November/December 2010
Ground Geophysics 1
Warrior Mine Site

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January 2011

Executive Summary

In November and December 2010, ground time-domain electromagnetic data were collected by Outer Rim Exploration Services (ORE) for Citigold. Data were collected on three loops; only Loop 1 is discussed in this report. This is the loop used for the October 2010 data. Seven lines of data were collected to understand the extent of the Warrior structure. Borehole EM data was also collected on the following drill holes: 3016, 3018, and 4015. Quality control and interpretation of the data was performed by Petros Eikon.

The model of the October data was used as a starting point. The main adjustments were to the strike and strike extent. In the final model, the main Warrior structure (E03) was modeled as a single target with a dip extent of 400 m, a dip of 48^0, and a conductance of 4.5 S. It is observed in the data across the entire extent of the survey. Thus, the ground TEM data show that Warrior Structure continues to the east of the Warrior mine. This model generally agrees with intercepts in the drill holes. Three additional structures, 100 m south of E03 on average, comprise what is now termed E10. E10 is observed on all survey lines as well. Note: E10 was wrongly named as E10 in previous 2010 reports.

At present, further borehole TEM work is recommended, but additional ground TEM is not needed as the ground TEM collected to date is fairly extensive over Warrior and Sons of Freedom.

Ground magnetic data was collected by Petros Eikon at the same time as the ground TEM work. The purpose was to fill-in and extend the 2008 ground survey. The data was processed and integrated with the 2008 data by Petros Eikon. Agreement with the 2008 ground data and the 1999 UTS airborne magnetic data is generally good. Future work on the magnetic data should focus on determining the source of the magnetic anomalies and whether the finer detail present in the ground data is of interest. At present, further ground magnetic surveying is not considered a priority.

PART I

TEM DATA

(TIME DOMAIN ELECTROMAGNETICS)

Introduction

In November-December 2010, seven lines of ground time-domain electromagnetic data were collected by Outer Rim Exploration Services (ORE) for Citigold utilizing the first transmitter loop. Borehole data was also collected for three boreholes (3016, 4015, 3028) using the same loop. Quality control and interpretation of the data were performed by Petros Eikon during December, 2010 and January, 2010.

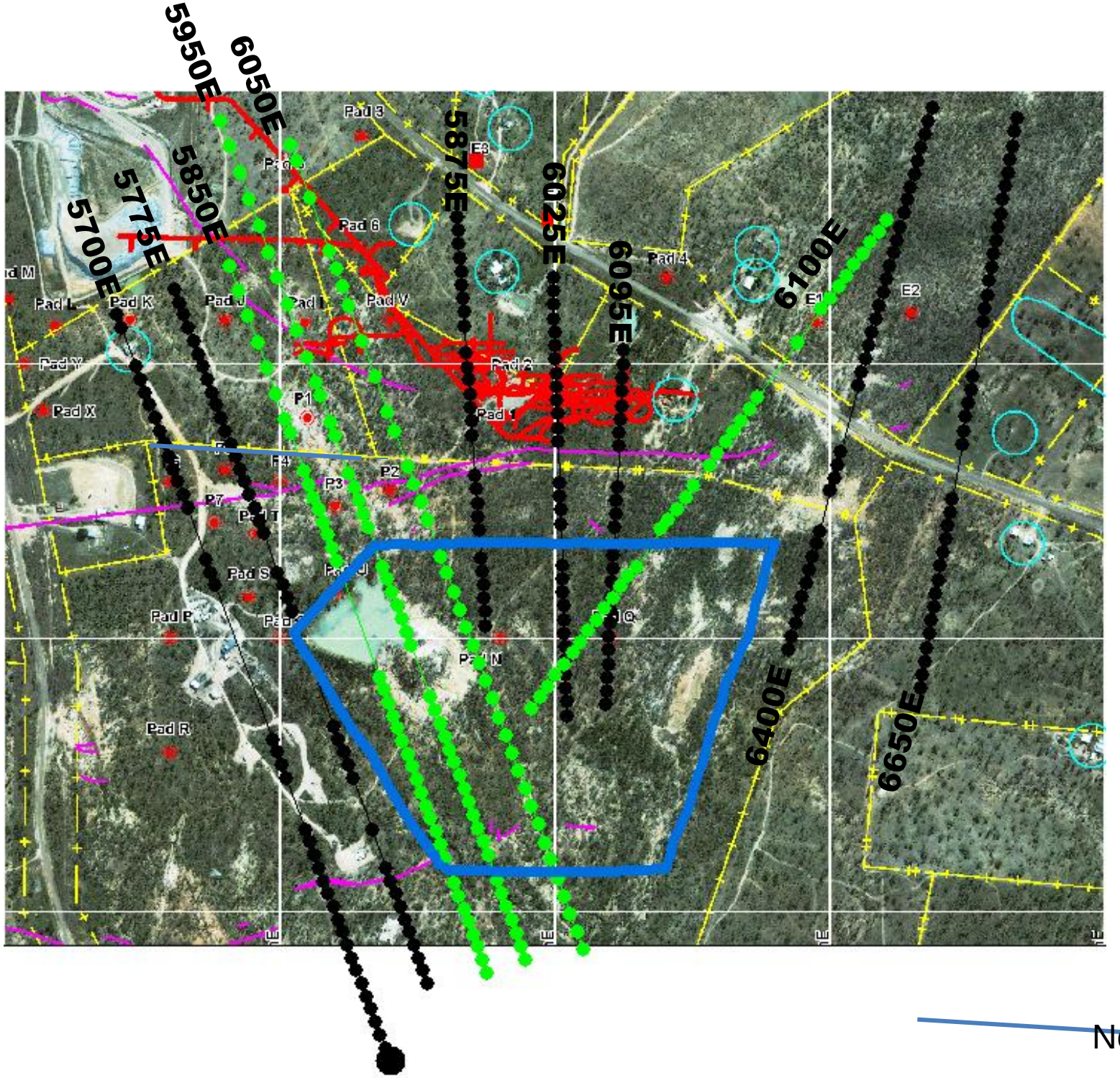
These lines were collected using the same loop as the October 2010 data (called 'Loop 1'). The purpose of the survey was to further understanding of the electromagnetic properties of Warrior West and Warrior East, including the extent of Warrior East to the east of the mine.

In this report, we present the results of the modeling for the November-December 2010 with reference to the October 2010 data as well. The results are compared with known geological information (primarily from drill logs).

Ground TEM Survey

System Parameters
Instrument: Crone Pulse EM (PEM)
Lines: 7
Stations: 233
Station Spacing: 25 m
Base Frequency: 25 Hz
Number of Time channels: 27 (26 off-time)
Turn-off time: 1 ms
Components: Hx (in-line), Hz (vertical)

Location of the TEM loop and all 11 lines (4 from October and 7 from November-December) are shown on the following slide with line labels.



Legend

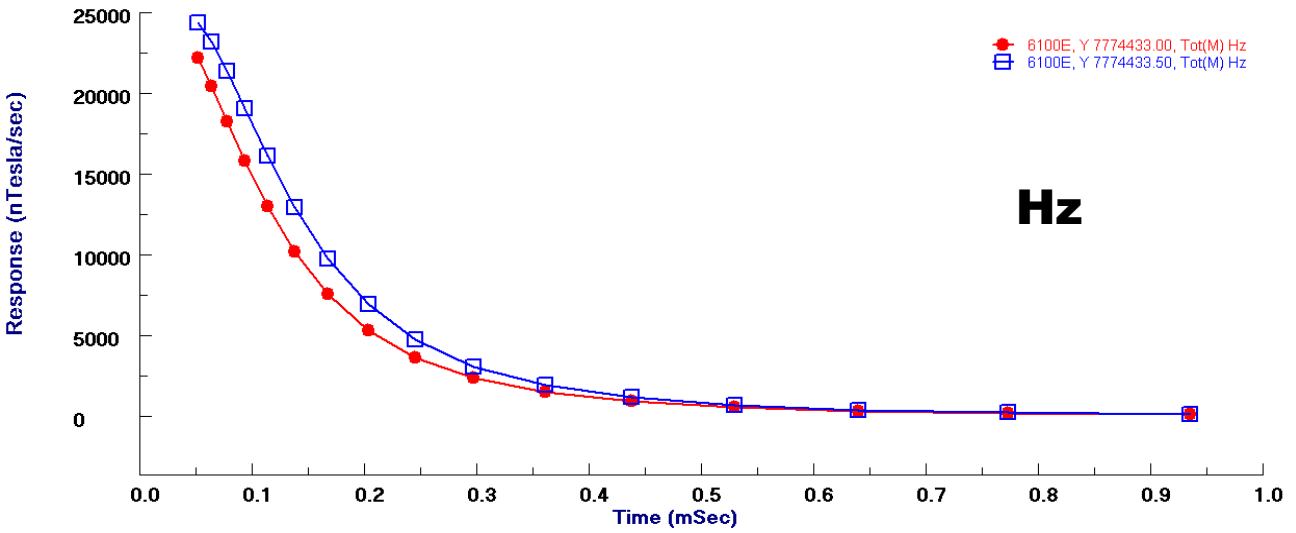
- TEM, Oct. 2010
- TEM, .-Dec. 2010
- Mine workings
- Surface expressions
- Fences

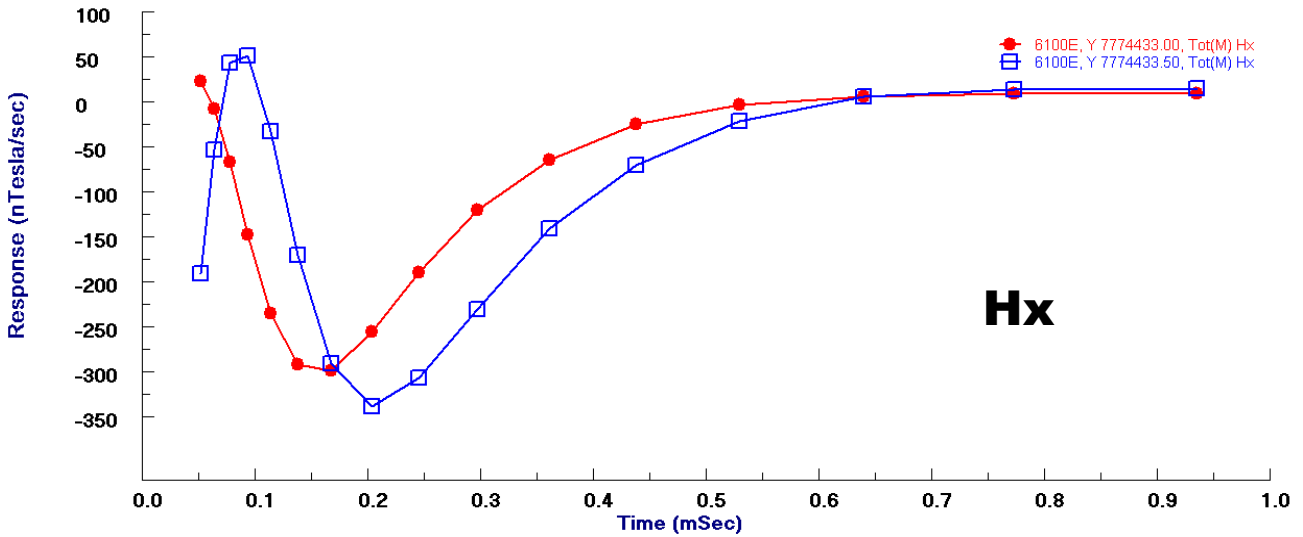
No fence

Figure 1:
Nov/Dec Survey Lines for Loop 1

QUALITY CONTROL

October vs. November 2010 Data





Three in-loop stations in the October 2010 survey were repeated in November 2010 for calibration between the two surveys. The decays (response vs time) at these three stations were compared to determine if there were any problems or discrepancies with the November data as compared to October data.

It was found that the response was similar in both October and November, but that there was a shift in the decay, as seen at station 7774433N on the right.

This suggests a timing difference between the two datasets. A further possibility would be a difference in the conductance of the overburden due to moisture content.

October

November

Figure 2:
Decays at a representative calibration station

October vs. November 2010 Data

At the request of Petros Eikon, ORE provided PP (Primary Pulse) files for each day of surveying from December 2 onwards. Primary pulse files were also available for the October data, and these were compared.

The primary pulse file contains tight sampling (4 µs) near the end of the pulse (between -100 µs and 100 µs). Time zero in the PP files corresponds to the timing reference point used for data collection.

Through examining the PP files it was determined that:

1) The end of the pulse in the Crone equipment is when the coil response begins to drop. In an ideal system, it would drop to zero instantaneously; however, in a real system, bandwidth is limited. In our modeling, the point at which the coil response decays to half its maximum is considered the end of the pulse. As a result, the data should be shifted 30 µs closer to the end of the pulse.
2) This 'mid-point' is 20 µs later in the November data than in the October data – this explains the shift in the decays observed on the previous page. It is not known whether this is to slightly different equipment, or due to how the operator picks the end of the pulse. Note: files on different days were relatively consistent. Representative examples from October (red) and November (blue) are shown below.
3) As a result of 1) and 2), the October data should be shift 30 µs closer to the end of the pulse, and the November/December data should be shifted 50 µs closer to the end of the pulse for modeling. (This is the shift that should be applied to the times given by ORE.)

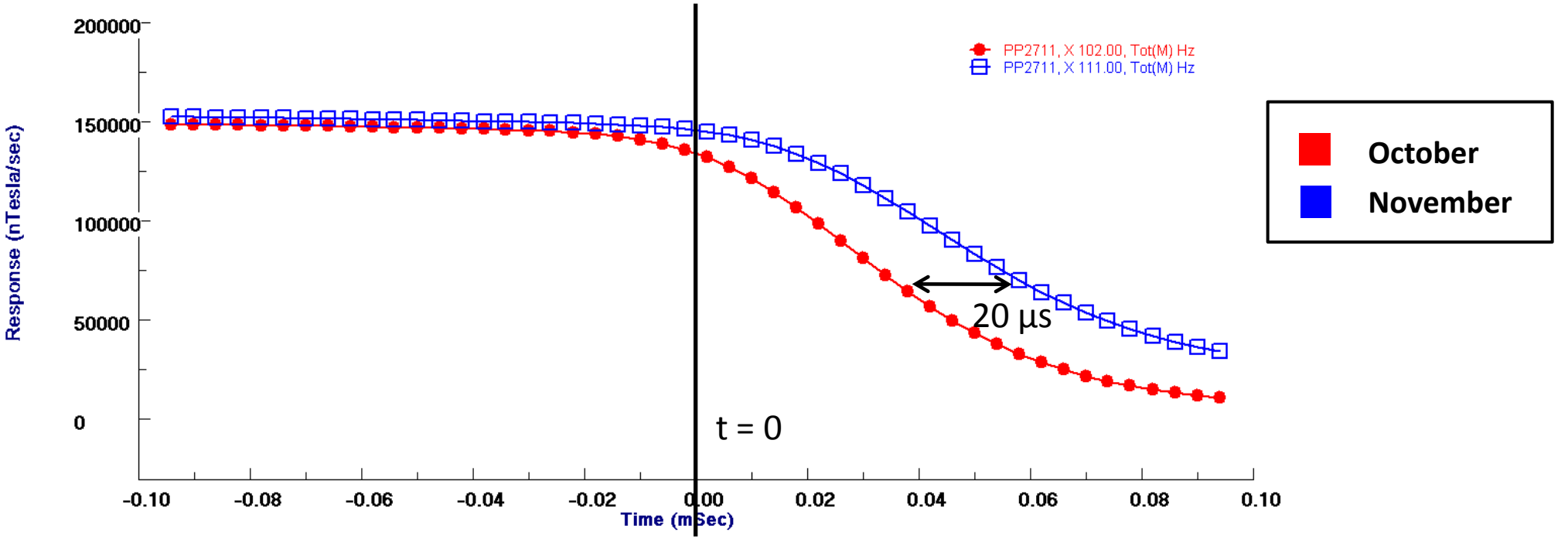


Fig 3: *Time reference comparison*

October vs. November 2010 Data

We conclude that:

1) There is good agreement between the October and November data; however, the timing needs to be adjusted.

2) If further TEM data is collected with Crone equipment, it is imperative that we have the primary pulse files to monitor timing issues.

GROUND TEM MODELING

“Modeling” : In this report as well as previous and subsequent reports,the term modeling is meant to represent something quite different than how the term may be understood when referring to geological modeling. While a Physical model is made in three dimensions and placed within a GIS context, the geophysical response of the physical model is also simulated synthetically to match to the acquired data. Advances in simulation of geological models Have allowed more accurate representations of the geophysical measuring Systems and more complex models. However, due to limitations in the quantity and details of data as well as limitations in the simulation algorthms, models may appear simplistic to the trained geologist.

Modeling Overview

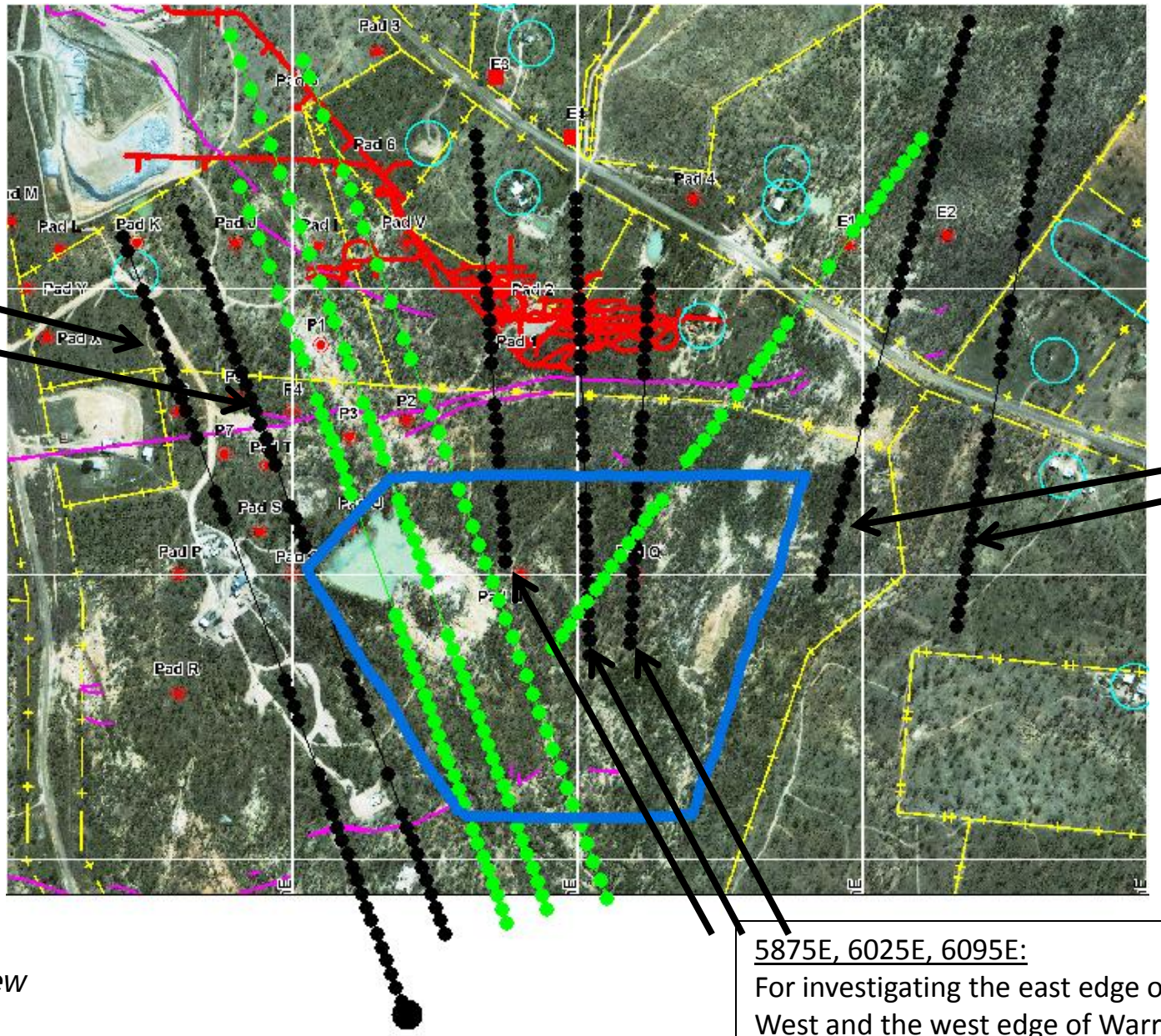
This report only discusses the modeling of Warrior (E03) and a structure to the south, identified in the October 2010 data, which we call Warrior South (E10). Imperial and Son's of Freedom are also observed in the data, but are not discussed here.

A model for both of these structures was previously developed for the October data. E03 was split into Warrior East (Line 6100E) and Warrior West (Lines 5850E, 5950E, and 6050E). E10 was modeled only on the west; however, it was observed on Line 6100E as well.

These models were used as the starting point for modeling of the November/December data. The main adjustments were to the position and strike extent of the structures: the October model was too far south for the neighboring November/December lines. Later, the modified model was simulated for the October data.

The additional lines allowed the strike angle and strike extent of the structures to be refined. Lines 5700E-5775E, west of Line 5850E from October, allowed examination of the structure to the west. Lines 6400-6650E were used to determine if the structure continued to the east.

Modeling Overview



5700E, 5775E:
The purpose of these lines was to understand the extent of Warrior West to the west. Data collected with 'Loop 3' (to be discussed in a later report) investigated the continuity of this structure to the west of Bluff Road.

6450E, 6600E:
The purpose of these lines was to understand the extent of Warrior East to the east of the mine.

5875E, 6025E, 6095E:
For investigating the east edge of Warrior West and the west edge of Warrior East (i.e. electrical connection between East and West).

Figure 4:
Model overview

Modeling

Background (host structures) model:
The targets are inserted into a background resistivity model. The background model is a 1D model in which resistivity varies only with depth.

Here, the background model is a simple conductive overburden (2.3 Ω m for 1.5 m) over a resistor (10,000 Ω m for the granite). This model is determined by a variety of methods but mostly in relation to where lateral variations in the geophysical responses are considered to be at a minimum.

On the top right is a plot of the measured data vs. the background response for Hz, the vertical component. The anomalies caused by the E03 and E10 are identified.

On the bottom right is a similar plot for Hx, the in-line horizontal component.

Both components were collected in October and November/December.

*Note: the response of the background model varies across the line due to the distance between the transmitter and the receiver. The location of a data point denotes the GPS of the receiver.

