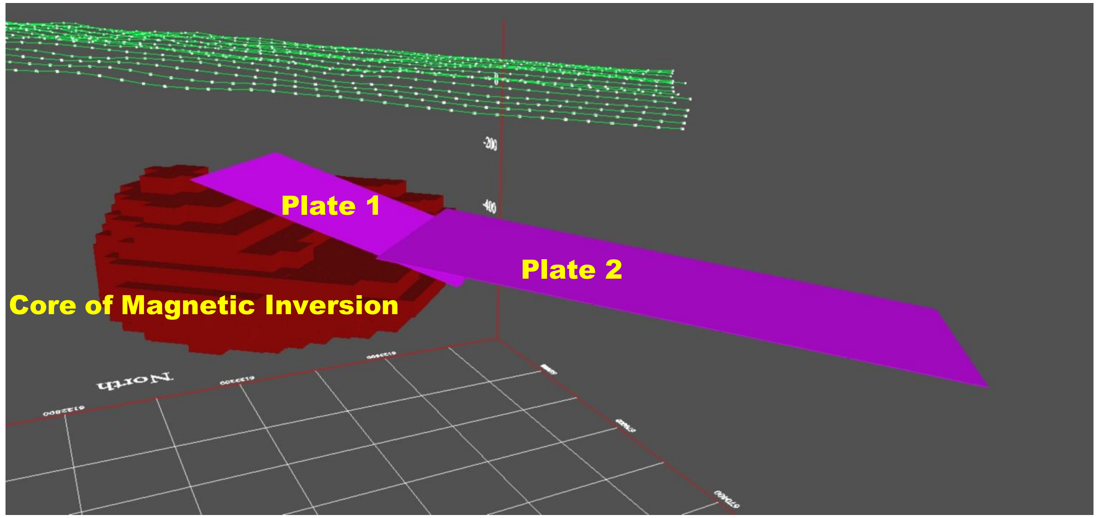
TARGET NW 1

Anomaly 1_1
Strike Length: 240m
Dip Extent: 400m
Strike Angle: 49 WNW
Dip Angle: 18 NE
Conductance: 45 S
Depth to Top: 30m
Depth to Bottom: 150m

Anomaly 1_2
Strike Length: 300m
Dip Extent: 800m
Strike Angle: 49° WNW
Dip Angle: 7° NE
Conductance: 50 S
Depth to Top: 100m
Depth to Bottom: 195m

The conductive model is more complicated that shown below. In addition, to the two main conductors shown, there is two additional weaker conductors. The first is very shallow, flat lying and just SW of the two conductors shown. The second is also shallow, spatially small and above the intersection of the two conductors. It is very noticeable in early times but decays quickly.

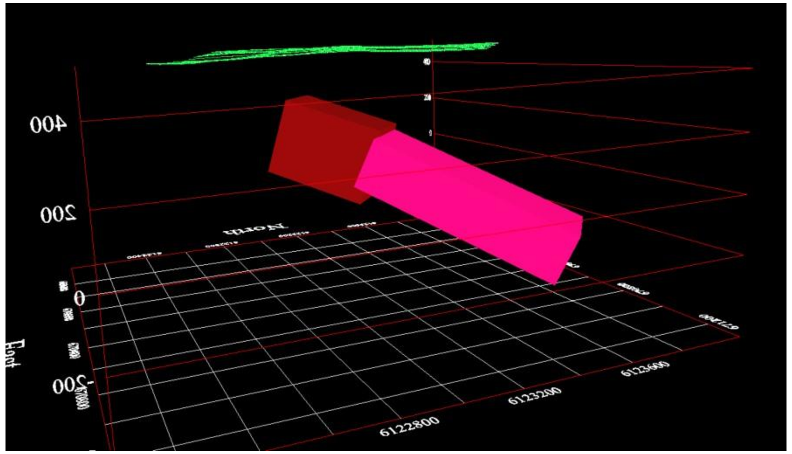
Note: It is critical to understand that the conductors are not likely so thin. The thinnest of the conductors is partially because this type of small loop system flown approximately 40m above the ground can only "see" the top of the conductors if they have shallow dip angles. Secondly, the limitations of software algorithms for conductors in hard rock is generally limited to "thin-plate" structures.



View from East

The core of the magnetic anomaly shows magnetic susceptibilities ranging between 0.008 to 0.015 SI units

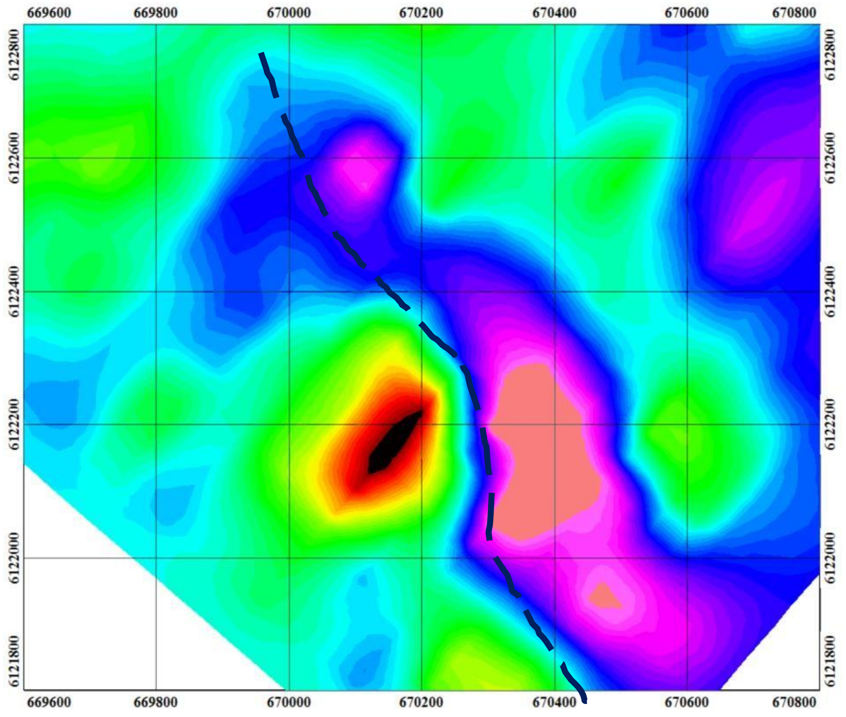
To illustrate, the magnetic model below based upon the EM model to the left, fits the principle aspects of the magnetic anomaly.

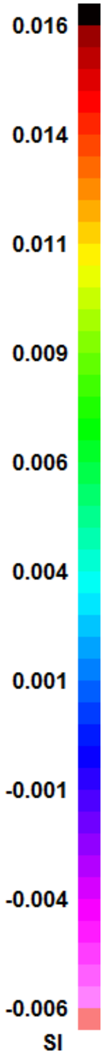


TARGET NW 2

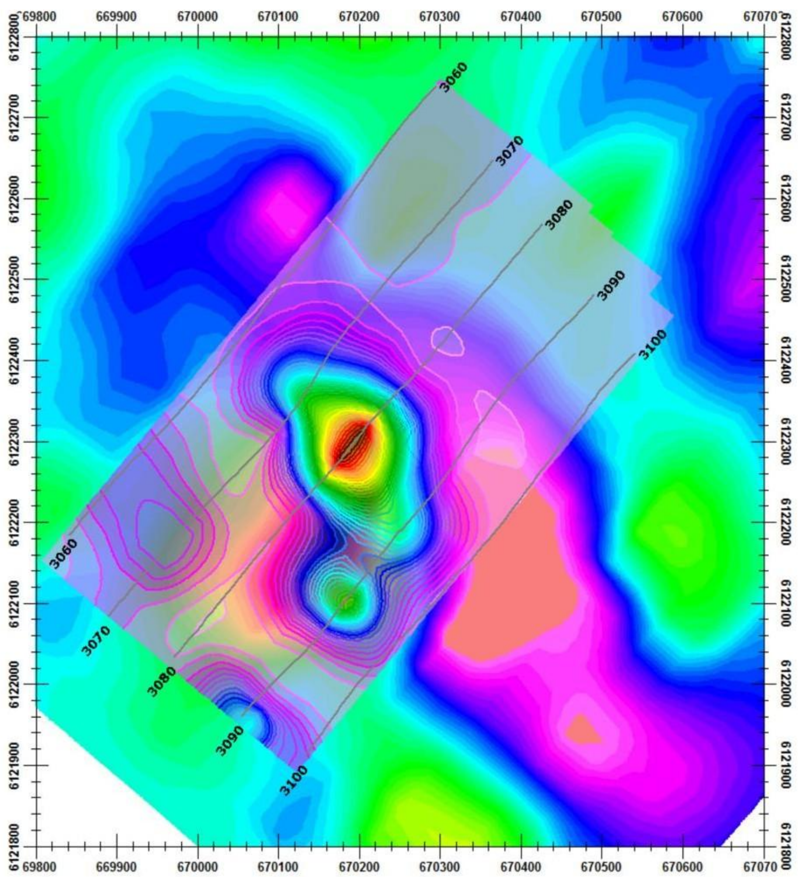
Note: The blue contours represent regions with no susceptible (magnetic) rocks. Pink indicates de-magnetized (paramagnetic) rocks which is a common property of granitoids (coarse grained igneous rocks).

Dashed black line is estimate of air photo lineament.



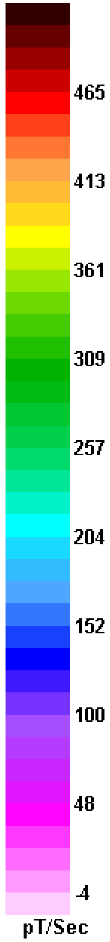


Aeromagnetic Model –Contours of Magnetic Susceptibility
 - ***Sliced at 150m Depth***



Bz (vertical field) EM contours underlain with magnetic model at 150m depth.

Channel 24 (1msec) is contoured. Later time data is questionable due to obvious late time smoothing filters.

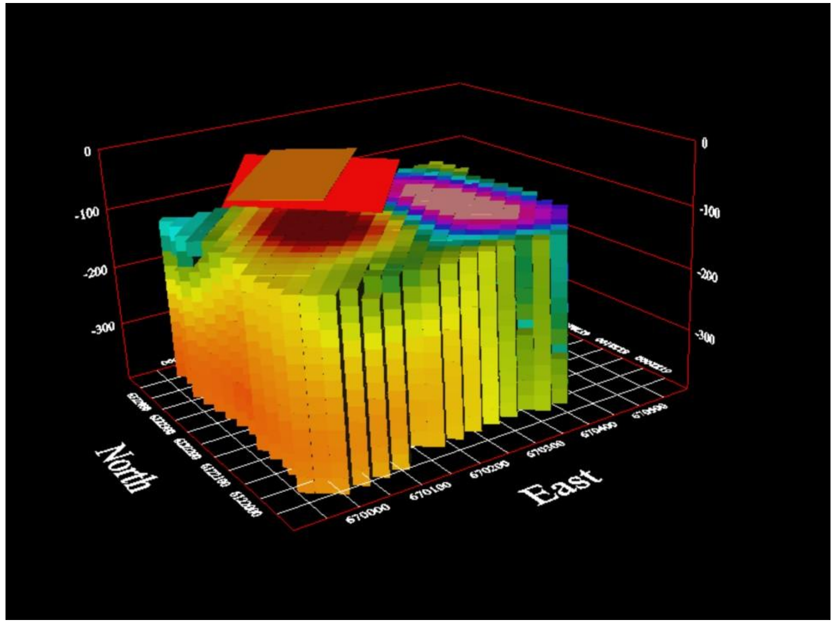


TARGET NW 2

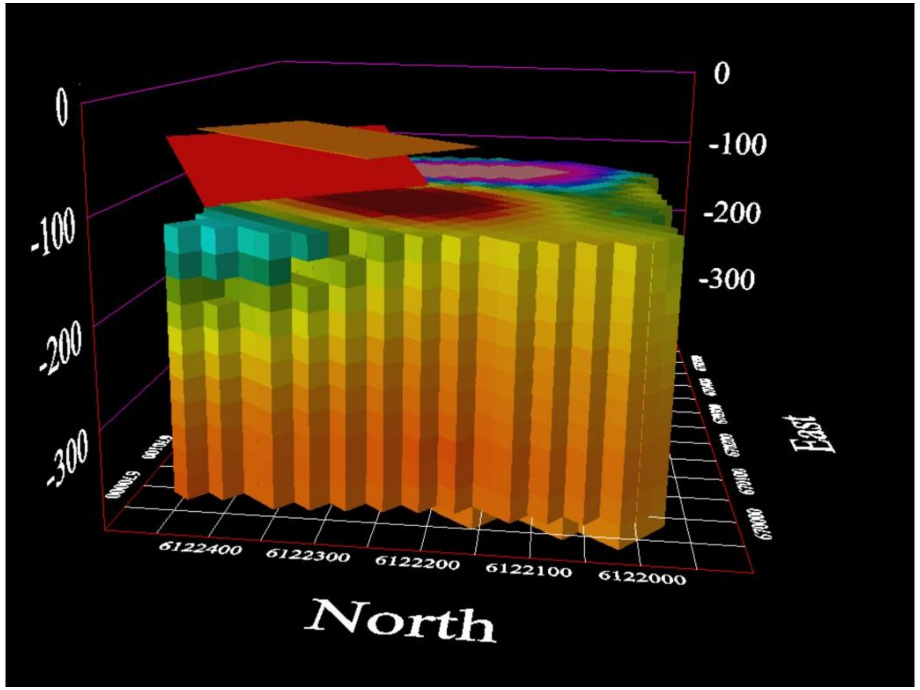
Anomaly 2_1
Strike Length: 280m
Dip Extent: 170m
Strike Angle: 40°NW
Dip Angle: 30°SW
Conductance: 100 S
Depth to Top: 60m
Depth to Bottom: 145m

Anomaly 2_2
Strike Length: 150m
Dip Extent: 300m
Strike Angle: 50° WNW
Dip Angle: 0°
Conductance: 5 S
Depth to Top: 55m
Depth to Bottom: 55m

Note: Anomaly 2_1 could penetrate deeper. However, this system has a much shallower depth of penetration than even the VTEM and certainly much, much less than ground TDEM.



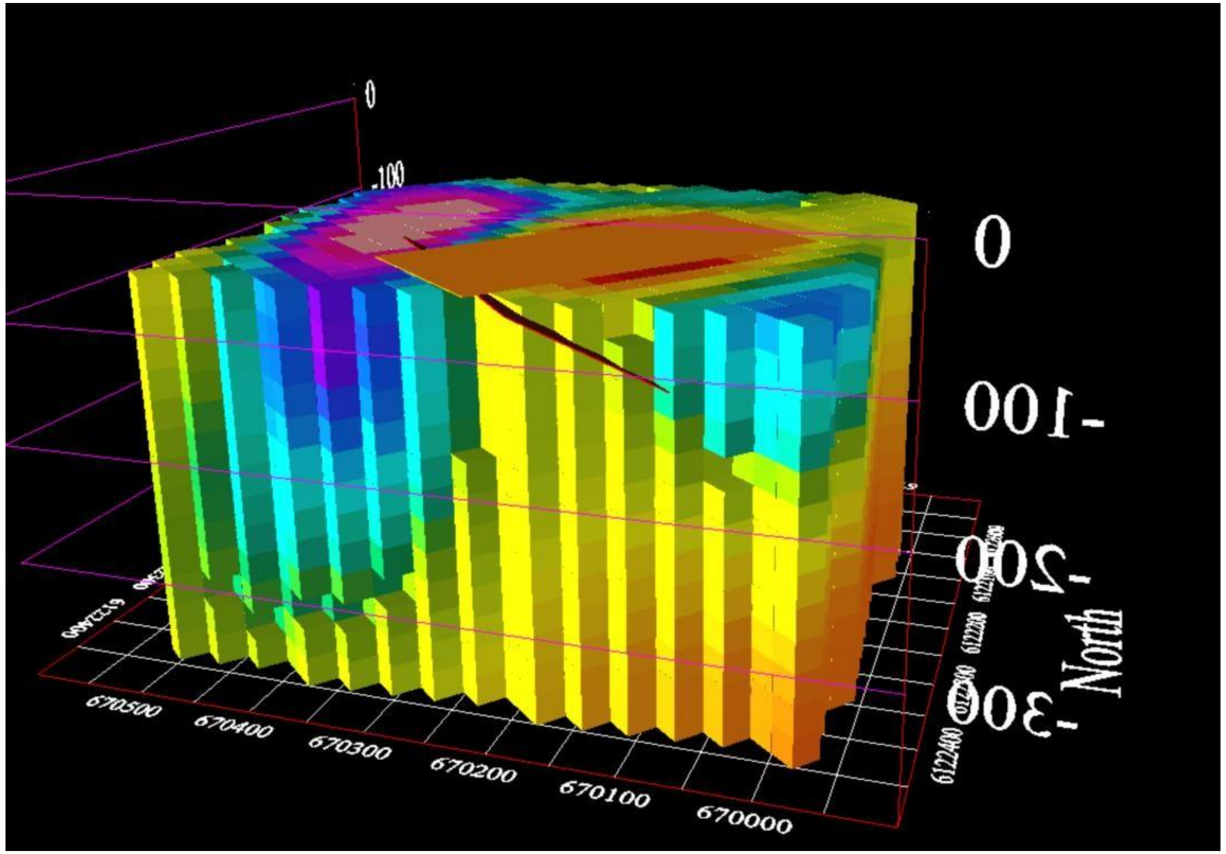
View from SW, Magnetic Inversion sliced to 120m depth



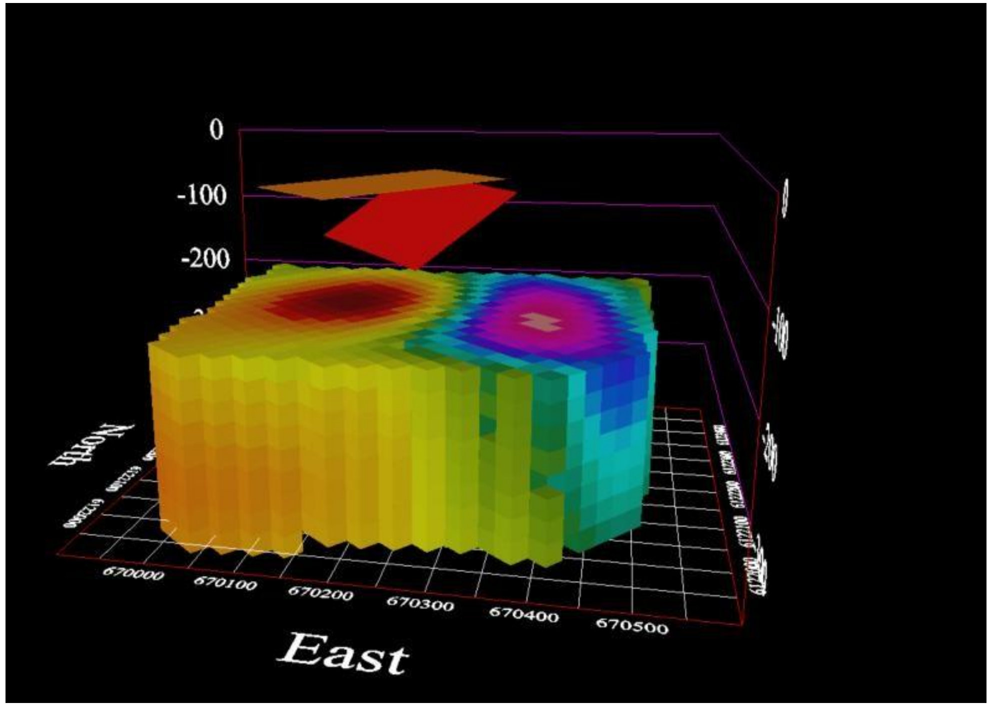
View from West, Magnetic Inversion sliced to 120m depth

TARGET NW 2

Magnetic Inversion model sliced at 84m



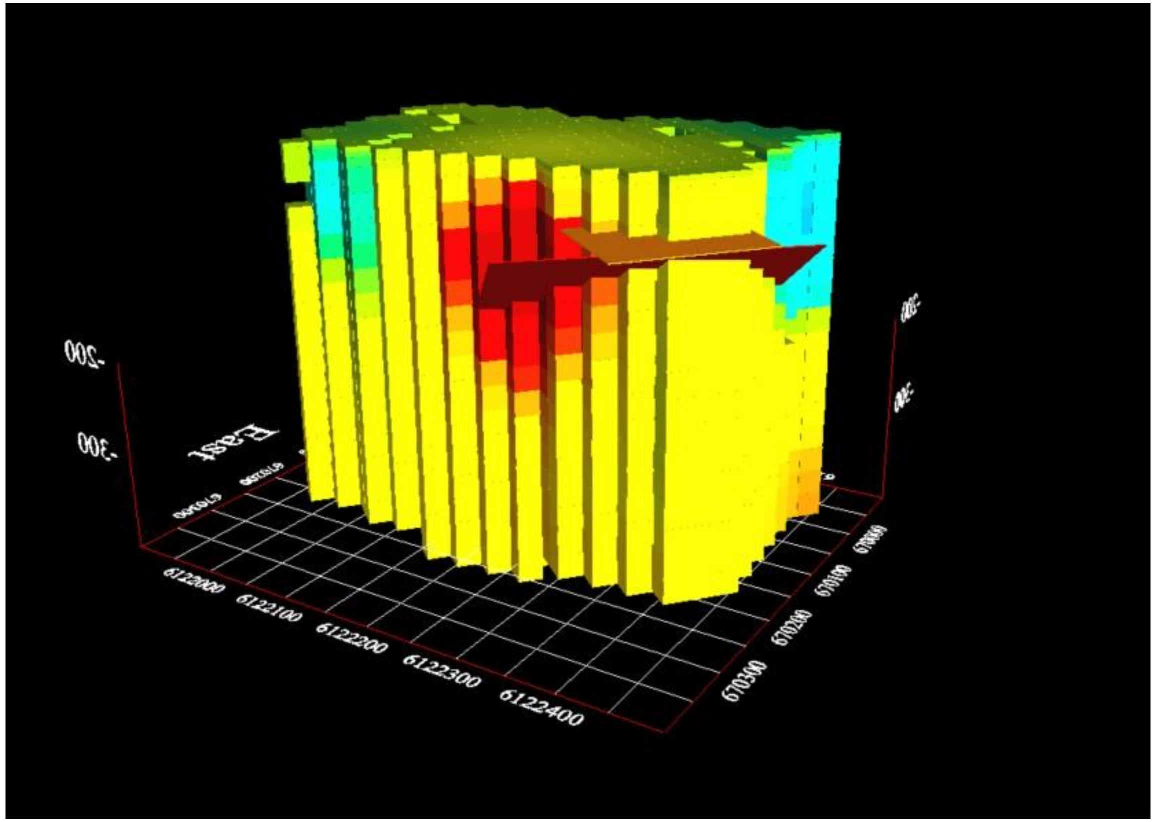
214m depth to top of magnetic model



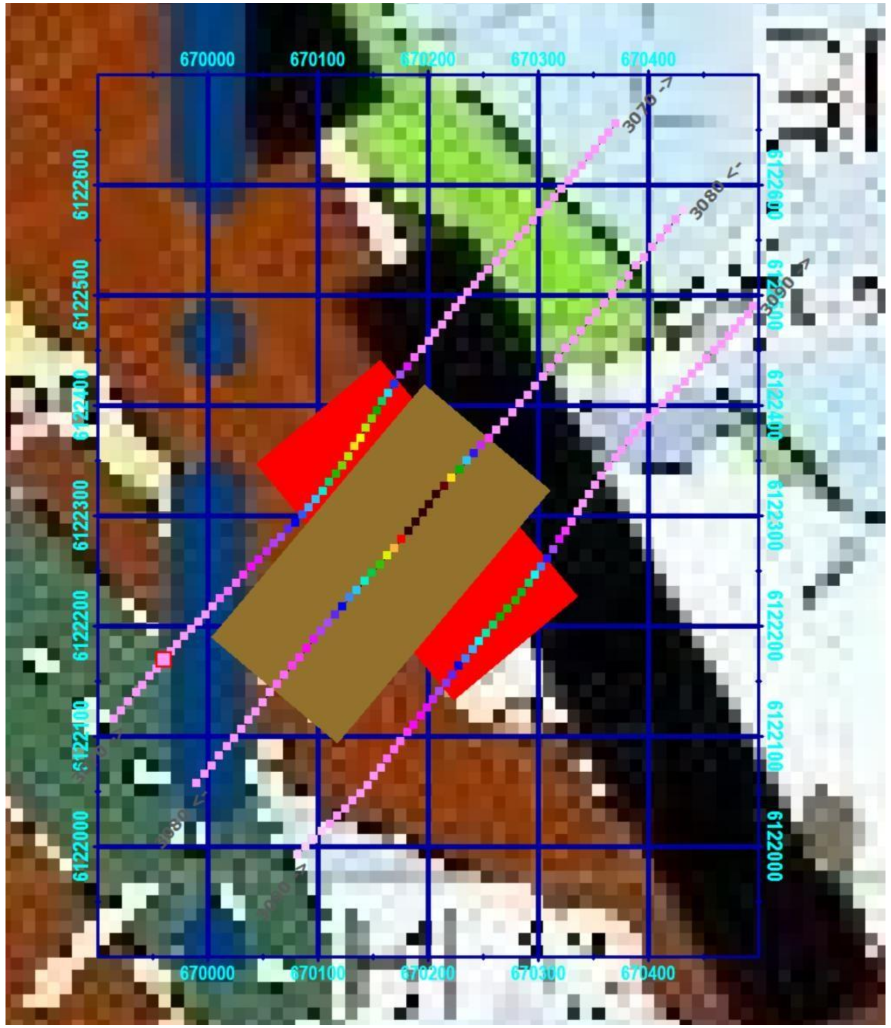
View from NW

TARGET NW 2

Magnetic Model Sliced vertically along Easting 670200



View from NWE

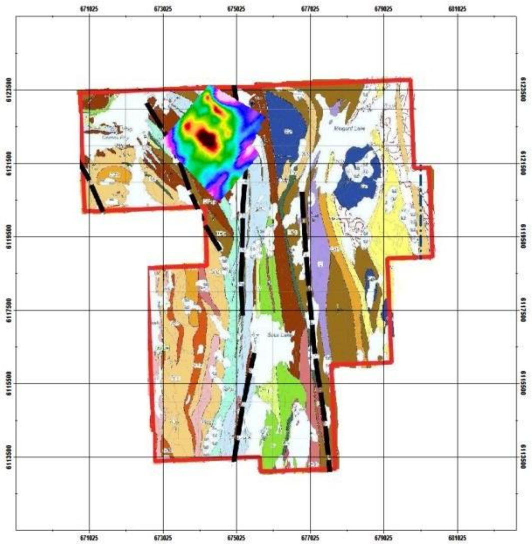


Anomalies projected to surface with geology map underlay. The black dashed line is indicated as a lineament on the geology map.

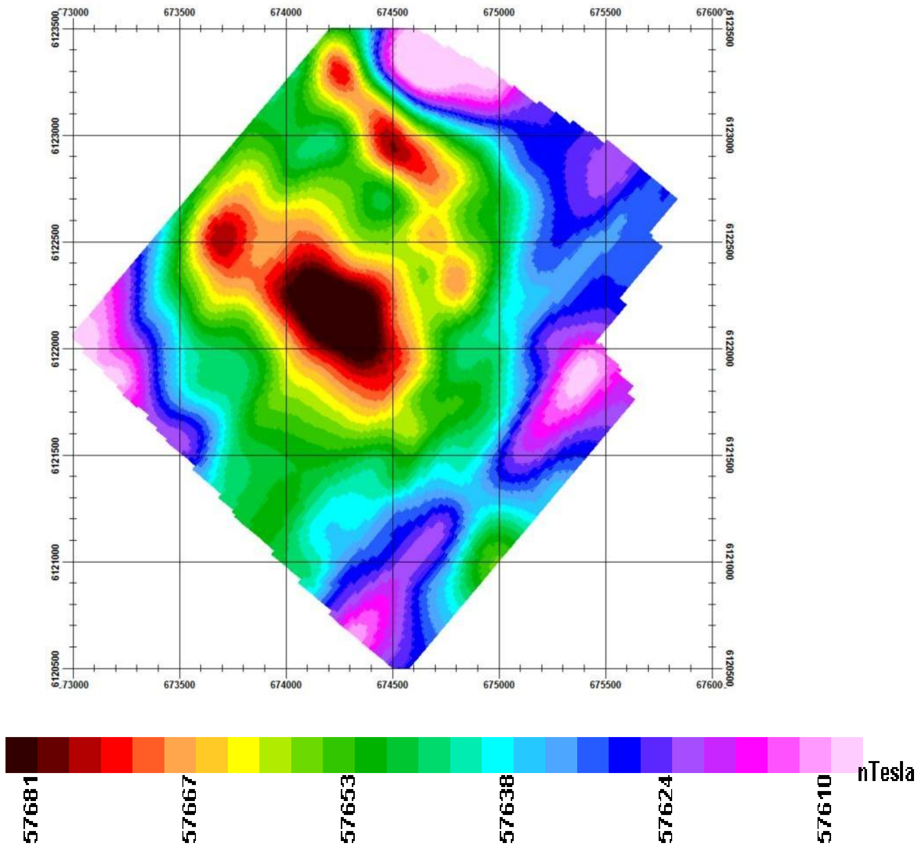
TARGET NW 3

This area in the far north of the survey just to the west of the centre of the claims area is a very unusual in terms of geophysical responses both in the magnetic data and the EM data. The amplitude of magnetic high is not large but the region of anomalously high magnetic field is considerable (almost 2 sq km). The EM data is even more unusual not just that there several areas of high EM at late time but more significant is that the EM response continues to be moderately high outside the localized EM anomaly highs.

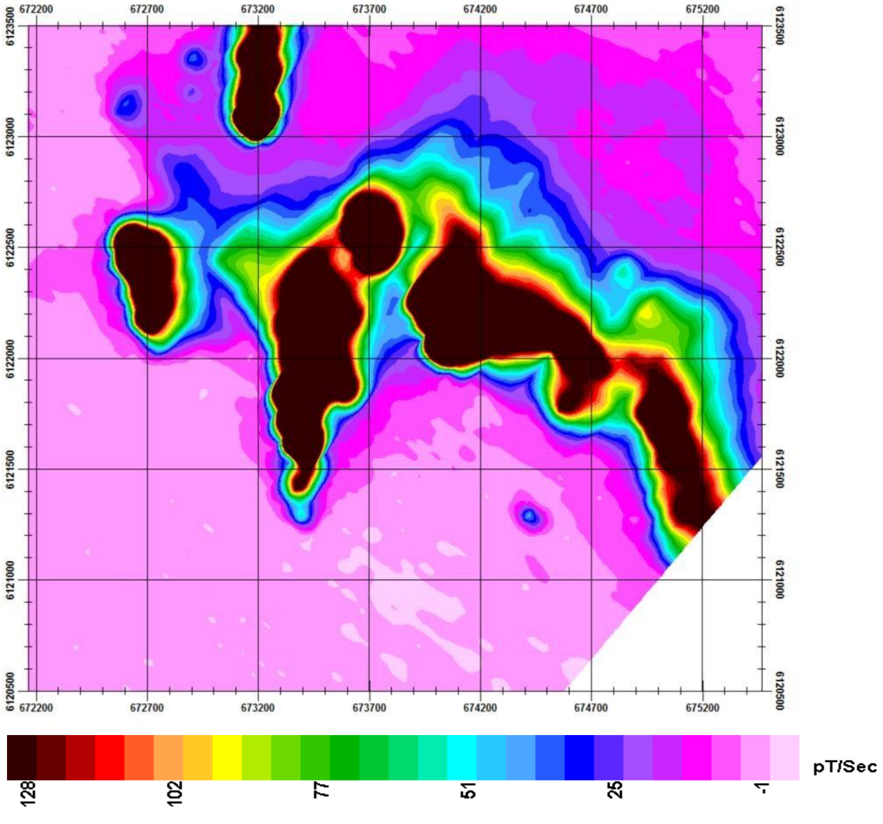
Target Area NW 3



Total Field Magnetic Data



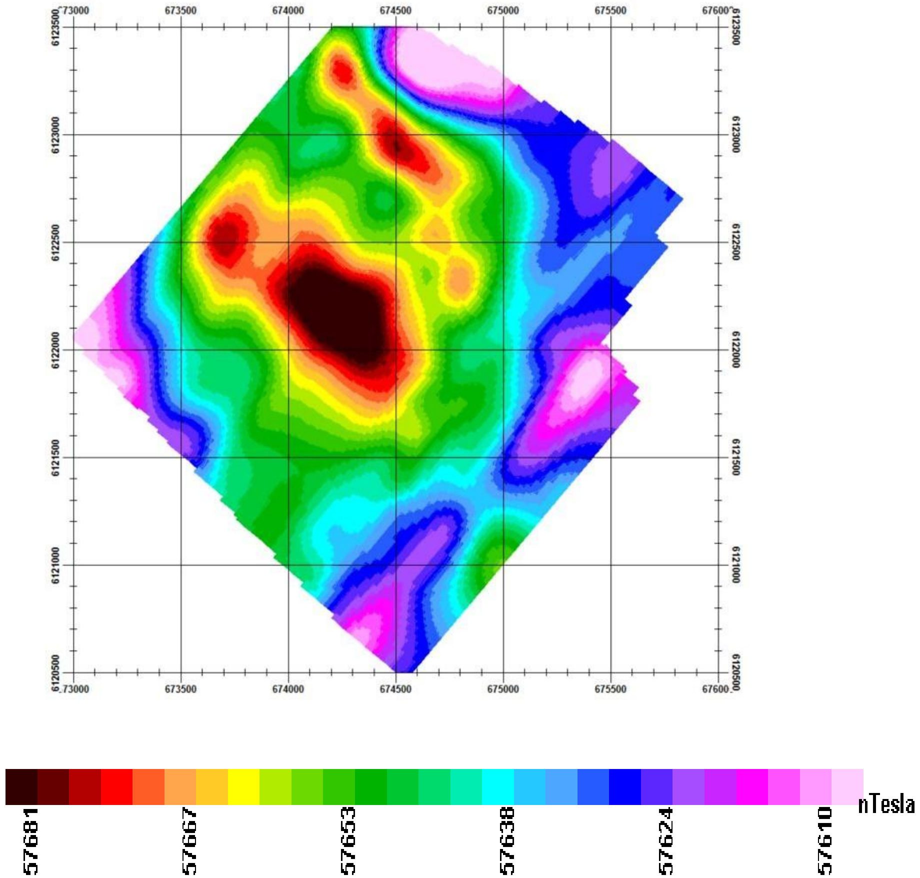
EM - dB_z/dt – Channel 34 – Late

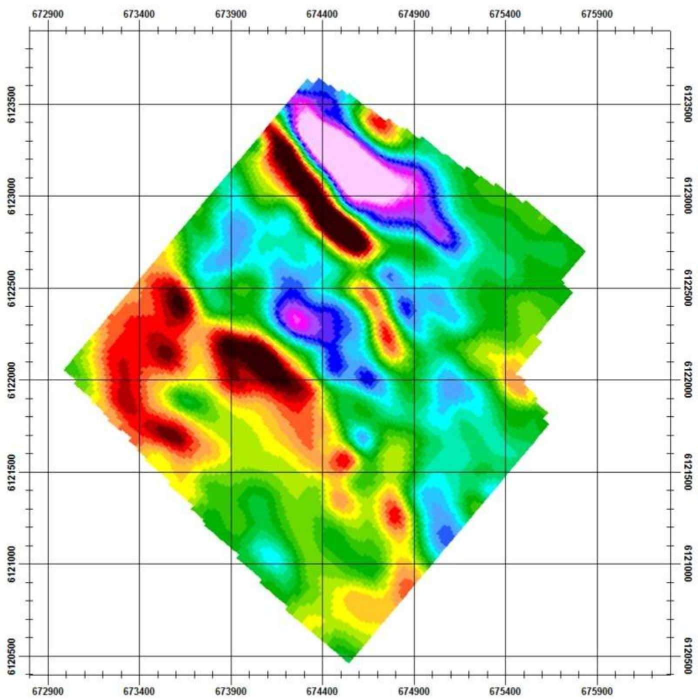


TARGET NW 3

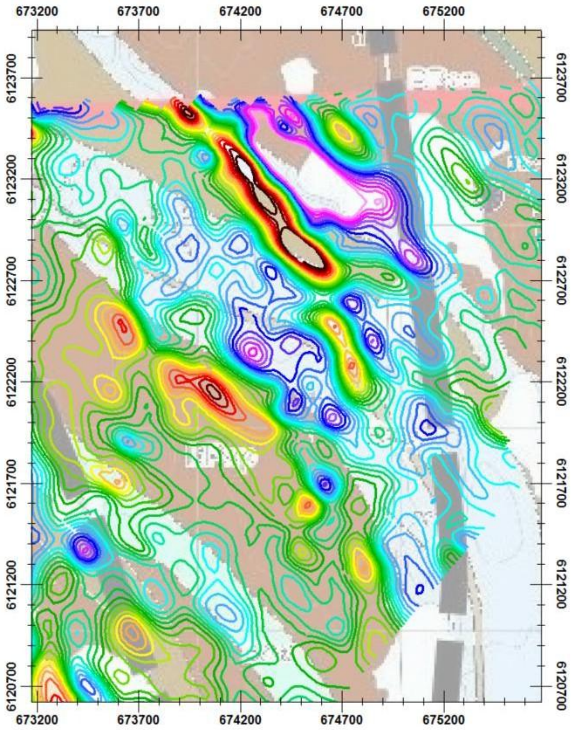
The total field magnetic data is shown on the left while the horizontal gradient directed in the NE direction is shown in the center and on the right with the geology map underlain. The horizontal derivative generally indicates the boundaries between magnetic domains. But, it can also indicate the strike of the structures and whether the structures are dipping. There is little correlation between the total field data (TMI) and the geology but the derivative shows some clear correlations with the surface expression of the geology. There is also a subtle indication that the structures may be dipping to the northeast.

Total Field Magnetic Data Upward Continued to 150m





NE Horizontal Gradient

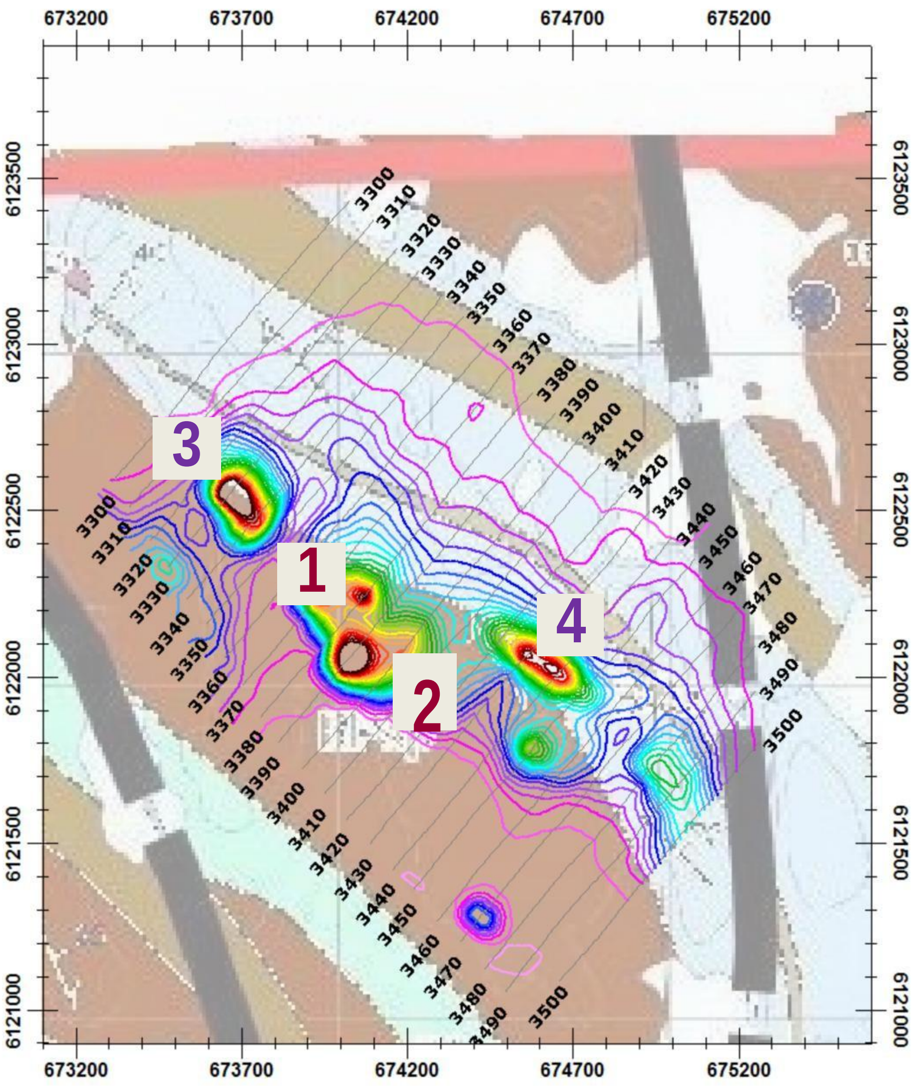


NE Horizontal Gradient , geology map underlay

TARGET NW 3

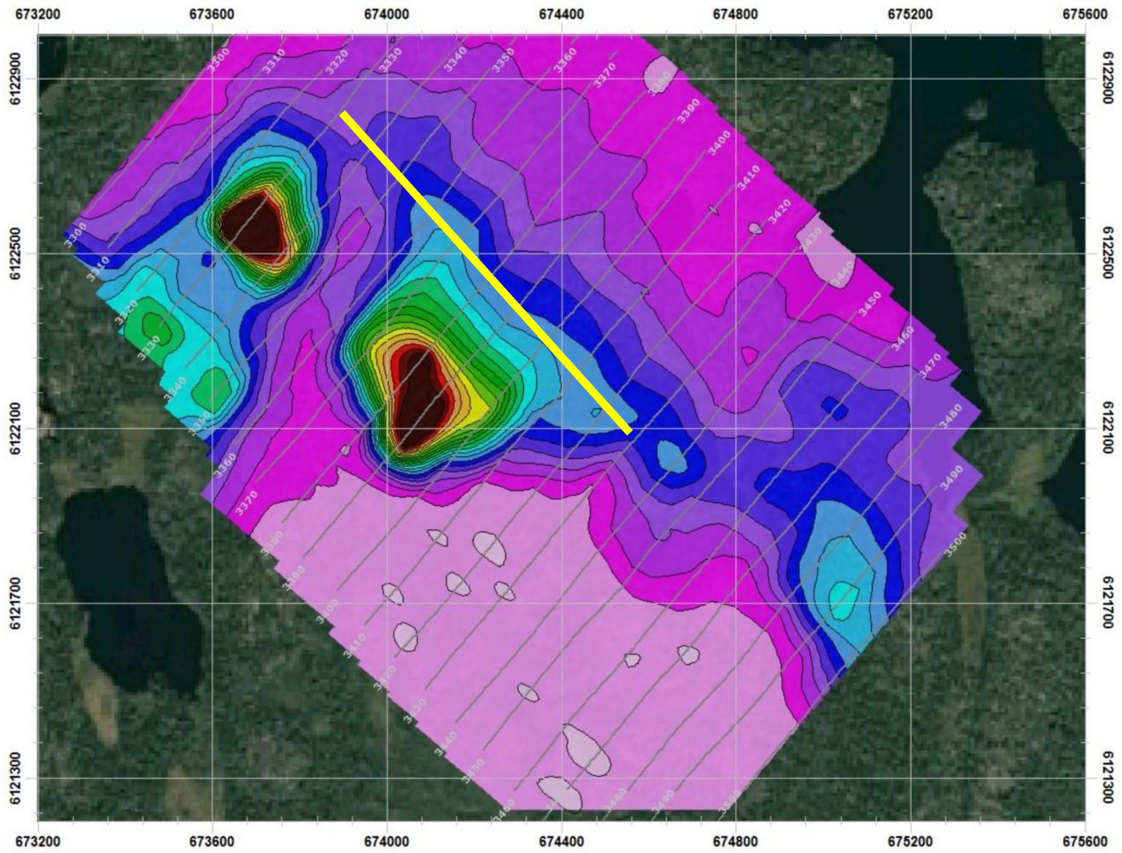
In this portion of the NW of the Melgurd Lake survey there are 4 main late time anomalies. Again, it must be emphasized that these are not simple isolated anomalies but each is underlain to a much wider area with significant conductive material. This lower conductive material is not penetrated by the airborne survey. It can only be interpreted as a conductive halfspace underlying all the other structures or by a slowly dipping structure dipping to the NE. Depth to the top of this large base structure is approximately 120m

The line marked in yellow indicates conductive structure at the very limits of the resolution capacity of the data. The conductive response at the very latest of reliable data channels repeats across 10 survey lines and appears to show connecting conductive material between NW3 1-4. Additionally NW3-1 and NW3-2 appear connected at depth.



EM dB_z/dt Chn30 - Claim boundary /Geology underlay

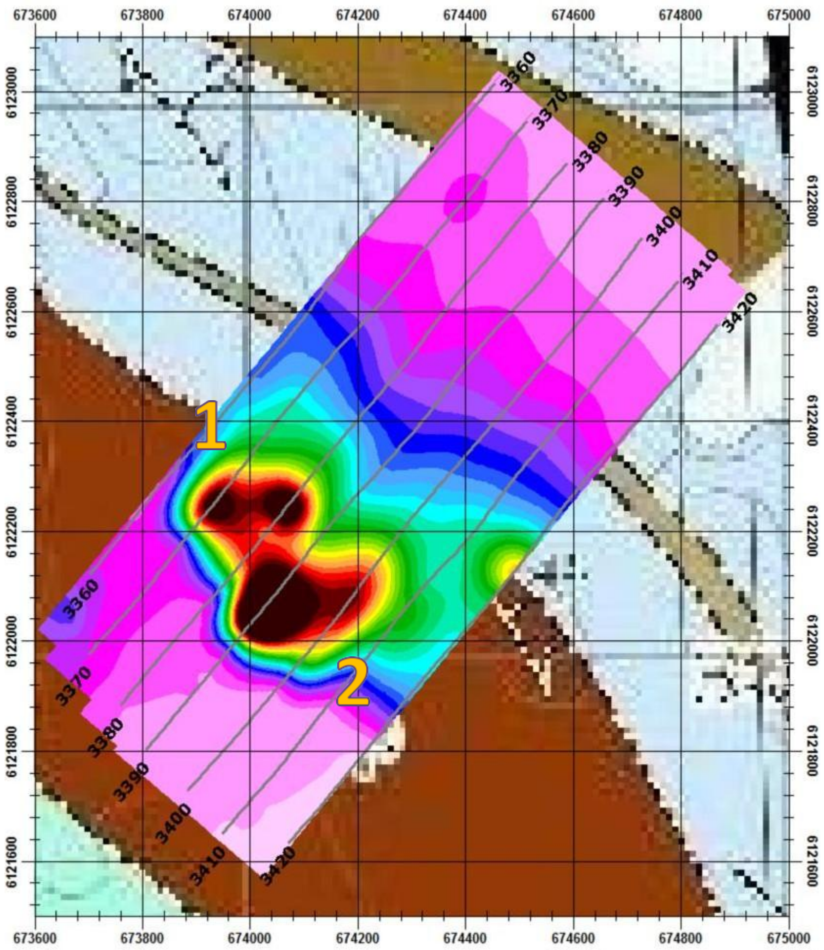
Anomaly NW3 – dB_z/dt Ch38



TARGET NW 3A

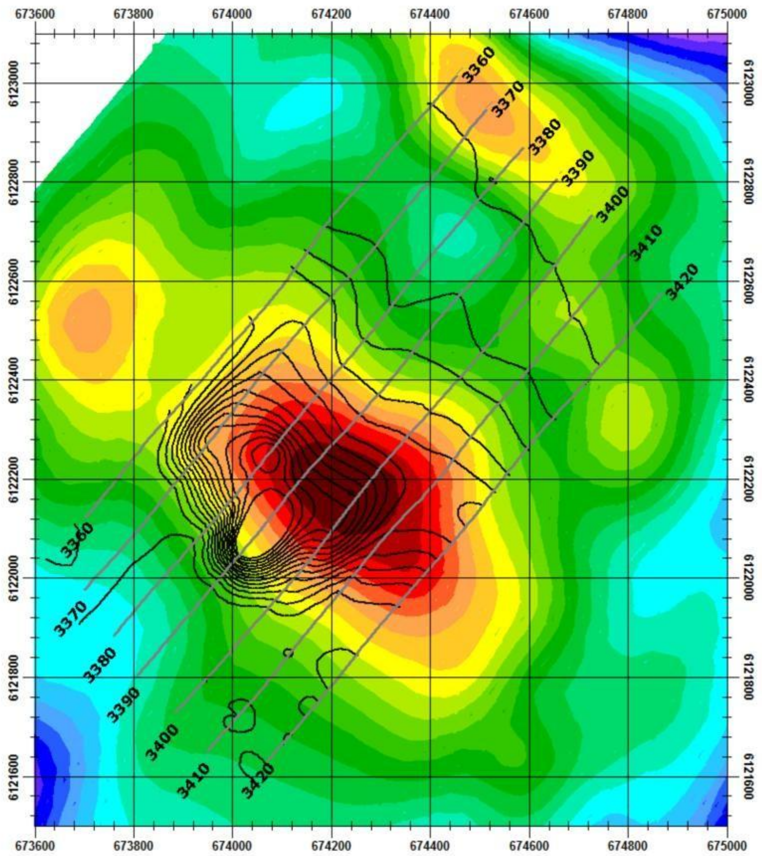
In this portion of the NW of the Melgurd Lake survey, we label as NW3A and in this area there are two main anomalies, 1 & 2, as below. NW 3A-1 dips approximately to the North while NW 3A-2 dips to the east. Again, it is important to note that these two anomalies sit on top of a base of conductive material that 400m x 600m in size. To what extent these two anomalies are connected at depth cannot be determined due to the spacing of the survey lines.

The conductive response is certainly associated with a magnetic high. While the center of the EM anomaly at Ch36 is not over the center of the magnetic structure, the EM response is migrating to towards the magnetic center.



Anomaly NW3A-1 and 3A-2– Ch30

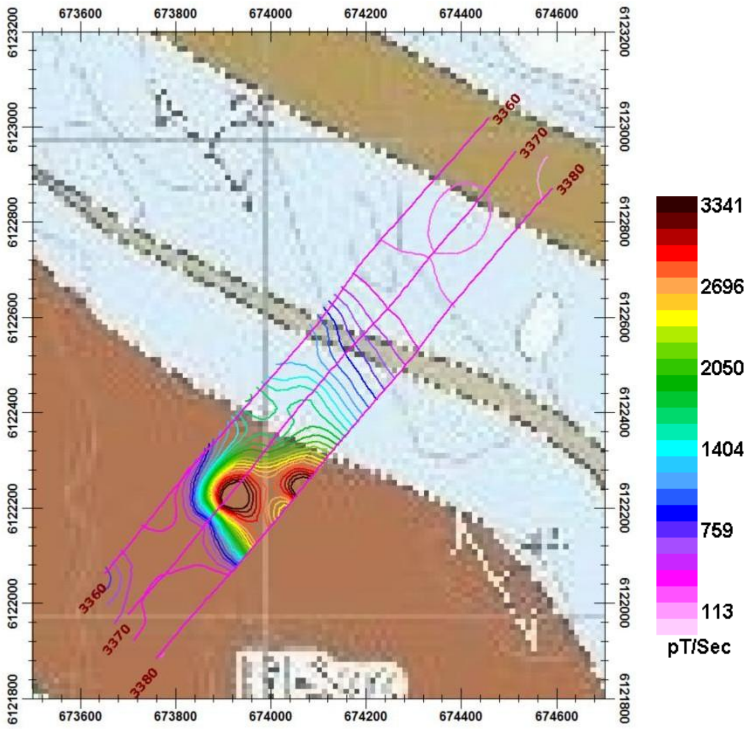
Anomalies numbered 1&2 on pg14 are now labelled NW3A-1 and NW3A-2 respectively



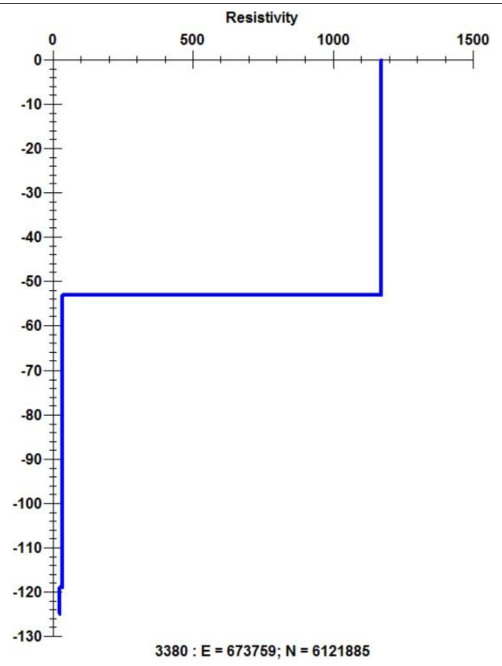
Anomaly NW3A-1 and 3A-2 black contours with deep magnetic structure underlain

TARGET NW 3A-1

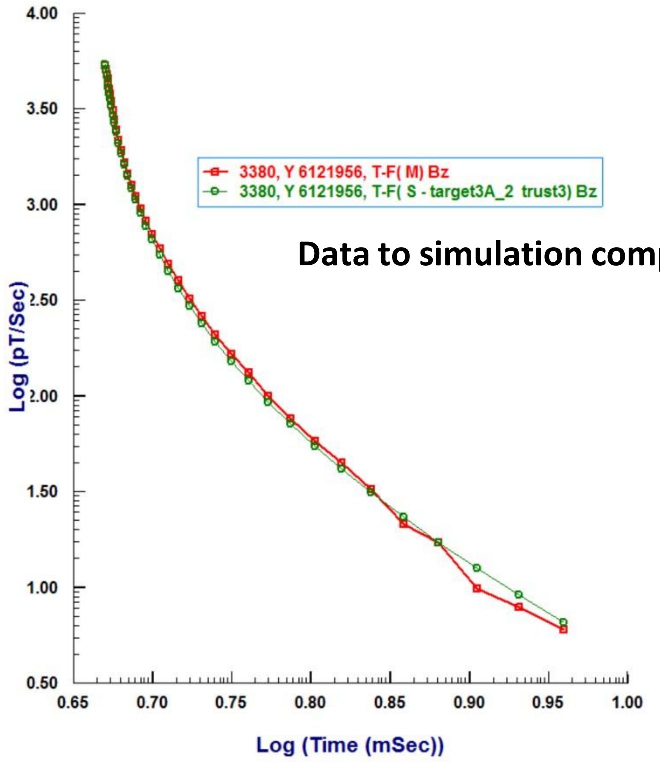
Target NW 3A-1 is underlain by conductive material over an area much larger than the strong conductive anomalies. To determine the resistivity depth structure outside the conductive anomalies an inversion routine was used which inverts multiple stations with a technique which can accurately determine depth to different strata (under parameterized Trust region approach). On the left, below, is the resistivity to depth profile at the southern ends of the lines. The base of the resistivity model is 25 Ωm. To the right is the data in red at one of the data points to the south of the anomaly along L3380 and green is the synthetic data due to the model. Any data point on any of the three lines are essentially equivalent in regard to anything that is relevant to interpretation of this anomaly. While the data provided has 49 channels of data. In this area, only the first 35 are reliable. We show 38channels below. The time after turn off of the 35th channel is only 1.49msec which is extremely early compared to other airborne systems and thus part of the reason for the inability to "see" below this conductive underlay. Also, the figure to the right illustrates that the short spacing between the early windows produces far too many early windows to be of use in this geological environment for such an exploration project. Such window design appears suitable for ground water studies but not for mining exploration.



EM Bz Chn30 - Claim boundary /Geology underlay



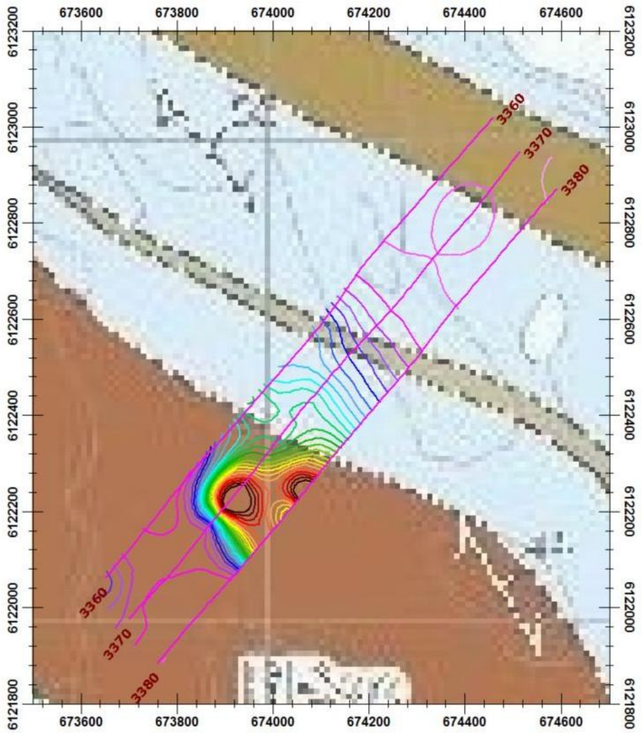
Background resistivity model for NW 3A-1 and 2



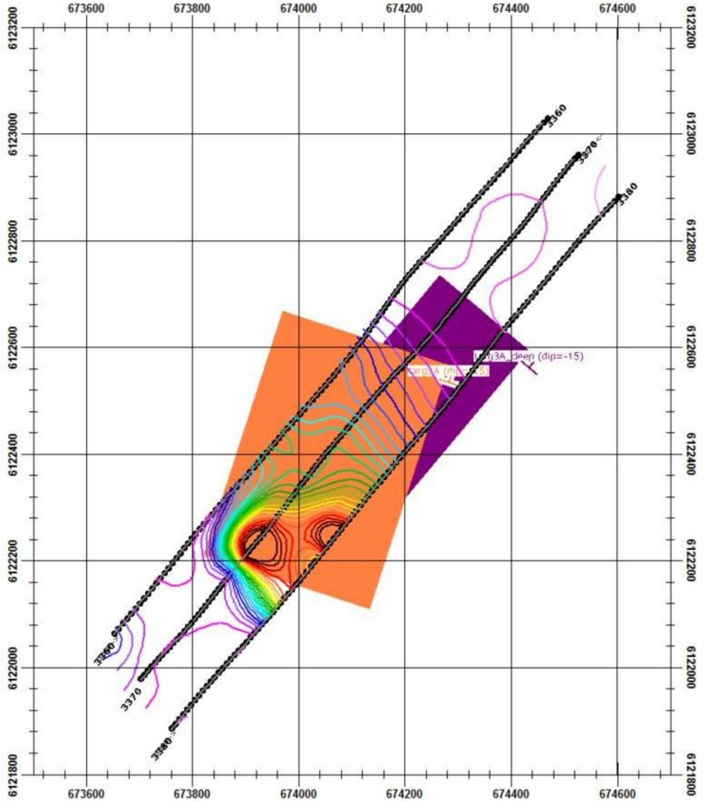
Data to simulation comparison

TARGET NW 3A-1

Target NW 3A-1 consists of two portions as shown below. Resolution of NW 3A-2 is difficult for a number of reasons. However, depth to the top is deeper than NW 3A-1 but the depth extent of this portion is not possible with this data.



