Boreal Gold Inc

TDEM and Aeromagnetic Airborne Survey Data Analyses and Modeling, Fay Lake, MB Assessment Report

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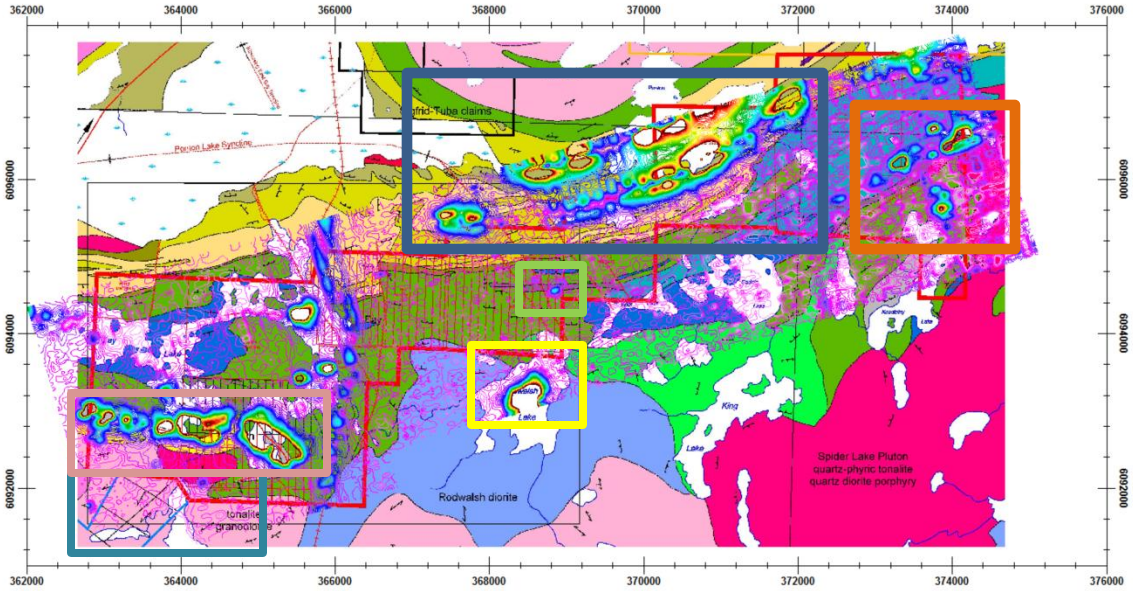
TDEM and Aeromagnetic Airborne Survey
Data Analyses and Modeling

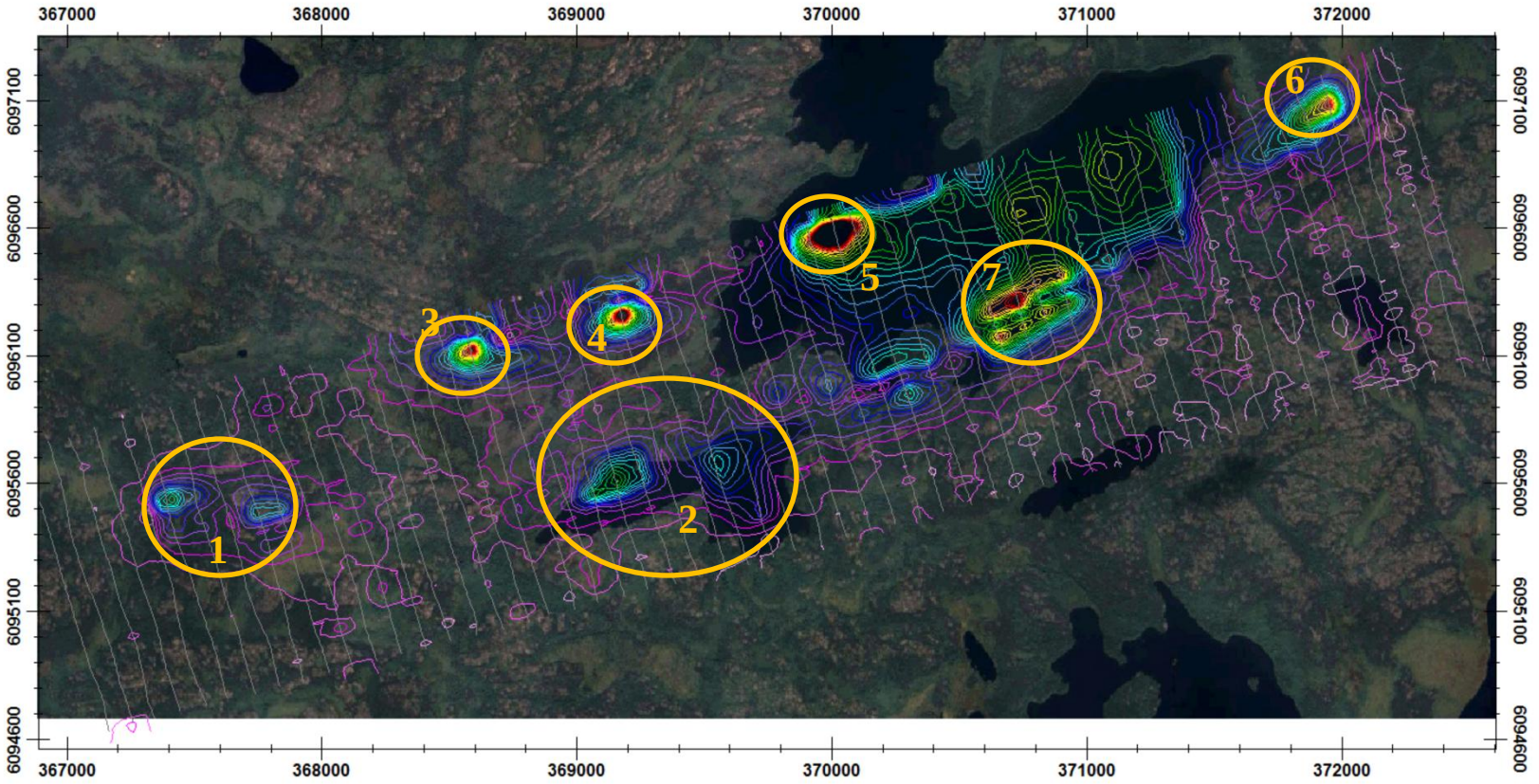


This study divides the survey into six parts;

North Central (blue):	**Pgs 3 - 23**
Central (green):	**Pgs 25**
East (orange):	**Pgs 26-36**
South Central (yellow):	**Pgs 37-38**
South West (blue green):	**Pgs 39-43**
Main Zone (light brown):	**Pgs 44- 54**

Xcite TDEM Survey Fay Lake **North Central Area**

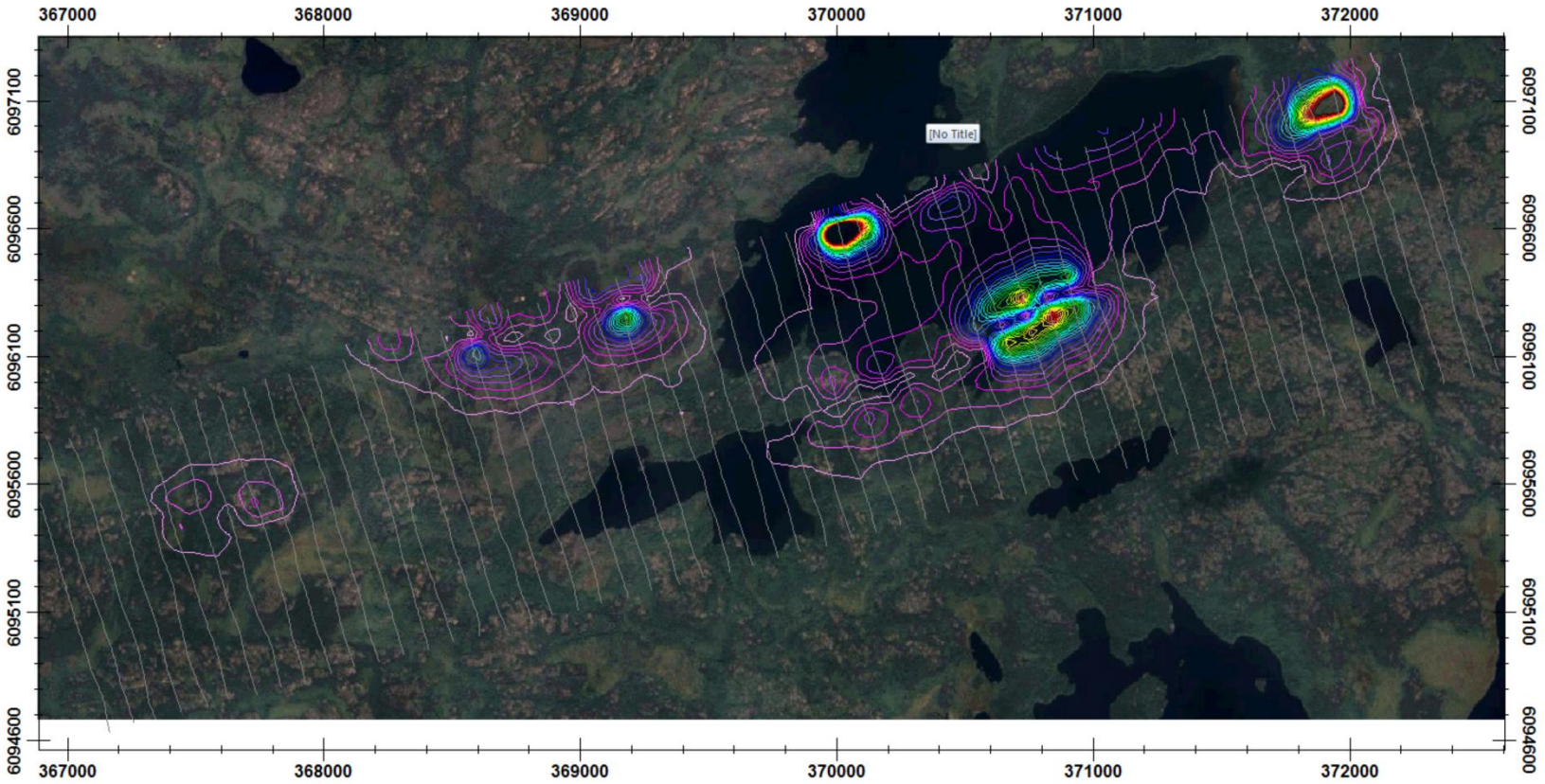
Early Time Vertical Component, Ch10 Bz



At late early time for the vertical component, seven (7) anomalous areas are indentified. Area 7 could be extended to see if the weaker response to the SW is connected to the main anomalous area. These 7 areas will be studied and modeled individually later in this report.

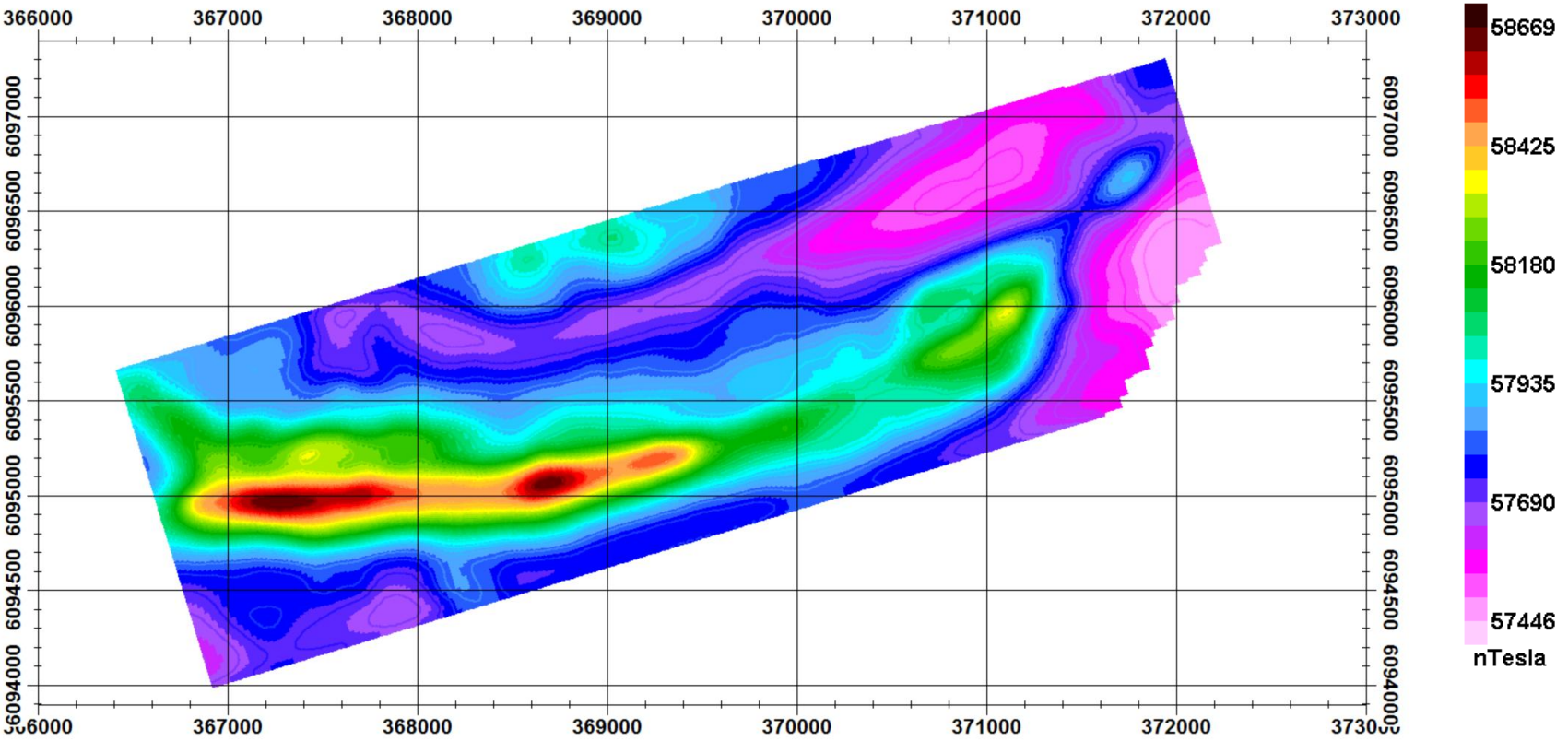
Xcite TDEM Survey Fay Lake **North Central Area**

Ch21 Bz Early late time



Early late time seen here may possibly indicate the areas of the most conductive material or the highest conductivity. Note that area 1 at the far west is very weak by this time compared to five of the other areas. Area 2 to the south over the lake has almost disappeared.

Aeromagnetic data – Total Field (TMI) upward continue to 125m

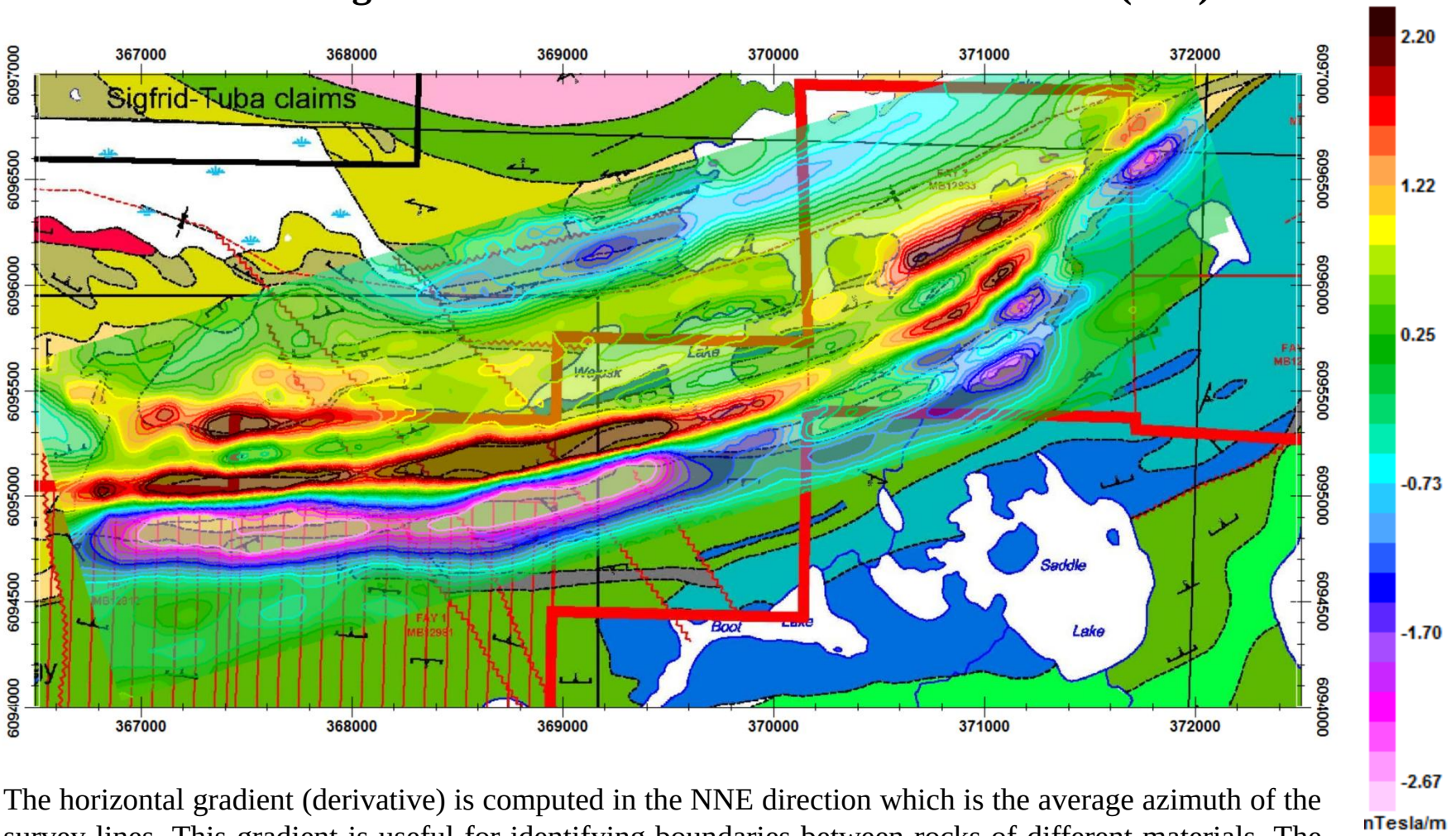


This particular study zone has an unusual magnetic response compared the remainder of the survey and indeed for this region NE of Flin Flon. The data has been upward continued to 125m. This means that the data has been processed to a response that would have been expected had the magnetometer been flown at a height of 125m as opposed to the average of 80m in actuality. Performing this processing has two main advantages, first it minimizes the surficial response while exposes the magnetism of the deeper rocks and thus separating the different structural materials. Secondly, it has the advantage of removing some of the airborne acquisition noise.

The boundaries between the magnetic rocks and the non-magnetic rocks are particularly sharp. But, the strength of the variation can be more than 1200 nT.

Xcite TDEM Survey Fay Lake **North Central Area**

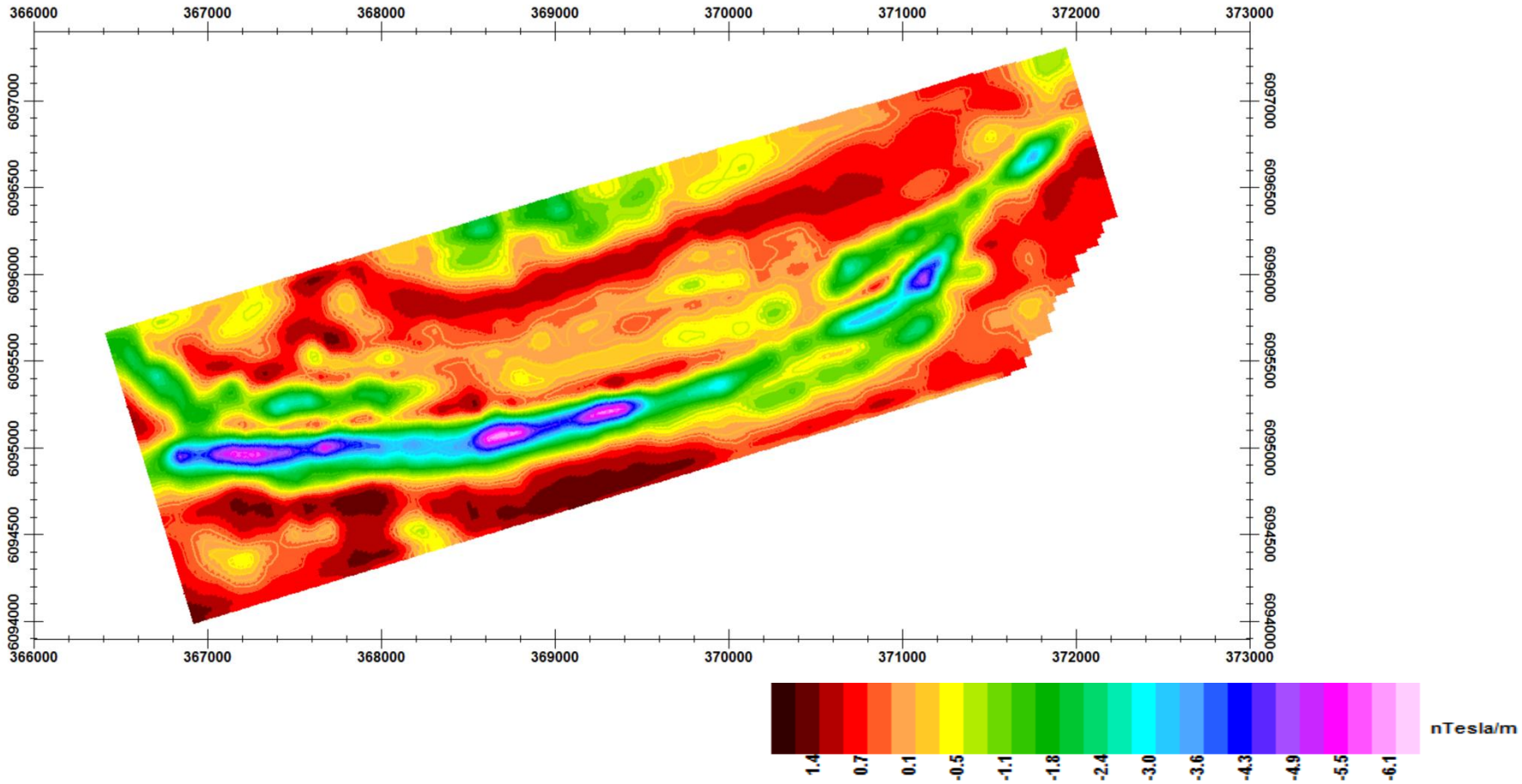
Magnetic Horizontal Gradient in NNE direction (-17º)



The horizontal gradient (derivative) is computed in the NNE direction which is the average azimuth of the survey lines. This gradient is useful for identifying boundaries between rocks of different materials. The high magnetic area could be associated with the one portion of the metasedimentary rocks.

Xcite TDEM Survey Fay Lake **North Central Area**

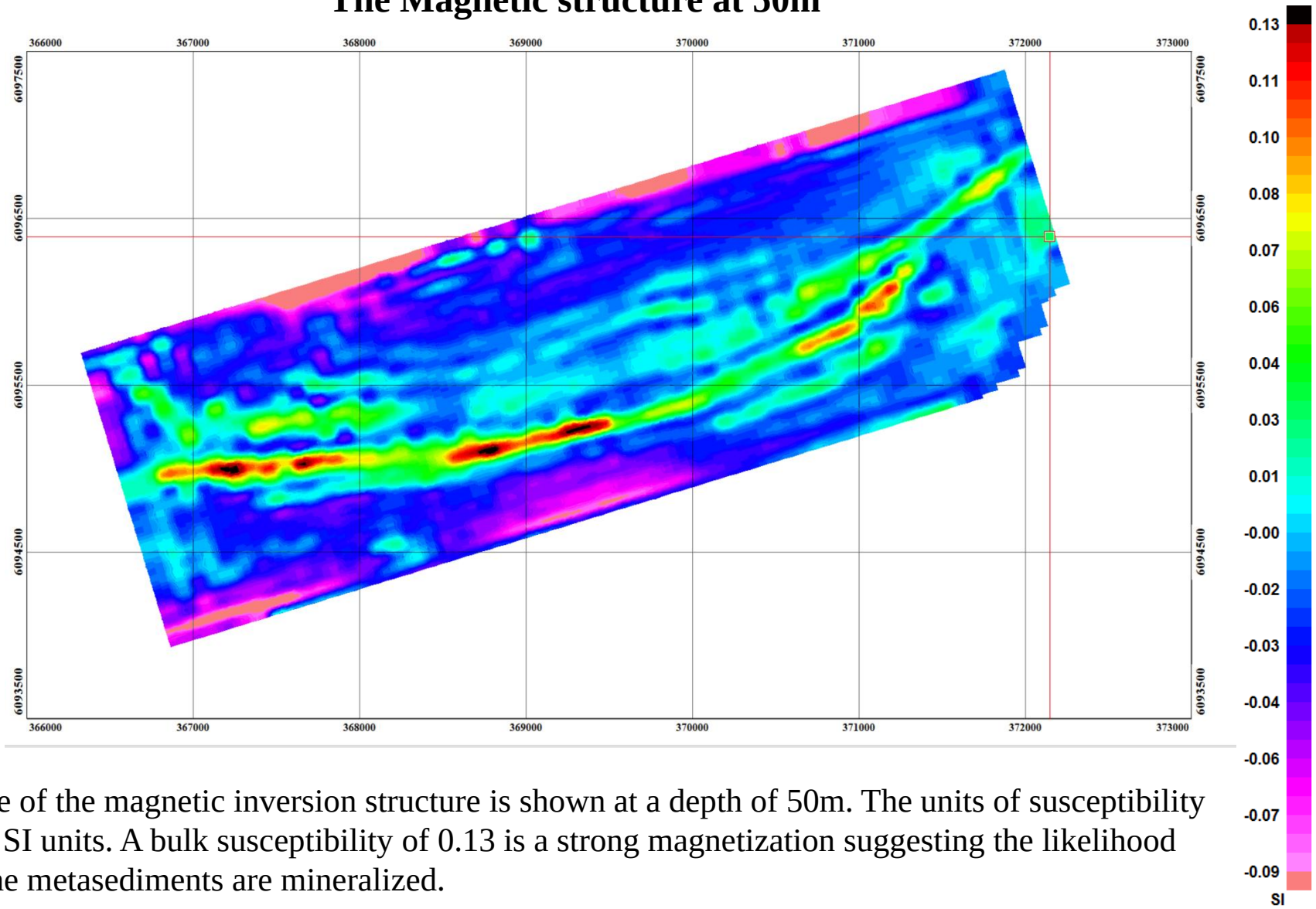
Magnetic Vertical Gradient



The vertical gradient (derivative) of the magnetic data is computed. The vertical derivative locates the principle areas of magnetization. Also, it helps identify the variation in depths. Larger negative values indicate deeper structures. From inversion, the depths to the pink values are about 150m. Again, the zones of high negative magnetic gradients appear correlated with the Mississippi metasedimentary rocks

Xcite TDEM Survey Fay Lake **North Central Area**

The Magnetic structure at 50m

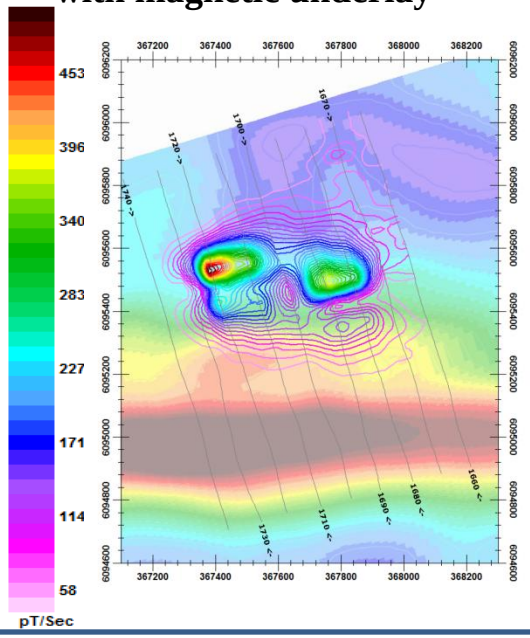


A slice of the magnetic inversion structure is shown at a depth of 50m. The units of susceptibility are in SI units. A bulk susceptibility of 0.13 is a strong magnetization suggesting the likelihood that the metasediments are mineralized.