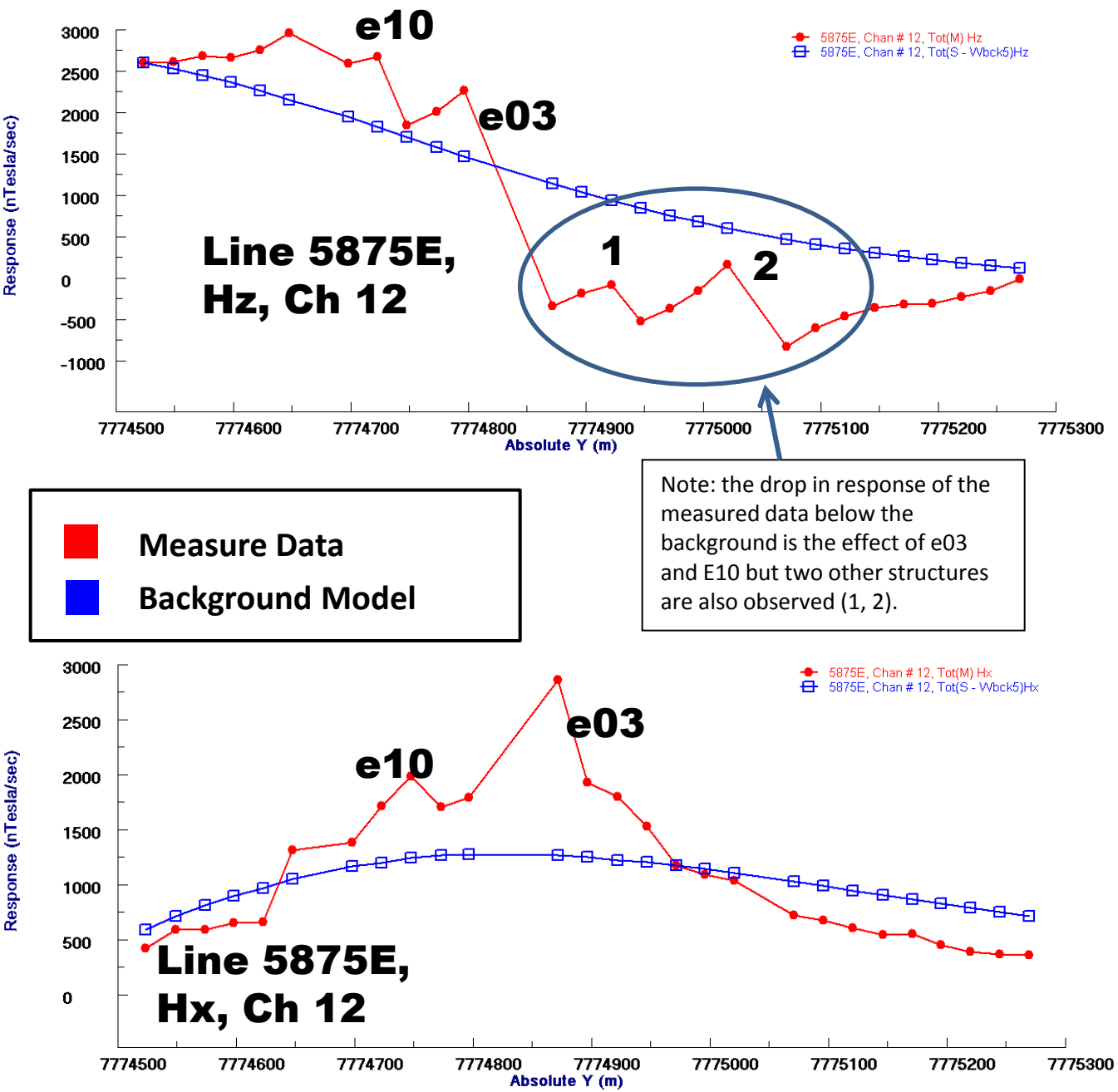


Figure 5:
Response of the host geology

The map indicates the EM and geological surface expressions of the E03 and E10 EM models. While the EM models do not come to surface, we have shown the projection of the models on the surface.

Model – Plan View

E03

Initially, E03 was modeled as two structures (Warrior West and Warrior East). Although, these initial structures overlapped, there was no evidence that they were connected electrically. With modeling on the new data, the two structures had the same conductance, strike, and approximately the same northing. Furthermore, none of the lines had a response that suggested a significant break in the structure (i.e., the amplitude of the response is reasonably consistent across the survey). Thus, these were combined into a single E03 structure which provided a reasonable fit to the data. Between Lines 5875E and 6100E, the position of the model approximately matches that of the geological surface expression of Warrior, as marked in pink on the map.

The EM data shows the structure continuing to the east at the same northing as far as Line 6650E (most easterly line). The response on Line 6650E does not suggest that the structure terminates near this line; however, with the current data, we cannot determine its extent to the east. Thus, although the model extends 300-400m east of Line 6650, its eastern extent cannot be accurately determined without further data to the east. E03 is observed in the EM data on Lines 5700E and 5775E which are the most westerly lines as well. Note that the model is north of the geological surface expression.

E10

A second structure to the south is observed on every line in the EM surveys. This was modeled as three separate structures to capture the change in strike. Each structures has a different conductance, with E10_east having a conductance about double that of the central and west structures. It is not known whether there is some connectivity between these structures, or whether they are entirely separate. The data to date is not able to determine this issue.

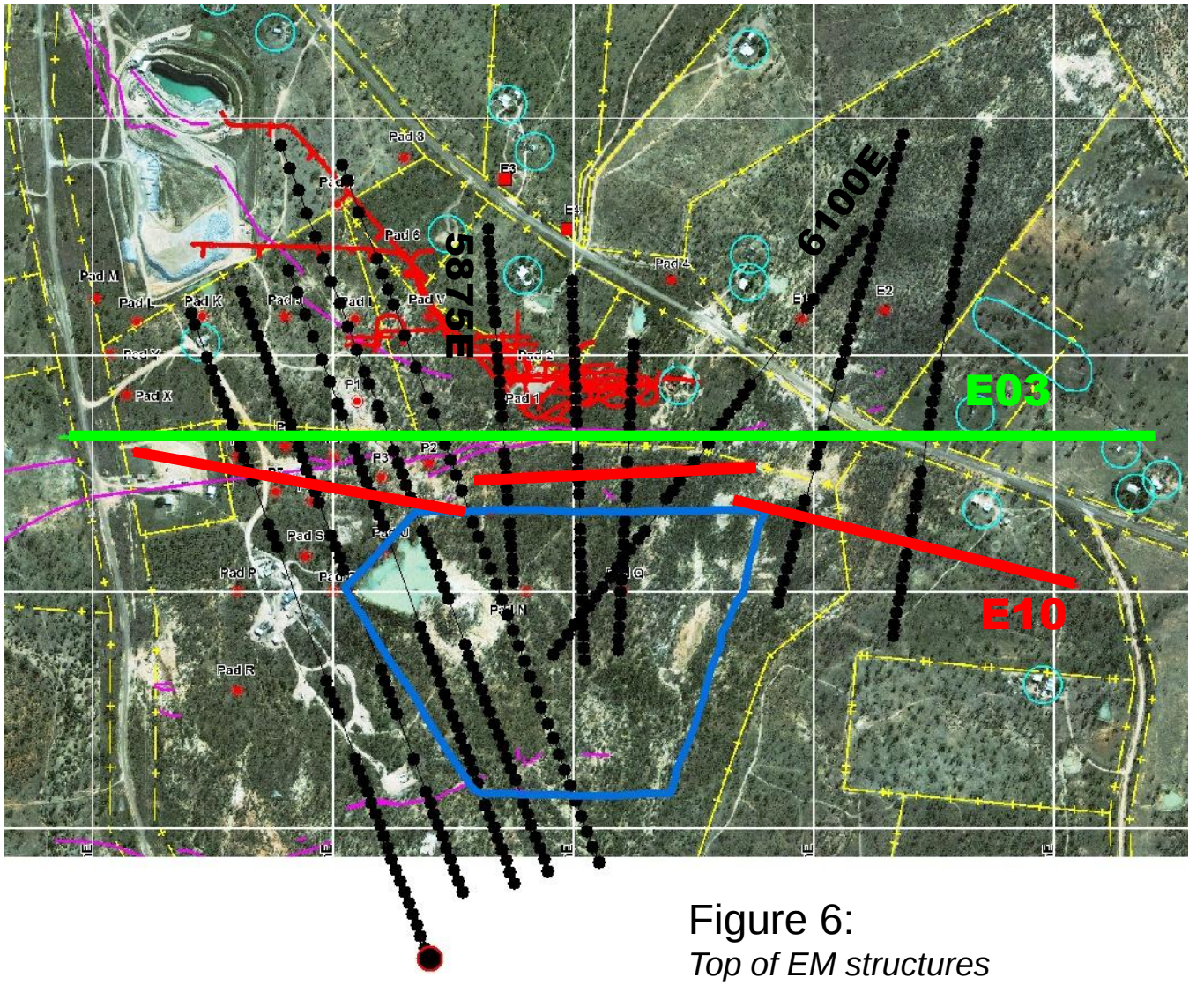
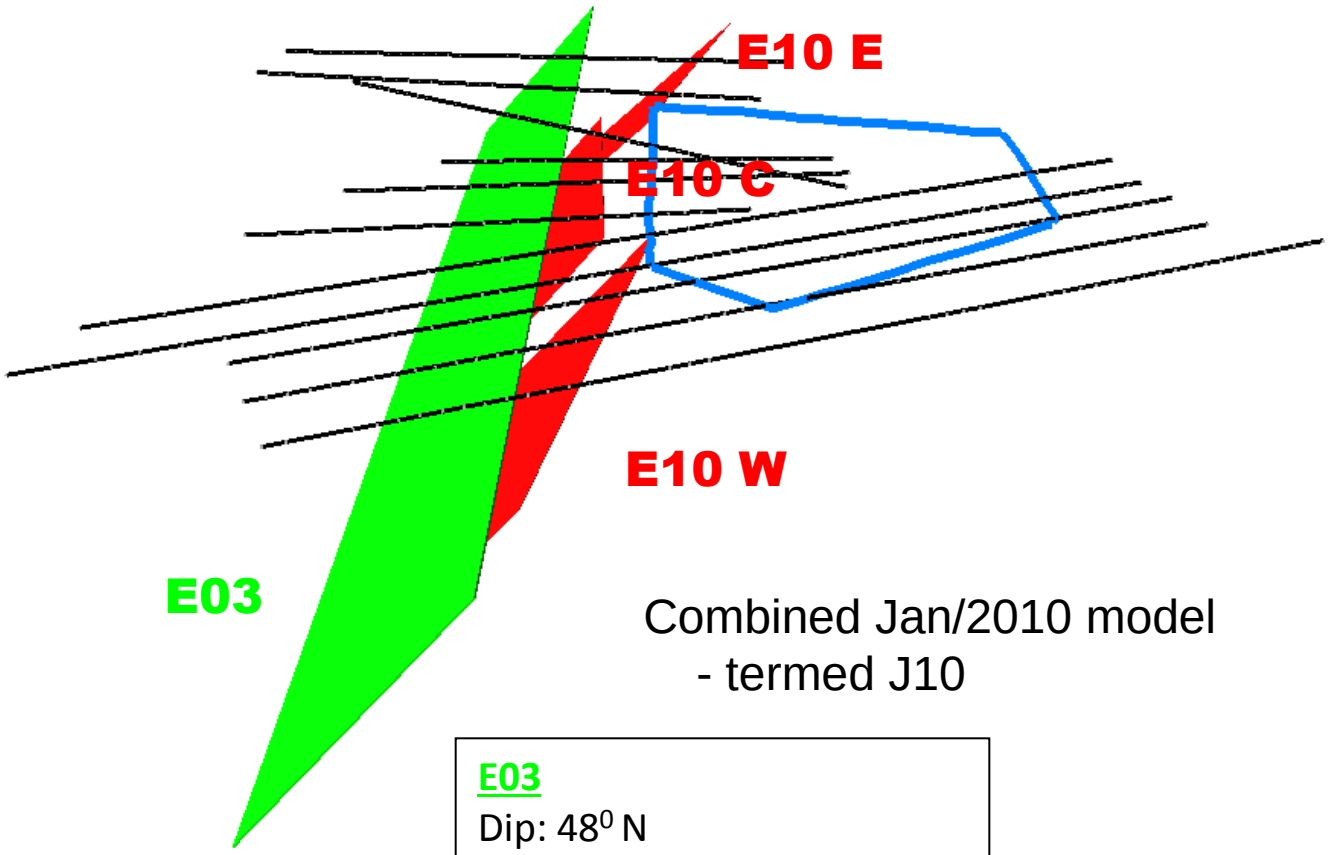


Figure 6:
Top of EM structures

Conductance: electrical conductivity times thickness
The structures are too thin to enable determination of thickness from tem surveys.

Model – 3D View

Looking East



Combined Jan/2010 model
- termed J10

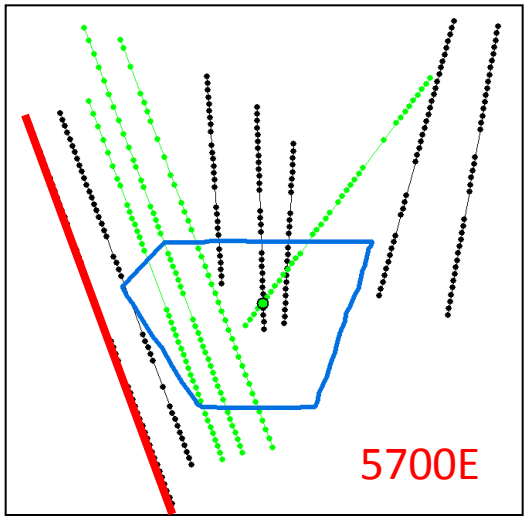
E03
Dip: 48^0 N
Dip Extent: 400 m
Strike: 90^0
Strike Length: 2270 m
Depth to top: 10 m
Conductance: 4.5 S
Center: (426069, 7774826)

E10 east
Dip: 48^0 N
Dip Extent: 400 m
Strike: 104^0
Strike Length: 725 m
Depth to top: 30 m
Conductance: 7 S
Center: (426696, 7774601)

E10 center
Dip: 48^0 N
Dip Extent: 400 m
Strike: 87^0
Strike Length: 570 m
Depth to top: 10 m
Conductance: 3 S
Center: (426092, 7774756)

E10 west
Dip: 48^0 N
Dip Extent: 400 m
Strike: 100^0
Strike Length: 760 m
Depth to top: 10 m
Conductance: 3.5 S
Center: (425457, 7774732)

Figure 7:
East view of EM structures



Note: the following pages display modeled vs collected data. These details are possibly relevant only to the geophysicist . However, these issues are important to document for the longer term.

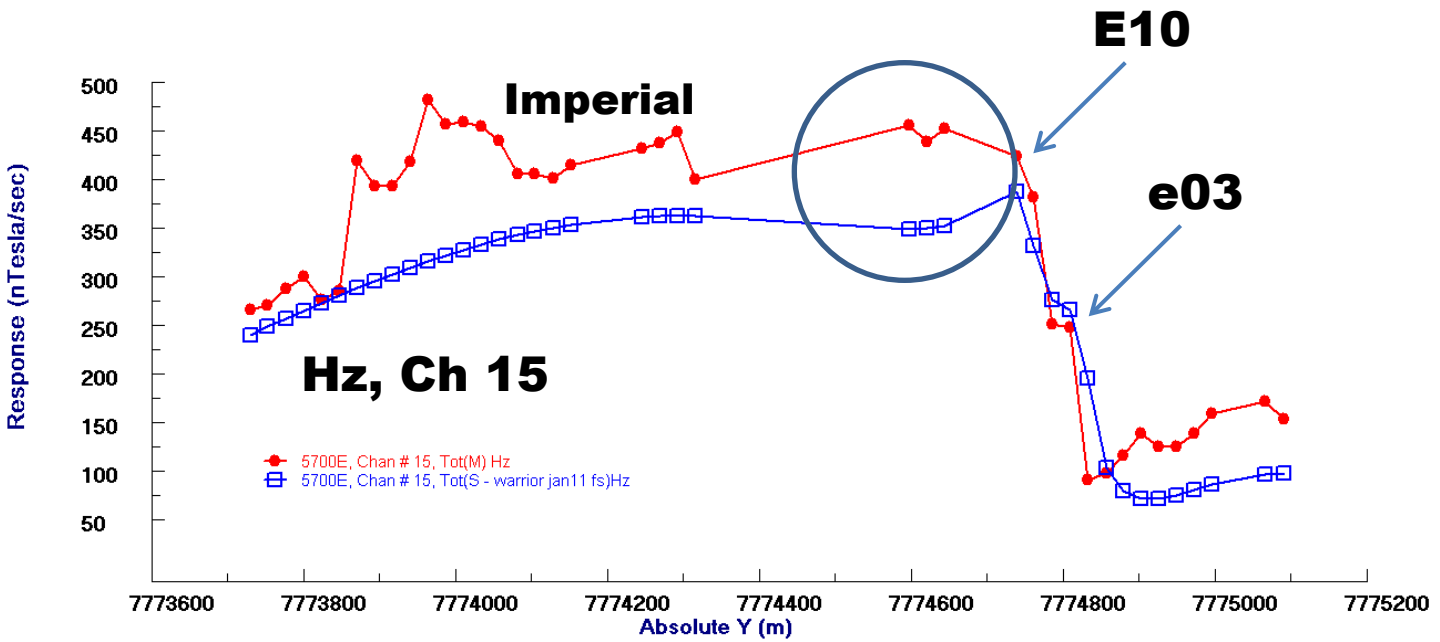
The plots show the response of the model against the data for Hz and Hx on the most westerly line, 5700E. A mid-time channel is shown. In the figure above, the red line indicates the position of the line in the figure. Green lines are October and black, November-December data.

The model (J10) explains the main features observed in the data.

There is an offset between the model and the measured data just south of E10. It is thought that this could be due to another structure; however, there are few data points south of E10 due to the explosives factory, which limits our interpretation. This EM effect is not seen on the neighboring line - 5775E.

Note: E07 (imperial) was not modeled. There are also two small anomalies in Hz to the north of J10 which also have not been modeled.

Line 5700E



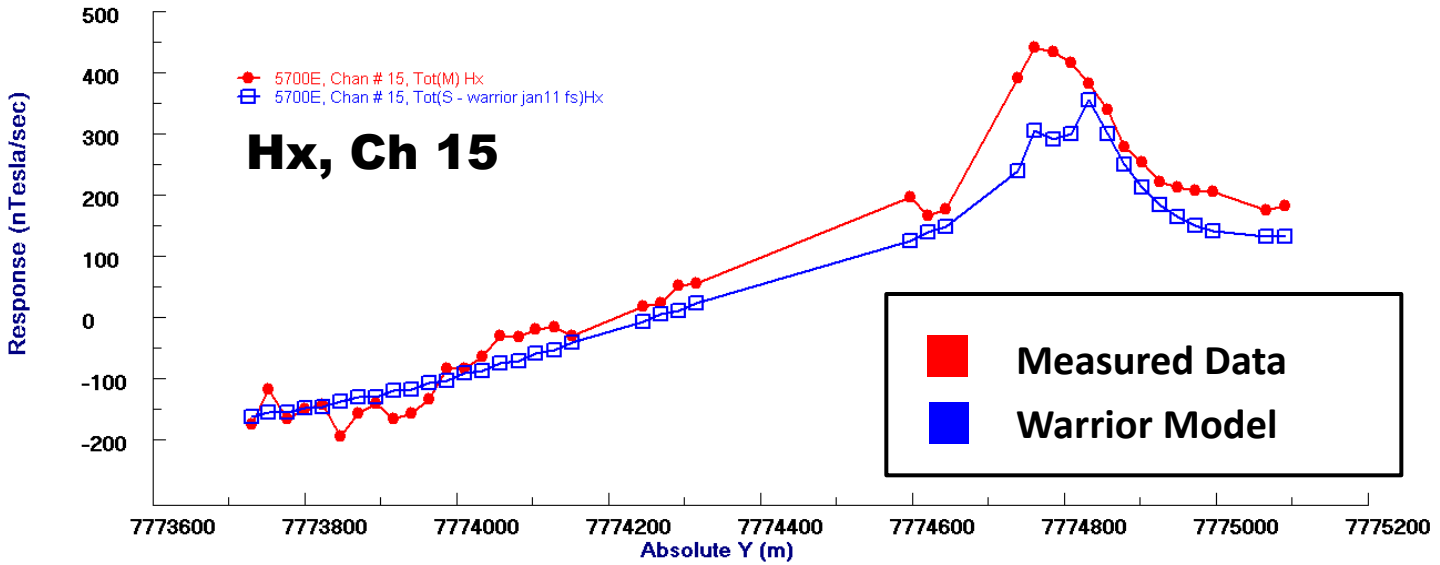
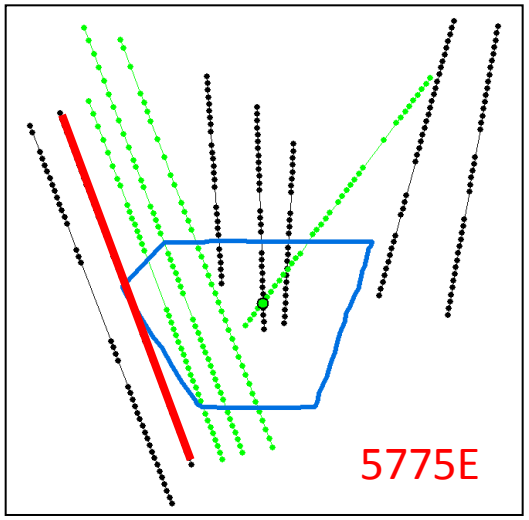


Figure 8
Data vs Simulated Data

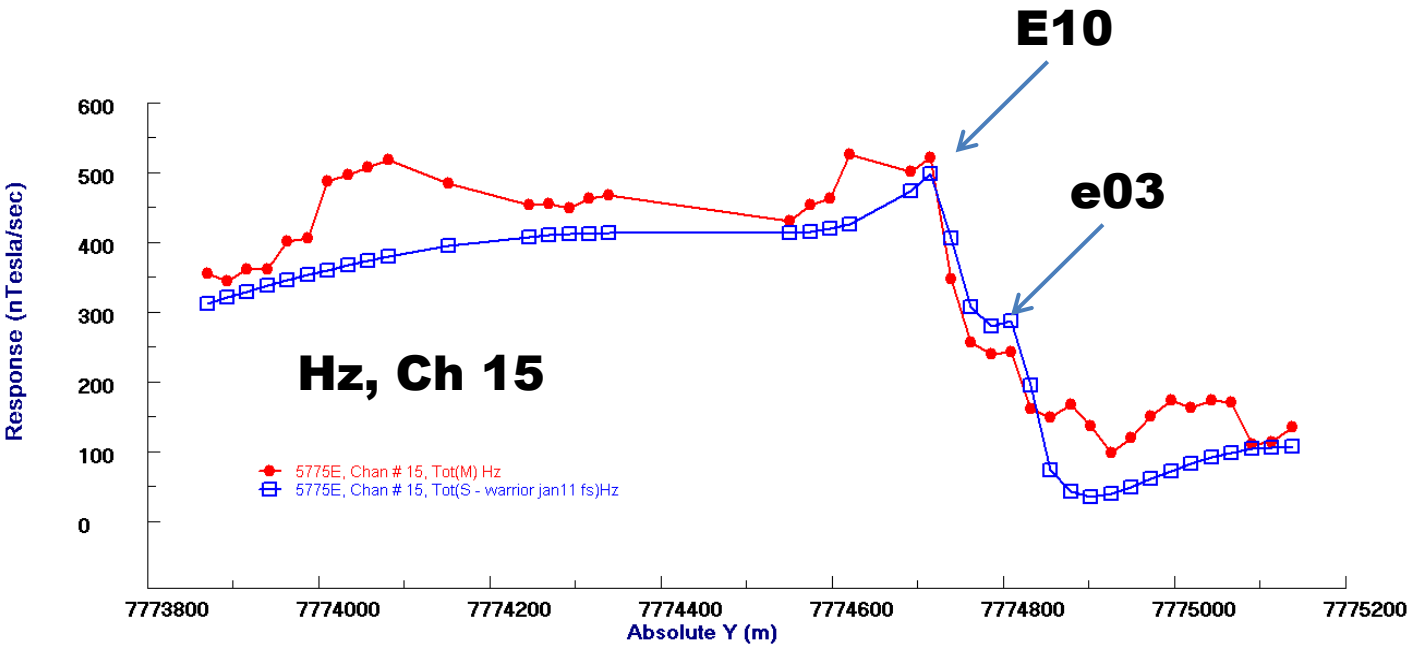
Line 5775E

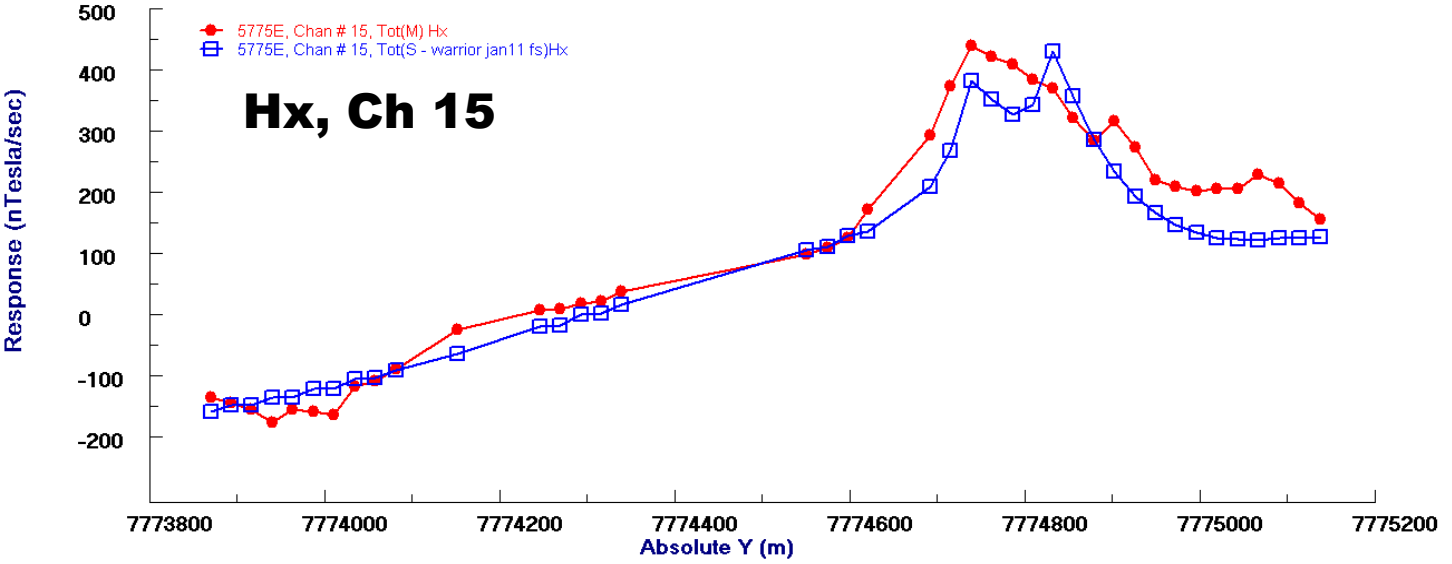


The plots show the response of the model against the data for Hz and Hx on Line 5775E. A mid-time channel is shown.