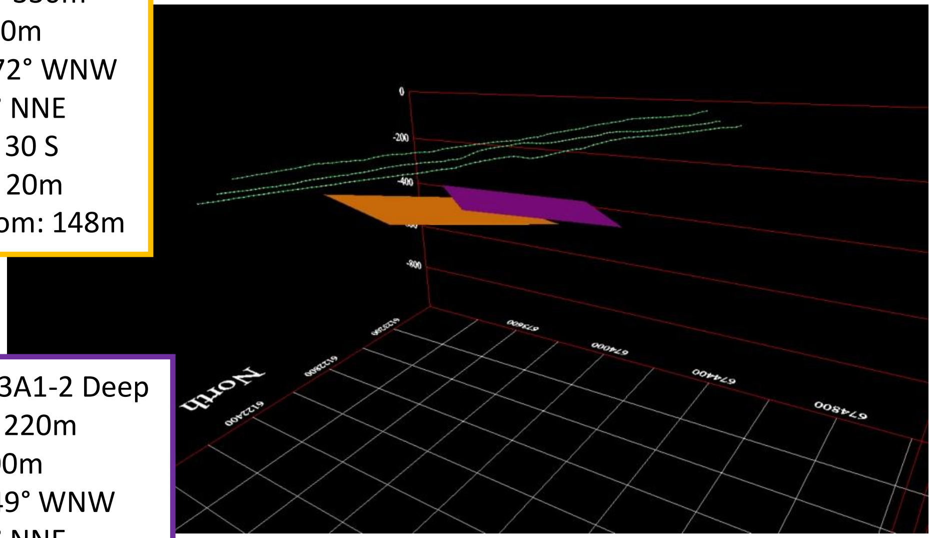
EM Bz Chn30 -
Claim boundary /Geology underlay



Model NW 3A-1

Anomaly NW 3A1-1 Top
Strike Length: 330m
Dip Extent: 500m
Strike Angle: 72° WNW
Dip Angle: 18° NNE
Conductance: 30 S
Depth to Top: 20m
Depth to Bottom: 148m

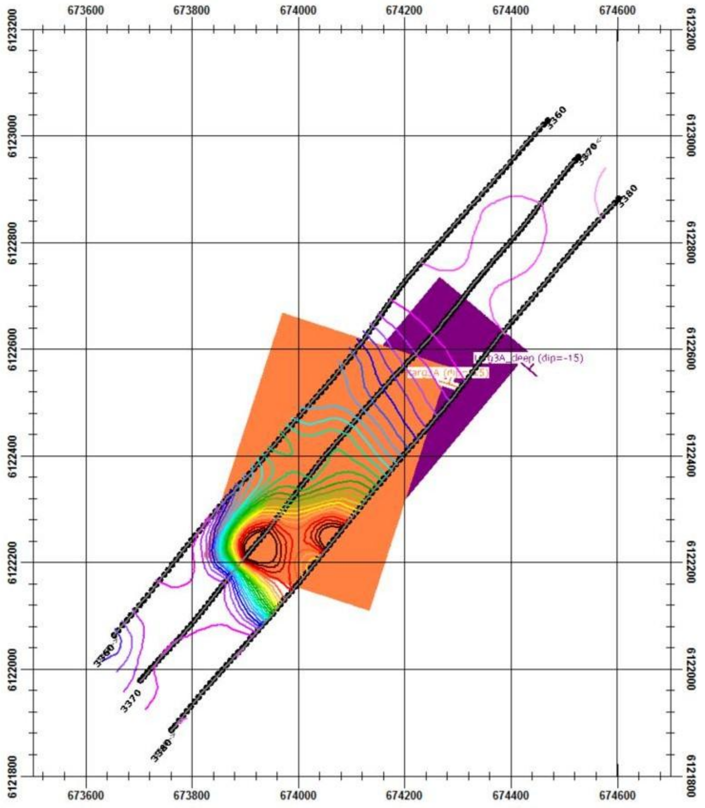
Anomaly NW 3A1-2 Deep
Strike Length: 220m
Dip Extent: 400m
Strike Angle: 49° WNW
Dip Angle: 15° NNE
Conductance: 30 S
Depth to Top: 40m
Depth to Bottom: 140m



Model NW 3A-1
View from SE

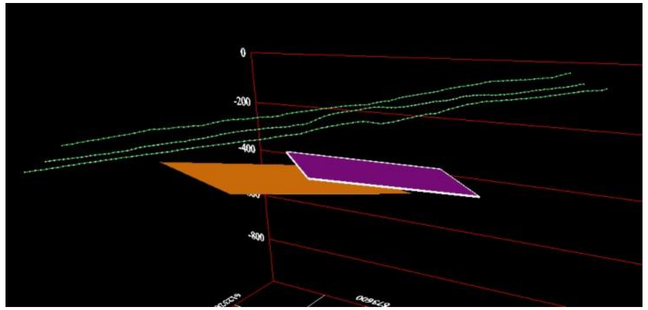
TARGET NW 3A-1

Surface Project of NW 3A-1 is shown on the right with the aeromagnetic data upward continued to 125 contoured beneath. A magnetic susceptibility inversion section is shown below. The section follows the black line on the map to the right. As we can see the magnetic model also dips to the NE.

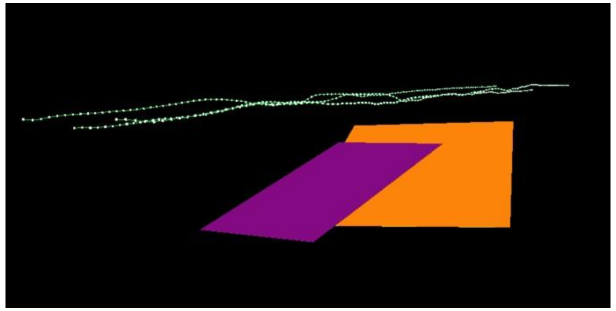


Model NW 3A-1

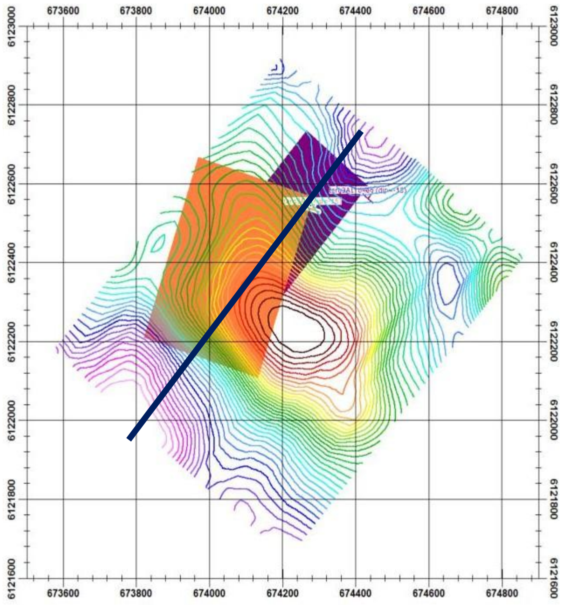
Anomaly NW 3A-2 Deep	Anomaly NW 3A-1 Top
Strike Length: 220m	Strike Length: 330m
Dip Extent: 400m	Dip Extent: 500m
Strike Angle: 49° WNW	Strike Angle: 72° WNW
Dip Angle: 15° NNE	Dip Angle: 15° NNE
Conductance: 30 S	Conductance: 30 S
Depth to Top: 40m	Depth to Top: 20m
Depth to Bottom: 140m	Depth to Bottom: 148m



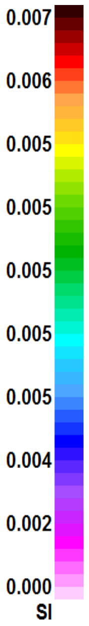
Model NW 3A-1 View from SE

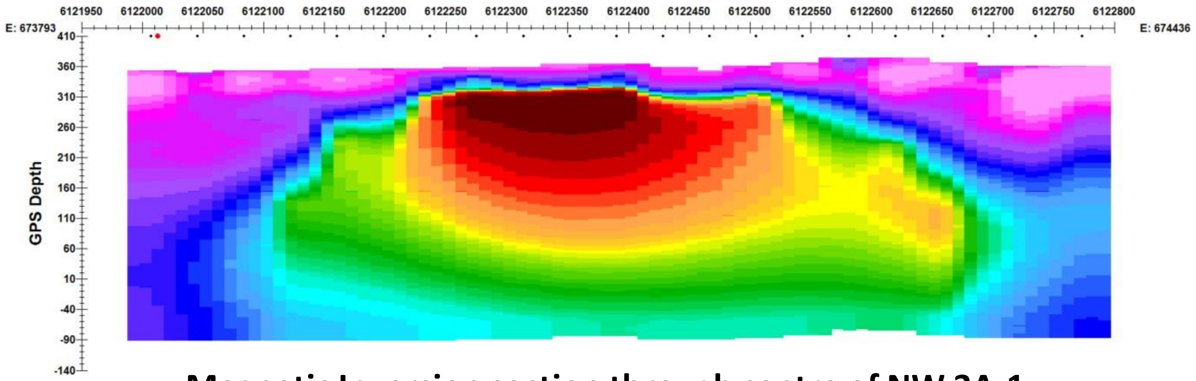


Model NW 3A-1 View from North



Model NW 3A-1
Magnetic Data contours
Inversion Section Location



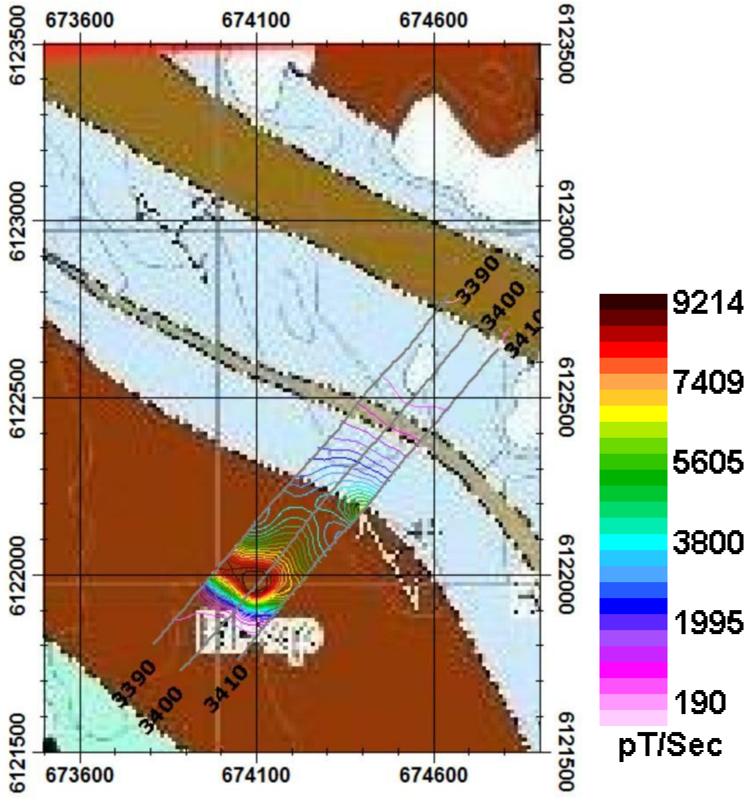


Magnetic Inversion section through centre of NW 3A-1

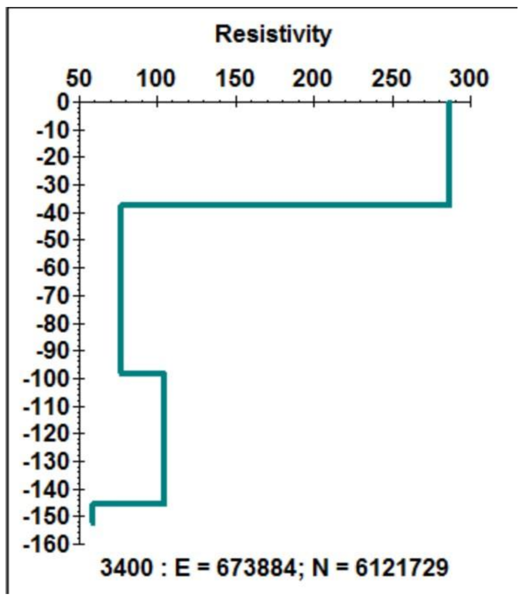
TARGET NW 3A-2

Target NW 3A-2 is also underlain by conductive material over an area much larger than the strong conductive anomalies. To determine the resistivity depth structure outside the conductive anomalies an inversion routine was used which inverts multiple stations with a technique which can accurately determine depth to different strata (under parameterized Trust region approach). On the left, below, is the resistivity to depth profile at the southern ends of the lines. The base of the resistivity model is 60 Ωm. To the right is the data in red at one of the data points to the south of the anomaly along L34000 and blue is the synthetic data due to the model. Any data point on any of the three lines are essentially equivalent in regard to anything that is relevant to interpretation of this anomaly.

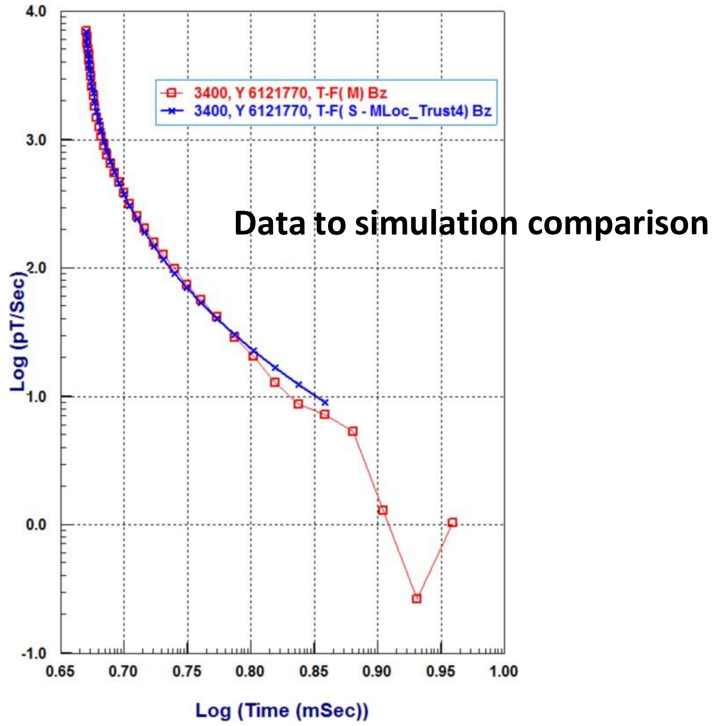
Additionally, north of the high conductivity anomaly shown in the left figure, on L3400 and L3410 there is more conductive material below the 60 Ωm indicated in the model below. This deep conductive material is not associated with a shallower anomaly and strikes perpendicular to the survey lines for a distance of about 900m.



EM dB_z/dt Chn22 –
Claim boundary /Geology underlay

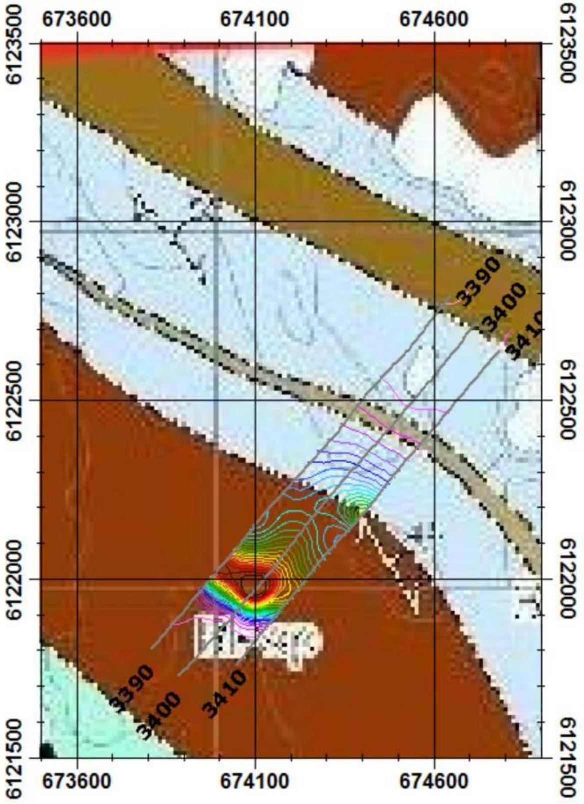


Background resistivity model for NW 3A-2

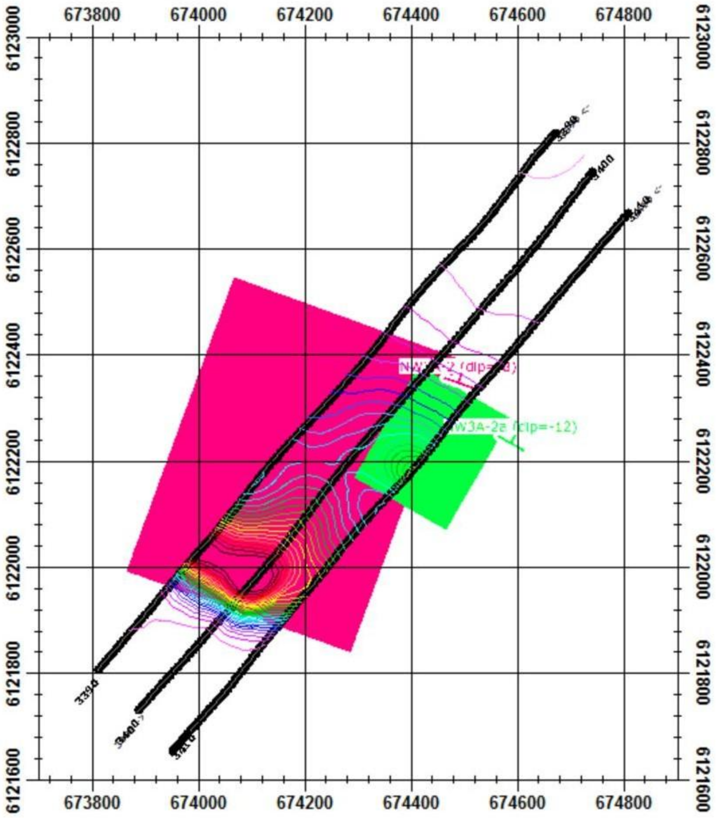


TARGET NW 3A-2

Target NW 3A-2 consists of two portions as shown below. Again, it is important to note that there continues to be conductive material at depth to the NE of the two structures.



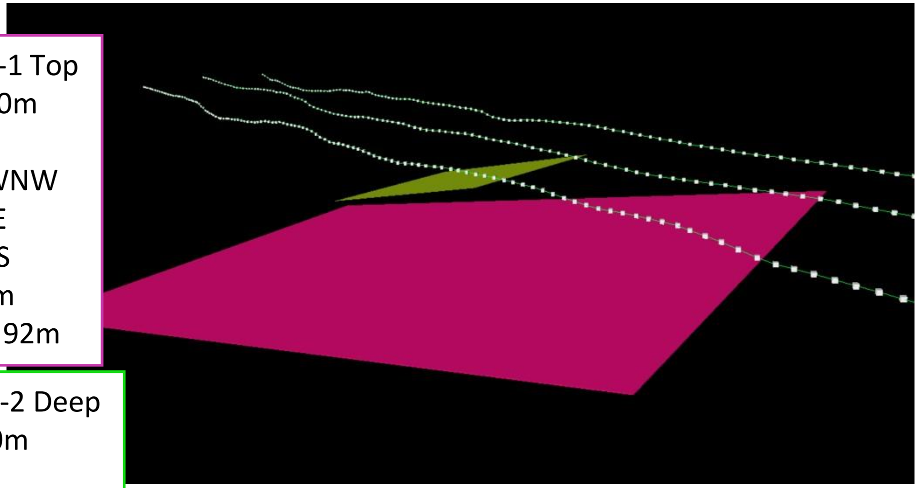
EM dB_z/dt Chn22 –
Claim boundary /Geology underlay



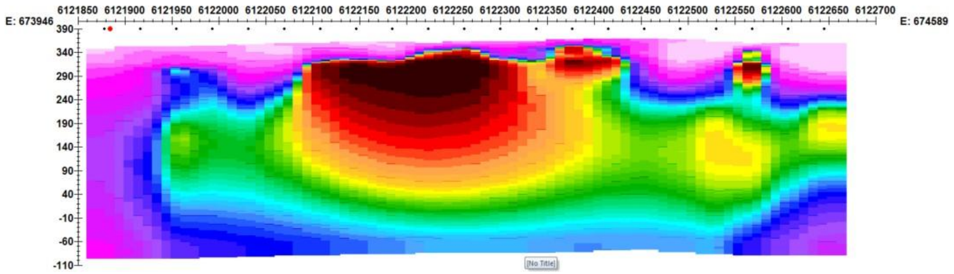
Model NW 3A-2

Anomaly NW 3A2-1 Top
Strike Length: 450m
Dip Extent: 600m
Strike Angle: 70 WNW
Dip Angle: 20 NNE
Conductance: 15 S
Depth to Top: 10m
Depth to Bottom: 92m

Anomaly NW 3A2-2 Deep
Strike Length: 200m
Dip Extent: 250m
Strike Angle: 60 WNW
Dip Angle: 30 NNE
Conductance: 15 S
Depth to Top: 41m
Depth to Bottom: 66m



Model NW 3A-2 View from WEST

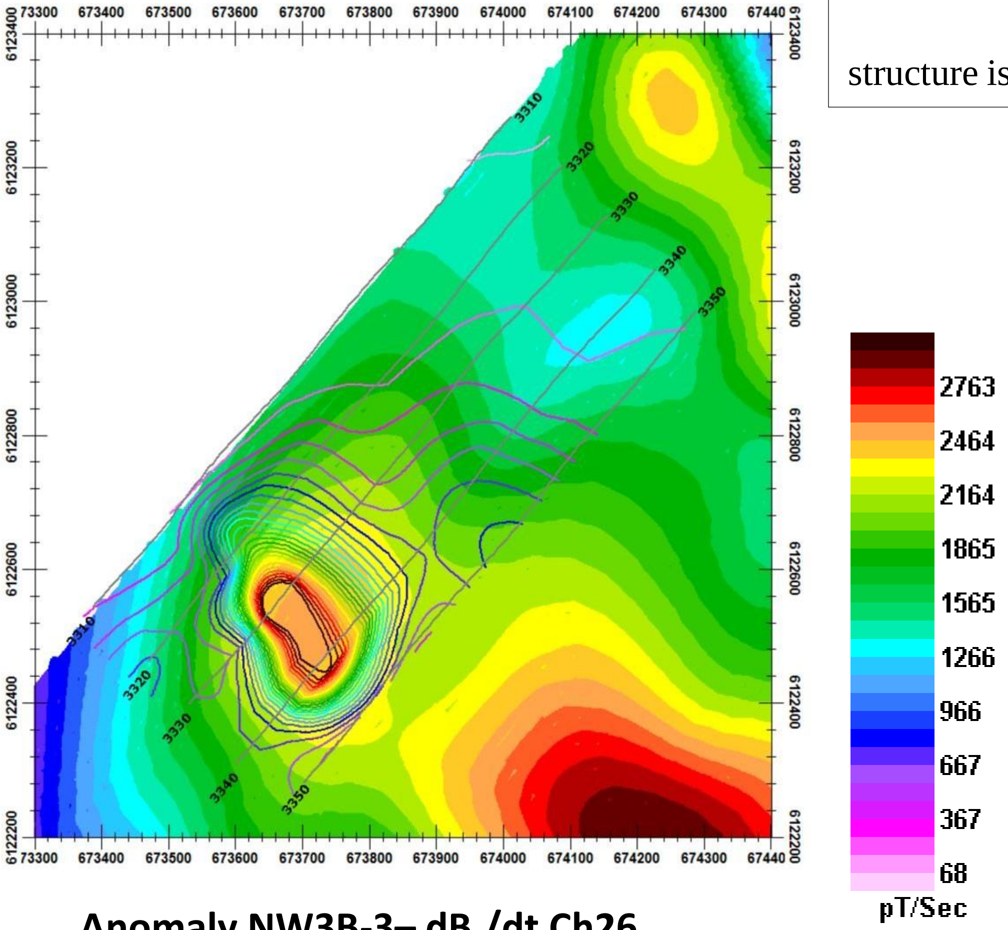


Inversion section through centre of NW 3A2

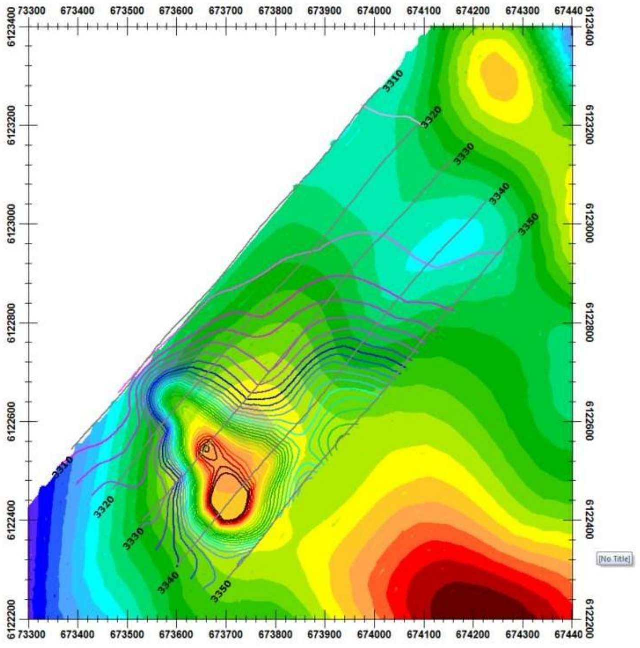
TARGET NW 3B-3

Target 3 on page 14 is now labelled as NW3B. NW 3B-3 dips approximately to the NE as seen on the left and right figures below. However, the figure in the centre below of Bz at Ch16 indicates a structure plunging approximately NW. In this area, the late time dBx/dt is quite good and shows quite clearly the overlying strike of the structure(s). Given the line spacing and the responses, it is not clear how connected is this structure which could consist of more than one distinct conductor.

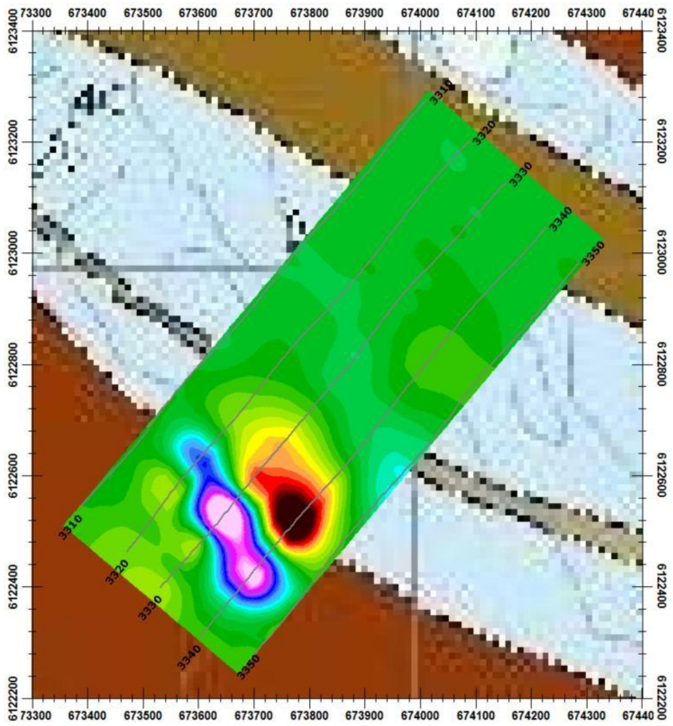
This area is again underlain by conductive material but in this case the underlying conductive structure is more complicated than for area 3B.



Anomaly NW3B-3– dB_z/dt Ch26
Aeromagnetic underlay



Anomaly NW3B-3– dB_z/dt Ch16

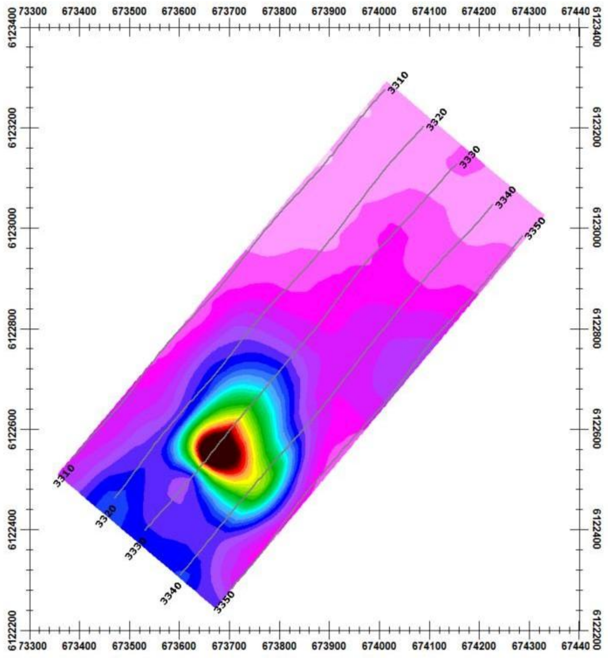


Anomaly NW3B-3– dB_x/dt Ch16

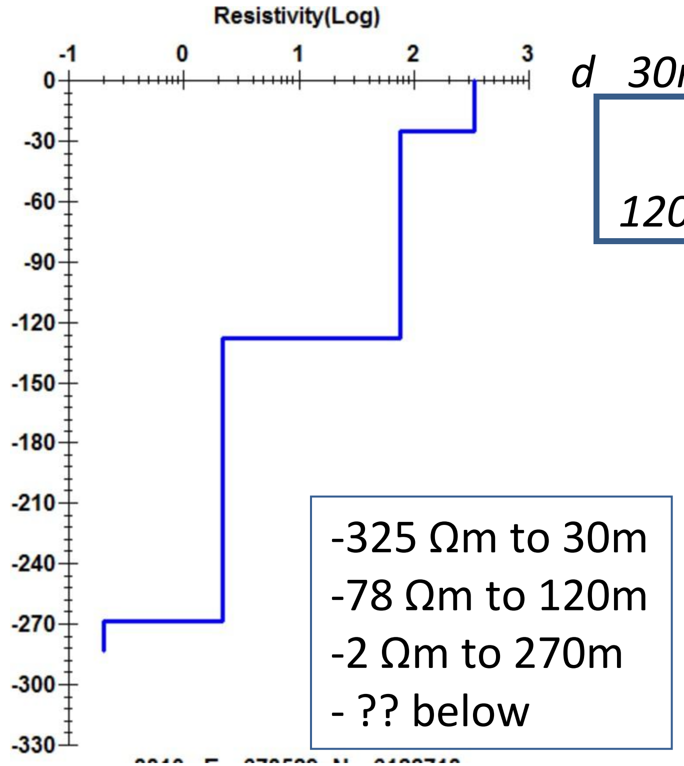
TARGET NW 3B-3

A contour map of dBz/dt for Ch38 (the latest reliable channel) shows clearly the dipping and plugging nature of the structure. But, Also the high amplitudes to the SW of the structure show deep conducting material. Apart from the shallow conductor which dominates the response, there is deep conductive material. To the south, the resistivity structure can be simplified to the model show below in blue. This resistivity structure also underlies the shallow conductor. The boundary between the southern deep resistivity structure and the northern structure as shown on the right cannot be determined from the data but there appears to be no sharp boundary between the southern and northern deep structures.

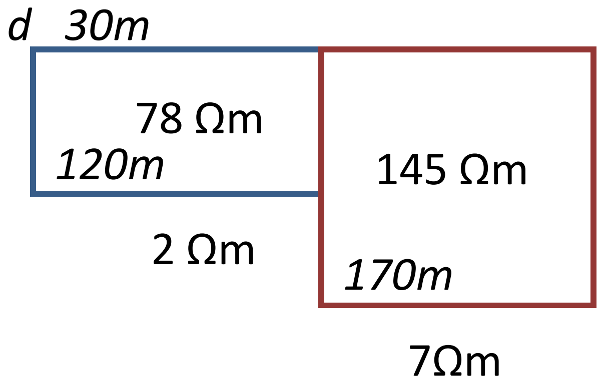
The southern deep structure while being somewhat less resistive at shallow and intermediate depths is very conductive starting at a depth of about 120m. The northern deep structure is somewhat more resistive at intermediate depths and does not reach a very conductive zone until about 170m in depth. The deeper material is somewhat less conductive than to the south but still very conductive. The data cannot "see" below this conductive material. Given the limited depth of penetration of this data, the depth might not be very much greater to the resistive basement.

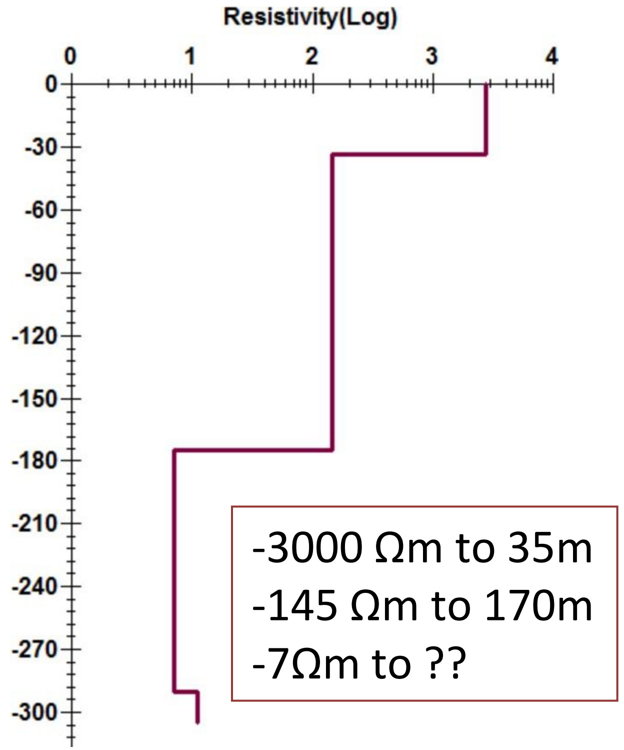


EM dB_z/dt 38



Background resistivity model SW of NW 3B-3



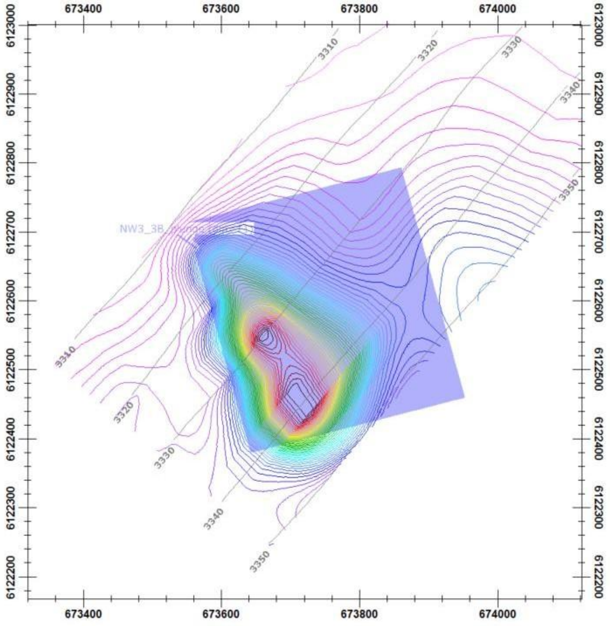


Background resistivity model NE of NW 3B-3

TARGET NW 3B-3

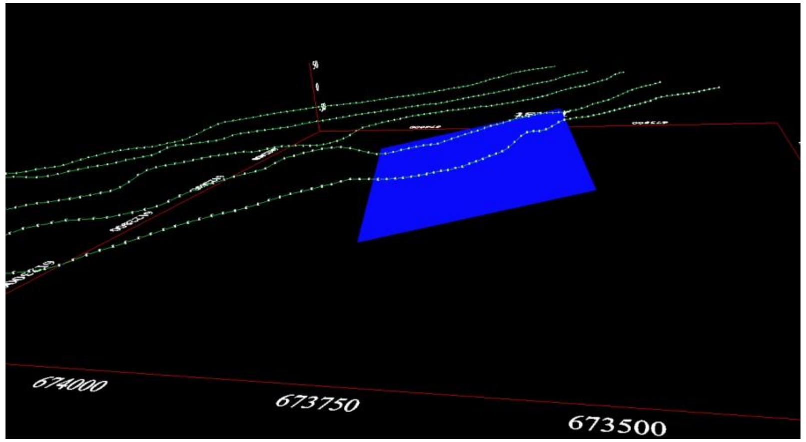
The principle anomaly of Target NW is shown below. Ir
below has the same azimuth as the survey lines and ho
Northing. The depth to the magnetic material to the north a
is consistent with the depths given to the deep conductive n

Similarly, the depth of to the top of the magnetic struc
consistent with the depth the modeled shallow 3D structui
shallow and consistent with the shallow conductor. An ou
sheet model. Keep in mind that given these are good condu
cannot determine the thickness of the anomaly.

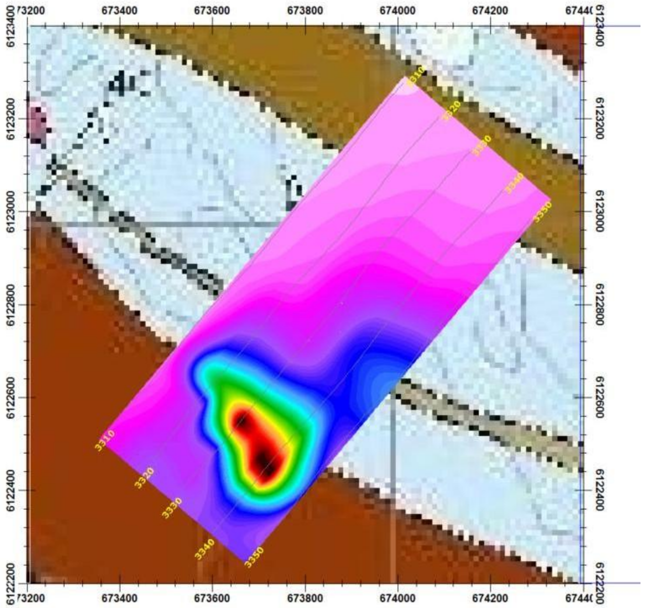


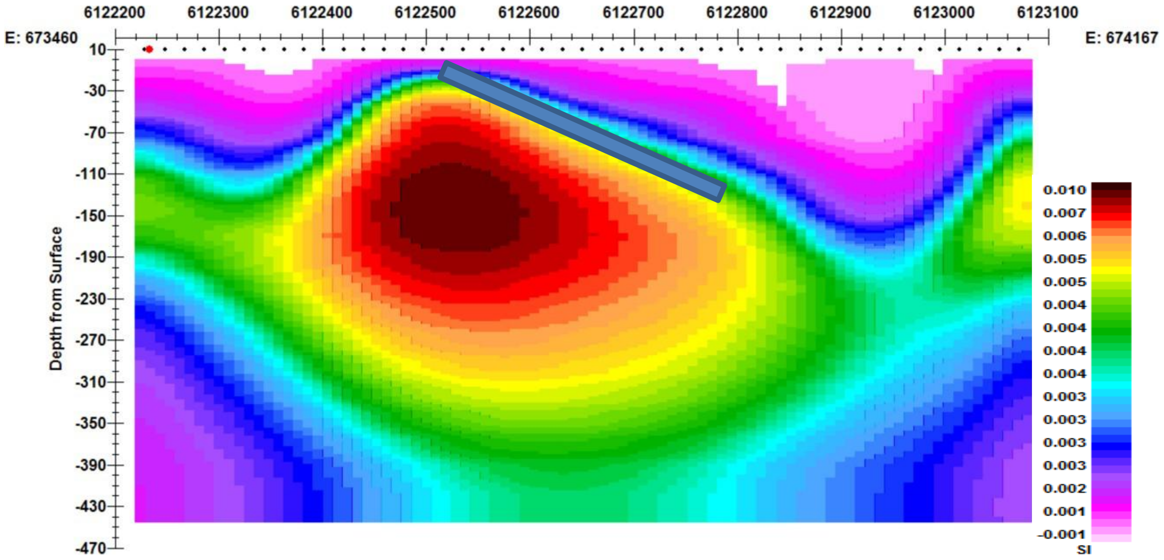
Model NW 3B-3

omaly NW 3B-3
ike Length: 350m
Extent: 325m
ike Angle: 15° NNW
Angle: 11° ENE
inge: 39° NW
nductance: 30 S
pth to Top: 7m
pth to Bottom: 90m



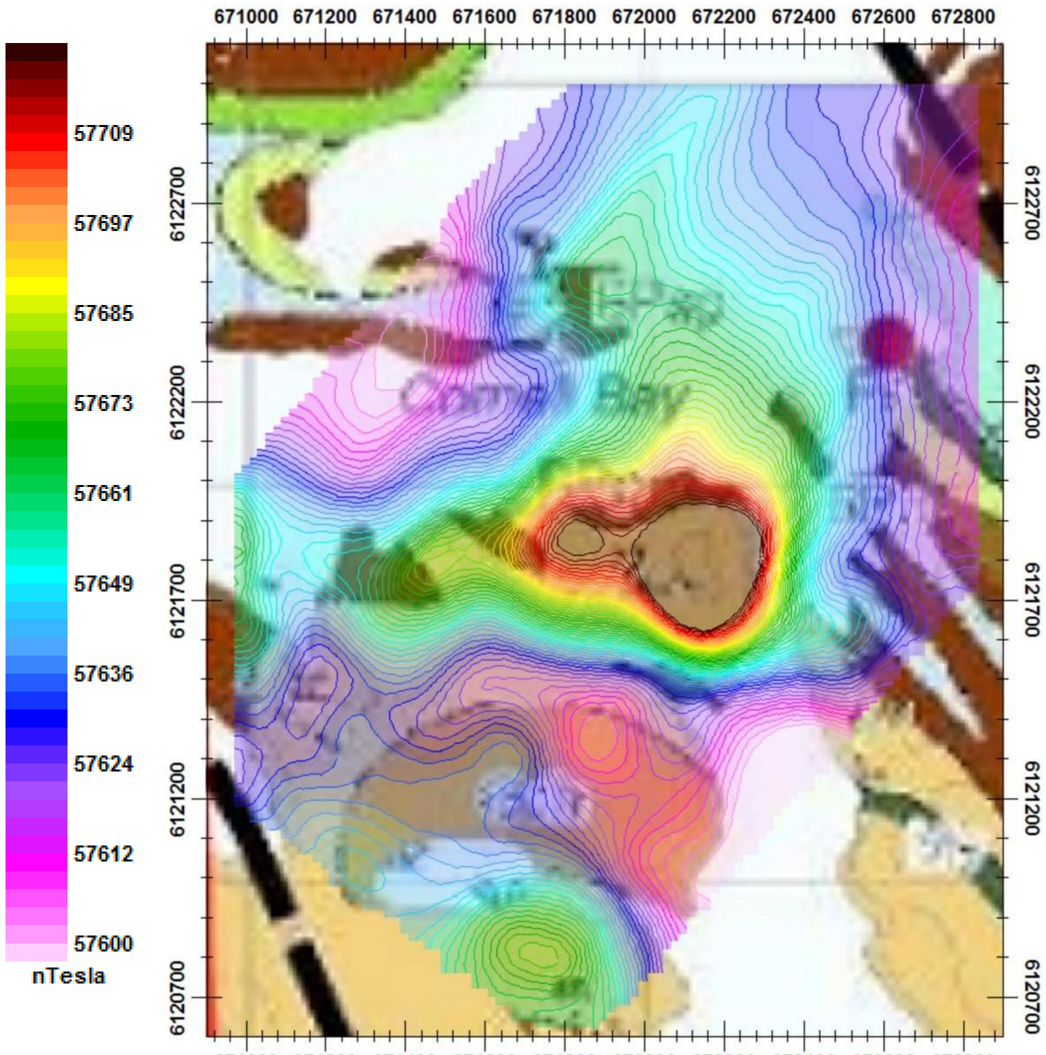
Model NW 3B-3 View from North



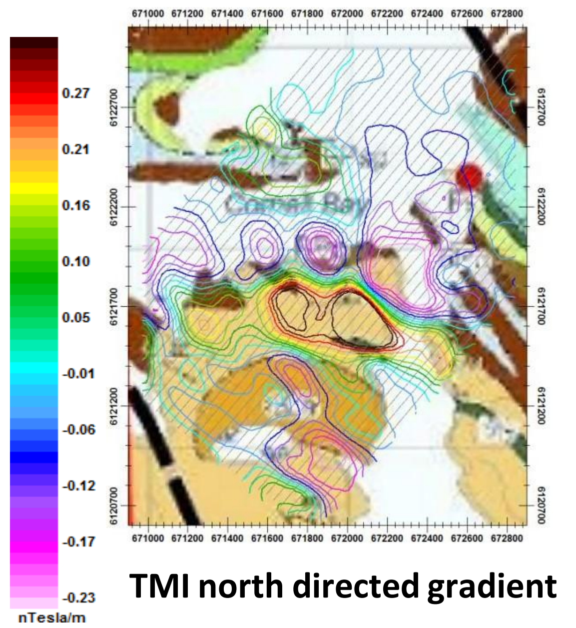


Inversion section through centre of NW 3B-3. EM conductor shown

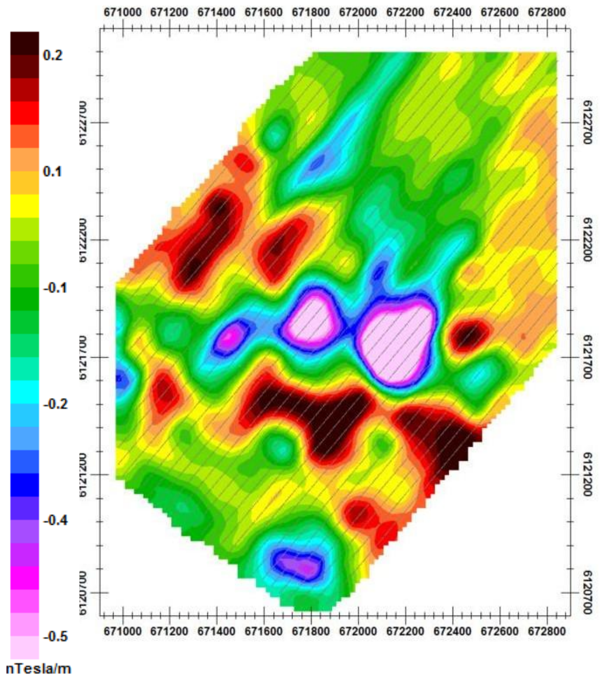
NW Cornell Bay Magnetics Anomaly



Total Field aeromagnetic upward continued to 125m elevation



TMI north directed gradient

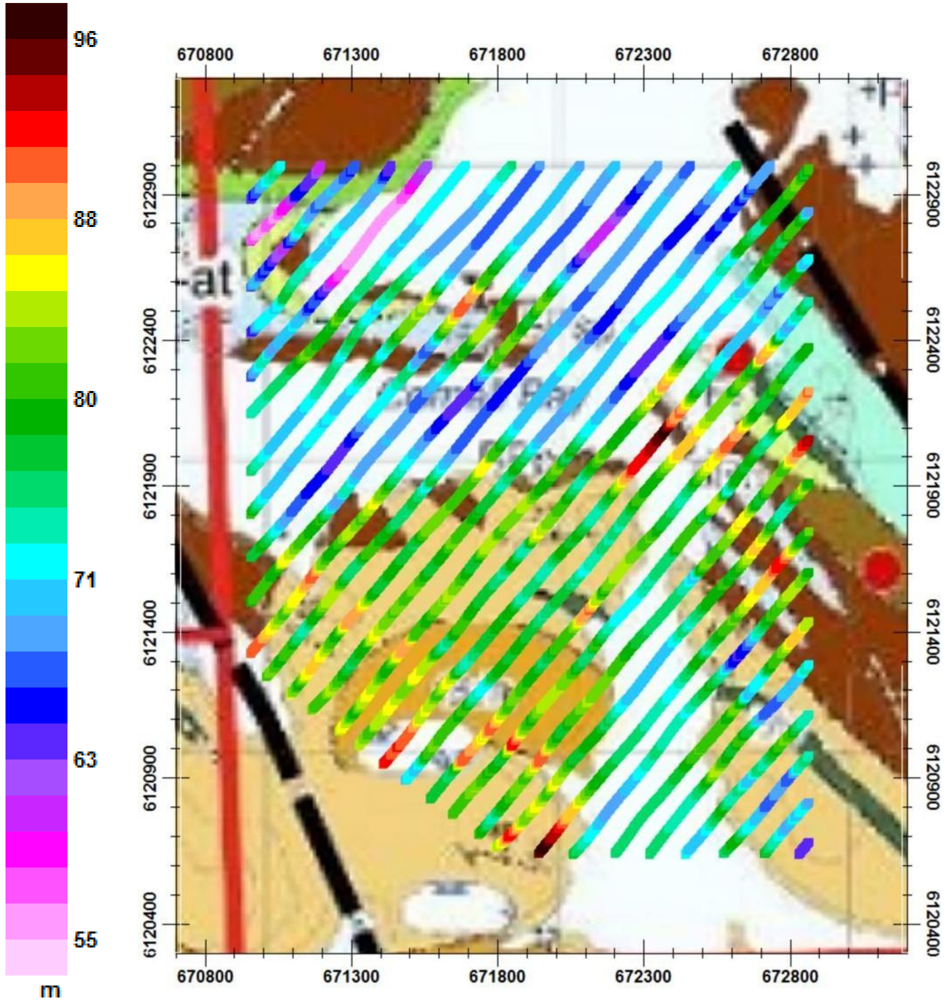


TMI Vertical gradient

The strongest portion of the observed anomaly hugs the southern shoreline of Cornell Bay. It has a strike roughly East-West and consists at least of three parts at least as regards the shallow structure. However, the structure extends east to west slightly but also well north into the bay (left figure). The vertical derivative indicates the main response comes from a shallow structure but the extended structure is deeper.

Note: The interpolation grid is defined north to south so as not to emphasize issues regarding the profile data along individual survey lines.

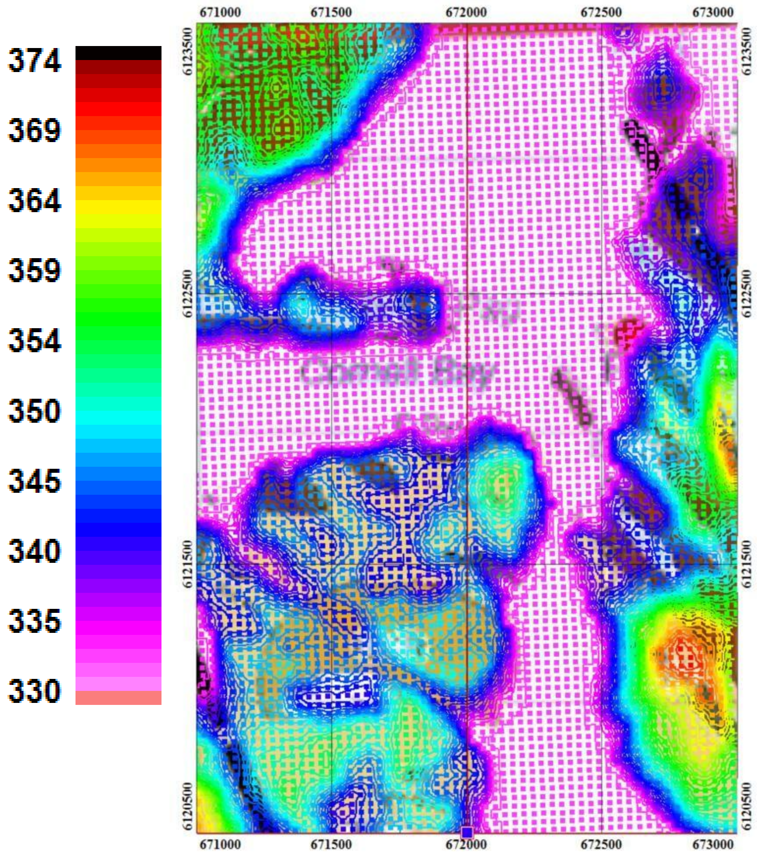
NW Cornell Bay Magnetics Anomaly



ground clearance of magnetometer

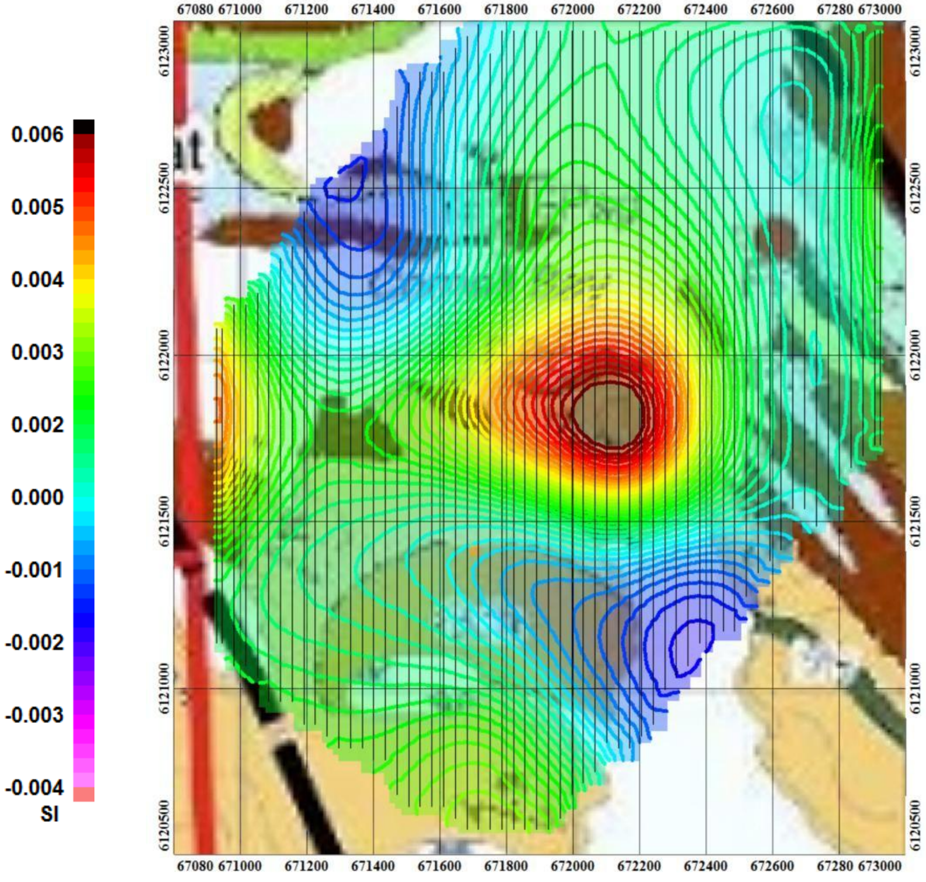
There is some considerable variation in ground clearance (left). The strongest response is collected roughly 30m higher than over the lake. This is not an issue for modeling and inversion as we do not utilize the leveled data but rather maintain the elevation of the collected data in the inversion process.

The terrain model utilized is that of the NASA SRTM data as shown to the right. The area of the strongest magnetic highs mostly is only 8m above the level of the lake except for a hill roughly 20m above the lake close to the strongest of the three pods that make up the strongest part of the magnetic anomaly.

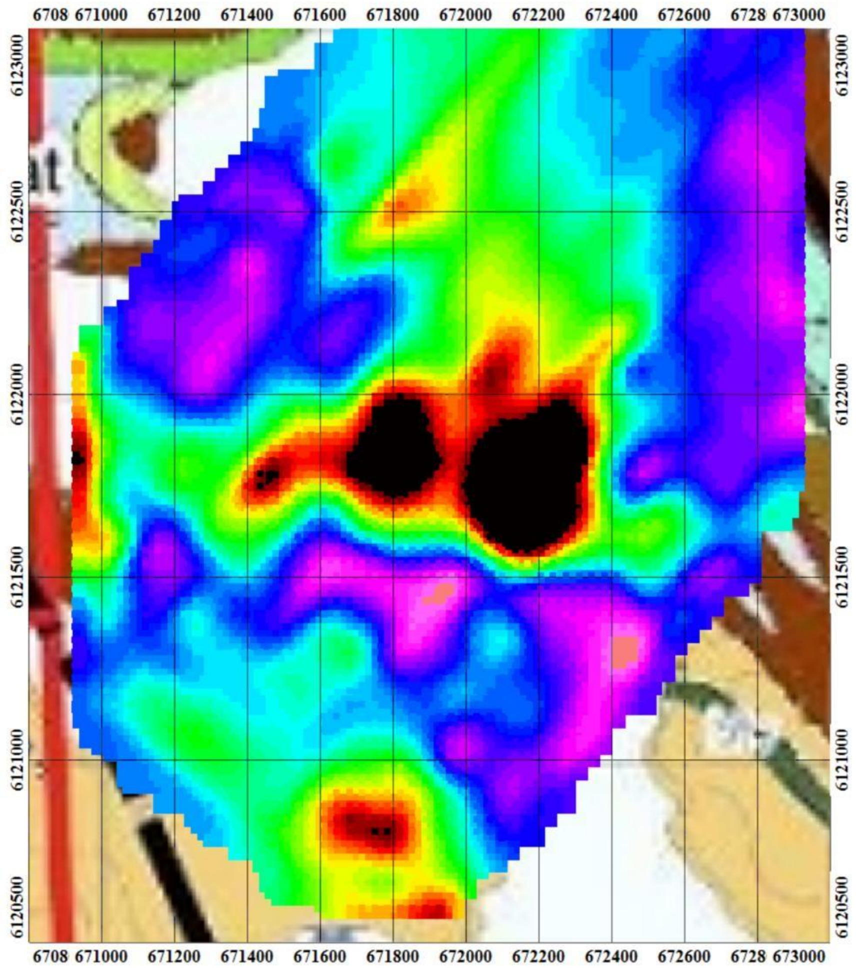


Terrain Model (SRTM)

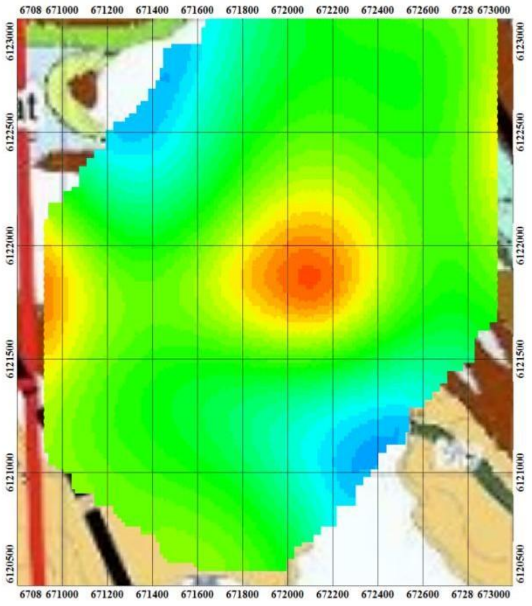
NW Cornell Bay Magnetics Anomaly



Inversion Section at a depth of 365m



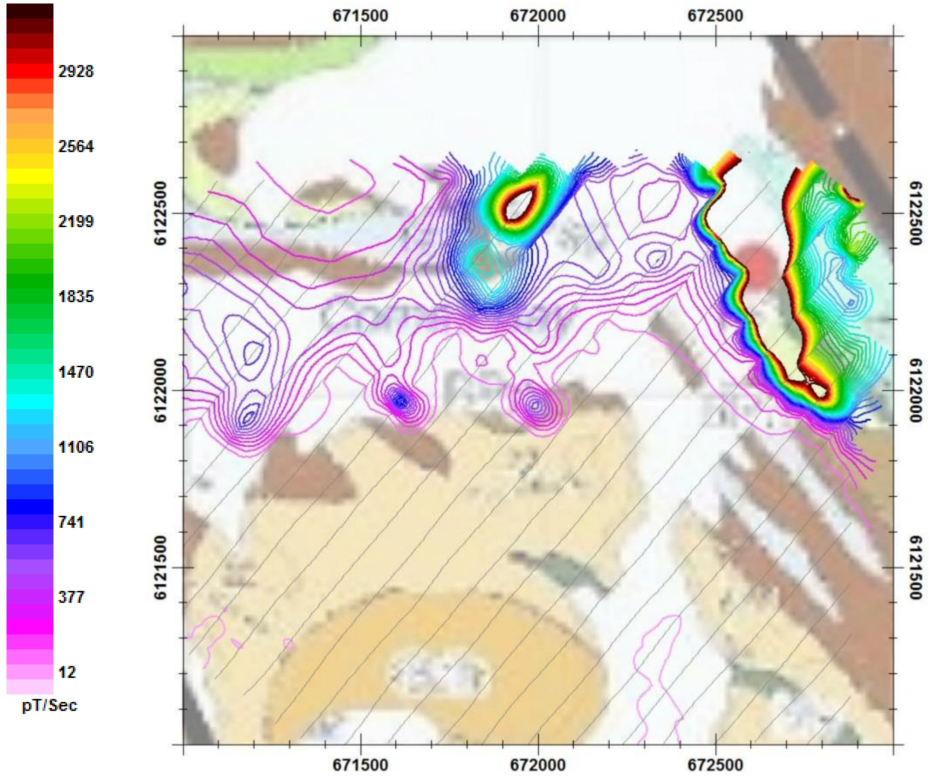
Inversion Section at a depth of 145m



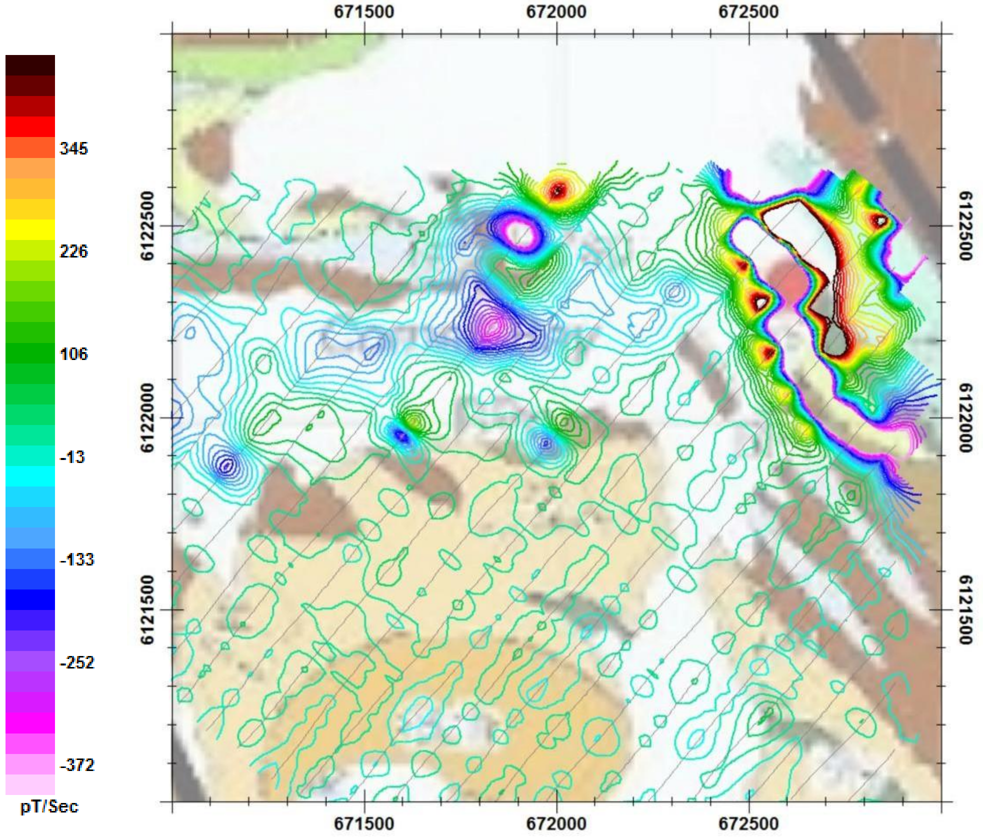
Inversion Section at a depth of 605m

The strongest magnetic material is near surface where the 3 pods can be differentiated (centre figure). At a depth of 365m (just below sea level), it is shown that the entire area is magnetic with demagnetized material injected into the dominant structure. The separation of the 3 pods cannot be distinguished as they may have merged but the center of the anomaly is still quite magnetic. However, by a depth of 606m, the magnetism of the overall structure can be seen with little left of either the strong magnetic material or the demagnetized roc.