Xcite TDEM Survey Fay Lake **North Central Area**

Target 1

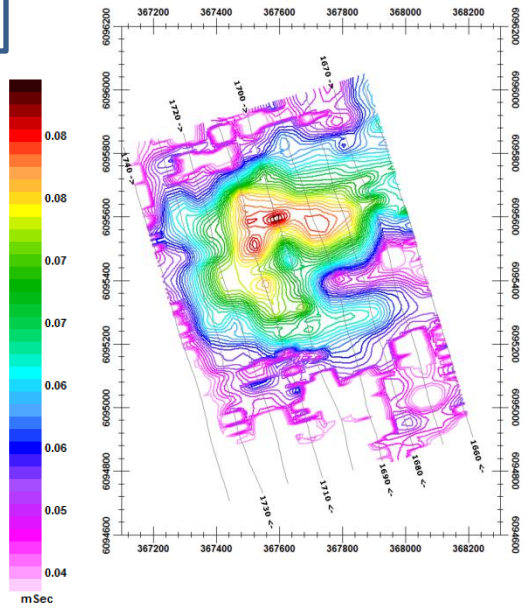
Ch13 Vertical Component Bz with magnetic underlay

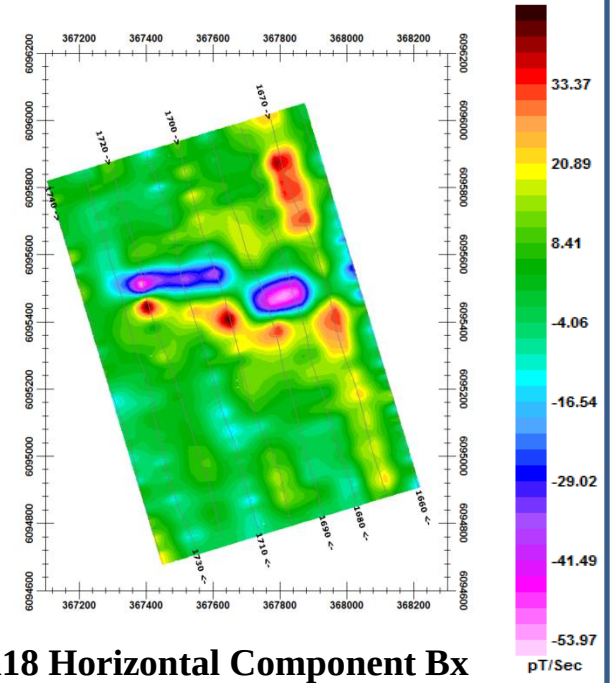


These two anomalies are indicated as pelites in information provided by the client. They appear to be embedded in what is indicated as arkosic sandstone.

Mid to late mid-time data indicates the structures as mostly vertical but slightly dipping towards the north. The Bx component (right figure) appears to indicate these as two distinct structures.

The decay rate (late early to late mid-time) indicates a very rapid decay constant. This implies these are weak conductors.





Ch18 Horizontal Component Bx

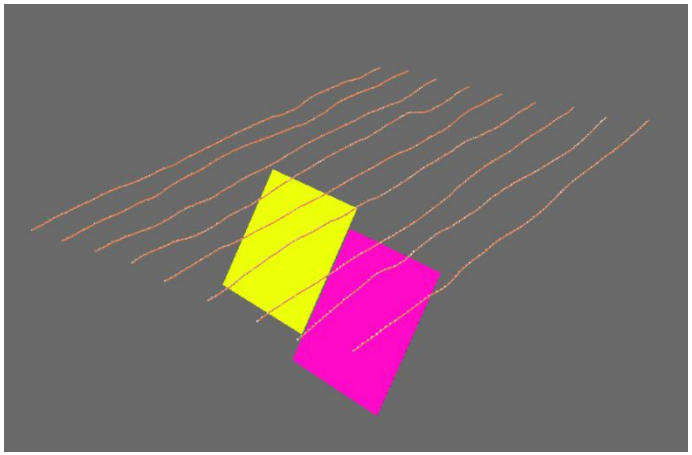
Decay Rate for Bz

(Ch8-18) with a maximum of 0.09msec

Xcite TDEM Survey Fay Lake **North Central Area**

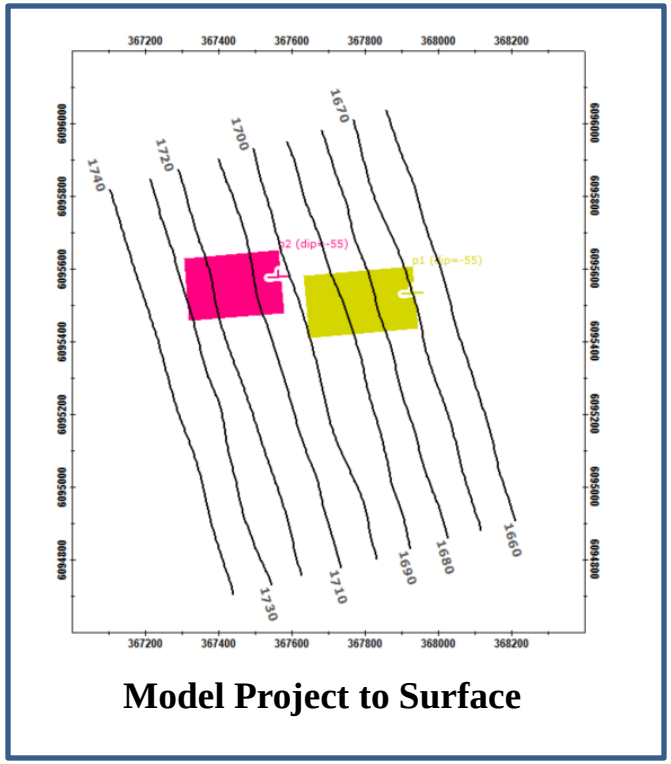
Target 1

View from North West



Anomaly NC T1A
Strike Length: 300m
Dip Extent: 300m
Strike Angle: 85º East
Dip Angle: 55º NNW
Conductance: 4 S
Depth to Top: 30m
Depth to Bottom: 270m

Anomaly NC T1B
Strike Length: 260m
Dip Extent: 300m
Strike Angle: 85º East
Dip Angle: 55º NNW
Conductance: 4 S
Depth to Top: 30m
Depth to Bottom: 270m



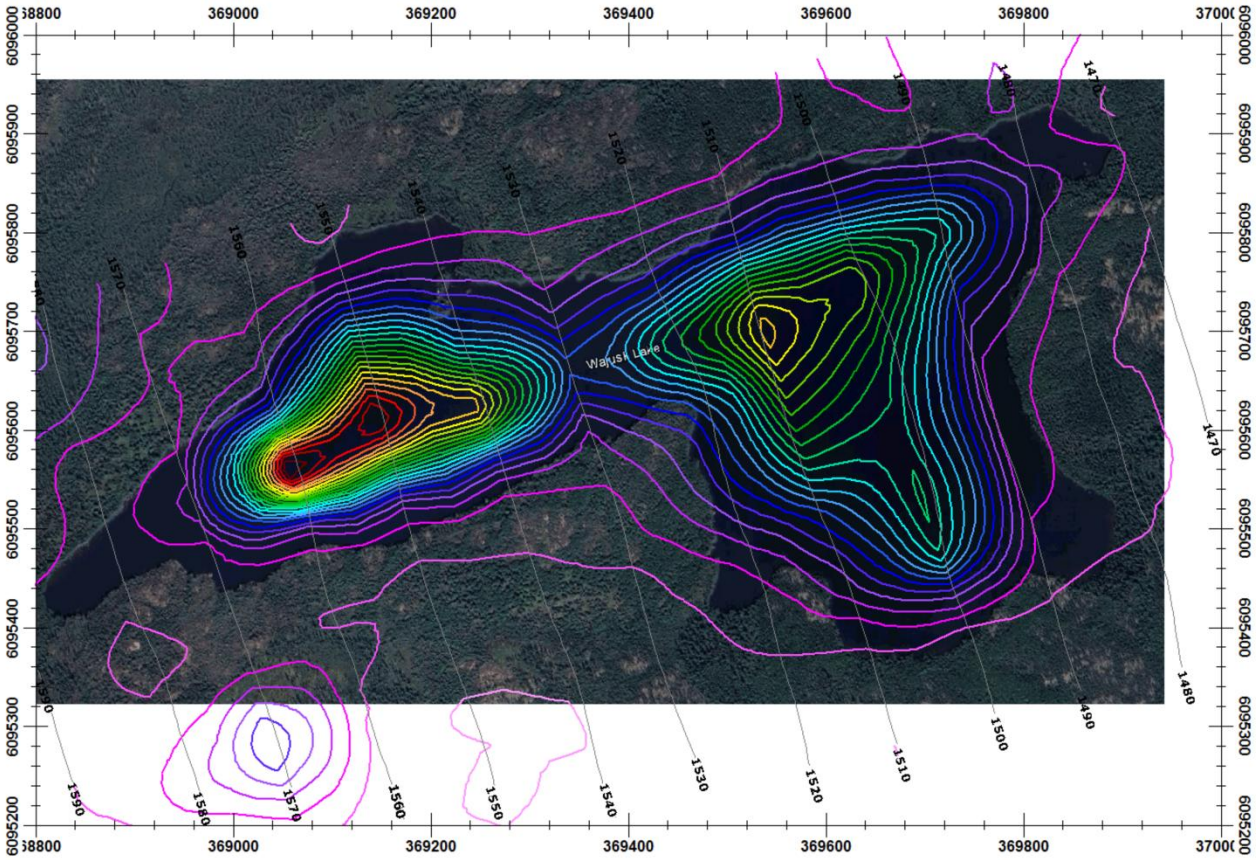
Model Project to Surface

The models of the anomalies represent the data from mid-time to late time (Ch24). Particularly, over the western anomaly NC T1B, there is additional flat lying conductive material of weaker conductivity. The flat lying, more weakly conductive material, decays more quickly that the sub-vertical structures and thus is not present at late time and is likely surficial material.

While pelites are known to be highly resistive resistive in the laboratory when dry, they could be expected to be of low conductivity when wet particularly if coarse grained and depending upon the degree of metamorphism. These are very weak conductors.

Xcite TDEM Survey Fay Lake **North Central Area**

Vertical Component, Bz, Ch3 with satellite image underlay

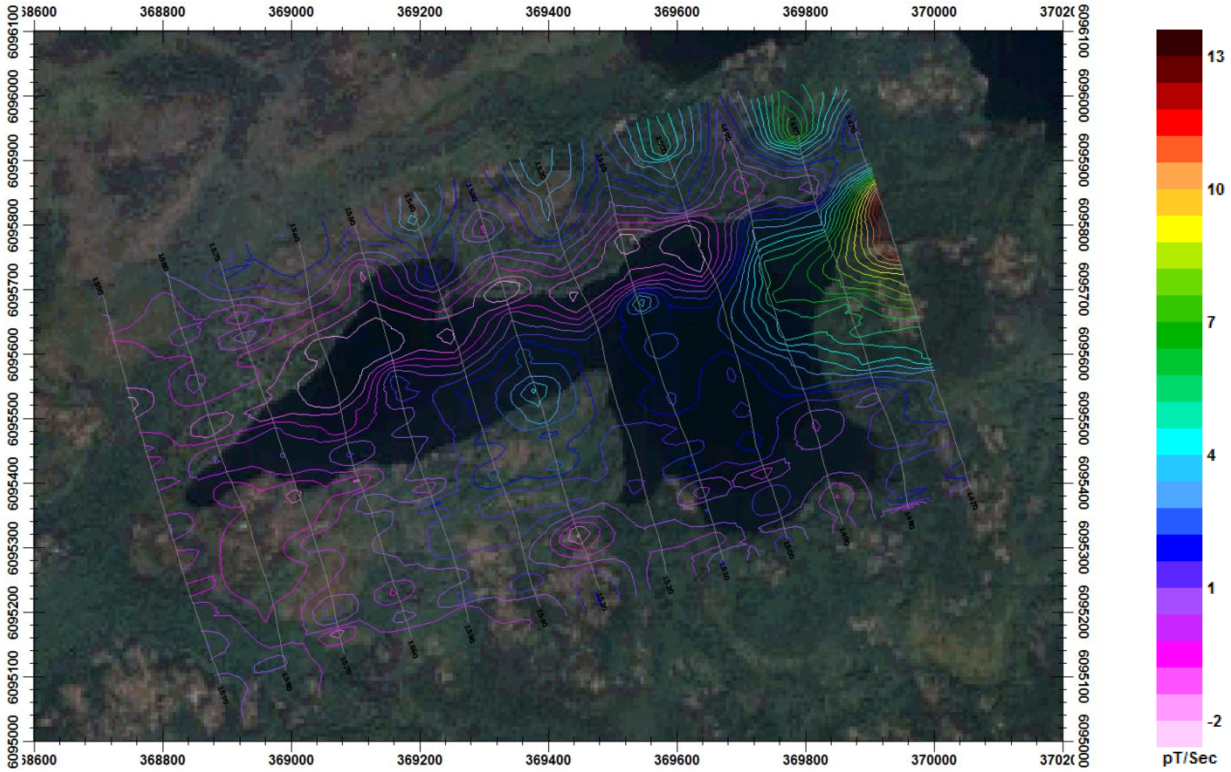


Target 2

It would appear that the early time response is caused by lake bottom sediments.

Xcite TDEM Survey Fay Lake **North Central Area**

Vertical Component, Bz, Ch22 with satellite image underlay

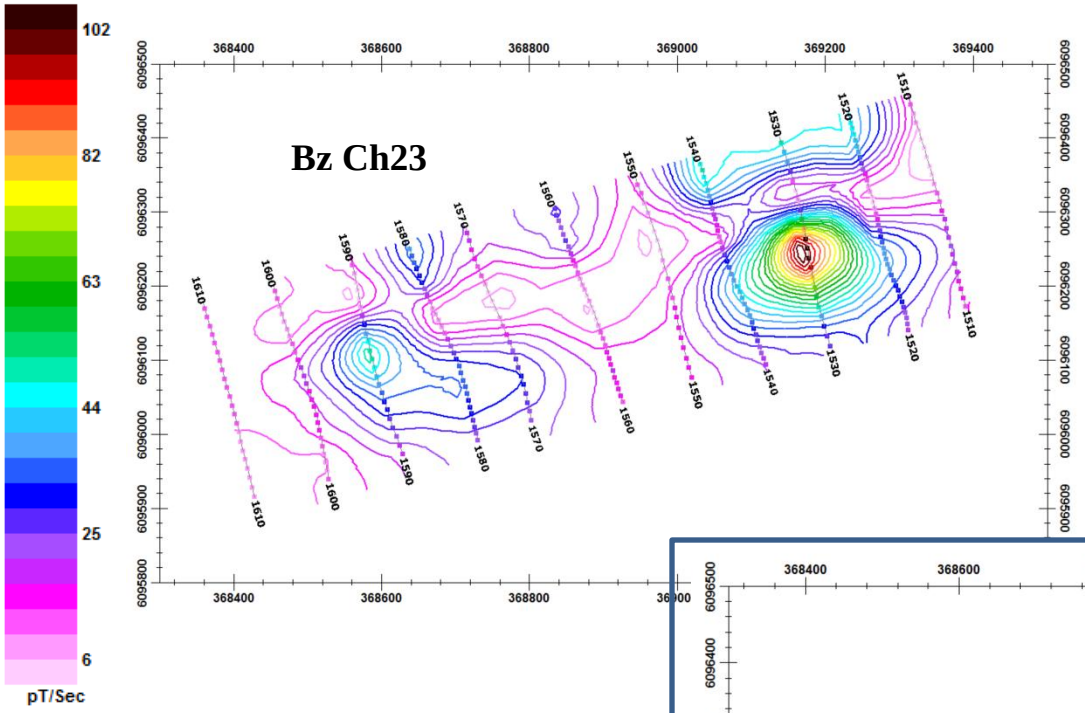


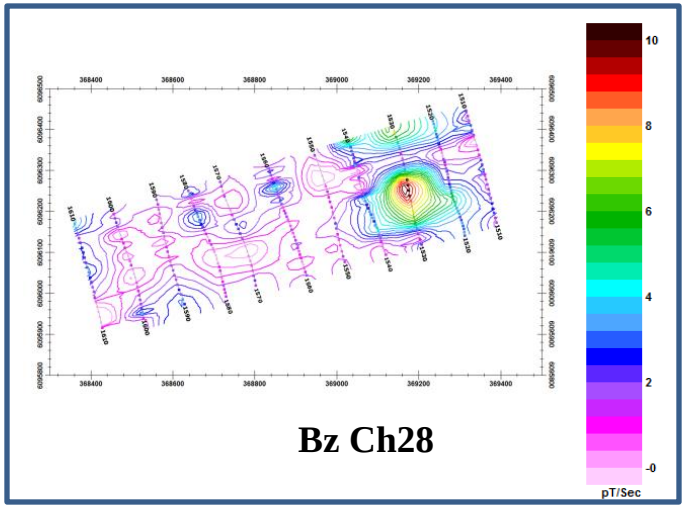
Target 2

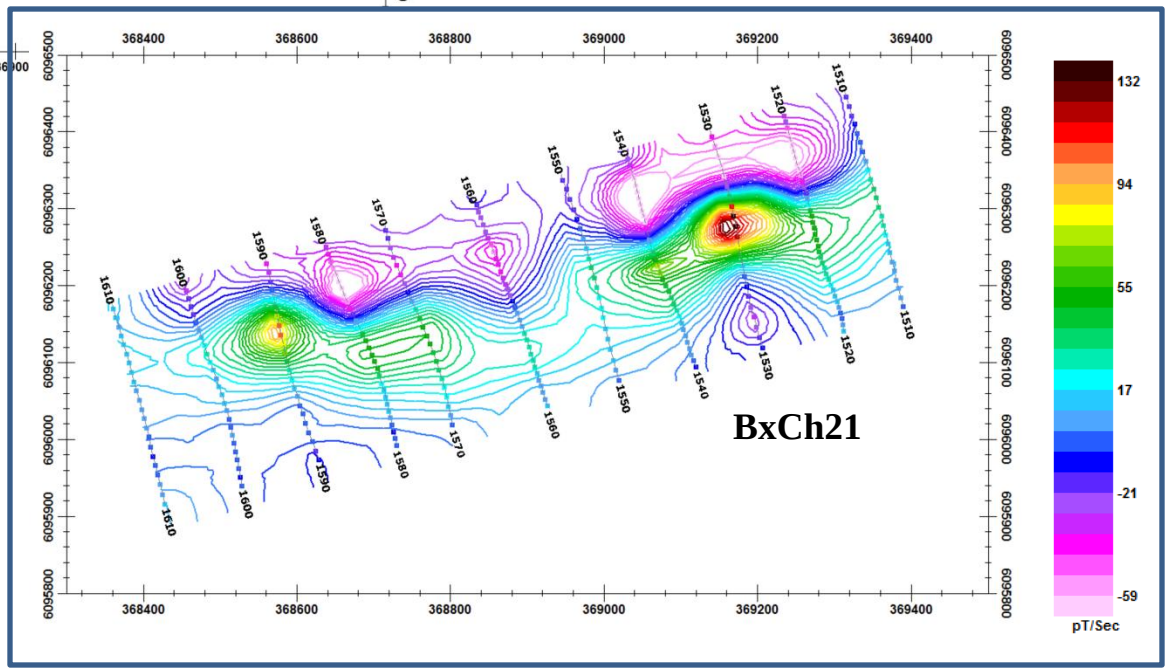
As we move the view of the data to later times, there appears to be no conductors beneath the sediments. There is modest conductive material just to the east of the lake but only a weak conductor. But, this conductor is along strike with Target 7 to the north east suggesting The NE anomaly is over mapped Mississippi arkos and on the edge of mapped synvolcanic intrusions.

Xcite TDEM Survey Fay Lake **North Central Area**

Target 3&4







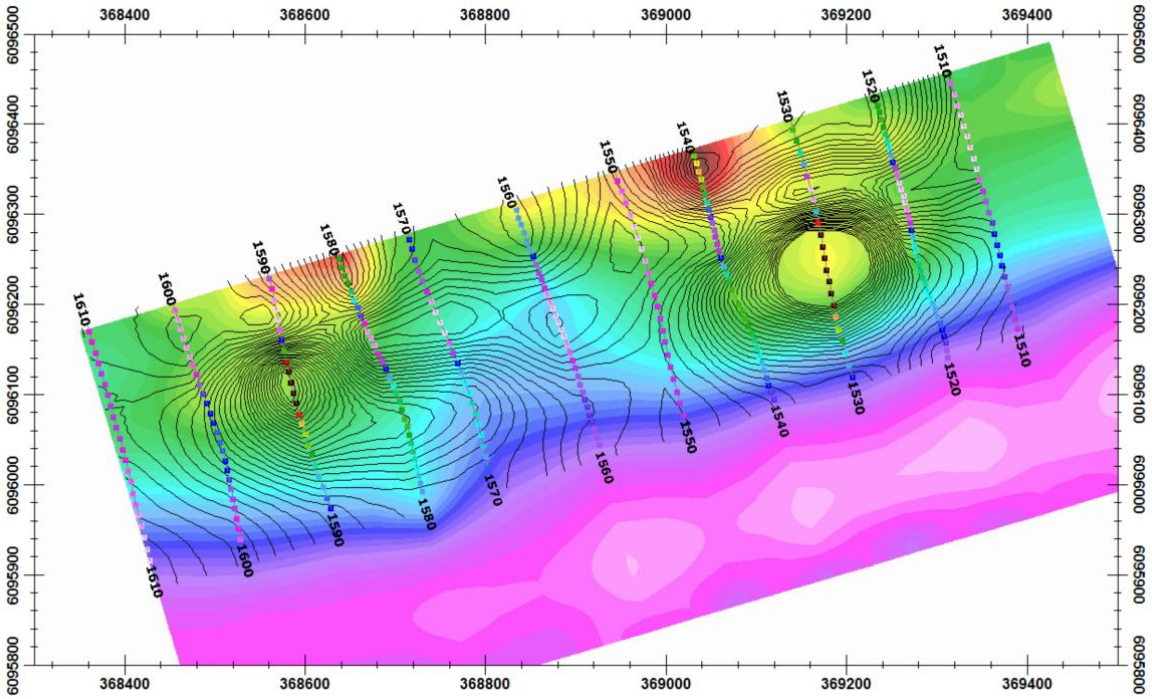
Target 3 and Target 4 are primarily observed on L1590 and L1530 respectively with a moderate high seen on L1540. While there is still a reasonable response for both anomalies at Ch23 (above left) by Chn28 (right) only Target4 still has a detectable response. There appears to be 2 additional anomalies to the north just outside the survey area.

The horizontal component (Bx) shown on the right for Ch21, appears to show there may be a deeper structure connecting the 2 anomalies.

Xcite TDEM Survey Fay Lake **North Central Area**

Target 3&4

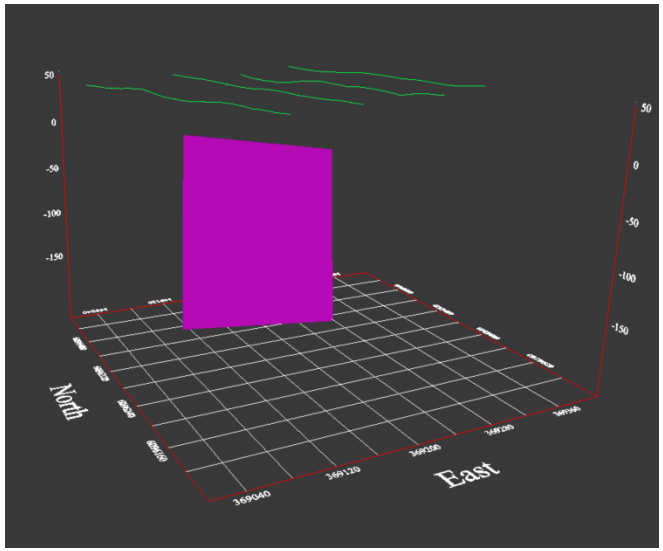
Bz Ch21 Contoured in back with aeromagnetics underlain



There is weak magnetic response associated with both anomalies and in particular Target 4. Stronger (also circular) magnetic anomalies appear at the very edge of the magnetic survey coincident with the EM responses in previous figures. This would appear to confirm the presence of 2 other anomalies just outside the survey.

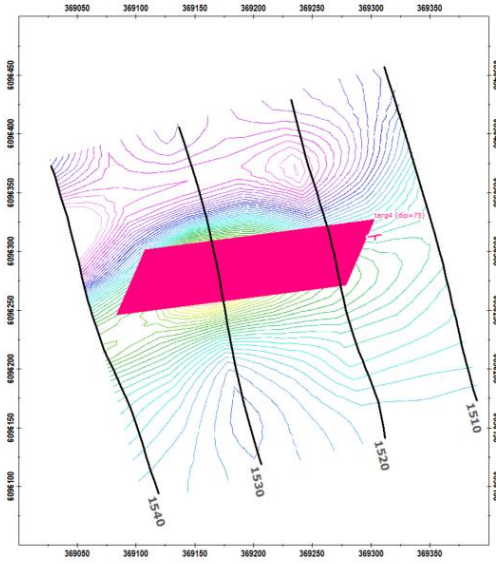
Xcite TDEM Survey Fay Lake **North Central Area** Target 4

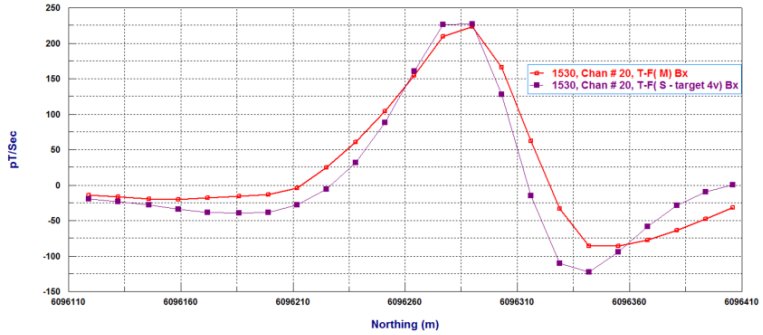
View from South West



Anomaly NC T4
Strike Length: 200m
Dip Extent: 200m
Strike Angle: 80º East of N
Dip Angle: 75º SSE
Plunge: East
Conductance: 13 S
Depth to Top: 5m
Depth to Bottom: 225m

Model with Bx Ch20 underlain



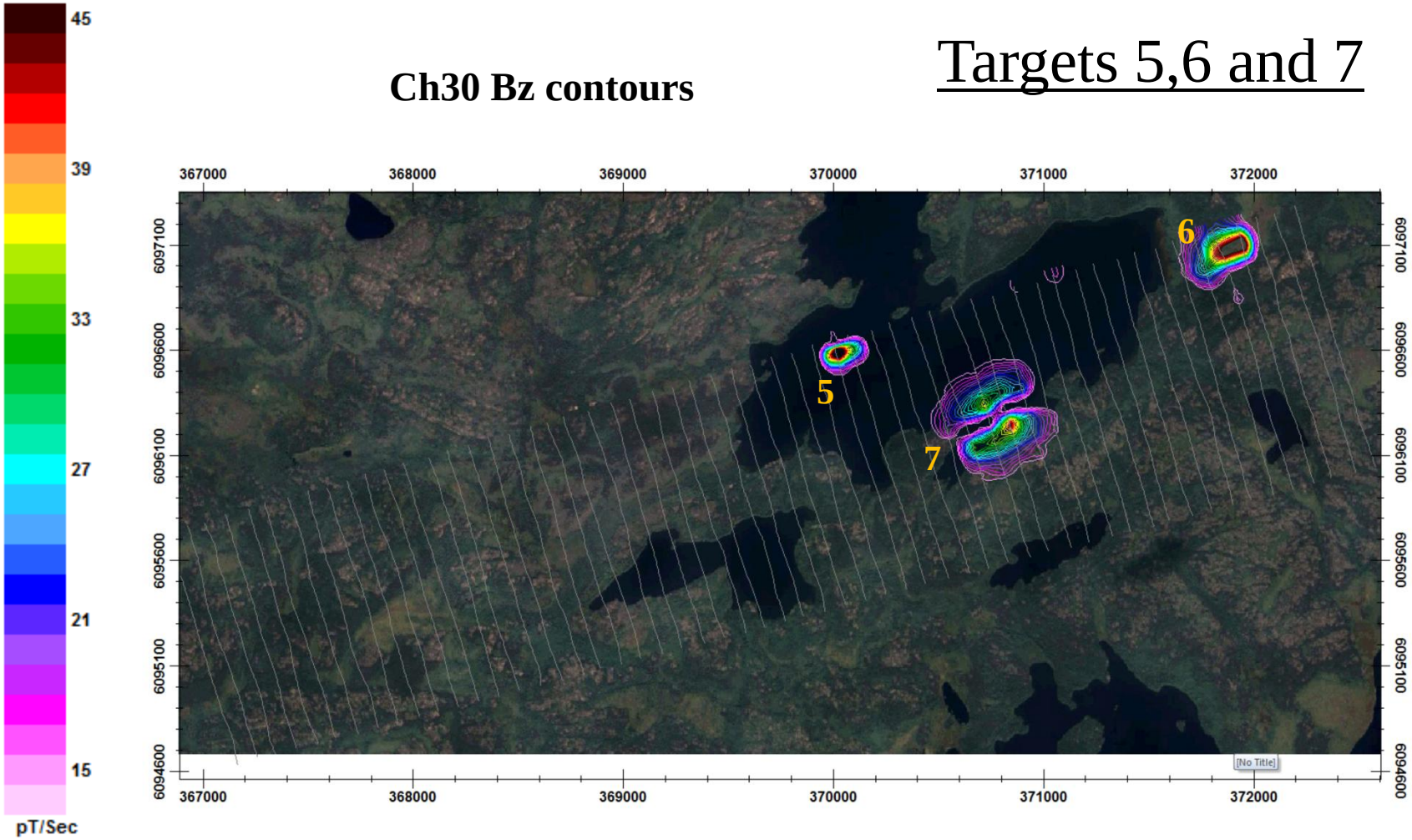


Data vs. Model response including background response, L1530 Bx Ch 20.