The model fits Hz quite well in the vicinity of Warrior. However, there are some small anomalies to the north of E03 which are not modeled here.

The model fits Hx reasonably well; however, the peaks caused by E03 and E10 in the model appear more distinct than in the data. This was seen on 5700E as well. Some minor adjustments to the model might improve the fit here; however, the width and amplitude of the response is correct.





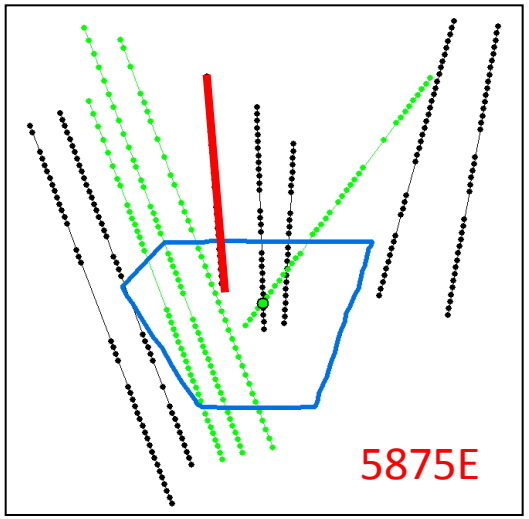
Measured Data

Warrior Model

Figure 9

Data vs Simulated Data

Line 5875E

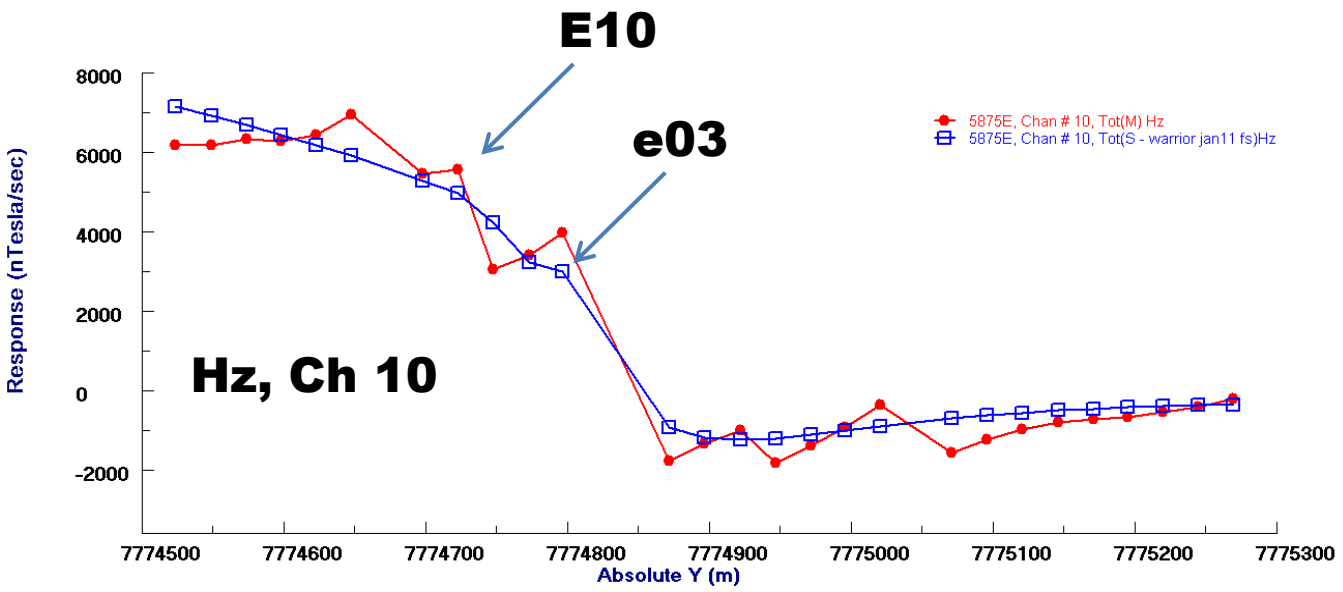


The plots show the response of the model against the data for Hz and Hx on Line 5875E at Channel 10.

The model fits the data (both components) reasonably well, although the response of the model is not as sharp as that of the measured data possibly due to a thickening at surface and a weakening of conductivity.

Measured Data

Warrior Model



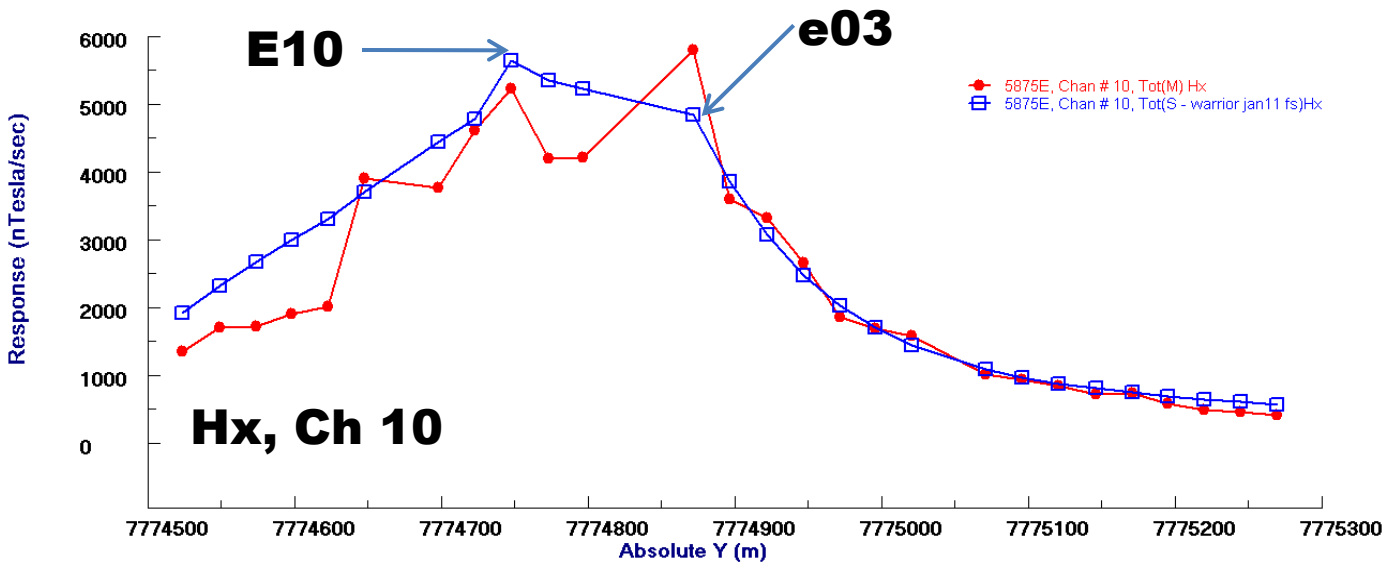
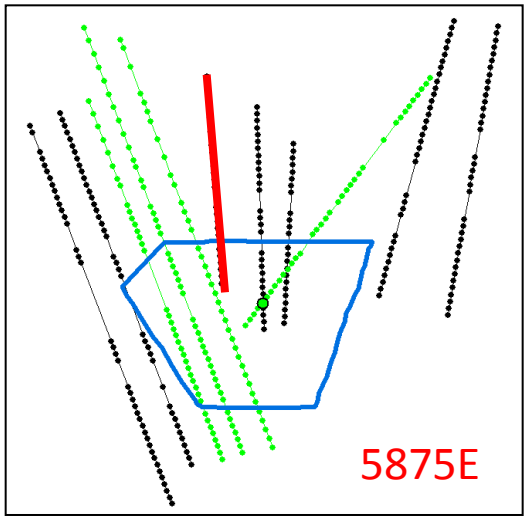


Figure 10

Data vs Simulated Data

Line 5875E



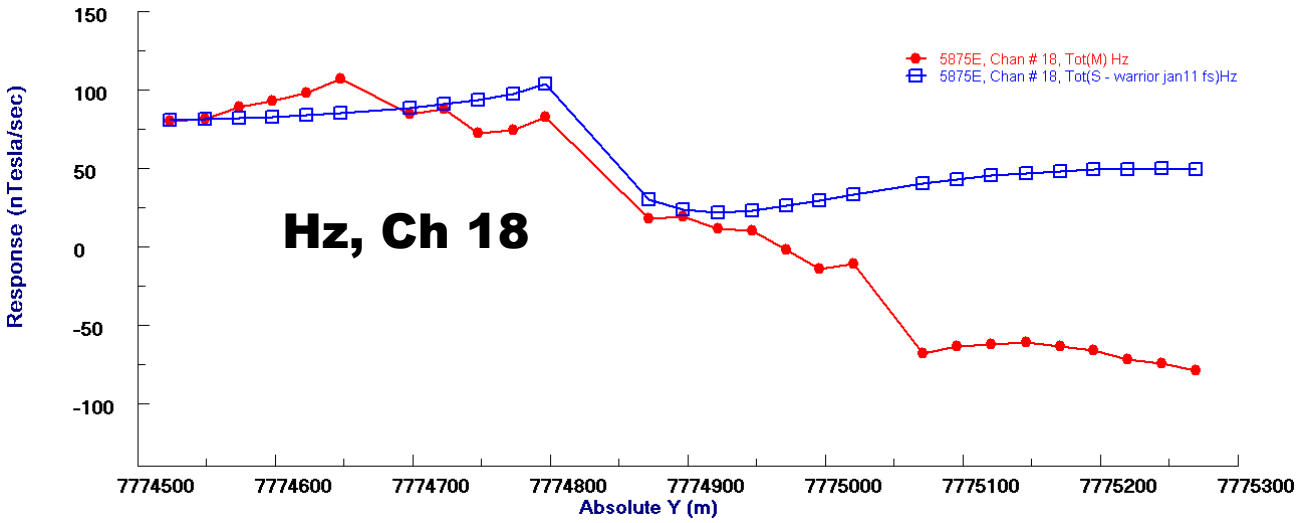
The plots show the response of the model against the data for Hz and Hx on Line 5875E at Channel 18,

The model does not fit the data as well at this time channel.

It is believed that this late time response is at least in part the response of the mine and is not related to the Warrior structure itself. The mine workings are centered at about 7775000N on this line.

Measured Data

Warrior Model



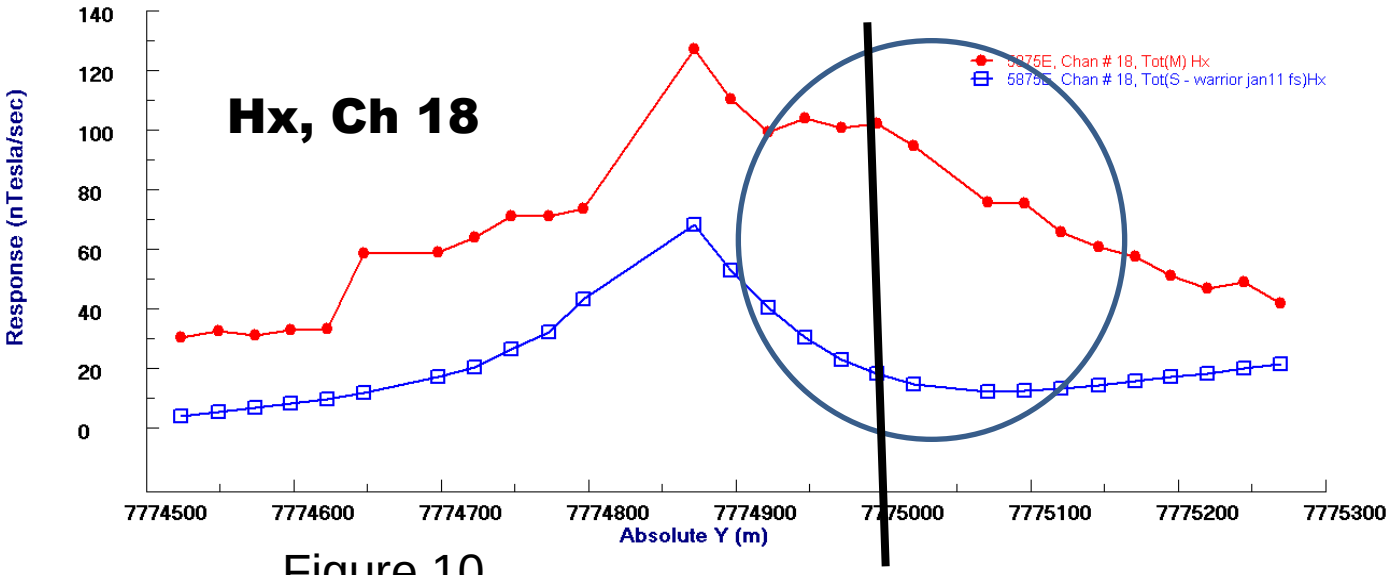
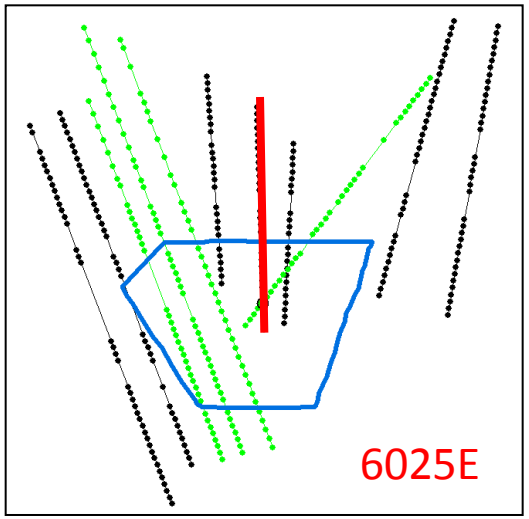


Figure 10

Data vs Simulated Data

Center of mine workings

Line 6025E

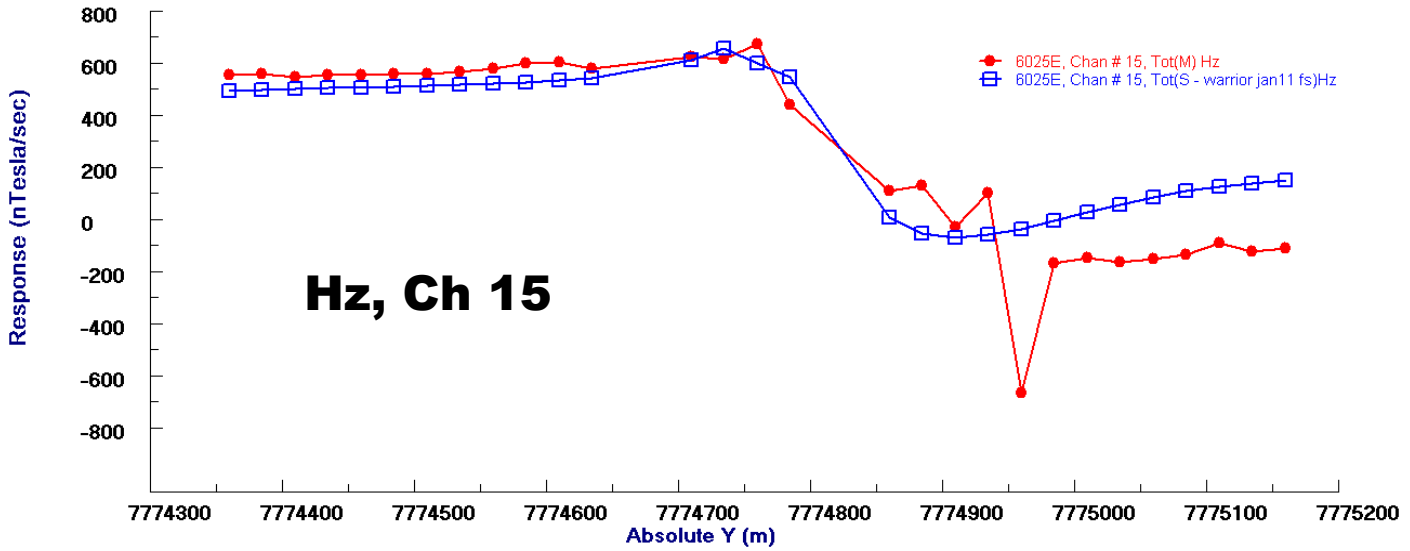


The plots show the response of the model against the data for Hz and Hx on Line 6025E at Channel 15.

The model fits Hx and Hz well; however, again, further structures to the north are observed in the data.

Measured Data

Warrior Model



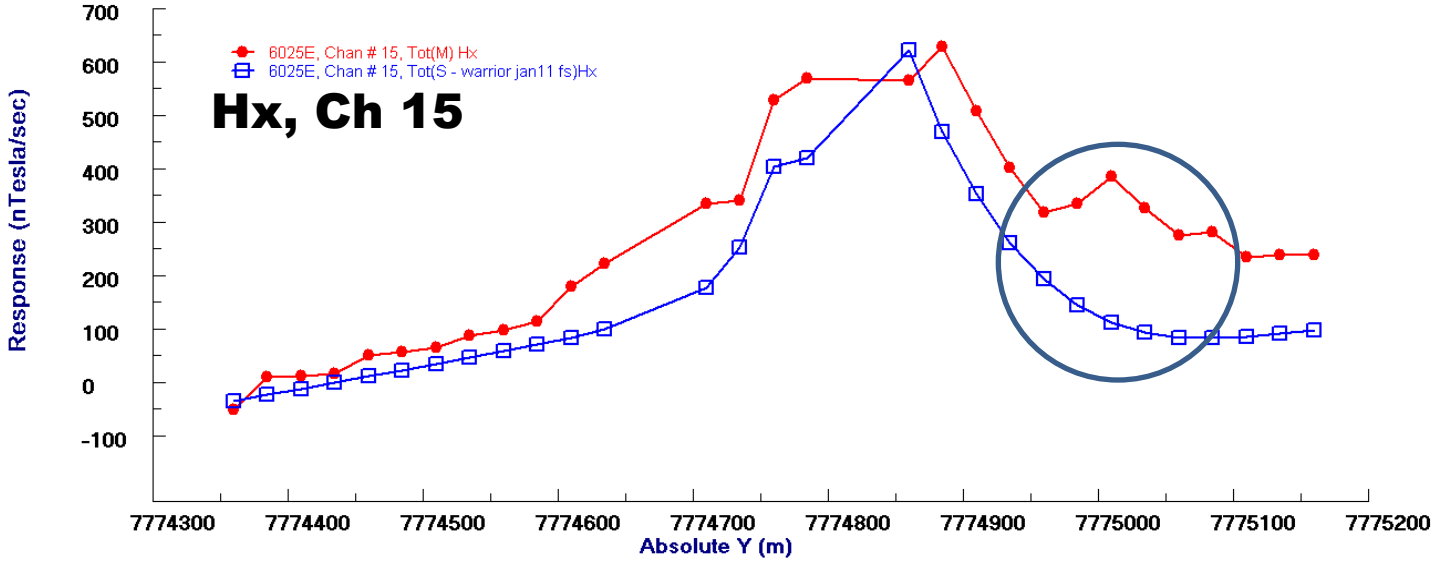
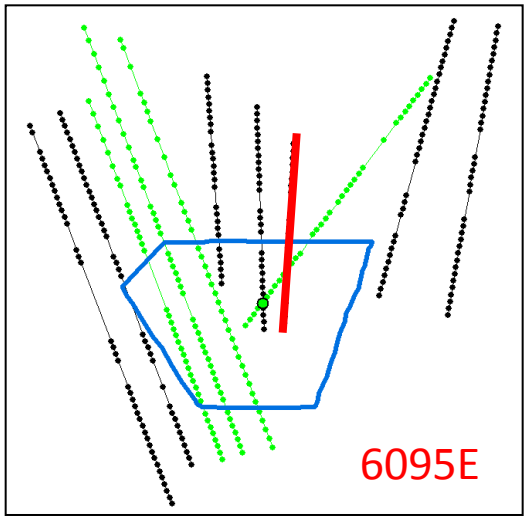
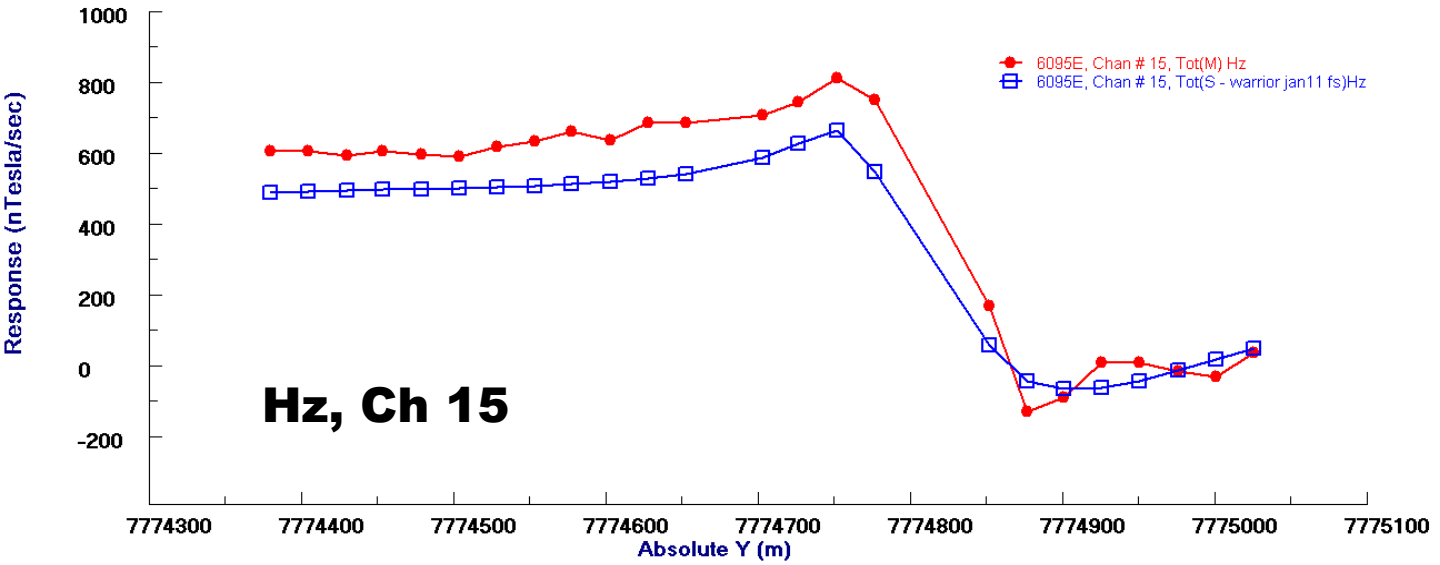