NW Cornell Bay Magnetics Anomaly
EM Data



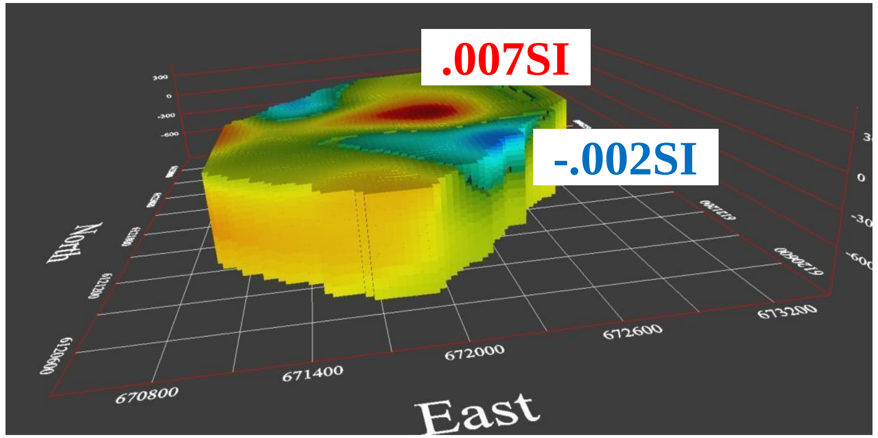
EM Bz Ch 15



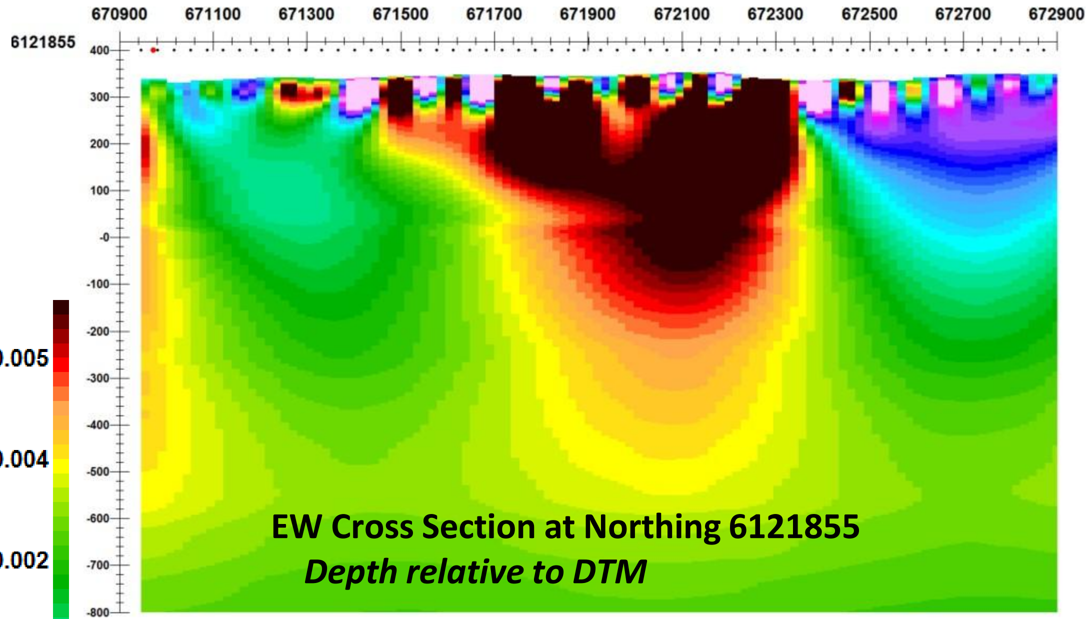
EM Bx Ch 16

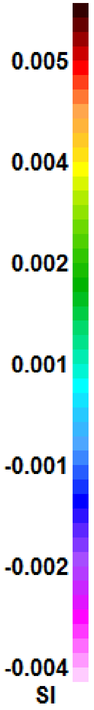
There are 3 small responses on the southern shore of the bay as well as a large response on the edge of the island in the bay. There are notions on the geology map but we cannot read these notations on our versions. The responses on the southern shore have the characteristics of man-made metallic objects. The response of these small anomalies are not visible at early times as the responses of the lake sediments dominate until Channel 10. This is probably the result of spatial filtering and interpolation as discussed at the end of the report.

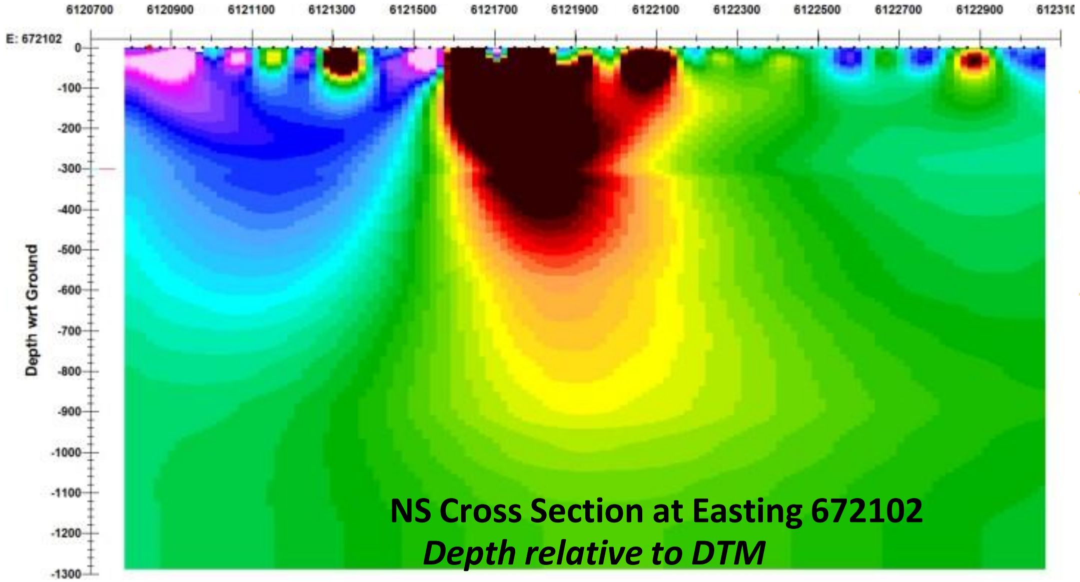
NW Cornell Bay Magnetics Anomaly



Sliced at sea level – view from South







The depth of the magnetic structure appearing confined above 900m in depth or 600m below the geoid may be a limitation of the data. The two major limitations are the line spacing of roughly 100m and the lack of a consistent drape for the data.

Notes on the Inversion Process: First, the inversion grid, in this instance, was setup with grid cells orientated along the X,Y axes as opposed to be orientated parallel and perpendicular to the profile. This was done primarily for two reasons. First, because the strike of the structure appeared EW on the surface and there was no indication of the strike being perpendicular to the survey lines. Secondly, due to noise and elevation variations, we did not want to bias the data with grid cells orientated with regard to the profiles.

The inversion was a joint inversion of the total field data (TMI) and the vertical derivative (dT/dz) as calculated by a discrete Fourier transform technique. This approach is the best approach to determine the structure with depth without any other information to constrain the inversion.

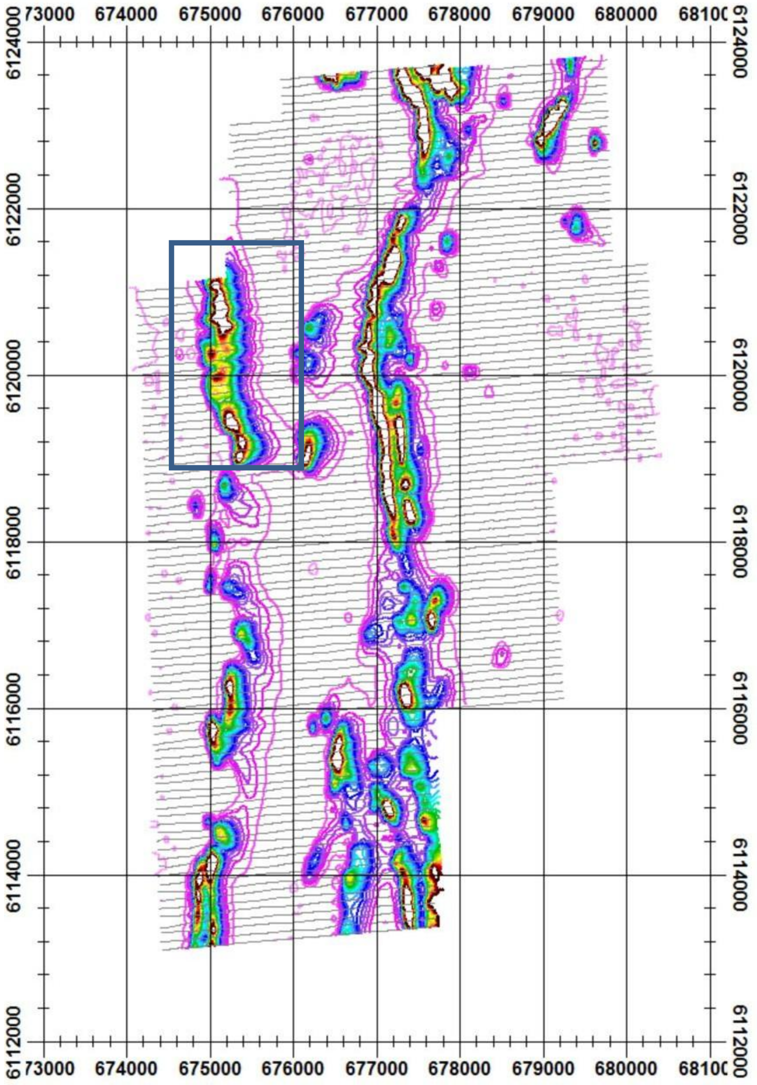
Xcite Airborne EM and Magnetics Analyzes, 2024, Boreal Gold Inc Melgurd Lake, SK, Main Survey Area

<u>Introduction:</u>

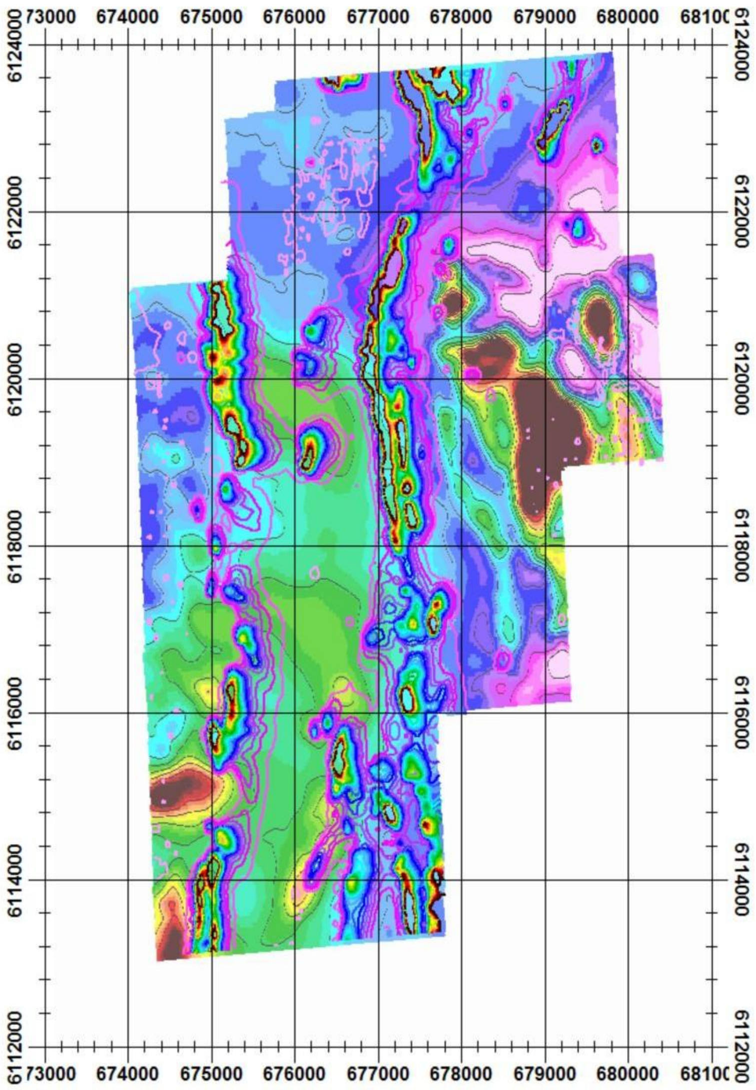
The main area of the Melgurd Lake survey shows very different characteristics than the NW area of the survey. This area shows very little in the way of strong magnetic anomalies except in the eastern area of the survey. There is very little coincidence of a magnetic anomaly with a conducting anomaly as there was in the NW part of the survey.

The conductors in this area of the survey are primarily contained within two relatively narrow north-south trends stretching from the north to the south of the survey. These two trends are contained primarily in the west and central zones of the main survey area.

Melgurd Lake Main Survey Area



Ch25 Bz (5.39msec – 0.756msec OFF)



Ch25 Bz (5.39msec – 0.756msec OFF)
Aeromagnetics underlay

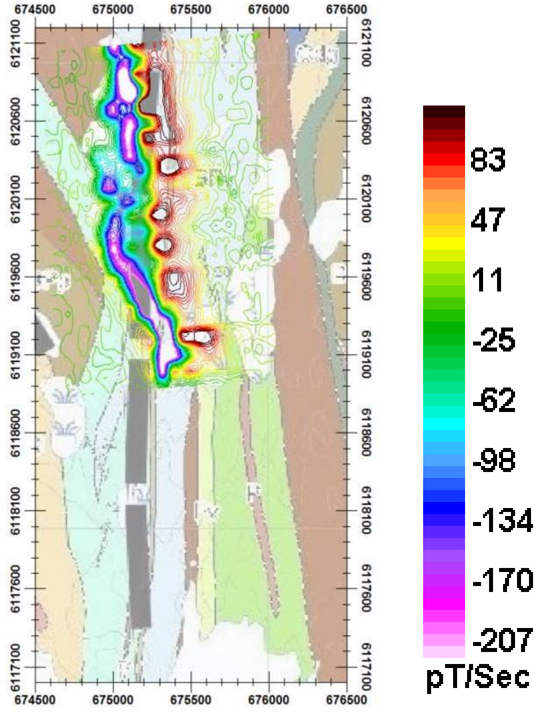
Within the complex magnetic area to the east of the survey, there are no significant late time conductors.

There are two lines of mid- to late time conductive anomalies. One on the western side of the survey and second is down the approximate center of the survey .

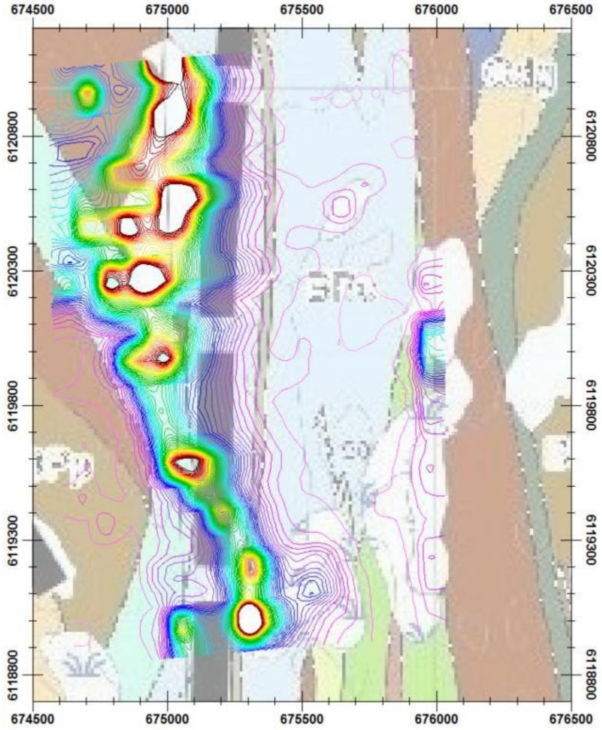
There are no significant magnetic anomalies along these two lines of conductors. However, there is moderate strength magnetic anomaly at a moderate depth approximately down the centre of the two lines of conductors. Later it will be shown that this area of moderate magnetic response is consistent with a late time slow decay in the EM. The slow decay indicates a conductive material. But this deeper conductive material to the east of the west line of conductors does not appear as an amplitude anomaly.

Within the complex magnetic area to the east of the survey, there are no significant late time conductors.

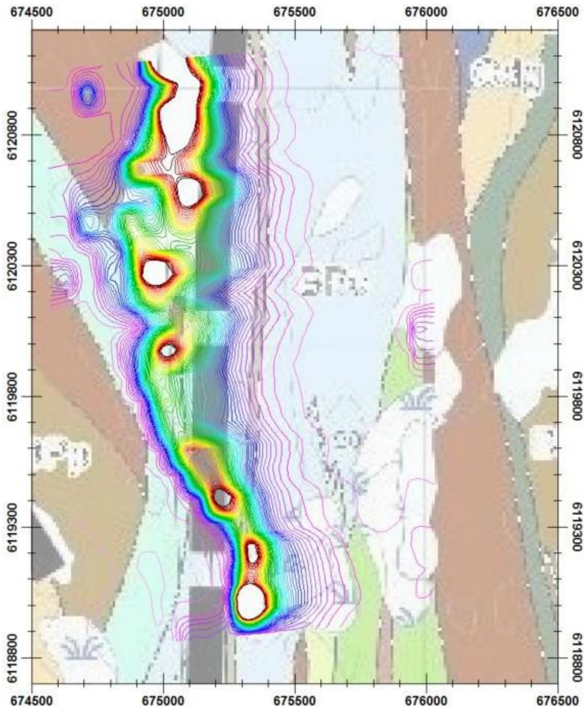
Melgurd Lake Main West – Northern



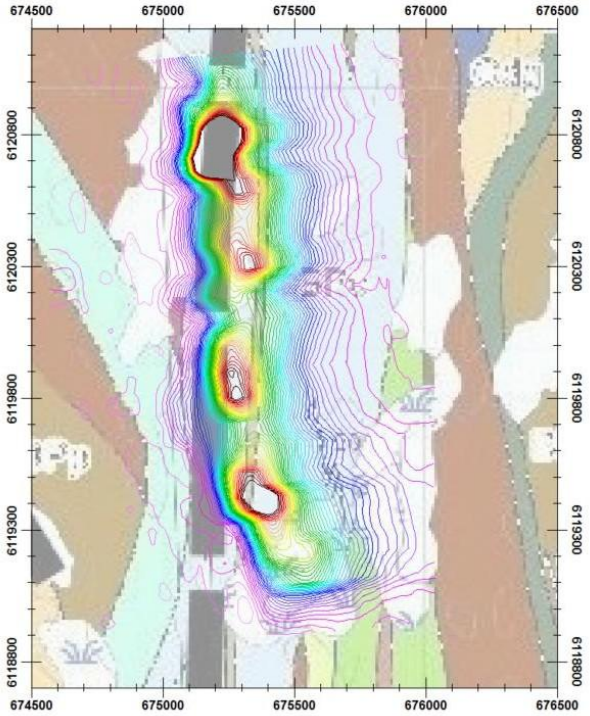
Ch29 Bx (5.93msec)



Ch6 Bz



Ch17 Bz

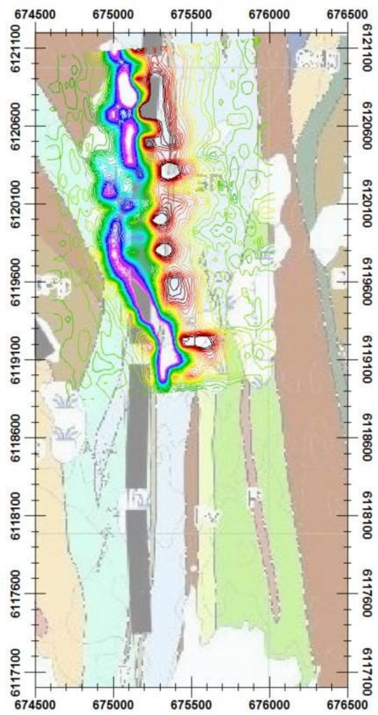


Ch35 Bz

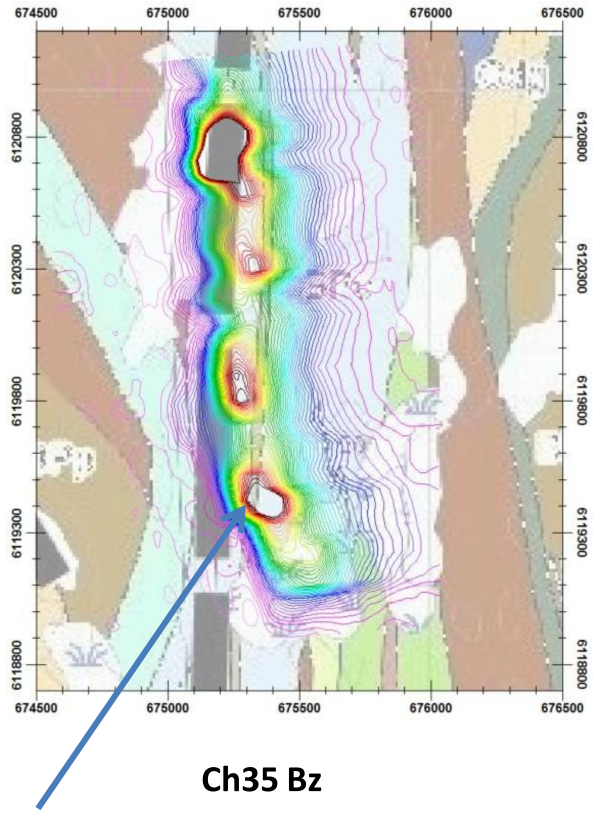
This string of conductors at the north end of the western linear trend of conductors consists of a number of small conductors but in the late time these conductors reduce to 4 main conductors.

Melgurd Lake Main West - Northern

Xcite Airborne EM and Magnetics Analyzes, 2024   Boreal Gold

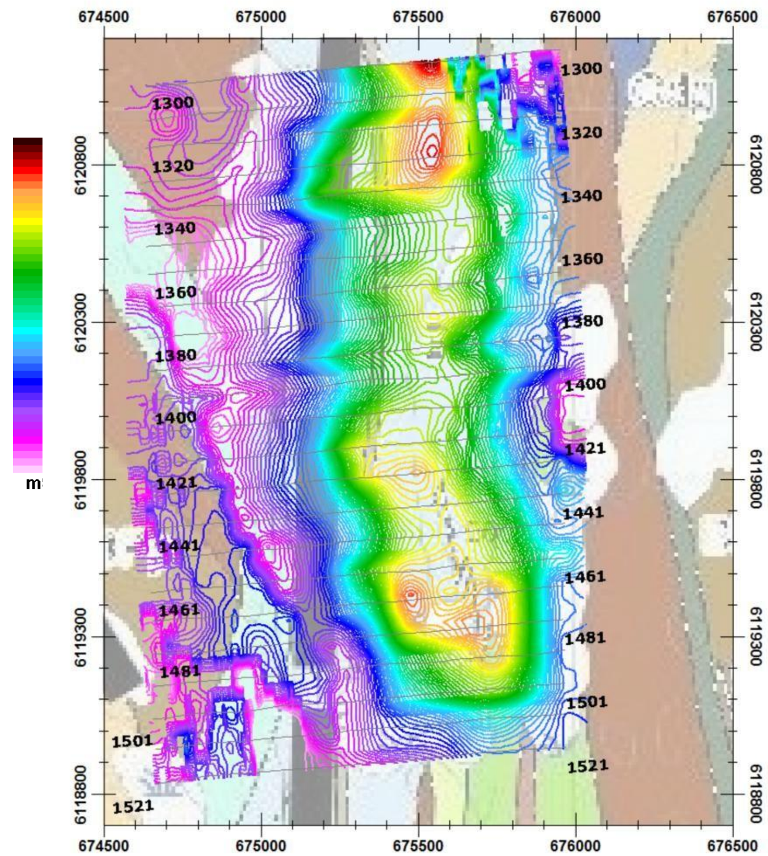


Ch29 Bx (5.93msec)

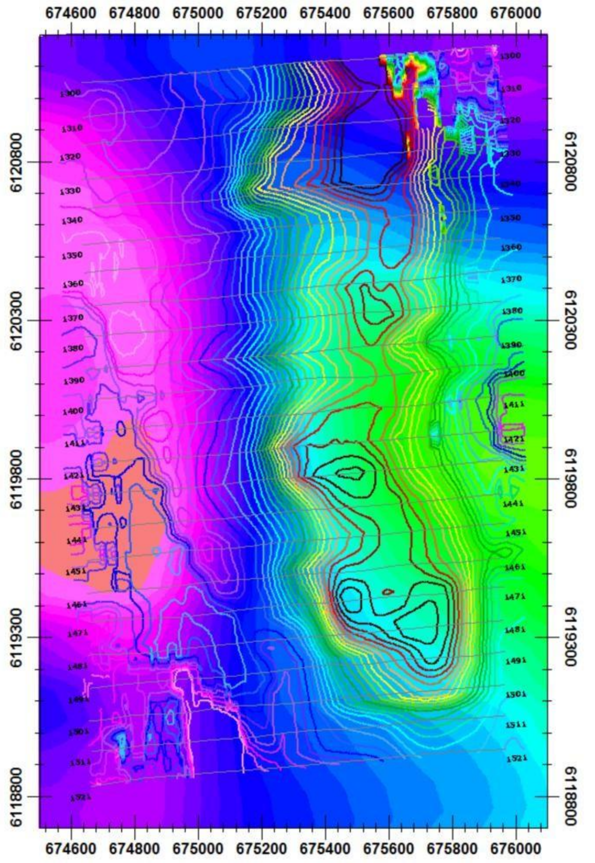


Ch35 Bz

Target1



Rate of Decay (δ) in msecs, Bz channels 20-35

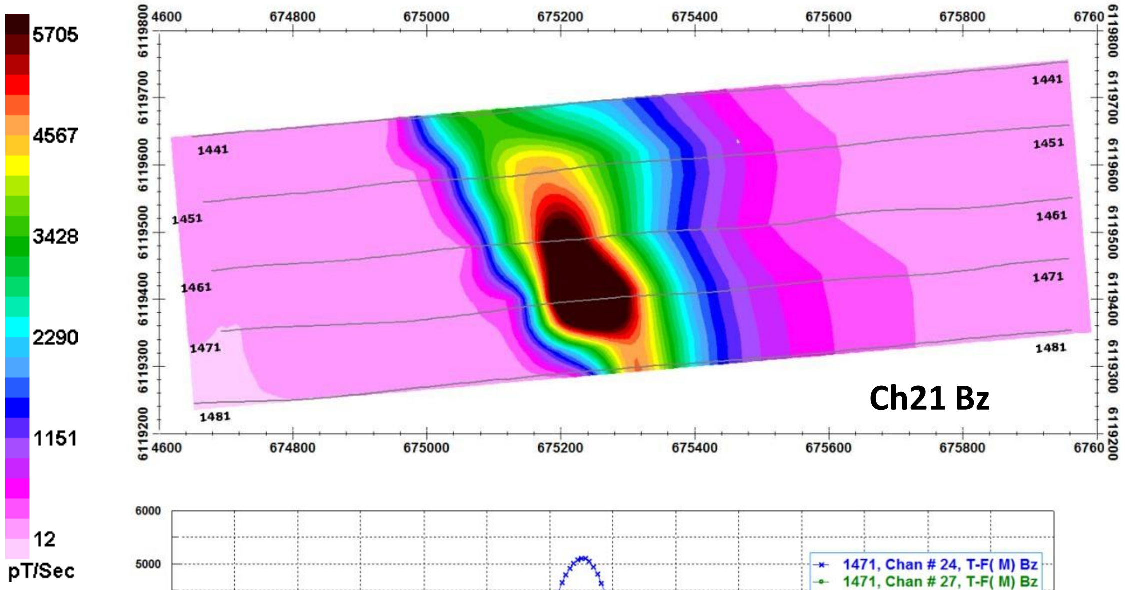


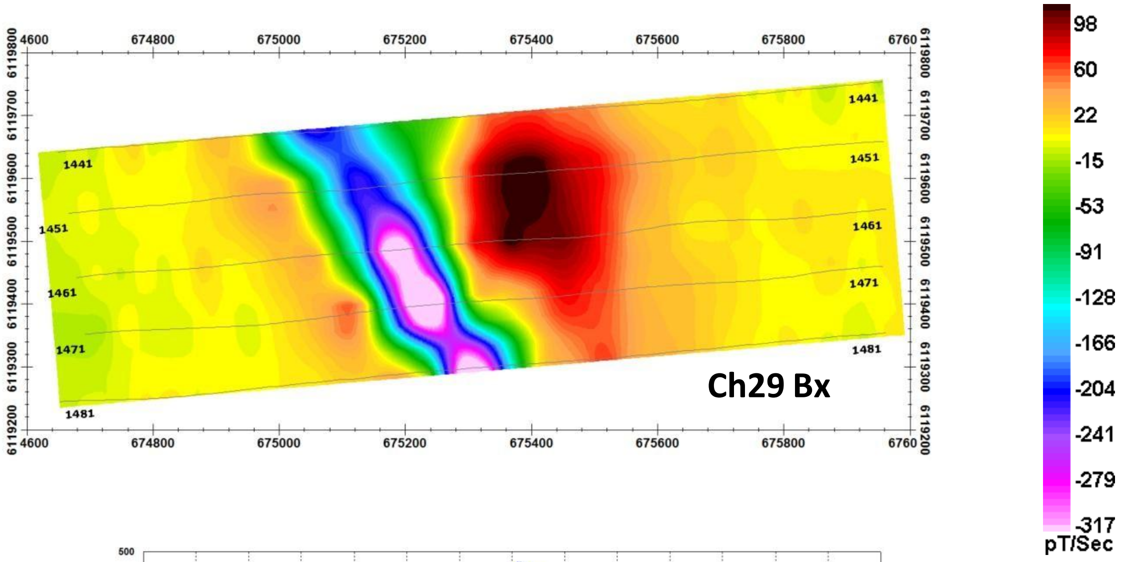
Rate of Decay (δ) in msecs, Bz channels 20-35. Aeromag underlay

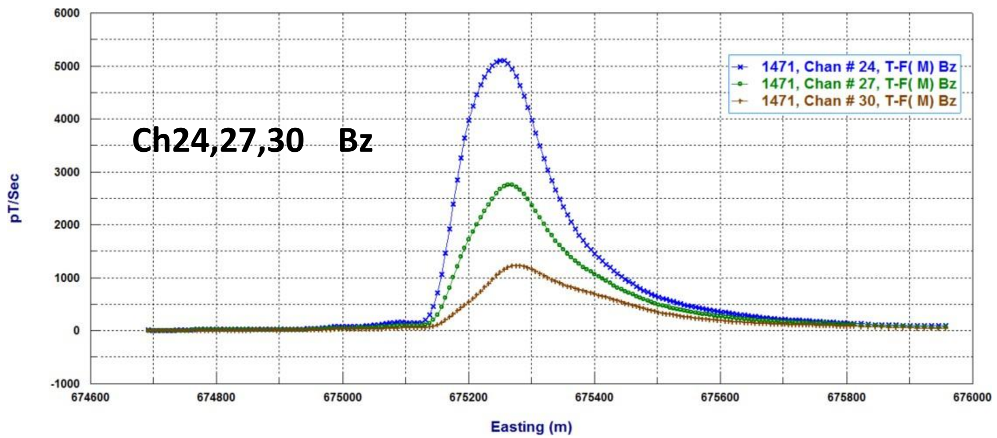
DECAY RATE Anomaly: The speed of decrease or the rate of decay of the data during the offtime can indicate the conductance of the structure below ground. The slower the rate of decrease of the data indicates more conducting material. The rate of decrease is often measured by determining an exponential rate of decay. The larger the rate of decay (see right figure), the more conductive is the ground material. According to this decay rate analyses, there is a large conductive zone to the east (right figure) of the late time amplitude peaks (central figure).

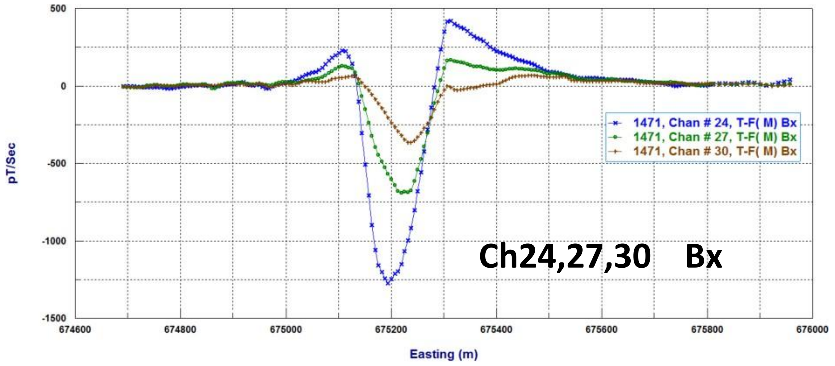
In this area of slow decay, a moderately deep magnetic anomaly impinges (right figure). The underlay is a magnetic inversion sliced at 350m below surface. Green is of order 0.001 susceptibility while pink is negative susceptibility.

Melgurd Lake Main West – Target1



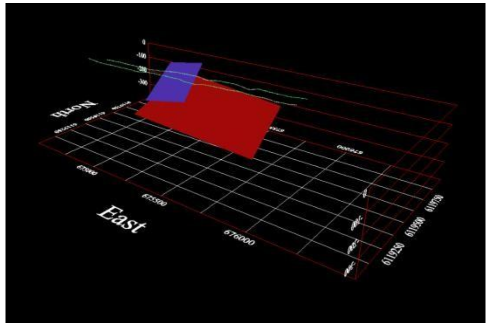






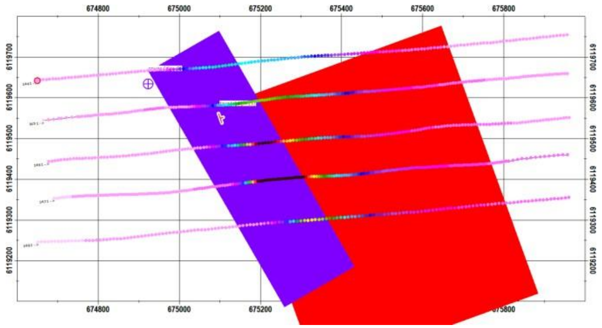
On the left is the vertical field (Bz) response as contours as well as profile plots for L1471. On the right is the same but for the horizontal response (Bx) . Both the vertical and the horizontal response are indicative of a flat lying conductor dipping slightly towards the NE. At these late times, the peak positive response of Bz and the peak negative response of Bx are relatively stationary and have stopped migrating towards the east.

Melgurd Lake Main West – Target1

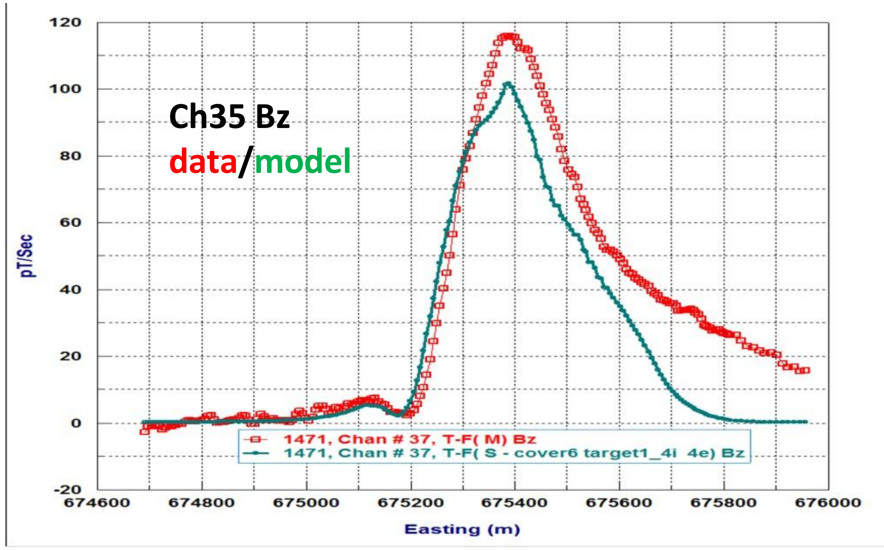


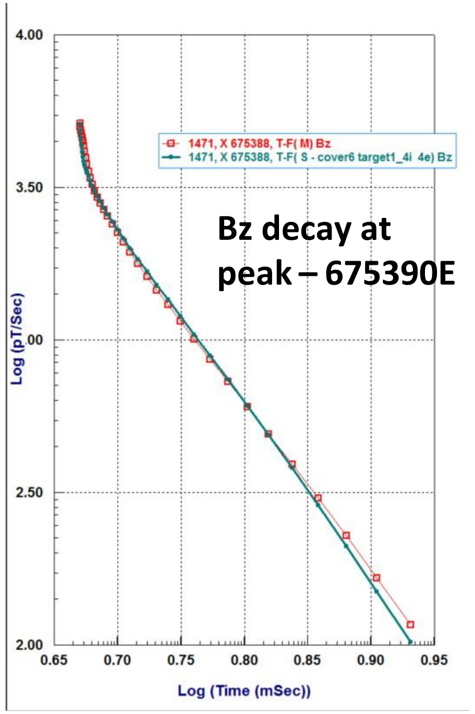
West Target1 plus Cover

Anomaly W T1
Strike Length: 700m
Dip Extent: 630m
Strike Angle: 20° NNW
Dip Angle: 15° ENE
Conductance: 20 S
Depth to Top: 2m
Depth to Bottom: 155m

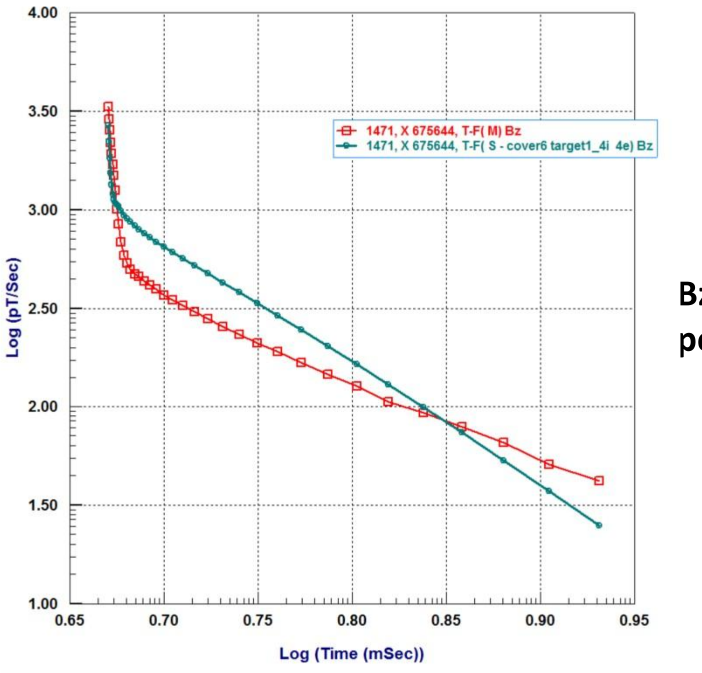


West Target1 plus Cover





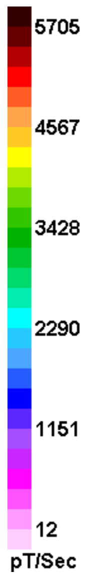
Bz decay at peak – 675390E

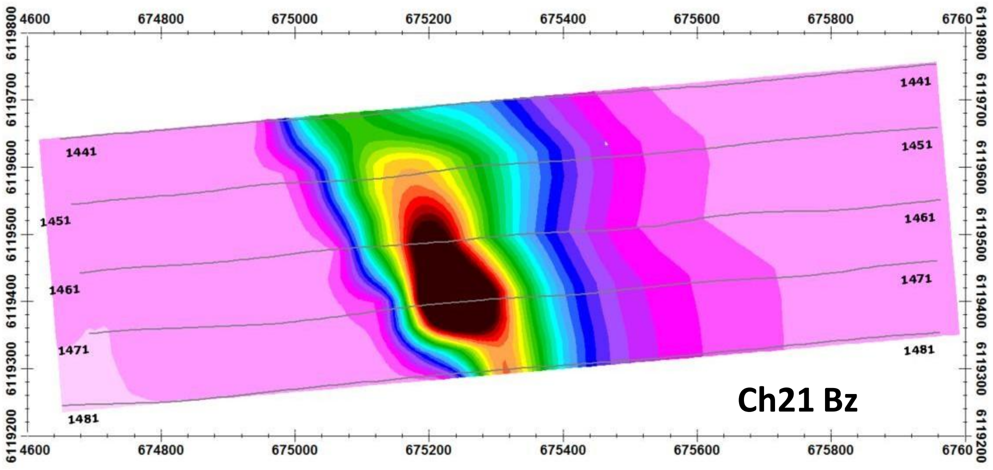


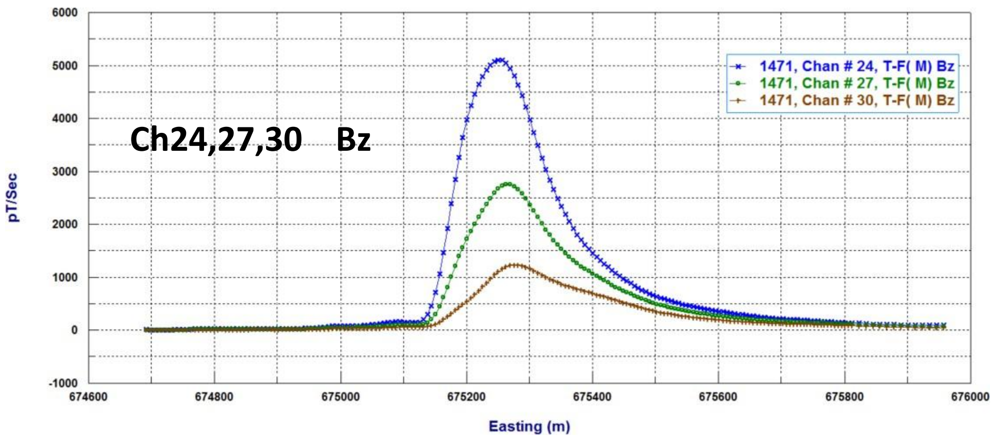
Bz decay at peak – 675645E

The response along this line (L1471) is typical of the responses in this area (Main West Northern). The data can be simulated with a large target dipping gently to the east but with a relatively large depth extent (630m). However, this model does not represent the tail of the response at the far east. The model is not a strong conductor (20Siemans) and as can be seen by the figure in the center this conductance matches the decay near the peak of the response. However, further east (right bottom figure), the actual response shows much more conductive material. This stronger conductor to the east cannot be modeled with the data that is available.

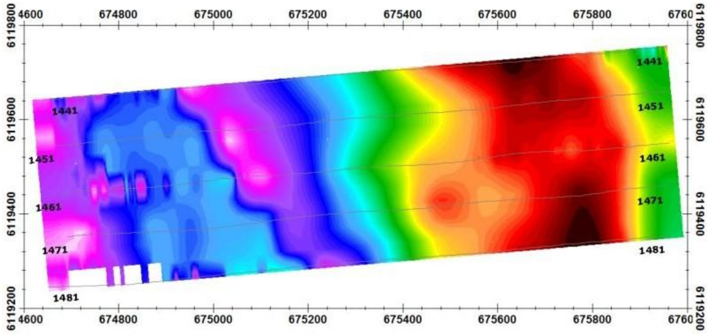
Melgurd Lake Main West – Target1

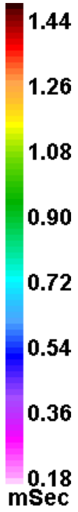


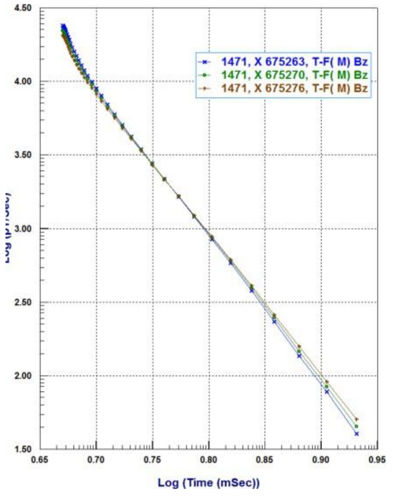




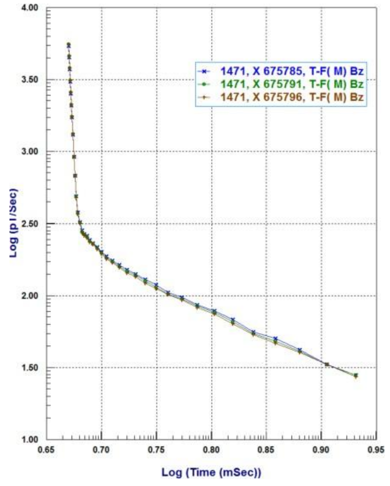
Late time decay Bz







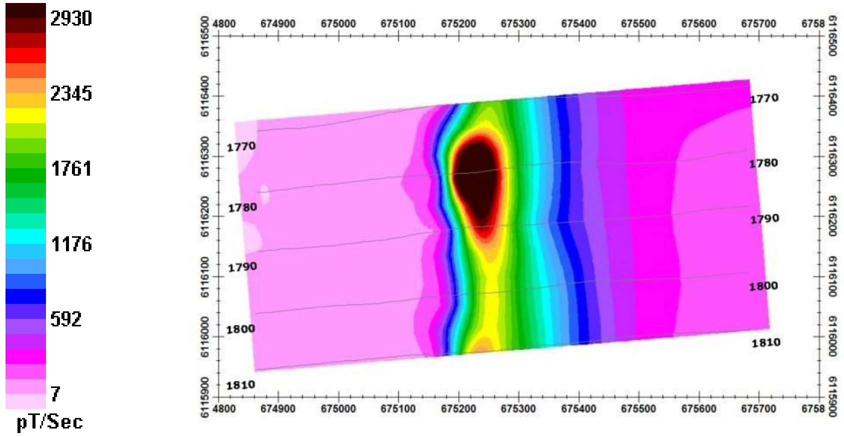
Bz decay at peak – 675251E



Bz decay at eastern edge– 675846E

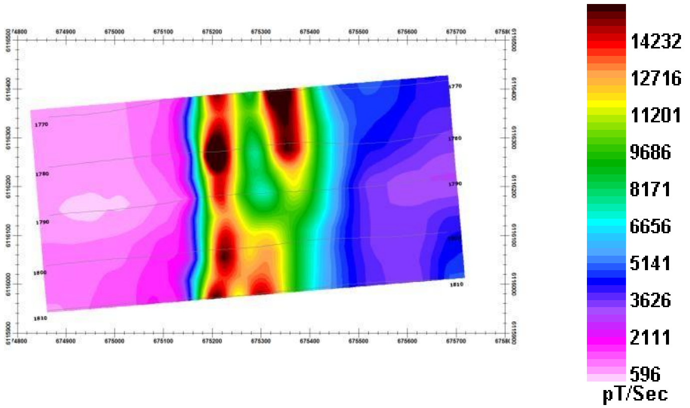
The much slower decay rate to the east of the anomaly maxima again illustrates much more conductive material buried at depth. The decay rates at the anomaly peak and the eastern edge of this study are shown on the right. There is a very dramatic slow decay in the east.

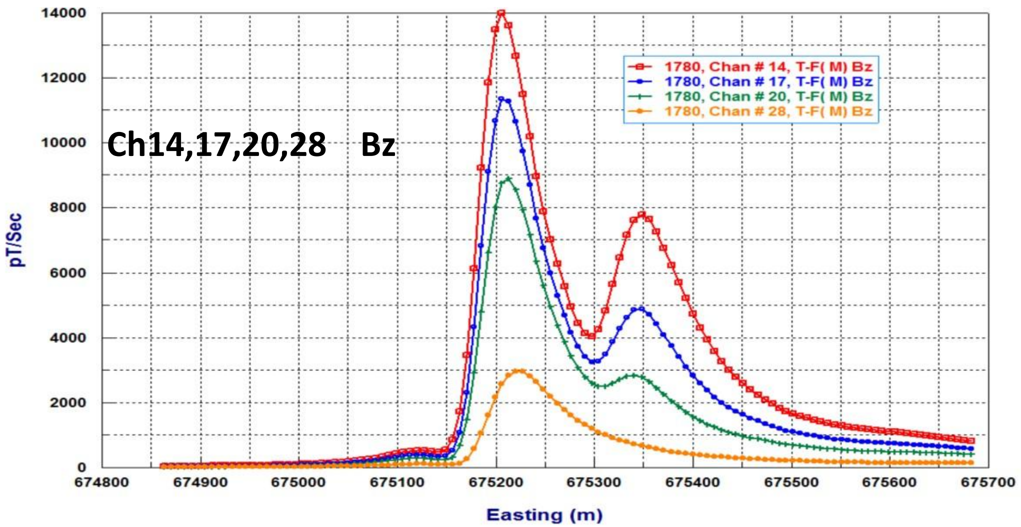
Melgurd Lake Main West South – Target2

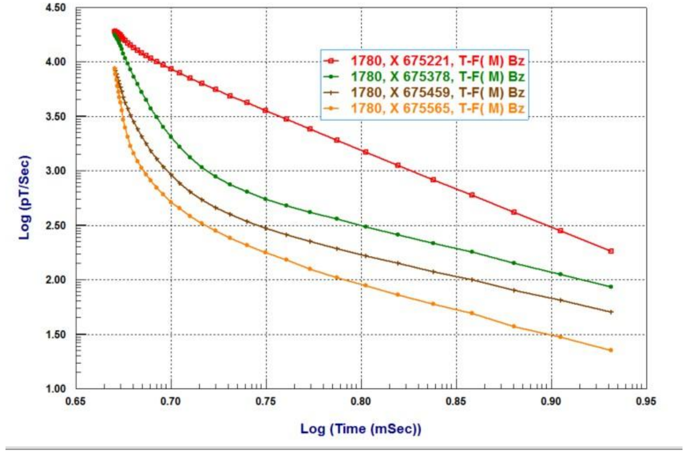


Ch25 Bz

Ch7 Bz







221
378
459
565

Bz decay from peak to eastern edge

In this area, there is a second weak conductor just to the east of the main conductor. From the figure on the left, we see that by Ch26, the weaker conductor as disappeared. What we note from the figure on the right is that the conductance at the center peak is not particularly strong and the decay curve is more or less straight in log-log plot. To the east of the center continuing to 675460, the decay at very late time is slower and then further to the east 675565E, the decay at late times starts to speed up. Here, we do not have the same extent of deep conductor as the conductors slowly dip to the east.