The conductor is modest at only 13 Siemens. At the peak of the anomaly along L1530, the Bz becomes very noisy by Ch29. The top of the target is very shallow with very little indication of interfering surficial material.

Targets 5,6 and 7

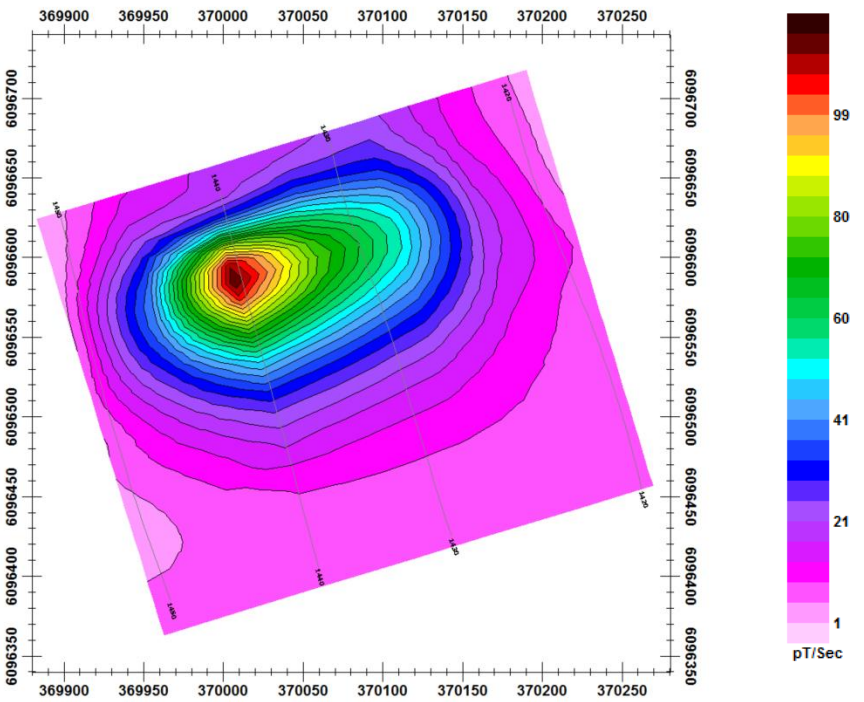
Ch30 Bz contours



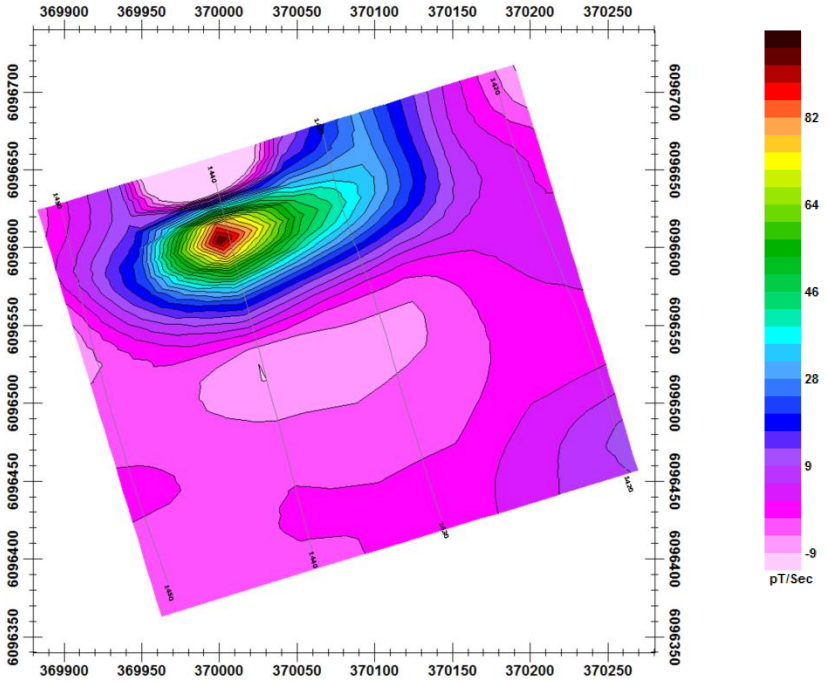
The data displayed is quite late in time eliminating any interference from lake bottom materials. Target 5 is small and entirely below the lake. Target 6 is larger and just off the lake. Target 7 is divided apparently into two sections, one over the lake but one off the lake. Target 5 and 6 are apparently shallow dipping while target 7 could be more vertical.

Xcite TDEM Survey Fay Lake **North Central Area** <u>Target 5</u>

Vertical Component, Bz, Ch28 late time



Horizontal Component, Bx, Ch28 late time



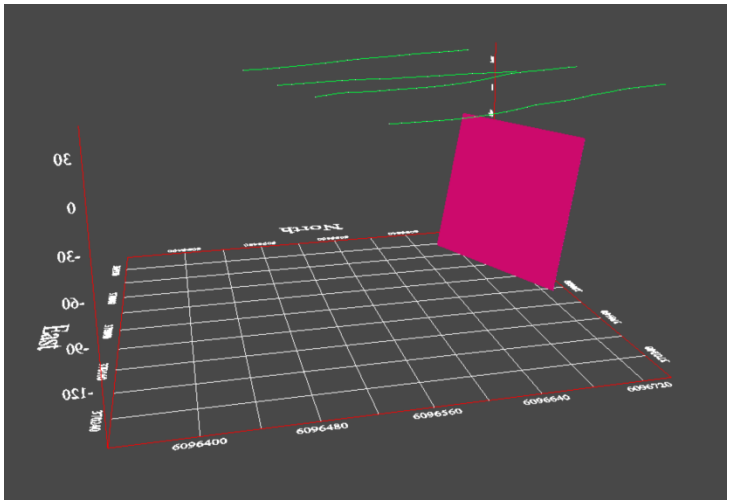
Target 5 is beneath Lake Ponton at the northwest edge and on the edge of the claims. Target5 has a relatively strong response to Ch30 and still a coherent response to Ch35. are primarily observed on L1590 and L1530 respectively with a moderate high seen on L1540. However, the response is primarily on one line, L1440 with a small response on L1430.

The anomaly is on the edge of 2 magnetic domains but there is no specific magnetic response to this anomaly.

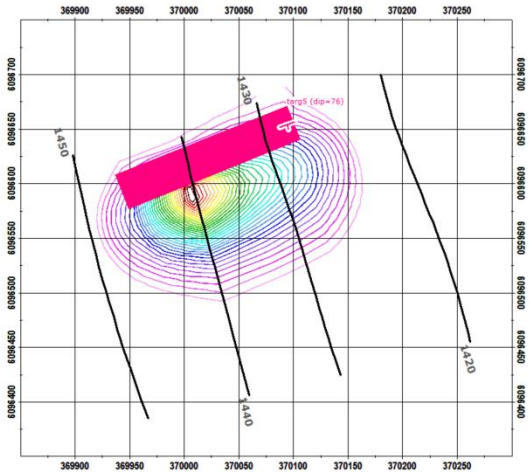
Xcite TDEM Survey Fay Lake North Central Area

Target 5

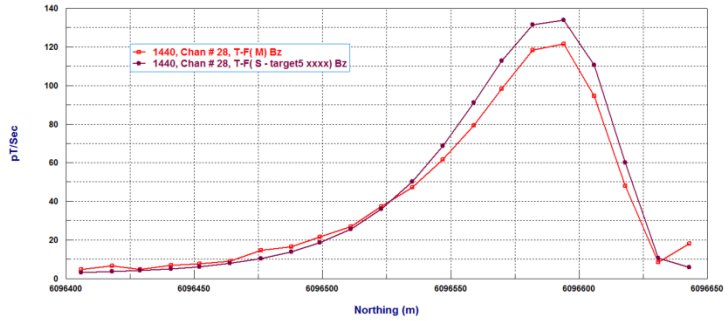
View from South



Anomaly NC T5
Strike Length: 170m
Dip Extent: 140m
Strike Angle: 68º East of N
Dip Angle: 76º SSE
Conductance: 25 S
Depth to Top: 15m
Depth to Bottom: 145m



Model projected to surface



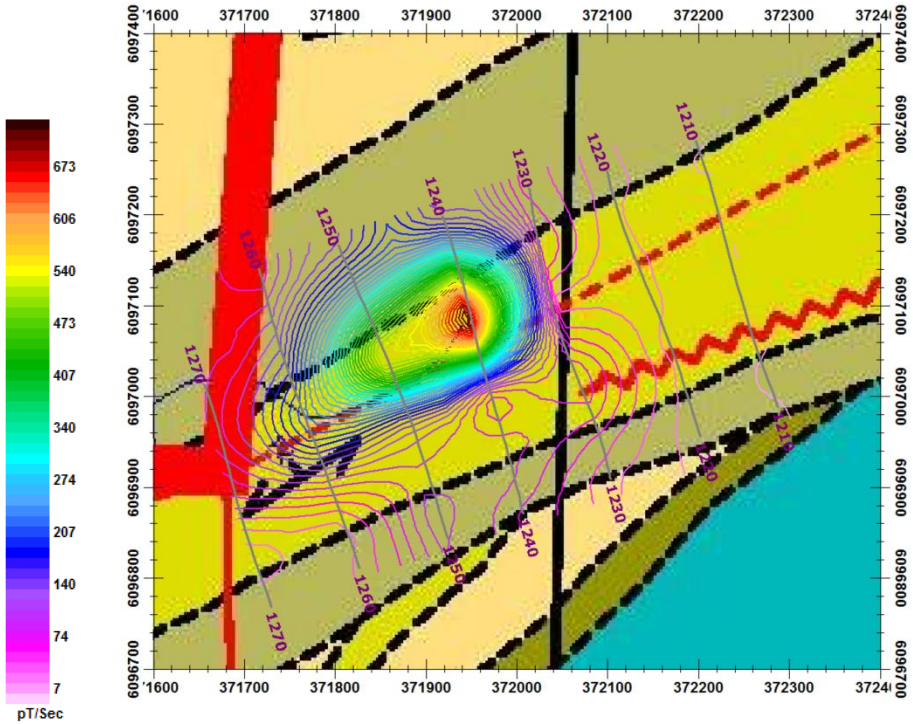
Data versus Model response including background response, L1440 Bz Ch 28.

This conductor is isolated from other anomalies. The conductance is moderate at 25 Siemens. There is no associated magnetic response with this target.

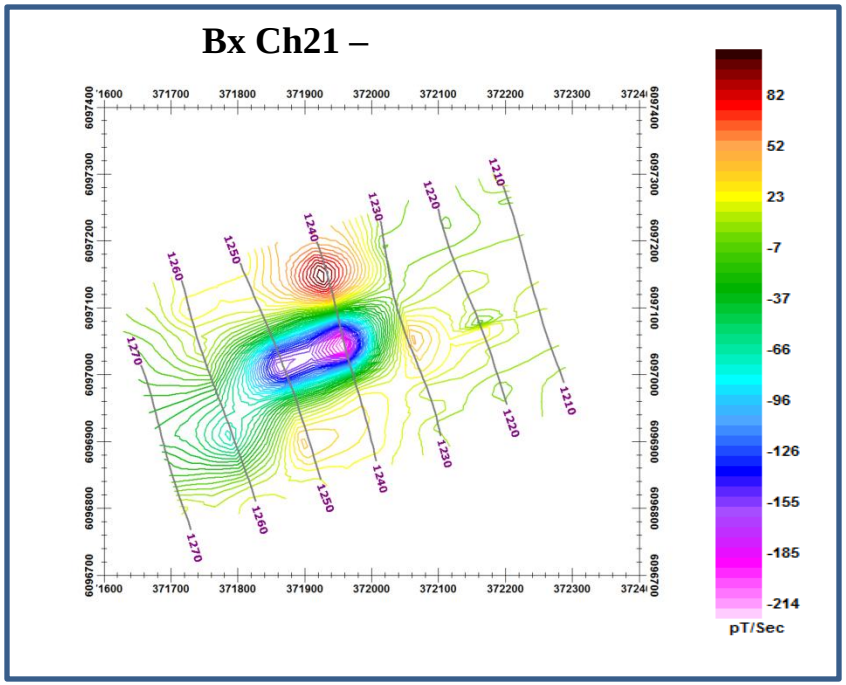
Xcite TDEM Survey Fay Lake **North Central Area**

Target 6

Bz Ch18 – Geology with claim boundaries underlain



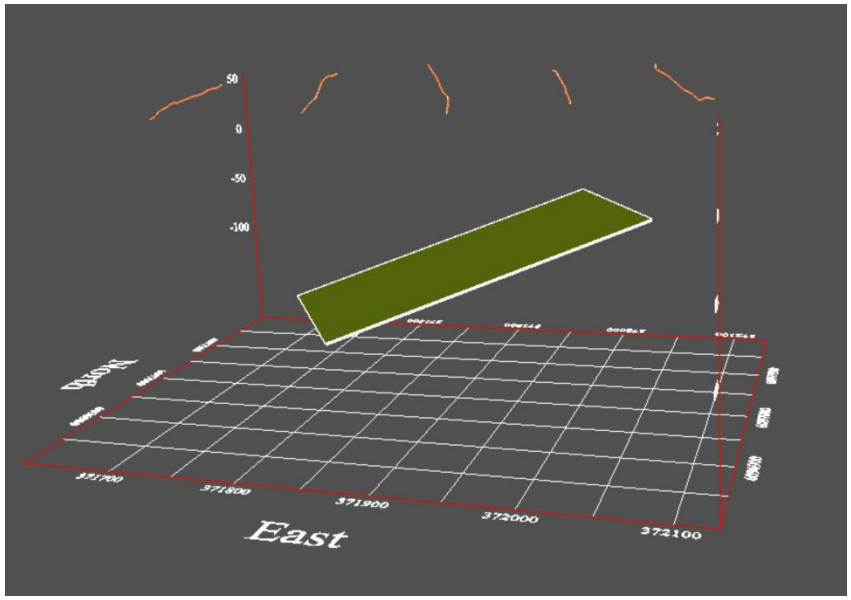
Bx Ch21 –

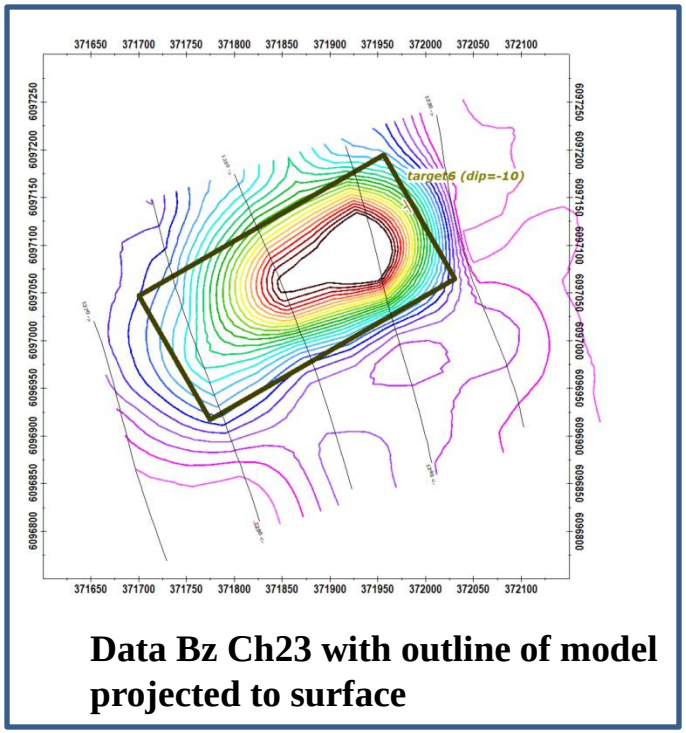


Target 6 is to the NE of the survey just outside the edge of the claims. Initially, the target appears to be striking along the survey line and dipping to the SW. There is a good coherent response down to Ch35 indicating a strong conductor.

One unusual aspect of the resistivity structure around this anomaly is that the background resistivity of the hosting rocks changes from a surface resistivity of about 626 Ωm to 400 Ωm at about 60m depth. The data cannot resolve how deep this lower resistivity material extends. It is also possible that this is an indication of over smoothing the later time data during processing.

View from South





Data Bz Ch23 with outline of model projected to surface

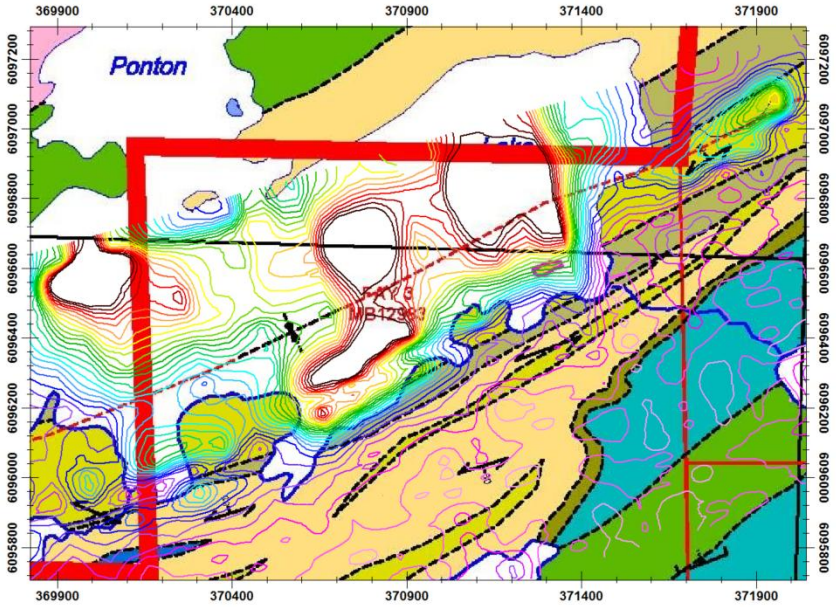
Anomaly NC T6
Strike Length: 170m
Dip Extent: 300m
Strike Angle: 32º West of N
Dip Angle: 15º SE
Conductance: 30 S
Depth to Top: 75m
Depth to Bottom: 150m

This conductor is isolated from other anomalies. The conductance is more significant with a conductance o 30 Siemens. There is no associated magnetic response with this target. It is buried deeper beneath the resistive top rock in the slightly less resistive basement. The response is seen predominantly one L1240, 1250 and 1260 but also has a slighter response on L1270 and L1230.

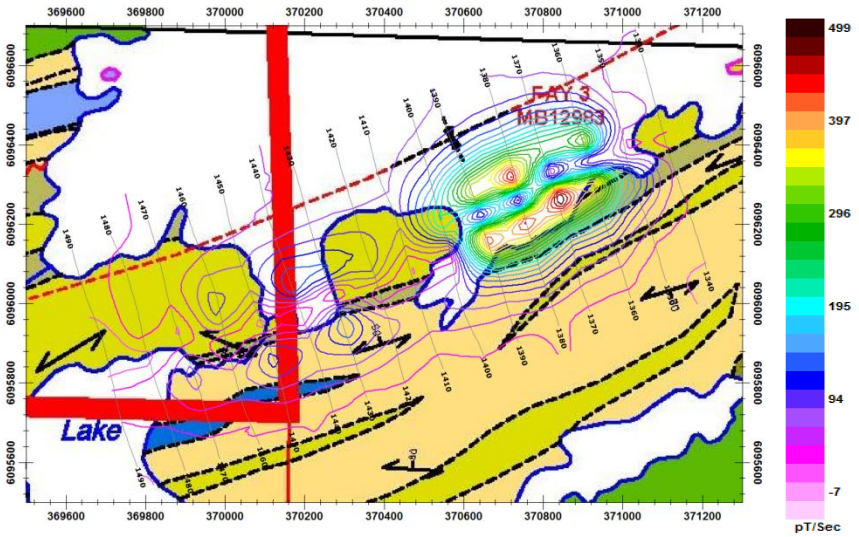
Xcite TDEM Survey Fay Lake **North Central Area**

Target 7

Bz Ch8 – Geology with claim boundaries underlain



Vertical component , Bz Ch18

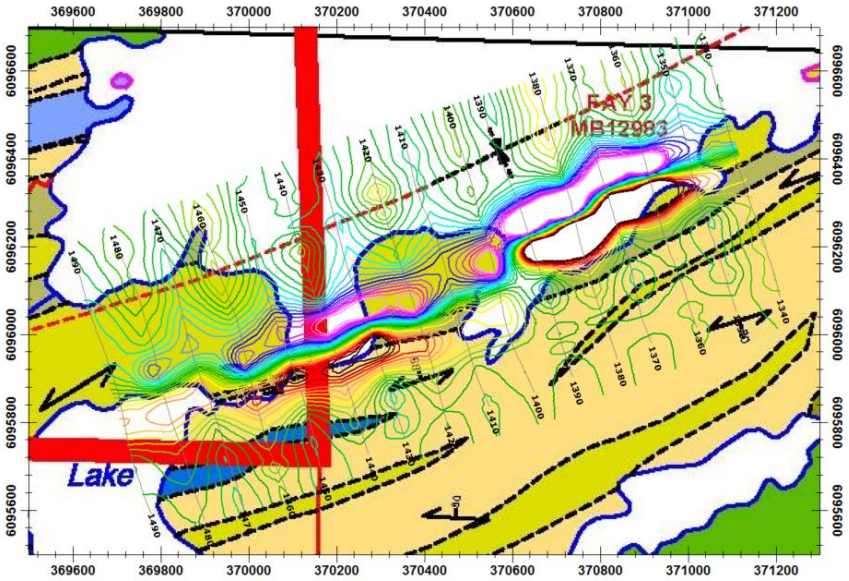


Target 7 is underneath Ponton Lake but at the very southern edge. Bz in early time (left figure), has a considerable response from the lake bottom sediments. By mid-times, the anomaly becomes isolated from the lake boundaries and appears to consist of two portions having the same strike. However, upon modeling it is demonstrated that this is almost a perfectly vertical conductor! There is also an indication of a SW extension further south along strike. We have shown previously the coincidence of a magnetic response (pg6) and further on the following page.

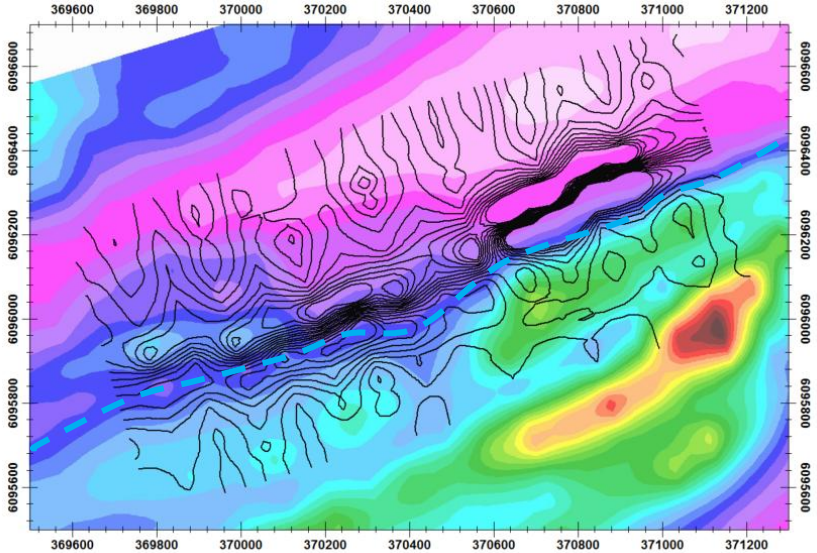
Xcite TDEM Survey Fay Lake **North Central Area**

Target 7

Horizontal Bx Ch15 –
Geology with claim boundaries underlain



Bx Ch15 – aeromagnetics underlay



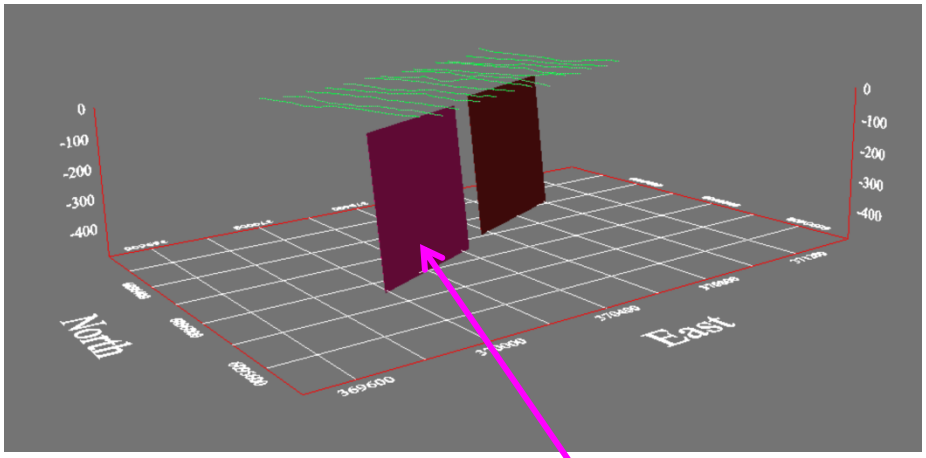
The horizontal EM component, Bx, indicates more clearly the extension along strike to the SW. This extension disappears in the data at later times indicating either weaker conductive material or the structure is plunging to the SW. This EM response appears correlated to the boundary between the Mississippi metasediments and the Burnwood metasedimentary rocks. Both the strong response (NC T7A) and the weaker response (NC T7B) will be modeled.

The horizontal component appears correlated with a thin magnetic structure (dark blue) as shown in the right figure and highlighted with a light blue dashed line. The width of the magnetic structure as indicated by this thin blue response striking SW to NE has a thickness comparable to Burnwood sedimentary rocks shown in the geology map (left figure).