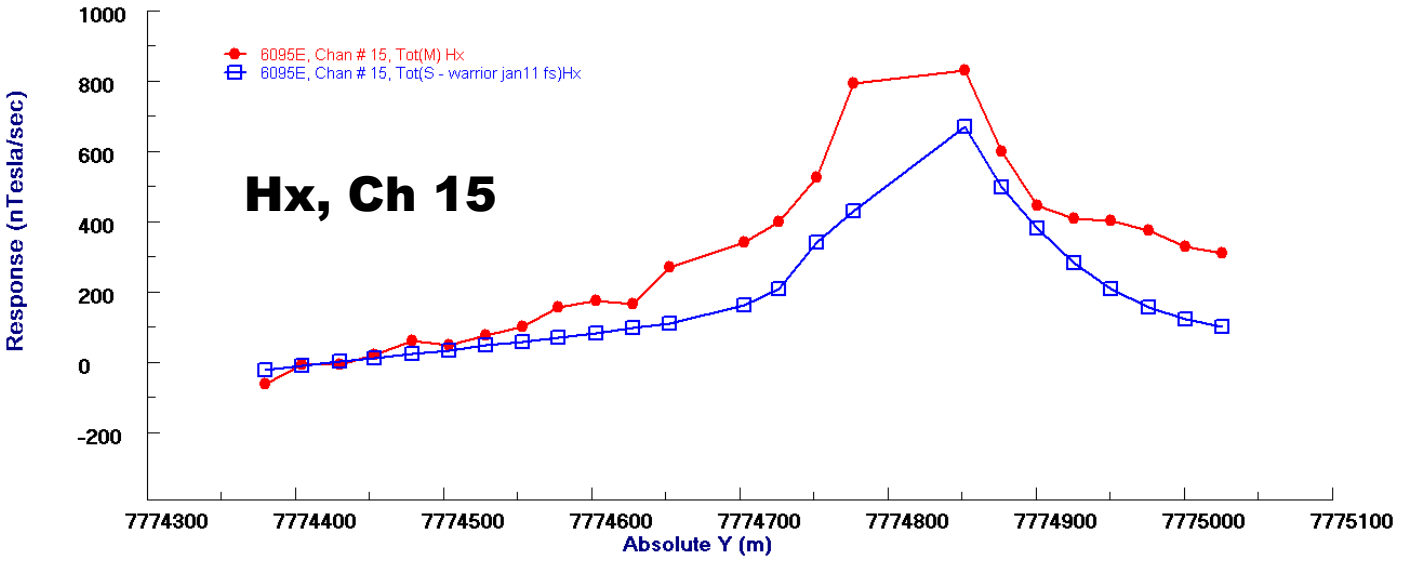
Figure 11

Data vs Simulated Data

Line 6095E







The plots show the response of the model against the data for Hz and Hx on Line 6095E at Channel 15.

The model generally fits both components; however, the response of E10 is too small. This suggests that the conductance of the model should be slightly higher. However, on Line 5875E (two lines to the west), the response of E10 was sufficiently large for the data. Therefore, the conductance of the structure may change slightly across its length

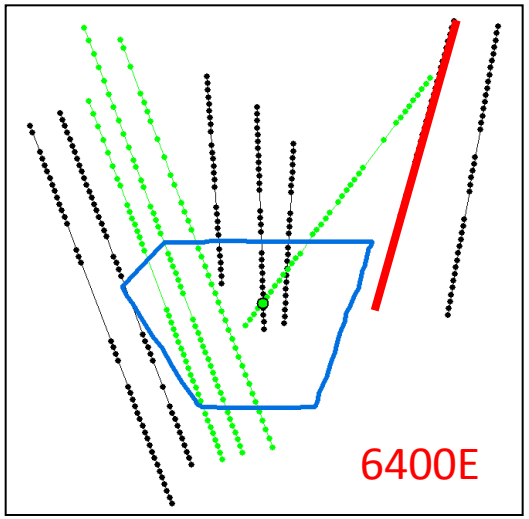
Measured Data

Warrior Model

Figure 12

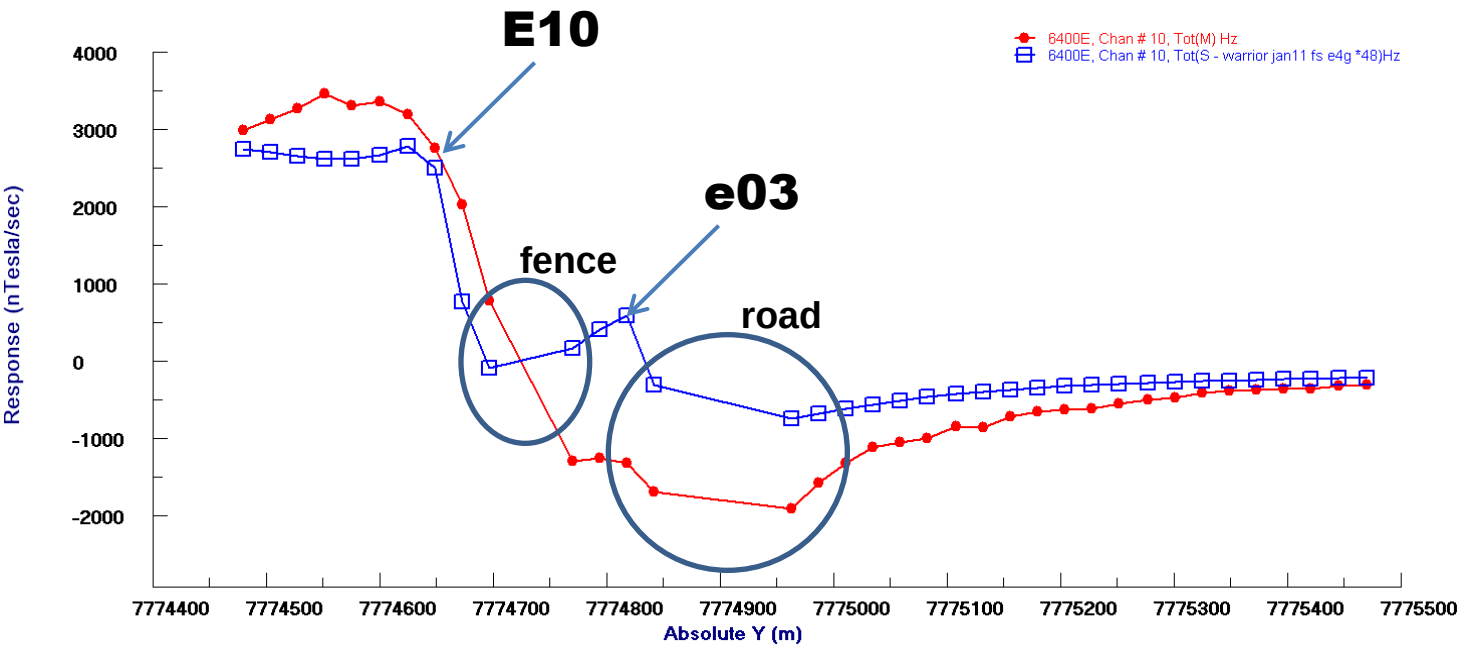
Data vs Simulated Data

Line 6400E

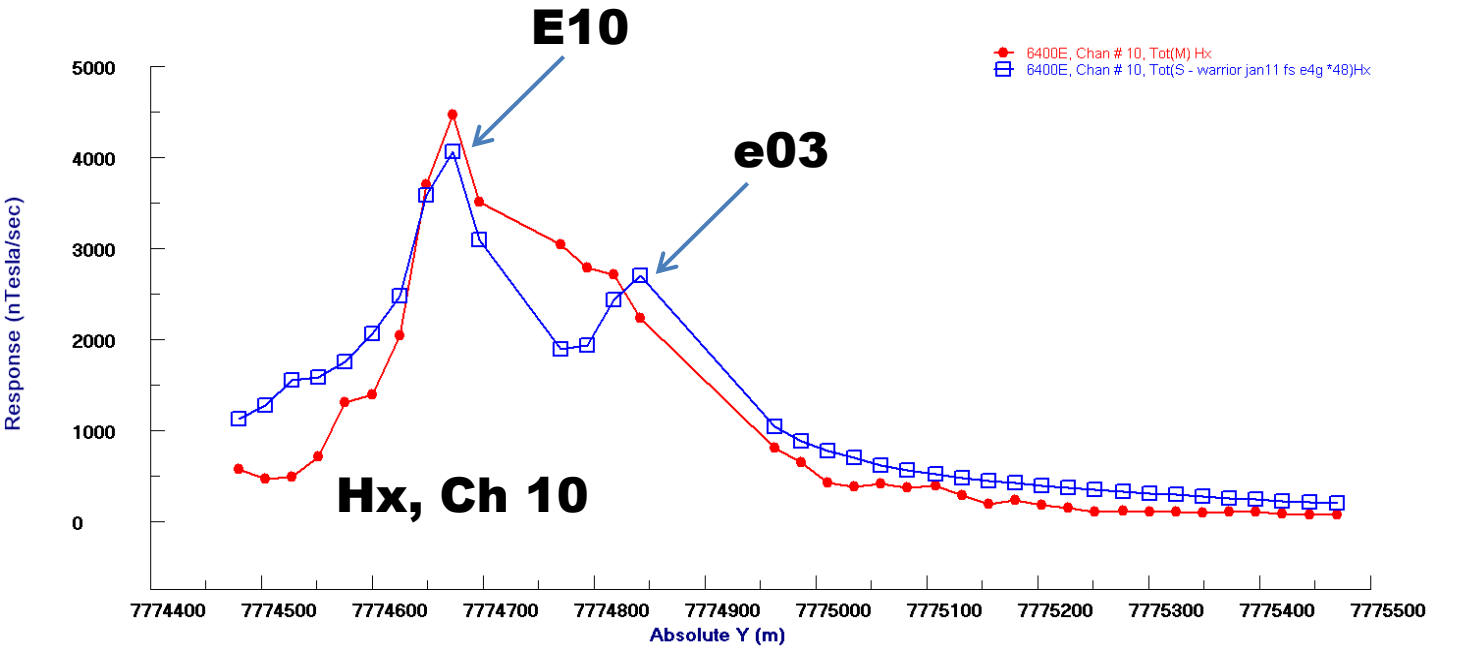


The plots show the response of the model against the data for Hz and Hx on Line 6400E at early-mid time (Channel 10). 6400E is just east of the loop.

Note: there are two gaps on Line 6400E when it crosses a fence and a road. Unfortunately, these sections of the line are near E03 and thus knowledge of the shape of the anomaly is more limited than on the other lines.



Hz, Ch 10



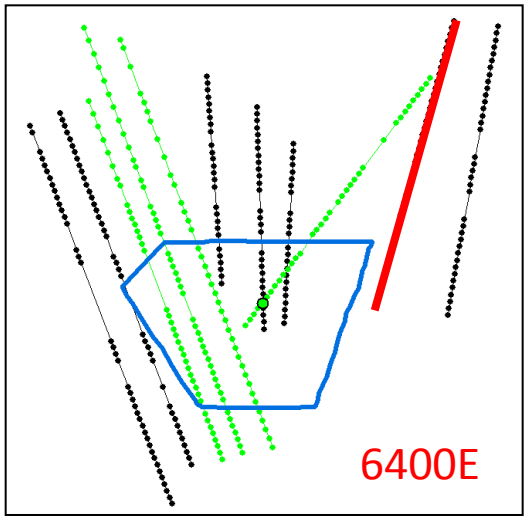
Measured Data

Warrior Model

Figure 13

Data vs Simulated Data

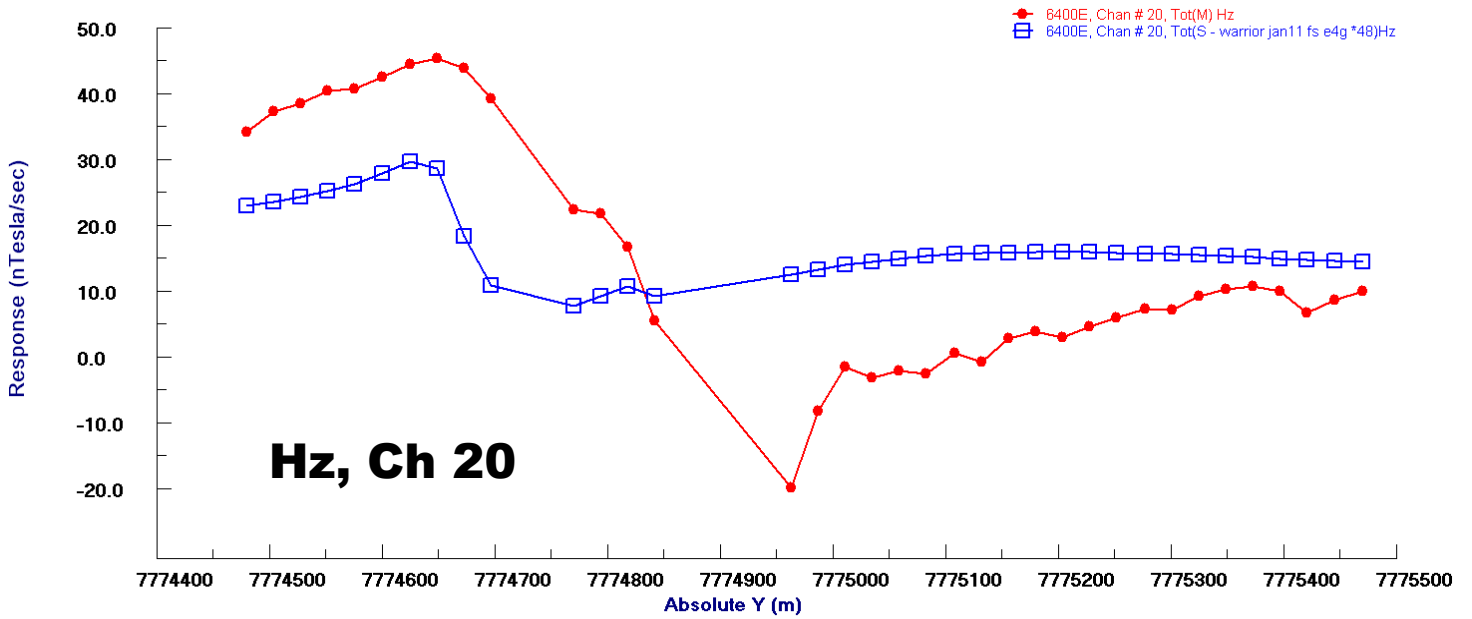
Line 6400E

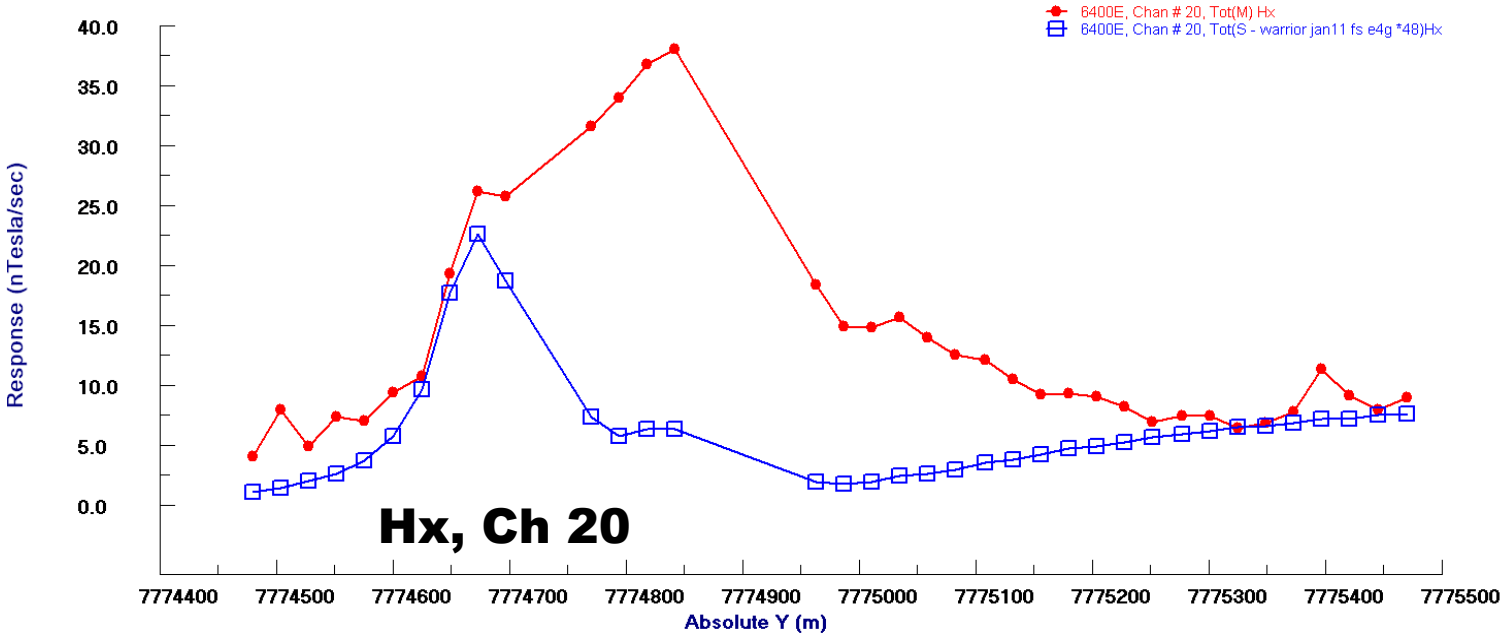


While the model (J10) fit the data well at early-mid times, its response is too small for the data at later times, as shown here (Channel 20). The response at late time could be increased by increasing 1) the dip extent of E03, or 2) the conductance of E03.

The dip extent of E03 in the model is 400 m. However, it is believed that the structures continue to depth. It is possible that: 1) The structures are not conductive at depth, or 2) Mining has disconnected the structures, preventing induced currents from flowing to depth.

If 2) is true, it would not apply as far east as 6400E and 6650E, as this area has not be mined. Increasing the dip extent of E03 to 800 m improves the late-time response, as shown on the following page.