Melgurd Lake Main West – Target2

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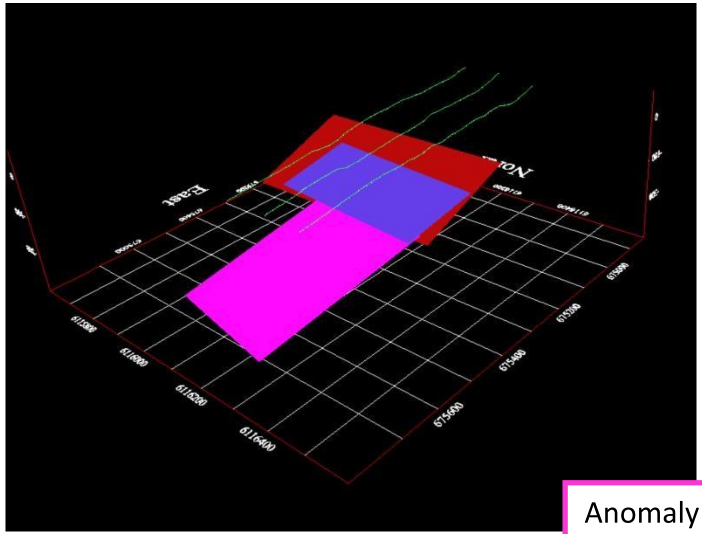
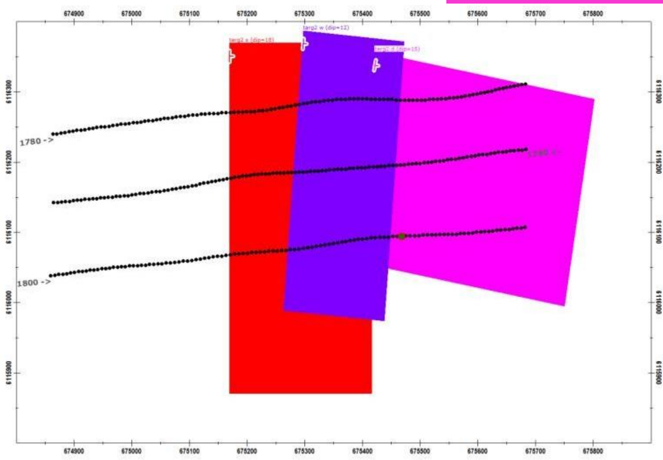


Anomaly W T2 Top
Strike Length: 500m
Dip Extent: 260m
Strike Angle: 0°N
Dip Angle: 18° East
Conductance: 40 S
Depth to Top: 10m
Depth to Bottom: 95m

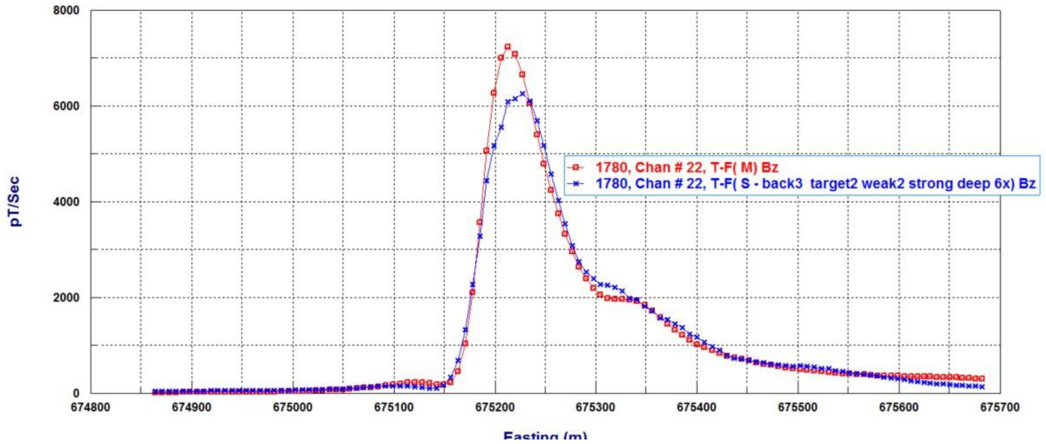
West Target2

Anomaly W T2 Centre
Strike Length: 400m
Dip Extent: 180m
Strike Angle: 5°ENE
Dip Angle: 12° East
Conductance: 6 S
Depth to Top: 20m
Depth to Bottom: 60m

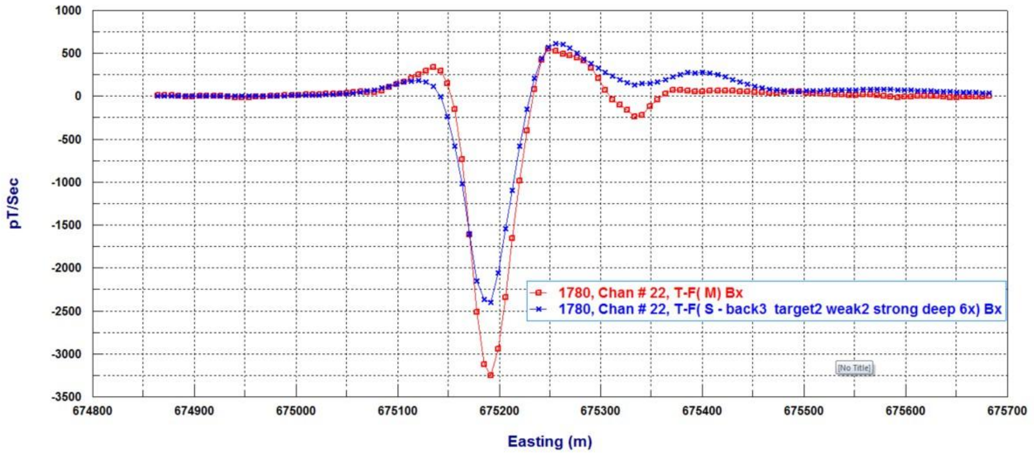
Anomaly W T2 Deep
Strike Length: 300m
Dip Extent: 400m
Strike Angle: 10°ENE
Dip Angle: 15° ESE
Conductance: 35 S
Depth to Top: 70m
Depth to Bottom: 175m



West Target2

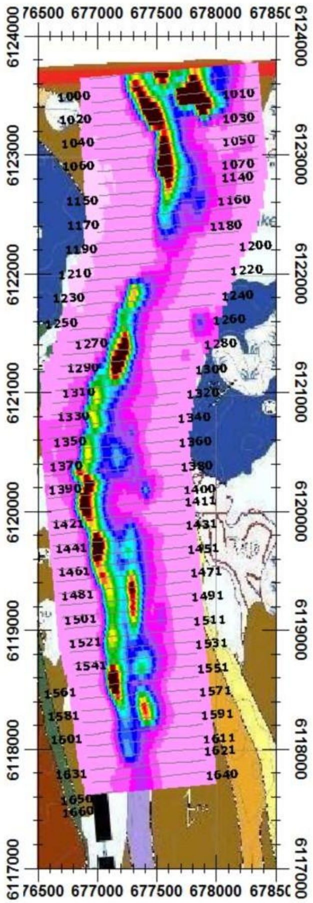


Ch22 Bz
data/model

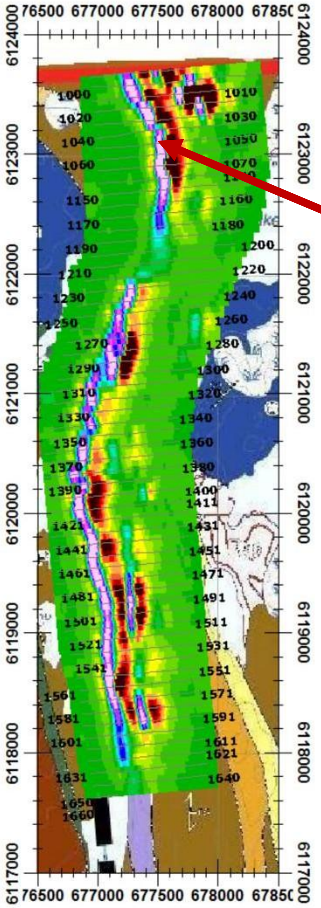


Ch22 Bx
data/model

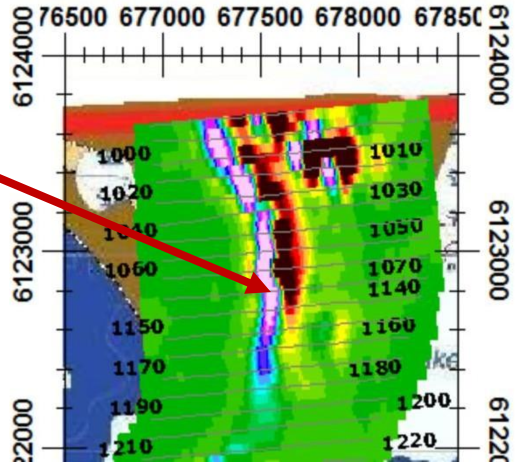
Melgurd Lake Main Central North– Target3



Ch29 Bz

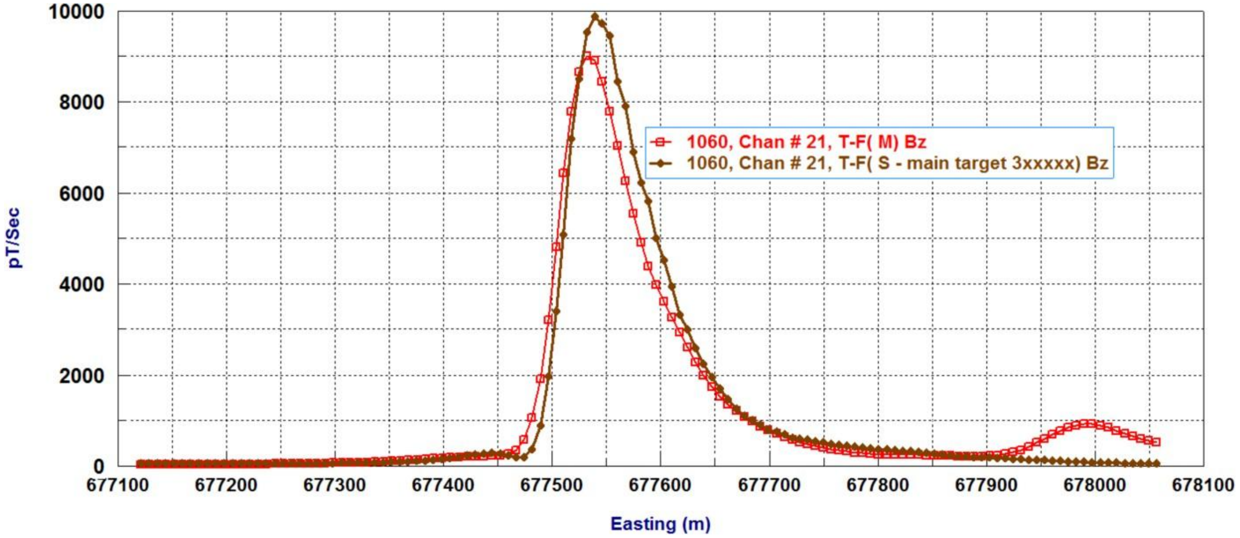


Ch29 Bx

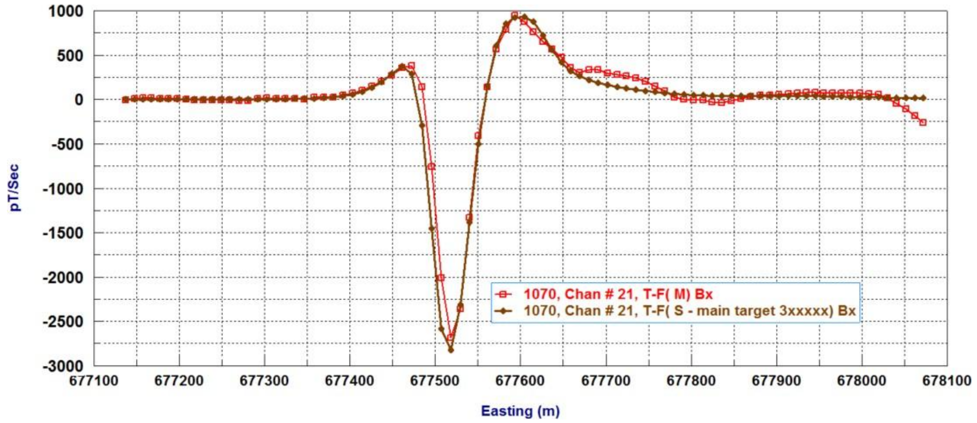


Main West Central North Target 3

Ch21 Bz L1060 data/model

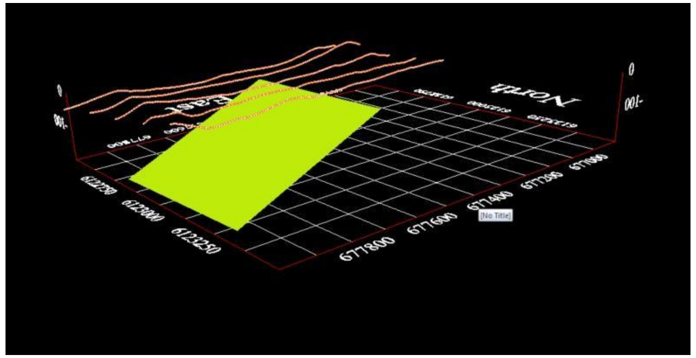


Ch21 Bx L1070 data/model



There is a long thin strip of conductors down the centre of the main Melgurd survey (left two figures). In the north of this strip, we selected one conductor (Main Target 3). The response of the data and the model are shown in the two right figures.

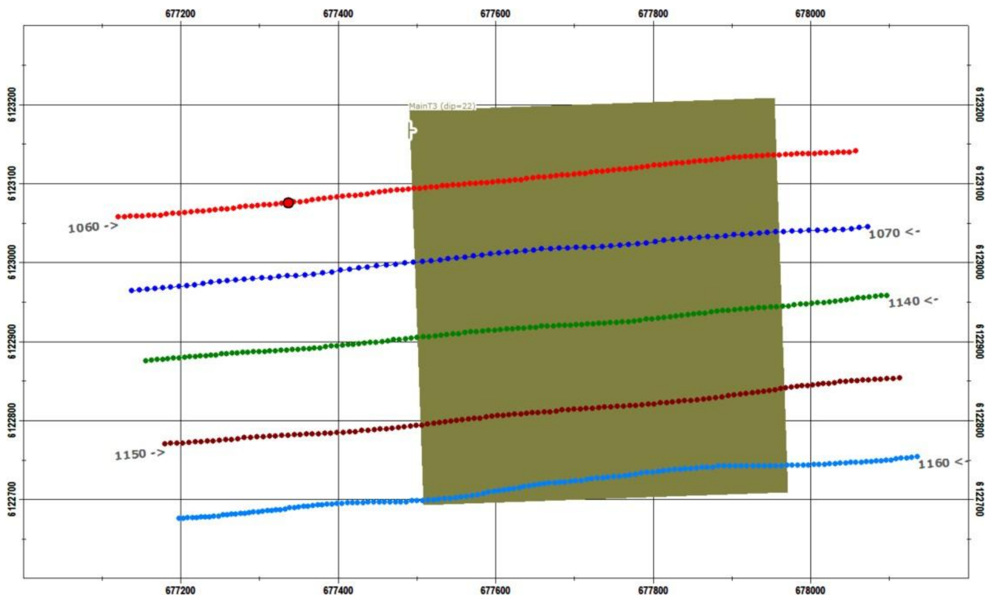
Melgurd Lake Main West – Target3



Anomaly NC T3
Strike Length: 500m
Dip Extent: 500m
Strike Angle: -2°N
Dip Angle: 22° East
Conductance: 50 S
Depth to Top: 5m
Depth to Bottom: 192m

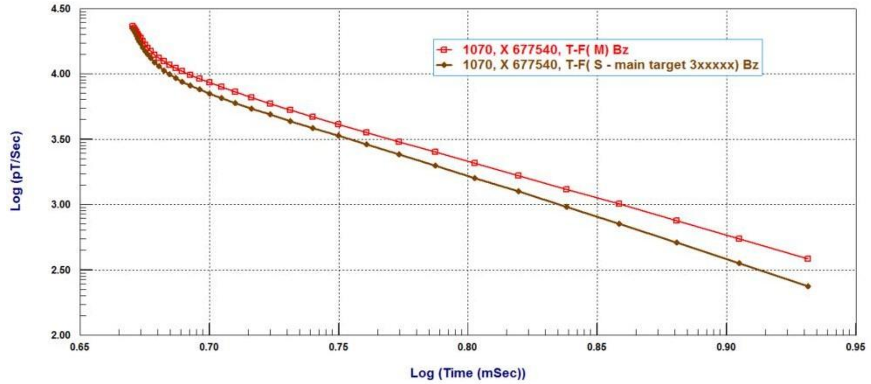
Central Target3
view from NE

Central Target 3

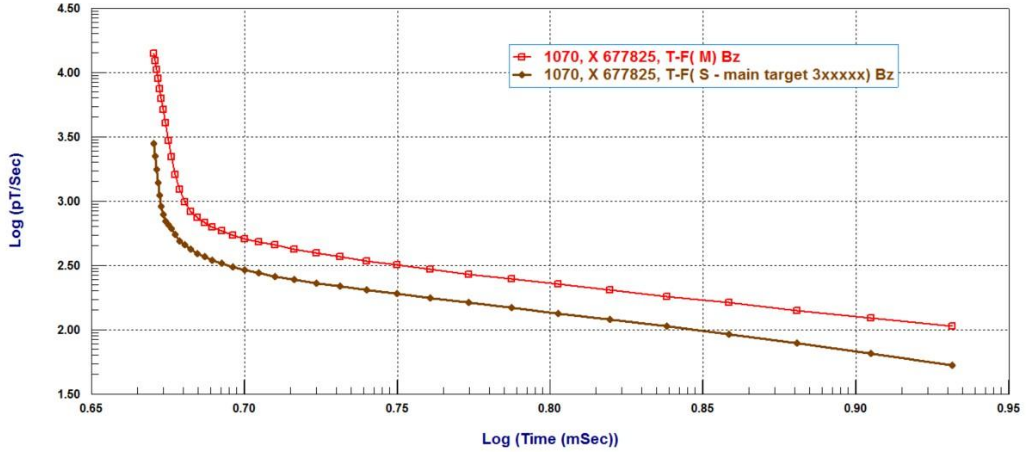


. Bz L1070 data/model

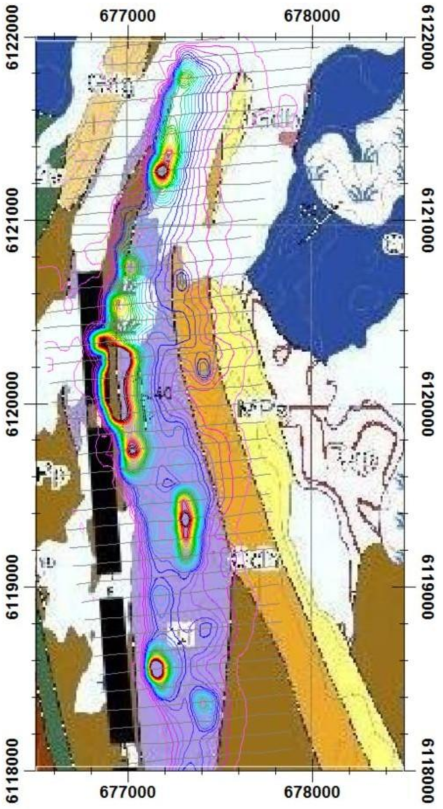
Bz at Peak
data/ model



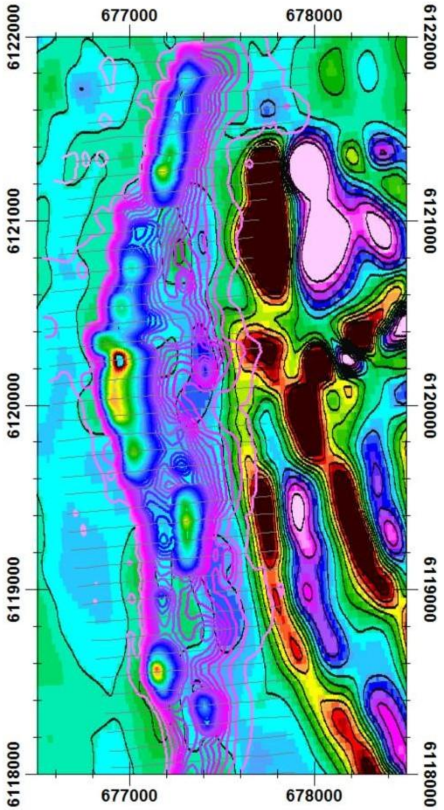
Bz to the east
data/ model



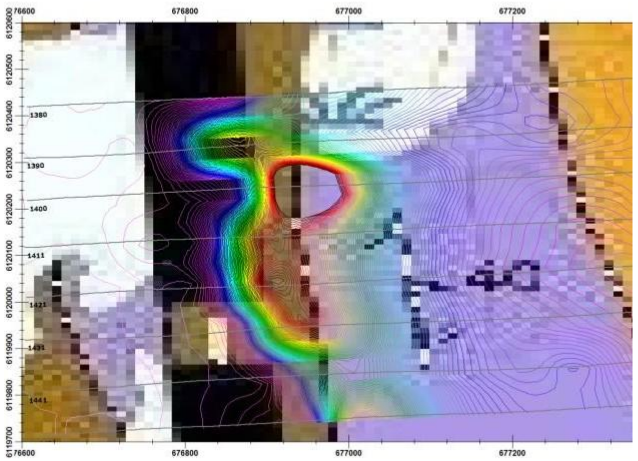
Melgurd Lake Main - Central Mid– Target4



Ch37 Bz
geology underlay

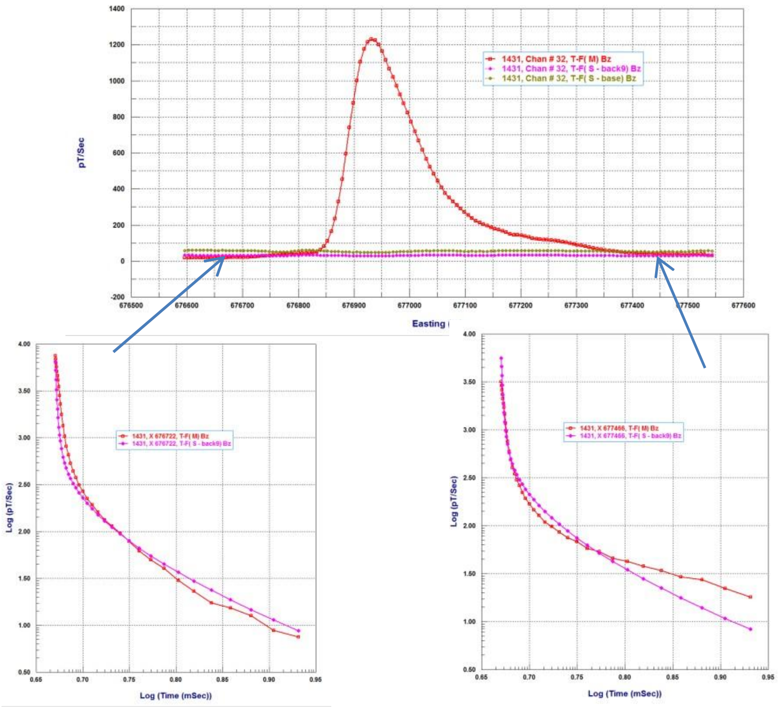


Ch37 Bz
TMI horizontal gradient



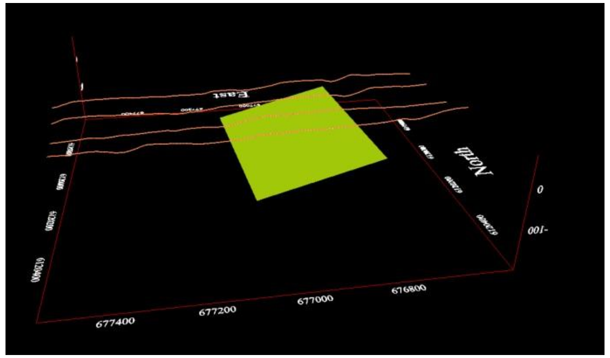
Main West Central
Mid Target 4

Ch32 Bz L1431 data/background



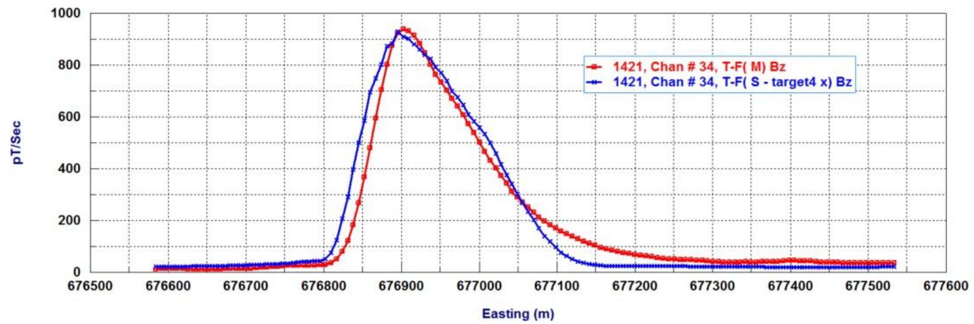
There is a second long thin strip of conductors down the centre of the main Melgurd survey (left two figures). In this central area, the conductors dip to the east towards the area of abnormal magnetic activity. We select the larger of the conductors in this central area to study (L1400-1431). This area is also unusual in that as in other areas there is conductive material at depth which cannot be modeled. But, in this area, the conductive material is throughout the area shown in the central map. To the right we show the response for Ch31 on L1431 and below examples of decay from the west and east of this portion of the line. The pink decay plots are those for our approximate background response of the material hosting the conductors. For this model which has a thin shallow modestly conductive cover and then 150m of moderately resistive rock (400 Ωm) and below that a basement of 10Ωm!). This conductive material is best simulated as a halfspace rather than a conducting plate.

Melgurd Lake Main Mid-West North – Target4



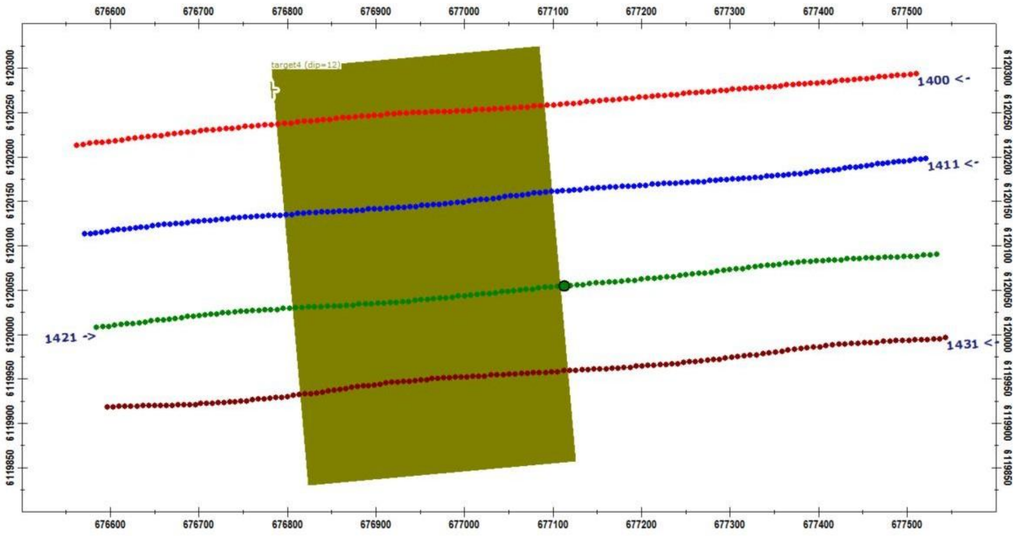
Anomaly NCT4
Strike Length: 600m
Dip Extent: 310m
Strike Angle: -5°N
Dip Angle: 8° East
Conductance: 40 S
Depth to Top: 8m
Depth to Bottom: 51m

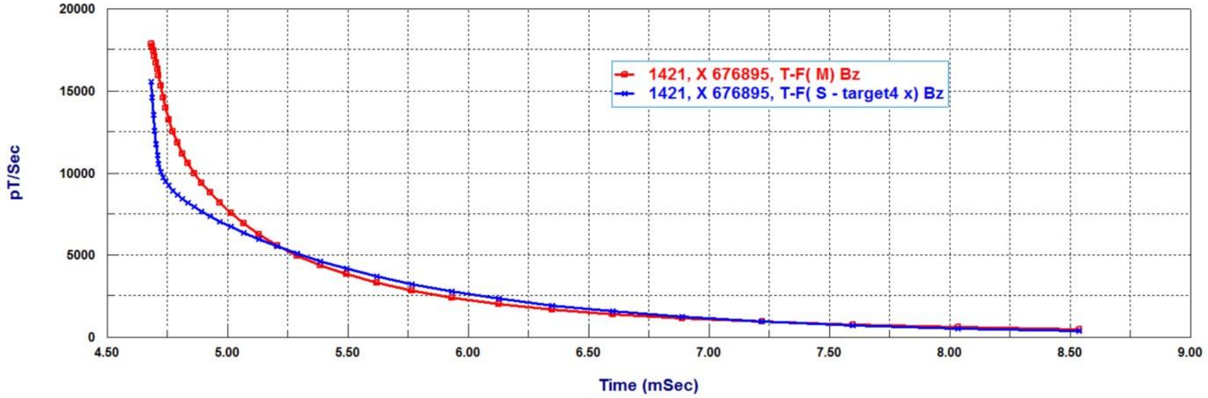
Central Target4
View from North



Bz at Peak Ch34 L1421
data/model

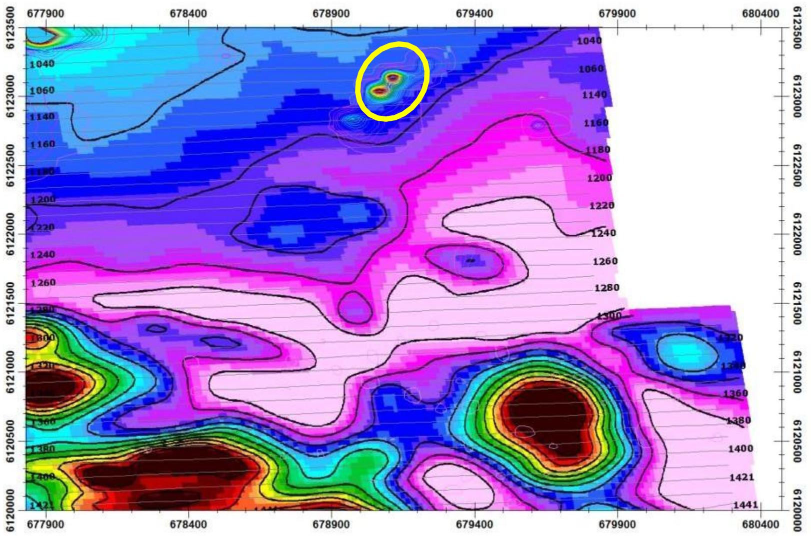
Central Target 4



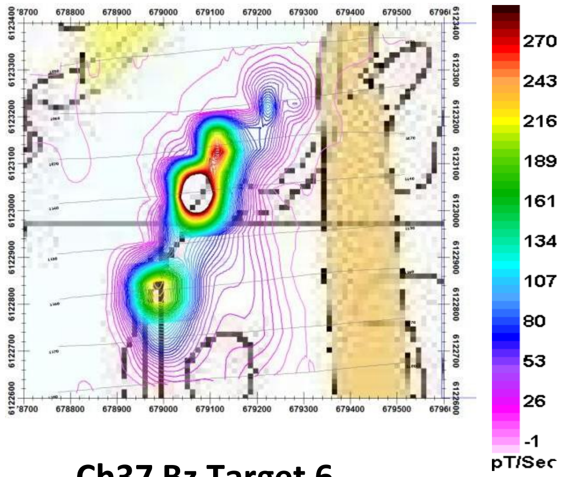


Bz Decay at peak data/model
surficial weak conductor not included in model

Melgurd Lake Main North East – Target6

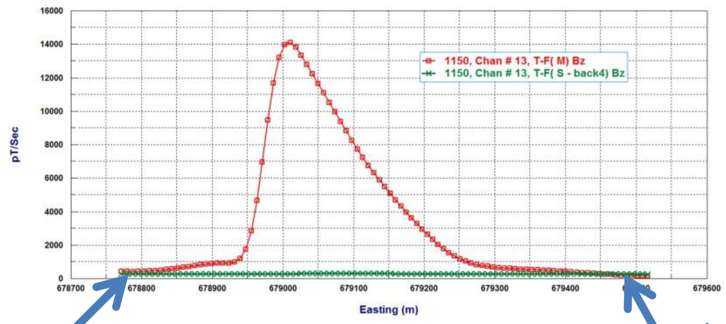


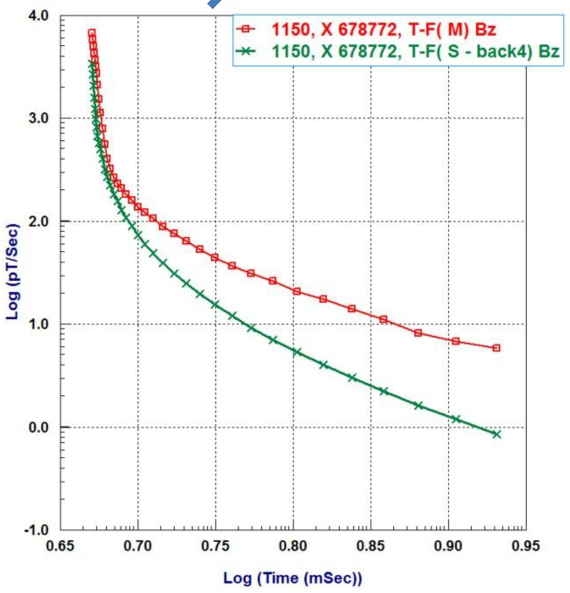
Ch33 Bz Target 6
Aeromagnetics (TMI) underlay

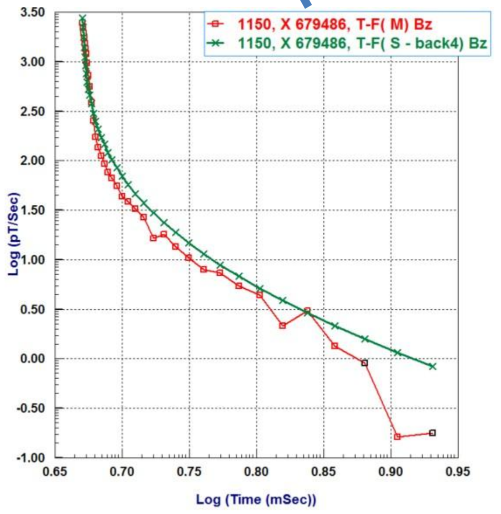


Ch37 Bz Target 6
Geology Underlay

Ch13 Bz L1150 data/background

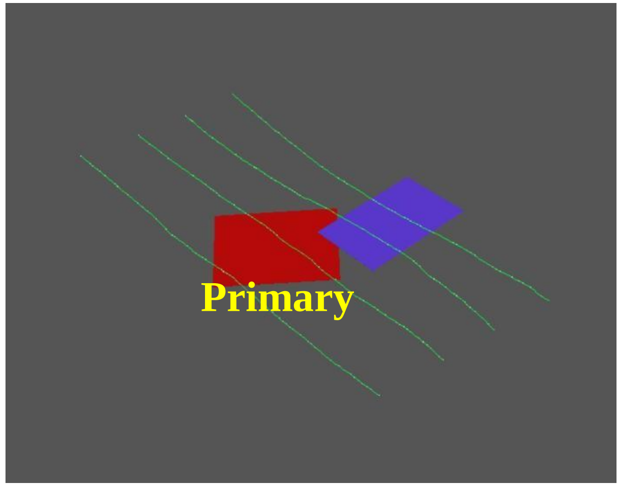






Target West 6, is in the far NE of the survey. It was chosen as it lies on the edge of a transition in the magnetic characteristics of the rocks. The anomaly also lies on the eastern edge of a slight rise (15m) in the topography. Again, the anomaly is dipping to the east. But again, this surprising and unexpected conductive material lying underneath this target. To the west of the anomaly as illustrated in the figure to the right, the response of a basement of 125Ωm provides a late time decay that is slightly faster than the data. To the east, the model decay matches the data even though the data is noisy. There is likely two concentrations of conductive material. We will focus on modeling the northern anomaly.

Melgurd Lake Main Northeast- Target6

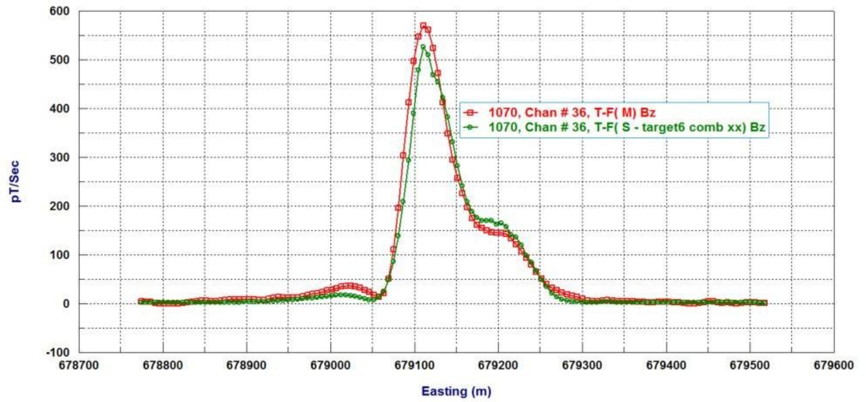


Central Target6
View from South East

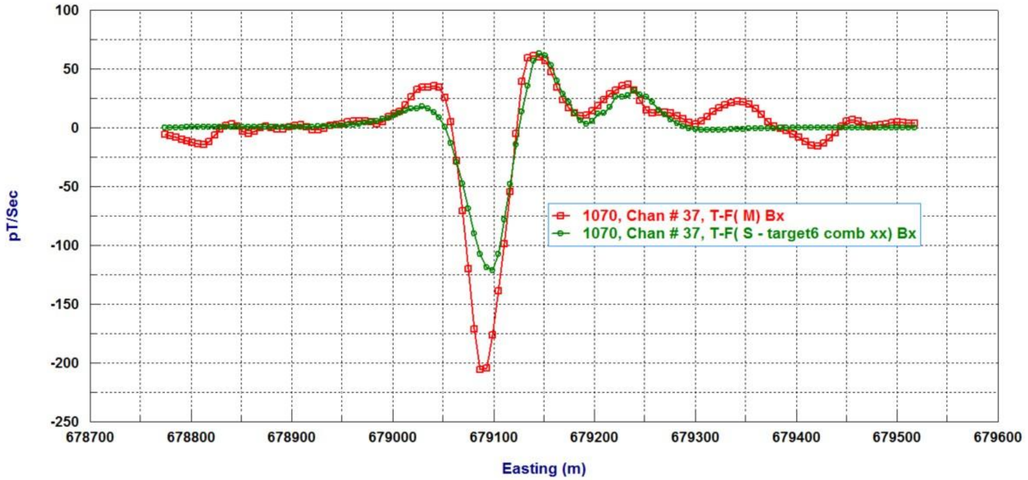
Anomaly NE T6 Primary
Strike Length: 200m
Dip Extent: 130m
Strike Angle: +35°NE
Dip Angle: 20° South East
Conductance: 90 S
Depth to Top: 9m
Depth to Bottom: 52m

Anomaly NE T6 Secondary
Strike Length: 200m
Dip Extent: 120m
Strike Angle: -5°NW
Dip Angle: 0° East
Conductance: 60 S
Depth to Top: 10m
Depth to Bottom: 10m

The structure as indicated by the data (e.g. previous page/upper center figure) consists of at least two structures likely connected along the strike of the primary anomaly. Here we represent as one structures.



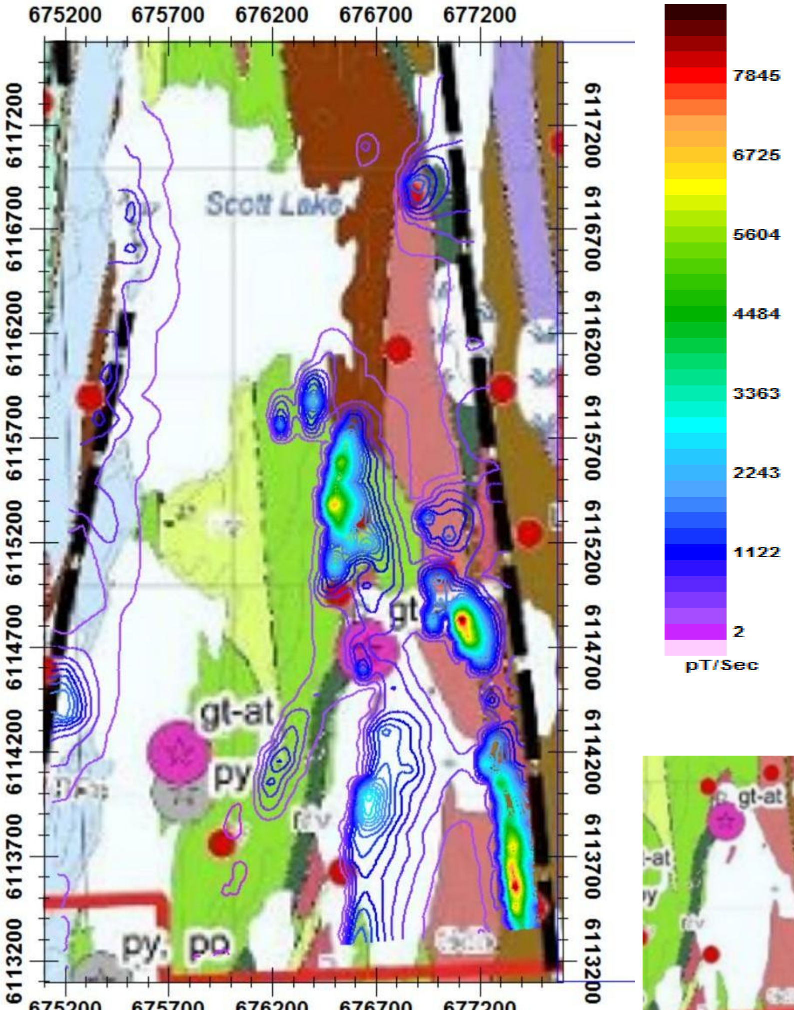
Bz Ch36 L1070
data/model



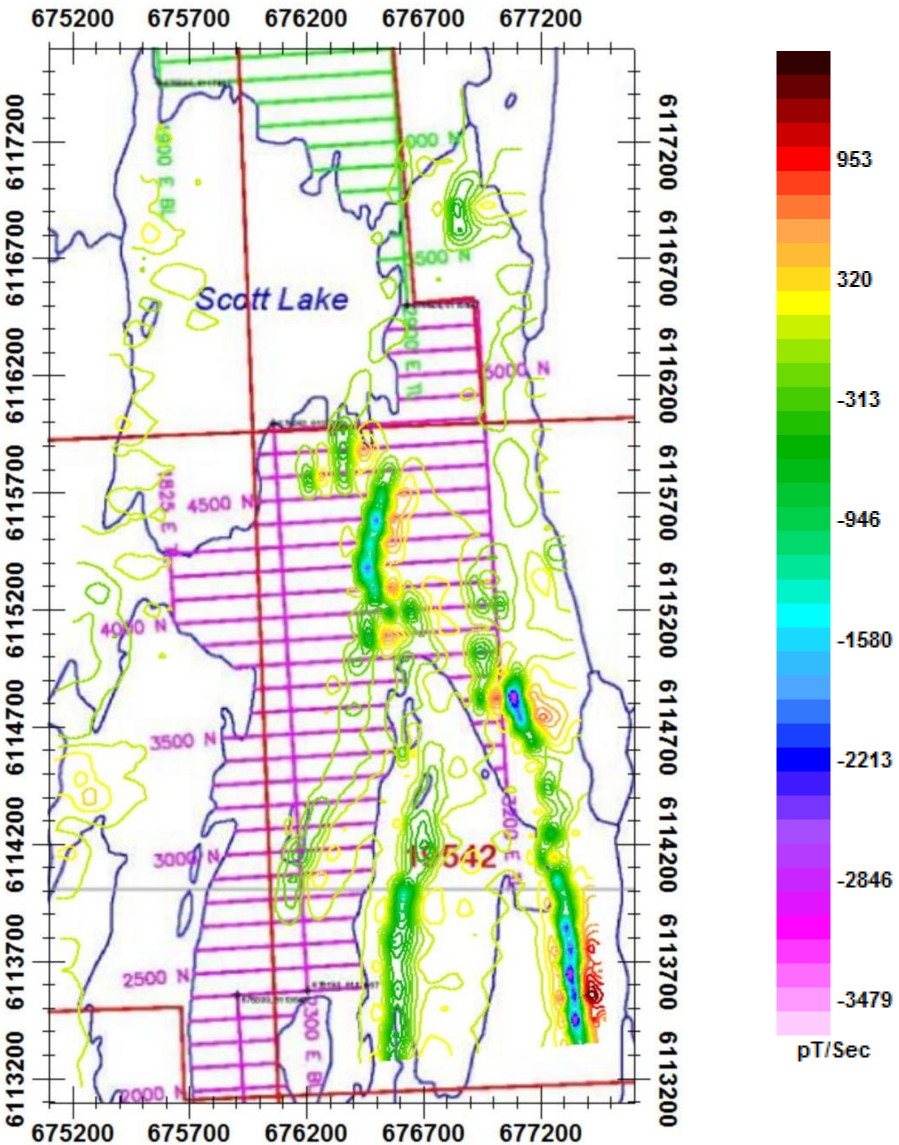
Bx L1070 Ch36 data/model

Melgurd Lake Main South – Priority A

More than 75% of the data is below the noise level by Ch 23 for Bz.

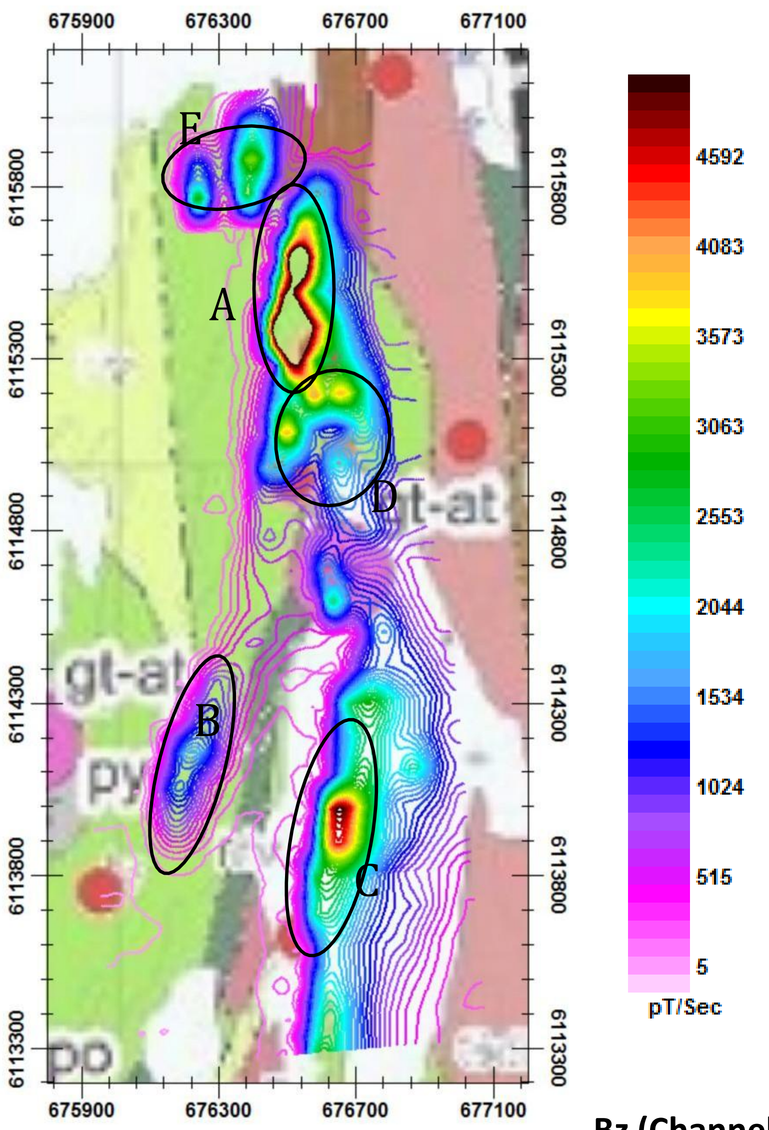


Bz (Channel 23) – 23rd percentile

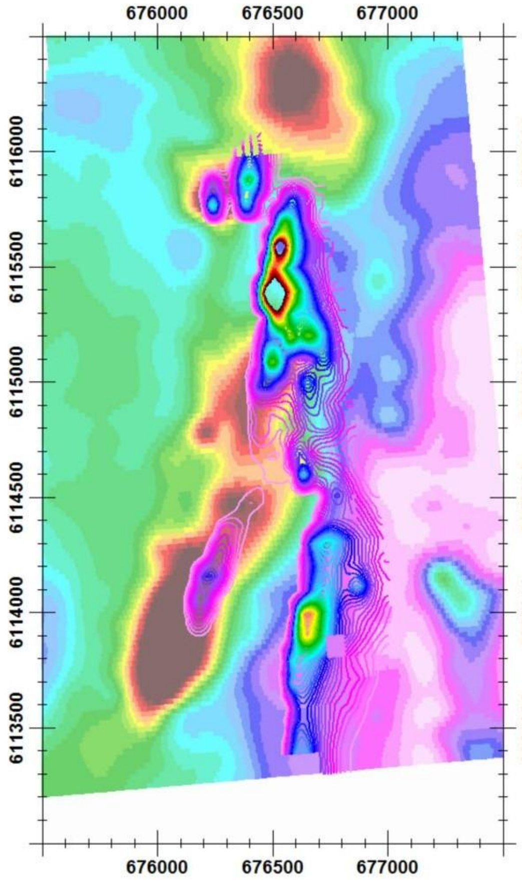


Bx (Channel 23) – 99th percentile

Melgurd Lake South – Priority A South Central

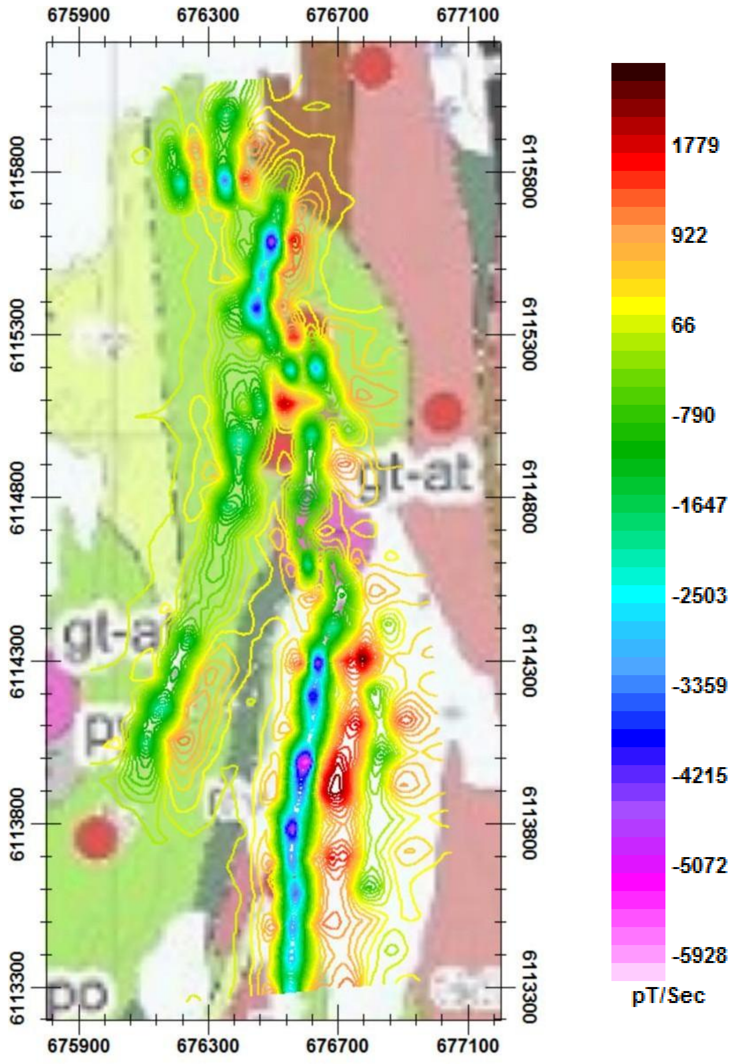


Bz (Channel 21) – 95[th] percentile



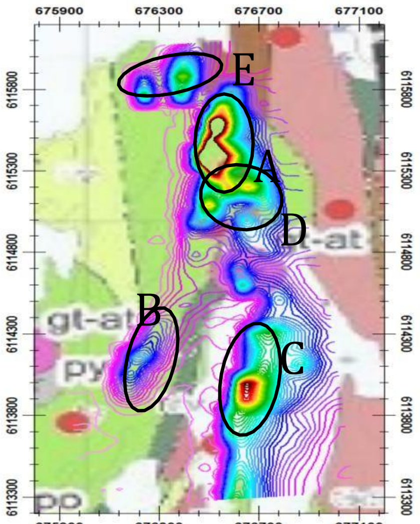
Total Field Aeromagnetic underlay

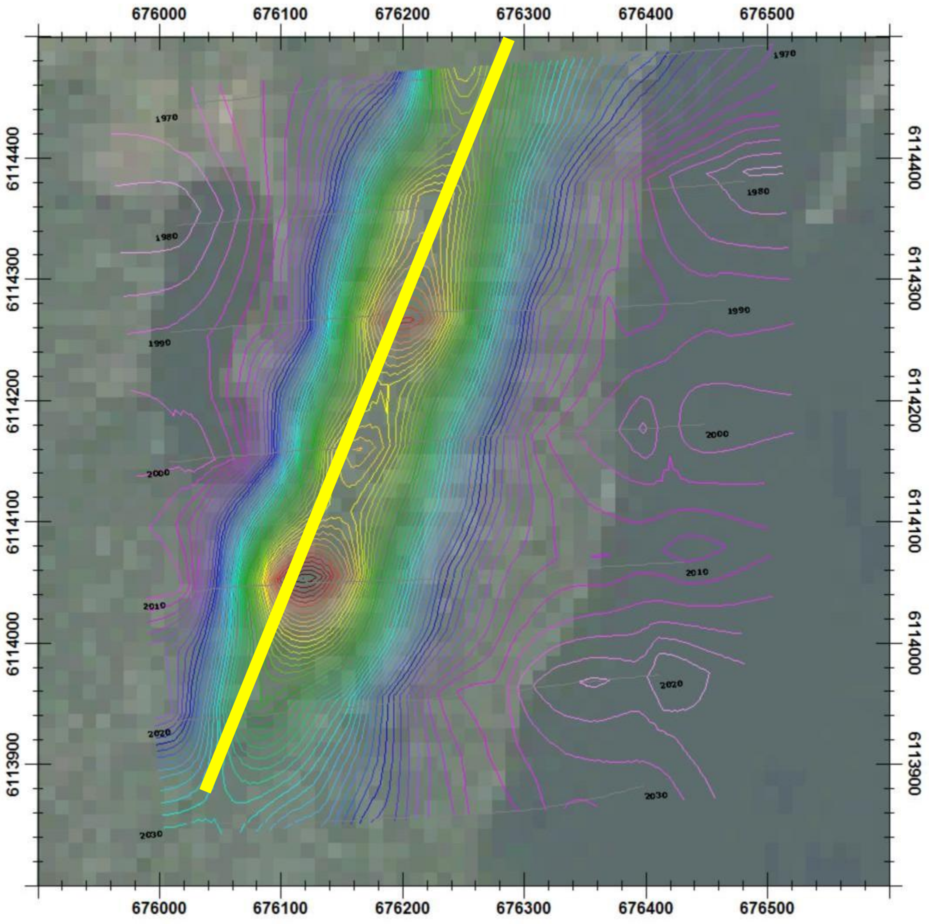
Note: Target A was studied previously see pg. 39



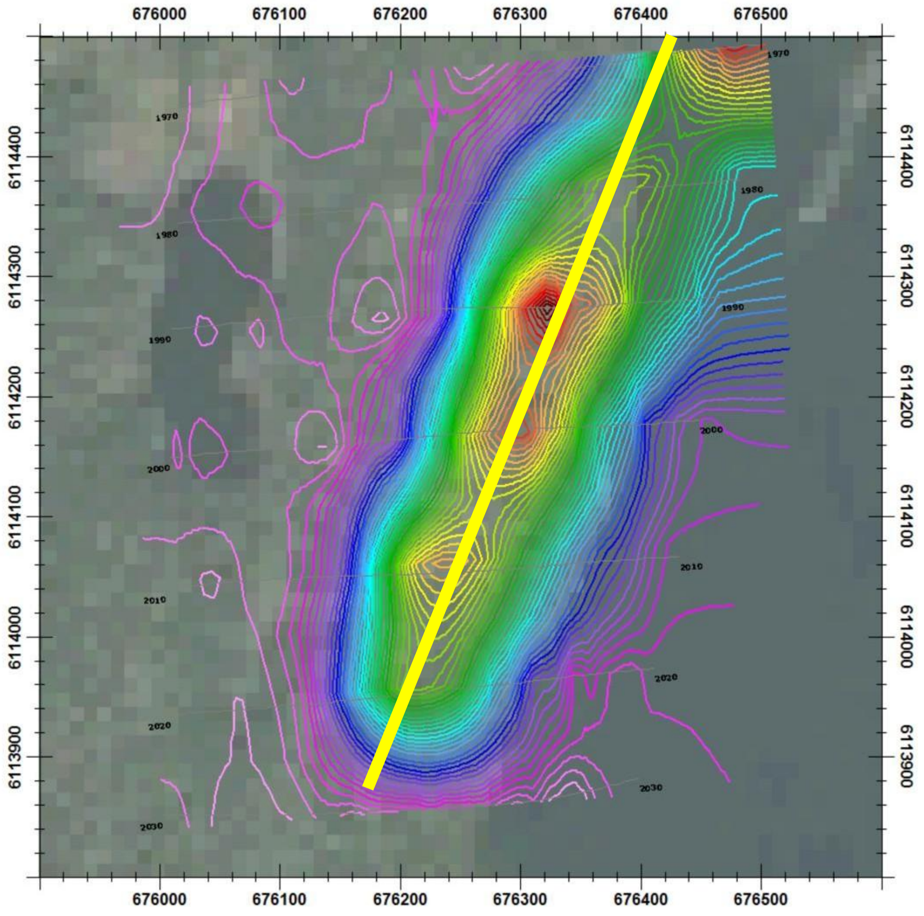
Bx (Channel 15) – 99[th] percentile

Melgurd Lake South – Priority A Target B





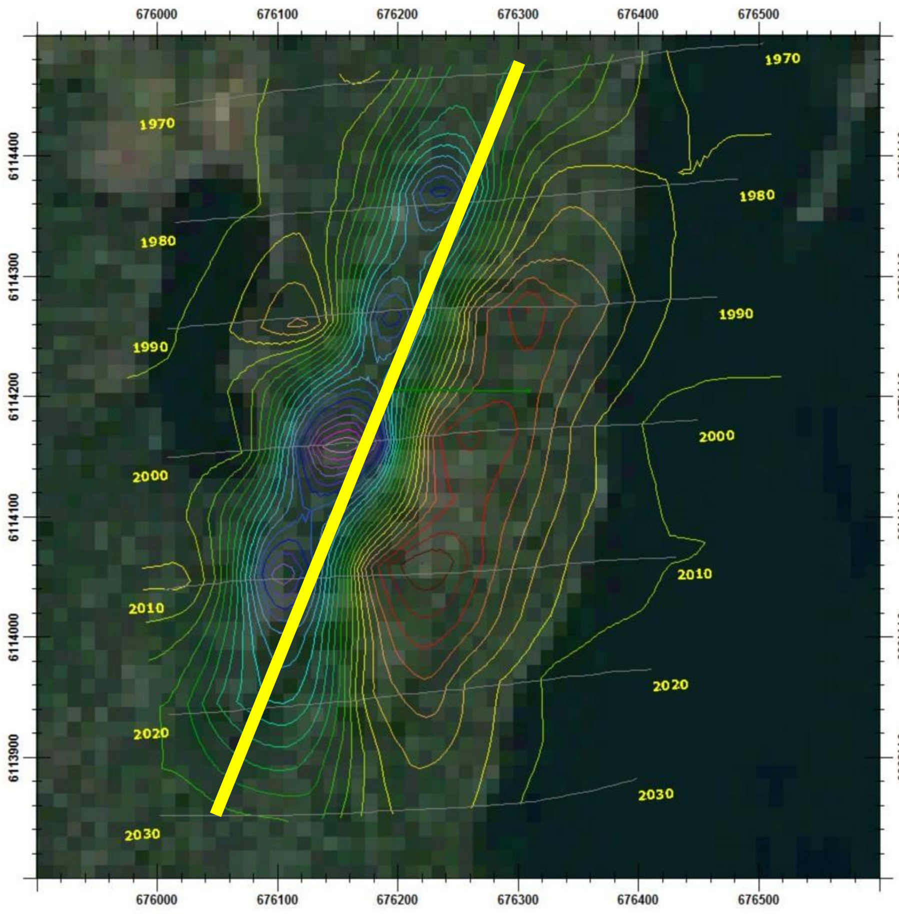
Early Time Bz (Channel 5) – 97th percentile



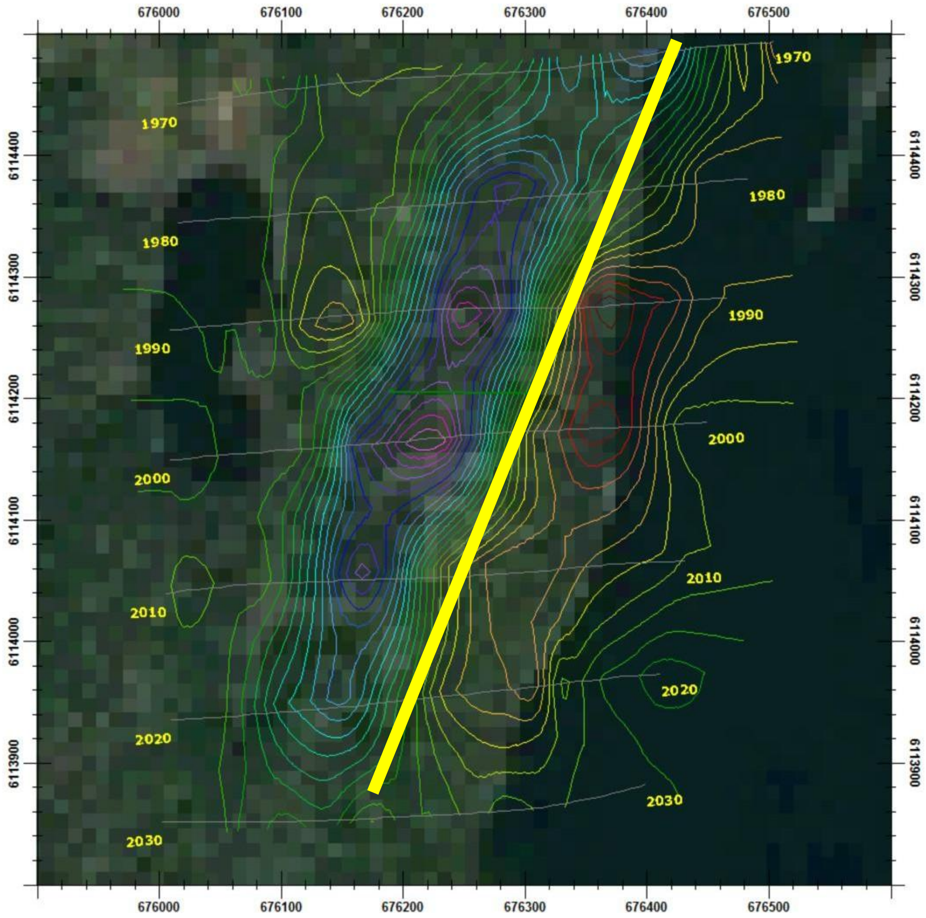
Late Time
Bz (Channel 37) – 97th percentile

The focus axis of the anomaly (B) shifts east some 120m from early time (left) to late time (right) to the western edge of Keep Lake. The west response has a quick decay (low conductance) while the east response has a much larger conductance. While in time domain EM, it is possible for currents to move down a conductor to depth at late time, the lateral migration in this case is too large given the speed of helicopter pulling the system.