Xcite TDEM Survey Fay Lake **North Central Area**

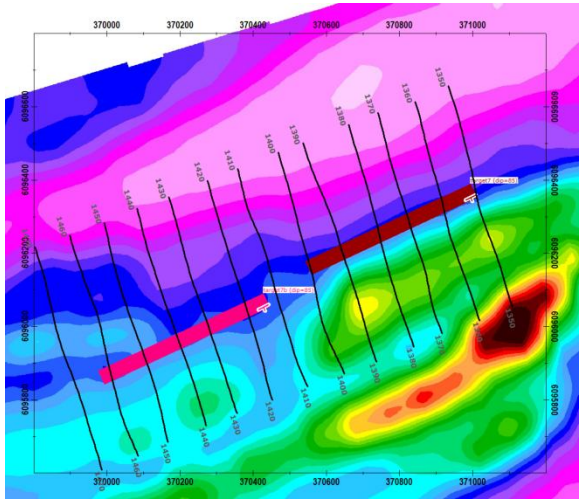
Target 7

View from South West



Anomaly NC T7A
Strike Length: 500m
Dip Extent: 480m
Strike Angle: 65º East of N
Dip Angle: 85º SE
Conductance: 15 S
Depth to Top: 24m
Depth to Bottom: 500m

Anomaly NC T7B
Strike Length: 500m
Dip Extent: 480m
Strike Angle: 65º East of N
Dip Angle: 85º SE
Conductance: 5 S
Depth to Top: 30m
Depth to Bottom: 506m



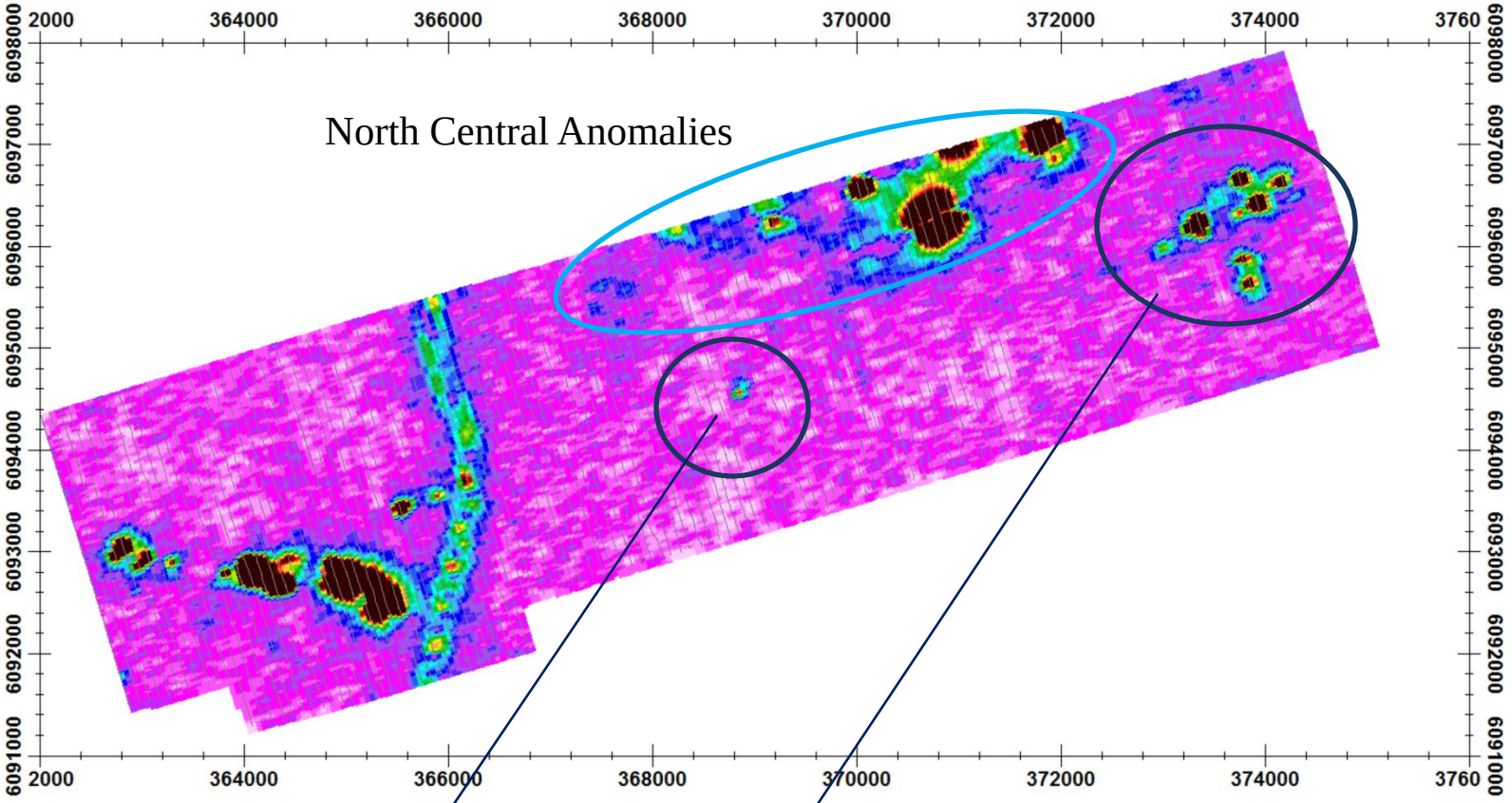
Projection of model with aeromag underlay

The two conductors follow the same strike. However, the SW anomaly T7B is much weaker in conductance than the NE anomaly. As such, the model for T7B is more approximate than the model for T7A. The model parameter, dip, is not well determined in this data for either conductor. The dip is almost vertical but not clear if there is a single dip to the structure but indicates variation across the targets.

These conductors are obviously quite vertical in their orientation thus suggesting some type of fracture or fault. The coincidence of a weak magnetic structure with the same strike might suggest a mixture of sulphides.

Xcite TDEM Survey Fay Lake **Central and East Areas**

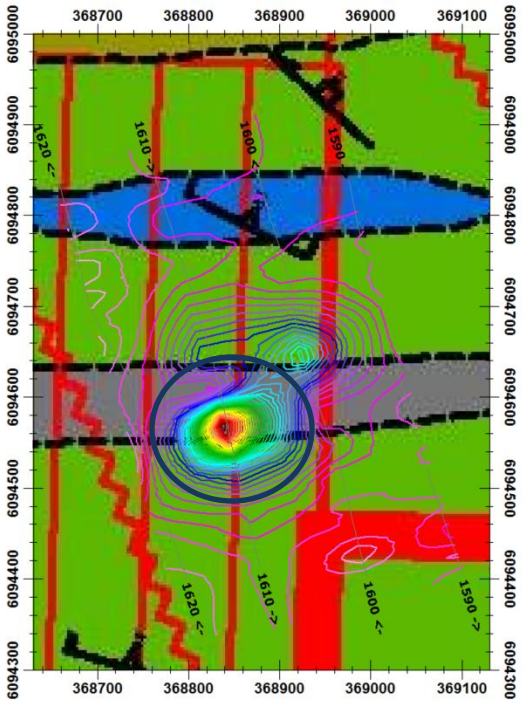
Late Time vertical component: Ch28 Bz

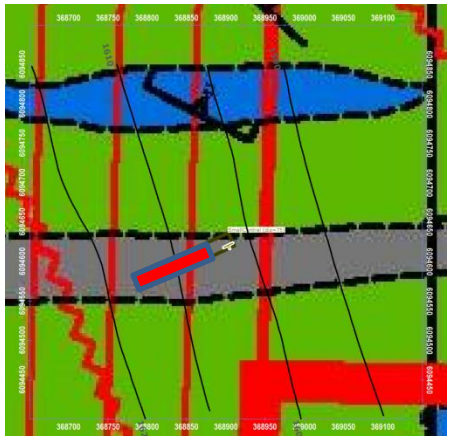


Xcite TDEM Survey Fay Lake **Central Anomaly**

Late Time, Ch22 Bz

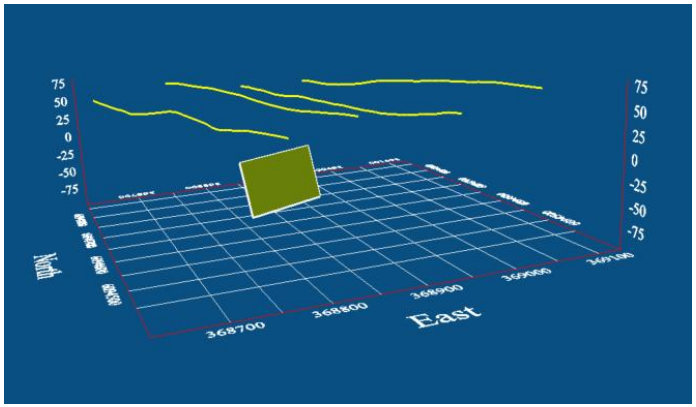
Central Anomaly Geology Underlay





Model Projection

View from South



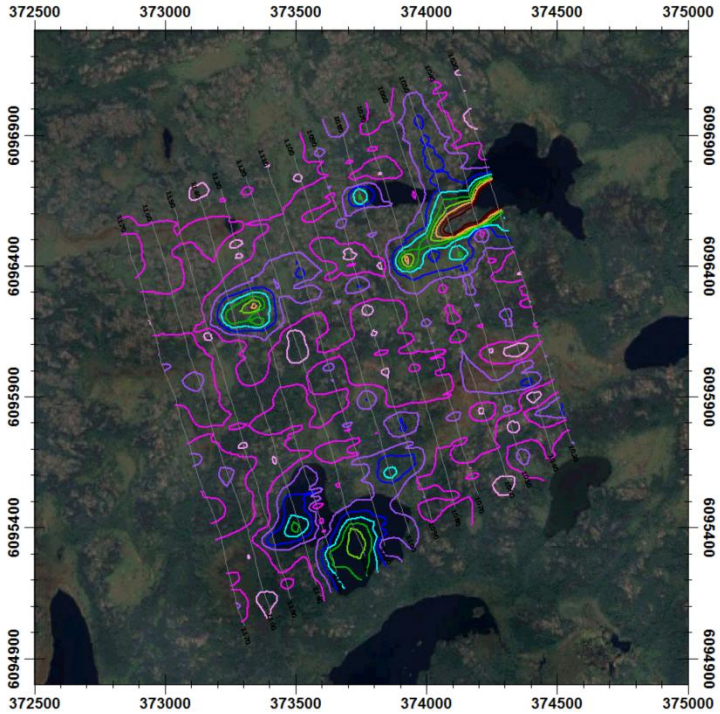
Anomaly C T8
Strike Length: 120m
Dip Extent: 70m
Strike Angle: 65º East of N
Dip Angle: 65º South of E
Conductance: 22 S
Depth to Top: 20m
Depth to Bottom: 83m

This conductor is small and does not appear clearly in early times. It is associated as per the geology map with a mafic schist. The cover rock is approximately 600 Ωm and is roughly 50m thick. The basement resistivity cannot be determined from the data.

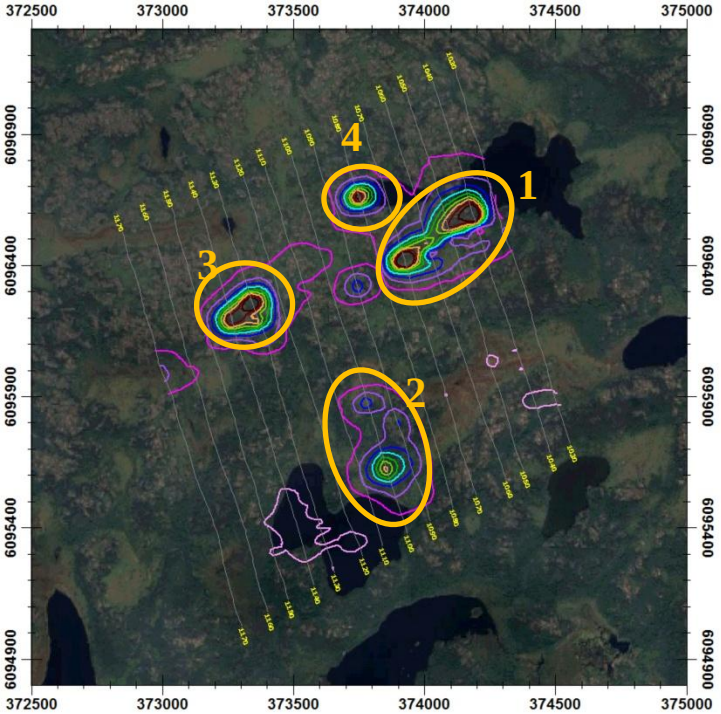
The structure is relatively small both in strike and depth extent. The depth to top is indicated at 20m but the structure becomes larger with depth as indicated by the Bz response. This thickening with depth cannot be modeled accurately. It is semi-vertical dipping SSE.

Xcite TDEM Survey Fay Lake **East Area**

Vertical component, Ch8 Bz



Ch15 Bz

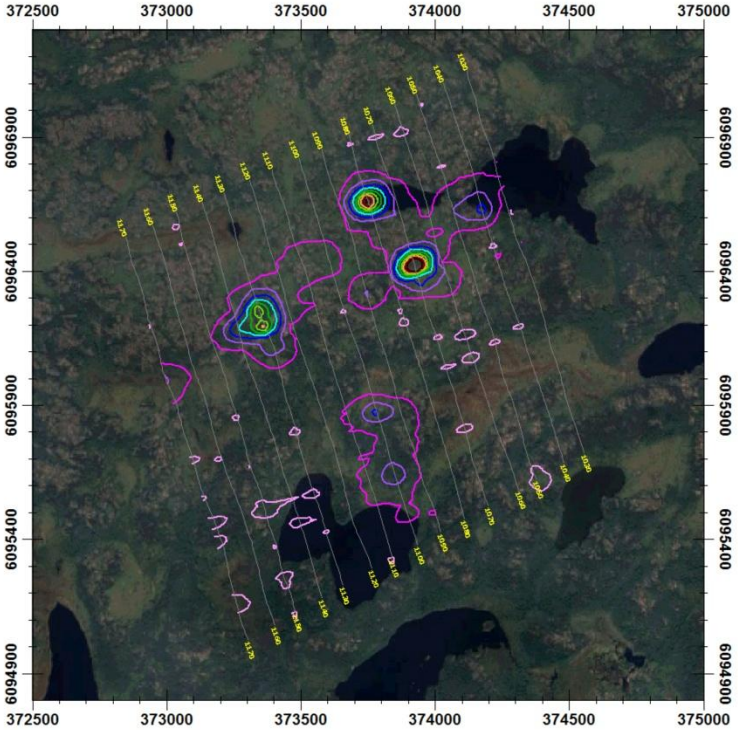


The early time data shows responses over several lakes. By Ch15, four distinct anomalies appear. Only the NE part of anomaly 1 is over a lake.

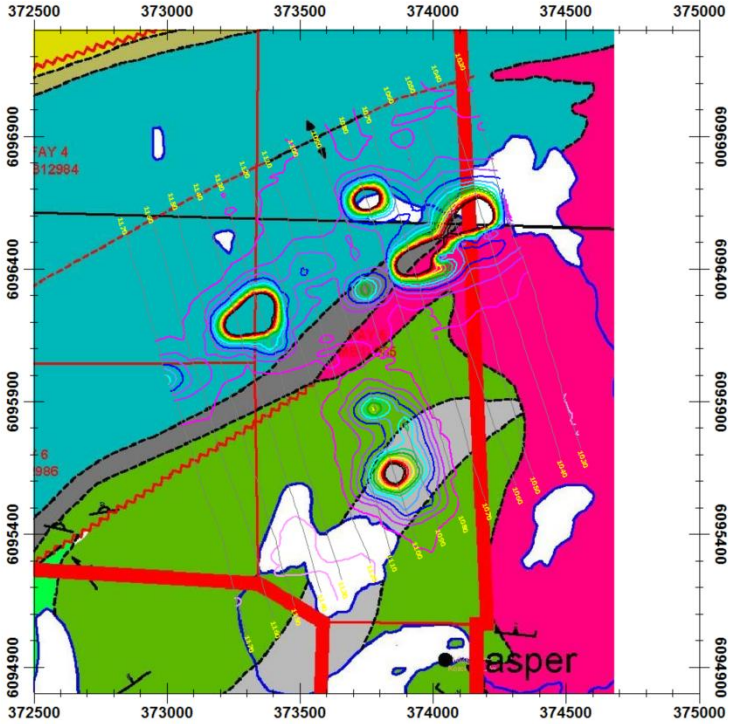
Xcite TDEM Survey Fay Lake

East Area

Vertical Component, Ch30 Bz



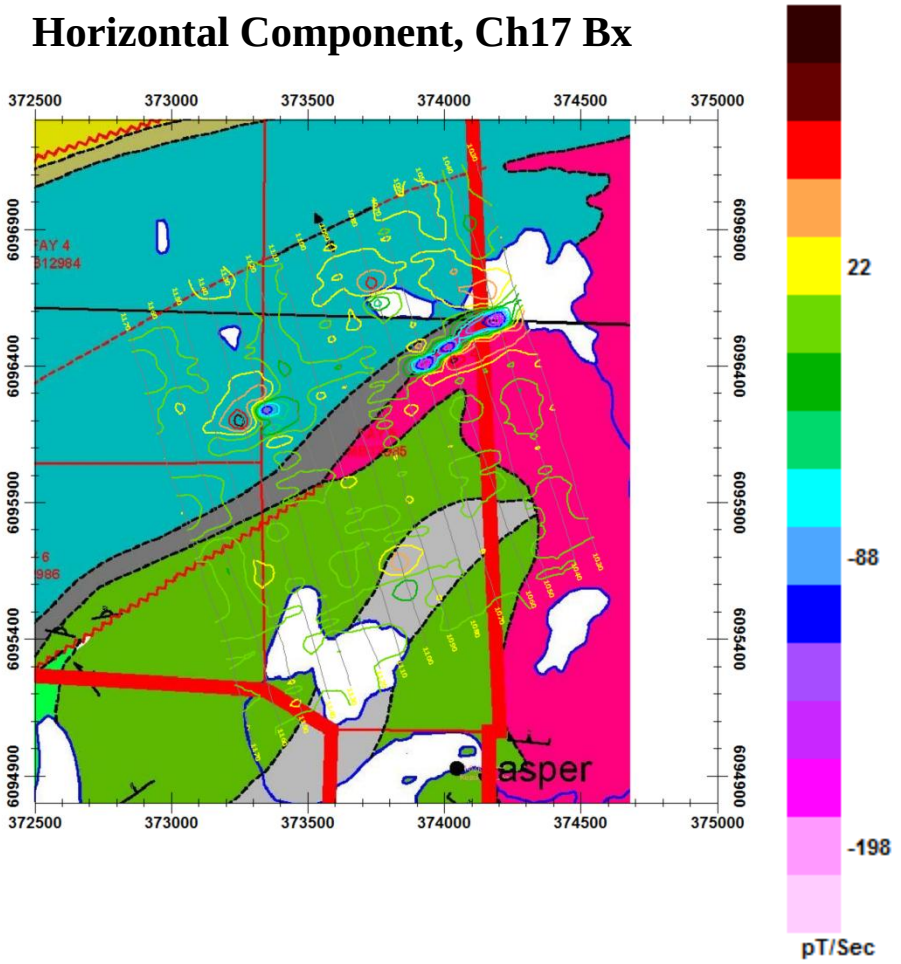
Ch18 Bz



By late middle time (right figure), 5 separate structures can be detected as anomaly 2 now obviously consists of two parts. The only structures of any size is anomaly 1 and this is associated with mafic schist and strikes along the surface expression of the schist. By late time (left figure) , only three anomalies survive indicating that these are the strongest conductors.

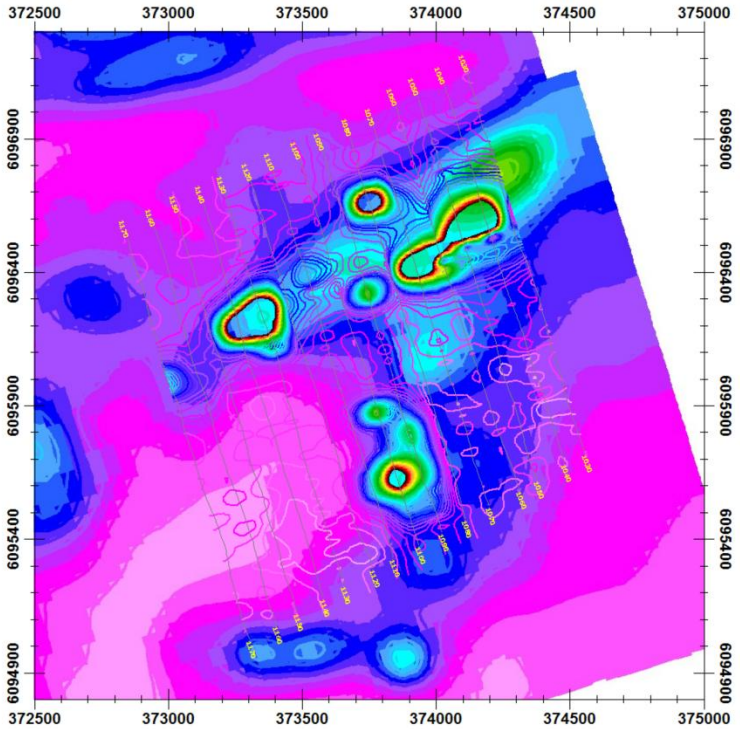
Xcite TDEM Survey Fay Lake **East Area**

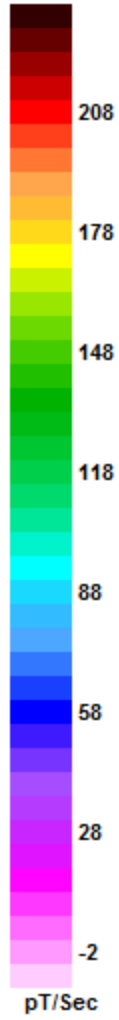
Horizontal Component, Ch17 Bx



Vertical Component, Ch15 Bz

aeromagnetics underlain



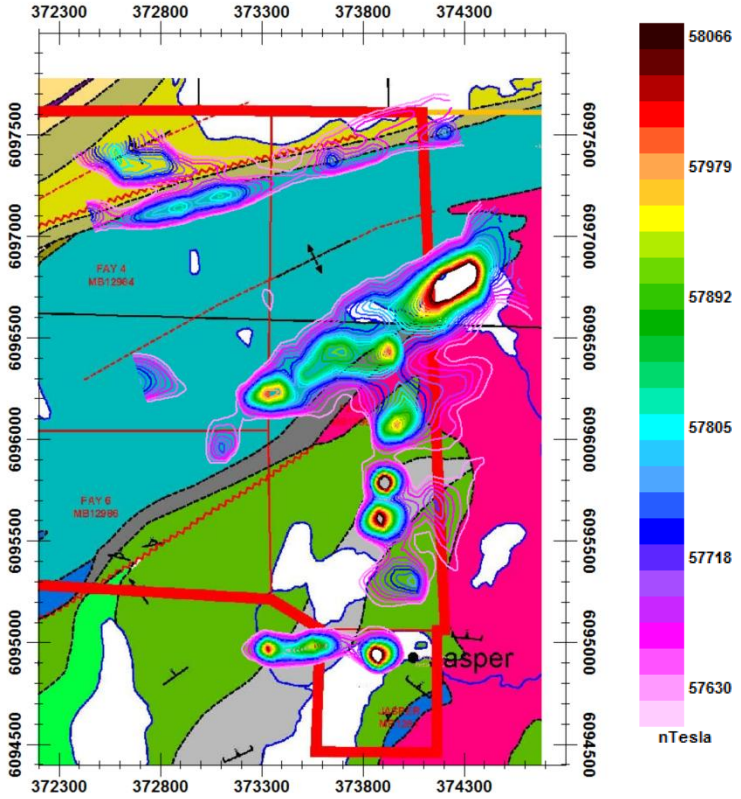


Bx at mid-time (Ch17, left figure) shows that this interesting anomaly (1) is actually along the contact between the schist and intrusive rocks. The figure to the right is Bz at mid-time with the aeromagnetic data underlain. All of the EM anomalies are associated with a magnetic anomaly (blue and green areas).

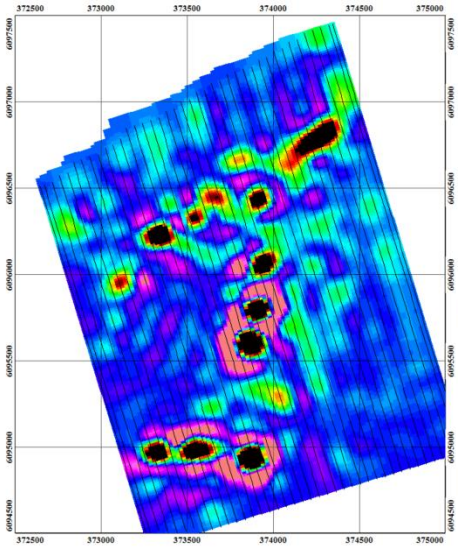
Xcite TDEM Survey Fay Lake

East Area Magnetics

Aeromagnetics RTP

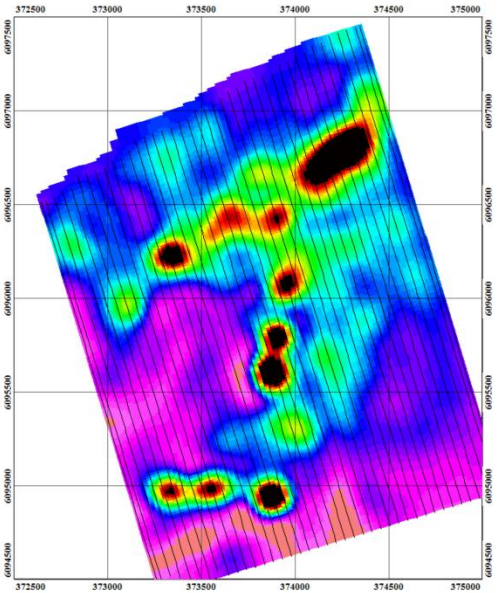


Sections of Aeromagnetics Inversion Model



Z=40m below surface

Z=160m

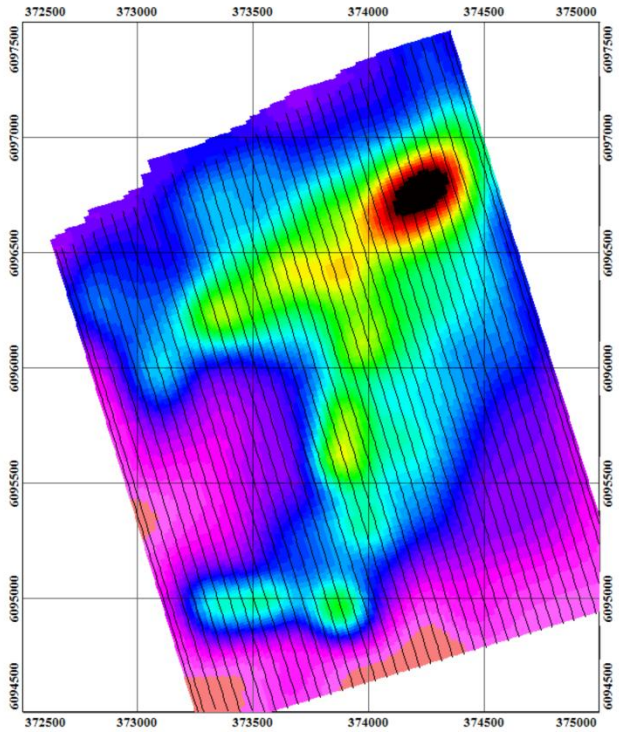


The magnetic inversion model reveals that the tops of the magnetic structures are quite shallow but there is depth extent to the anomalies. The susceptibilities are quite high at over 0.25 units SI at depths of 40m indicating metallic elements.

However, the inversion reveals that these small defined anomalies lie within a larger region of material which is less magnetized. It would appear that the mapping of the metasediments is just a thin surficial representation of the metasediments (next page).