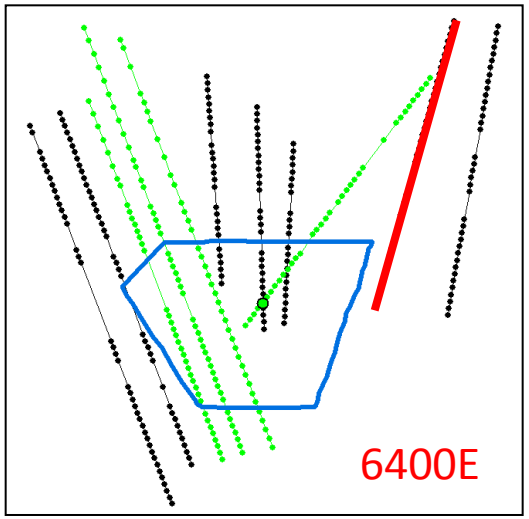


Measured Data

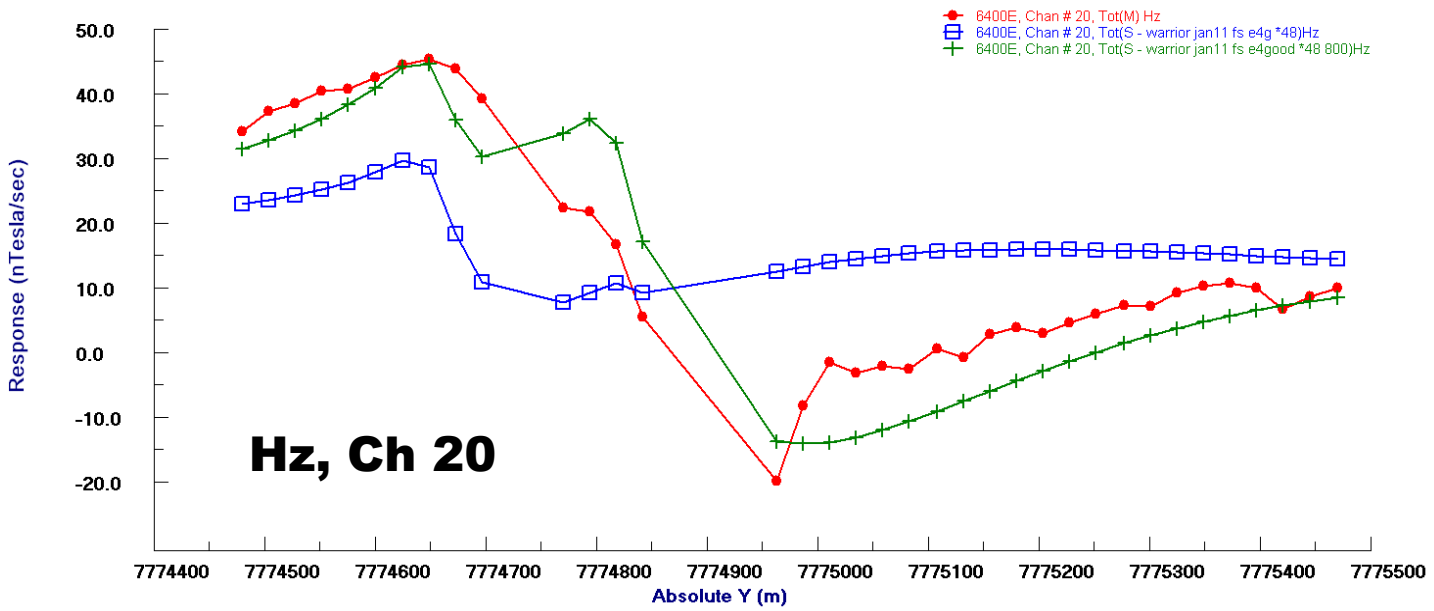
Warrior Model

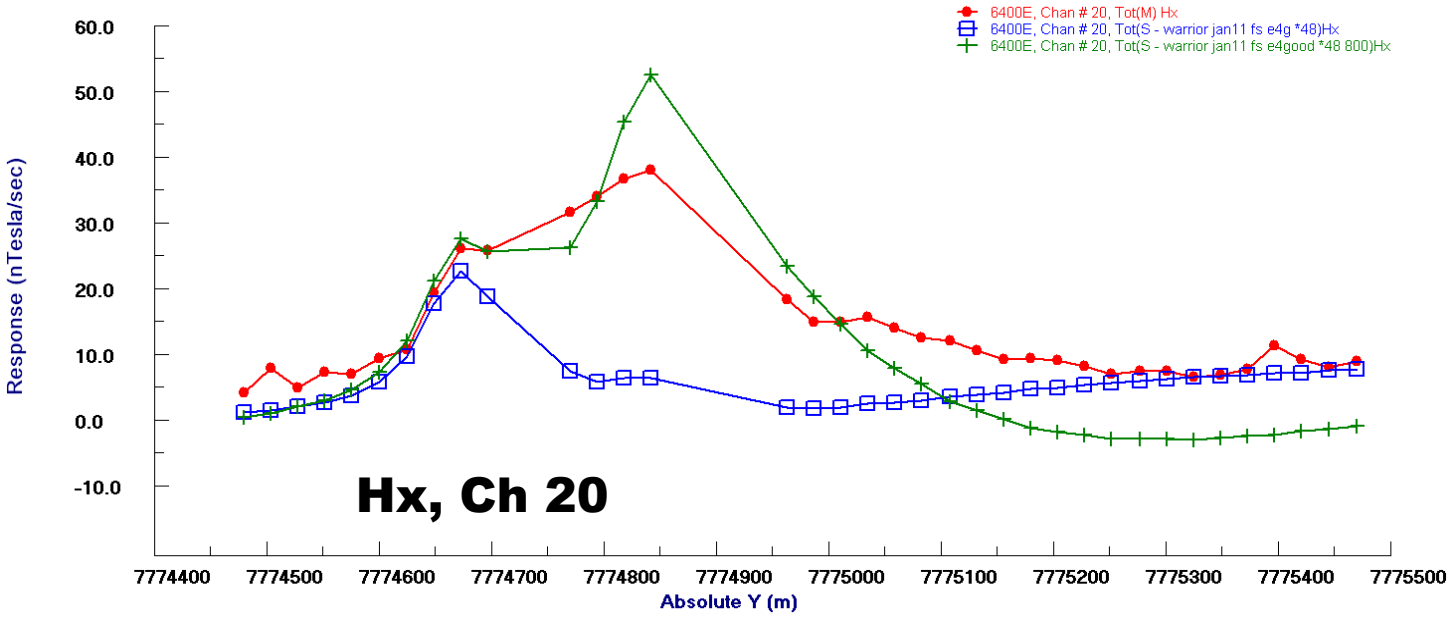
Figure 14
Data vs Simulated Data

Line 6400E



The plots show the response of the model against the data for Hz and Hx on Line 6400E at Channel 20. Ch20 is quite late in time and serves to confirm not only positioning of the structure but at least an approximately correct conductance.





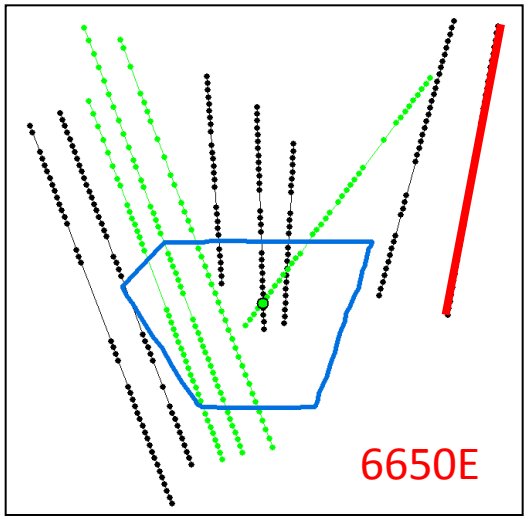
Measured Data

Warrior Model

Warrior (800 m dip extent)

Figure 15
Data vs Simulated Data

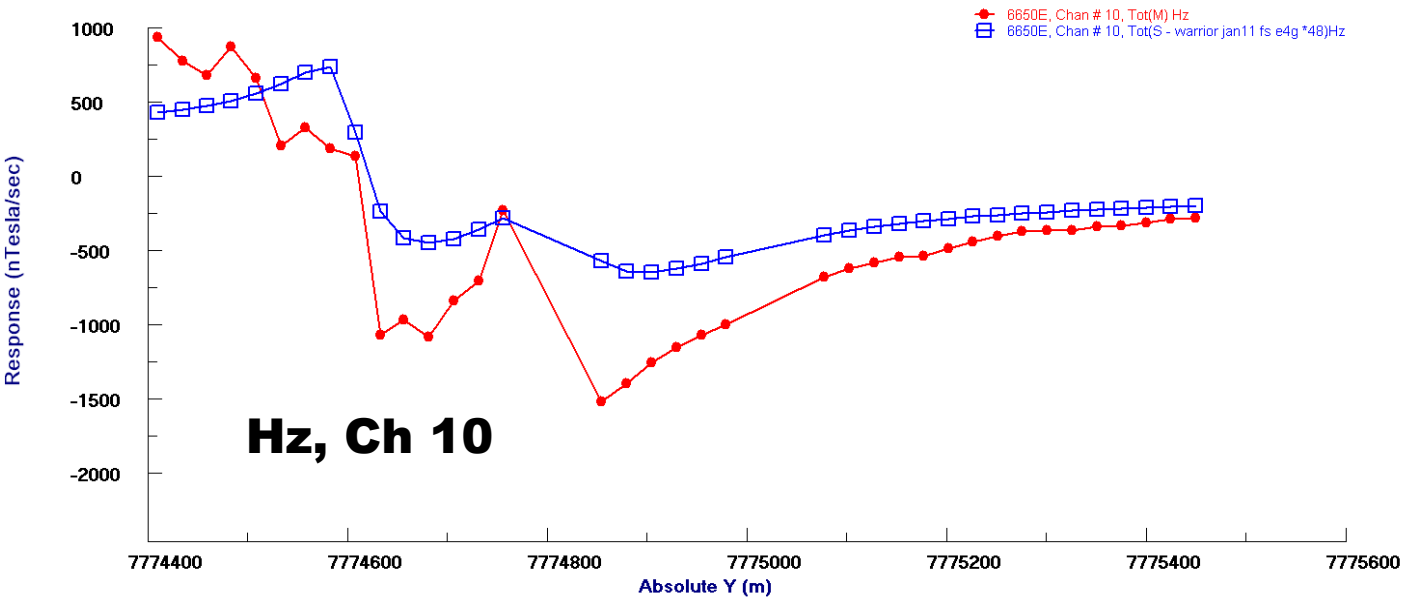
Line 6650E



The plots show the response of the model against the data for Hz and Hx on Line 6650E at Channel 10. 6650E is the most easterly line.

Measured Data

Warrior Model



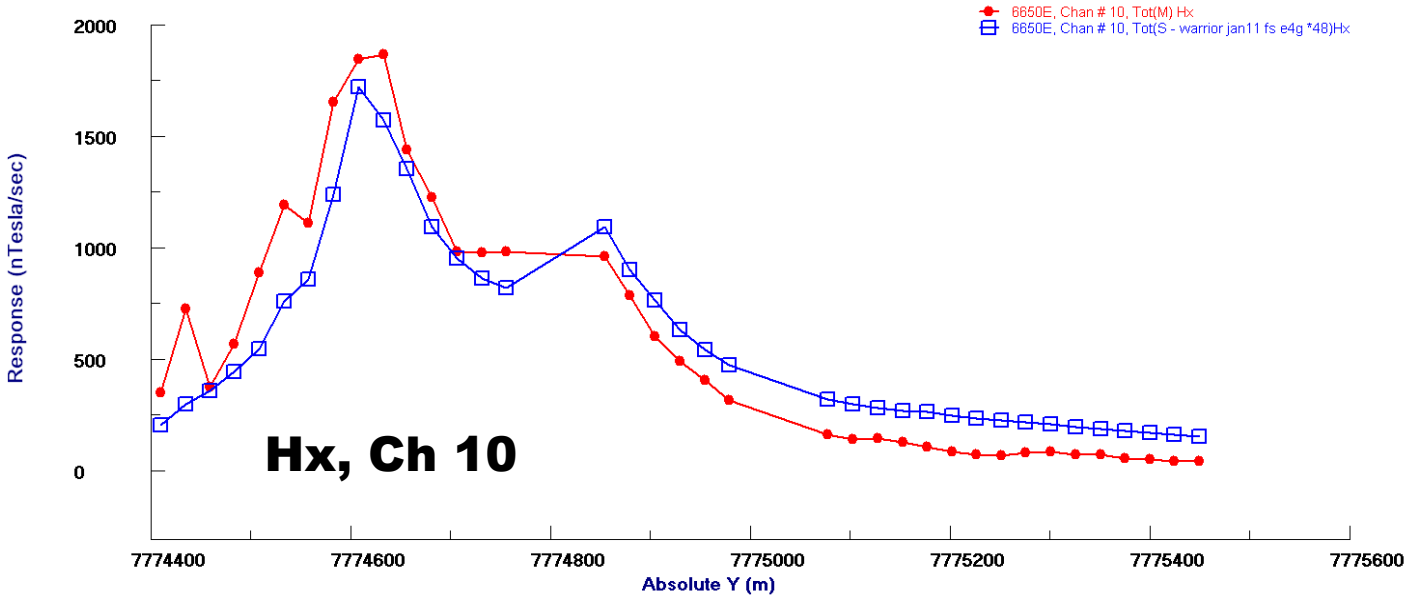
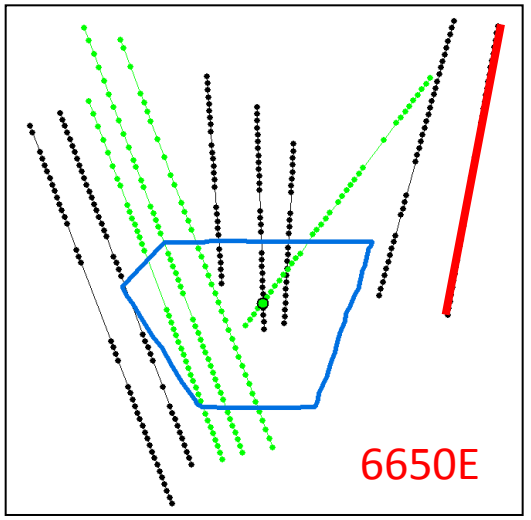
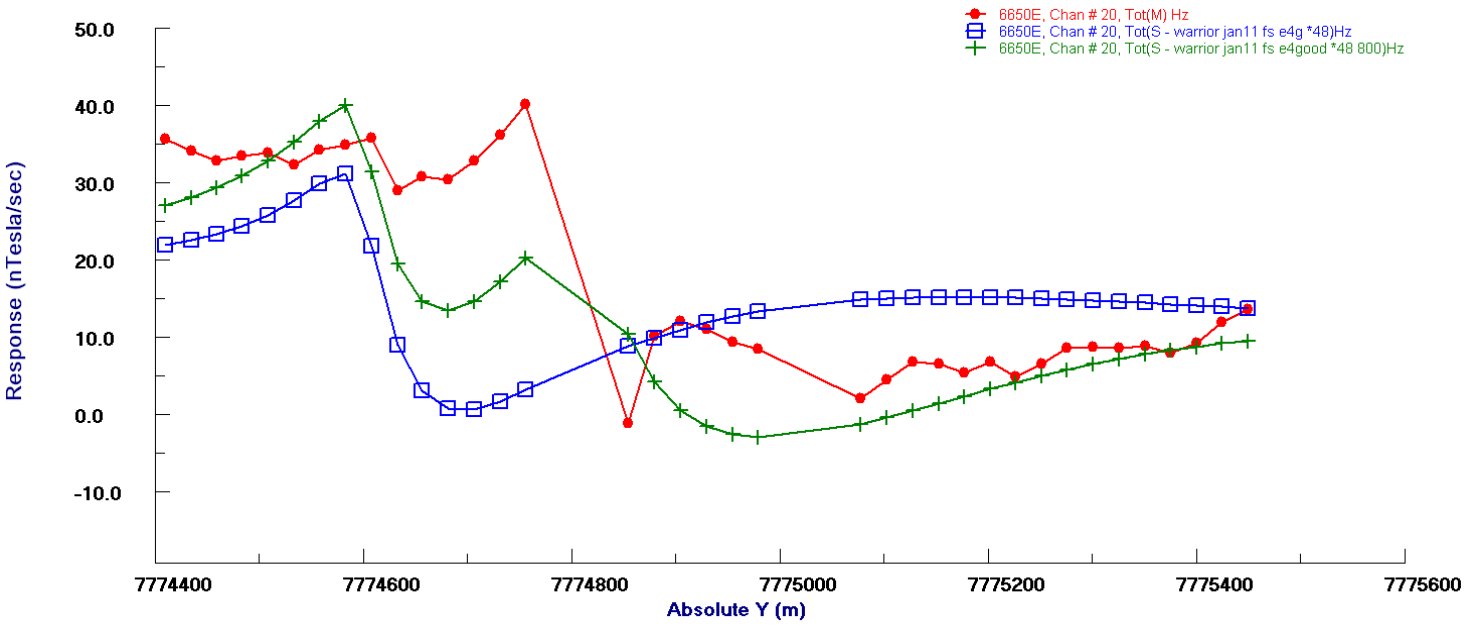


Figure 16
Data vs Simulated Data

Line 6650E





The plots show the response of the model against the data for Hz and Hx on Line 6650E at Channel 20.

As with 6400E, the response is too small at late times near E03. If the dip extent of E03 is increased to 800m, the fit to the data is improved.

Measured Data

Warrior Model

Warrior (800 m dip extent)

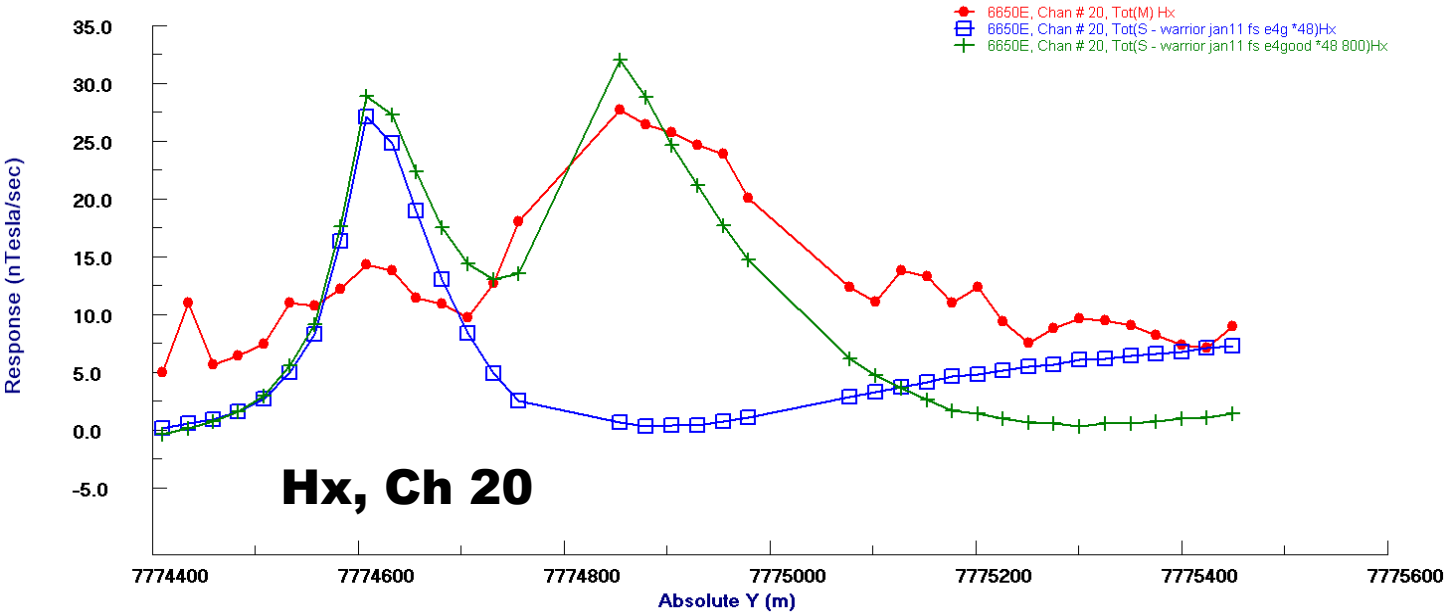


Figure 17
Data vs Simulated Data

October Lines

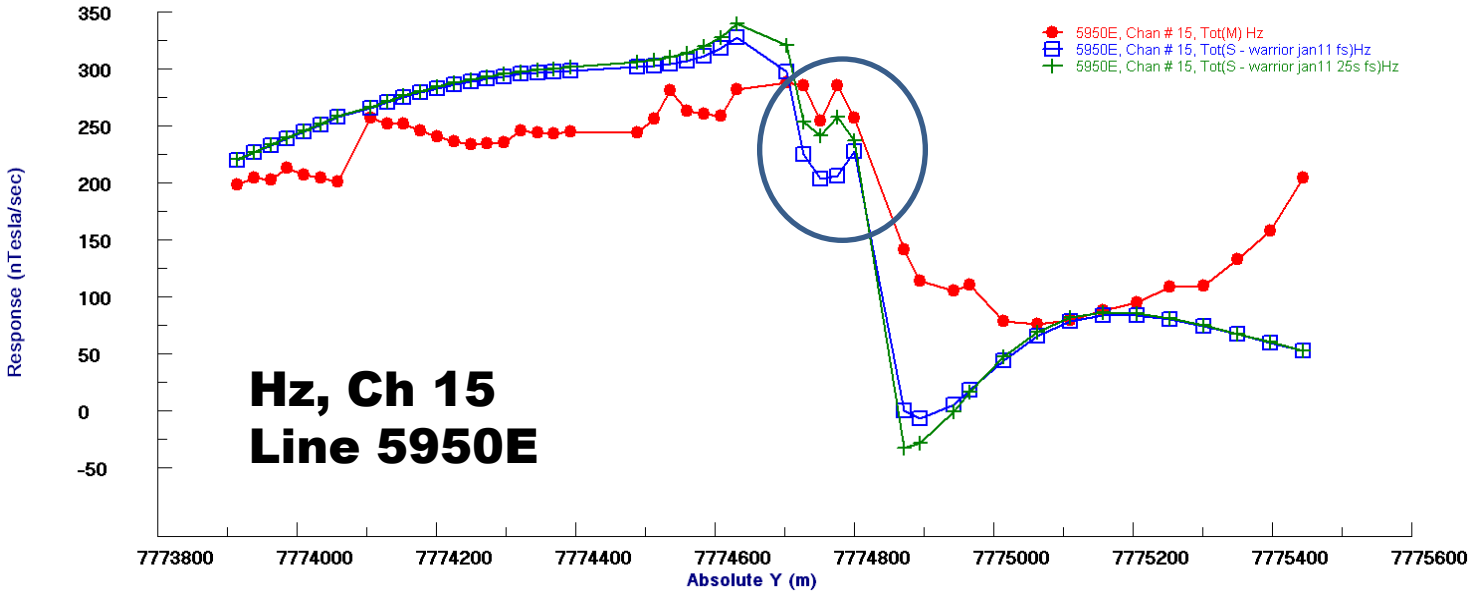


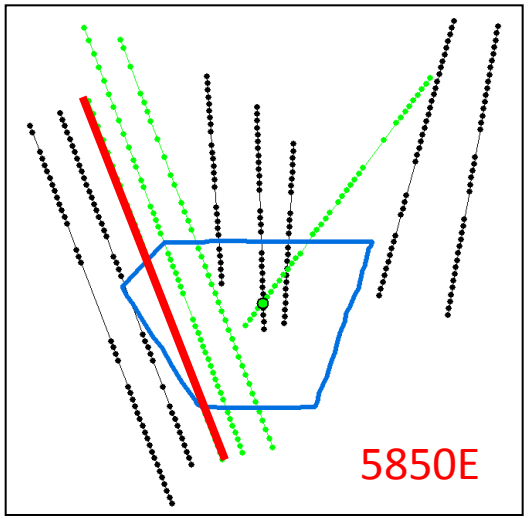
Figure 18
Data (Oct) vs Simulated Data

As mentioned previously, the northing of the October Warrior West model had to be modified slightly to fit the November/December lines.

The response of new model J10 (blue) was subsequently compared against the October data (red). The anomaly is too far north on Line 5959E. If the target is shifted south by 25 m, then the response agrees well with the measured data. This is observed on Lines 5850E, 5950E, and 6050E, but not on Line 6100E. Thus, E03 appears to curvs slightly to the south around 425750E.

Measured Data
Warrior Model
Warrior (25 m south)

Line 5850E (October)

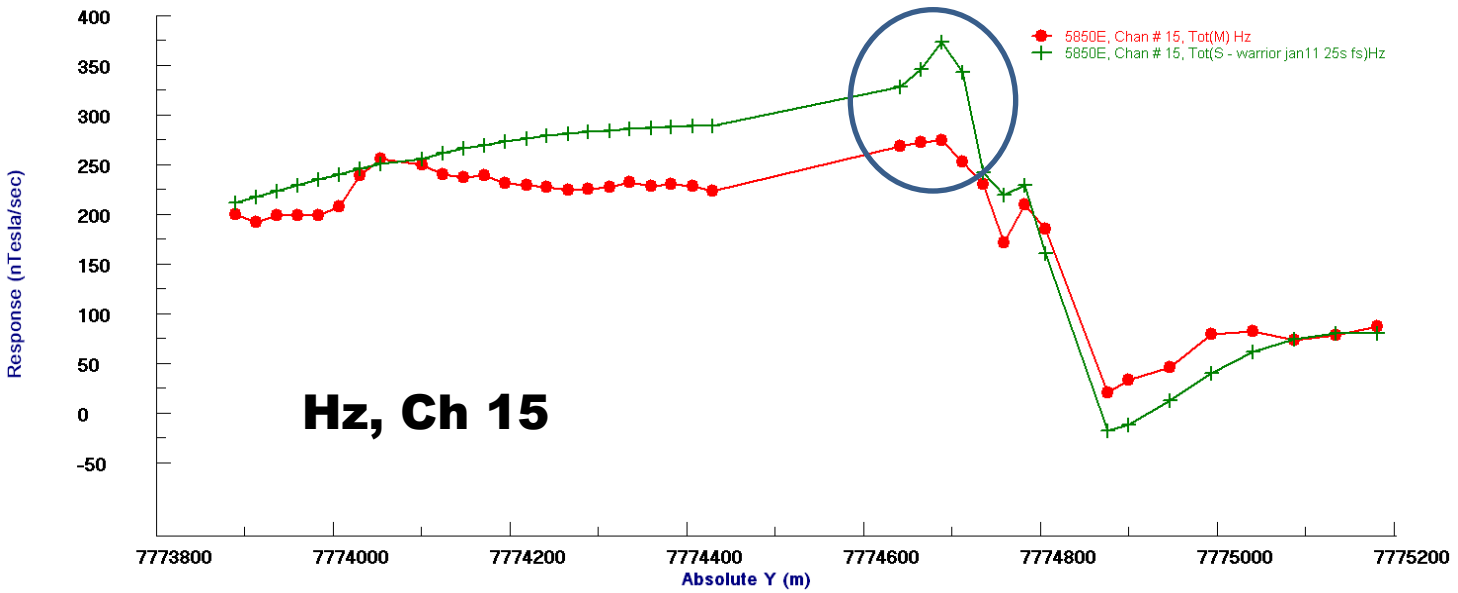


The plots show the response of the model against the data for Hz and Hx on Line 5850E at Channel 15.