Melgurd Lake South – Priority A Target B



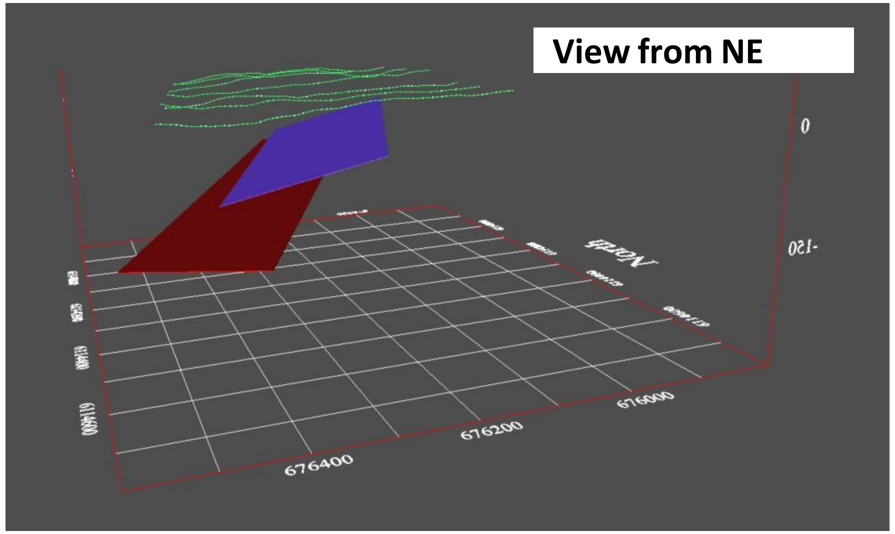
Early Time Bx (Channel 15) – 99th percentile



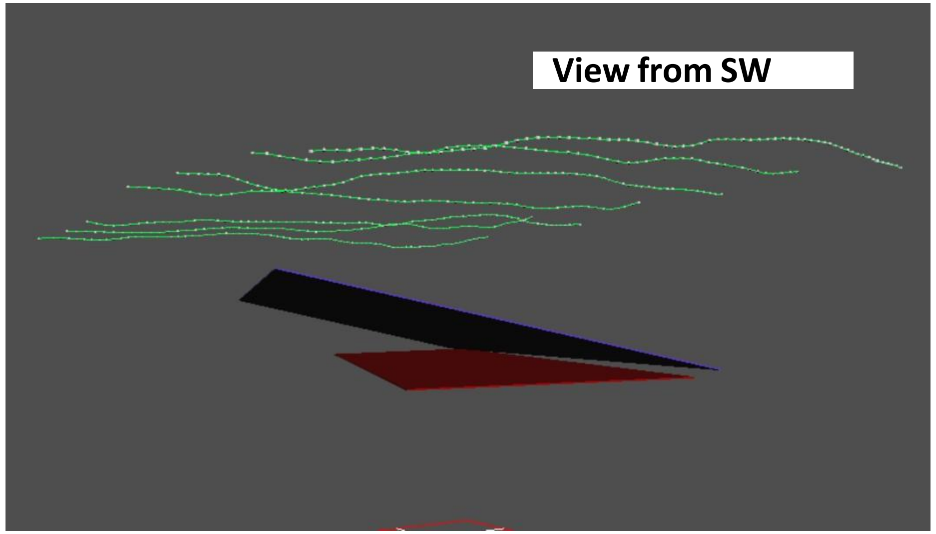
Late Time
Bx (Channel 30) – 99th percentile

The earliest provided horizontal channel (Bx) is shown on the left. The axis of the early time Bz response is shown as the thick yellow line. By channel 15, the axis of the total Bx response has shifted slightly east about 30m. For the late time horizontal response shown on the right, the axis of the response is unchanged from the late time axis of Bz.

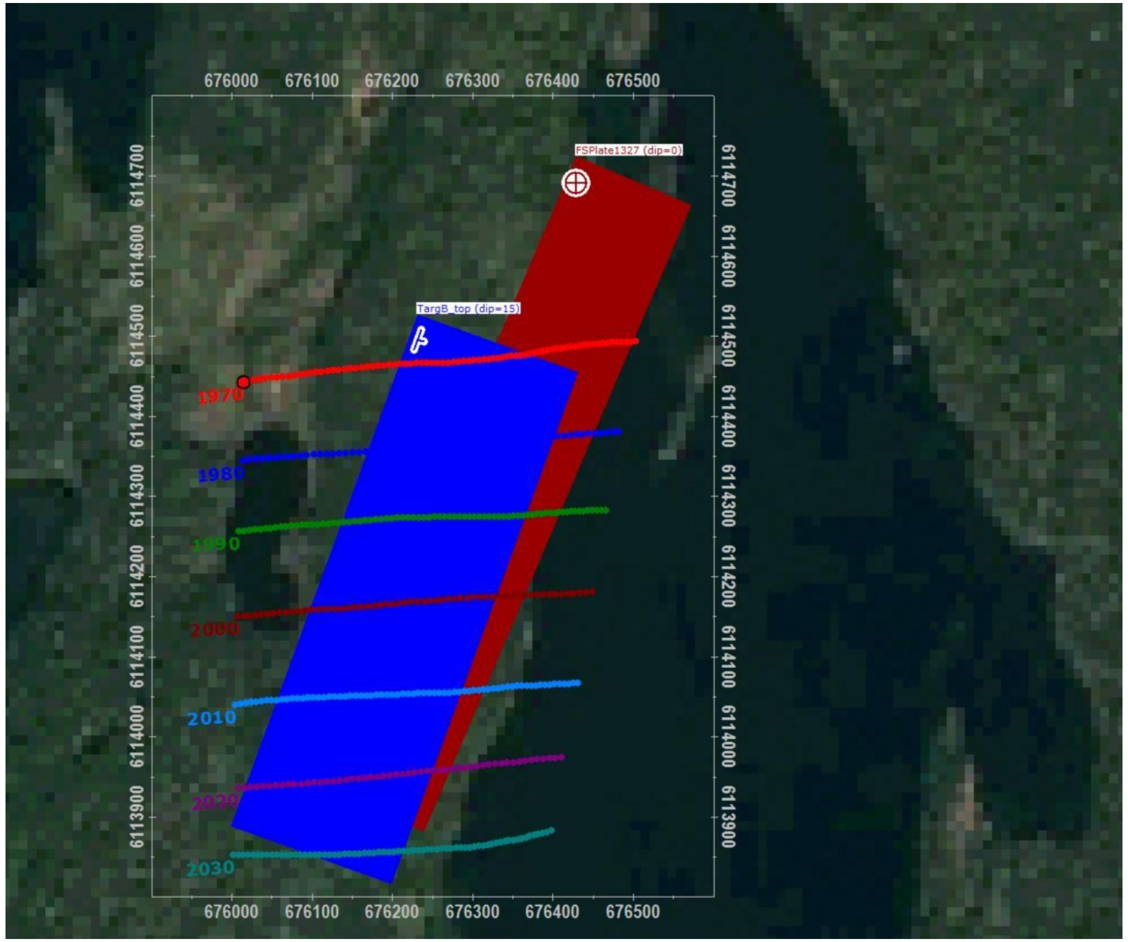
Melgurd Lake South – Priority A Target B



Priority A TB Top
Strike Length: 680m
Dip Extent: 220m
Strike Angle: +20°NE
Dip Angle: 15° West
Conductance: 4 S
Depth to Top: 20m
Depth to Bottom: 75m

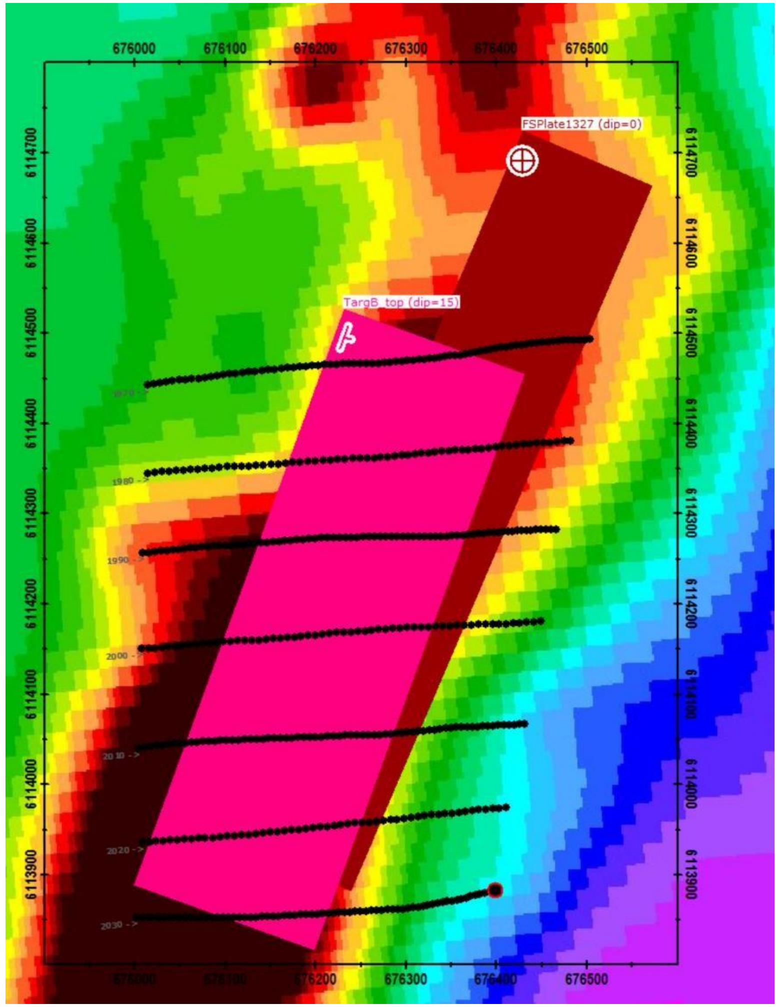


Priority A TB Lower
Strike Length: 850m
Dip Extent: 156m
Strike Angle: +23°NE
Dip Angle: 0°
Conductance: 58 S
Depth to Top: 84m
Depth to Bottom: 84m

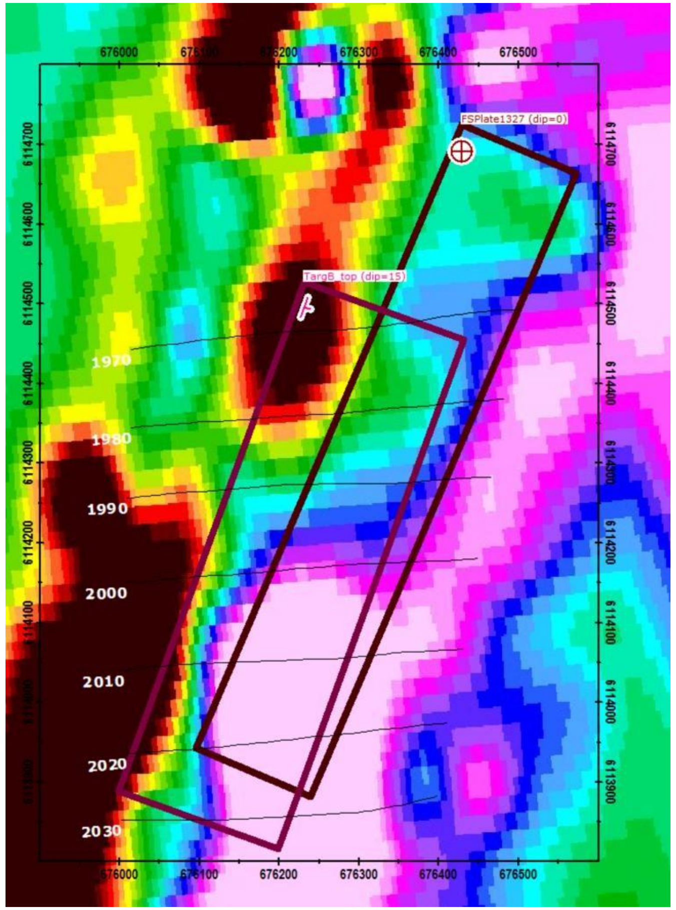


The modeling is a little difficult in this case and our inversion application is not yet developed to the extent needed to fully apply to this problem. Thus, we rely on inversion plus interactive forward modeling.

Melgurd Lake South – Priority A Target B



Anomaly projections
aeromagnetics total field underlay

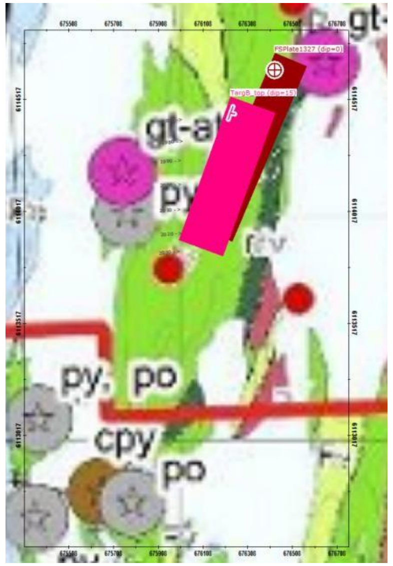


Anomaly projections
aeromagnetics horizontal gradient underlay

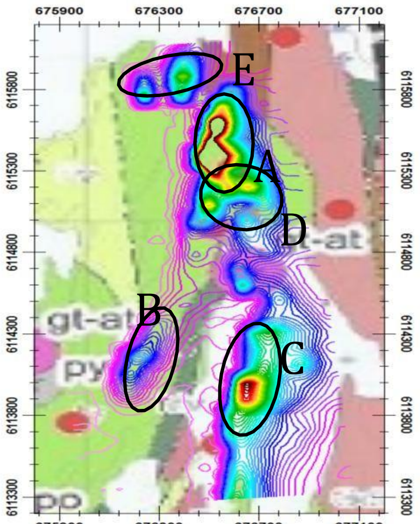
The boundary between the low (pinks) and the highs (red-brown) marks the magnetic axis of the magnetic anomaly.

NOTE:

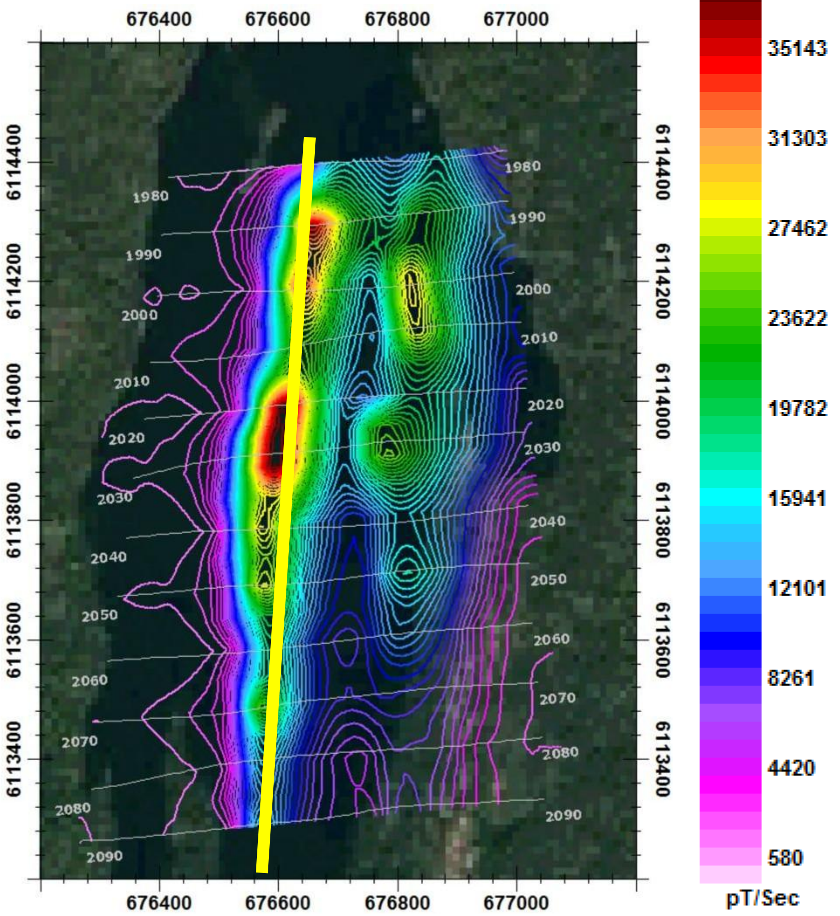
The chalcopyrite showing to the south, just outside the survey area, is on strike with the main target.

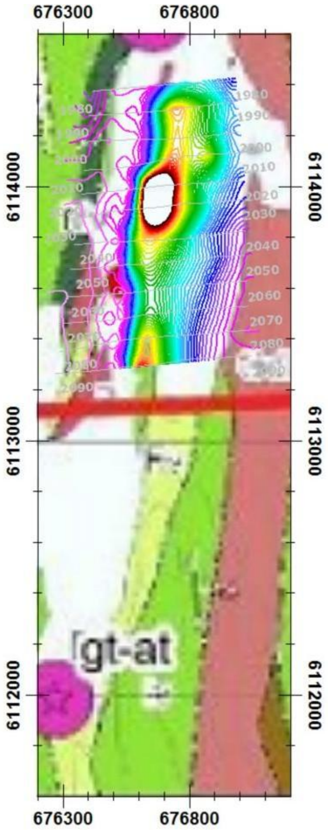


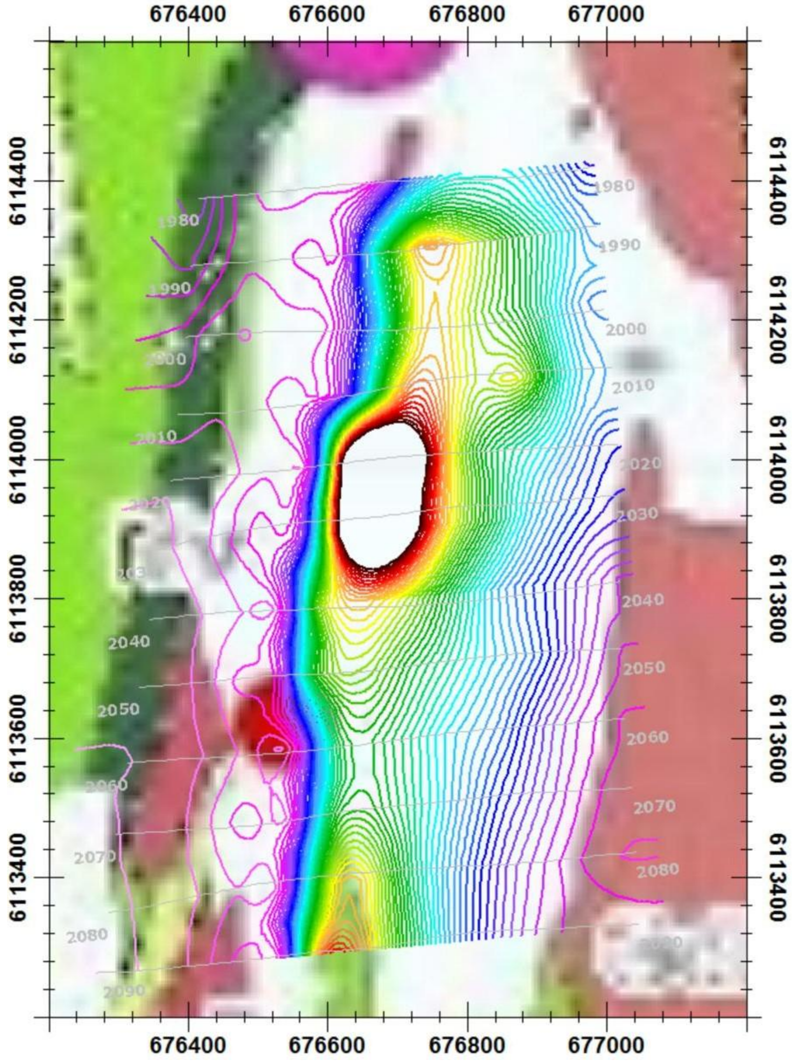
Melgurd Lake South – Priority A Target C



Early Time Bz (Channel 8) – 100th percentile



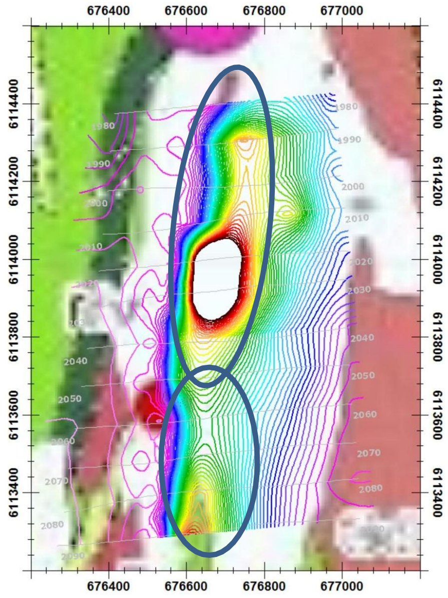




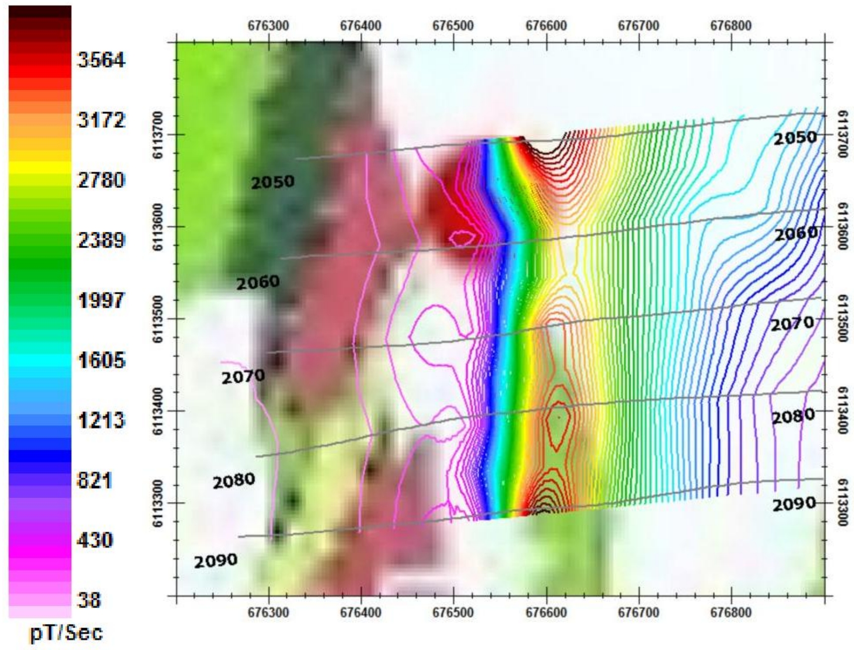
Late Time
Bz (Channel 23) – 95th percentile

In early time, there are two linear responses striking roughly 5 degrees east of north. The western anomaly marked with a yellow thick line is a strong conductor dipping to the east while the eastern conductor is flat lying and weak. The easterly anomaly could be lake bottom sediments although no information on lake depths are given. At late times , the western anomaly has migrated easterly but this is simply the dip to the mineralization. The eastern anomaly disappears at late time. The rock types underneath Keep lake are not given but where the lake splits at the south of this structure, felsic rocks are shown (right figure). An alteration showing is along strike to the south of the survey (middle figure).

Melgurd Lake South – Priority A, Target C South



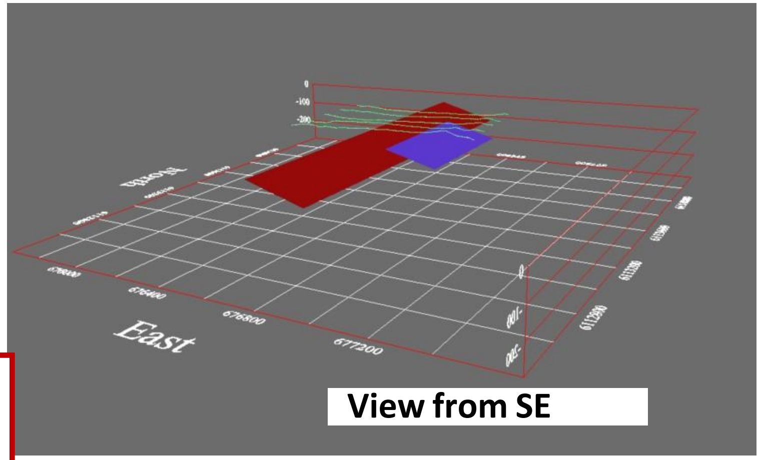
Target C is divided into two parts, south and north. The strike of the anomalies are slightly different and the northern portion is stronger is conductivity.

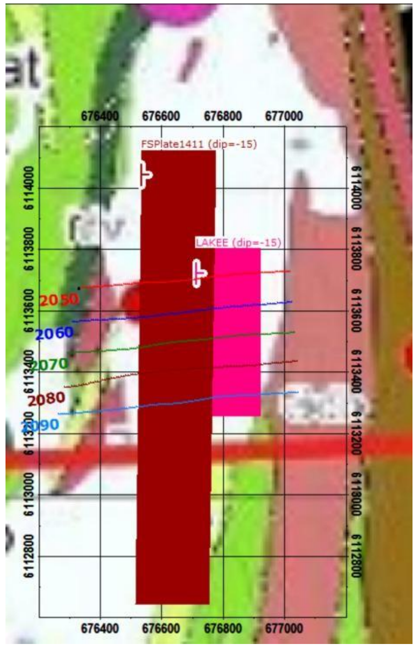


Mid Time
Bz (Channel 19) – 97th percentile

Anomaly A, TC -S Top
Strike Length: 550m
Dip Extent: 220m
Strike Angle: +0N
Dip Angle: 15 East
Conductance: 2.6 S
Depth to Top: 25m
Depth to Bottom: 80m

Anomaly A, TC -S Lower
Strike Length: 1480m
Dip Extent: 252m
Strike Angle: -1NW
Dip Angle: 16 East
Conductance: 10S
Depth to Top: 9m
Depth to Bottom: 77m

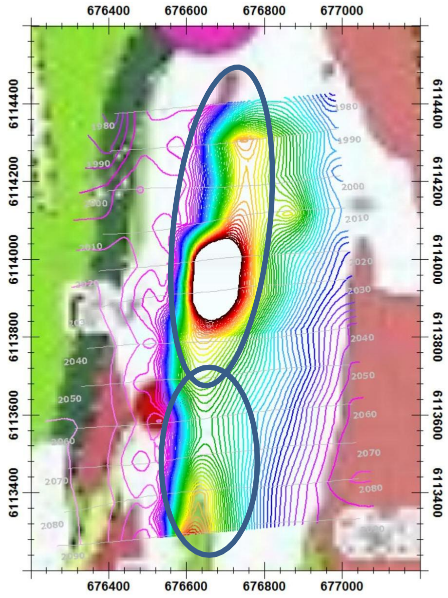




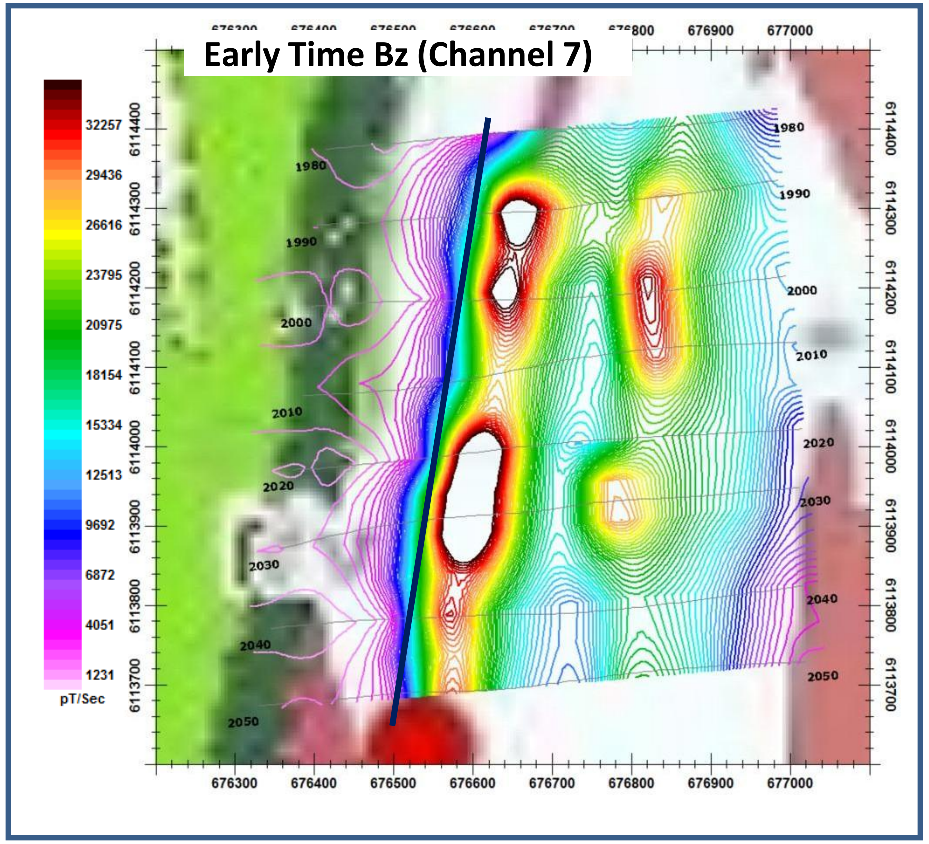
The upper anomaly while not very conductive and one may consider it to be due to lake bottom sediments. However, it starts at a depth of 25m implying a very deep lake but also it penetrates to some 80m in depth. This depth is not entirely accurate but is at least 60m.

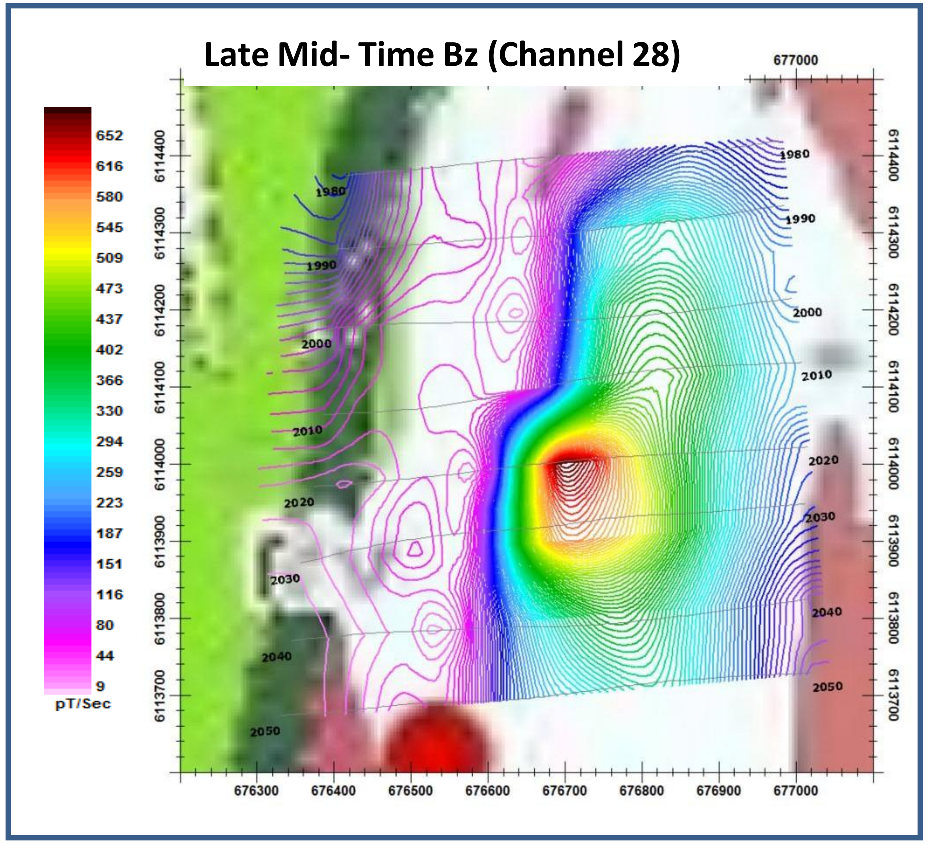
Additionally, to the anomalies there is a background resistivity response with a moderately conducting cover (sediments?) but the base below the thin cover is 500Ωm. In the Target C area, the bottom resistivity was far higher at 1000Ωm. There is no appreciable magnetic response beneath Keep lake.

Melgurd Lake South – Priority A, Target C North



Target C is divided into two parts, south and north. The strike of the anomalies are slightly different and the northern portion is stronger is conductivity.

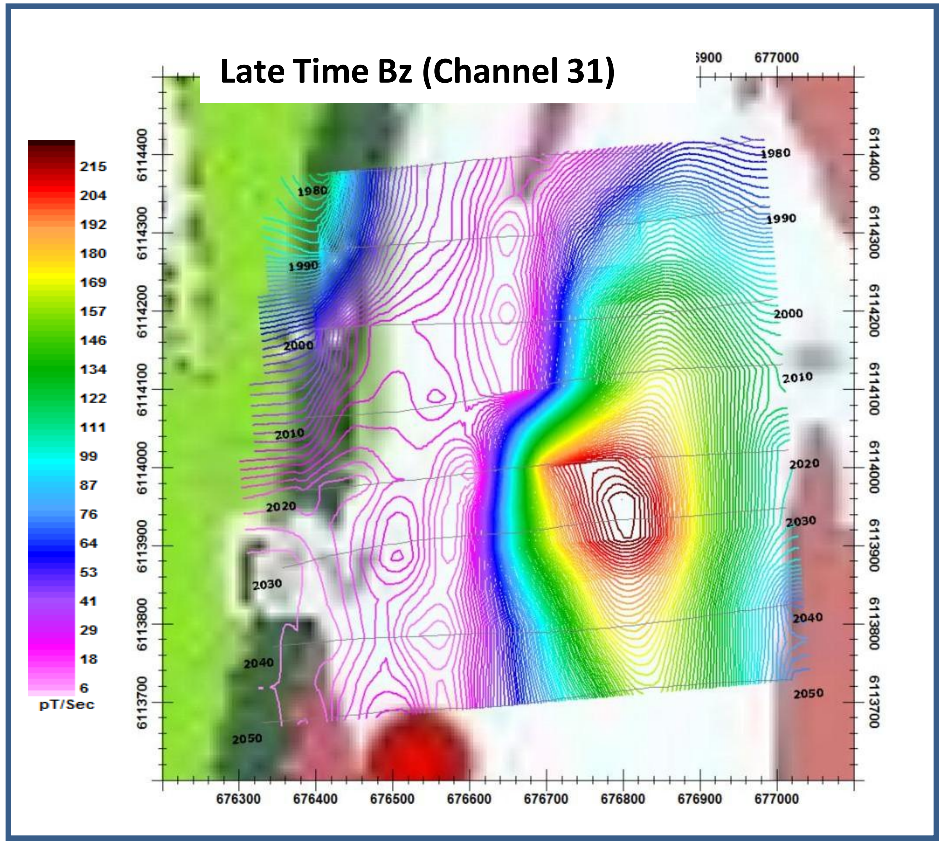


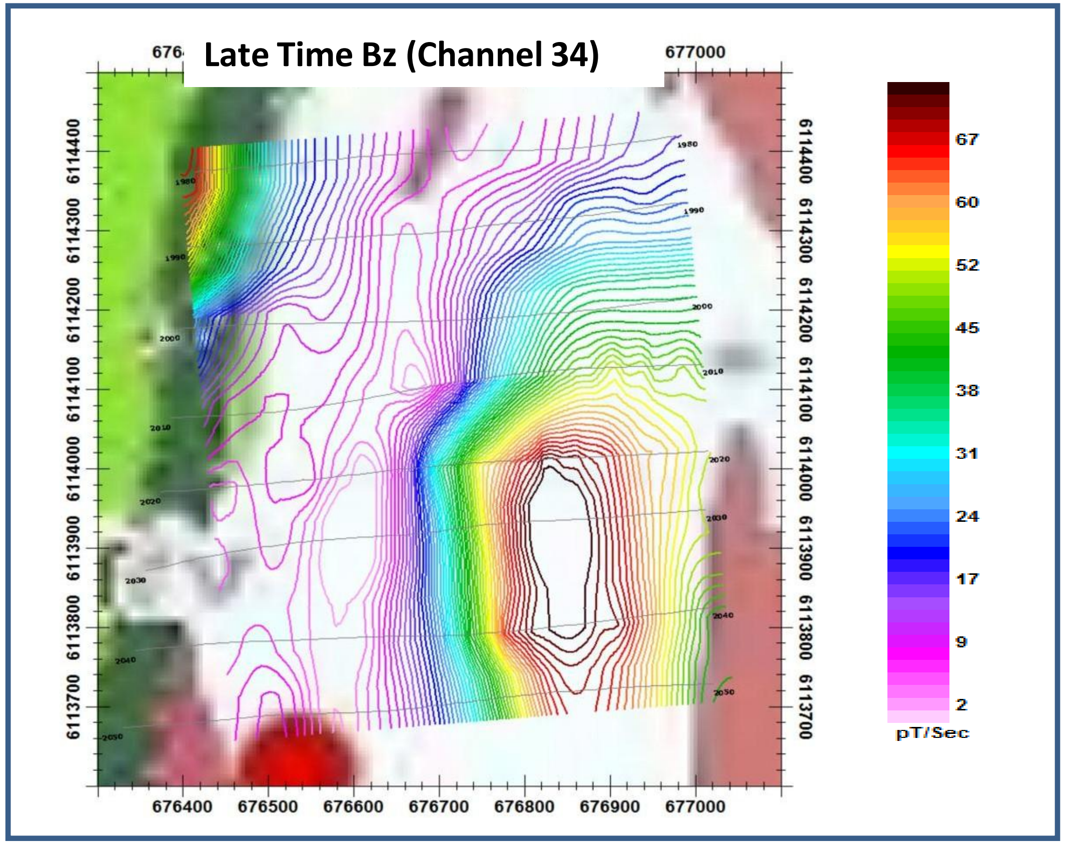


First, the basement resistivity being the response away from the conductors is much the same as for the area under Target B implying that likely the rocks beneath Keep Lake are also felsic. There are, in fact, 3 conductors beneath the lake. The larger conductor on the west of the lake is dipping to the east as indicated by the sharp boundary shown for Ch7 Bz on the left. The eastern anomaly is in fact weak indicating the possibility that these are thicker lake bottom sediments. However, this conductor also dips to the east.

The figure to the right is Bz for Ch28 being very late in the mid-time. There appears one main conductor but this response is primarily the response of the eastern conductor due to its dip. While the central area appears to have a stronger response, the plot is a bit deceiving as the green contours are in the region of 400 pT/sec while the red is only of the order of 600pT/sec and not much larger.

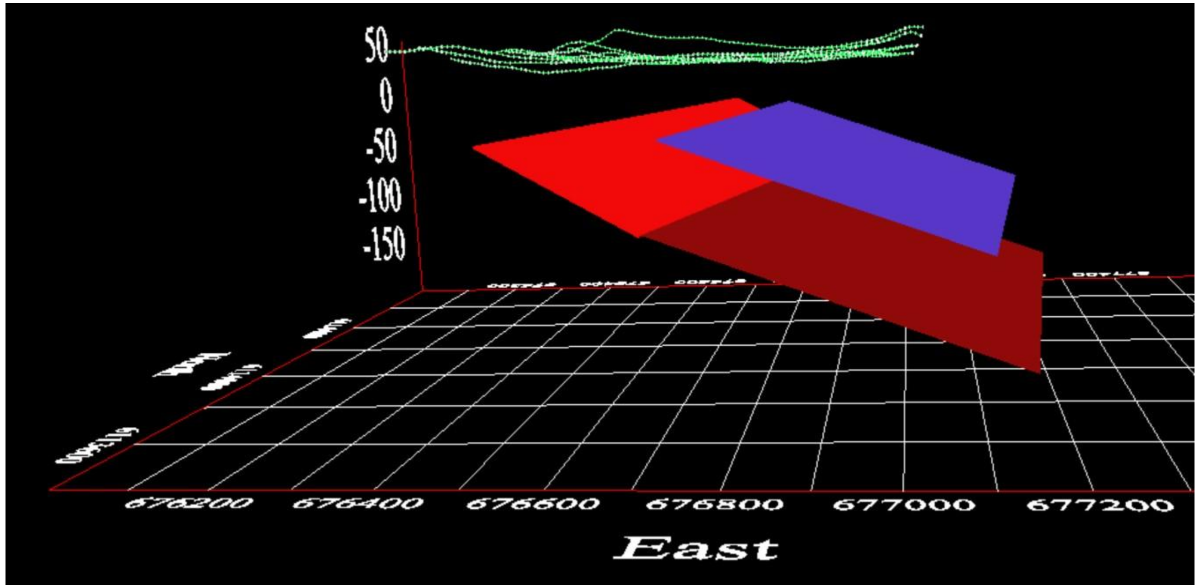
Melgurd Lake South – Priority A, Target C North



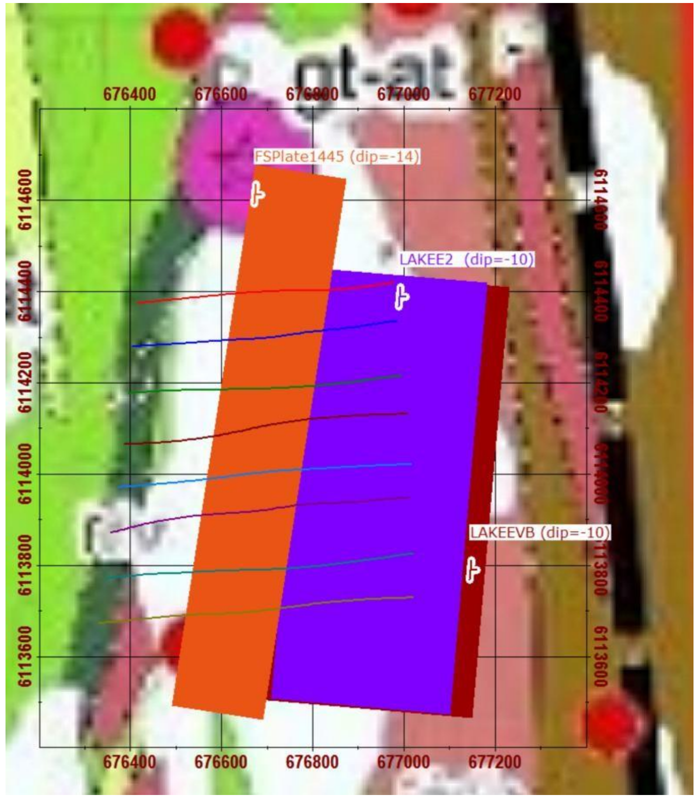


The left figure (Bz Chn 31) shows the response is now even further to the east but this is the deeper more conductive, eastern anomaly now appearing. Finally, Ch34 is shown now indicating that the deeper conductor is somewhat stronger to the south but not so significantly. Note, that the response is dropping off rapidly as it approaches the granodiorite-grantites implying again that the lake is underlain by felsic rocks.

Melgurd Lake South – Priority A, Target C North



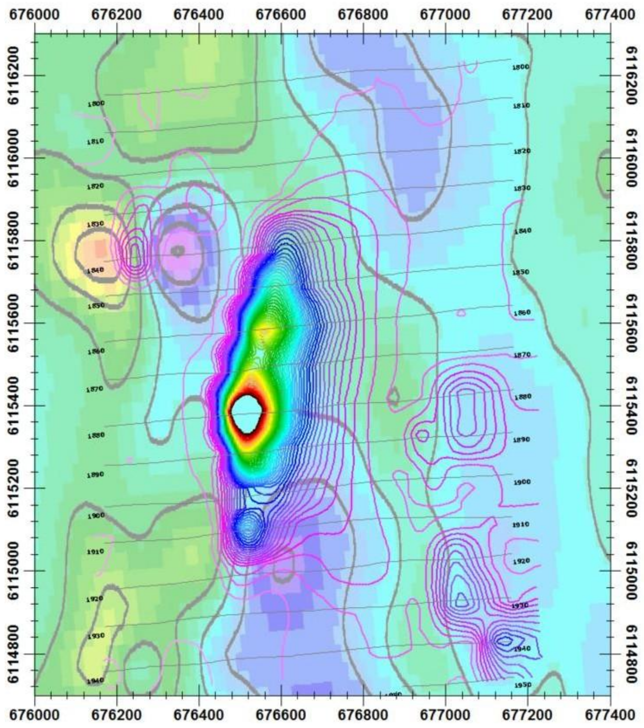
View from the South – vertical exaggeration x2



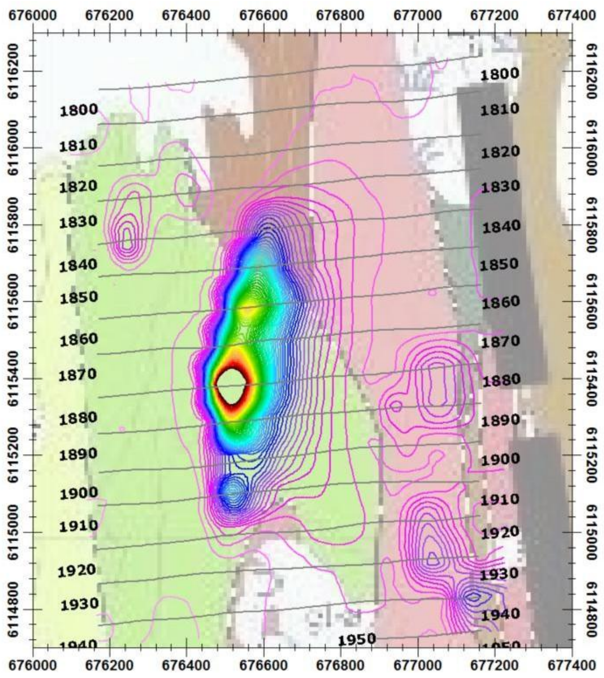
Priority A, TC N –Lake E	Priority A, TC N -Main	Priority A, TC N -DEEP
Strike Length: 950m	Strike Length: 1200m	Strike Length: 950m
Dip Extent: 400m	Dip Extent: 210m	Dip Extent: 500m
Strike Angle: 5° NE	Strike Angle: 9°NE	Strike Angle: 5°NE
Dip Angle: 10° East	Dip Angle: 15° East	Dip Angle: 10° East
Conductance: 1.5 S	Conductance: 9.25S	Conductance: 12S
Depth to Top: 15m	Depth to Top: 15m	Depth to Top: 65m
Depth to Bottom: 85m	Depth to Bottom: 67m	Depth to Bottom: 150m

This model is only approximate. The conductors are no uniform along their strike and so a type of average model is provided. Additionally, it must be understood the EM response is not simply due to the conductors but also there is a response from the overall geology. The conductors and the overall resistivity of the background rocks can interact producing a varied response. Also, if the conductors are magnetic this would also modify their EM response. None of these complexities which are hopefully minor have been explored due to two main reasons. First, investigating these possible variations to the response due to additional scattering phenomena would be much more time consuming and secondly, the quality of the data limits the certainty of more accurate interpretations.

Melgurd Lake Main Priority A – Central South–TARGET A

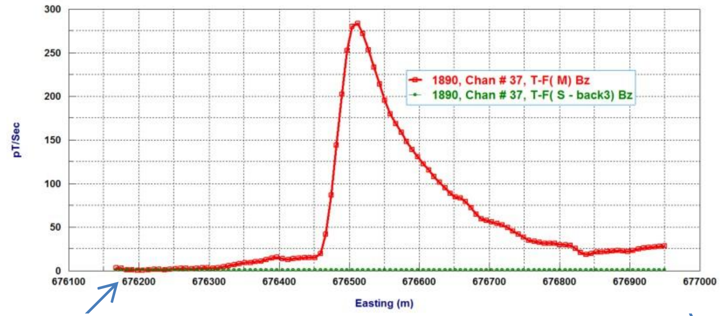


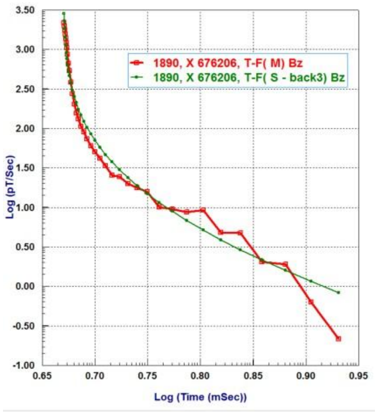
Ch33 Bz Target A (target 5 in original report)
Horizontal magnetic gradient underlay



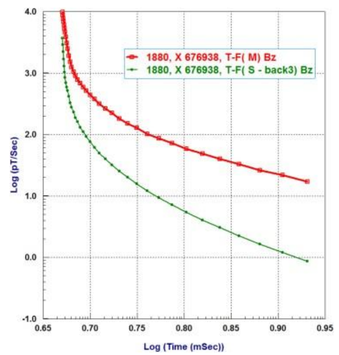
Ch33 Bz Target 5
Geology Underlay

Ch37 Bz L1890 data/background



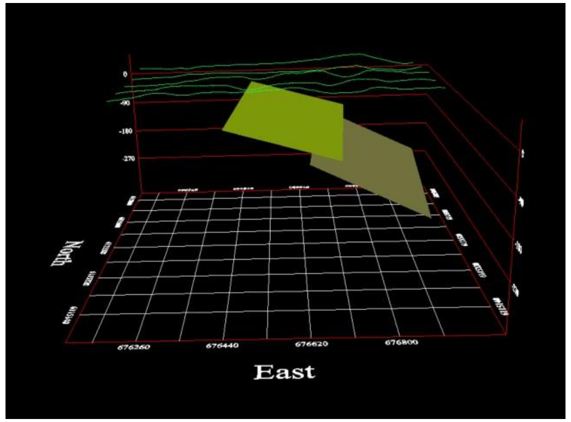


Bz L1890 east side data/background



There is a long thin strip of conductors down the centre of the main Melgurd survey. Towards the south is an isolated conductor (Target 5) which has one of the largest responses at late time of this strip of conductors down the centre. The figure to the left is this anomaly. It appears centered in a magnetic low of modest amplitude. The figure in the centre has the geology map underlain. To the right (at the top) we see the response of Bz for Ch37 along L1890 over the conductor. Again, as in many of the other examples, there is a similar shape of the response indicating a target dipping to the east. In this area, there is again conductive material underlying the isolated conductor but here the resistivity of the basement in the model shown (green) is 125Ωm. Still unusually conductive in such a geological environment but not so dramatic as in for Target 4.

Melgurd Lake Main Mid-West – Priority A Target A



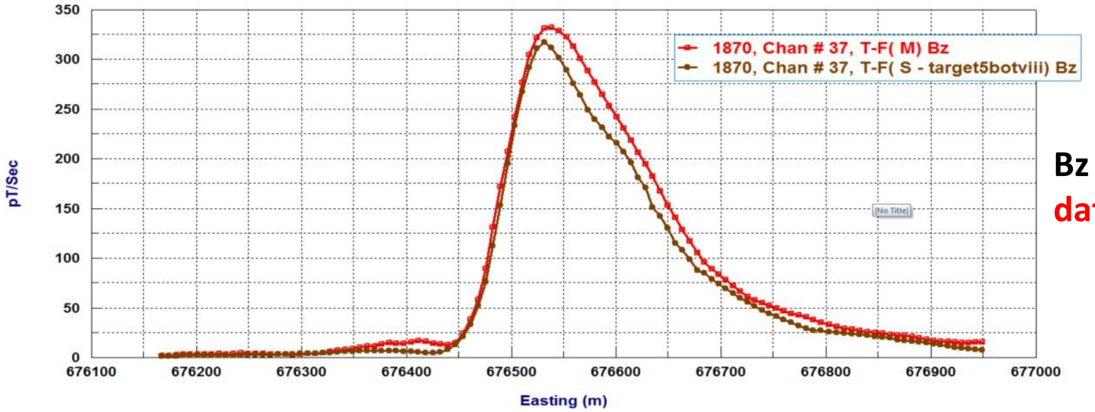
Priority A Target A (5)
View from South

Priority A TA Top
Strike Length: 550m
Dip Extent: 280m
Strike Angle: +5°NE
Dip Angle: 15° East
Conductance: 60 S
Depth to Top: 20m
Depth to Bottom: 22m

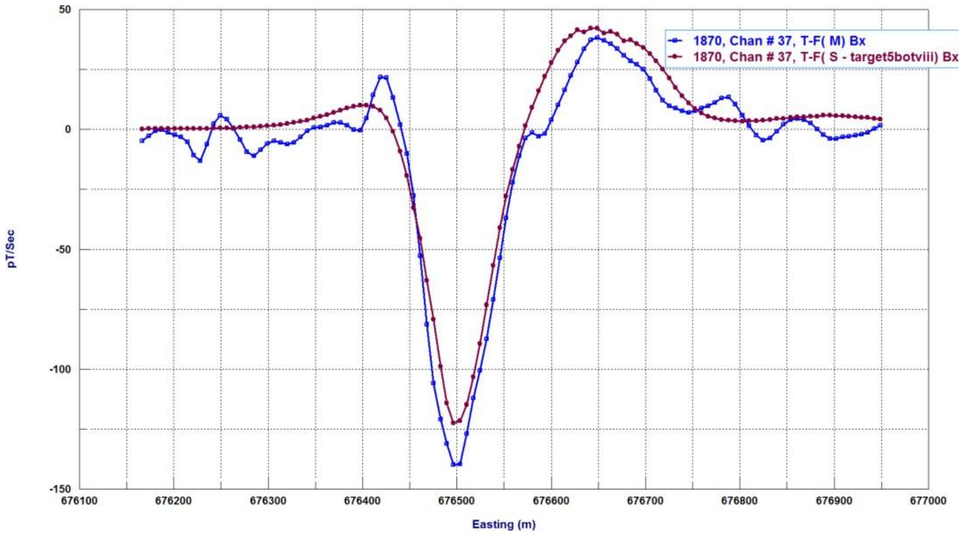
Priority A TA bottom
Strike Length: 550m
Dip Extent: 300m
Strike Angle: +5°NE
Dip Angle: 25° East
Conductance: 60 S
Depth to Top: 98m
Depth to Bottom: 225m

Again, there appears a very smoothly dipping response to the east in Bz. Bx indicates the main area of the anomaly while the eastern data on these lines for Bx may simply be noise although why such smooth noise is the question in regards to the processing of this data.

The bottom part of the model generating the eastern tail of the Bz response is seemly appropriate but the reader should be warned that the details of the eastern side of this anomaly is anything but certain.

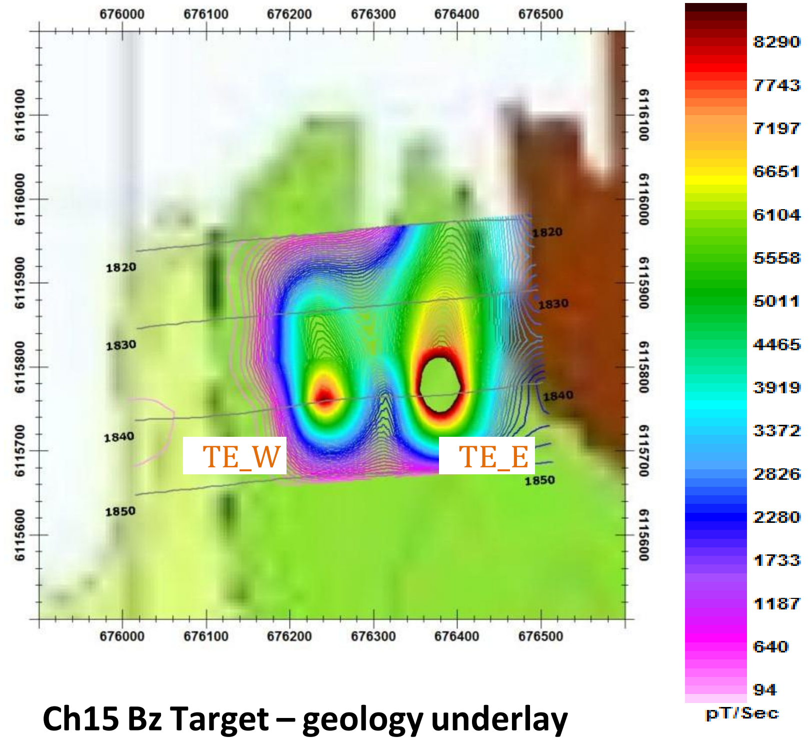


Bz Ch37 L1870
data/model

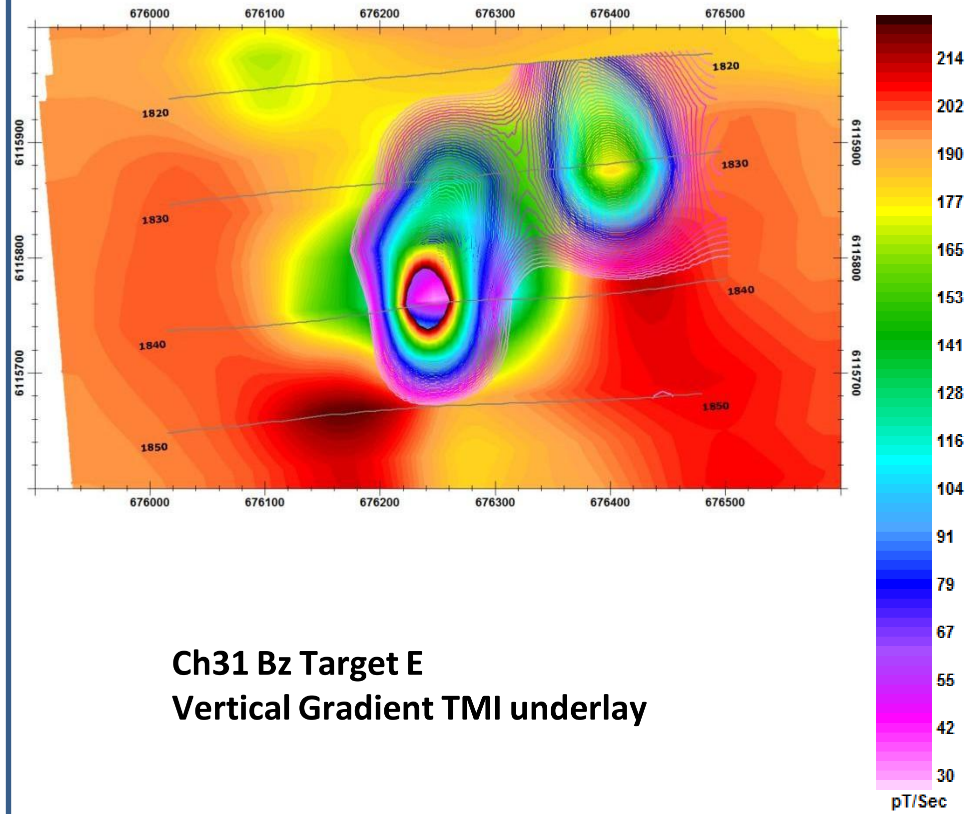


Bx L1870 data/model

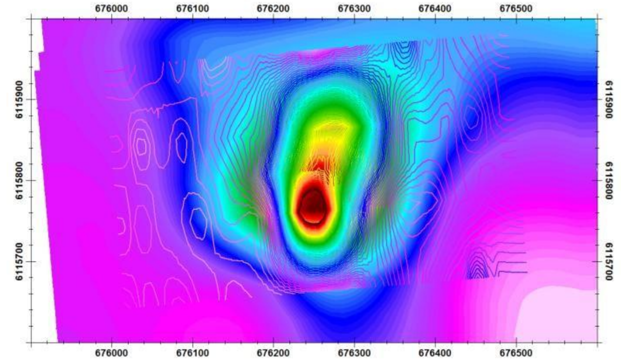
Melgurd Lake Priority A – Central South–TARGET E



Ch15 Bz Target – geology underlay



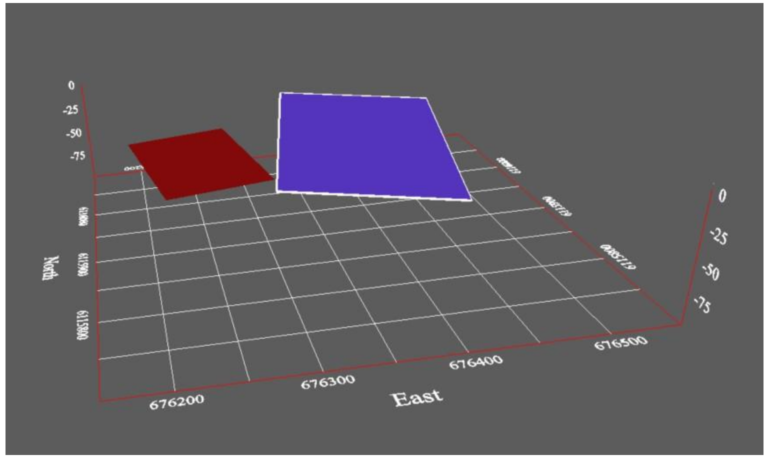
Ch31 Bz Target E
Vertical Gradient TMI underlay



37 Bz Target E
TMI underlay

In this area, just on the south edge of Scott Lake, there are two conductors as well as a strong centralized magnetic anomaly. While the eastern anomaly, TE_E, seems the strongest at last early time (left figure), by mid-late time (central figure), the western anomaly (TE_W) has the strongest anomaly. By the very late time (right figure), the eastern anomaly as disappeared and the western anomaly is still strong. The magnetic coincides almost exactly with the EM anomaly (centre and right figures). The response of the eastern anomaly is due to a shallow weak conductor to the south and a more conducting slightly deeper conductor to the north. Thus by late time, the eastern response has moved north from the position of the early time responses.