Xcite TDEM Survey Fay Lake

Aeromagnetics Inversion Model

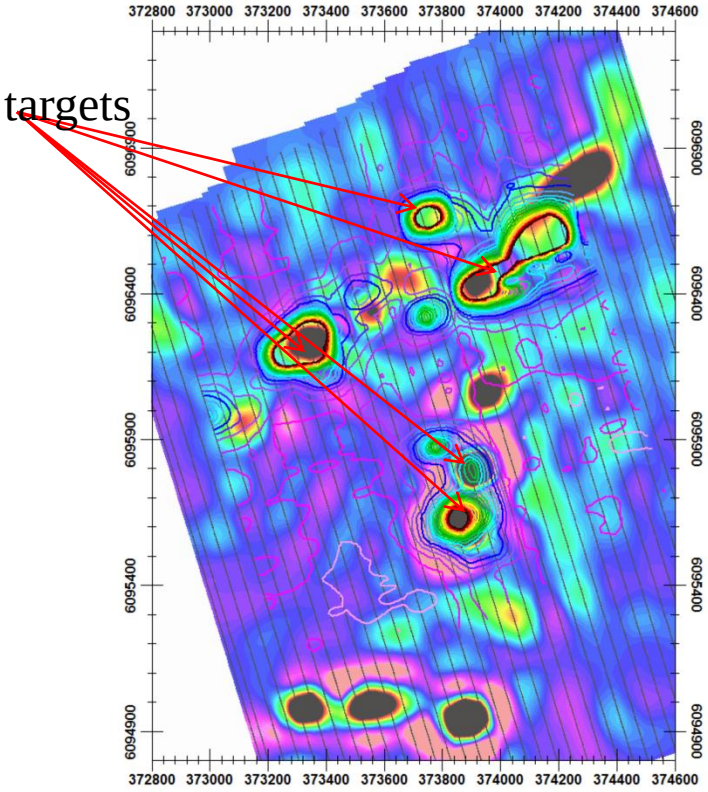


Z=260m

East Area Magnetics

Mid-time Ch15 Bz

Magnetics inversion model underlay, z=60m

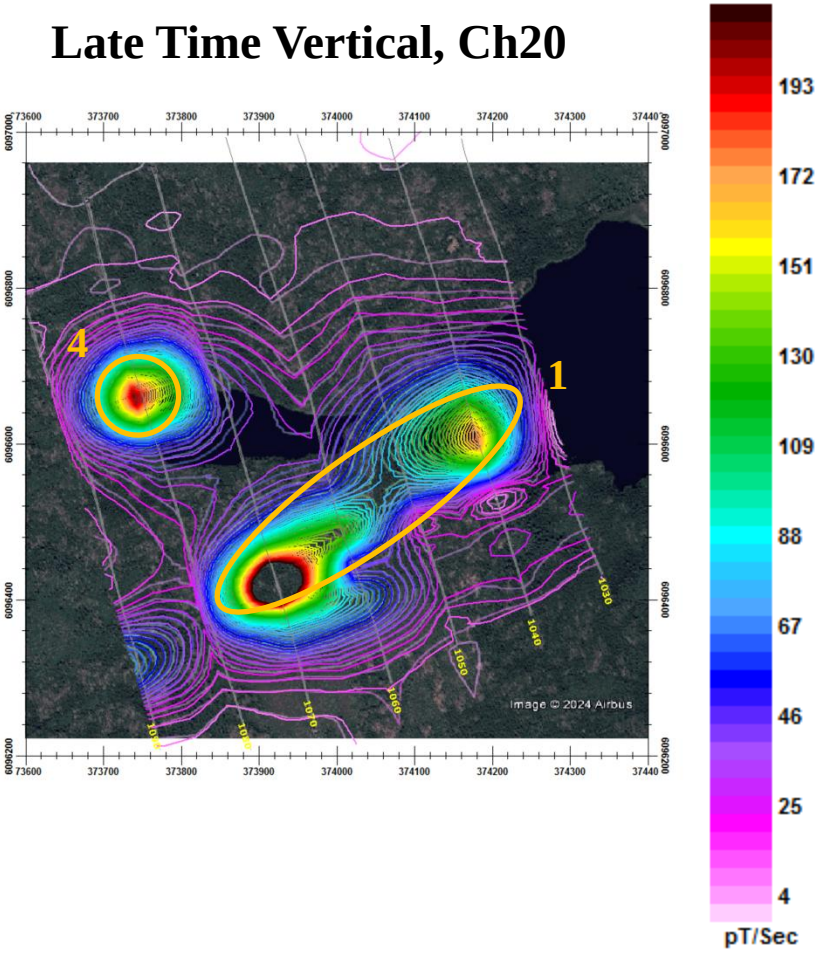


The figure to the left is the magnetic inversion model at a depth of 260m below surface. This would indicate weaker magnetic material over a large area in which the stronger magnetic anomalies are hosted.

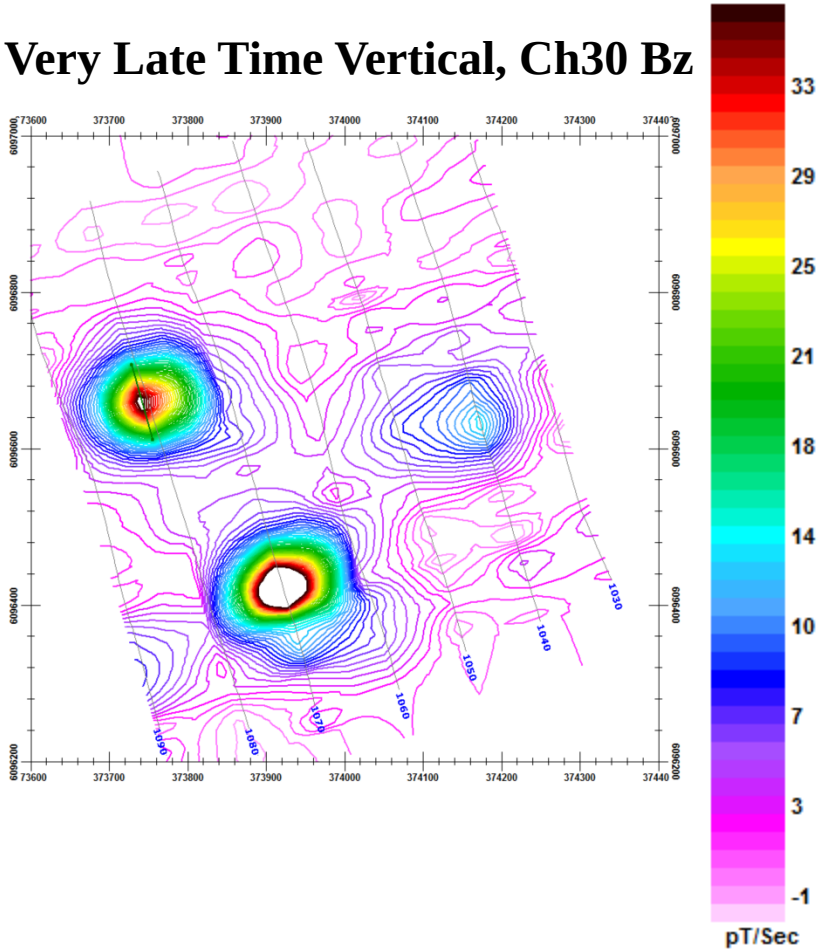
The figure on the right has Bz (Ch15) as contour lines overlain over the aeromagnetic inversion at a depth of 60m. There is a strong correlation between several of the EM anomalies and shallow magnetic structure (red arrow). If the isolated magnetic structures are sulphides then this correlation might indicate the presence of chalcopyrites.

Xcite TDEM Survey Fay Lake **East Area EM Targets 1 and 4**

Late Time Vertical, Ch20



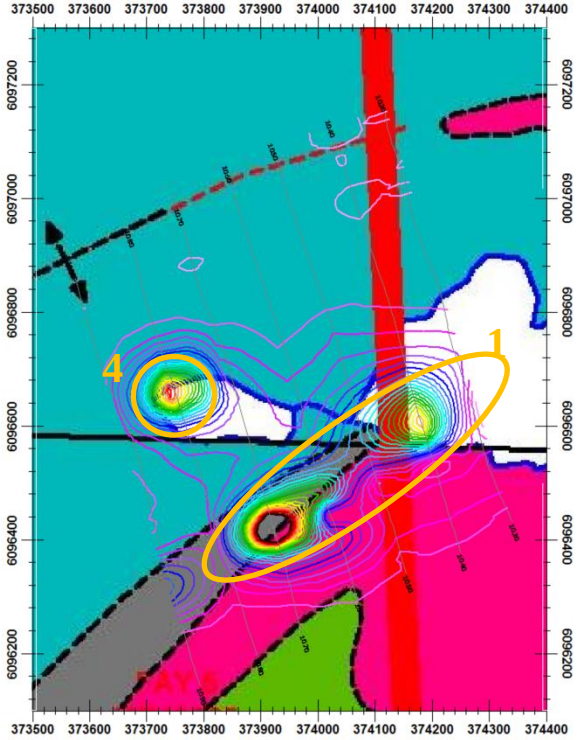
Very Late Time Vertical, Ch30 Bz



Bz at early late time (Ch20, left figure) shows two anomalies well defined. Target 1 appears to have two components but connected with weaker conductive material. By late time (Ch30, right figure), target 4 and the SW portion of Target 1 still have relatively strong responses.

Xcite TDEM Survey Fay Lake

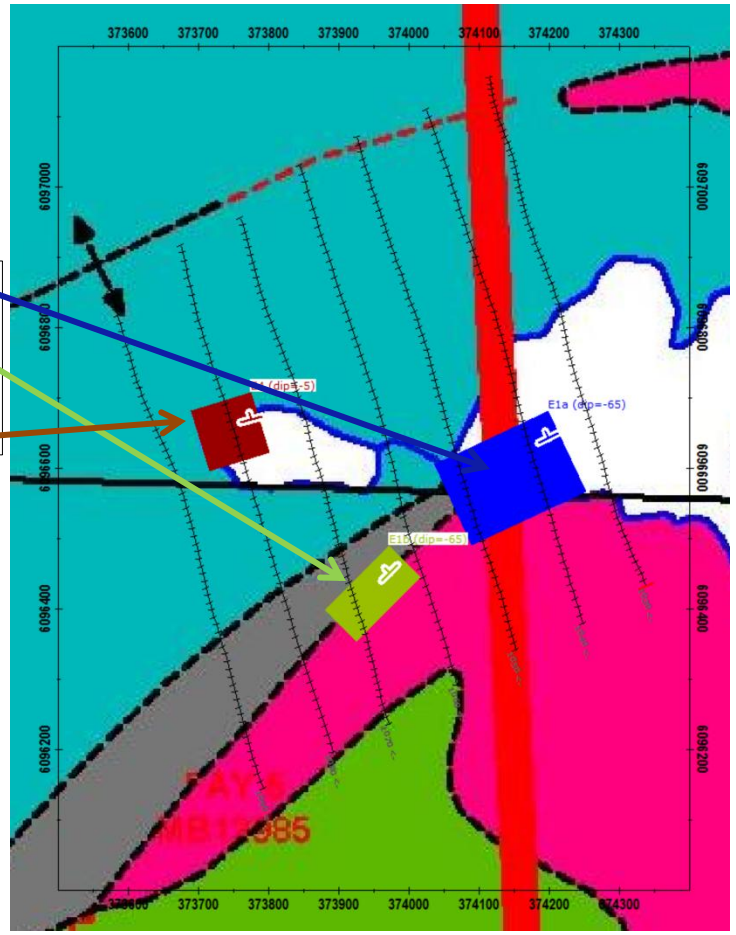
Vertical Component, Ch20 Bz



The tops of Targets 1a and 1b are both near the edge of the geologically mapped metasediments and dip towards the NNW and NW respectively. Target 4 is apparently within mafic volcanic rocks. Target 4 is almost flat lying and the top is much deeper than the other two targets.

East Area EM Targets 1 and 4

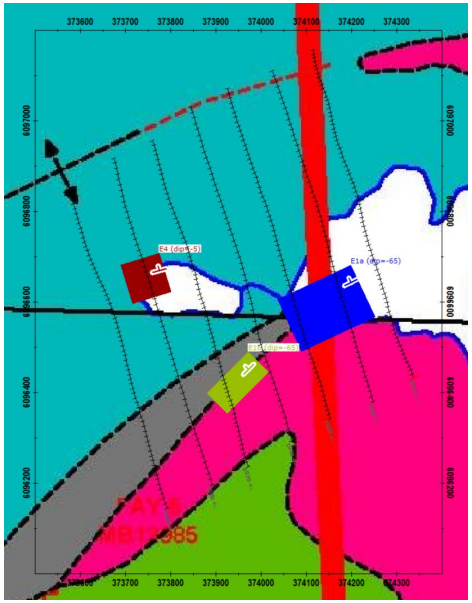
Target 1A
Target 1B
Target 4



Project of model on Surface

geology map underlay

Xcite TDEM Survey Fay Lake **East Area EM Targets 1 and 4**



Project of model on Surface

geology map underlay

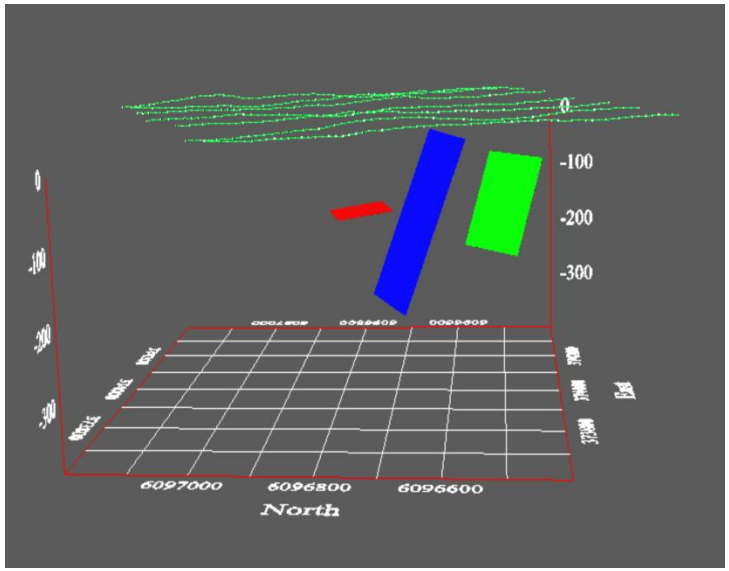
Target 1A
Target 1B
Target 4

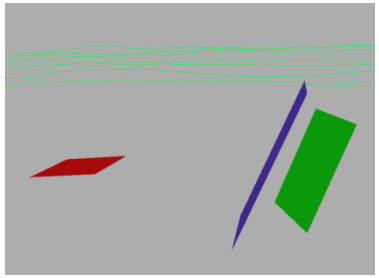
Anomaly East T1A
Strike Length: 180m
Dip Extent: 300m
Strike Angle: 65º East of N
Dip Angle: 65º NW
Conductance: 15 S
Depth to Top: 20m
Depth to Bottom: 290m

Anomaly East T1B
Strike Length: 130m
Dip Extent: 150m
Strike Angle: 45º NW
Dip Angle: 65º SE
Conductance: 35 S
Depth to Top: 30m
Depth to Bottom: 165m

Anomaly East T4
Strike Length: 90m
Dip Extent: 90m
Strike Angle: 73º East of N
Dip Angle: 5º N
Conductance: 55 S
Depth to Top: 70m
Depth to Bottom: 77m

View from West

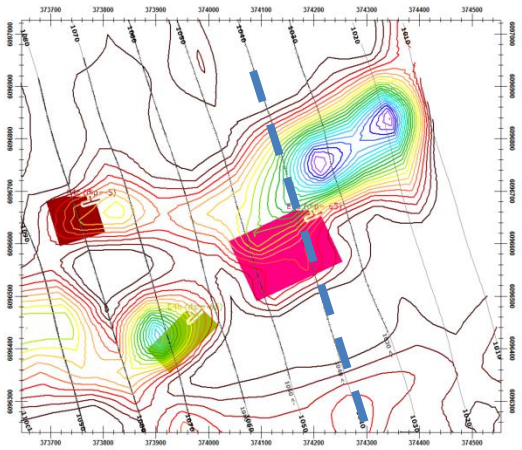




View from SW

Targets East 1A and East 1B are approximately along the same strike and dip at the same angle. Target 1B is significantly stronger than 1A. Target 4 is buried much deeper at about 70m and is significantly more conductive at 55 Siemens which is why it does not appear as well as the other two targets until later time. It is flat lying.

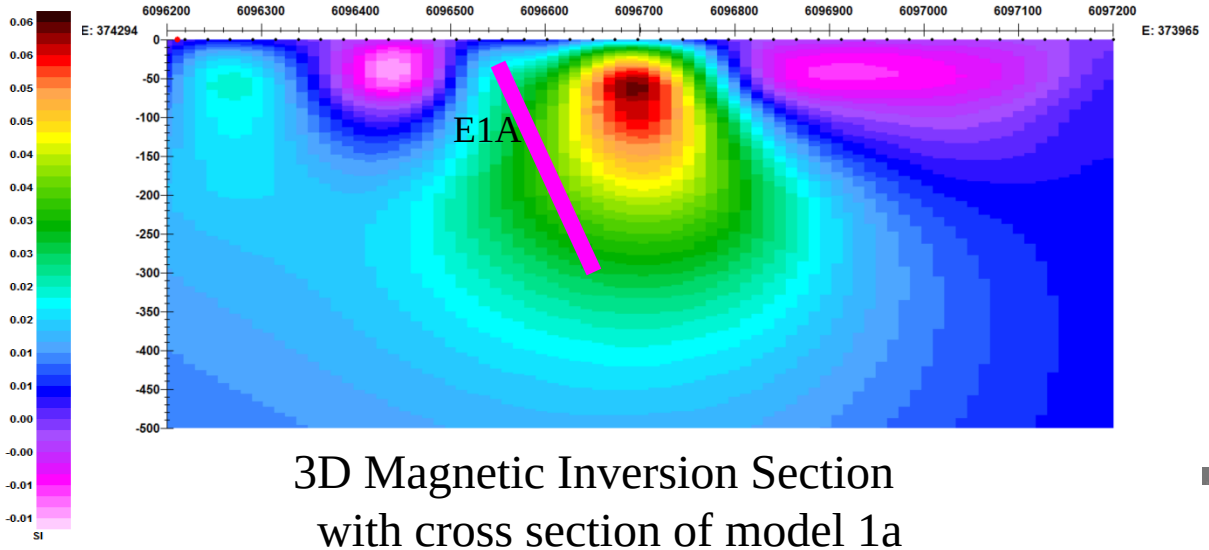
Location of magnetic model section



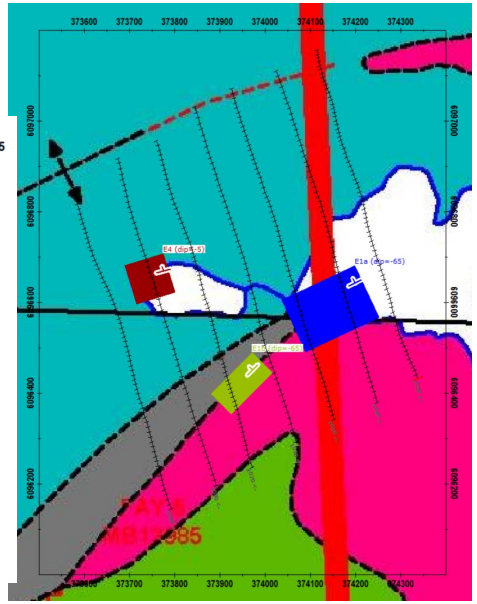
It is worthwhile to examine the relationship between the magnetics and the EM in regard to these two targets when considering the possibility of VMS mineralization deposits. On the geology map shown below to the right, the mafic volcanic rocks to the north of the mapped metasediments and the quartz intrusive rocks to the south are shown on the surface. These rocks would have no magnetic signature and likely are the pink areas shown in the inversion section below. However, the metasediments could well have a weak magnetic signature and have been shown in previous parts of this report to be very likely magnetic in this area. Thus, it might be expected that the light blue in the section are metasediments while the green, orange and red are metallic minerals .

An approximate cross section of target East 1A (pink) is shown for illustration against the inversion model. The conclusion might be either that the conductor is not magnetic which is most likely or there are positional errors in the processing between the EM and the magnetic data.

Vertical Derivative of Magnetic Data with surface projection of targets

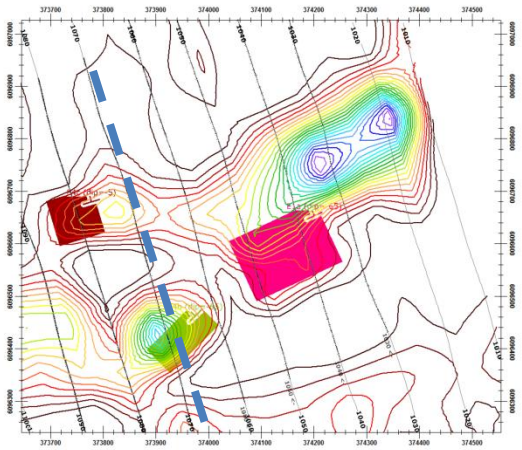


3D Magnetic Inversion Section
with cross section of model 1a



Targets East 1 and 4

Location of magnetic model section

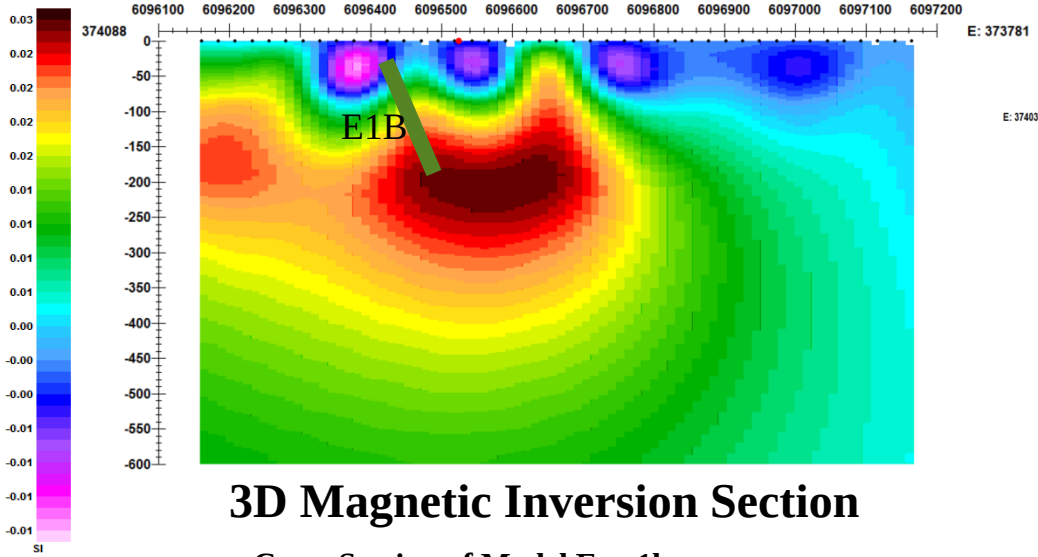


Vertical Derivative of Magnetic Data with surface projection of targets

Two magnetic inversion sections are shown below for Target East 1B. The location of the first section is shown to the right by the blue dashed line. This section is displayed below to the left with cross section of the conductive model for Target East 1B superimposed.

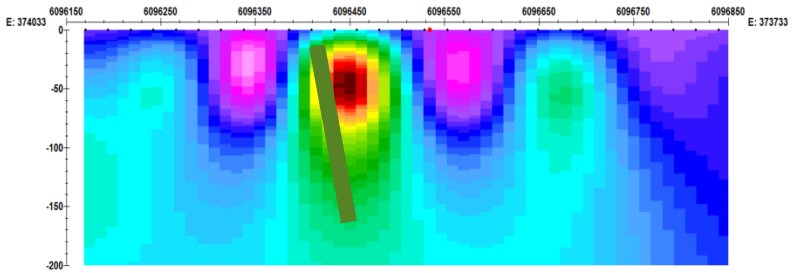
A second section is 55m to the west of the first section is shown below to the right with a cross section of the conductive model again superimposed on the section.

Again, it should be remembered the first the modeling algorithm for the conductors only interprets the conductance and not the thickness and conductivity separately. Also, given these levels of conductance it is unlikely that the EM system sees anything but the thin top surface of the target. In short, the EM field from the towed transmitter only penetrates a small distance into the conductor.



3D Magnetic Inversion Section

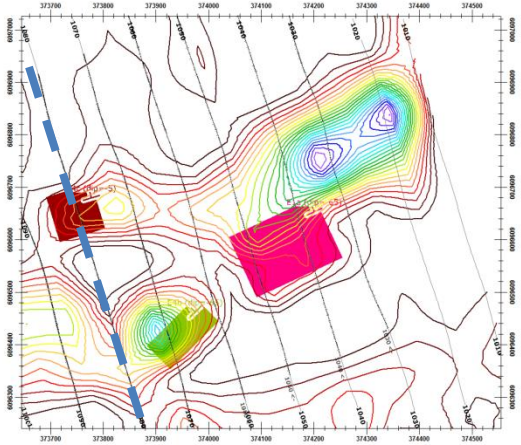
Cross Section of Model East1b



3D Magnetic Inversion Section 55m West

East Area EM Targets 1 and 4

Location of magnetic model section



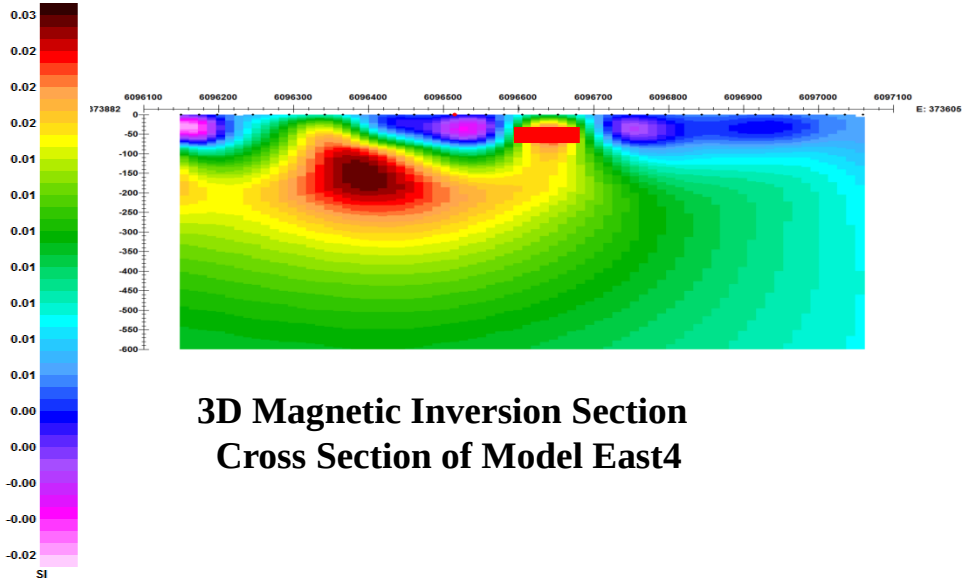
Vertical Derivative of Magnetic Data
with surface projection of targets

Two magnetic inversion sections are shown below for Target East4. The location of the first section is shown to the right by the blue dashed line. This section is displayed below to the left with cross section of the conductive model for Target East 4 superimposed. A second section 55m to the west of the first section is shown below to the right with a cross section of the conductive model again superimposed on the section.

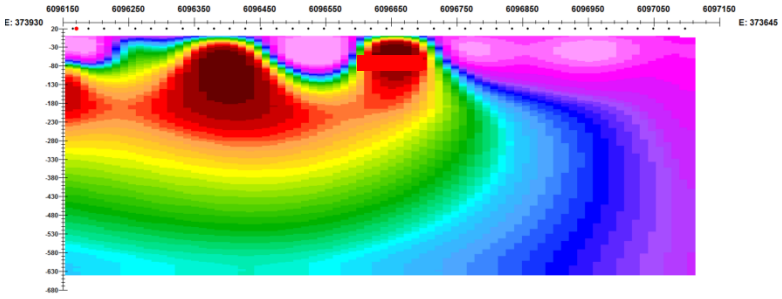
In this case, the EM conductor location and the magnetic anomaly model are virtually the same. The figure to the right indicates the magnetic anomaly is stronger on the east side of the target. This would indicate the likelihood of sulphides at this location.