The response of E10 on this line is somewhat too large for the data, but this is not observed on neighboring lines. It is thought that the depth of the top of the structure may be slightly greater in the vicinity of this line.

Measured Data

Warrior (25 m south)



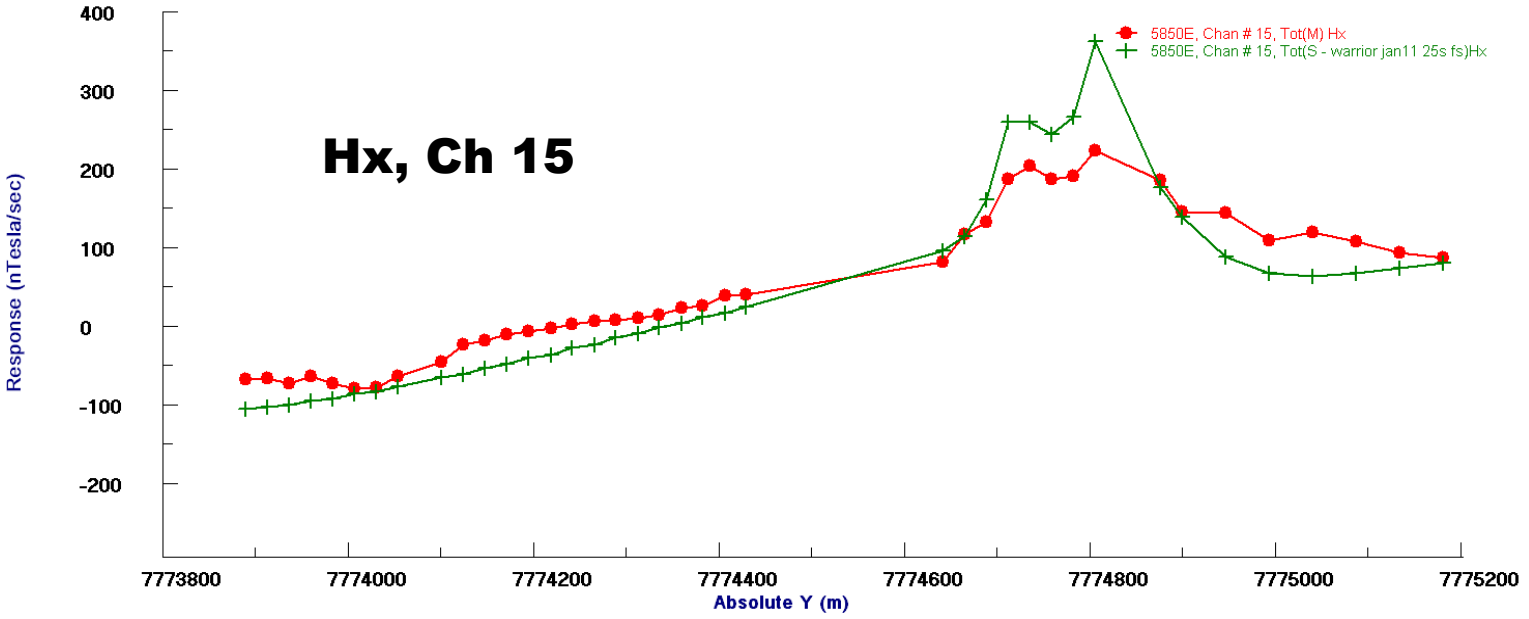
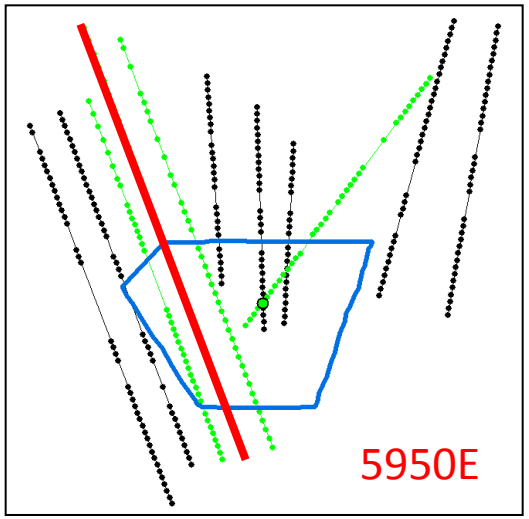
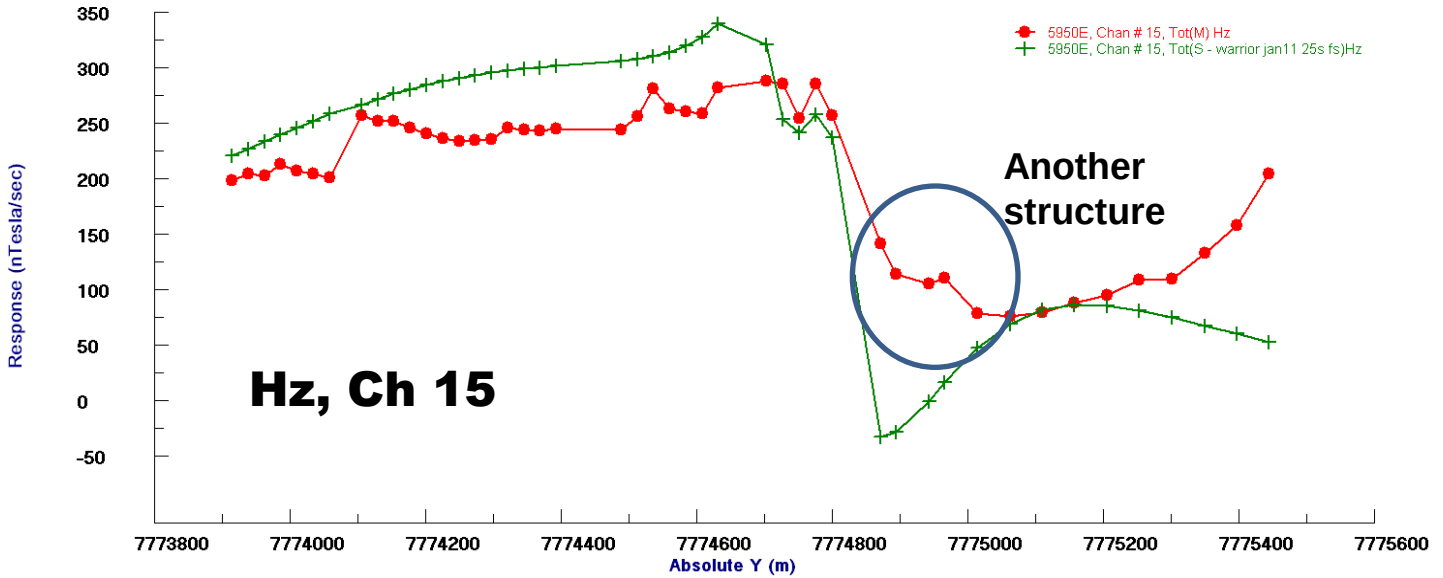


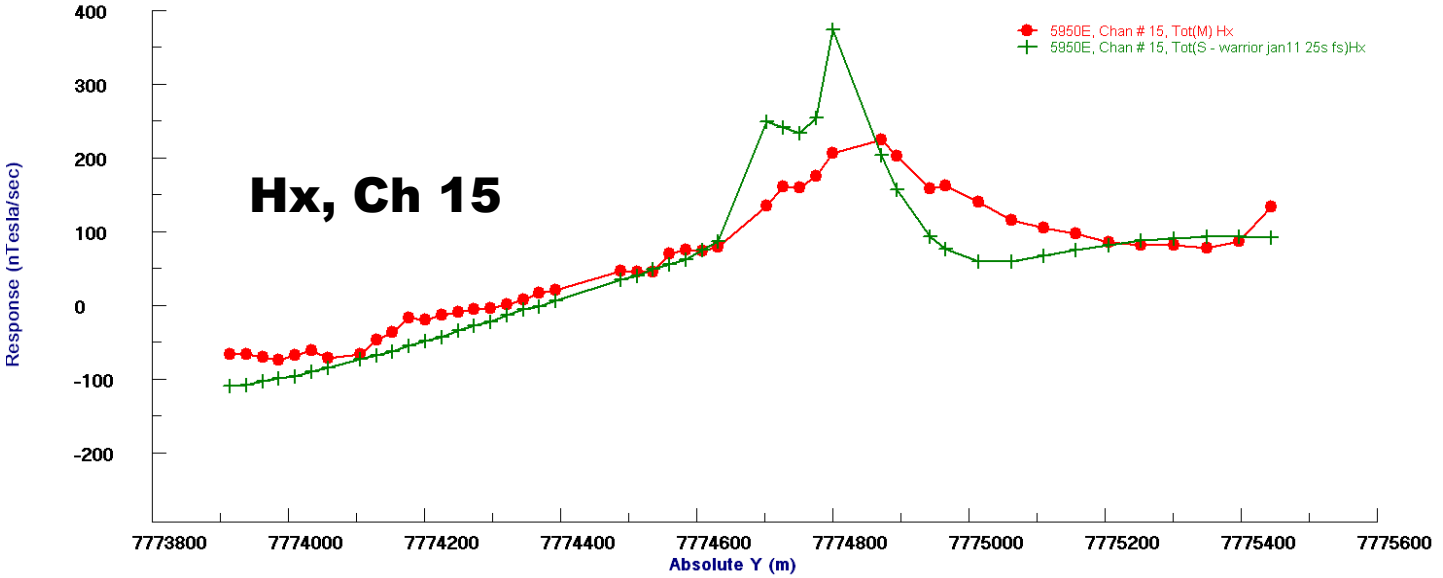
Figure 19
Data (Oct) vs Simulated Data

Line 5950E (October)



The plots show the response of the model against the data for Hz and Hx on Line 5950E at Channel 15.





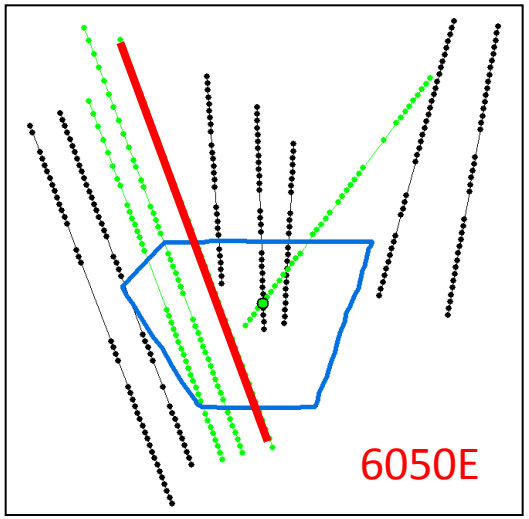
Measured Data

Warrior (25 m south)

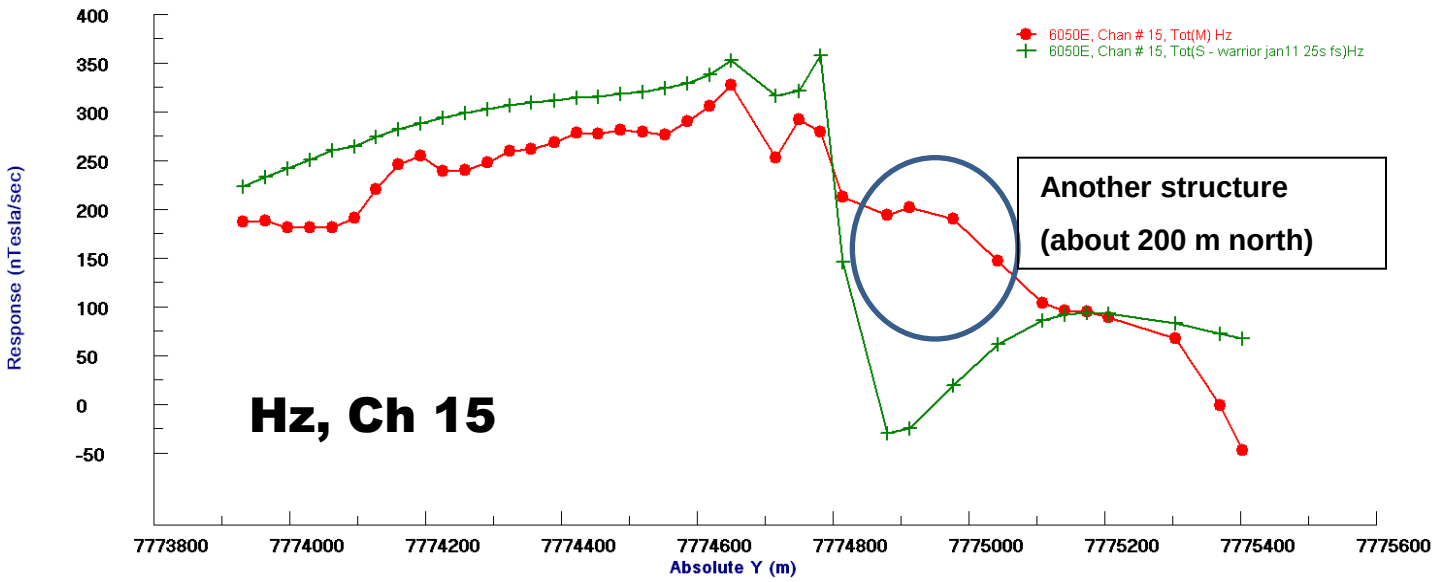
Figure 20

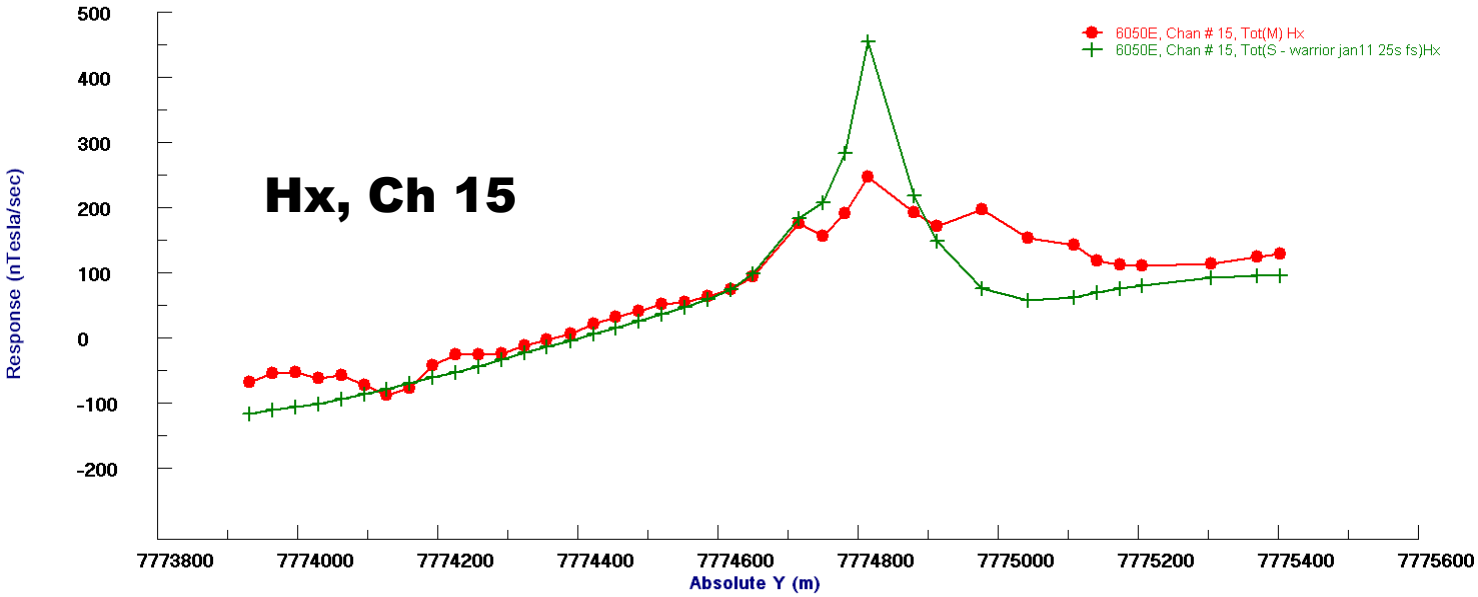
Data (Oct) vs Simulated Data

Line 6050E (October)



The plots show the response of the model against the data for Hz and Hx on Line 6050E at Channel 15.





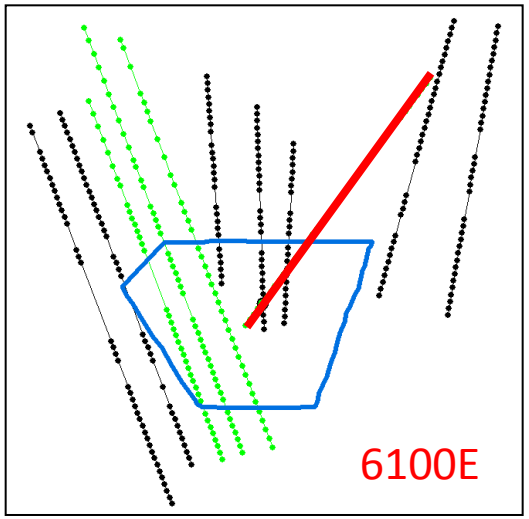
Measured Data

Warrior (25 m south)

Figure 21

Data (Oct) vs Simulated Data

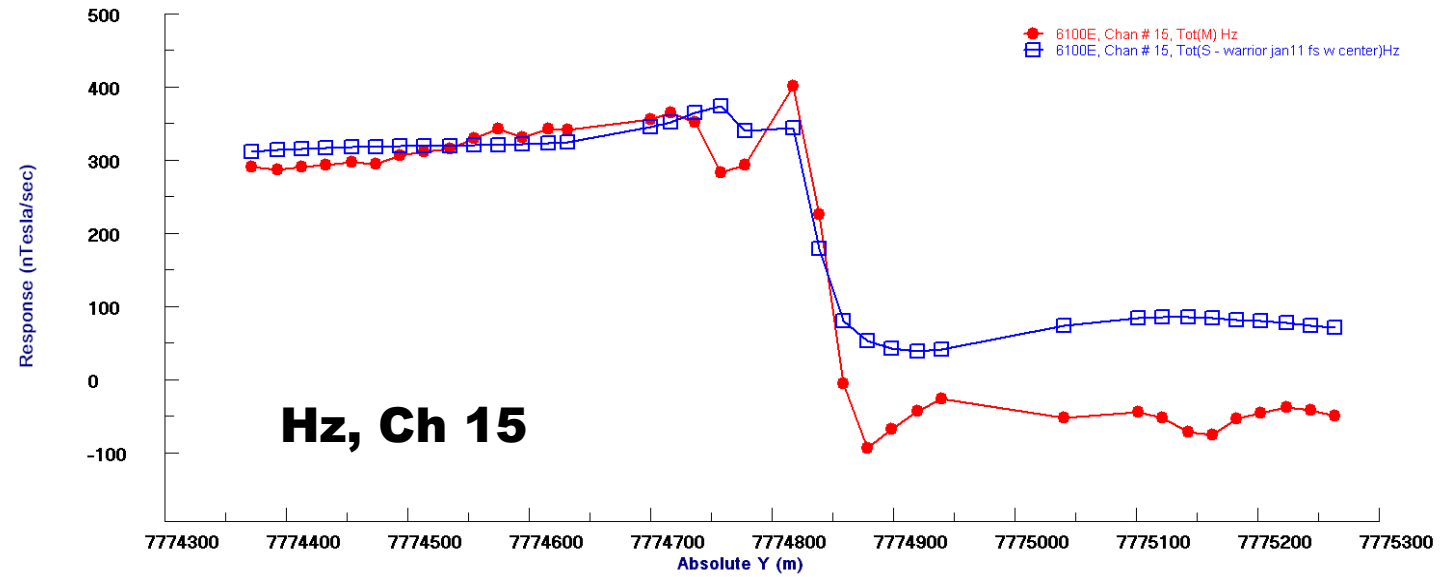
Line 6100E (October)



The plots show the response of the model against the data for Hz and Hx on Line 5850E at Channel 15.

Measured Data

Warrior Model



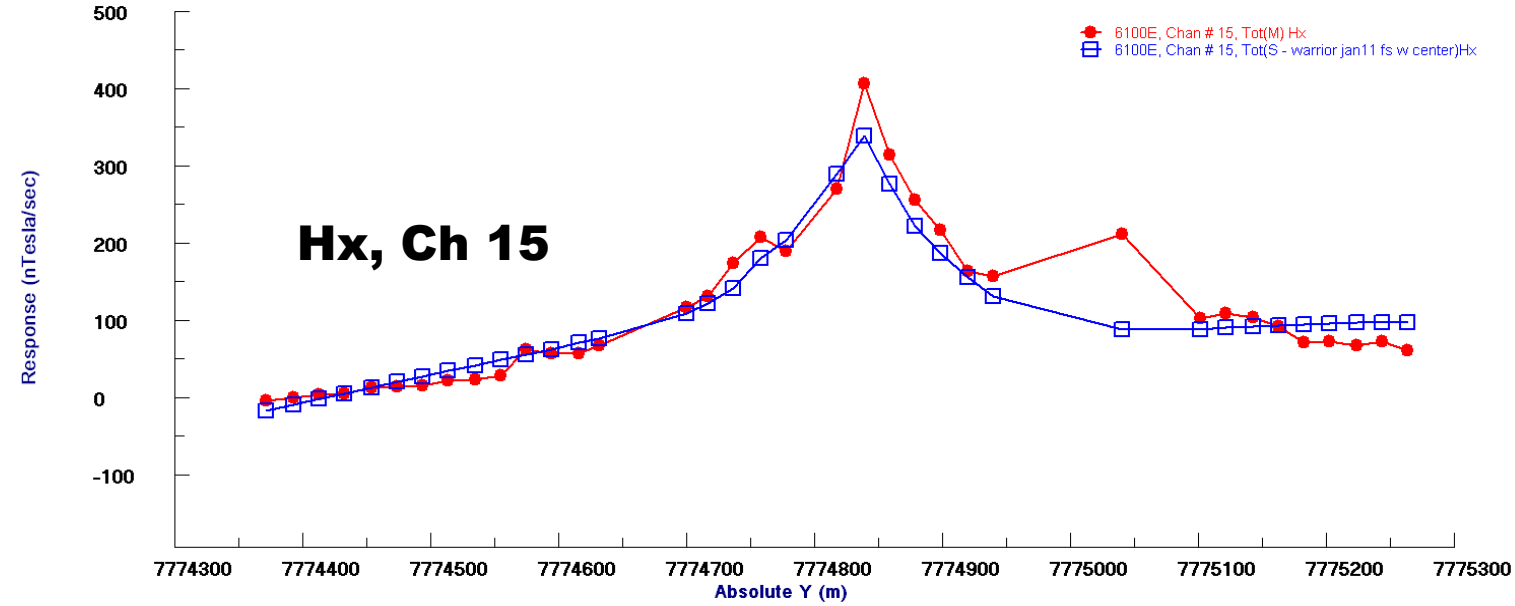


Figure 22

Data (Oct) vs Simulated Data

Model – Plan View

This map is a modified version of that on page 15, with the top of E03 in green and the top of E10 in red. The shape of E03 has been adjusted to account for the difference in position of the structure between 425550 and 425750. (i.e., based on Lines 5850E, 5950E, and 6050E pg. 28)

With this change, the top of the model better agrees with the geological surface expression in this area as marked in pink.