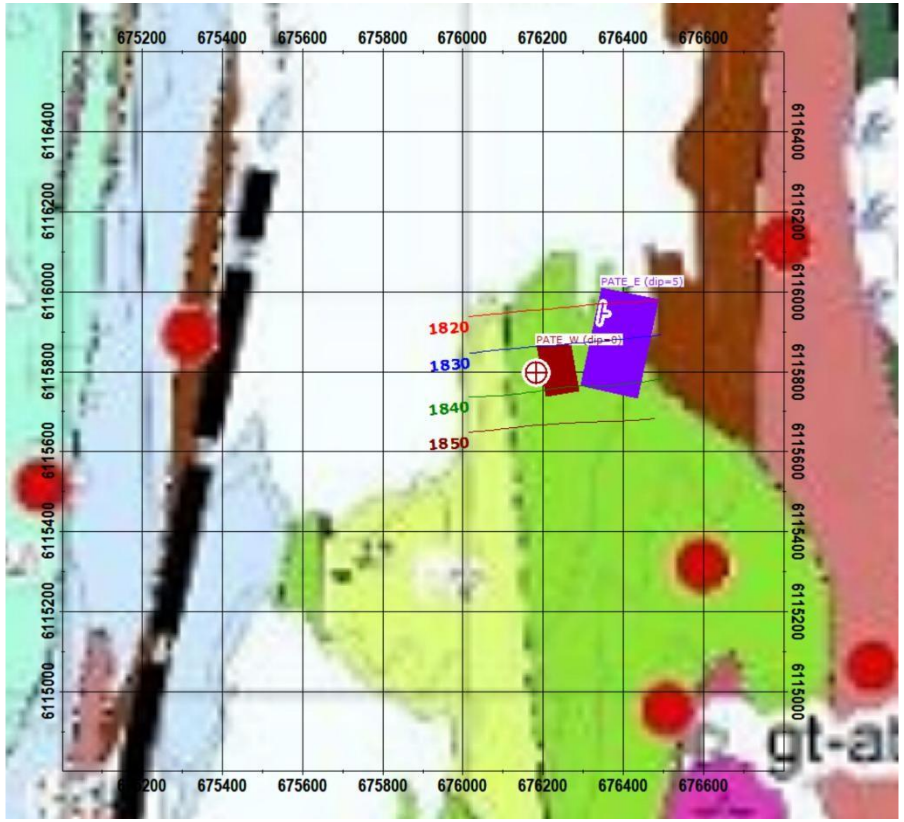
Melgurd Lake Priority A – Central South–TARGET E



Priority A Target E
View from South

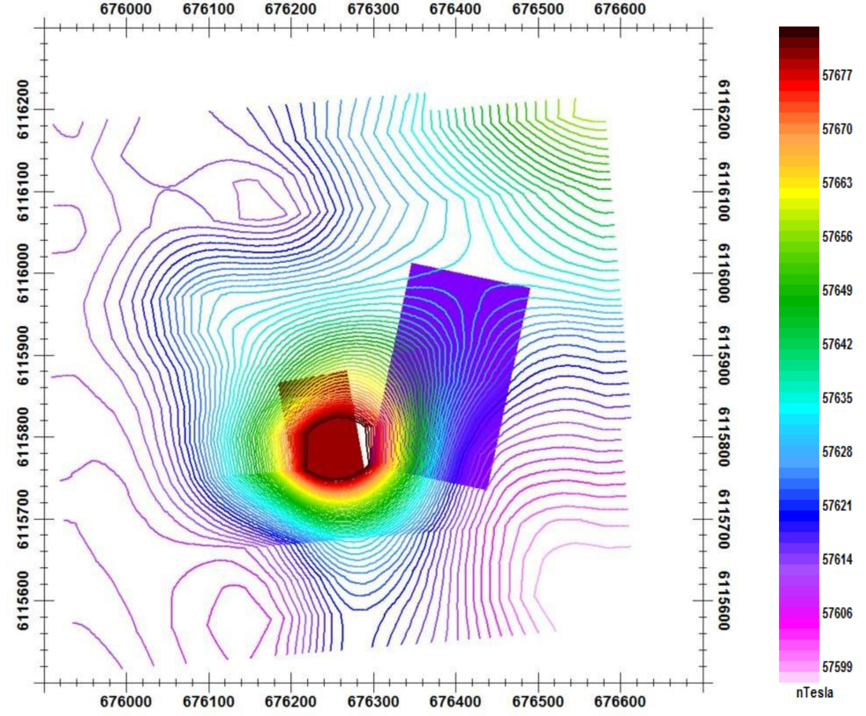
Priority A TE West
Strike Length: 130m
Dip Extent: 85m
Strike Angle: -10°NW
Dip Angle: 0° East
Conductance: 35 S
Depth to Top: 14m
Depth to Bottom: 14m

Priority A TE East
Strike Length: 353m
Dip Extent: 148m
Strike Angle: +12°NE
Dip Angle: 5° East
Conductance: 16 S
Depth to Top: 29m
Depth to Bottom: 41m

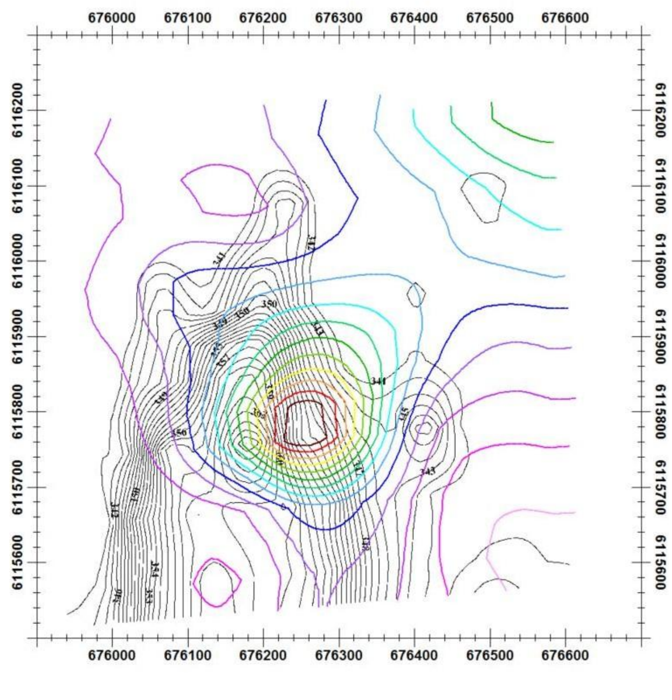


The eastern anomaly although weaker and shallower than the western anomaly appears stronger at earlier times due to the size of the anomaly. By late time, the deeper but more conductive western anomaly which coincides with the heart of the magnetic anomaly dominates the EM response. Again, there is a small weak shallow conductor above the south end of the eastern anomaly (not shown).

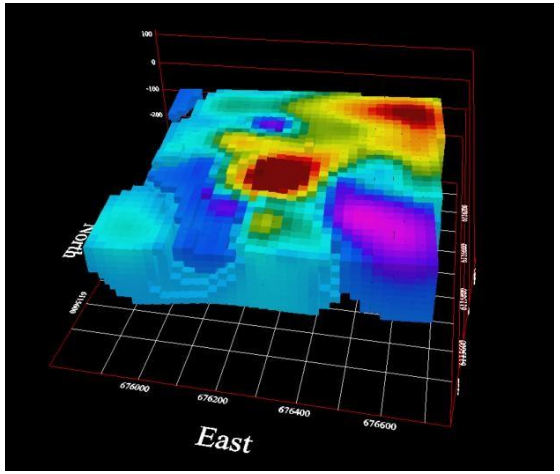
Melgurd Lake Priority A – Central South–TARGET E - Magnetics



Total Field with EM targets



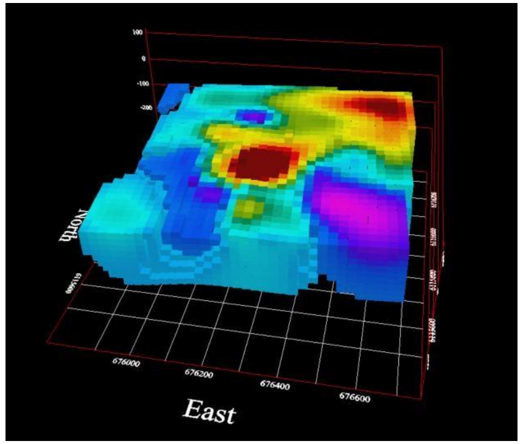
Total Field with topography underlay

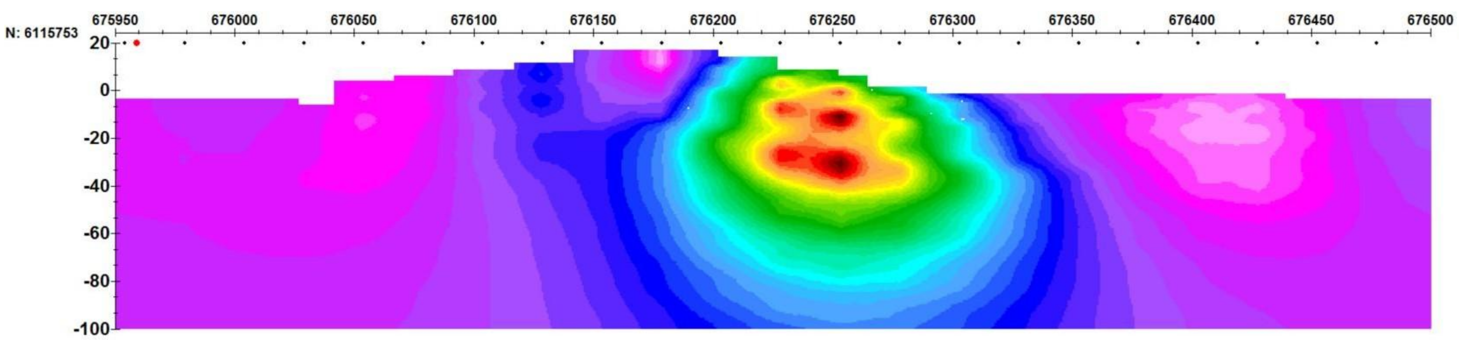


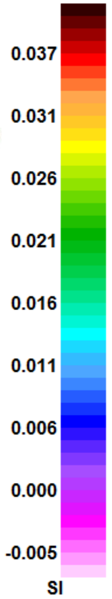
Magnetic Inversion Model sliced at 80m depth

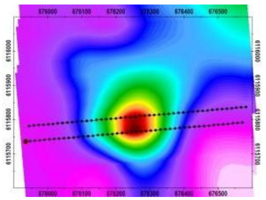
The magnetic response is concentrated over the western EM anomaly (PATE_W). The magnetic response is also contained beneath the eastern slope of a slight rise in the ground level on the eastern edge of a slight hill which at its maximum is about 25m above the surrounding ground. The susceptibility of the magnetic materials is estimated to be a maximum of 0.04SI which is quite high. From the inversion results, the magnetic material could appear on the surface. At depth, the inversion indicates the magnetic material trends NE along the axis on the eastern EM anomaly (PATE_E) and then expands in size to the NE.

Melgurd Lake Priority A – Central South–TARGET E - Magnetics

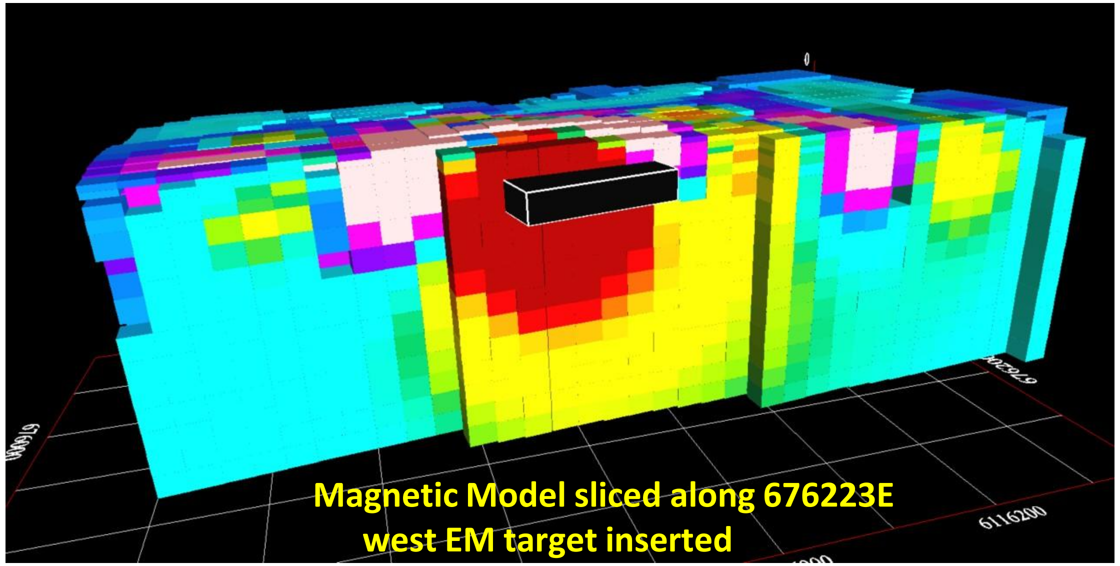








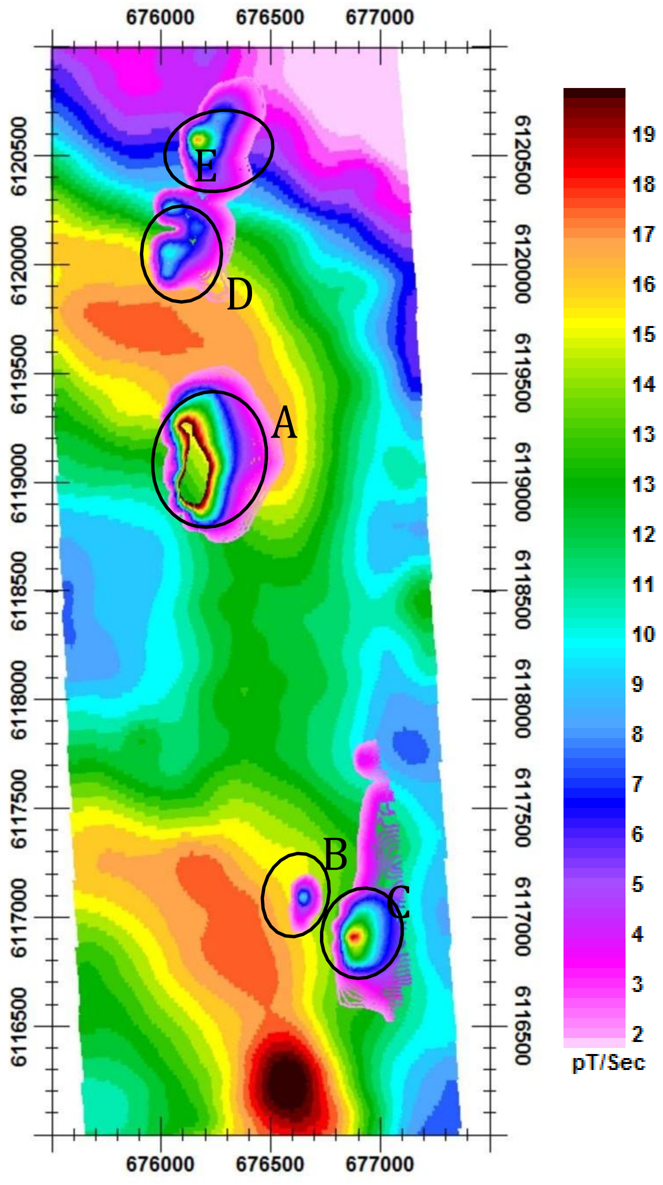
Magnetic Inversion Model sliced through highest magnetization from (675950, 6115753) to (676500,6115825)



Magnetic Model sliced along 676223E west EM target inserted

The magnetic inversion model is sliced to a cross section through the middle of the magnetic high. The magnetic target is shallow although the strongest magnetization is not immediately at surface. Upper left figure is a slice at a depth of about 60m. The upper figure is a cross section through the middle of the model and the bottom left figure is a NS slice through the heart of the anomaly with the west EM model inserted (black rectangular prism). Note: EM model has no thickness due to the algorithm and the fact that generally we only “see” the top of the EM body with a system such as Xcite. Here we have given it a thickness to make it more visible in the figure.

Melgurd Lake South – Priority B Central

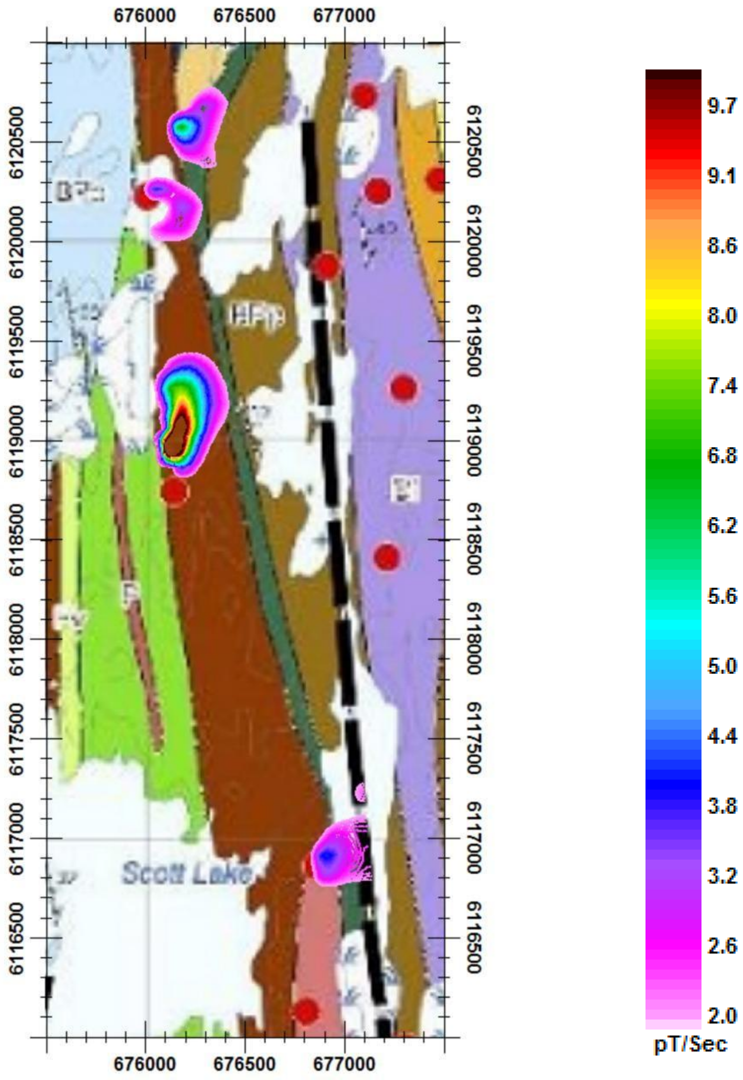


Bz (Channel 20) – 17th percentile magnetic underlay

In the area, designated as Priority B, there are 5 reasonable EM anomalies – A-E. Two the anomalies lie in mafic rocks while the other three apparently are in the Burnside Group. The EM responses are relatively weak and show decay rates indicating lower levels of conductance.

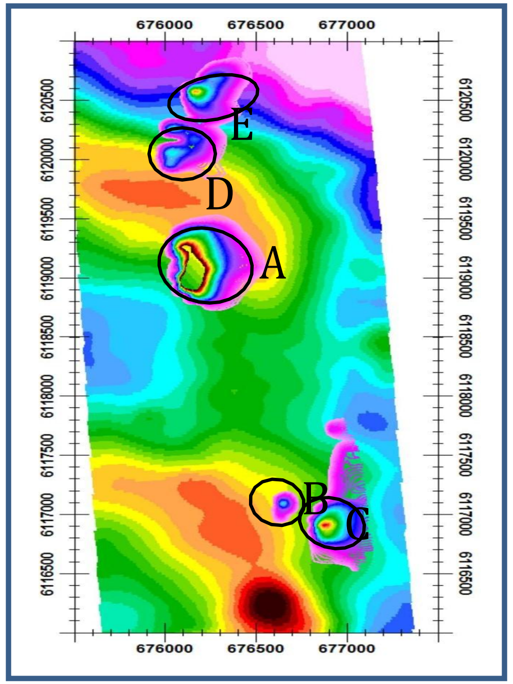
Three EM anomalies lie on the edge of magnetic anomalies (A,B and D) while the remaining (C,E) are in areas of the weak magnetic response.

Anomaly A, is the strongest response and is the only anomaly have a response above noise levels at late time (Ch 30 – 6.13msec).

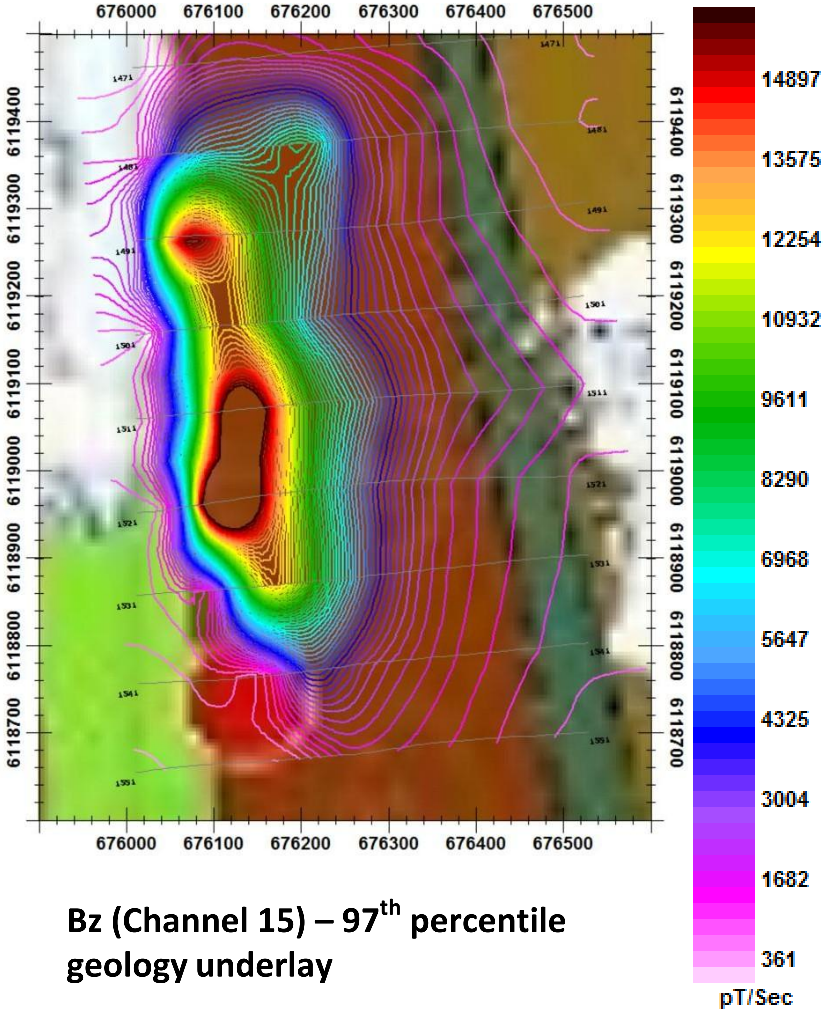


Bz (Channel 24) – 7th percentile geology underlay

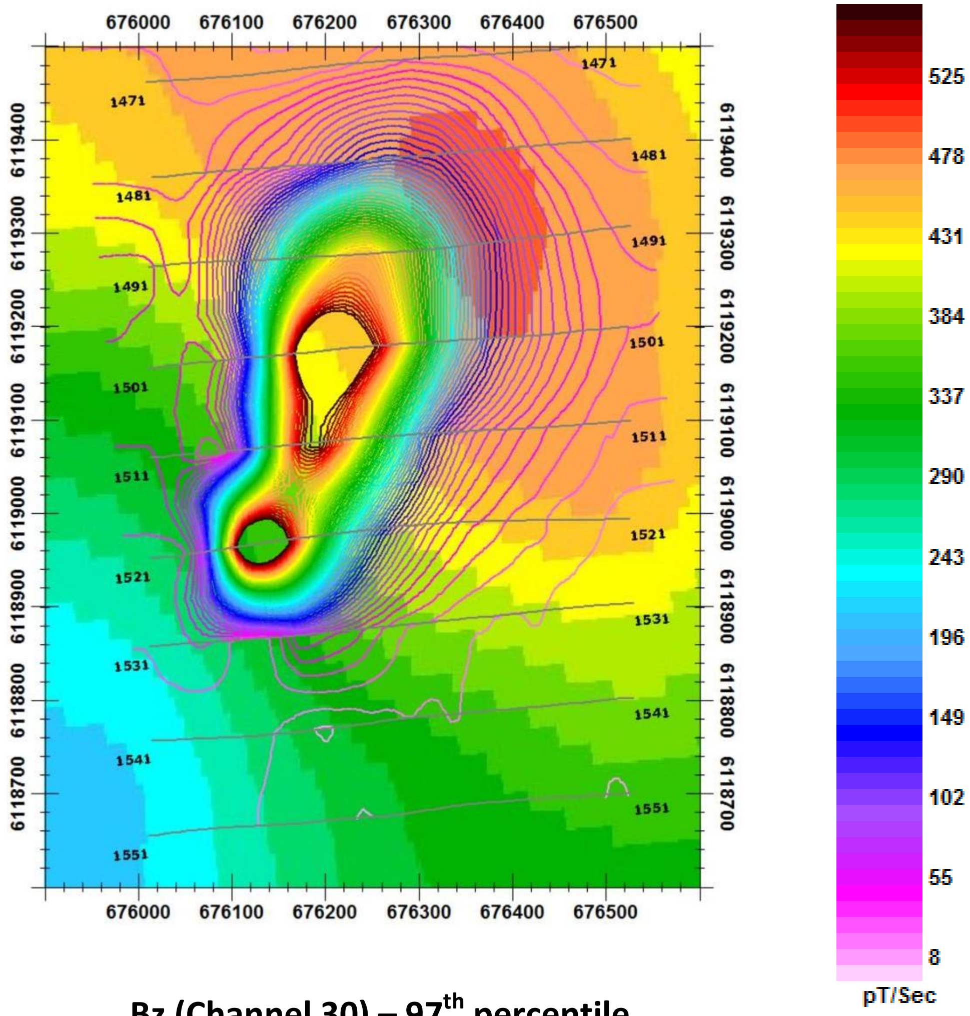
Melgurd Lake South – Priority B Target A - PBTA



At late early time, the strike of Target A is approximately -5NW but the strike constantly moves towards the NE until by late time (right figure), the strike is roughly 30° NE. By very late time, only the NE nodule of PBTA continues to exist.



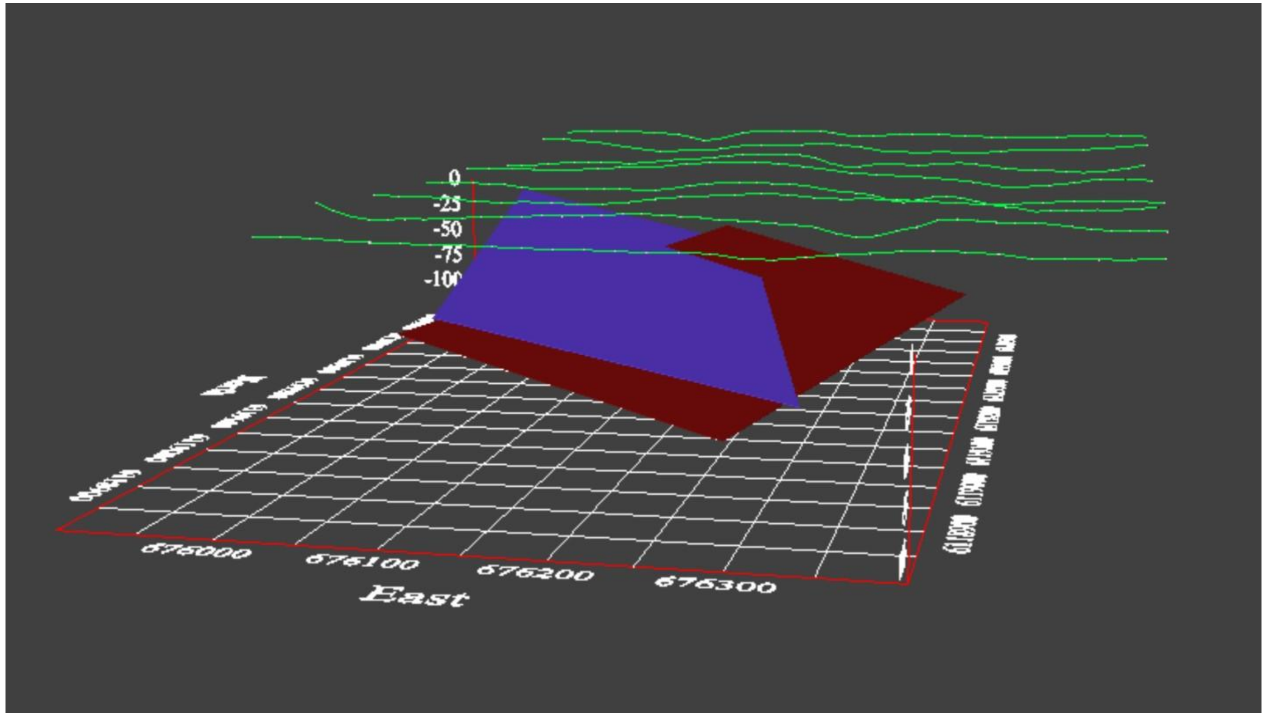
Bz (Channel 15) – 97th percentile geology underlay

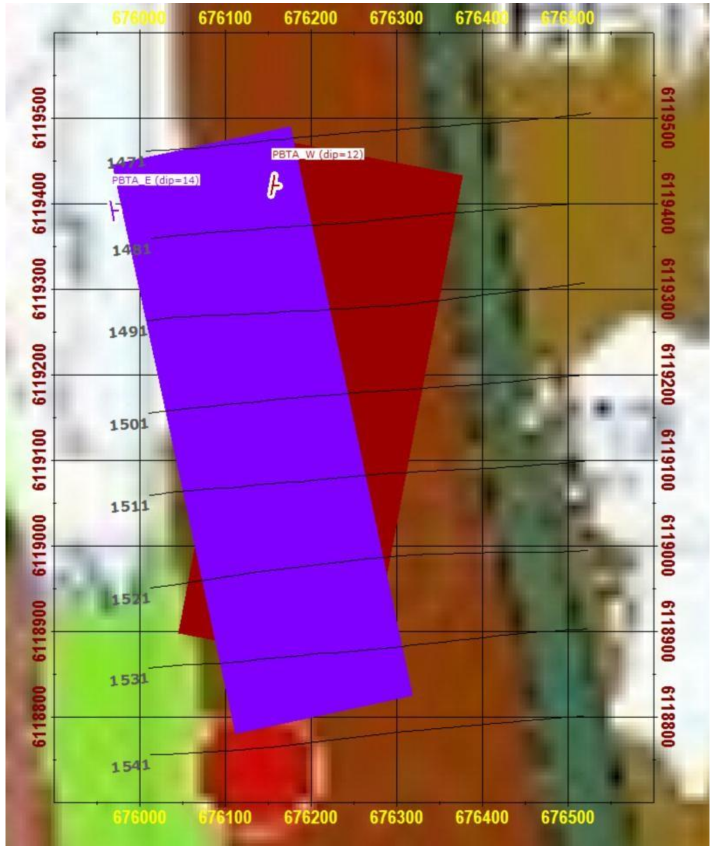


Bz (Channel 30) – 97th percentile aeromagnetics TMI underlay

Melgurd Lake South – Priority B Target A - PBTA

Xcite Airborne EM and Magnetics Analyzes, 2024 Boreal Gold





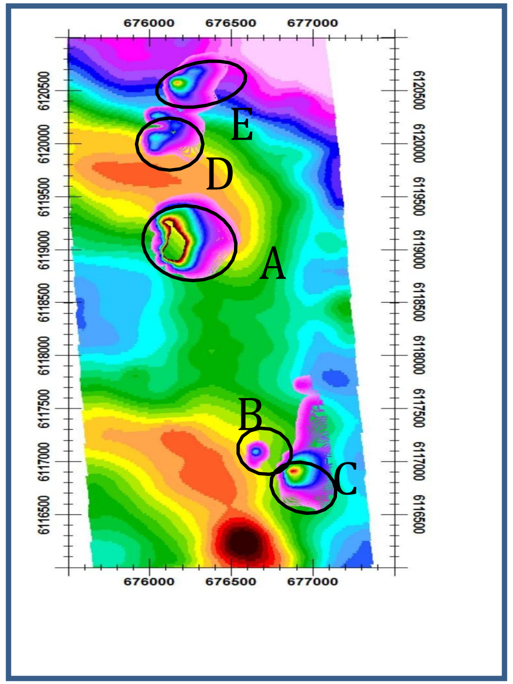
View from the South –

Priority B, TA W	Priority B, TA E
Strike Length: 680m	Strike Length: 588m
Dip Extent: 220m	Dip Extent: 232m
Strike Angle: -12° NW	Strike Angle: 10.8°NE
Dip Angle: 14° East	Dip Angle: 12.6° East
Conductance: 6.4S	Conductance: 18S
Depth to Top: 1.5m	Depth to Top: 35m
Depth to Bottom: 55m	Depth to Bottom: 84m

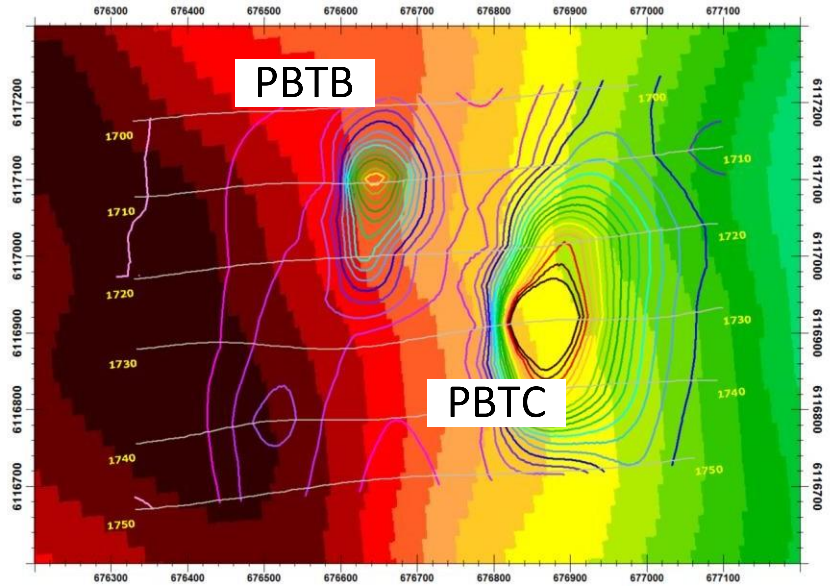
The two conductors are not the whole story in regard to the full EM response. The background resistivity indicates the normal moderately low resistivity of the cover (about 300Ω) but below the top cover there is about 100m of low conductive material (25 Ωm) followed below by very high resistivity. The resistivity of the host rocks cannot be determined from the response over the conductors but rather, particularly to the east when the responses of the conductors have fallen off, there is a consistent background response at the ends of the profile segments in this area. This background resistivity can be determined from the data away from the response of the conductors. This could be interpreted as the Burntwood group being quite thin in this area and being underlain by the felsic rocks.

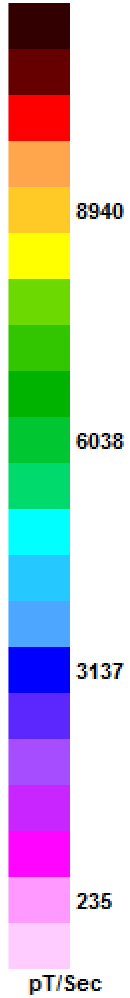
The structures are continuously conductive but not with exactly uniform conductivity throughout the structures.

Melgurd Lake South – Priority B – PB TB & C



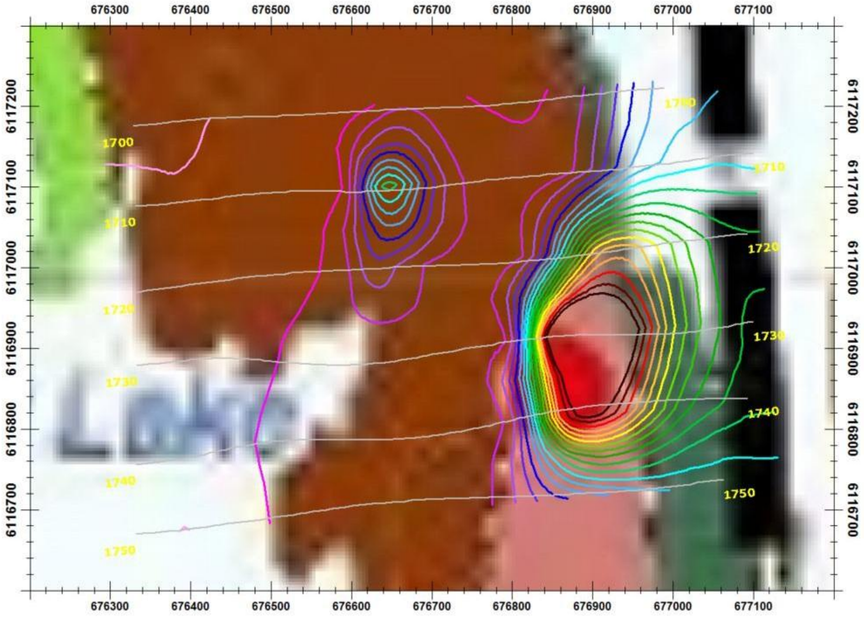
Both EM anomalies lie in an area of very strong magnetic gradients. Target C is at a point of granodiorites wedged between the Burntwood Group and mafic volcanics.

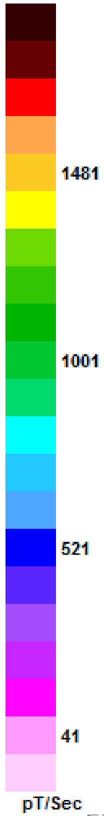




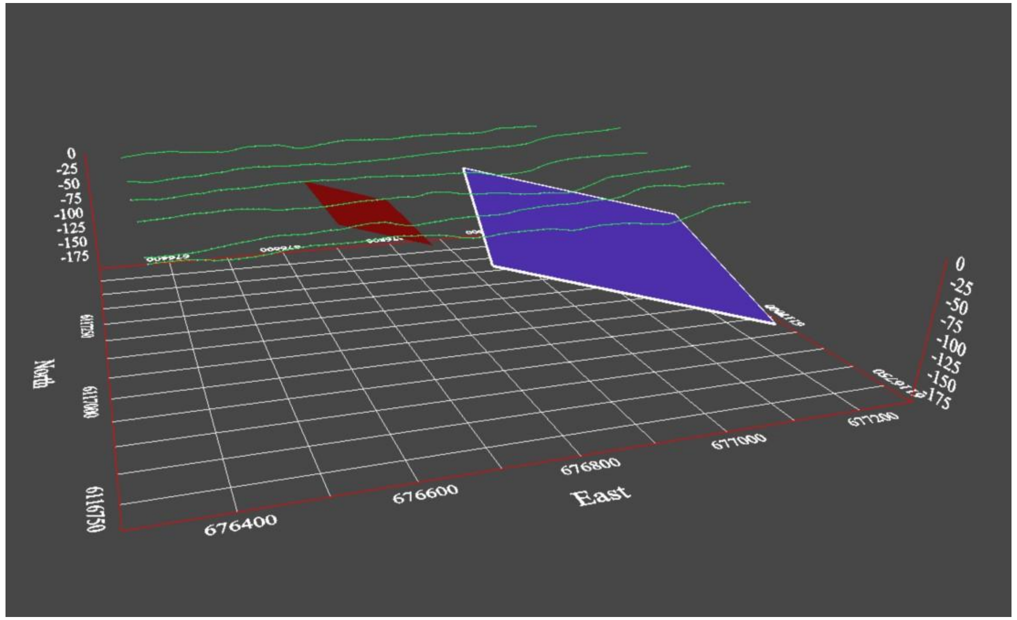
Bz (Channel 15)
aeromagnetics TMI underlay

Bz (Channel 22)
geology underlay

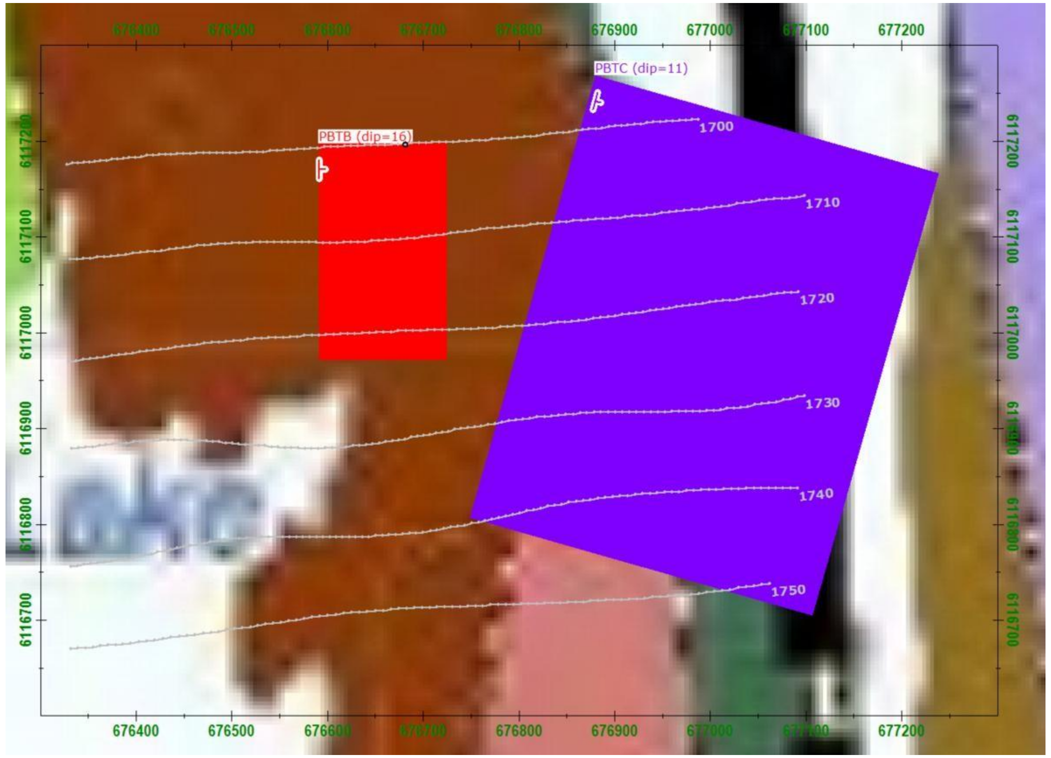




Melgurd Lake South – Priority B – PB TB & C



View from the South –



Priority B, PBTC
Strike Length: 480m
Dip Extent: 382m
Strike Angle: 16° NE
Dip Angle: 12° East
Conductance: 6.5S
Depth to Top: 24m
Depth to Bottom: 102m

Priority B, PBTC
Strike Length: 226m
Dip Extent: 140m
Strike Angle: 0°N
Dip Angle: 16.9° East
Conductance: 8S
Depth to Top: 8.7m
Depth to Bottom: 49m

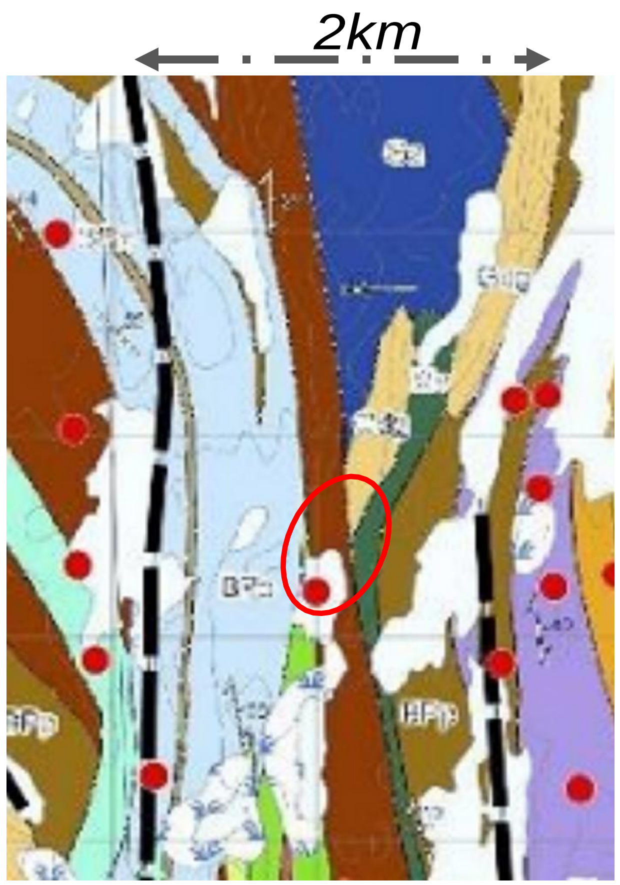
The background resistivity response in which the conductors are hosted is more similar to the southern conductors. The data indicates a moderate weathered cover of about 110 Ωm with a relatively resistive basement (2000Ωm).

The structures are not particularly conductive but PBTC is a relatively large conductor.

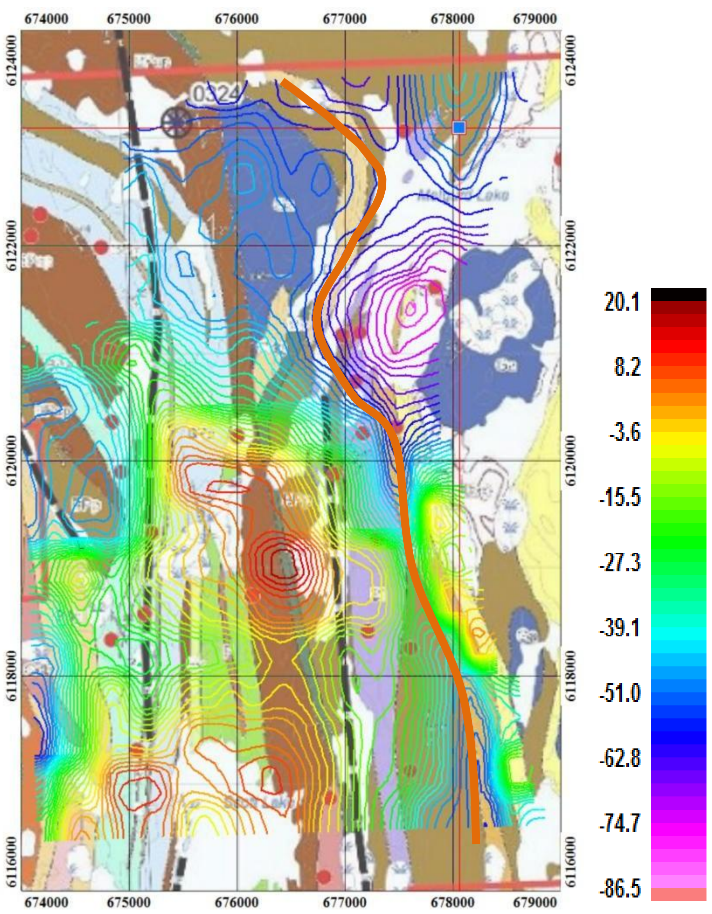
Melgurd Lake – Priority B –

Some issues in regard to the aeromagnetic responses

This is an interesting area in regard to the magnetic response as there is a great confluence of rock structures occurring where targets D and E occur (left figure red ellipse). Unlike, in most surveys, there is little correlation between the geology of the hard rocks and the magnetic data. As a check, we downloaded data from the GSC site. In 2007, the GSC had a fixed wing survey flown by Sanders (Ottawa) called the Hanson Survey and the Melgurd Lake claims lay in the survey area. This survey was flown at approximately 125m ground clearance. The Axiom survey was flown with the magnetometer at an average height of approximately 80m. The Axiom data is, however, too noisy to use at the nominal height and thus we have upward continued it to 125m for comparison. The residual (TMI – IGRF) is plotted below for both the GSC data (center) and the axiom data. The only obvious correlation between the geology map and the aeromagnetic data is outlined in orange on the central map. Magnetic inversion images are in the following pages.

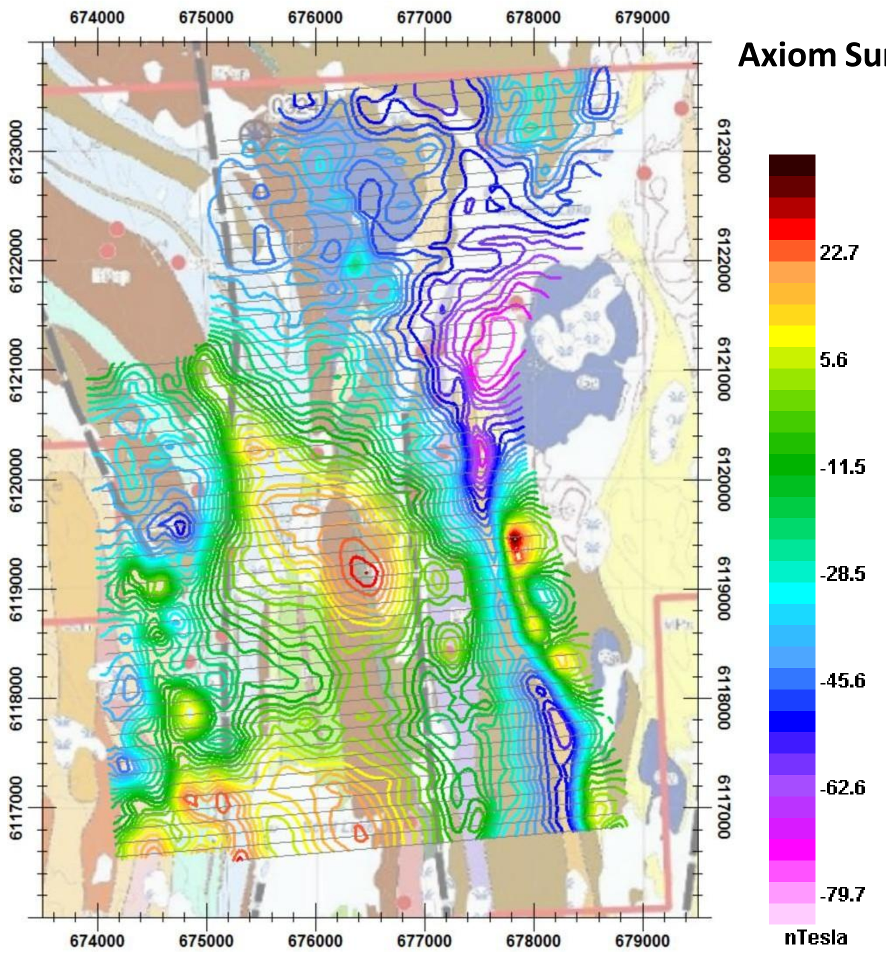


Focused Geology map of the area



GSC Hanson Survey - Residual

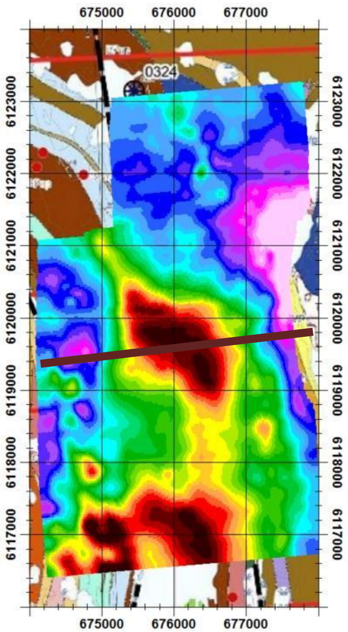
Axiom Survey - Residual



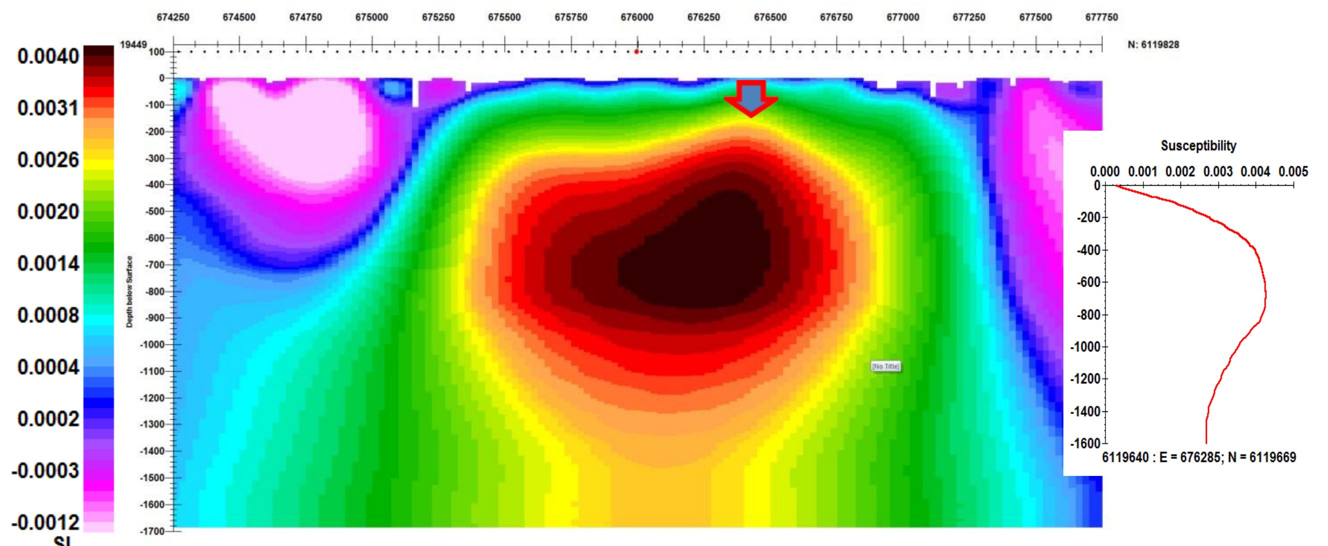
Melgurd Lake – Priority B –

Some issues in regard to the aeromagnetic responses

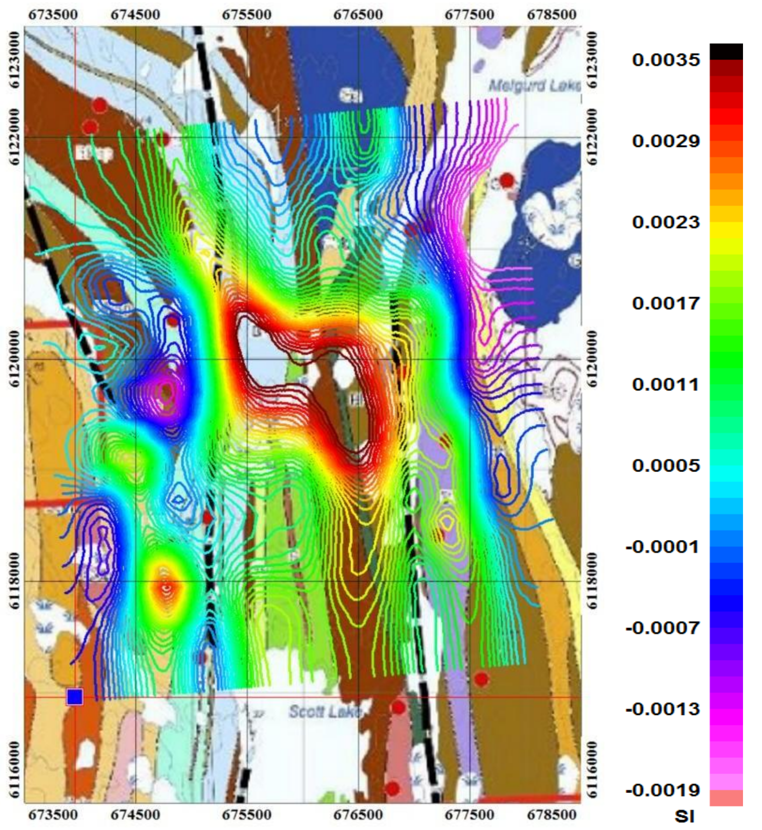
It would appear from the magnetic data that the geology map is only superficial. The central area is large, deep and magnetic pressed into what must be granitic rocks given that they have negative susceptibility. On the left is the map of the aeromagnetic data at an elevation of 125m with the brown line showing the location of the cross section shown in the middle plot. The large magnetic response shown on the left map is caused by magnetic material from depths of 400 to 800m below surface. On the right is the susceptibilities at a depth of 400m



Line of inversion cross section



Magnetic Inversion cross section relative ground level

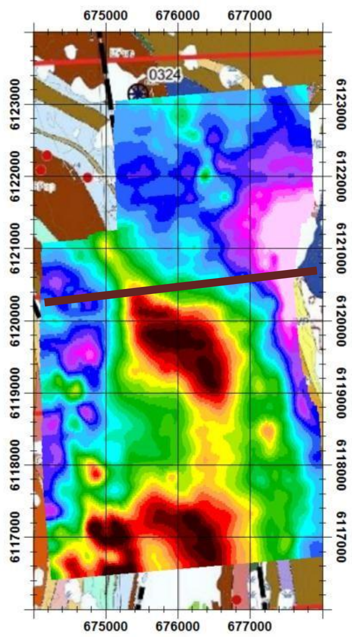


Magnetic Inversion depth section at 400m depth

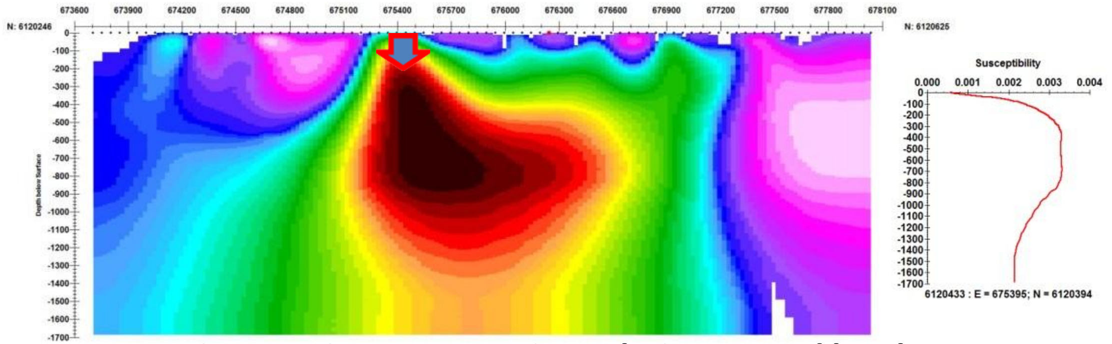
Melgurd Lake – Priority B –

Some issues in regard to the aeromagnetic responses

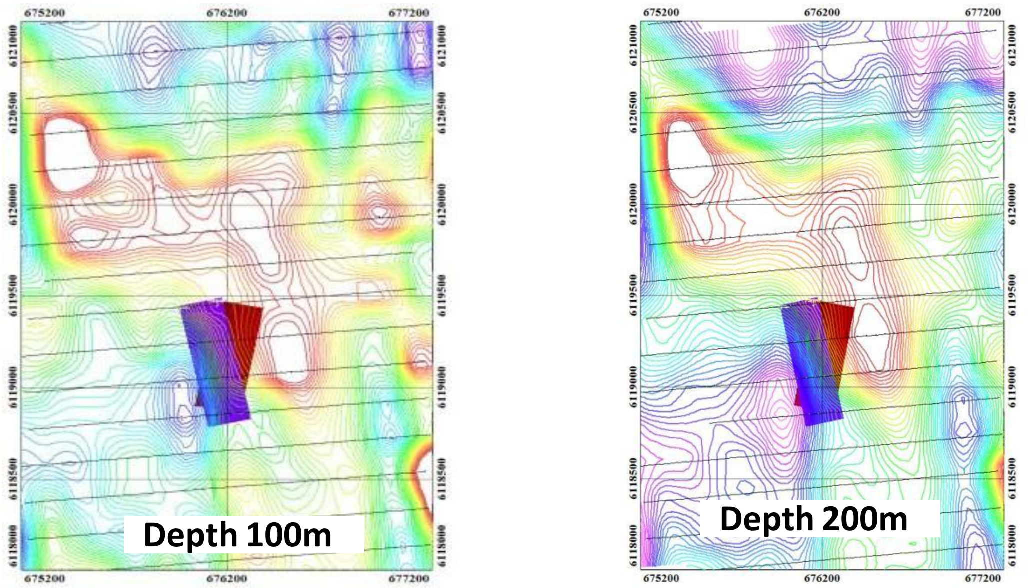
The cross section below is to the north crossing the handle type response leading to the NW. Here, the magnetic material comes to surface. To the right are the susceptibilities at 800m depth. The line plots give the susceptibility with depth at the location shown below the line plot. At the bottom, we show the inversion at a depth of 100m and 200m with the projection of the model PBTA (pg 58).