The magnetic inversion indicates that the non-magnetic rocks, indicated by pink and dark blue, lie above the weakly magnetic rocks. Again, it is likely that these non-magnetic rocks are what has been mapped as mafic volcanics and the underlying rocks are metasediments.

The deeper magnetic rocks at a depth of 180m and indicated as continuous over 500m. these rocks may also be conductive but are too deep to be resolved with this EM system.

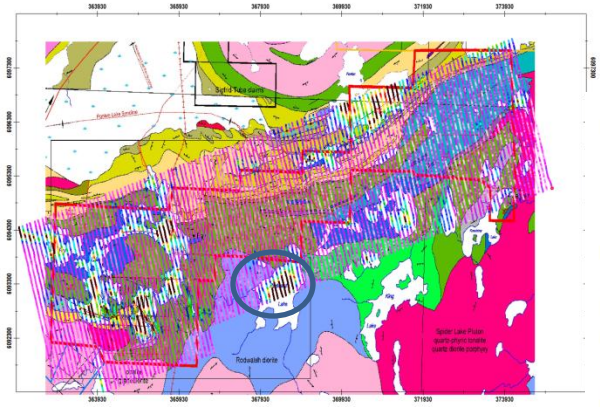


3D Magnetic Inversion Section
Cross Section of Model East4



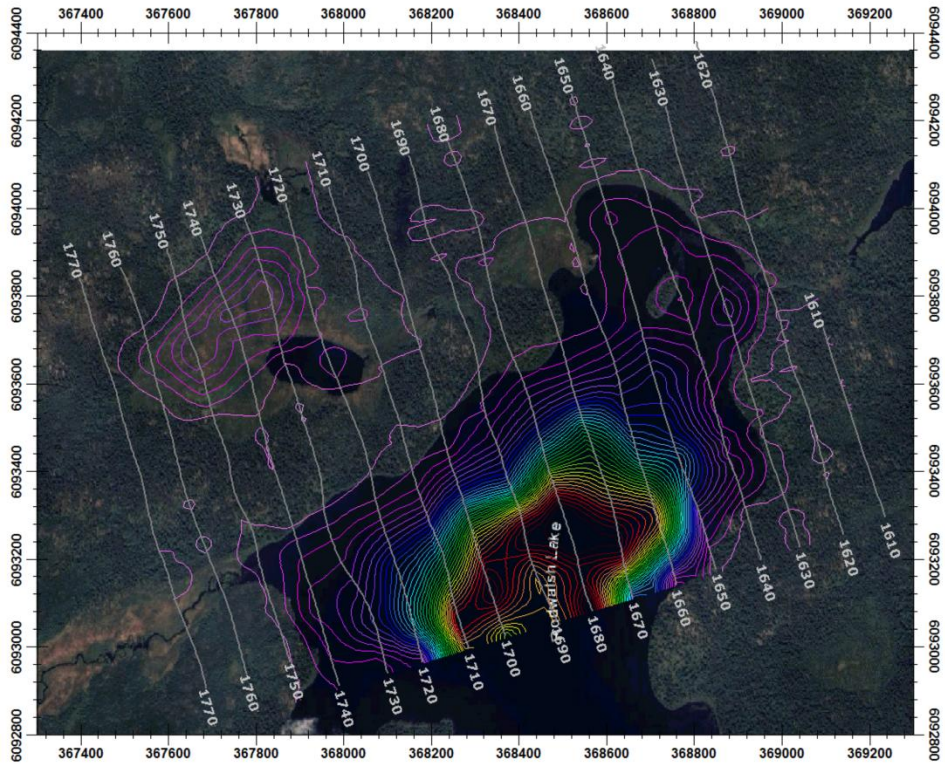
3D Magnetic Inversion Section 55m West

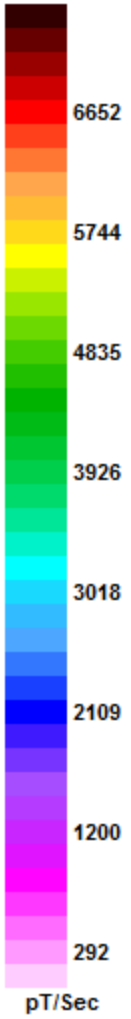
Xcite TDEM Survey Fay Lake **South Central EM**



South Central Anomaly

Vertical Component, Bz Ch8 – 0.26msec





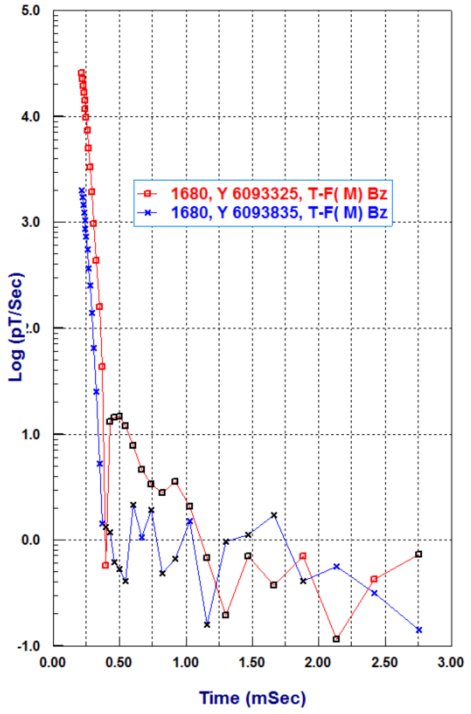
The response of the vertical component (Bz) at early time (Ch8) is shown with a satellite image underlain. The response over the center of the lake is 20 times the response of the surrounding areas.

Note: This channel is extremely early in time at only 0.26msec after the quoted turn off and still within the system response of the instrument.

Xcite TDEM Survey Fay Lake

South Central EM

The response of the vertical component (Bz) at Ch15 which is early mid-time is displayed to the right above. The response at the center of the lake has decayed by a factor of 50 indicating very little conductance. The response over the lake at Ch19 or 0.5msec after turn off (bottom right) is mostly below zero and thus well below the noise level of the instrument. The Bx component shows a coherent response only for Ch 15-17. (Ch15 is the earliest channel for Bx)

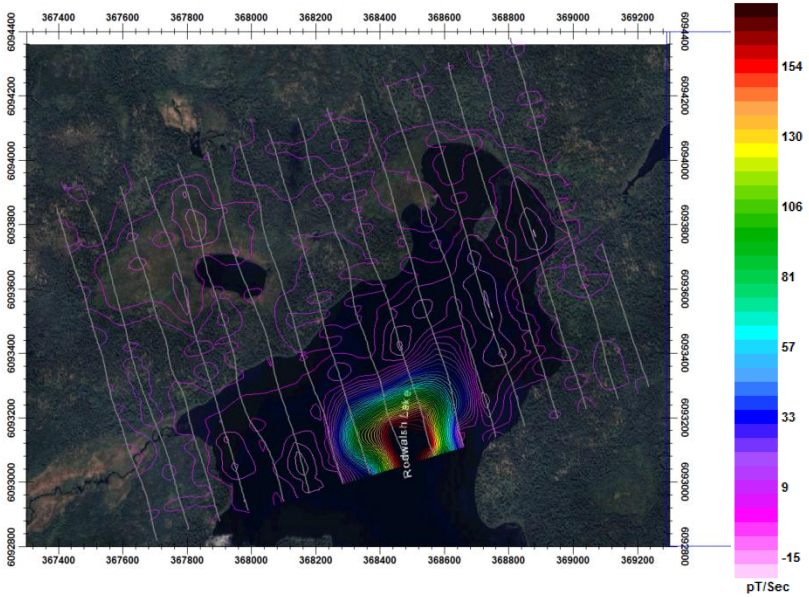


The Bz data (red) is shown to the left for the station near the peak of the Bz response in the center of the lake and for a second station (blue) several hundred metres north of the lake.

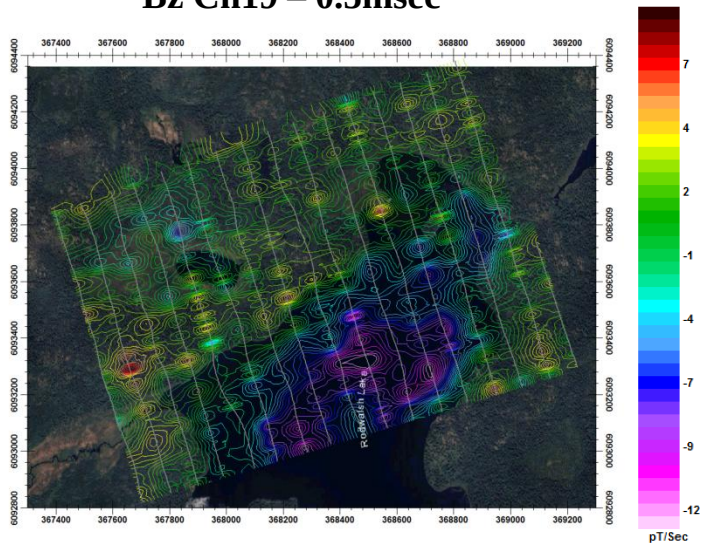
After Ch16 (0.4msec) the data at both stations is simply noise. {*Here when the data is plotted as logarithm, negative values are plotted as black*}.

What is striking is that the responses both over the conductive material in the lake bottom and over the very resistive rock north of the lake have the same decay pattern. Only the amplitude is changed. Thus, no ground decay can be detected in early time. This is indicative that the early time data is simply the system response apart from a DC amplitude effect from the immediate surface resistivity.

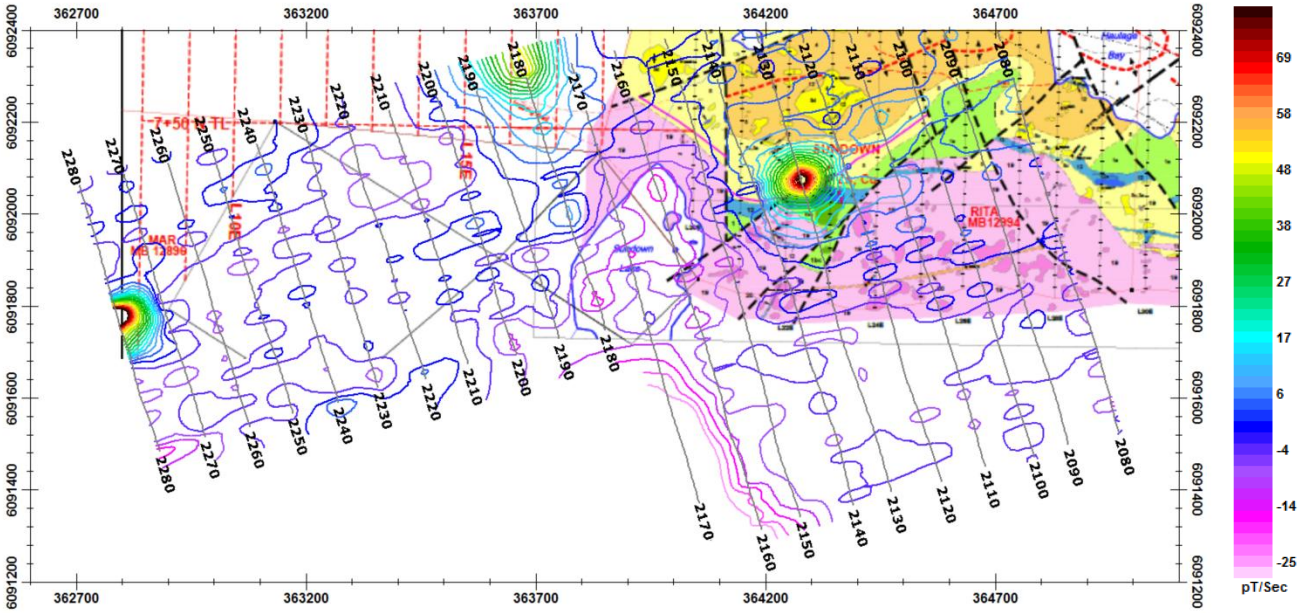
Bz Ch15 – 0.37msec



Bz Ch19 – 0.5msec

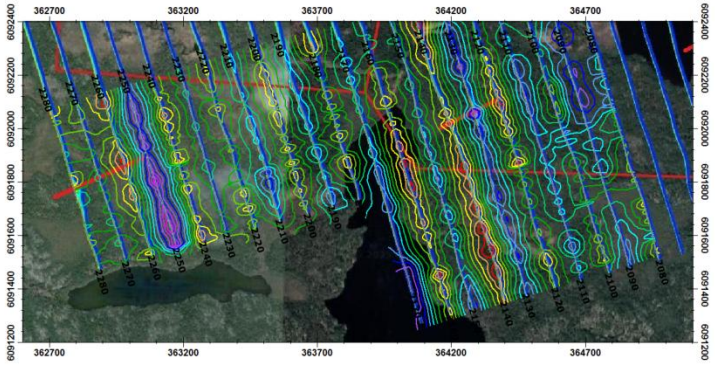


Xcite TDEM Survey Fay Lake South West



Vertical Bz
Ch15 early mid-time – 0.37msec

Horizontal Bx Ch15

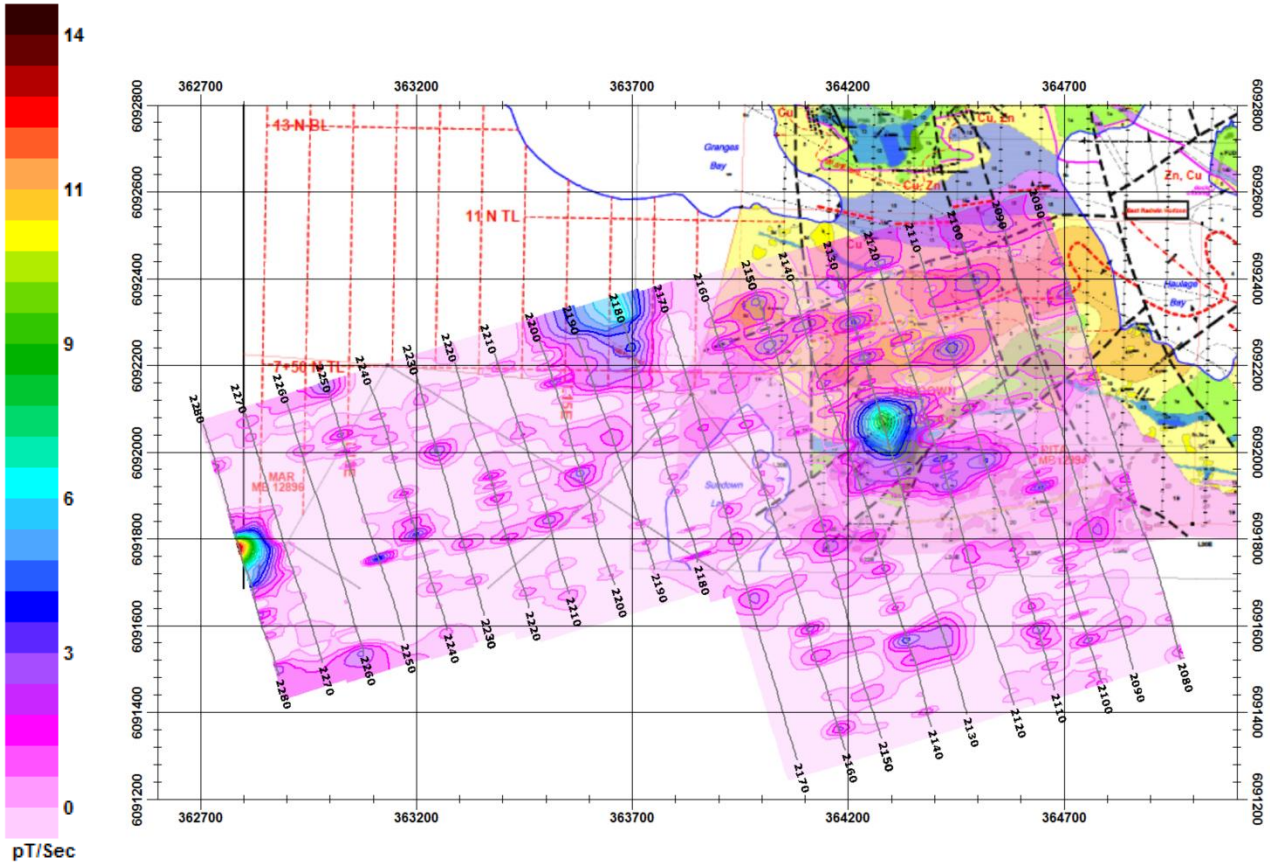


Two anomalies have been noted by Boreal, the first along Line 2130 has been termed the Sundown anomaly and the second on the last line to the west (L2280), we identify as the SSW anomaly.

The Sundown anomaly has virtually no expression in Bz except on the one line. The SSW anomaly has some signal in Bz also on a second line L2270.

Neither anomaly can bee seen even in even the earliest channel of the horizontal component, Bx.

Xcite TDEM Survey Fay Lake **South West**



Bz - Ch25

late time

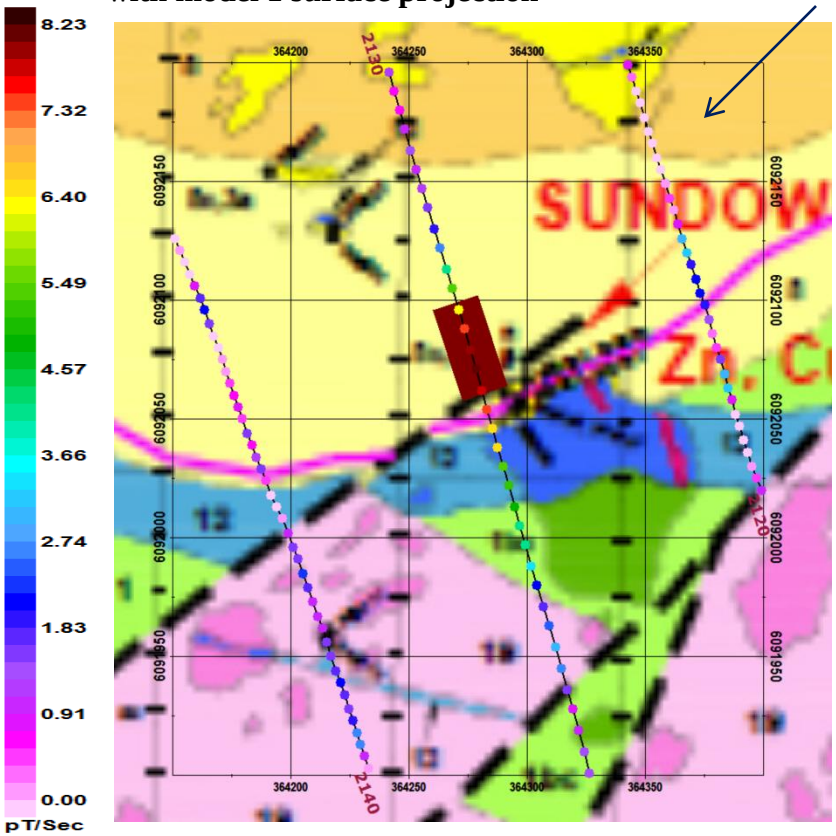
Two anomalies have been noted, the first along Line 2130 has been termed the Sundown anomaly and the second on the last line to the west (L2280), we identify as the SSW anomaly.

The two anomalies persist in Bz to Ch25 but the response is small particularly at the Sundown anomaly. The anomalies' responses remain coherent until Ch28.

Xcite TDEM Survey Fay Lake South West Sundown Target

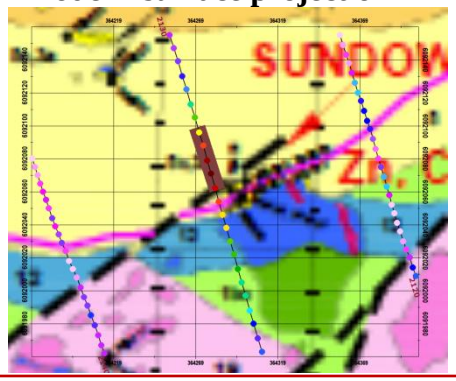
Bz – Mid-time Ch15

with model 1 surface projection

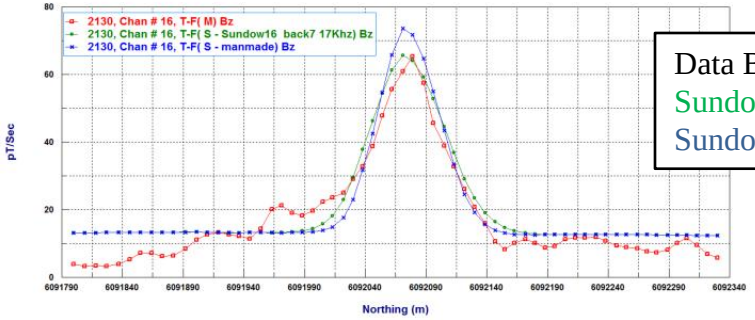


Anomaly Sundown1
Strike Length: 40m
Width: 20m
Strike Angle: 18º West of N
Dip Angle: 0º N
Conductance: 85 S
Depth to Top: 45m
Depth to Bottom: 45m

model 2 surface projection



Anomaly Sundown2
Strike Length: 40m, Width: 10m
Strike Angle: 18º West of N
Dip Angle: 0º N, Conductance: 175 S
Depth to Top: 25m, Depth to Bottom: 25m



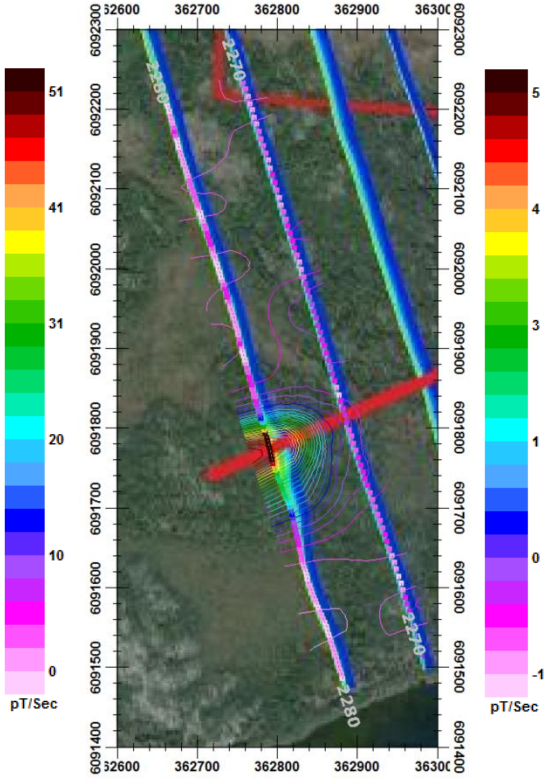
Data Bz, Ch16
Sundown 1 response
Sundown 2 response

The anomaly can only be seen on one line (L2130) and there is no horizontal Bx response. The former fact makes it impossible to determine a single definitive model as multiple models will fit the data. The latter fact implies the anomaly is flat lying. The Bz data also indicates it is flat lying. Two models are provided. Both models are 40m in length along the profile and both flat lying. However, Sundown 1 is 20m wide, has a conductance of 85S and is at a depth of 45m. Sundown 2 has a conductance of 175S, a width of 10m and is buried at 25m. This latter model indicates the possibility that this is a man-made target.

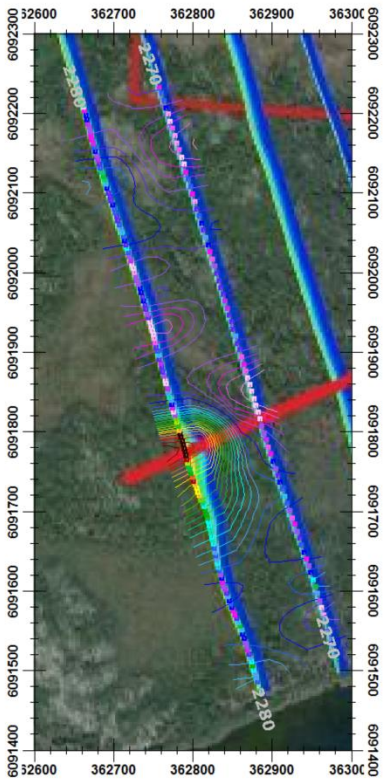
Xcite TDEM Survey Fay Lake

South South West

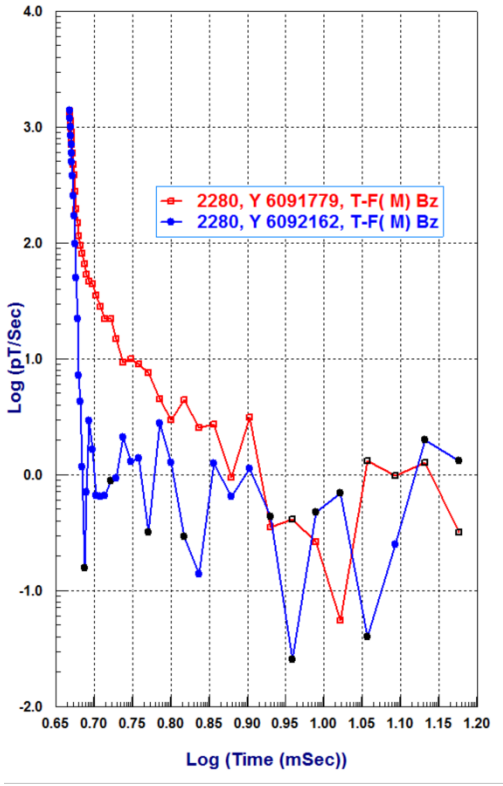
Bz – early mid-time Ch17



Late time, Bz – Ch29



Bz response at 2 offset stations



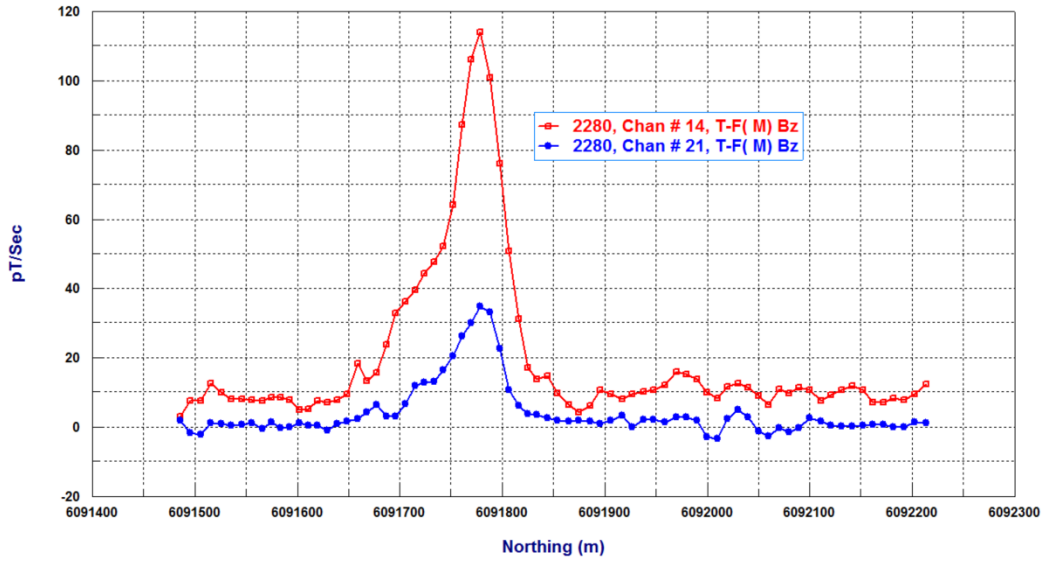
The anomaly appears only on the most western line (L2280). There is no indication of a response on the next line to the east (left figure). Here the data contours are shown but also the data at each station is the same colour scheme. Also, there is no discernible horizontal response (Bx). Thus, the anomaly is apparently flat lying and given the width of the peak portion of the response the anomaly probably cannot continue much further west. The response lasts with coherence until Ch29 but extends further south at later times (central figure).