However, west of 5850E, there is not good agreement between the geological surface expression and the top of the model for E03. But interestingly, the position of the surface expression approximately agrees with the top of E10 between Lines 5775E and 5700E. Thus, what is thought to be E10 may in fact be E03, and what is thought to be E03 may be a separate structure to the north.
Also, the extrapolation of E03 to the west appears to approximately agree with the geological expression west of Bluff.

The missing stations on Lines 5700E and 5775E (mainly due to the explosives factory) just south of E10 somewhat limit our understanding of these structures.

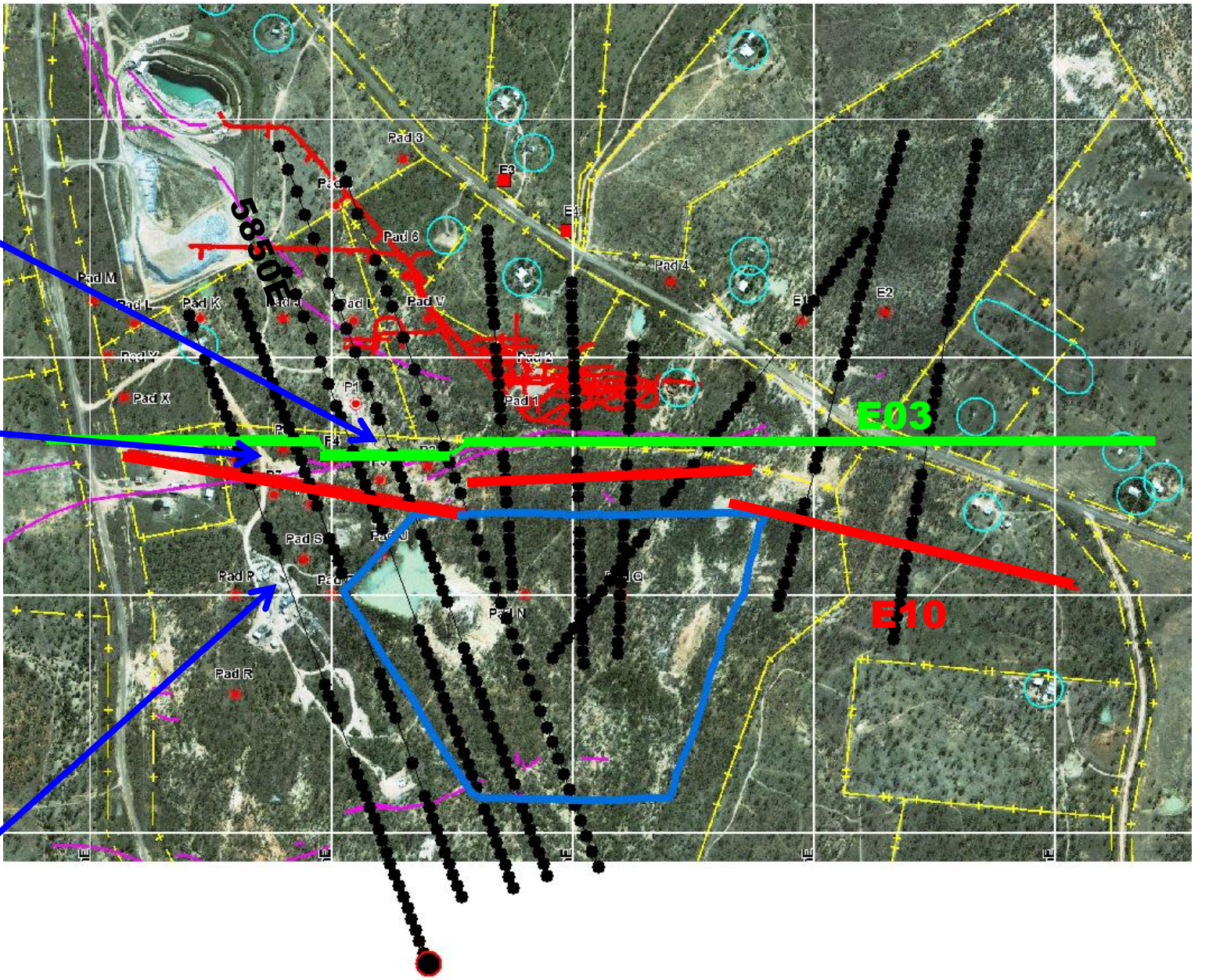


Figure 23
Revised Model J10 – RJ10

Dip Extent (length along dip)

A dip extent of 400 m is generally a good fit to the data for all structures, except on Lines 6400E and 6650E. As discussed, a greater dip extent is needed on this lines better fit the shape and amplitude of the late-time response on these lines.

It is thought that the dip extent on the lines west of 6400E is shorter because the structure has been mined and there is limited connectivity at depth.

Modeling was also performed with two 400 m thin-sheets that were disconnected (one below the other), and the response was very similar to that of the top plate only.

Thus, we believe that the short dip extent of the model is not due to the absence of the structure at depth, but due to the ore having been mined out and the conducting shear structure being discontinued (electrically) at depth.

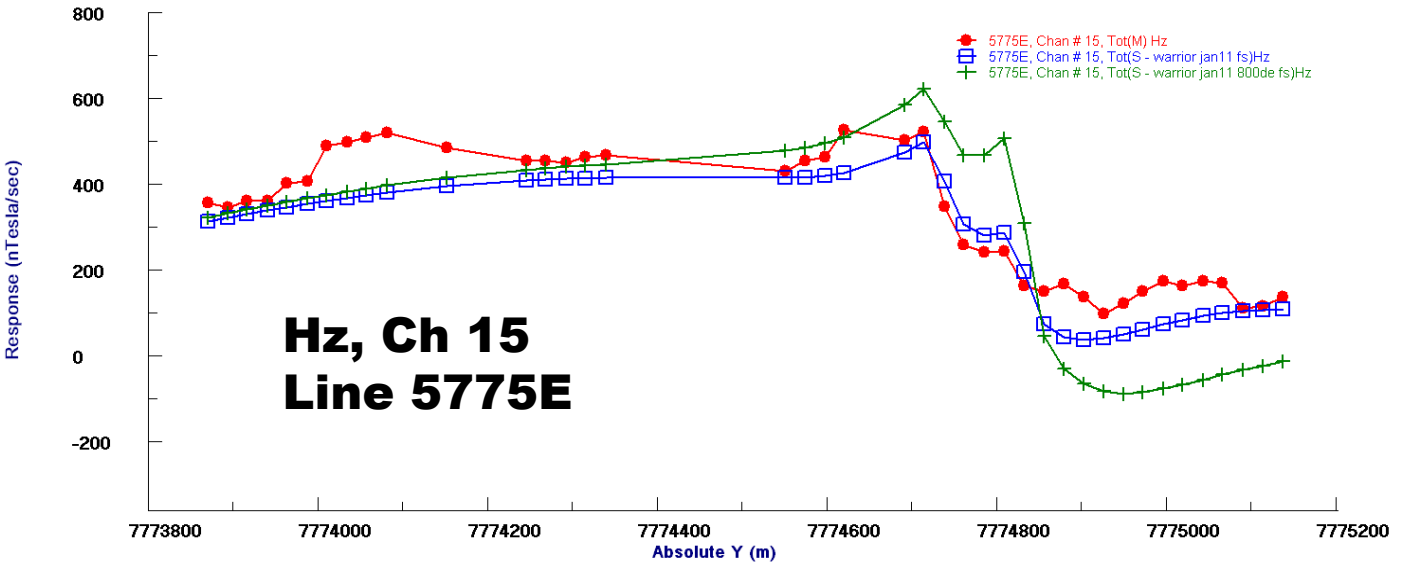


Figure 24:

Comparison of data with model of 400 m dip extent (blue) and 800 m dip extent (green). The shorter dip extent is a better fit to the data.

Measured Data

Warrior Model

Warrior (800 m dip extent)

Dip Angle

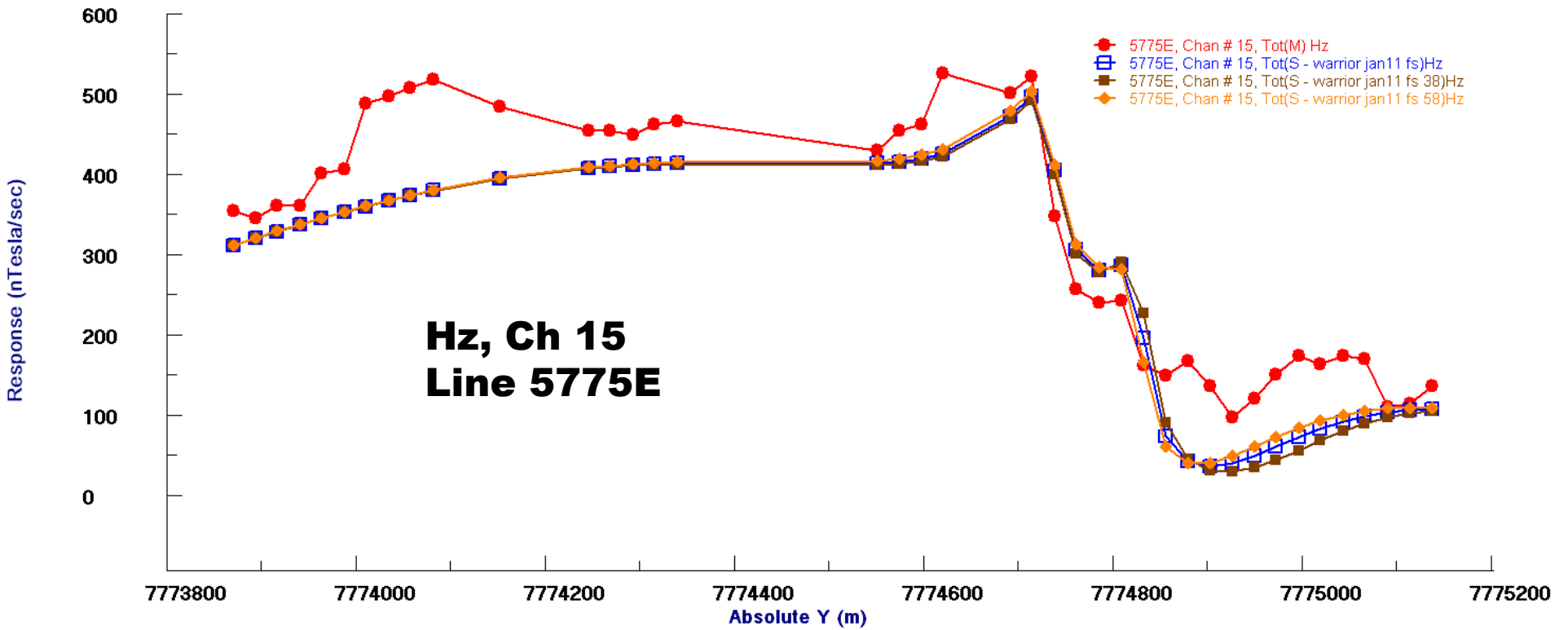


Figure 25: ***Dip Angle Comparisons***

Changes in dip on the order of 10^0 have limited effect on the TEM response of the model. Here, the data is compared with the response of the original model, and models with dips of 38^0 (brown) and 58^0 (orange) for E03. Thus, the ground data cannot provide precise information on the dip of the structure.

Measured Data
Warrior Model
Warrior (38^0 dip)
Warrior (58^0 dip)

MODELING VS. DRILL LOGS

Comparison with Drilling Results

We have the following drilling information:

1) Intercept information for E03
2) Drill logs for 34 holes, including detailed geometry and geology.

Using the intercept information, a 3D geological model of the intercepts was built, and compared with the plate (thin-sheet) model for E03 in our combined model - J10.

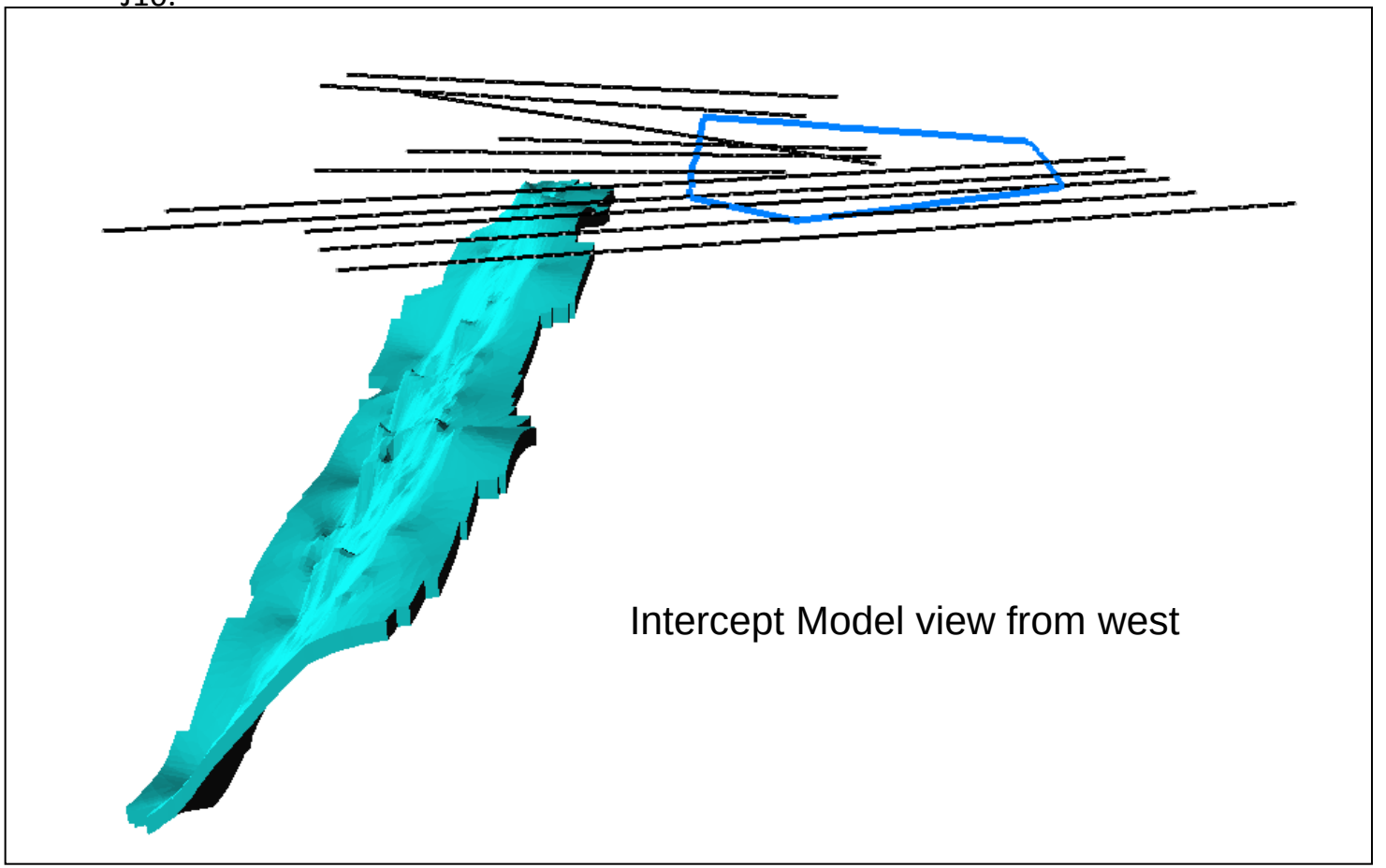


Figure 26: ***Intercept Model***

Comparison with Drilling Results

The thin-sheet (RJ10) model of E03 for the EM data agrees very well to the east. The thin-sheet model also extends further east than the drillings results, on the basis of Lines 6400E and 6650E.

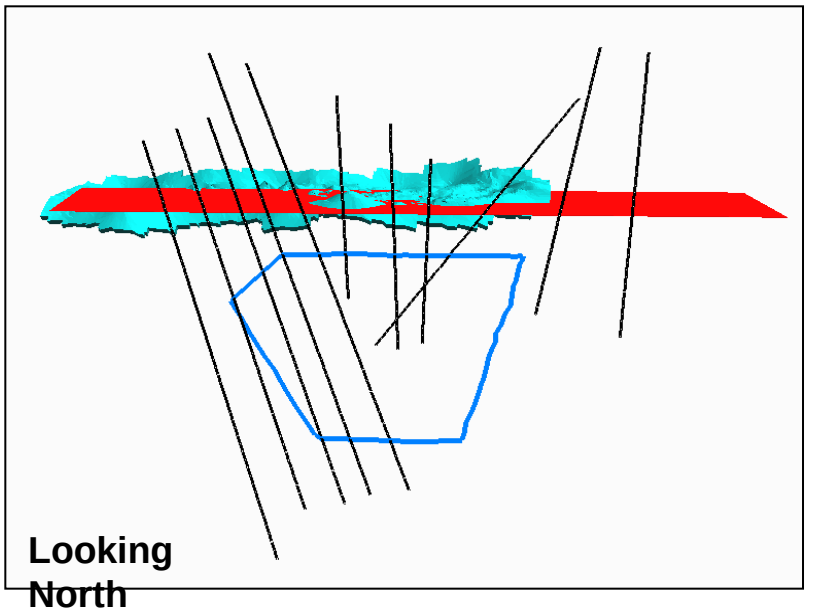
The model of E03 agrees less well to the west (i.e., near Lines 5700E and 5775E), where the model is further north than the intersection model. If the entire model were shifted south to match the intercept model near these two lines, the response would not match the data. But one possibility is that the structure curves downwards at depth (i.e., the dip is steeper at depth) to the west. This would have little effect on the EM response, but would better match the intercepts.

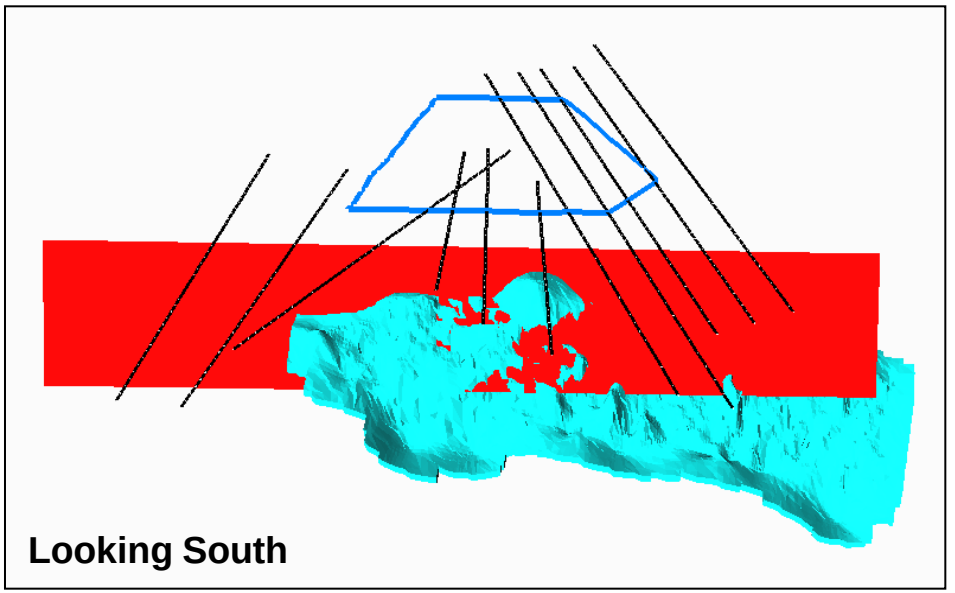
However, this is also the area where the position of the top of the model differs most from the surface expression (see page 30). The reason for that discrepancy is not known, but one possibility is that what is thought to be E10 between 5700E and 5775E may actually be E03, and there is a further target to the north, as described on page 30.

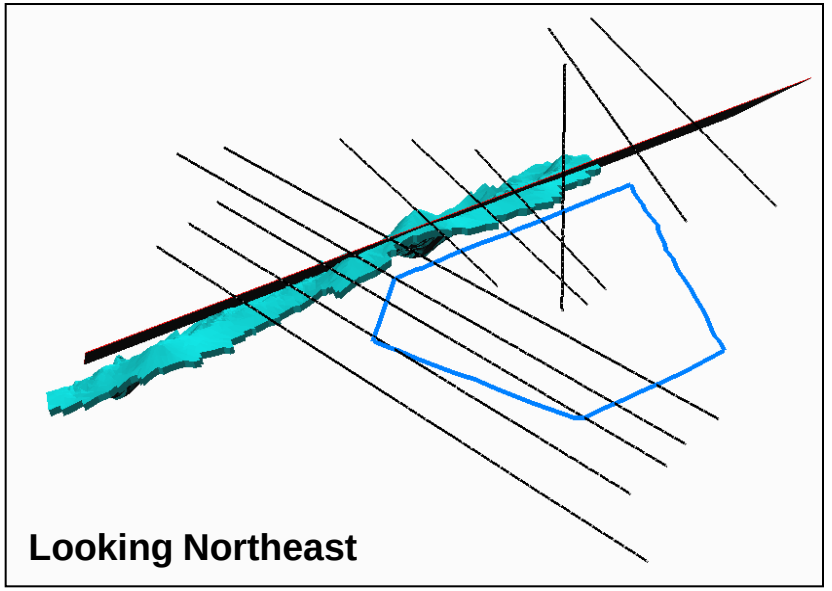
Note: the intercept model extends deeper than the 400 m dip extent of our model. As mentioned, the structure is likely not electrically connected beyond about 400m dip extent due to mining.

Comparison of intercept model (blue) with our model model of E03 (red) shown on the following page.