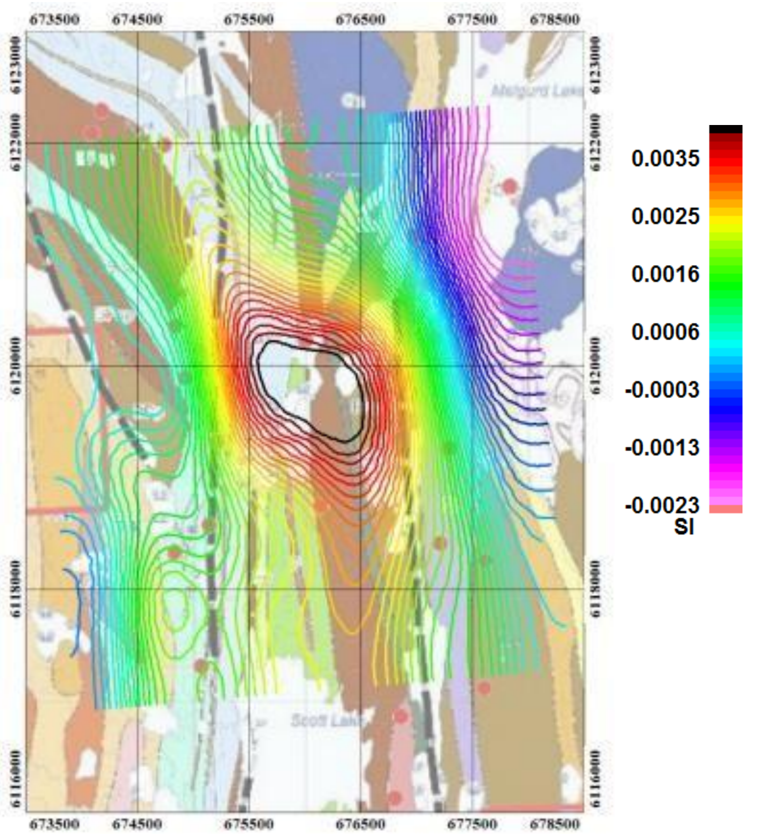


Line of inversion cross section



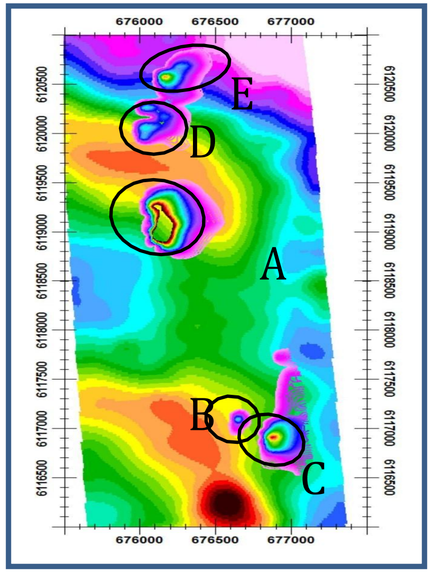
Magnetic Inversion cross section relative ground level

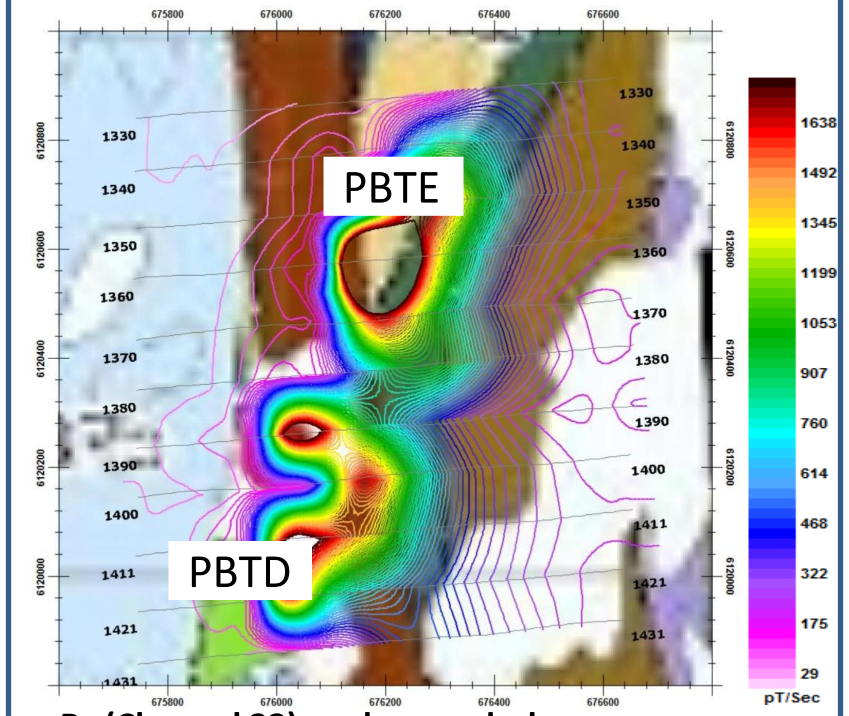




Magnetic Inversion depth section at 800m depth

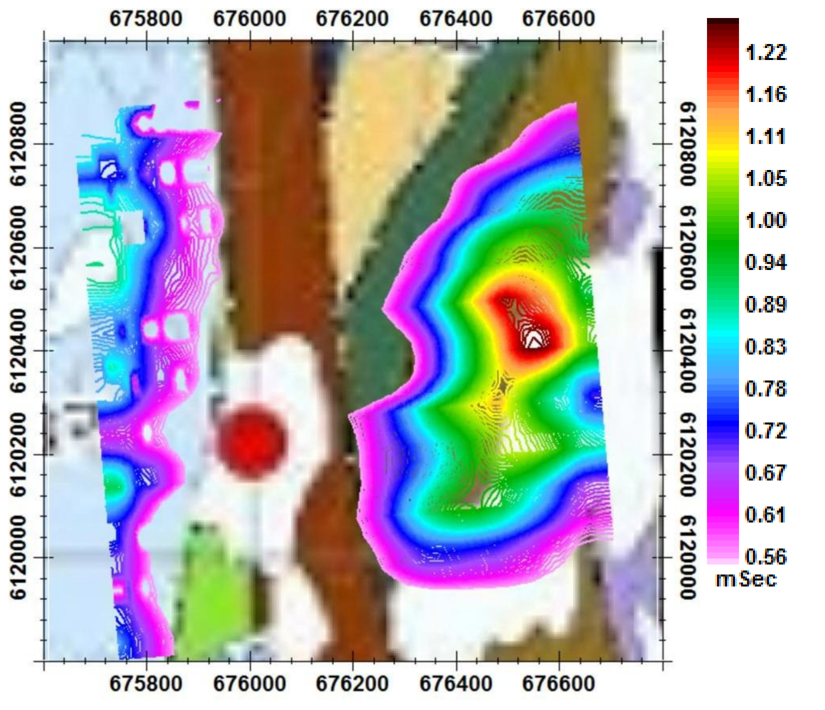
Melgurd Lake South – Priority B – PB TD & E





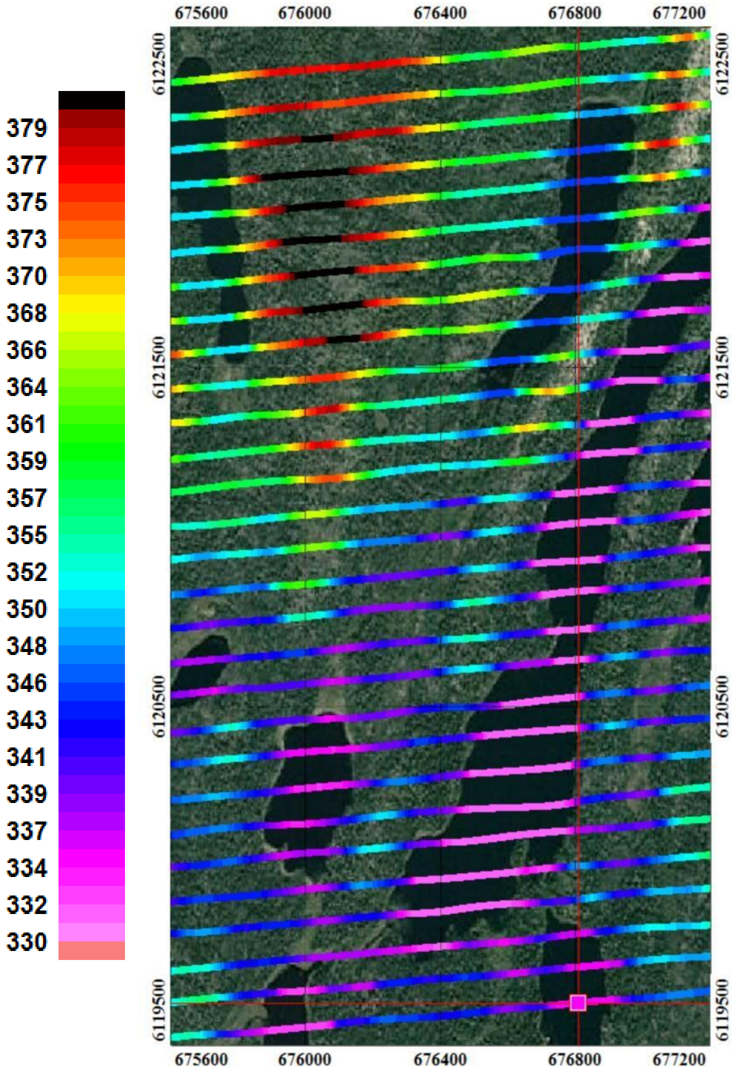
Bz (Channel 22) geology underlay

Rate of Decay - Chns 16 to 30

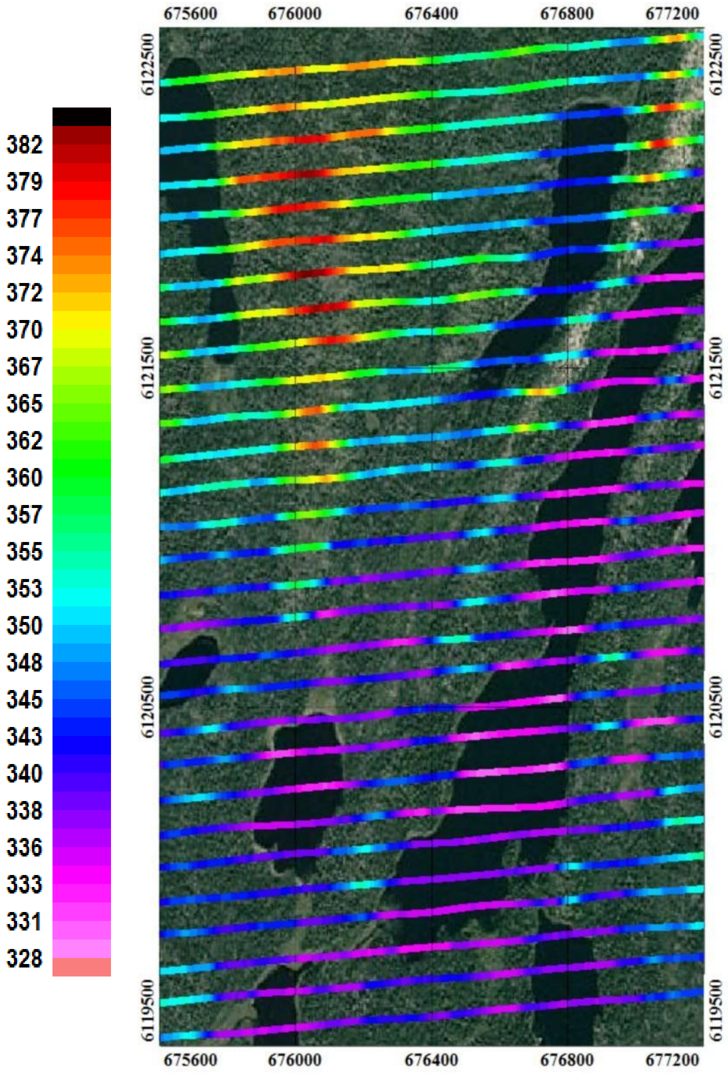


PBTD from late early time to late mid-time is arc-shaped with strong responses at the ends of the arc. PBTE is rather circular during the same time windows.
However, there is a deeper, more conductive feature to the east as shown by mapping the decay rate of the data using the channels 16-30 even out to channel 36. As the stations proceed over the lake to the east, there becomes a very clean quite slow decay particularly for L1350-L1400.

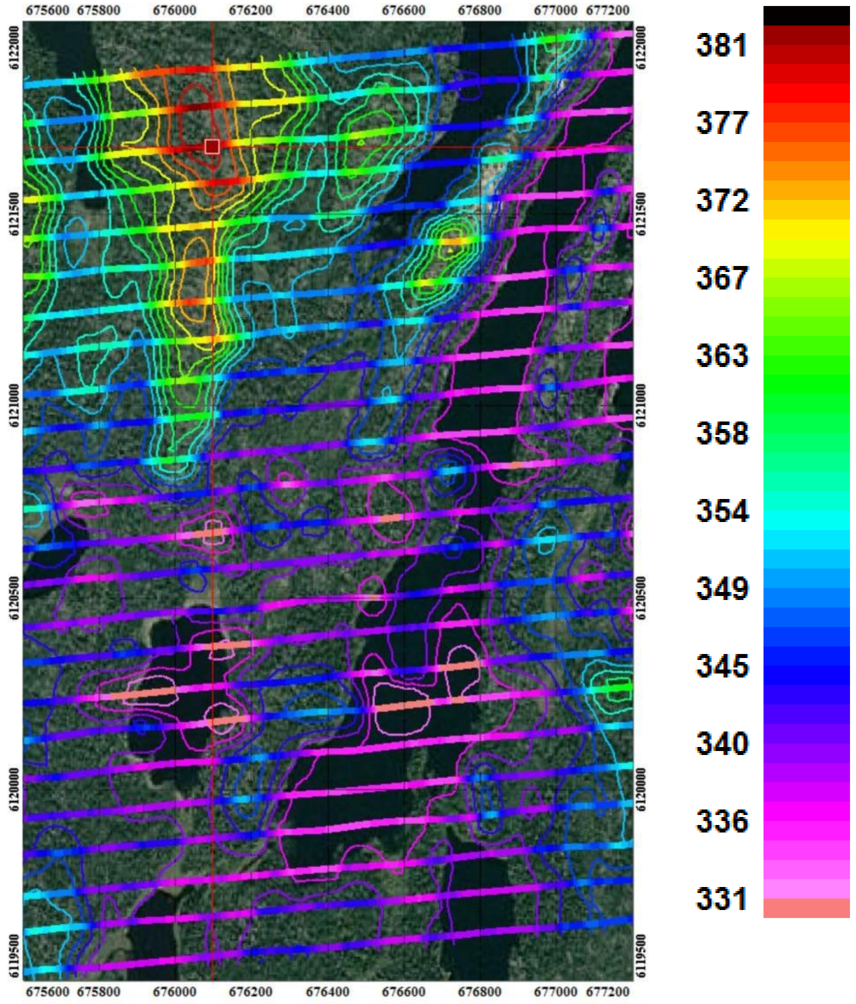
Melgurd Lake South – Elevation Issues



SRTM Elevation (m) data for NASA Shuttle project



[Sensor Elevation – Sensor Altitude] (m) determined from aeromagnetic data set



[Sensor Elevation – Sensor Altitude] (m) from EM data set

The satellite DTM data (SRTM) agrees reasonably both when mapped as in the left and middle figures as well as numerically. But, clearly from the right map as well as the data something is wrong in this target area with either the GPS data or the ground clearance data (altimeter).

Melgurd Lake South – Priority B – PB TD & E

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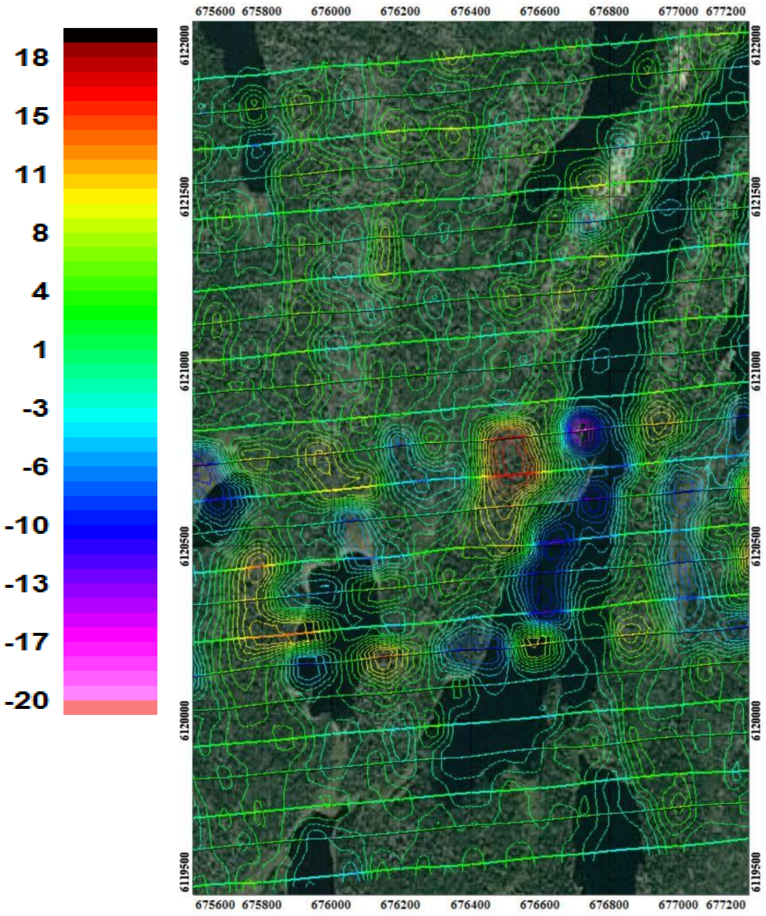
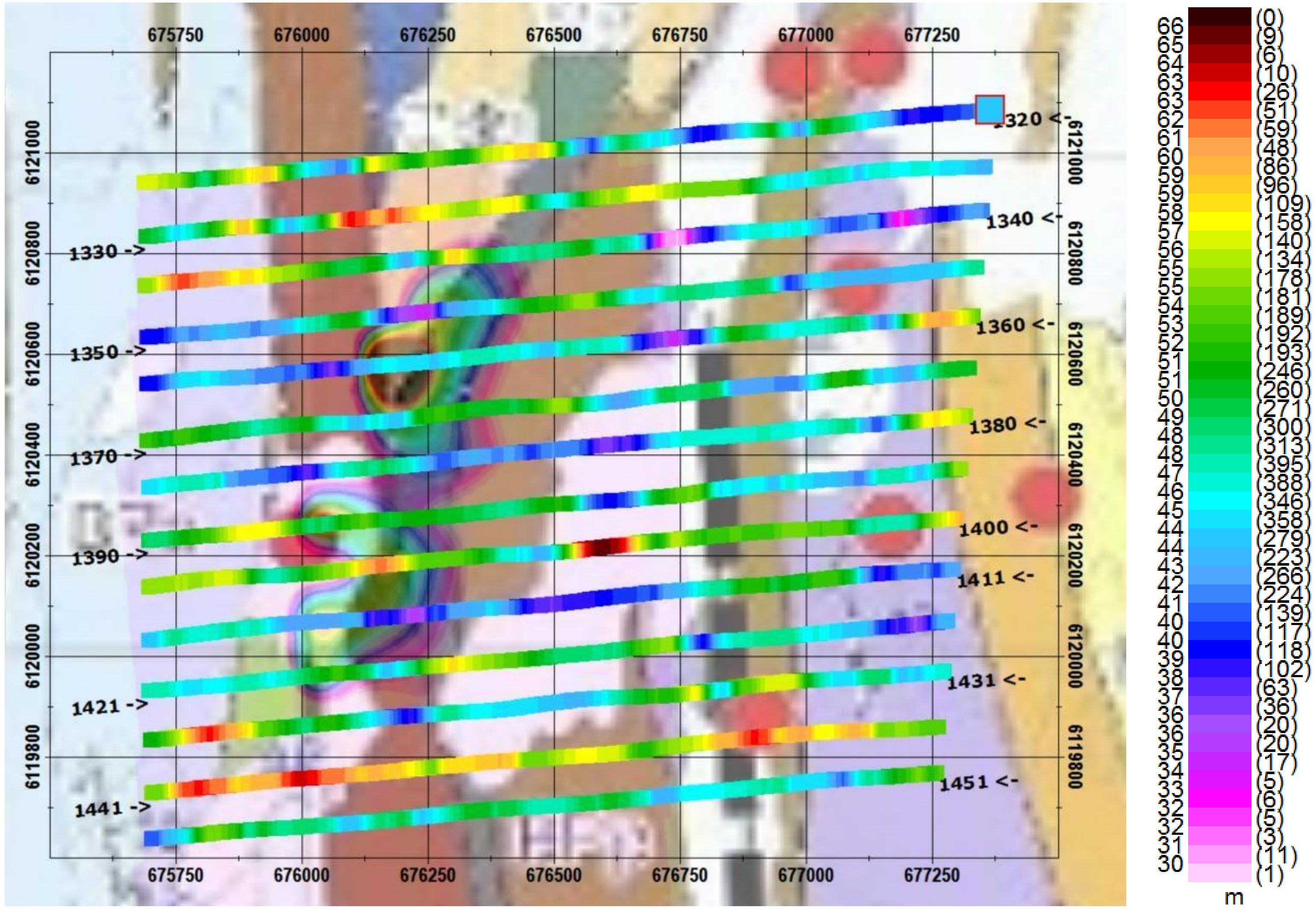


Errors in EM DTM

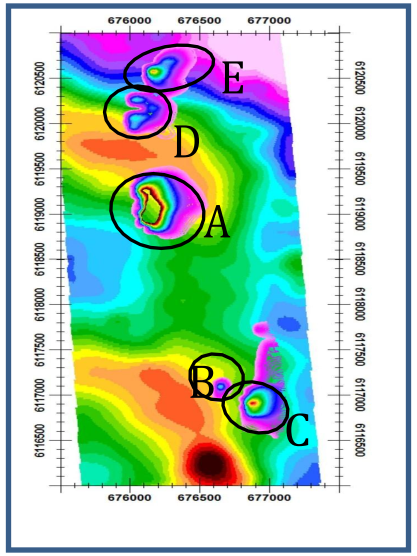
Particularly over the arm of the lake, we observe large variations in ground clearance from line to line. We have not observed such dramatic variations in

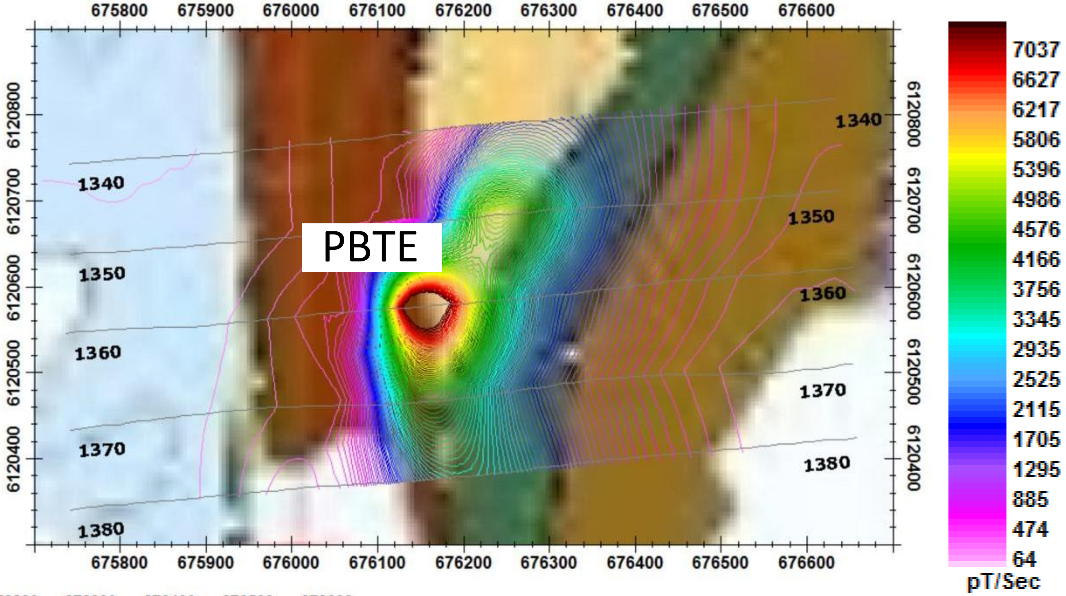


EM Instrument ground clearance

Elevation values with distribution Mean (48m), SD (6m)

Melgurd Lake South – Priority B – PB TE

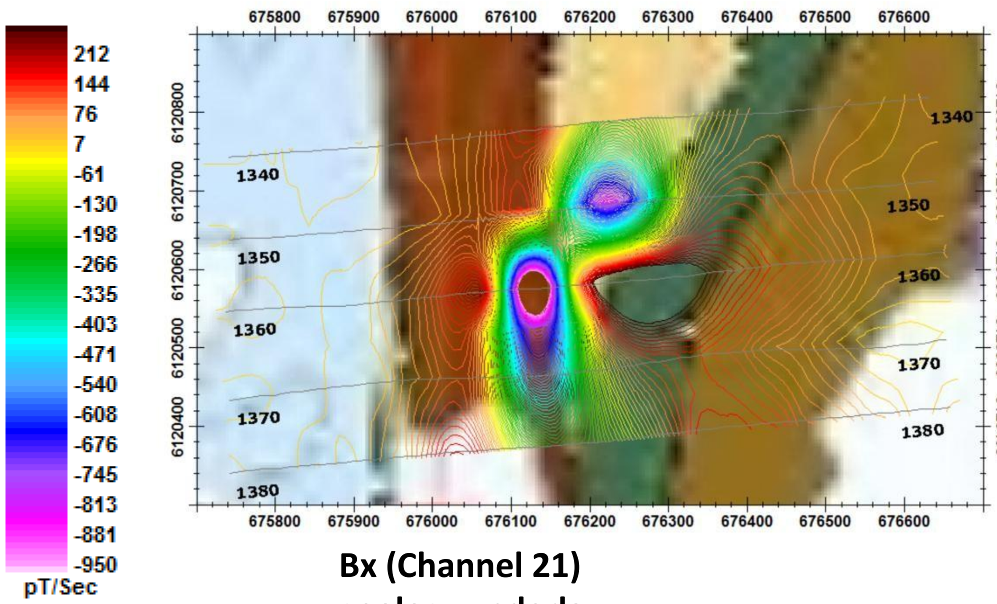




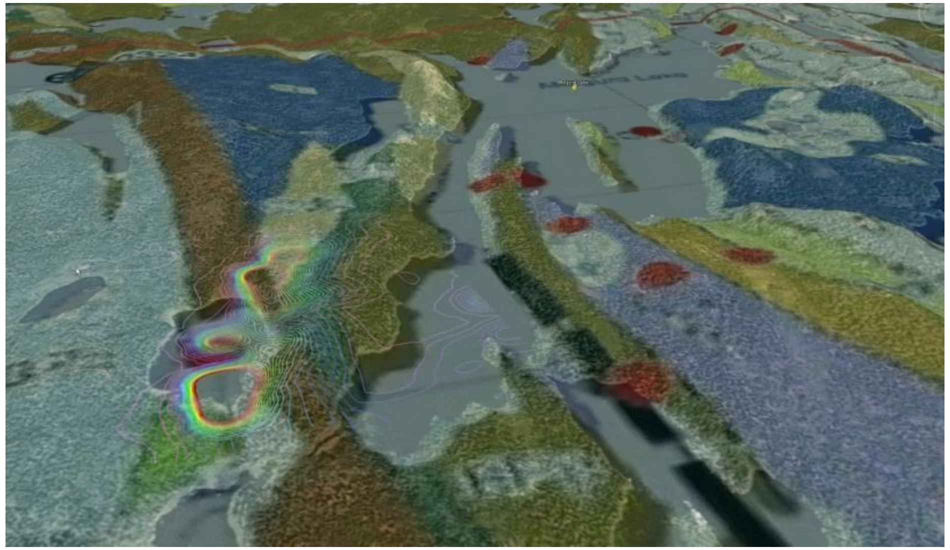
Bz (Channel 15)

The anomaly seems tucked into the corner where the granodiorites are pinched by the mafic rocks to the east and the Burntwood group to the west.

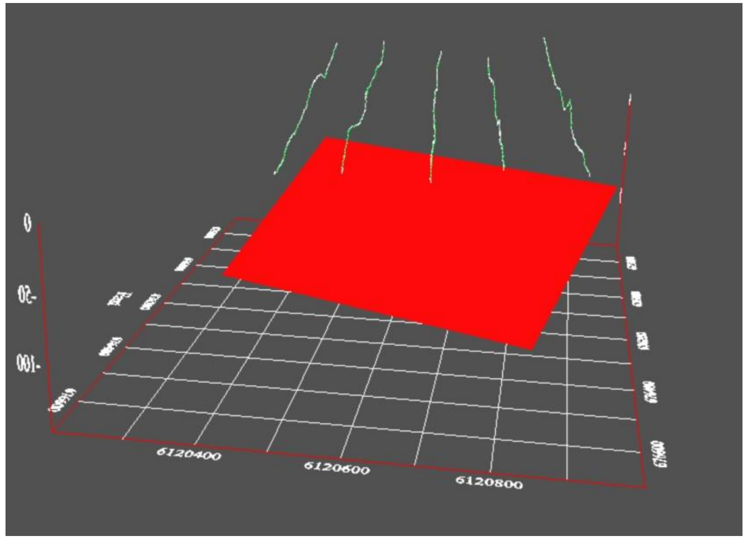
In early time the anomaly, is in a topographic low running along the east of the ridge that is on the east side of the this southern extension of the lake



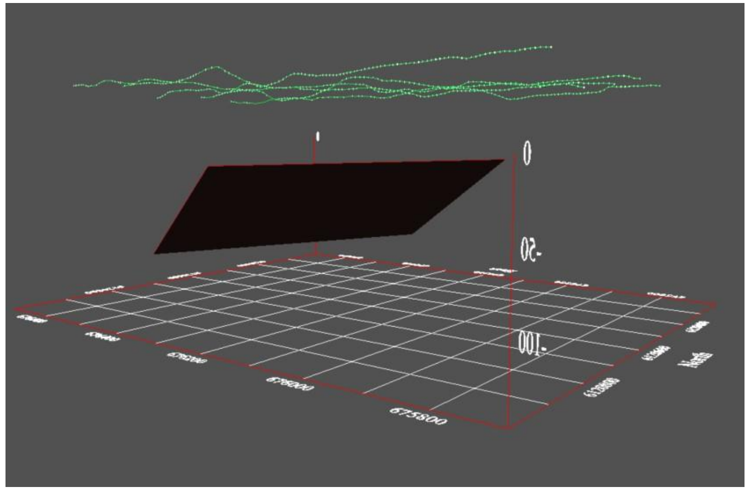
Bx (Channel 21)
geology underlay



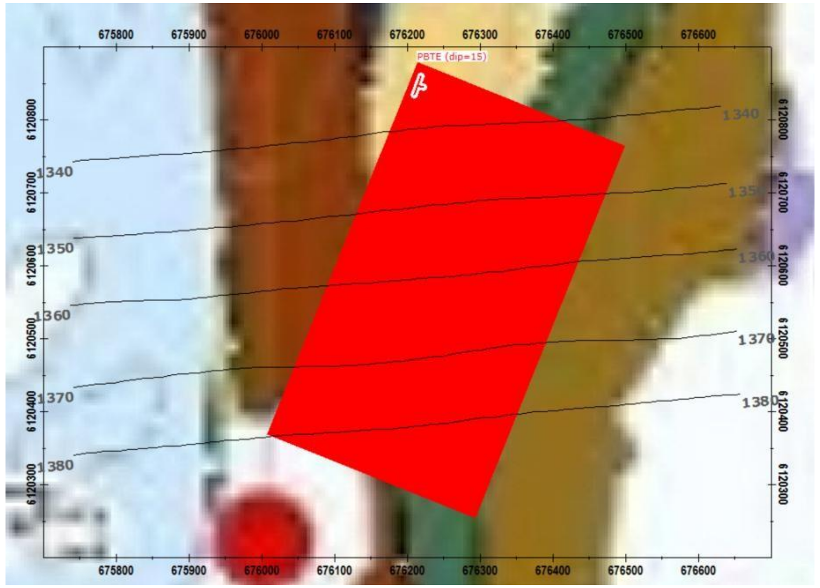
Melgurd Lake South – Priority B – PB TE



View from the East –



View from the North West



Priority B, PBTE
Strike Length: 550m
Dip Extent: 320m
Strike Angle: 22°NE
Dip Angle: 15.5° East
Conductance: 8 S
Depth to Top: 15.8m
Depth to Bottom: 100m

The model's conductance can be considered an average value. There is a higher concentration of conductive material at the target's centre beneath L1360. The bottom eastern edge is beneath the ridge that runs along the east side of the lake's west bay.

Melgurd Lake South – Priority B – PB TD & E

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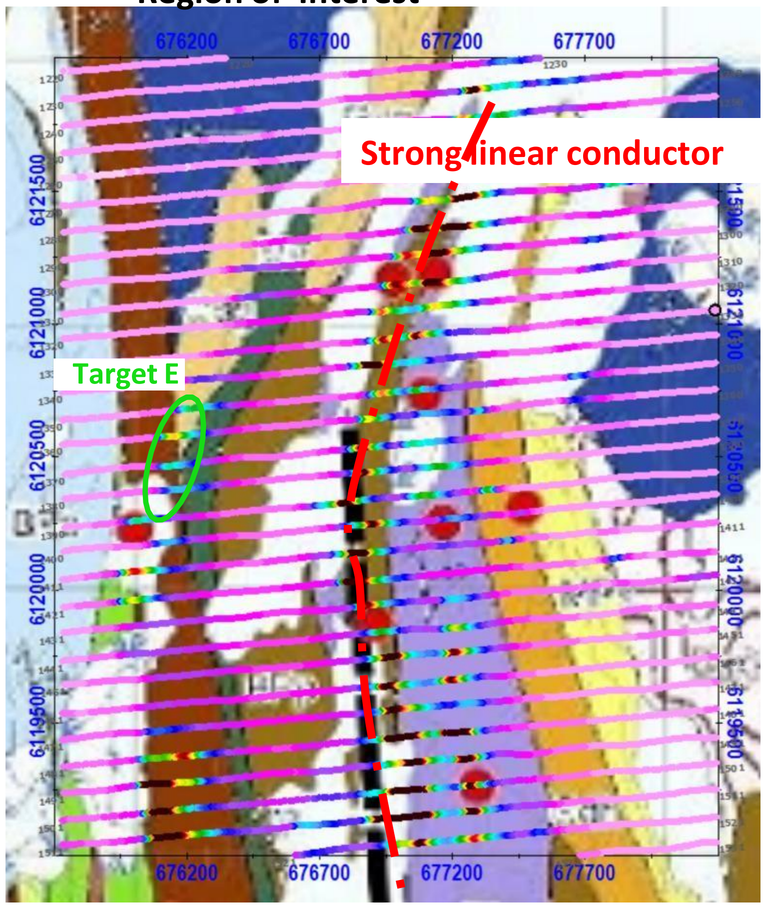
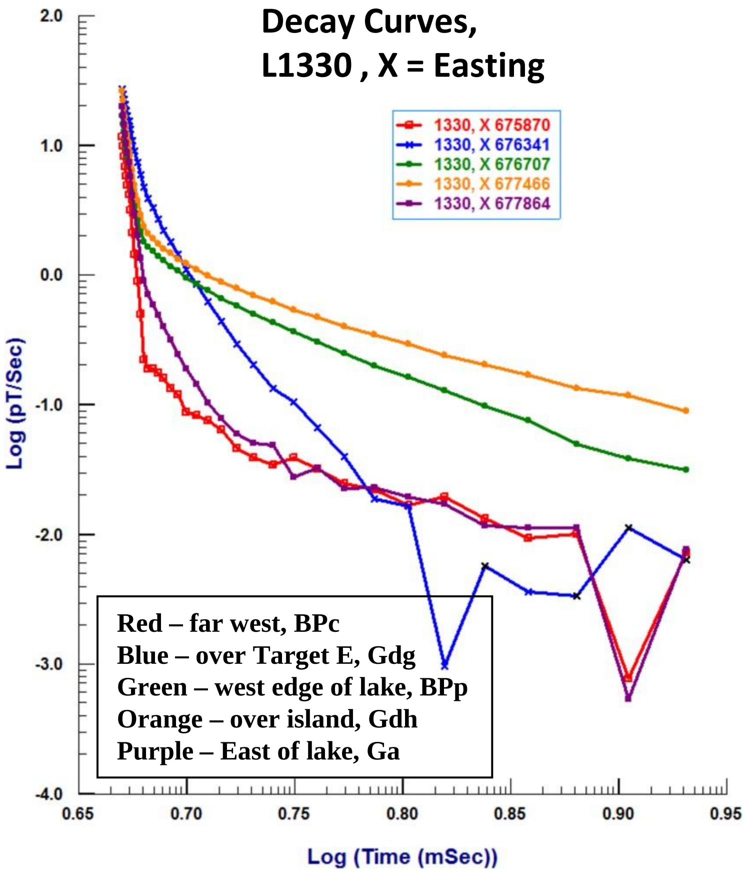
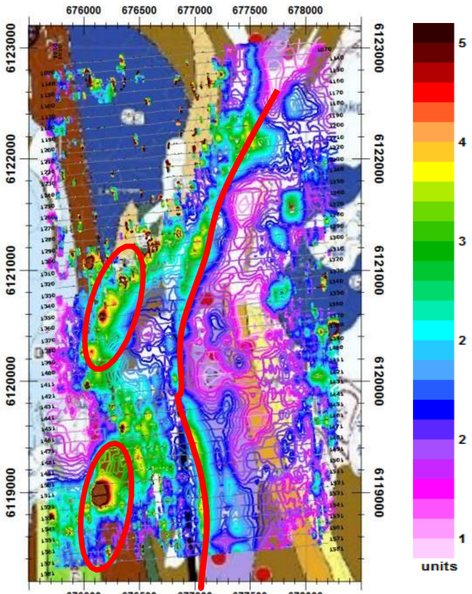
Region of Interest



This area of interest covers the northern portion of the Priority B area and extends east over the lake. In addition to the conductors, PB A, D and E, there is a long strong vertical linear conductor running along the eastern edge of the southern leg of Lake Melgurd. Most of this area is underlain by an unusually strong conductive substratum. However, the areas surrounding the long linear central conductor and the arc containing the 3 PB northern targets have much higher resistivity.



The decay curves above show the different areas crossed along L1330 . Stn 676341 is at the northern edge of Target E and demonstrates the fast decays in late time as shown in the contour map to the upper right. The other stations all have similar late time decays although it appears the thickness of the resistive rocks are thinner than to the west as shown in the figure on the bottom right.

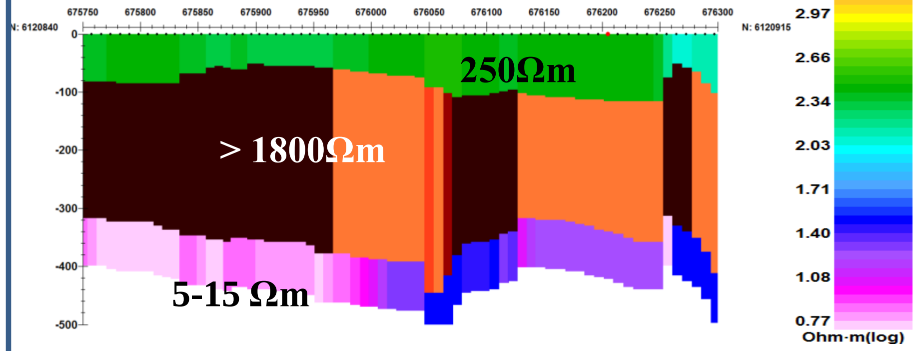


Decay Rates (p)

$Bz = A\ t^{-p}$

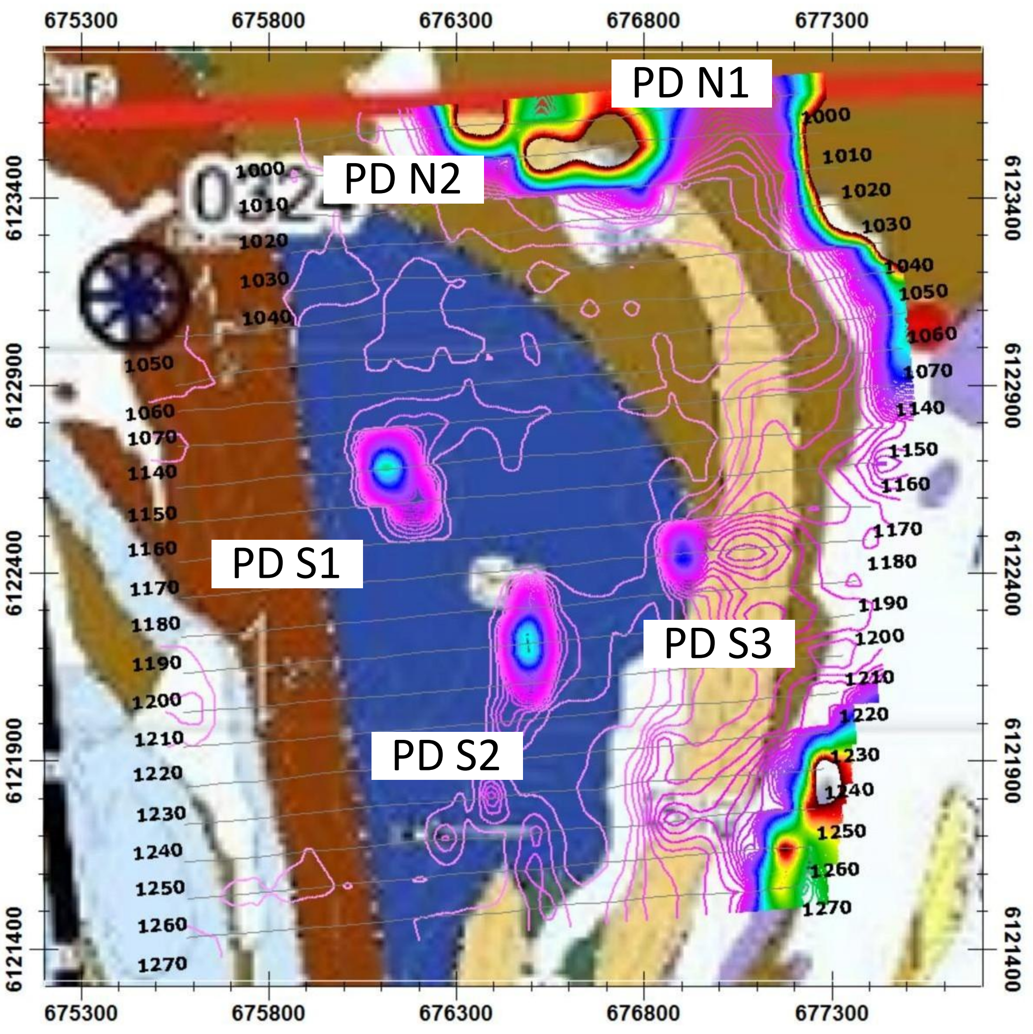
Channels 30 -37

Inversion Section L1330

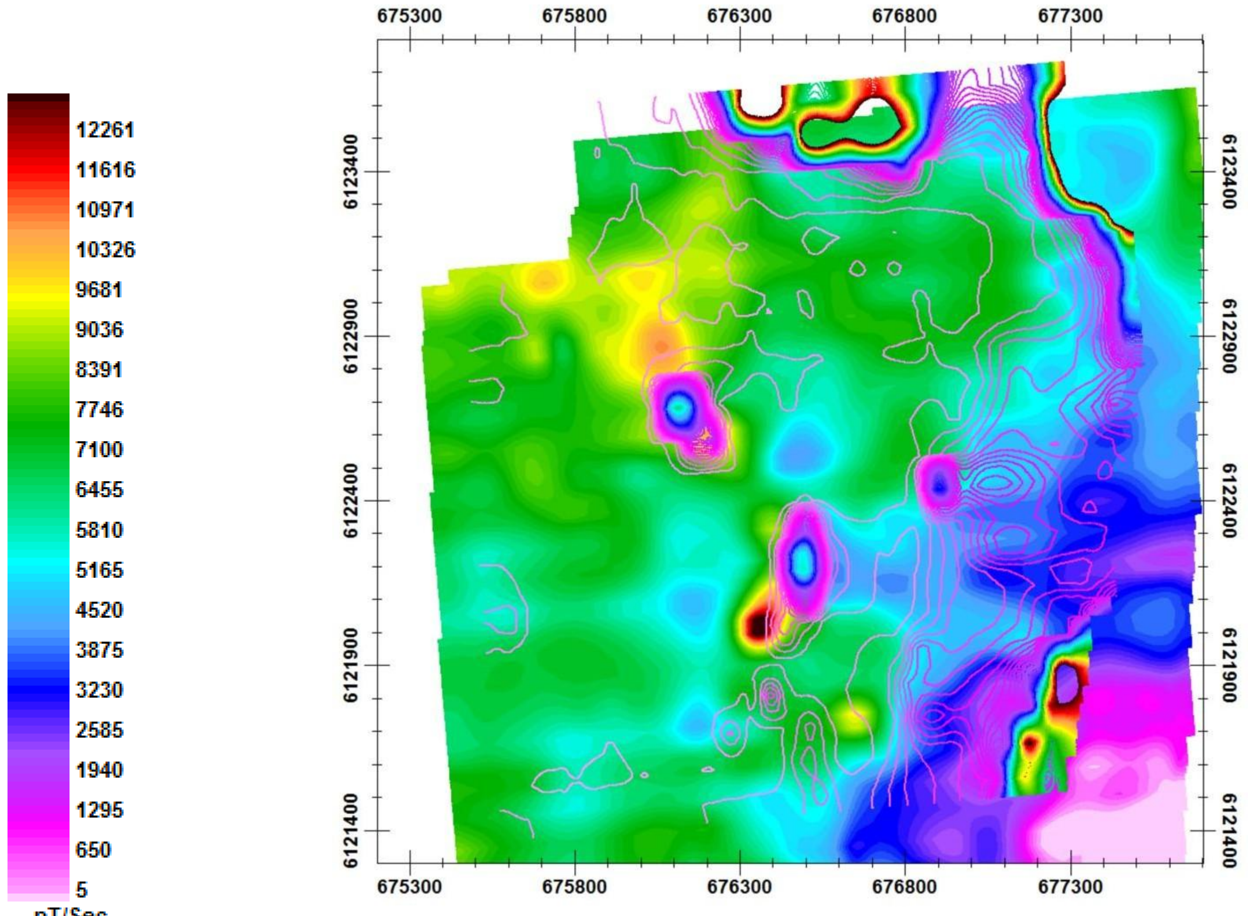


As shown in the decay curves in the center, the top rocks have a modestly low resistivity followed by very resistive rocks causing the very fast early time decays and finally the slow decays beginning about Ch15 and continuing to very late time. Such low resistivities, flat lying and over a large area are characteristic of graphites or saturated sediments.

Melgurd Lake North – Priority D



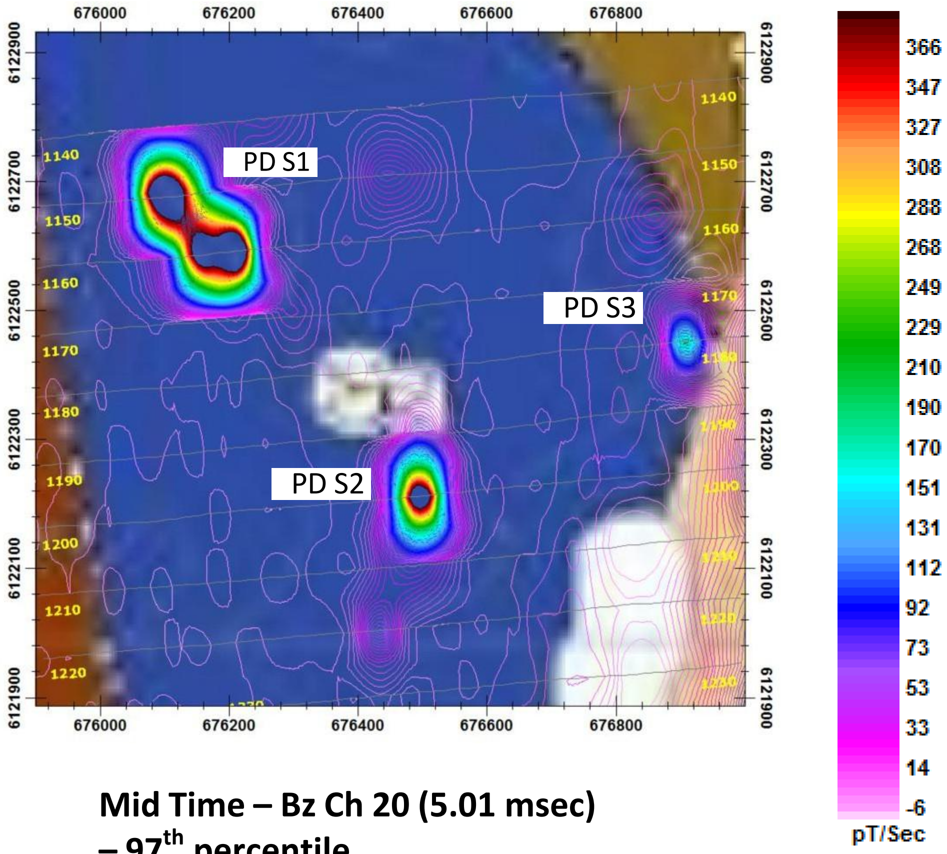
Late Early Time – Bz Ch 12 (4.77msec) – 95th percentile



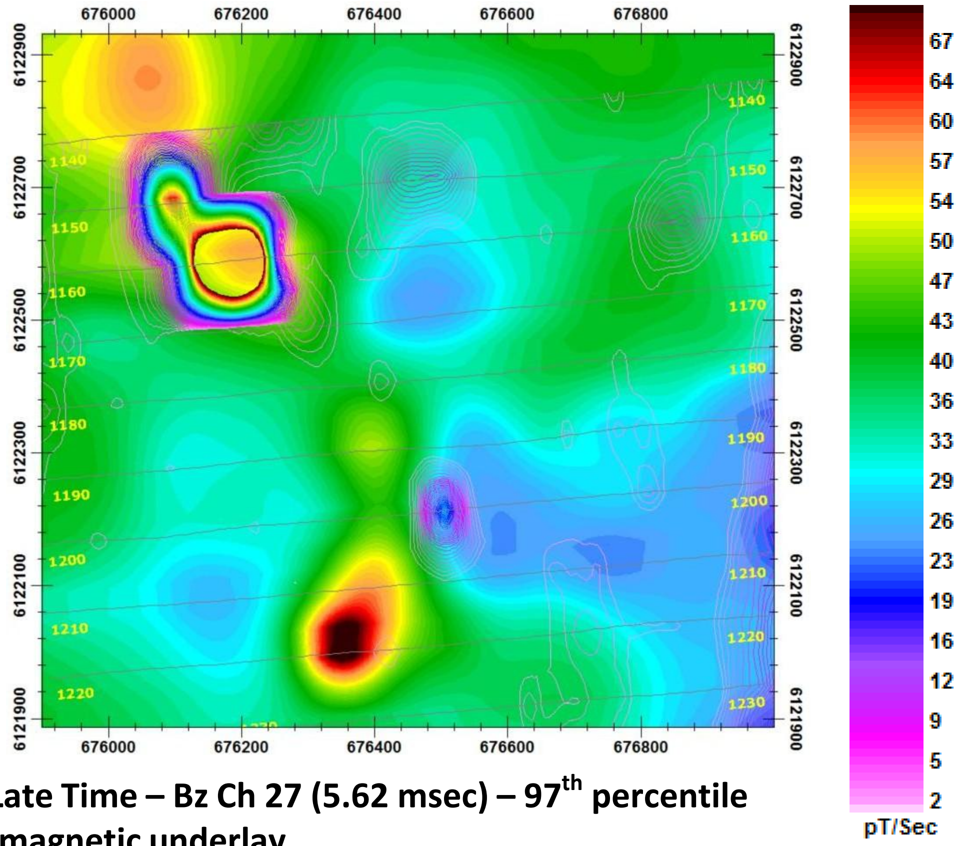
Aeromagnetics underlay

We divide the region into south and north. There are 3 interesting anomalies in the south and two in the north. There is little correlation between the magnetics and the geology as mapped although there is some hint that the crescent of granodiorite-tonalite gneiss marks a magnetic boundary. There are is one local strong magnetic anomaly near PDS2 and two moderate anomalies near PDS1. One in just north and the other is under the southeastern part of the EM anomaly.

Melgurd Lake North – Priority D PD South



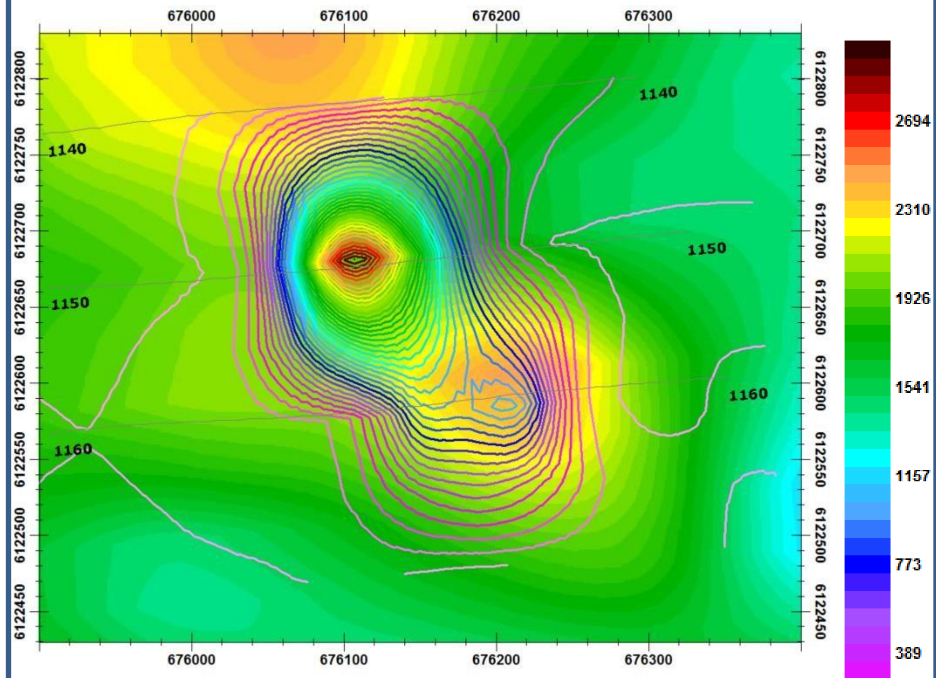
Mid Time – Bz Ch 20 (5.01 msec) – 97th percentile



Early Late Time – Bz Ch 27 (5.62 msec) – 97th percentile aeromagnetic underlay

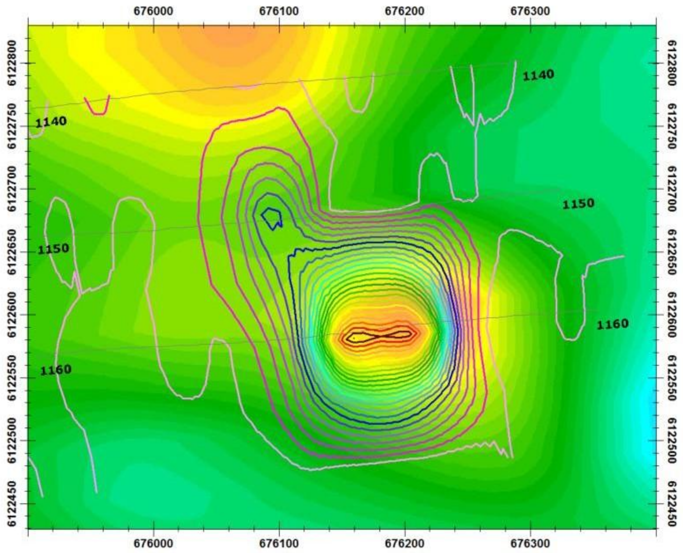
PDS1 is the strongest of the EM responses. PDS1 consists of two parts (NW and SE). The SE is the deeper of the two but the most conductive. Additionally, it is associated with a magnetic high although not of great strength.

Melgurd Lake North – Priority D PDS1



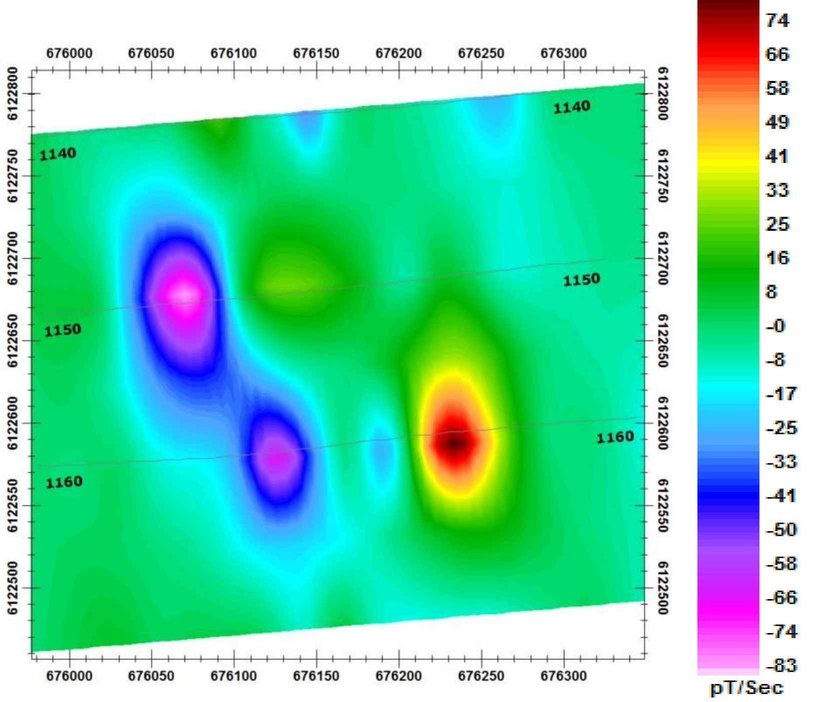
Late Early Time – Bz Ch 15 (4.84 msec) – 65th percentile
35% of data is below noise levels

aeromagnetic underlay



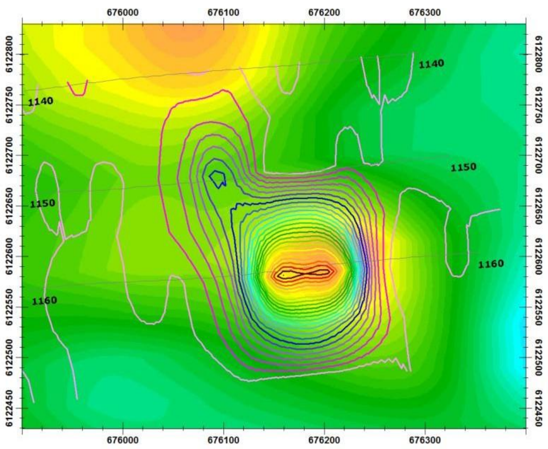
Late Time – Bz Ch 30 (6.13 msec) – 60th percentile

Mid-Time – Bx Ch 23 (5.2msec) – 100h percentile

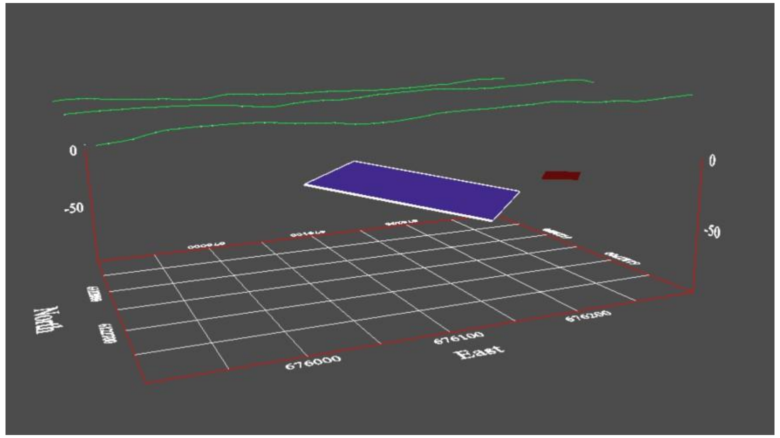


The two anomalies are completely contained within a gabbro structure and there is a NW-SE trending moderate magnetic anomaly underlying with the one focused magnetic anomaly surrounding the SE EM anomaly. The NW anomaly appears strong in early time but by late time it has dropped away and the SE now persists to late time. The horizontal EM field indicates two approximately flat-lying structures.