The response at the peak of the anomaly is shown to the right (red) along with a typical response away from the anomaly. Blue is the response 400m further north along the line. Again, it is demonstrated that the early time (Ch 1-10) are dominated by the system response. However, the response over the anomaly begins to decay slower at Ch13. However, the data falls into significant noise by Ch23 and is only approximately reliable at later times. Thus resolving the model is difficult and approximate.

Xcite TDEM Survey Fay Lake

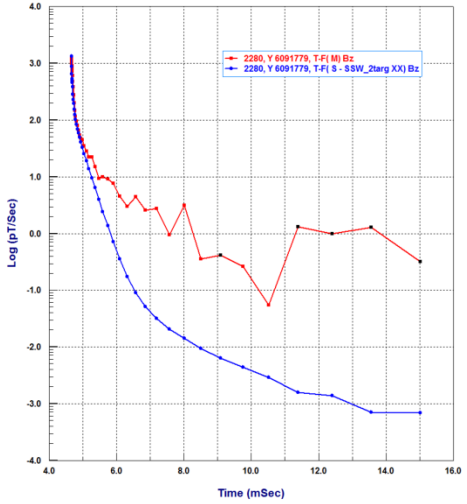
South South West

Vertical Component, Bz L2280 – Ch14 and Ch21



Visual analyses indicates the anomaly consists of two parts, a larger portion of weak conductance and a smaller portion of much stronger conductivity.

The model response diverges from the data at Ch22 but the data beyond Ch22 is not considered quantitatively reliable.

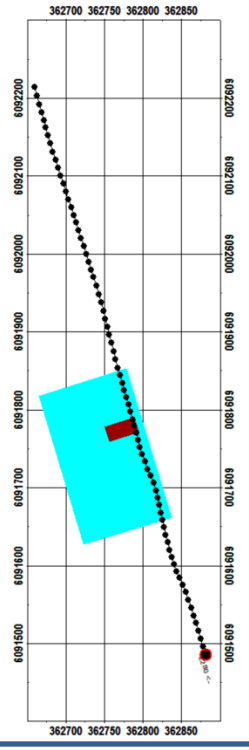


Data vs. Model
response at peak of anomaly (60911779N)

Data
Model Response

Weak portion
Conductive portion

Anomaly SSW Strong
Strike Length: 40m
Width: 20m
Strike Angle: 73º East of N
Dip Angle: 0º N
Conductance: 80 S
Depth to Top: 50m

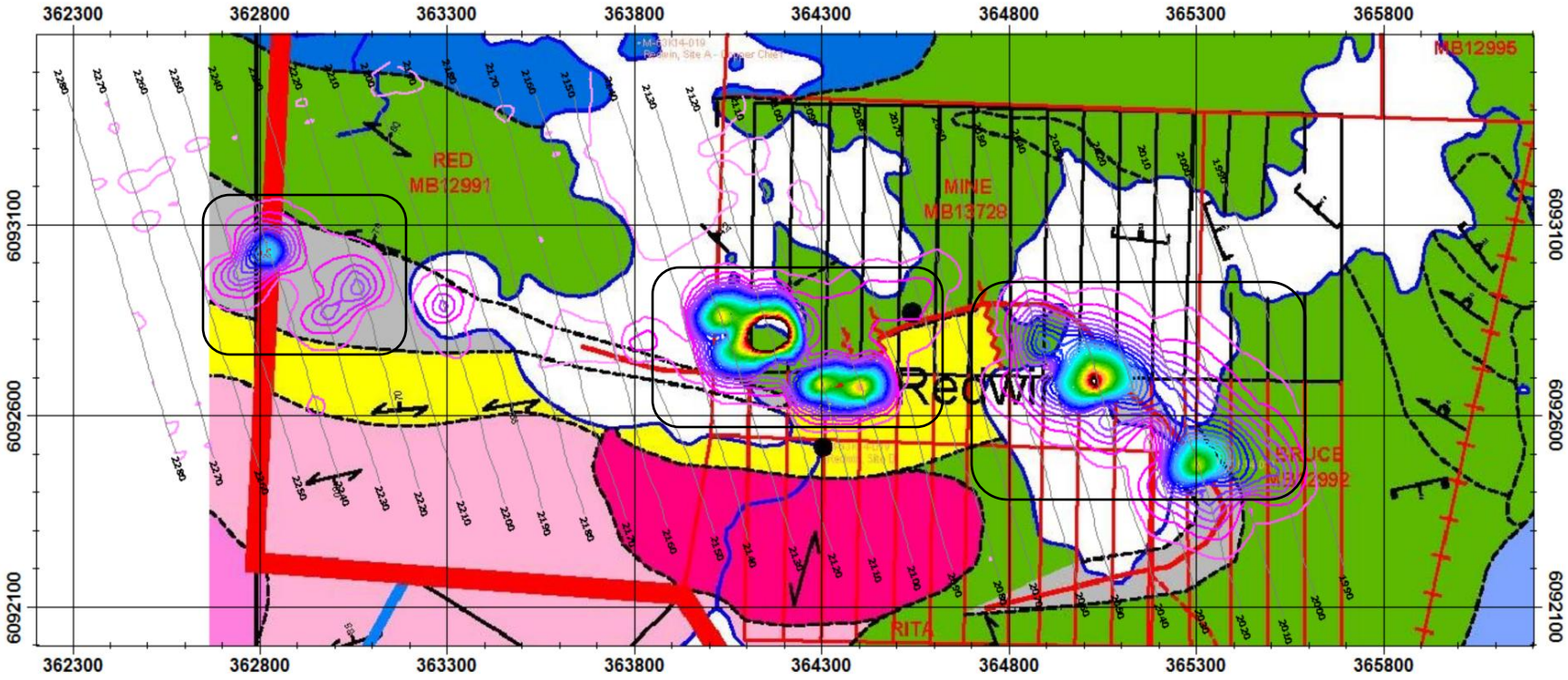


Xcite TDEM Survey Fay Lake **Main Zone**

West Targets

Central Targets

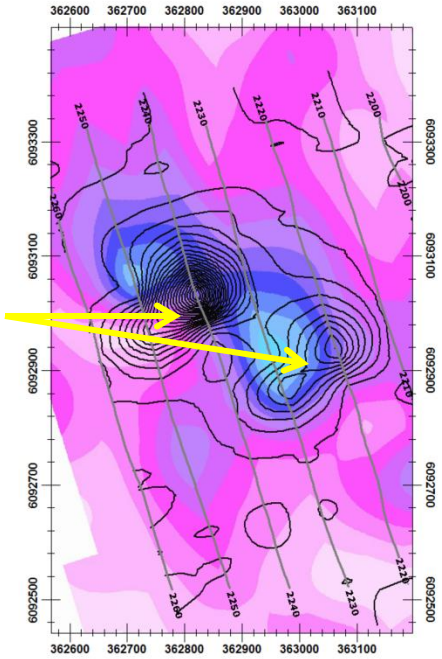
East Targets



We divide this area of interest into three parts for further analyzes.

Main Zone West Structures

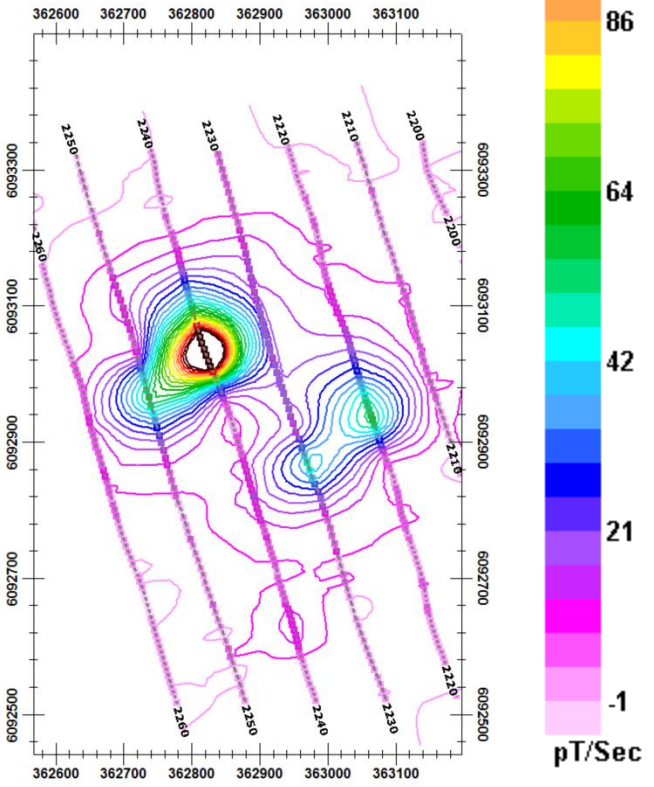
Bz Ch25 – Late time

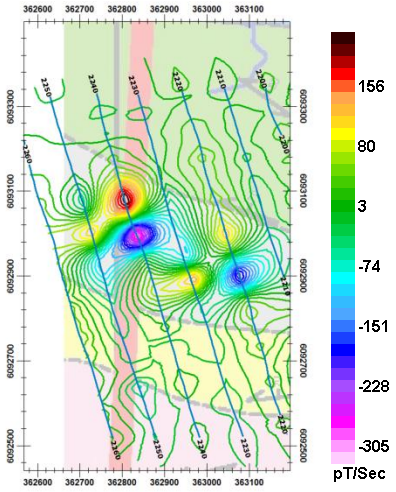


MT1
MT2

The analytic signal of the aeromagnetic data is underlain. This signal if used to identified the edges of a magnetic structure and identify the most anomalous material. Both, MT1 and MT2 are associated with a magnetic signal.

Bz Ch25 – Late time





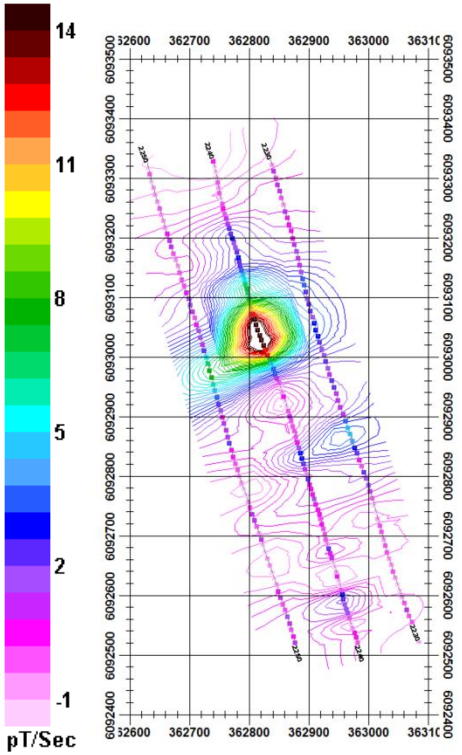
Bx Ch15 – Mid- time

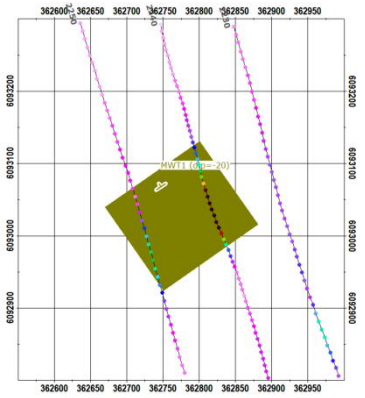
Both structures strike approximately SW to NE. MT1 is observed principally on L2240 but extending to L2250. There is a slight response on L2230 north of MT2. MT2 is seen primarily on L2220 but extending with the same approximate strength to L2230 and having a slight effect on L2240 which can be observed earlier than Ch25.

Both targets have a good horizontal response (Bx) indicating that they are not flat lying. The Bx response indicates both are dipping northward approximately along the profile lines. The Bx responses also indicate they are within the metasediments as mapped.

Xcite TDEM Survey Fay Lake **Main Zone – West Structures MT1**

Bz Ch34 – Late time

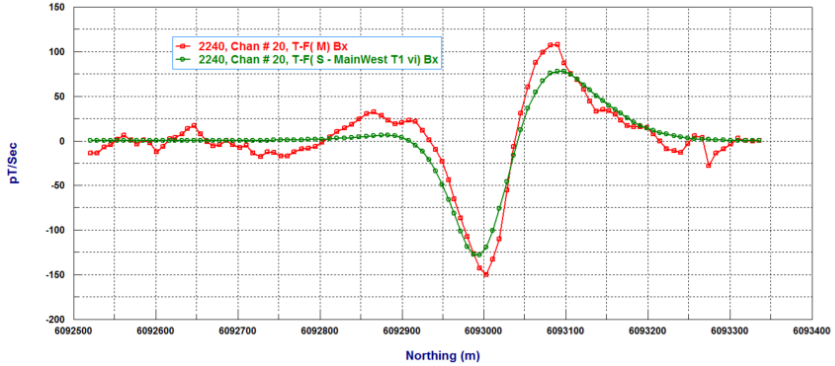


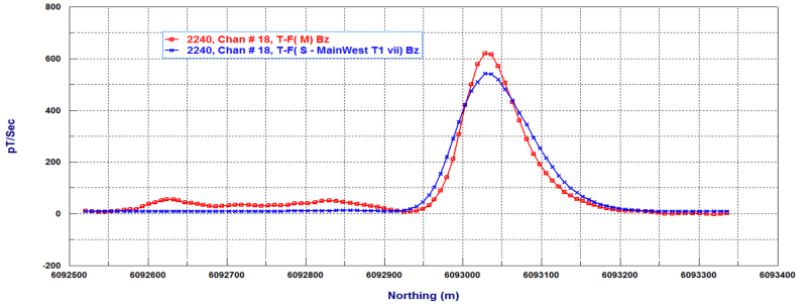


model projected to surface

Anomaly MT1
Strike Length: 160m
Depth Extent: 150m
Strike Angle: 55º East of N
Dip Angle: 20º N
Conductance: 80 S
Depth to Top: 55m
Depth to Bottom: 107m

Bx Ch20 – Late time
Data vs. Model Response



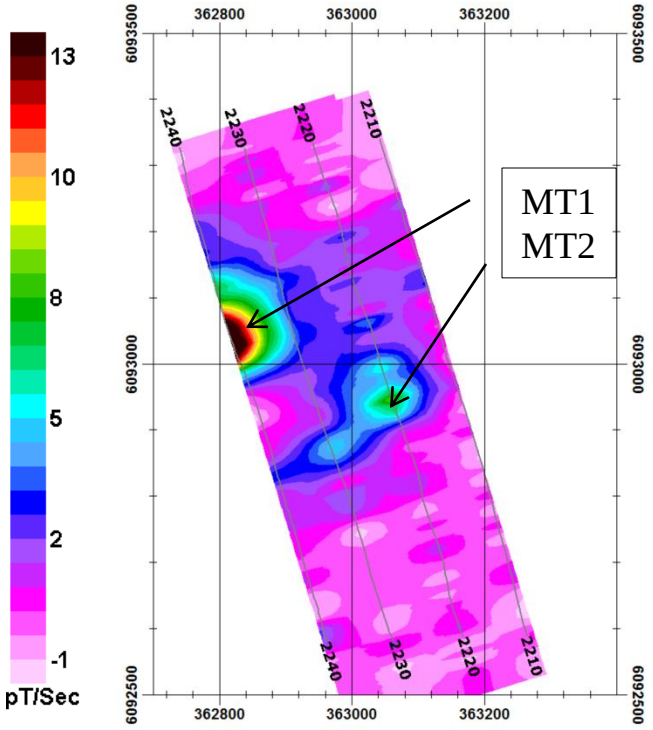


Bz Ch18 Mid-Time
Data vs. Model Response

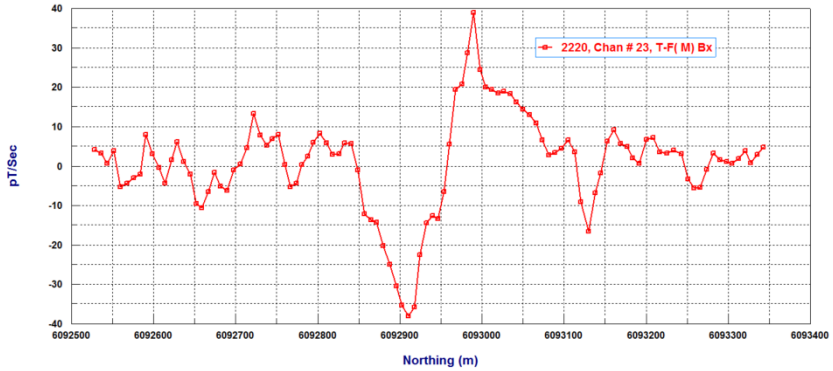
MT1 is relatively strong, dipping slightly towards the NNW but not large.

Main Zone – West Structures MT2

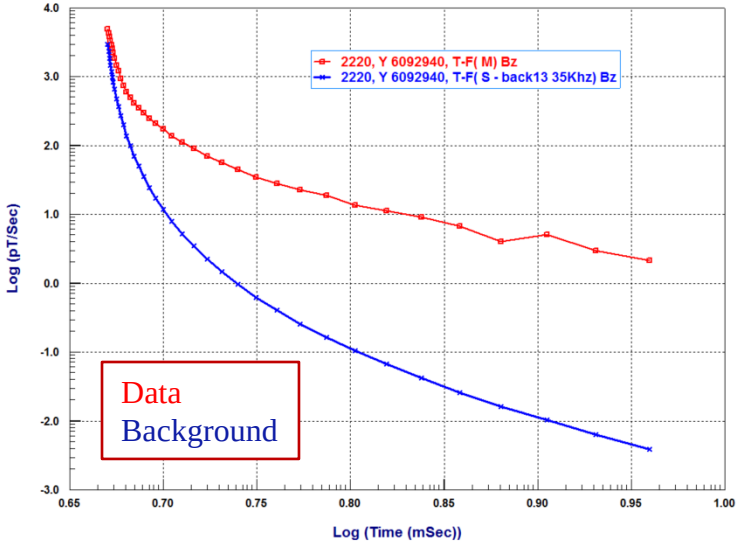
Bz Ch34 – Late time



Bx Ch23 – Early Late time



Bz Decay at Peak L2220
versus determined background response



MT2 is much weaker than MT1. By Ch34, MT2 is no longer coherent in the vertical component as compared to MT1 (upper left figure). The horizontal channel which is due entirely to 3D structures and noise has become very incoherent and noisy even at early late time (upper right figure).

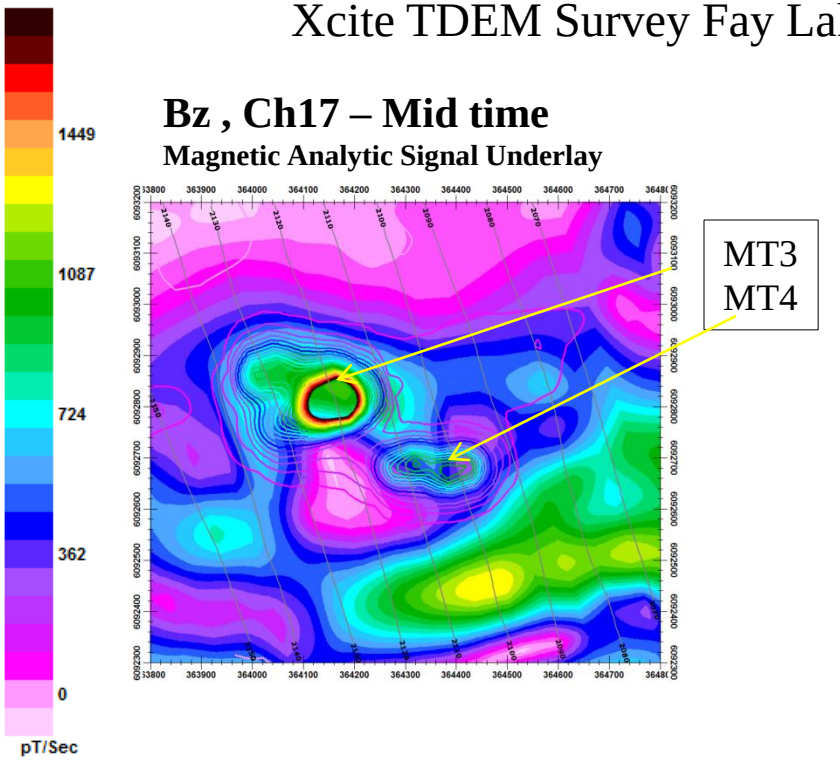
The response in time at the peak response on L2220 is shown on the bottom to the right in red while the determined response of the background is displayed in blue. There is a shallow amplitude effect shift. The decay in mid and late times is only slightly slower than the background. As such, it could be simply be a local thickening of the cover material.

Xcite TDEM Survey Fay Lake

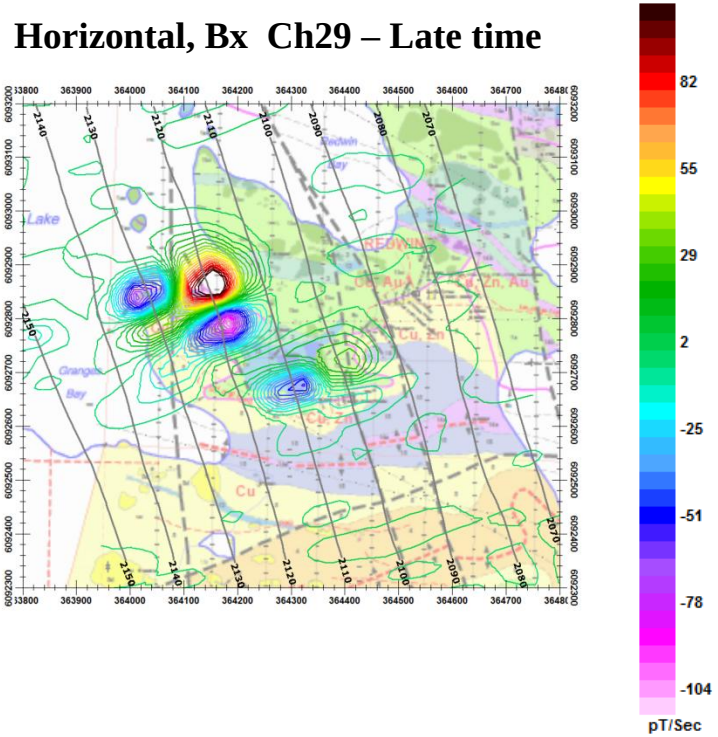
Main Zone – Central Structures

Bz , Ch17 – Mid time

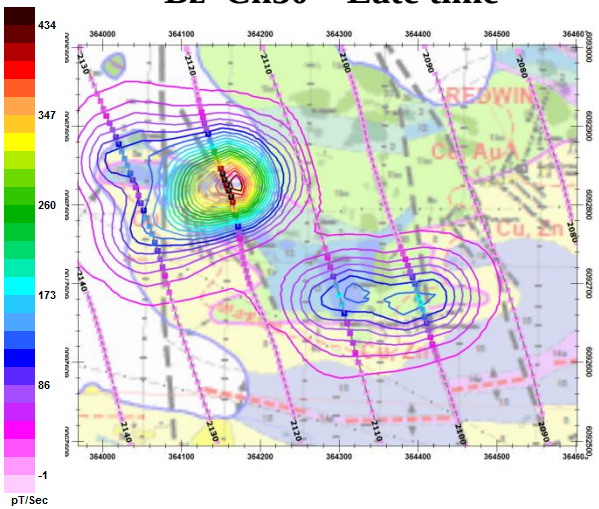
Magnetic Analytic Signal Underlay



Horizontal, Bx Ch29 – Late time



Bz Ch30 – Late time



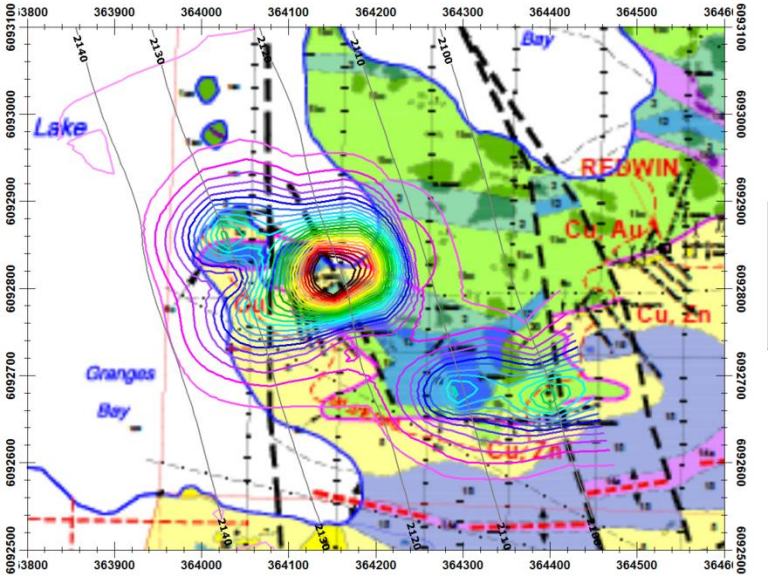
MT3 is the strongest anomaly of the two in terms of amplitude and the slowness of the decay rate. MT3 is associated with a magnetic anomaly as indicated in the upper left with the underlay of the analytic signal. MT3 has a definitive and strong horizontal component response (upper right figure) while MT4 has a weaker horizontal response.

MT3 is seen predominately on L2120 with a weak late time response on 2130. MT4 is seen well on both line 2110 and 2100.

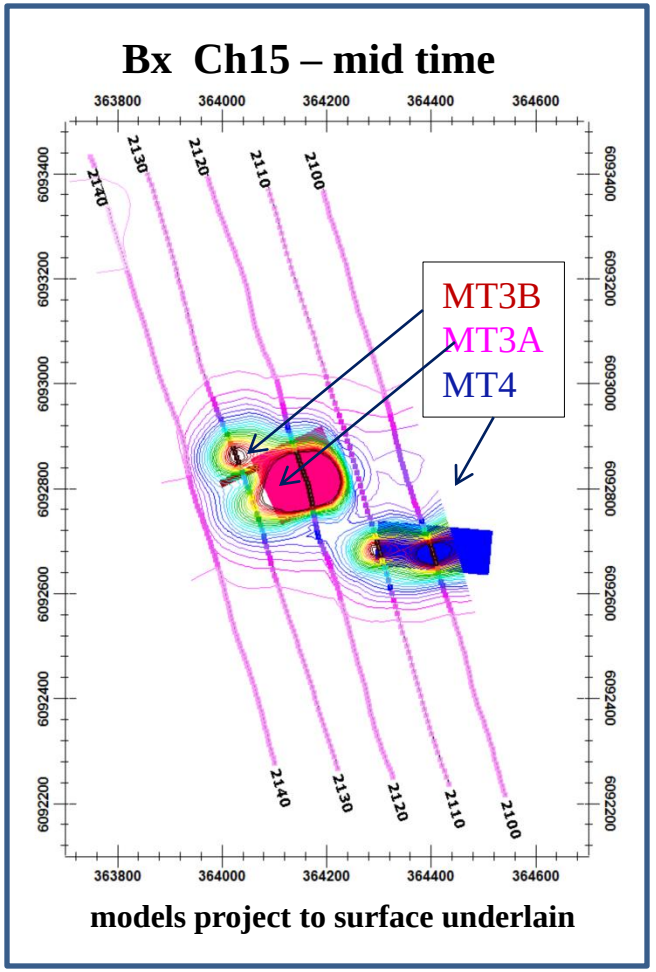
The peak of MT3 is on the very edge of Fay Lake on a bay north of Granges Bay.

Xcite TDEM Survey Fay Lake Main Zone – **Central Structures**

Bz Ch24 – Late Mid-time



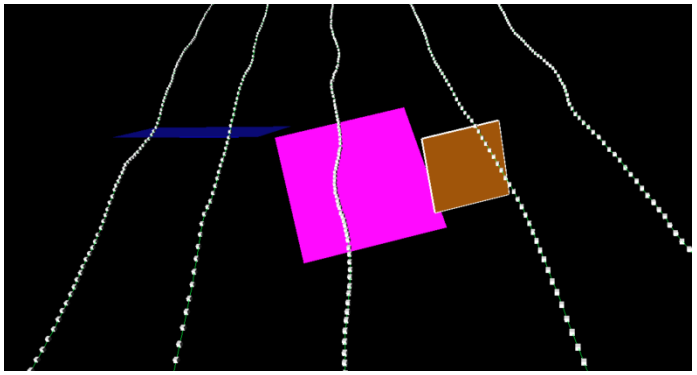
Bx Ch15 – mid time



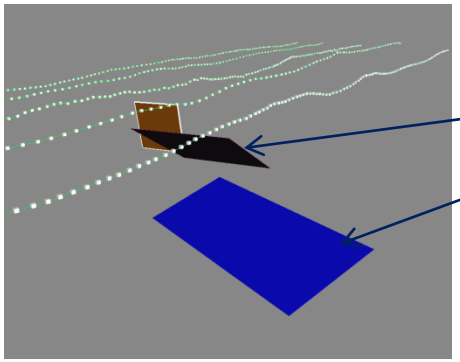
During the modeling exercise, it was found that MT3 actually consisted of two parts. The main anomaly is MT3A while the minor anomaly to the NW is MT3B. The response south of MT3B on L2130 is not the result of either MT3B or another anomaly but the western extended response of MT3A.

Xcite TDEM Survey Fay Lake Main Zone – **Central Structures**

View from North



View from South West

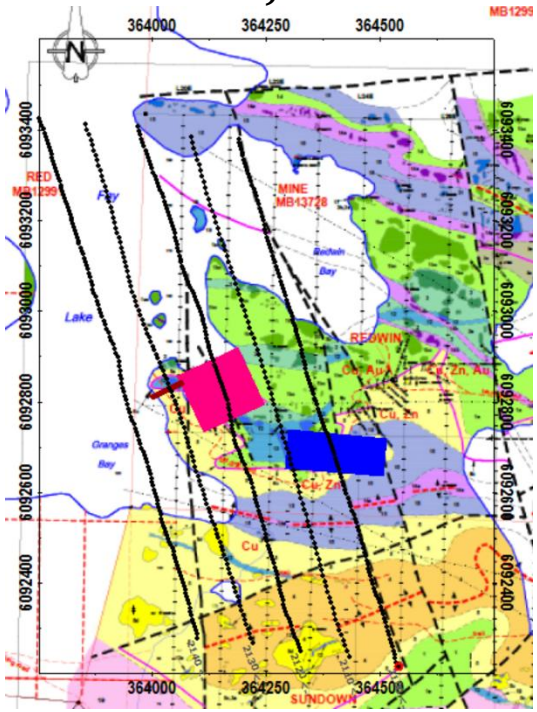


Anomaly MT4
Strike Length: 220m
Depth Extent: 90m
Strike Angle: 95º East of N
Dip Angle: 18º S
Conductance: 50 S
Depth to Top: 40m
Depth to Bottom: 67m

Anomaly MT3A
Strike Length: 150m
Depth Extent: 160m
Strike Angle: 65º East of N
Dip Angle: 30º N
Conductance: 50 S
Depth to Top: 15m
Depth to Bottom: 94m

Anomaly MT3B
Strike Length: 80m
Depth Extent: 80m
Strike Angle: 65º East of N
Dip Angle: 80º N
Conductance: 85 S
Depth to Top: 3m
Depth to Bottom: 79m

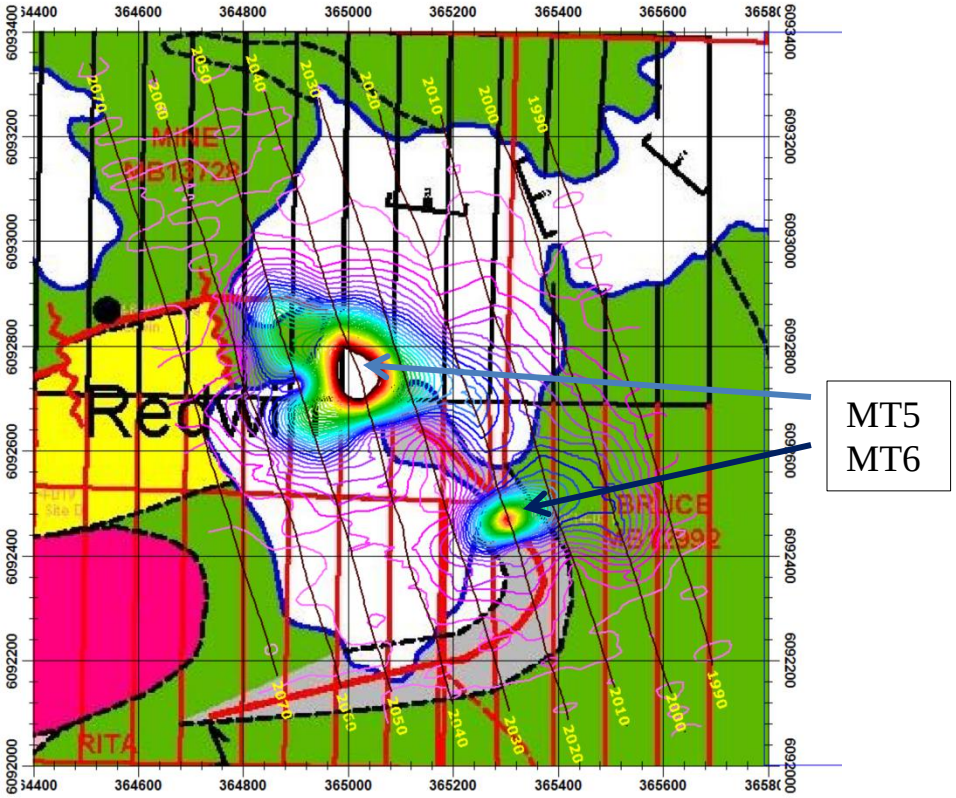
MT3 , MT4



All three structures have quite strong conductance. MT4 has the longest strike of the structures and has the shallowest dip and the only structure dipping southward. MT3B has the strongest conductance. It is almost vertical but the smallest of the three anomalies and the shallowest. MT3A appears the most significant target when displaying data but this is because its top is relatively shallow (15m), the conductance is the same as MT4 and its surface area is the largest. MT3B has the strongest conductance but is the smallest structure both in strike and depth extent.

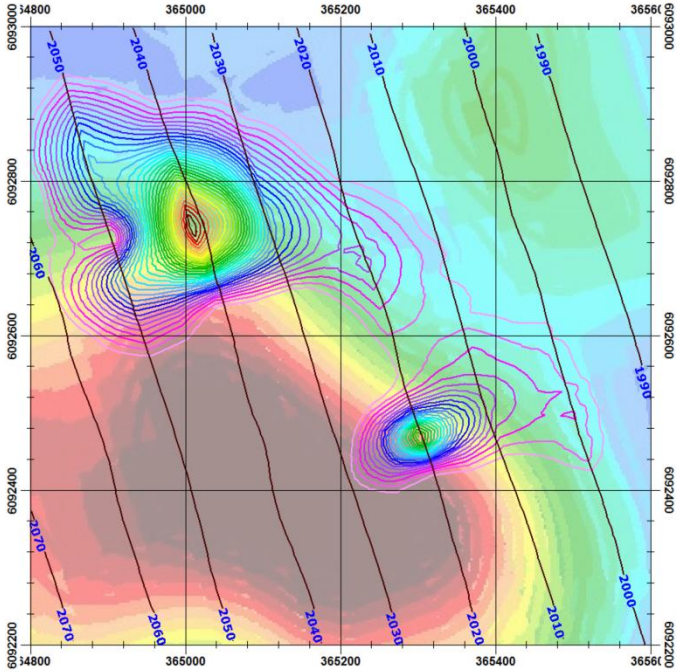
Xcite TDEM Survey Fay Lake Main Zone – **East Structures**

Main East Structures – MT5 and MT6



Bz Ch30 – Late Time

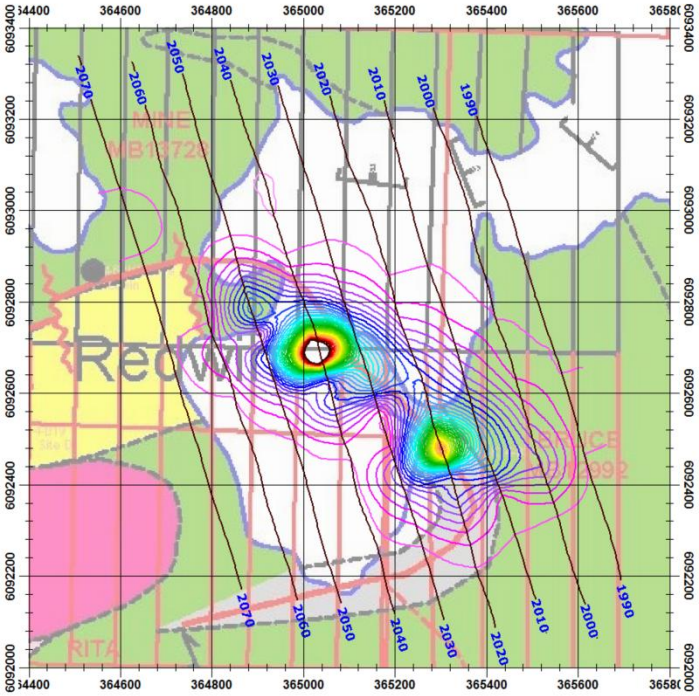
Aeromagnetic Underlay



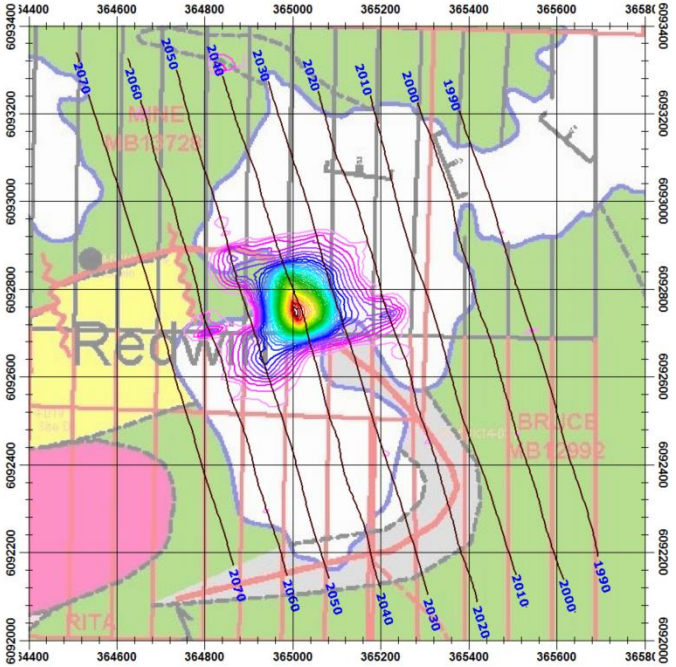
In the late time (e.g. Ch30) , the anomalies become quite small and concentrated. MT5 is under the lake and MT6 just at the edge of the lake. Apparently according to the geology map both are associated with metasediments. Both anomalies are also on the edge of a very strong magnetic feature (upper right).

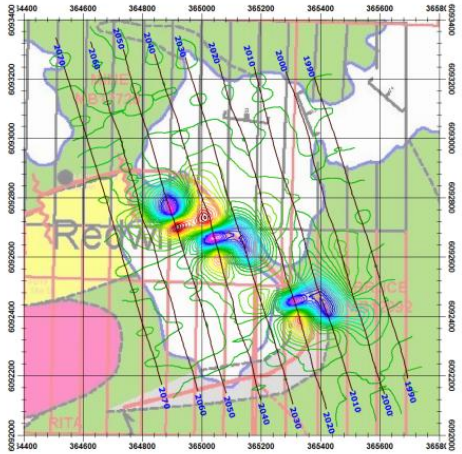
Xcite TDEM Survey Fay Lake Main Zone – **East Structures, MT5 and MT6**

Bz Ch15 – Mid Time



Bz Ch40 – Late Time





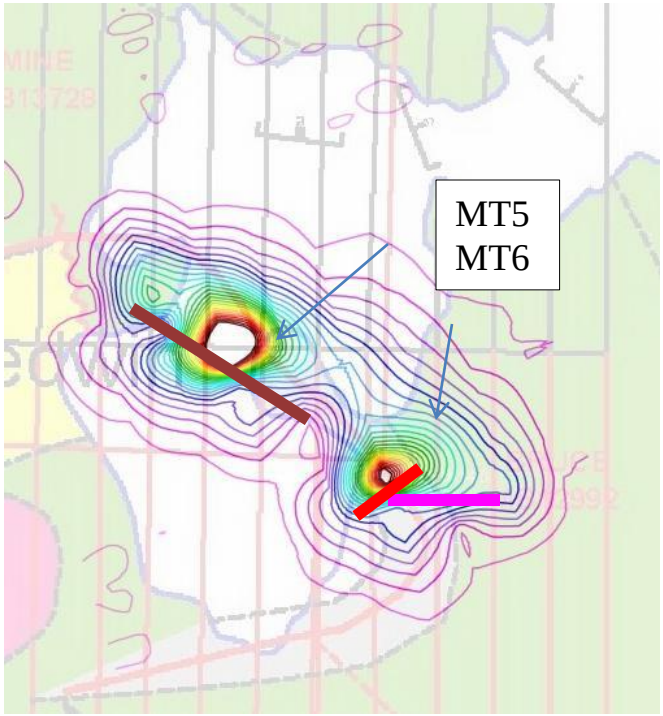
The Ch15 vertical data (upper left) indicates that there might be weak conductive material connecting the two targets. Also, it shows a halo of more weakly conducting material.

By very late time (upper right) only MT5 remains. The horizontal component data (Bx) is quite coherent into mid-late time and indicates some additional complexity (left bottom figure). It appears M6 consists of the portions.

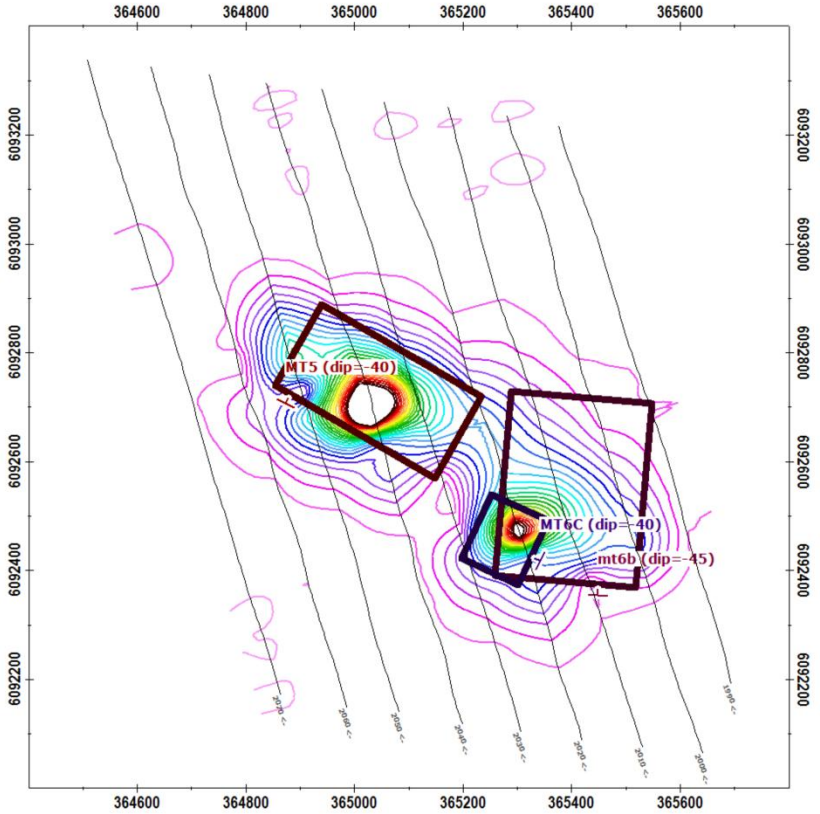
Bx Ch20
Early Mid Time

Xcite TDEM Survey Fay Lake Main Zone – **East Structures, MT5 , MT6**

Bz Ch21 – Early Late Time



MT5, MT6B, MT6C

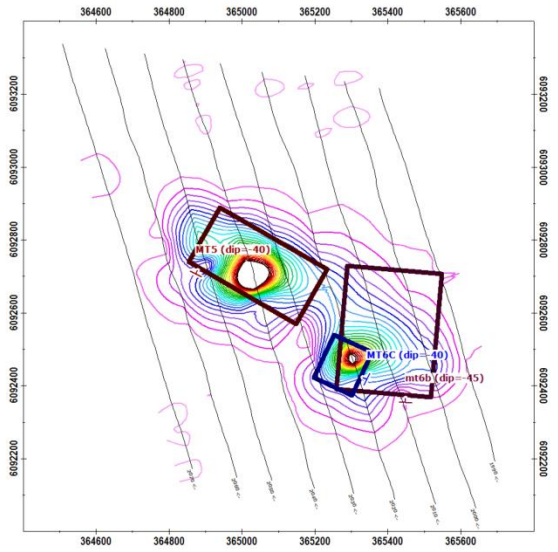


This anomaly consists of three distinct stronger anomalies; MT5 under the lake and MT6B and MT6C on the eastern edge of the lake. All of the structures have a moderate dip but are not flat lying. All three dip roughly to the NE. The use of rectangular model anomalies is only an approximation.

The top edges are outlined to the left above and the surface projection of the edges of the models is shown on the right.

Xcite TDEM Survey Fay Lake Main Zone – **East Structures, MT5, MT6**

MT5, MT6B, MT6C



Anomaly MT6B
Strike Length: 260m
Depth Extent: 480m
Strike Angle: 95º East of N
Dip Angle: 45º N
Conductance: 20 S
Depth to Top: 50m
Depth to Bottom: 388m

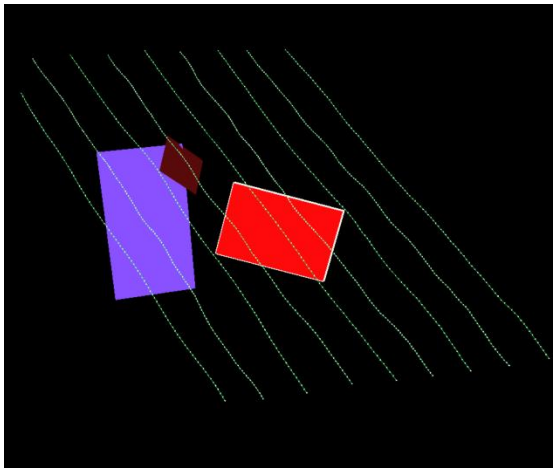
Anomaly MT6C
Strike Length: 130m
Depth Extent: 150m
Strike Angle: 25º East of N
Dip Angle: 40º N
Conductance: 25 S
Depth to Top: 20m
Depth to Bottom: 110m

Anomaly MT5
Strike Length: 340m
Depth Extent: 225m
Strike Angle: 30º South of E
Dip Angle: 40º N
Conductance: 25 S
Depth to Top: 35m
Depth to Bottom: 177m

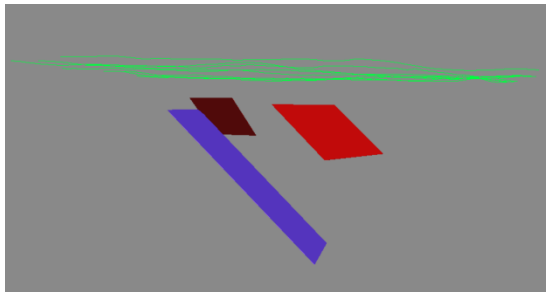
None of the models are particularly strong in conductance. However, MT5 and MT6B are relatively large compared to many of the models for Fay Lake. All the models have similar dip angles although all are dipping in different directions.

From examination of the data, MT5 twists at its NW end to become more vertically oriented.

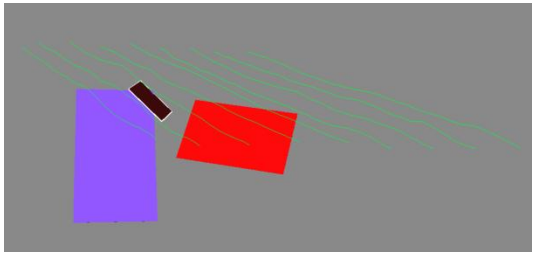
View from NE



View from East



View from North East



Xcite TDEM Survey Fay Lake area

SUMMARY:

The Xcite airborne TDEM and Magnetics airborne survey flown in 2022/2023 was divided into six sections for analyses and modeling (pg2)

1: North Central: This region is the largest of the six divisions and approximately 25 percent of this region is outside the present claims of Boreal Gold. In the North Central area, seven late-early time data to early mid-time anomalous target areas were identified (1-7). In target area 1 through 4, only anomalies were considered for modeling and models NCT1 and NCT4 were defined. Target NCT1 is quite weak consisting of two parts both of 4S (Siemens). Target NCT4 is slightly stronger at 13S while having some interesting associated magnetic responses. Target5 (NCT5) is slightly stronger at 25S, beneath a lake, steeply dipping and of reasonable size (170x140m). Target NCT6 is again slightly stronger at 30S, dipping slightly with a fairly long dip extent of 300m.

Target 7 (NCT7) is probably the most interesting anomaly. It consists of two parts both striking WSW to ENE with a combined length more than 1km. Both are dipping at 85 degrees. Neither is of particularly strong conductance, NCT7A which is the most eastern of the two portions is only 15S while NCT7B is just 5S. However, there appears to be continuing weak or deep conductive material much further along strike to the west. Moreover, the structures appear to be on the edge of two different rocks with different magnetic properties.

2: Central and East: This region is approximately midway along the survey profiles running across the eastern two thirds of the survey. There are two anomalous areas in this section. One is a small anomaly approximately central to the entire survey and the other area consists of a more complex array of anomalies. The central anomaly, CT8, is interesting because it appears to be on the edge of a mafic schist. It is of modest size, 120x70m, dipping at 65 degrees with a conductance of 22S.

In the eastern anomaly, four separate targets were identified as their responses persisted at least to early late time. These anomalies are of interest as they all are within a "J" shaped region of anomalous magnetic response. In addition, to these 4 stronger anomalies there are numerous other weak anomalies within this unusually shaped magnetic response. Targets ET1 and ET4 were chosen to model as they had the strongest responses very late in the data.

Target ET1 is associated with a mafic schist and is positioned near the edge of the schist and follows approximately the edge of the schist as it bends. It actually consists of two parts with the same strike with the two parts apparently connected by weaker conductive material. ET1A is the largest of the two Target 1 models and has the deepest extent but the weakest conductance, 15S. Both ET1A and ET1B dip at 65 degrees. ET1B is still relatively large (130x150m) with a conductance of 35S. ET4 if offset north from ET1B and is the smallest conductor but with the strongest conductance, 55S. It is almost flat lying and much deeper to its top (70m) then either of Target 1 portions. All three anomalies are associated with relatively shallow, local strong magnetic features.

SUMMARY (cont'd):

3: South Central: Only one anomaly was selected from this area but it proved not of significant interest to model fully.

4: South West: This region is in the very south west portion of the survey, covering an area of about 5 square kilometres. Two small anomalies were considered in this area. One anomaly designated (Boreal Gold) as the Sundown anomaly in the eastern portion of the section and the other we call the SSW anomaly and it occurs primarily on the last survey line to the west.

The Sundown anomaly appears only on one survey line (L2130) with no significant expression on the line to the west nor the east. We have modeled this anomaly with to parts. Both parts are flat lying and extend along the profile line for about 40m. Sundown1 is modeled with a width of 20m while Sundown 2 has a width of only 10m. Sundown1 is about 45m below ground with a conductance of 85S while Sundown 2 is shallower (20m) and has a conductance of 175S. We suggest that this anomaly could be man-made.

The SSW anomaly is seen only on L2280 . It is small and apparently flat-lying but not with a strong conductance. Given the nature of the data, we found it impossible to model with any certainty.

5: Main Zone: As this region appears to be the initial area of interest for Boreal Gold, we have named this as the Main Zone. This area can be further divided into West, Central and East. In each of these divisions, there are two significant anomalies.

In the west zone, there are two anomalies which can be identified in late early time, MT1 and MT2. Both are associated with a weak magnetic anomaly. The MT2 EM response, however, is quite weak even by early late time. Both anomalies have a coherent horizontal response is early mid-time implying they are not flat lying. MT1 is the most conducting of the two at 80S which is quite large for this survey. It has a shallow dip and is of a reasonable surface size. MT2, however, has a much weaker conductance and its horizontal response becomes incoherent even in early late time. It is interpreted as a thickening of the cover material.

The centre zone also contains two EM anomalies at early mid-time, MT3 and MT4. MT3 is identified with a significant magnetic anomaly and is the strongest conductor having a strong horizontal response even by mid-late time. MT4 has a much weaker response in late time in both the vertical and horizontal component data. However, MT4 has a clear response covering two survey lines whereas MT3 is predominately observed on only one line. MT3 actually comprises the responses of two separate conductors, one is of moderate size and the other small, MT3A and MT3B respectively. The main conductor, MT3A is of good size (150x160) with a strong conductance of 50 with its top very shallow and is dipping at 65 degrees. MT3B is even shallower but with a stronger conductance of 85S but much smaller in surface and dipping at 80 degrees. MT4 is the largest in strike length at 220m but has a shallow depth extent of 90m. It has a conductance of 50S but is deeper to the top at 40m which is why it initially appears weaker than MT3A.

SUMMARY (cont'd):

5: Main Zone (cont'd): The East zone again consists of two anomalies but the situation is more complicated that in the previous two zones. The western anomaly (MT5) in this zone has a strong defined anomalous response of about 100 by 100m in mid-late time and the eastern anomaly (MT6) of somewhat smaller size. there is a large halo of weaker conductive material surrounding the two anomalies with conductive material connecting the two anomalies. Both anomalies sit on the NE edge of a very strong magnetic anomaly which is the strongest magnetic anomaly in the entire survey. Additionally both EM anomalies are associated with a hooked shaped mapping of metasediments which also are on the edge of this strong magnetic anomaly.

MT5 is quite large having a strike length of 340m and a dip extent of 225m. It's strike angle and length takes it relatively close to MT6 (100m). Depth to top is relatively shallow at 35m. It is dipping northeast at 40 degrees but is not strongly conducting with a conductance only of 25S. MT6 consists of two parts which overlap. The largest portion (MT6B) has a strike of 260m but has a large depth extent of almost 500m. It dips towards the north at 45 degrees with a conductance of 20S and a depth to top of 50m. MT6C is smaller with dimensions of 130x150m, shallower to the top at 20m , a dip angle of 40 degrees towards the NE and a conductance of 25S.

COMMENTS:

The reader should the modeling algorithms are limited both in their ability to represent the true geometry of the anomalies. Secondly, the instrument is quite new and it does not appear to the writer that this data is processed appropriately for a mining survey in resistive rocks. A separate report is available if desired discussing various technical aspects of the data from a geophysical perspective.

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
NCT4	369193	6096287	1	5	200	200	40000	13						7
NCT6	371865	6097062	1	75	170	300	51000	30						4
NCT7	370777	6096266	2	24	500	480	240000	15	30	500	480	240000	6	2
ET1	373972	6096400	2	30	130	150	19500	35	20	180	300	54000	15	1
ET4	373759	6096610	1	70	90	90	8100	55						8
MT1	362775	6093027	1	55	160	150	24000	80						6
MT4	364403	6092687	1	40	220	90	19800	50						5
MT3	364150	6092826	2	3	80	80	6400	85	40	150	160	24000	50	5
MT5	365043	6092729	1	35	340	225	76500	25						3
MT6	365403	6092549	2	50	260	480	124800	20	20	130	150	19500	25	3

We provide a short table summary. "Number Targets" refers to the number different zones in 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 the edge of a geologic structure as provided in the geology map from Boreal Gold.