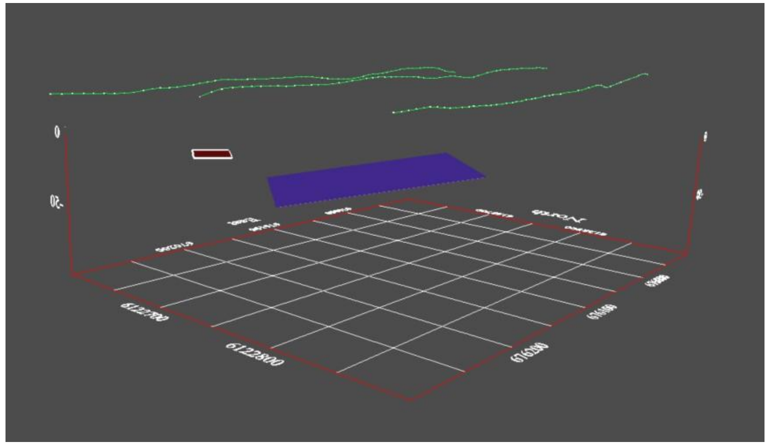
Melgurd Lake North – Priority D PDS1



Late Time – Bz Ch 30 (6.13 msec)



View from SW

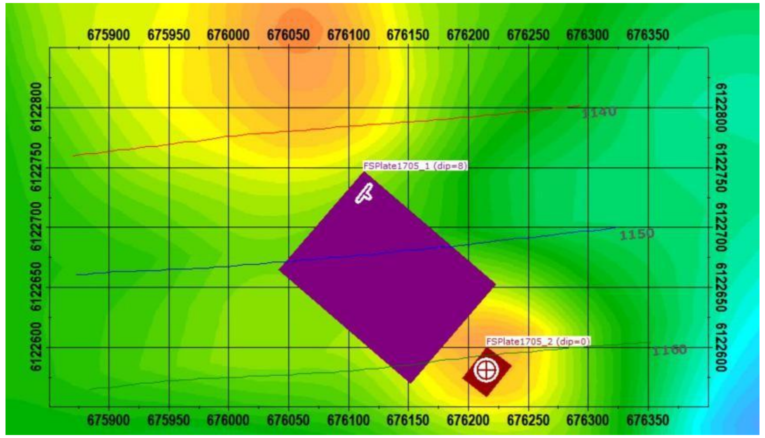


View from NE

Priority D S1 Top
Strike Length: 110m
Dip Extent: 147m
Strike Angle: +41°NE
Dip Angle: 8° SE
Conductance: 8S
Depth to Top: 18.6 m
Depth to Bottom: 40m

Priority D S1 bottom
Strike Length: 33m
Dip Extent: 26m
Strike Angle: -38°NW
Dip Angle: 0 degrees
Conductance: 47 S
Depth to Top: 14m
Depth to Bottom: 14m

aeromagnetic underlay

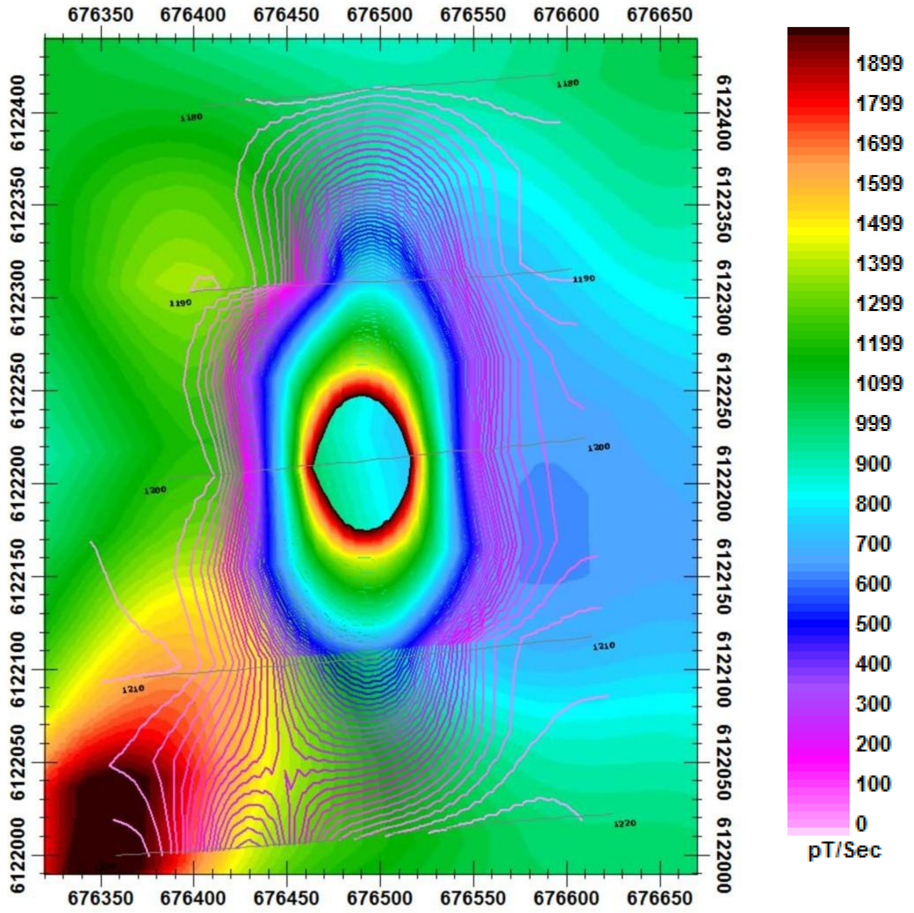


The top of the small structure is actually slightly shallower than the bigger structure. The smaller structure does not appear clearly in early time due to its small size but by late time because of its much stronger conductance it comes to prominence.

It must be advised that as the smaller structure is only observed on one line its size is not well resolved.

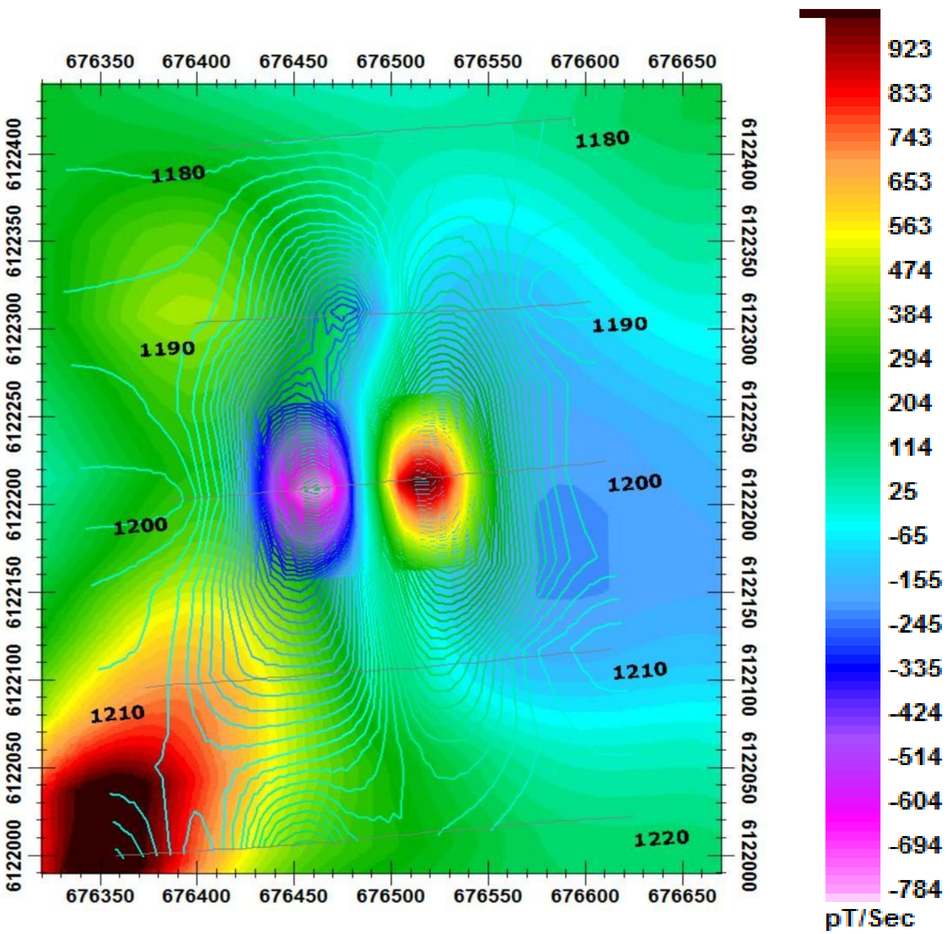
Additionally, due to uncertainties in the early time data, the depth to the top of shallow structures cannot be estimated with great precision.

Melgurd Lake North – Priority D PDS2



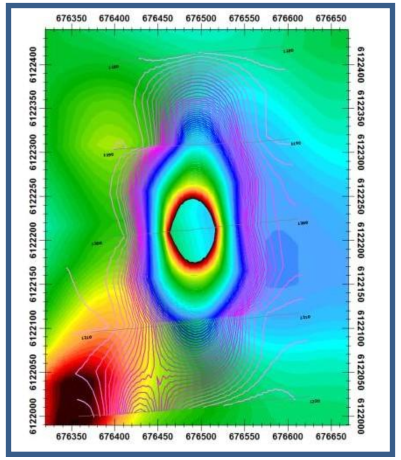
Late Early Time – Bz Ch 15 (4.84 msec) – 84th percentile
aeromagnetic underlay

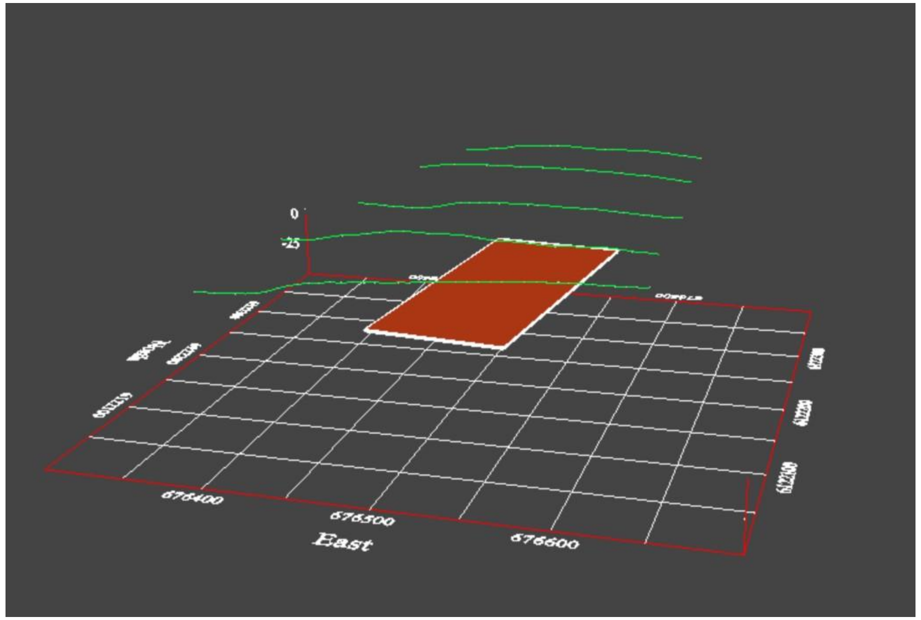
Mid-Time – Bx Ch 23 (5.2msec) – 100h percentile



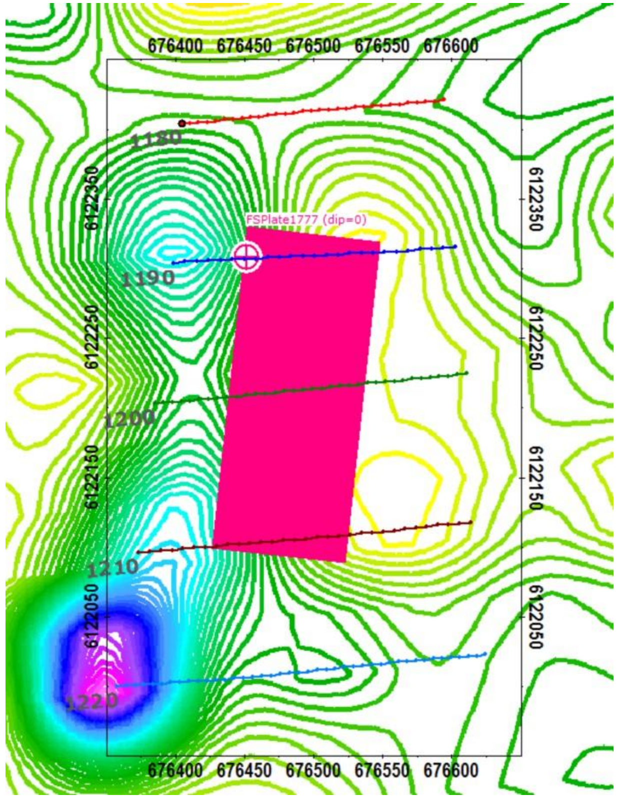
The structure is striking approximately perpendicular to the survey lines and can be seen slightly on the line north and south of the main response. The contour maps show to the structure to be approximately flat lying. The conductive structure is pushed between a magnetic high and a magnetic low. Locally the magnetic high strikes as the EM conductor.

Melgurd Lake North – Priority D PDS2





View from South

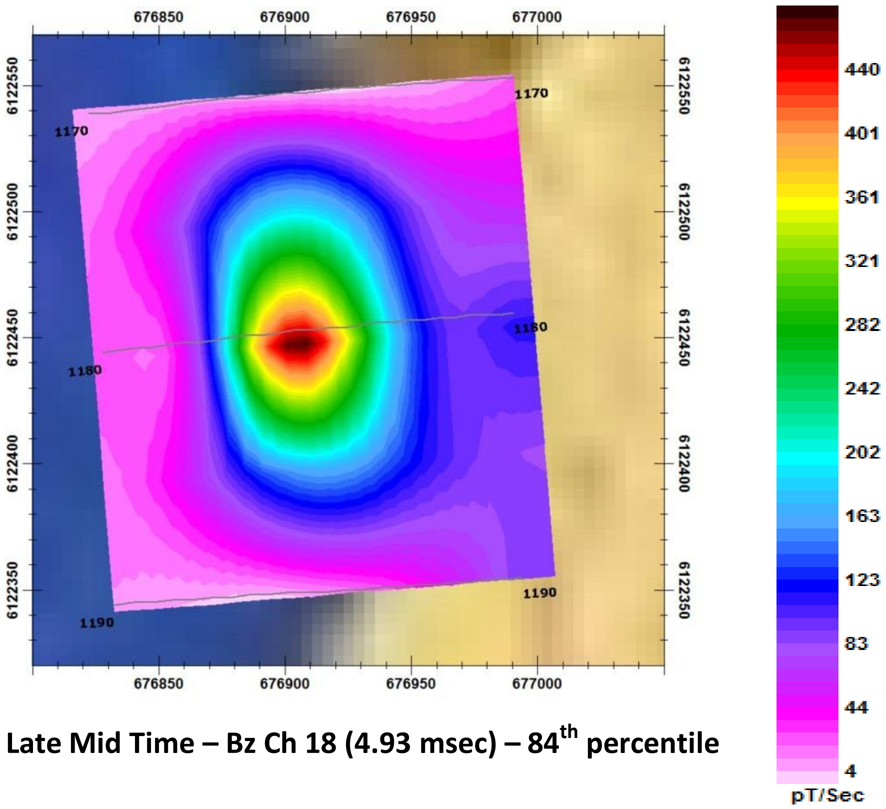


vertical aeromagnetic derivative underlay

The structure is very flat laying, relatively shallow and weakly conductive.

Priority D S2
Strike Length: 232m
Dip Extent: 97m
Strike Angle: 6°NE
Dip Angle: 0°
Conductance: 6 S
Depth to Top: 13m
Depth to Bottom: 14m

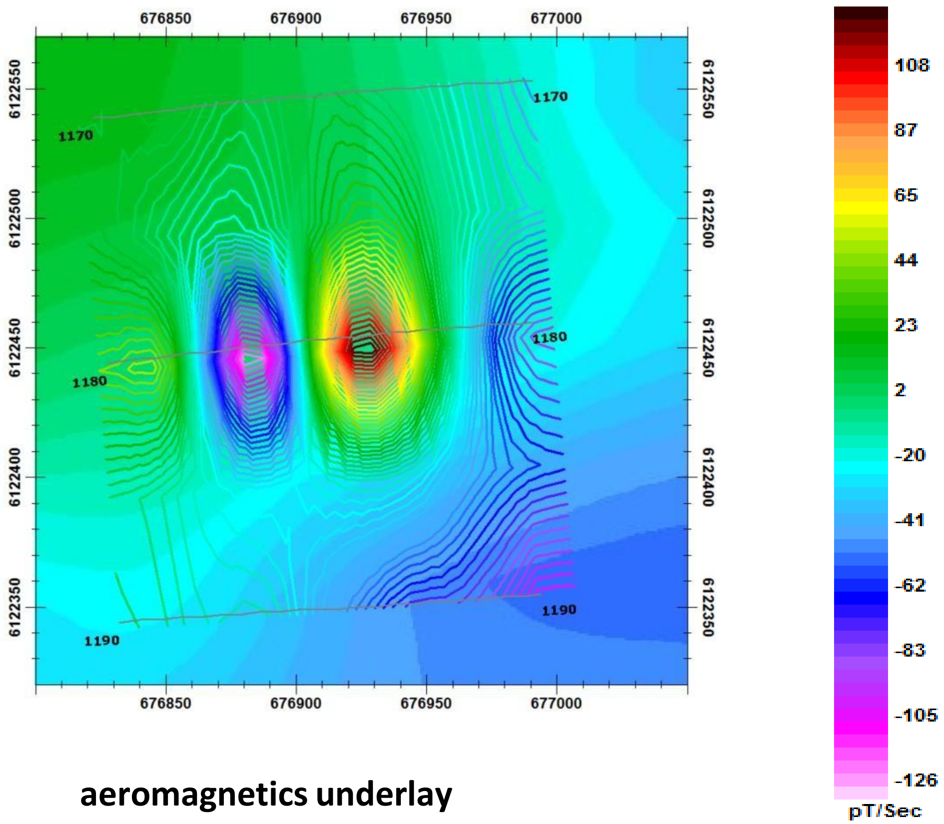
Melgurd Lake North – Priority D PDS3



Late Mid Time – Bz Ch 18 (4.93 msec) – 84th percentile

geology underlay

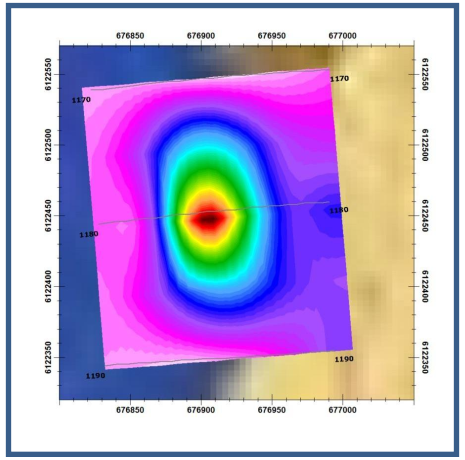
Late Early Time – Bx Ch 18 (4.93msec) – 100h percentile

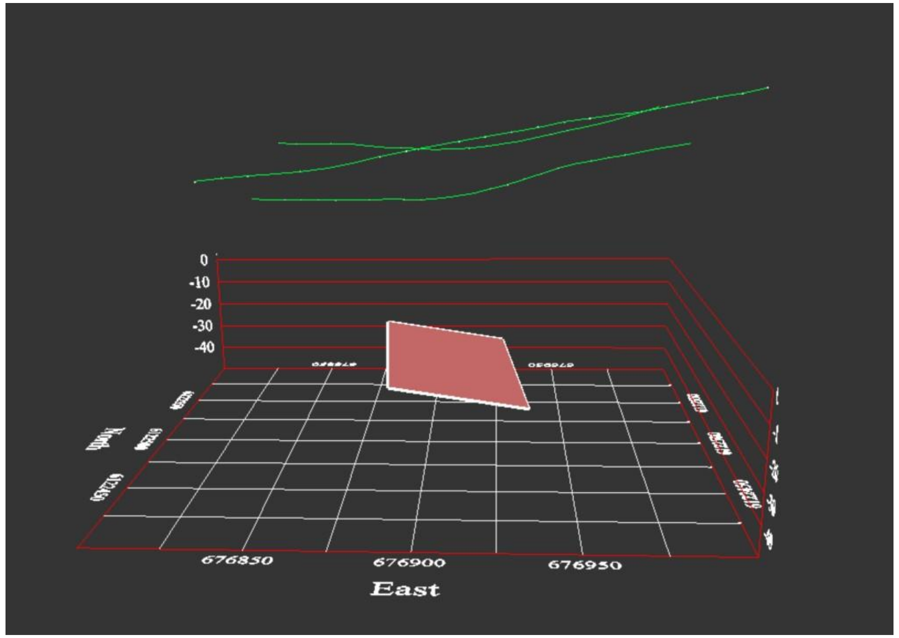


aeromagnetics underlay

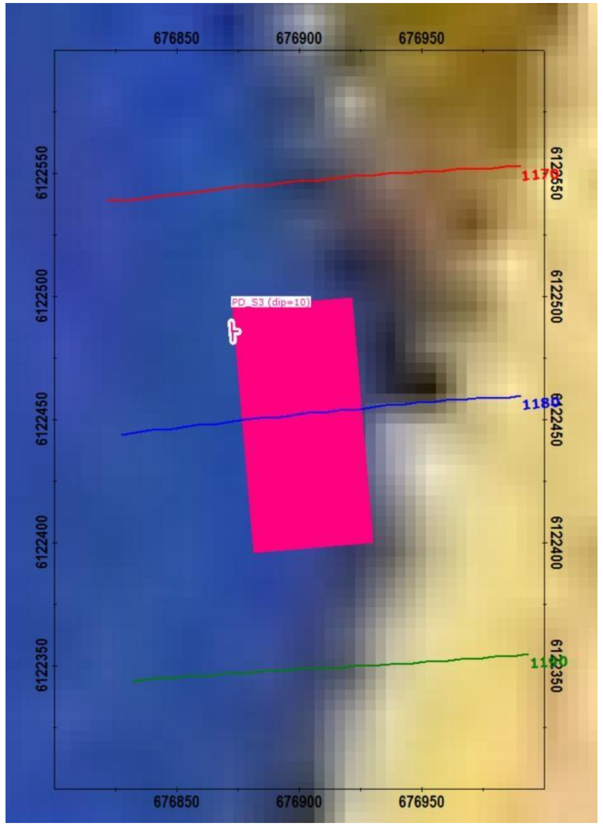
The structure is dipping slightly to the east. It is at the boundary between gabbro and granodiorite rocks and at a transition of the magnetic response likely due to less magnetized granodiorites which can often be demagnetized.

Melgurd Lake North – Priority D PDS3





View from South

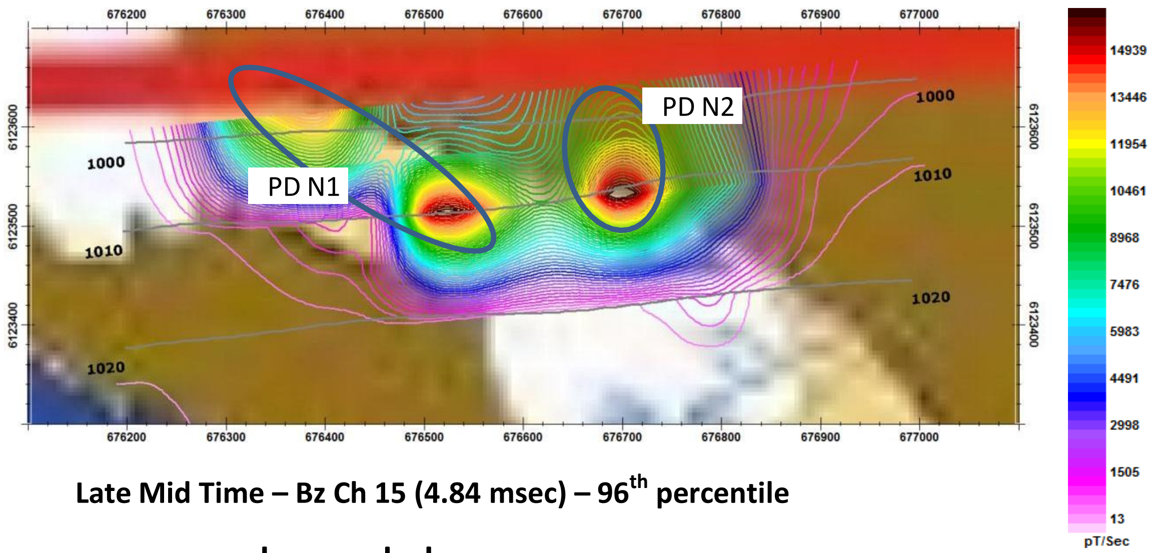


geology underlay

The structure is weakly conductive and at the edge of a geological boundary between gabbro and granodiorite rocks. The target is not very shallow and dips slightly to the east.

Priority D S3
Strike Length: 100m
Dip Extent: 50m
Strike Angle: 5°NW
Dip Angle: 10°E
Conductance: 6 S
Depth to Top: 22m
Depth to Bottom: 31m

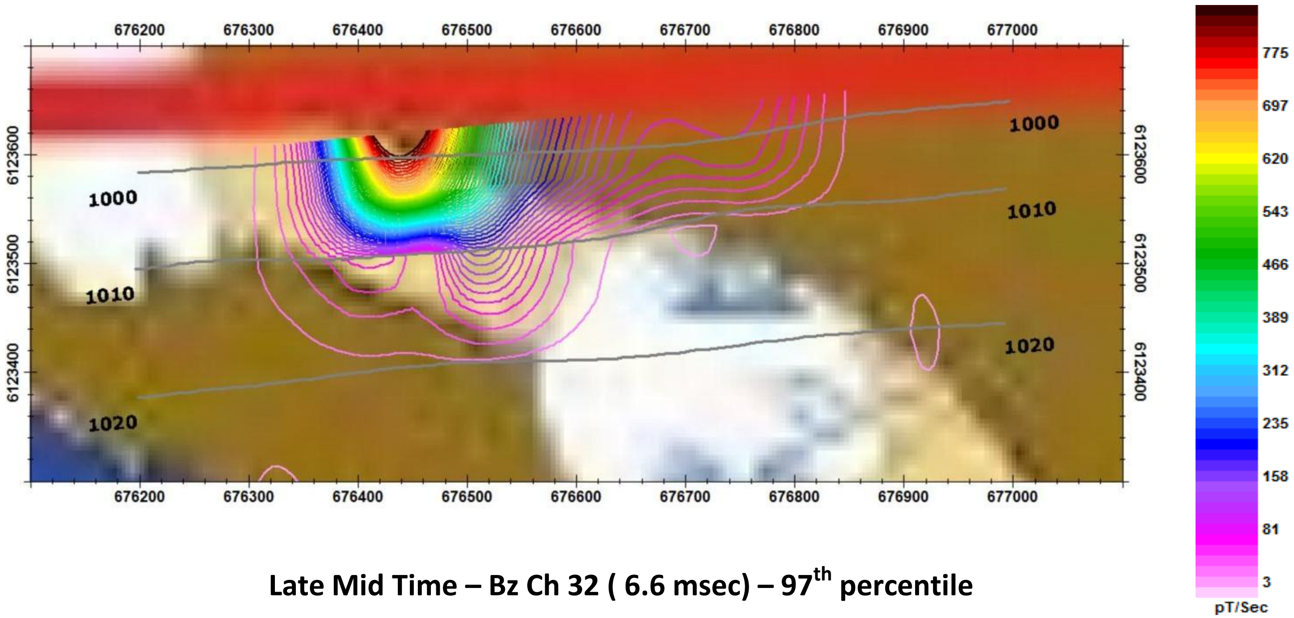
Melgurd Lake North – Priority D North



Late Mid Time – Bz Ch 15 (4.84 msec) – 96th percentile

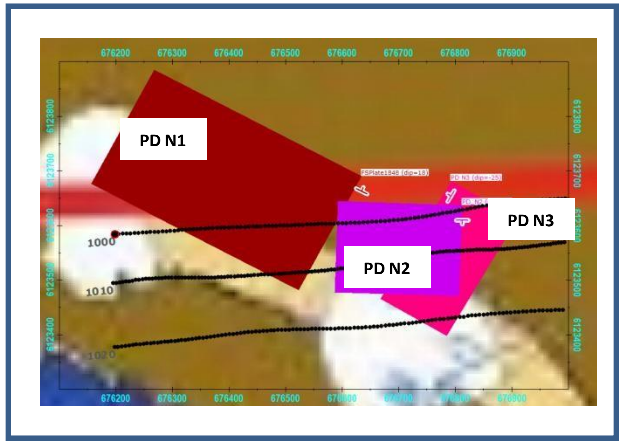
geology underlay

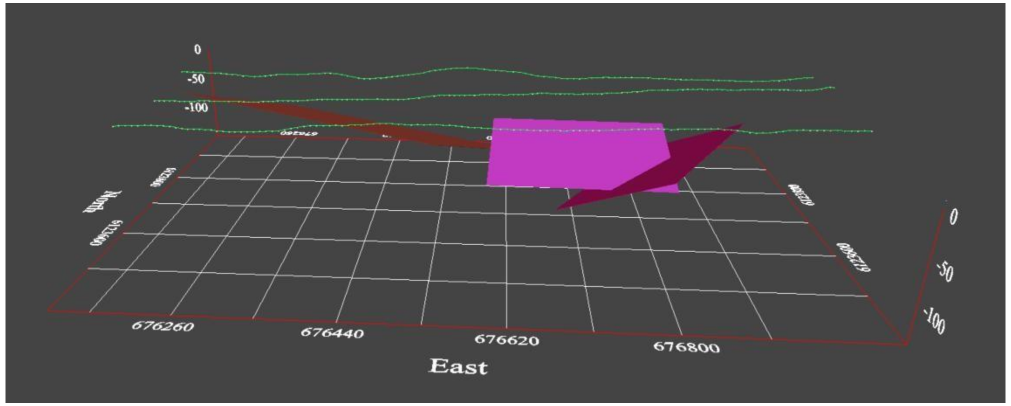
There are two major components to the response in this area but several other smaller anomalies. The extent of the data coverage due partially to the line spacing but also because the structures are not sampled adequately to the north as L1000 is the last northerly survey line. The EM responses appear to be highly correlated with the structure termed "granodiorite-tonalite gneiss and migmatite" on the geology map.



Late Mid Time – Bz Ch 32 (6.6 msec) – 97th percentile

Melgurd Lake North – Priority D North



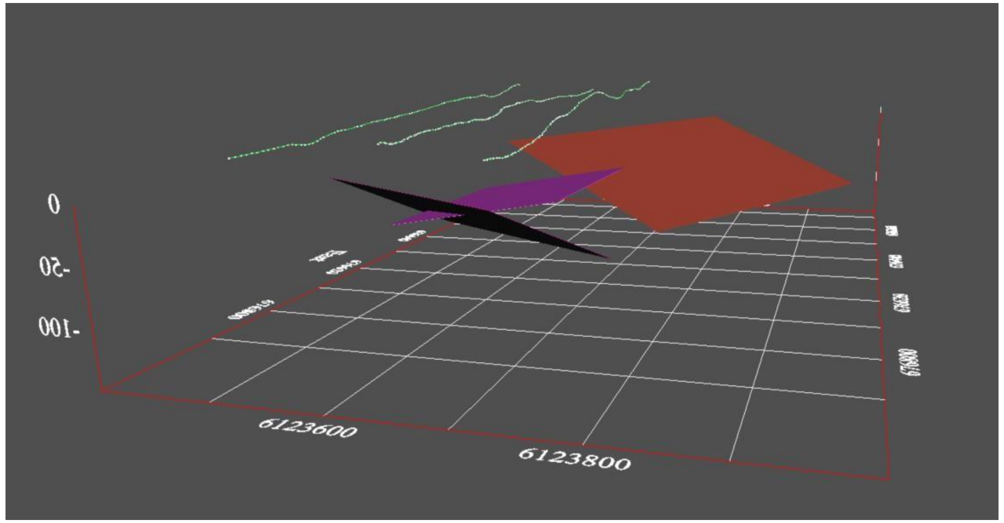


View from South

Priority D N1
Strike Length: 416m
Dip Extent: 250m
Strike Angle: -62°NW
Dip Angle: 18°NE
Conductance: 40 S
Depth to Top: 5m
Depth to Bottom: 82m

Priority D N2
Strike Length: 170m
Dip Extent: 220m
Strike Angle: 2°NE
Dip Angle: 10°S
Conductance: 14S
Depth to Top: 22m
Depth to Bottom: 51m

Priority D   N3
Strike Length: 250m
Dip Extent: 150m
Strike Angle: 30°NE
Dip Angle: 25° NW
Conductance: 10S
Depth to Top: 12m
Depth to Bottom: 74m



View from East

We have attempted to show the main conductors in this northern portion of the survey. However, there are two or three other minor conductors which are not shown. The area does not appear to consist of a few discrete conductors but rather the structure seems to be more amorphous. comprised of small blocks of varying conductance Additionally, as mentioned earlier, the survey ends at line 1000 which has the strongest responses of all the three survey lines. Extension of the models north of L1000, has to be considered with a certain degree of uncertainty and would require ground surveys to more accurately delineate the targets. PDN3 is a subtle response and this model is only approximate.

Data Issues: Electromagnetic

There are a three main issues regarding the EM data that concern me

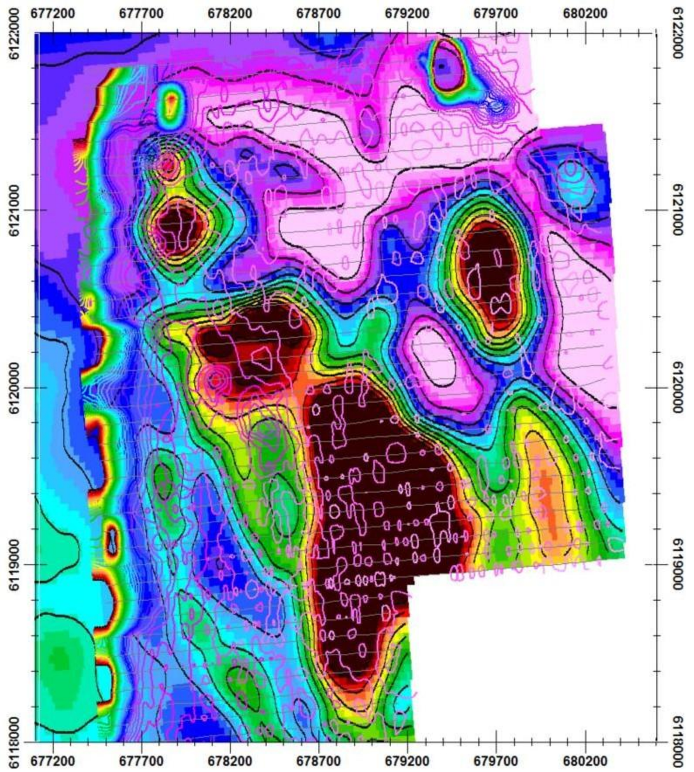
1. Over processing and filtering of the data: If we assume, the helicopter is flying an average of 60km/hr which is likely to be less than the actual speed, then the instrument covers on average approximately 17m/sec. In one second, the data which has a repetition rate of 30Hz, repeats 30 cycles. Even for ground TEM, 30 repeats is not sufficient to reduce noise to allow accurate data particularly at mid- to late-times. In the air, there is more sources of noise then when the instrument is stationary. However, the data is provided at a spatial resolution of less than 1m. This means some type of intense processing and smoothing of the data which is not described and probably provided by the manufacturers of the instrument and not the survey company. As a comparison, Geotech (VTEM) normally provides also a short spatial sampling but roughly twice the station spacing as Xcite. As the instrument is flown at a height typically above 40m and the diameter of the transmitter is 18m, such tight spacings are not relevant as the instrument obviously does. not have such a small spatial resolution.

2. The second issue is the timing of the windows. The window times are provided with respect to the beginning of the turn ON. As the ON time is approximately 4.68msec, the windows relative to the beginning of the OFF time is more appropriate. The first 12 windows have width less than 0.016msec. This would imply the instrument must have a bandwidth (upper end of the instrument's spectra) more than 100KHz in order to resolve windows of these widths and much higher for the first few windows. Thus, the early 12-15 windows cannot be well determined. But more importantly, having all these early windows so closely spaced in time is of little use for geological environments such as in this survey. Generally speaking, the last 6-7 windows are not of much use either due to noise or late time filtering as discussed below. Thus, it would be better to distribute more windows in the late early to late mid-time for interpretation purposes.

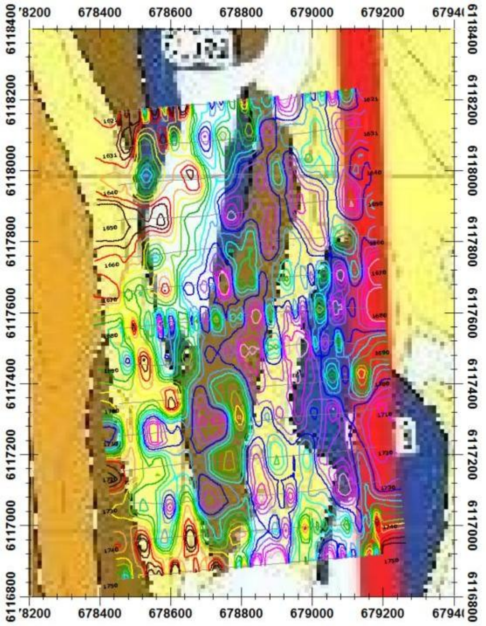
3. The final issue is what appears to be late time exponential filtering which masks the noise in late time. .This does not allow proper interpretation of late time data. This is discussed in more detail on later pages.

Data Issues: Electromagnetic

It has been discussed that in large sections of the survey, the late time data appears to indicate the presence of strong conducting material underlying the survey area. The question is whether this is “real” or simply an attribute of the over processed data. To examine this, we look at the area to the east of the survey where there is little conductive response and a great deal of magnetic activity. This area covers the south part of Melgurd Lake and the survey area to east of the lake to the eastern claim boundary.



On the map to the left , we can see that the only significant response at late time is a line of conductors on the very western edge of this area.

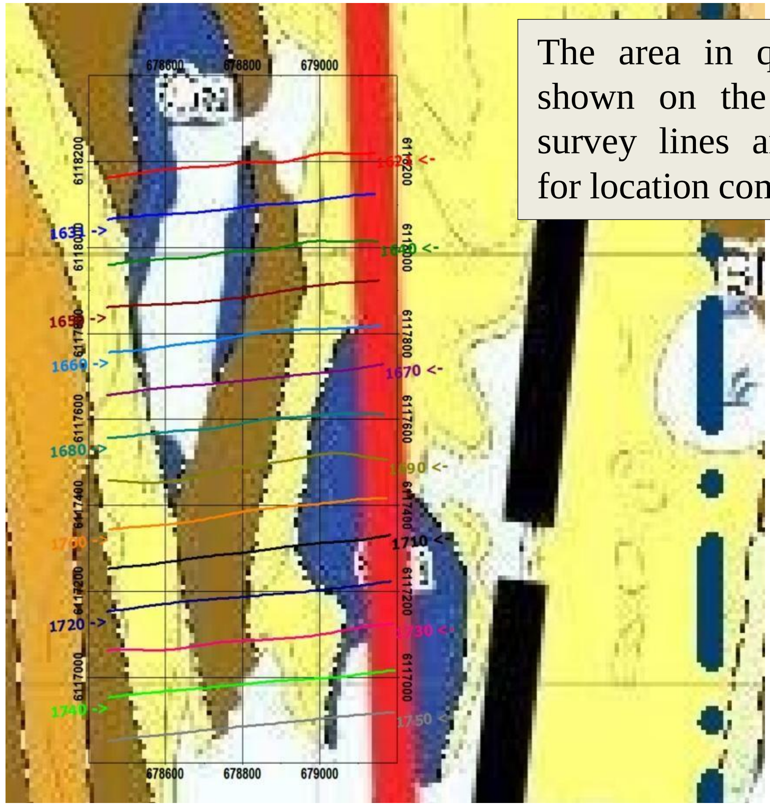


For the purposes of these illustrations, we have chosen a small subset of this area on the SE of the larger area.

Ch34 Bz Magnetic Zone Main Survey
Aeromagnetics (TMI) underlay

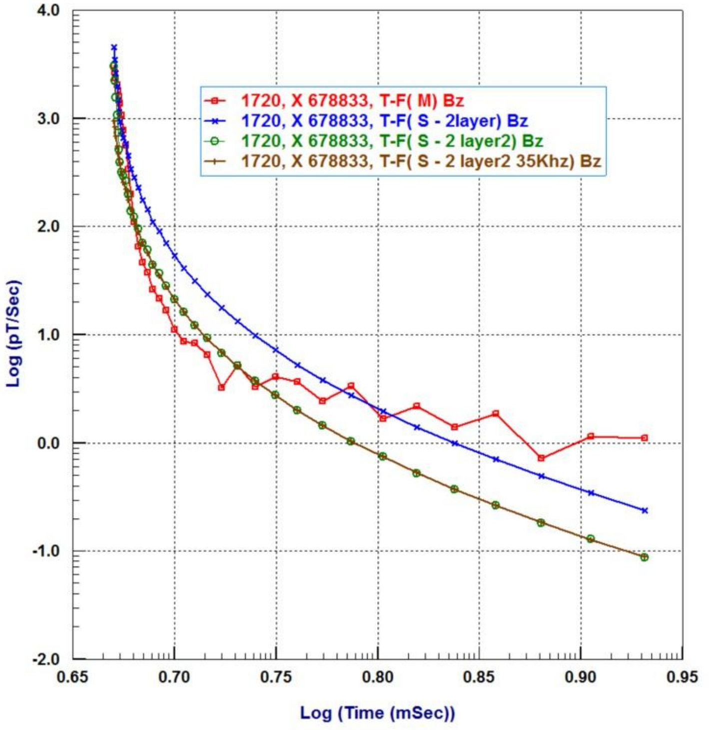
Data Issues: Electromagnetic

We use two basic models for the background to compare with the data to help illustrate this important issue. The models are derived from our analyzes of the data so far interpreted. The models both consist of 10m of cover (200 Ωm) with **Model** 1 having a 500 Ωm basement and **Model 2**, a 1000 Ωm basement.



The area in question is shown on the left. The survey lines are marked for location comparison.

Study Area



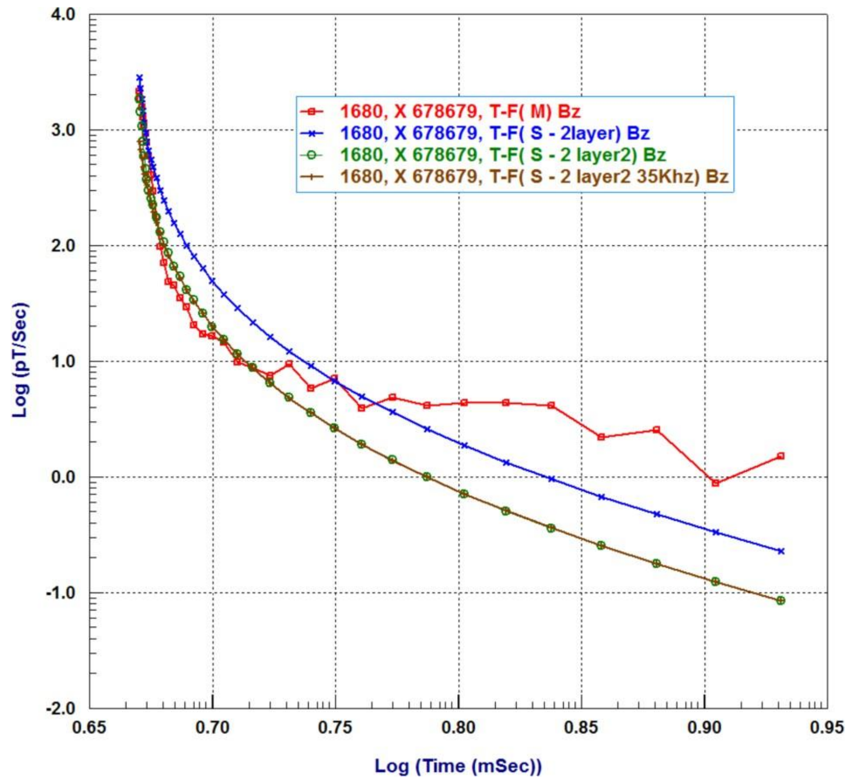
Example 1:
This is example is take from L1720 near the centre of this section of this line.

Data (red) is quite clean down to Ch21 which is only 0.38msec after the end of turn off. Beyond Ch21, the data appears moderately noisy. However, applying a smooth function through Ch21 to Ch37 would indicate conductive material below a 1000Ωm zone.

The second issue which can be illustrated here is the question of upper bandwidth and the implications for interpretation. The instrument cannot have an infinitely high upper frequency for a number of important instrument and physical issues. There is not sufficient information provided by the contractor to get any idea of this upper bandwidth. Other companies (Geotech, SkyTEM) provide high altitude data for a number of full cycles to provide the necessary information. Brown in the figure has the same model as green but the upper bandwidth is somewhat higher than for green. This effects the simulated early time response.

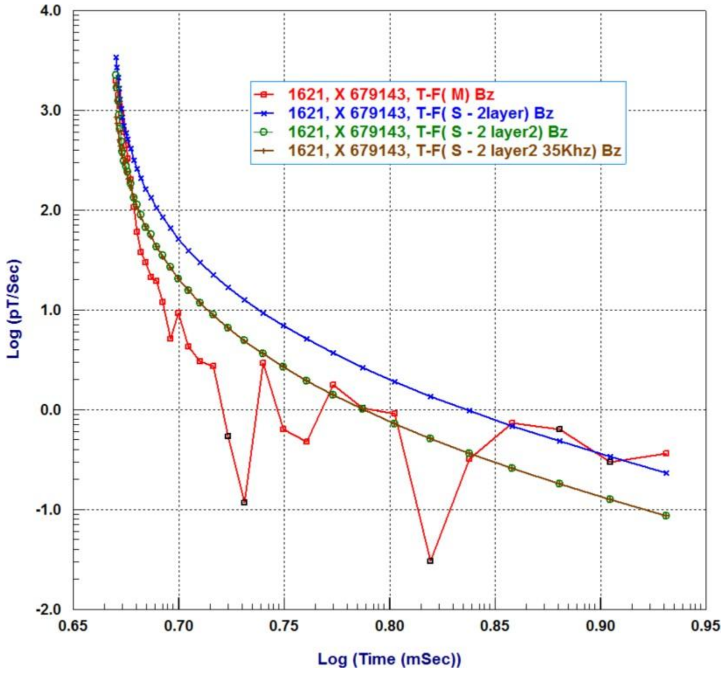
Data Issues: Electromagnetic

We use two basic models for the background to compare with the data to help illustrate this important issue. The models are derived from our analyzes of the data so far interpreted. The models both consist of 10m of cover (200 Ωm) with in **Model** 1 a 500 Ωm basement and in **Model 2**, a 1000 Ωm basement.



Example 2:
This is example is take from L1680 near the centre of this section of this line.

Date (red) is quite clean down to Ch21 which is only 0.38msec after the end of turn off. Beyond Ch21, the data appears moderately noisy. However, applying a smooth function through Ch21 to Ch37 would indicate conductive material below a 1000Ωm zone.

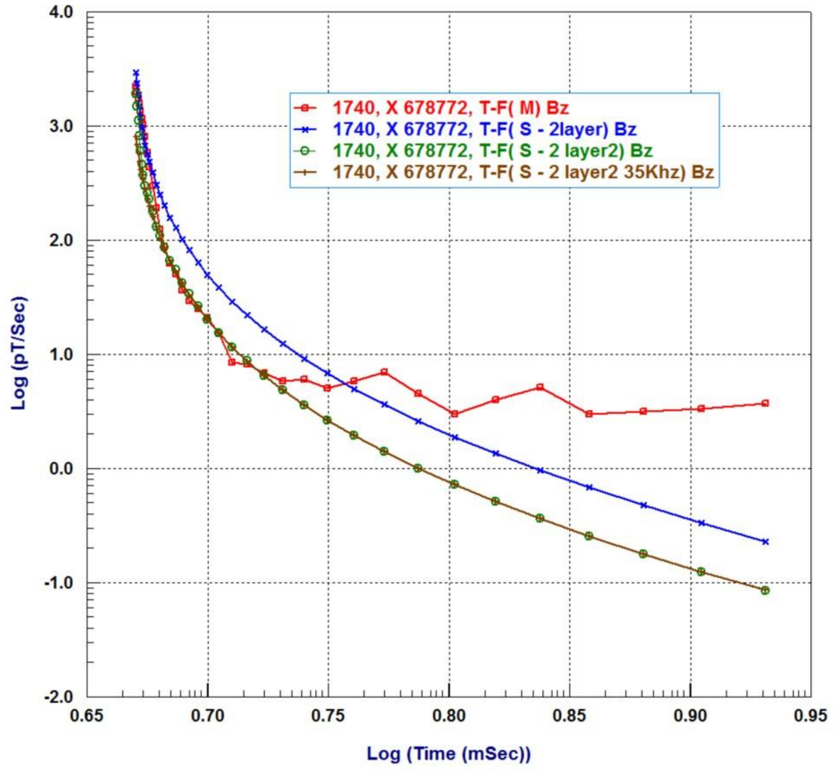


Example 3:
This is example is take from L1621 near the east part of this section of this line.

Date (red) is quite clean down to Ch16 which is only 0.19msec after the end of turn off. In the local area of this station, it appears the resistive later below the cover is more resistive than for Model 2. Beyond Ch16, the data is noisier than in the previous 2 examples. However, applying a smooth function through Ch16 to Ch37 would indicate conductive material with only 2 channels not fitting this smooth function.

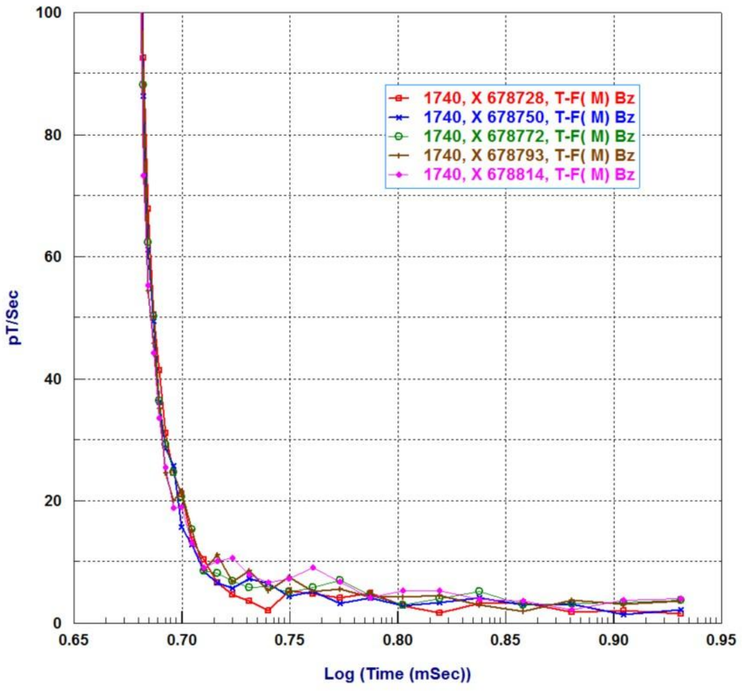
Data Issues: Electromagnetic

We use two basic models for the background to compare with the data to help illustrate this important issue. The models are derived from our analyzes of the data so far interpreted. The models both consist of 10m of cover (200 Ωm) with in **Model** 1 a 500 Ωm basement and in **Model 2**, a 1000 Ωm basement.



Example 3:
This is example is take from L1740 near the centre of this section of this line.

Date (red) is quite clean down to Ch21. Beyond Ch21, the data appears moderately noisy. At this station, there is a decided indication of very conducting material at depth. There is no conductive anomalies in this area.



Example 4:
This is example is take from L1621 near the east part of this section of this line.

Date (red) is quite clean down to Ch16 which is only 0.19msec after the end of turn off. In the local area of this station, it appears the resistive later below the cover is more resistive than for Model 2. Beyond Ch16, the data is noisier than in the previous 2 examples. However, applying a smooth function through Ch16 to Ch37 would indicate conductive material with only 2 channels not fitting this smooth function.

Data Issues: Recommendations

- The instrument (Xcite) is relatively new and yet to have a wide approval. The instrument has some unusual engineering aspects which has made many geophysicists skeptical of the system.
- There is no high altitude system response calibration data provided. This makes it almost impossible for someone to QC/QA the data after the survey has been completed and processed. It is always recommended that an independent geophysicists QC/QA the data during the survey and to check the processing during the processing period.
- Integrating the data and processing an airborne EM survey is a very difficult task requiring experience and a great deal of care. With relatively junior personnel doing the processing in a new firm, the question of processing errors will always appear. The data does not contain a number of critical channels to allow an independent geophysicist to check the processing of the data. But, nevertheless, I did turn over a number of processing issues which are questionable.
- The report provides little in the form of material to describe the processing and there are even data channels in the delivered data which have no description in the report.

- Before any further is done on the property is regards to this data or this interpretation, it is strongly suggested that a small ground TEM calibration study be done on the property in order to verify the airborne data. This survey would take less than a day to carry out with the principle costs being the transport of the instruments and crew in and out of the survey area.

Xcite TDEM Survey Fay Lake area

Priorities

	Centre Point		Number	strong					weak					
Anomaly Name	East	North	Targets	depth	strike(m)	dip(m)	volume	conductance(S)	depth	strike(m)	dip(m)	volume	conductance(S)	Priority
NW1	670232	6122973	2	30	240	400	96000	45	100	300	800	240000	50	1
NW2	670246	6122334	2	60	280	170	47600	100	55	150	300	45000	5	2
NW3A1	673975	6122160	2	20	330	500	165000	30	40	220	400	88000	30	6
NW3B3	673640	6122380	1	7	350	325	113750	30						7
WT1	675220	6119250	1	2	700	630	441000	20						13
WT2	675169	6116120	3	10	500	260	130000	40	70	300	400	120000	35	14
WT3	677499	6122943	1	5	500	300	150000	50						11
WT4	676803	6120064	1	8	600	310	186000	40						12
NET6	679060	6123111	2	9	200	130	26000	90	10	200	120	24000	60	15
PAT5	676453	6115500	2	20	550	280	154000	60	98	550	300	165000	60	4
PATB	676334	6114303	2	84	850	156	132600	58	20	680	220	149600	4	3
PATC-South	676524	6113385	2	9	1480	252	372960	10	25	550	220	121000	2.6	8
PATC-North	676700	6113980	3	65	950	500	475000	12	15	1200	210	252000	9.3	9
PDS1	676215	6122580	2	14	33	26	858	47	19	110	147	16170	8	10
PDN	676396	6123684	3	5	416	250	104000	40	22	170	220	37400	14	5

We provide a short table summary. "Number Targets" refers to the number different conductive zones within the anomaly. Depth, is the distance from the surface to the top of the target and strike and dip are the strike lengths and dip extent respectively. Volume assumes a 1m thickness. Conductance is in Siemens which is the conductivity-thickness product.

Our opinion, at the present time, of the order of priority or order of best target is given in the last column. The priority is based upon the conductance, size of the conductor, coincidence with a magnetic response and correlation with geologic structures as provided by Boreal Gold.

STATEMENT OF QUALIFICATIONS

I, Stephen L. Masson, of the city of Flin Flon, in the province of Manitoba, do certify as follows:

1. I am a consulting geologist and the President of M'Ore Exploration Services Ltd., with an office at 12 Mitchell Rd., P.O. Box 306, Flin Flon, Manitoba, since 1997.
2. I am former President of Boreal Gold Inc and President of Laser Gold Resources Inc. I am a technical consultant for Voyageur Mineral Explorers Corp. (formerly Copper Reef Mining Corporation).
3. I held previous, the position of Regional Exploration Manager for Central Canada from 1991 to 1996 for Granges Inc. and subsequently Aur Resources Inc. I have also held the positions of President and C.E.O. (2002-2005), Chairman, and V.P. of Exploration (1998-1999) of Foran Mining Corporation and President and CEO of Copper Reef Mining Corporation.
4. I have practiced my profession since 1967.
5. I am a graduate of Laurentian University, Sudbury, Ontario, with a Hon. B.Sc. and M.Sc degrees in Geology.
6. I am a graduate Mining Technologist from Haileybury School of Mines, Haileybury, Ontario.
7. I am a licensed Professional Geoscientist in good standing, registered in the Provinces of Saskatchewan and Manitoba. I am presently a Fellow in the Society of Economic Geologists.
8. I am the President and a member of the Manitoba-Saskatchewan Prospectors Association. I am also a member of the Prospectors and Developers Association of Canada.
9. I am considered a "Qualified Person" for the purposes the Canadian Securities Administrators/TSE's Proposed National Instrument 43-101 – Standards for Disclosure for Mineral Exploration and Development and Mining Properties regulations, revised May, 2000.
10. I have unrestricted access to the subject properties and all the exploration data upon which this report is based. I have personally been on the property worksites.
11. All information contained in this report was supplied either by the M'Ore Exploration fieldwork program completed under the supervision of M'Ore Exploration, subcontractors, or through previous workers reports on their previous work on the property. To the best of my knowledge, the quality of the information and data presented in this report is presented in a fair and accurate manner.
12. I am a significant shareholder of Boreal Gold Inc.
13. As of September 5, 2024, I am not aware of any material fact or material change that is not reflected in the report or aware of any omission to disclose that makes this report misleading.
14. I am in full agreement with recommendations and conclusions presented in this report.
15. Permission is granted to publish this report dated September 5, 2024, for corporate purposes, for disclosure requirements to appropriate securities regulators and/or exchanges, and the raising of funds. No portion of this report may be altered or reproduced without first being reviewed and accepted by M'Ore Exploration Services Ltd. and the authors and any portions extracted must properly reference this report and its authors.

Dated at Flin Flon, Manitoba this 5th day of September, 2024

Stephen L. Masson, M.Sc. P.Geo.
President, M'Ore Exploration Services Ltd.

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MEMBER 10488
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YR. MO. DAY
SASKATCHEWAN