Comparison with Drilling Results







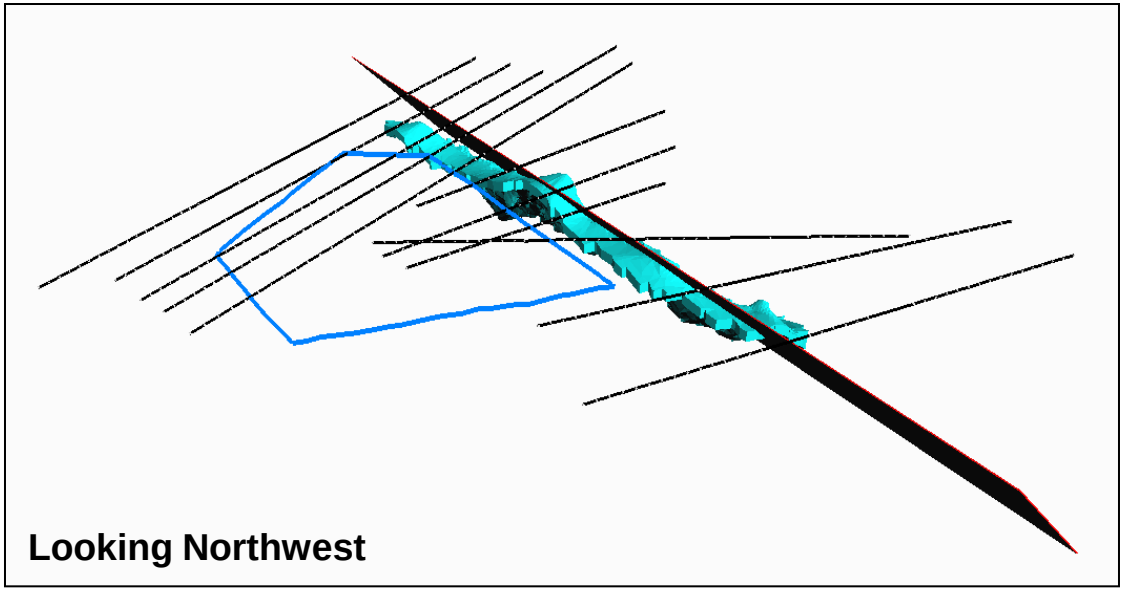


Figure 27: ***Views of the EM model versus the intercept model***

Comparison with Drilling – Warrior East

The comparison with the *intercept model* shows that the EM model roughly matches the drillings results. More detailed comparisons were performed on several holes for which detailed logs were available.

First, drill holes into Warrior East were examined. The drill logs for four holes from Pad 4 were available: CT3014, 3016, 3017, 3018. The intersection of the EM model with each of these drill holes was studied. Agreement was reasonably good with the model, and improved to a discrepancy of 5 m or less if the dip of the plate was adjusted to 47^0 from 48^0. Note: this would have negligible effect on the EM response of the model when the EM is measured at surface.

The exception was CT3018. The intercept of E03 according to the drill log is about 325m downhole, but the 47^0 dip Warrior Model intersects this drill hole at 354 m. However, based on the geology information in the drill log, there is another intercept around 352 m. Thus, it is thought that this may be the E03 intersection, as it agrees with the EM model. This is one evidence of the spaying of the structure. That is that the structure possibly consists of multiple fine fracture filaments.

None of these holes mentioned intersect our model of E10 indicating the possibility of a further structure which is not mined.

Comparison with Drilling – Warrior West

E03

A greater number of drill holes are available through Warrior West.

With the initial model at a dip of 48^0, the intercepts are too shallow. However, these are improved in the dip is 50^0. This change in dip has a negligible effect on the EM response of the model along the TEM ground lines.

At one hole, 4007, the intersection with the model was 40 m (in hole depth) from the intersection given for E03 in the drill log. However, as for 3018, there was a shear zone where the EM model intersected the hole.

E10

Very few drill holes intersected the EM model for E10. For the holes that did intersect the model, the drill logs were examined for any evidence of a structural intersection (i.e. fracture zone, shear zone, dyke, clay, quartz vein) at that depth. Such features are observed at the depth of our E10 model in three of the four holes examined (detailed below).

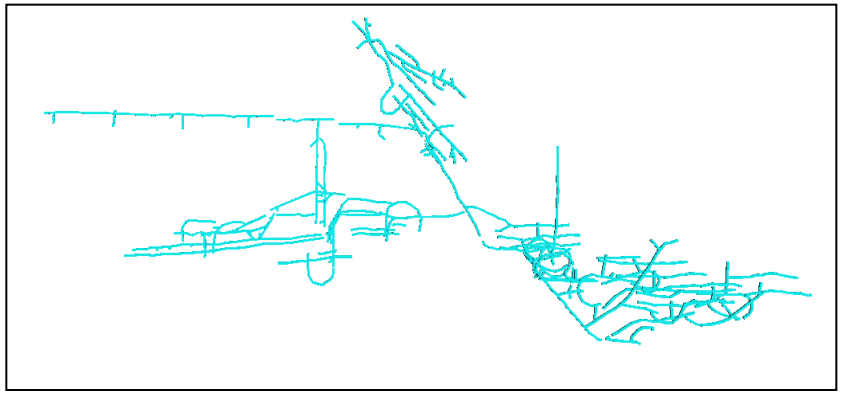
However, without further holes, we cannot conclusively comment on whether this model is in agreement with drilling results. A further possibility is that E03 and E10 are separate structures at shallow depths, but a single structure at greater depth. More drilling information would be helpful in determining if this is the case. Unfortunately, many holes terminated in E03.

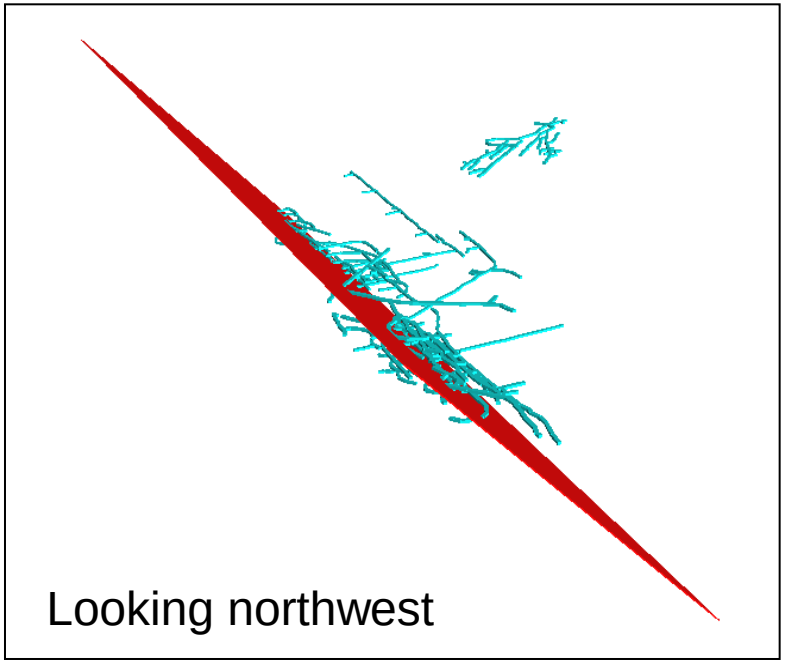
Underground holes CT4025 and 4044 (if EM mode dip-extent increased by 100 m):
With a dip of 50^0, the model intersects 4025 at 197 m, and there is a shear zone and clay at 204m depth in the hole. The model intersects CT4044 at 160 m, and there is gold, quartz, and a basalt dyke at 156 m. Note: It is difficult to determine the dip extent of E10 from the ground EM data due to its proximity to the loop and the EM response E03 to this type of survey.
A different EM survey design may possibly answer these questions.

Underground hole CT4076
The dip extent of the model must be extended to 700m to intersect this hole. The intersection is at a hole depth of 220m, which is close to the bottom of the hole (230m). No dyke, clay, quartz, gold, or shear zone is noted in the log file here.

CT743:
E10 intersects CT743 at 292m, which is very close to the bottom of the hole. There is a significant gold intercept and quartz vein at 287m.

Warrior Model vs. Mine Workings





The model E03 as determined by ground TEM was compared with a model of the mine workings as obtained from CiTiGold. The EM model intersects the mine workings both on Warrior West and Warrior East.

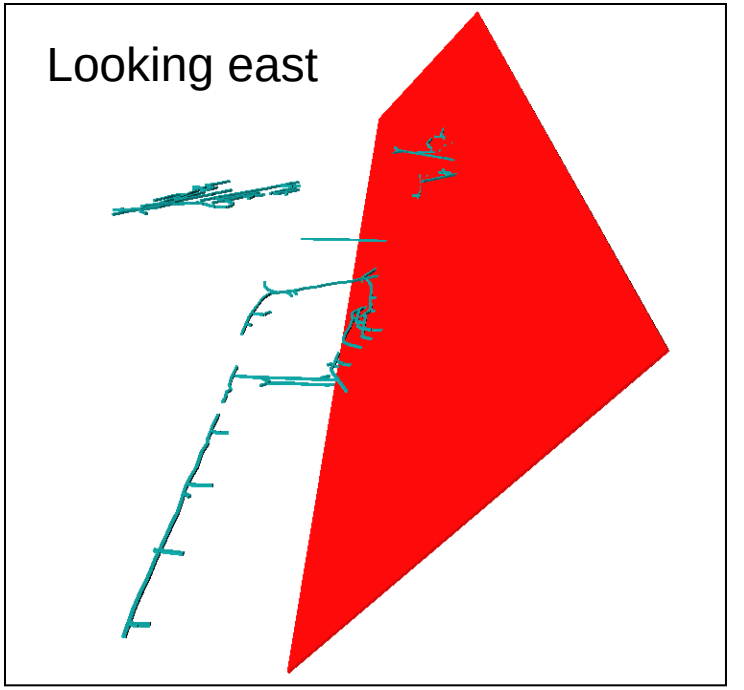


Figure 28: ***Views of the E03 EM model versus mine workings***

Warrior model vs. Mine Workings

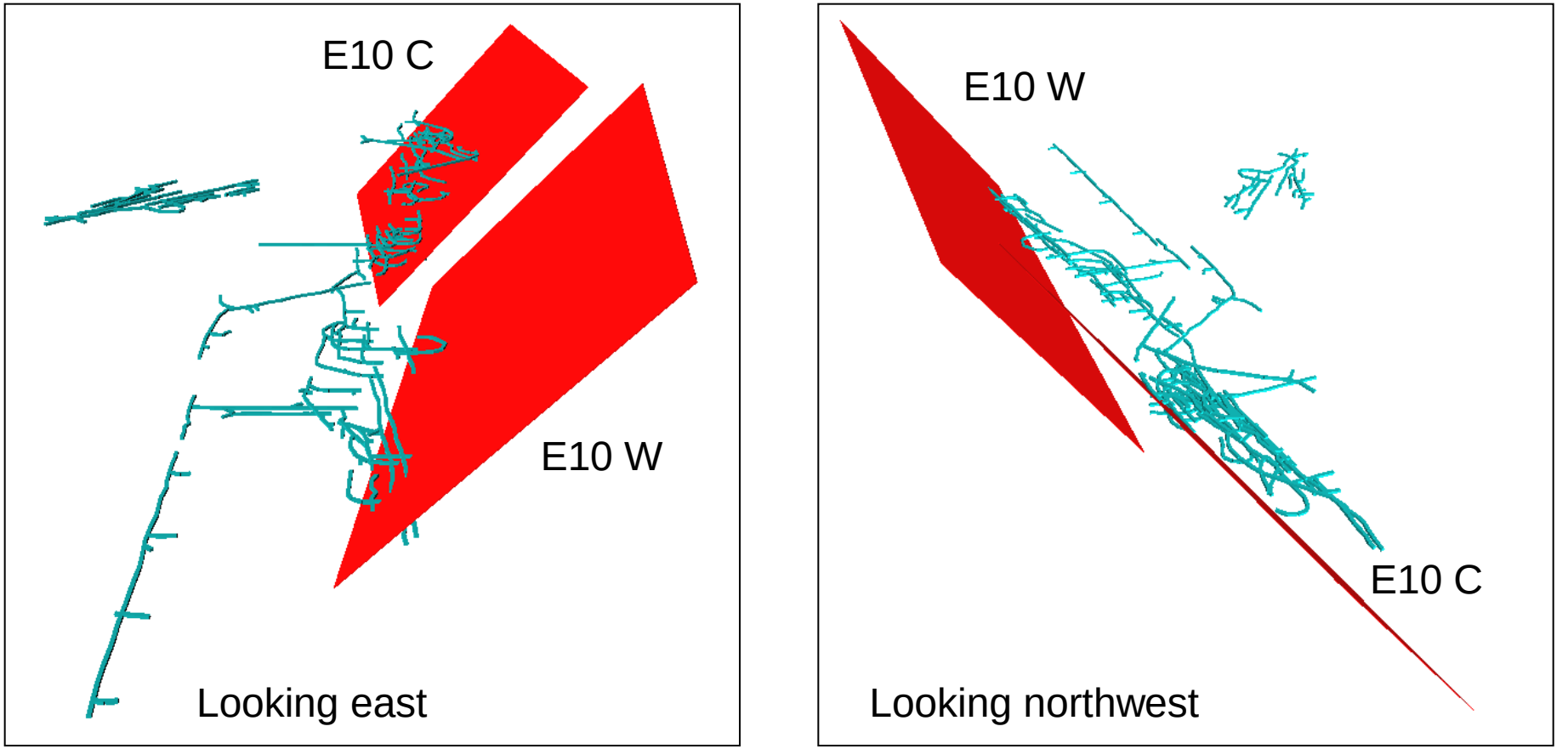


Figure 29: ***Views of the E10 EM model versus mine workings***

The EM models for E10 West and E10 Center are compared with the model of the mine workings. E10 intersects the far southwest section of the mine as well as the southeast section of the Warrior East workings.

Note that E03 and E10 were modeled as simple plates (thin-sheets), but the geometry of the mine workings suggests more complex geometries for the targets which are likely not resolvable from ground TEM data.

TEM Conclusions

The October 2010 and November/December 2010 ground TEM data on Loop 1 were used to investigate the properties of the entire East-West Warrior Structure. A geophysical model was developed to fit the this data. It was found that the main Warrior Structure, E03, extended across the entire survey from Line 5700E (about 425300E) to Line 6650E (about 426750). The modeled E03 structure generally agrees with drill results where available. Thus, the ground TEM data successfully showed that the Warrior structure continues further east of the present Warrior minings.

Furthermore, as discussed in the previous report on the October data, there is a second structure about 100 m south of E03, which we call E10. This was modeled geophysically as three separate structures with different strikes and slightly different conductances to best fit the data.

Through examination of the Loop 3 data, we expect to determine if Warrior continues to the west of Bluff Road. Son's of Freedom will be examined using the data from all three loops.

GROUND MAGNETICS

Introduction

Between December 4 and December 13, 2010, ground magnetic data were collected with a Geometrics 859 by Petros Eikon. The purpose was to fill in missing areas from the 2008 ground survey and to also survey further south, west and east of the 2008 survey (e.g., west of Bluff road).

Although UTS airborne data (1999) is available over this area (north-south lines at a 50 m line spacing), it does not have the fine resolution of the ground data due to

1) The altitude of the survey
2) Spatial smoothing filtering performed by the airborne company

Note also that the UTS data over the northeast section of the ground data was required to be flown at an altitude of 300 m, but the remainder of the UTS data was at about 50 m altitude.

Survey

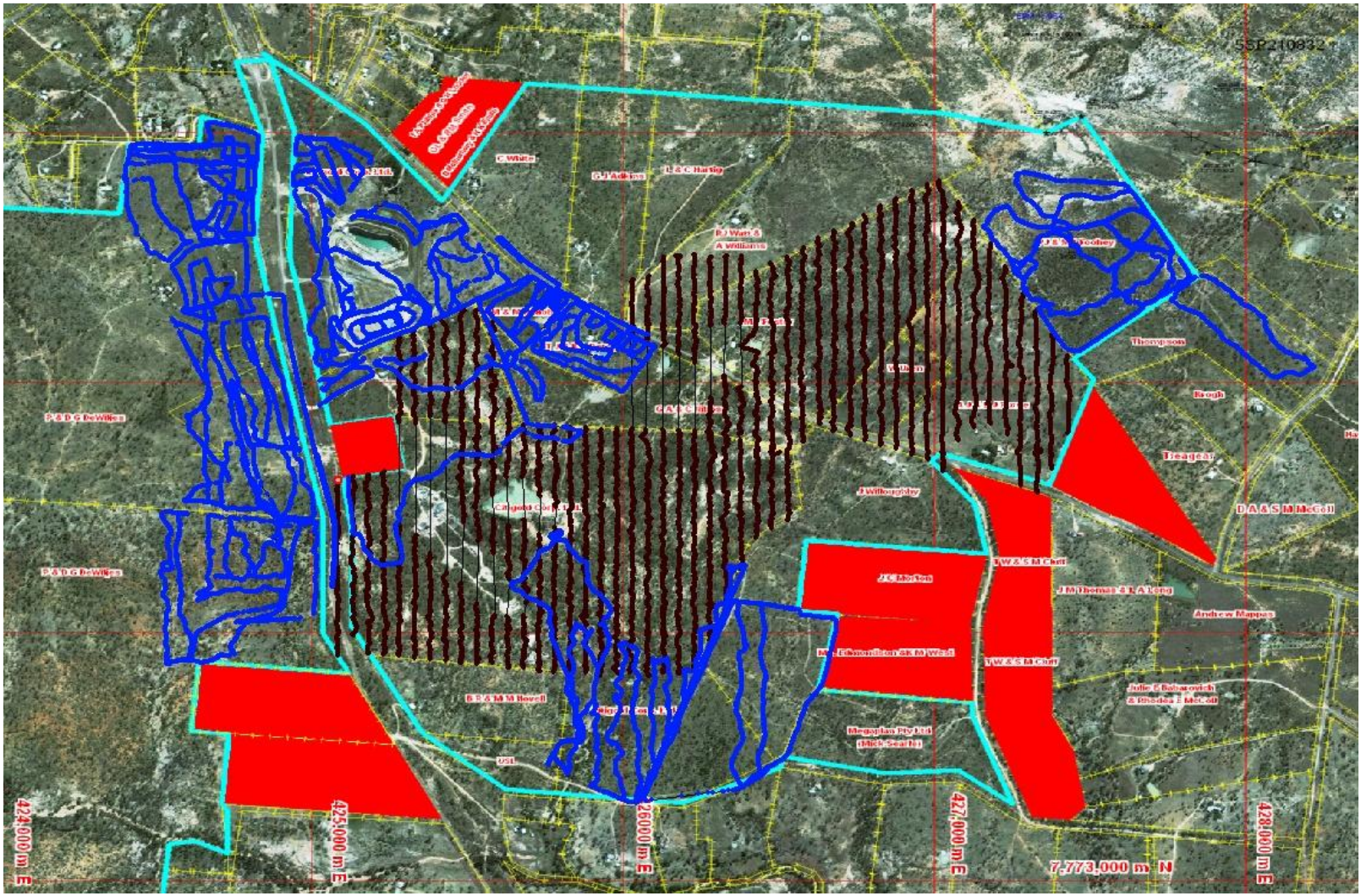


Figure 30: ***2008 and 2008 ground magnetic data vs property boundaries***

Property map showing the 2008 ground magnetic lines (black) and 2010 ground magnetic lines (blue).

2010 Survey Issues

1) The Geometrics 859 was rented without a base magnetometer, which limited our ability to perform diurnal and drift corrections.

Typically a base station is placed at a fixed location and the magnetic field is recorded throughout the duration of the ground survey. The background magnetic field varies with time, and with base station data, this variation can be removed from the survey data. This is called a diurnal or daily correction.

Despite the lack of a base station, some diurnal corrections were performed based on calibration loops performed in the survey. The readings at intersections and overlying lines were compared.

2) There were frequent drop-outs (readings of 0 nT) in the data which is an issue with the sensor obtained from the rental company. Some lines contained a significant number of drop outs. Spikes were frequently observed as well. These were removed as the first step in the data processing.

3) The 859 is a so-called walking magnetometer with a built-in GPS; however, the GPS cannot be viewed while operating the instrument. It was difficult for a single operator to navigate straight lines without either picketed grids or a second operator navigating by a handheld GPS unit.

4) Despite these issues, we believe with out exhaustive processing reliable data has been obtained.

2010 Ground Magnetic Processing

Below are the basic processing steps performed on the 2010 ground magnetic data:

1) Spike removal
2) Gaussian filtering
3) Diurnal corrections within a given day, if possible
4) Shift between days where lines overlap
5) Shift to the level of the 2008 data (this shift is required due to the variation in the Earth's magnetic field over the two years).

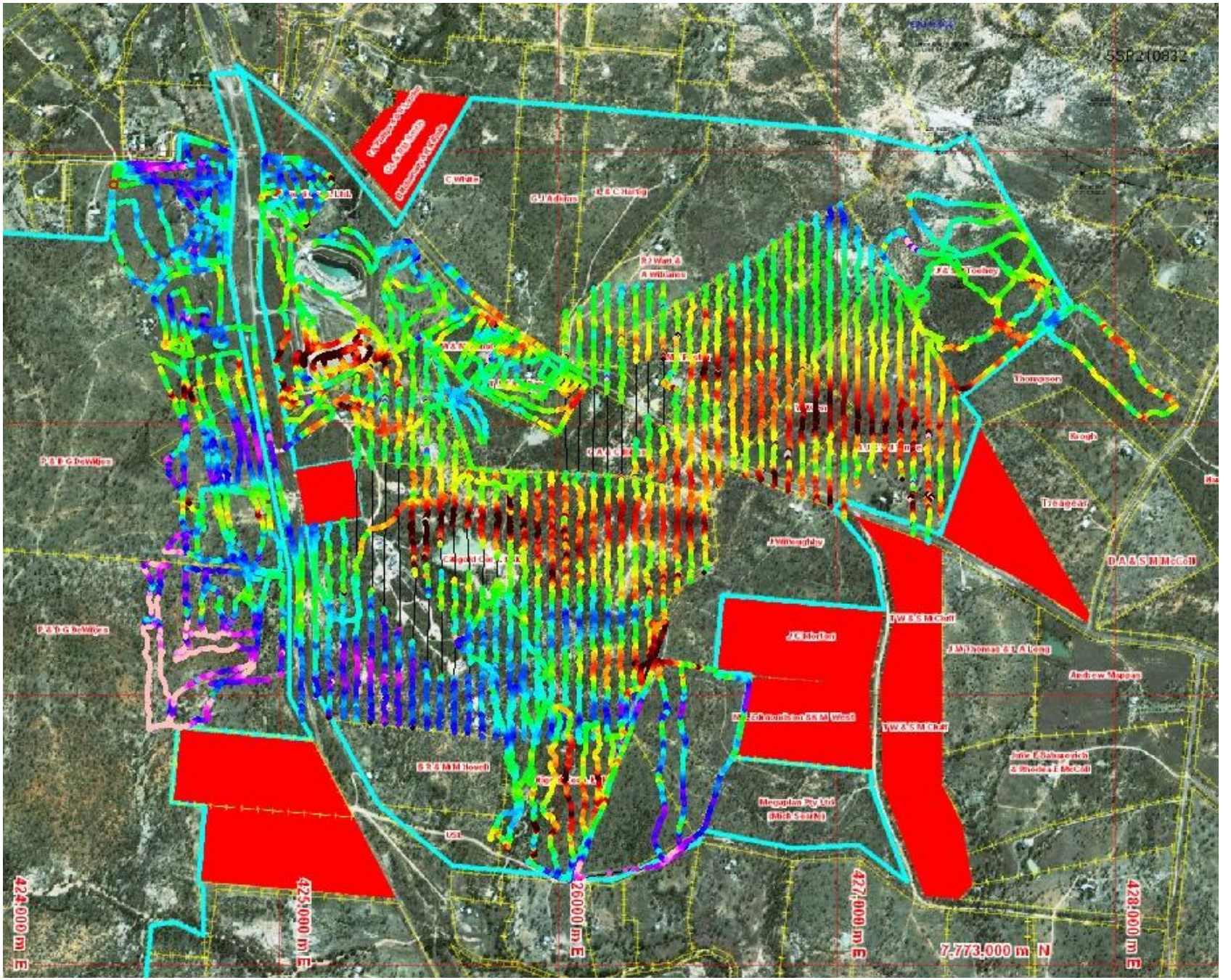
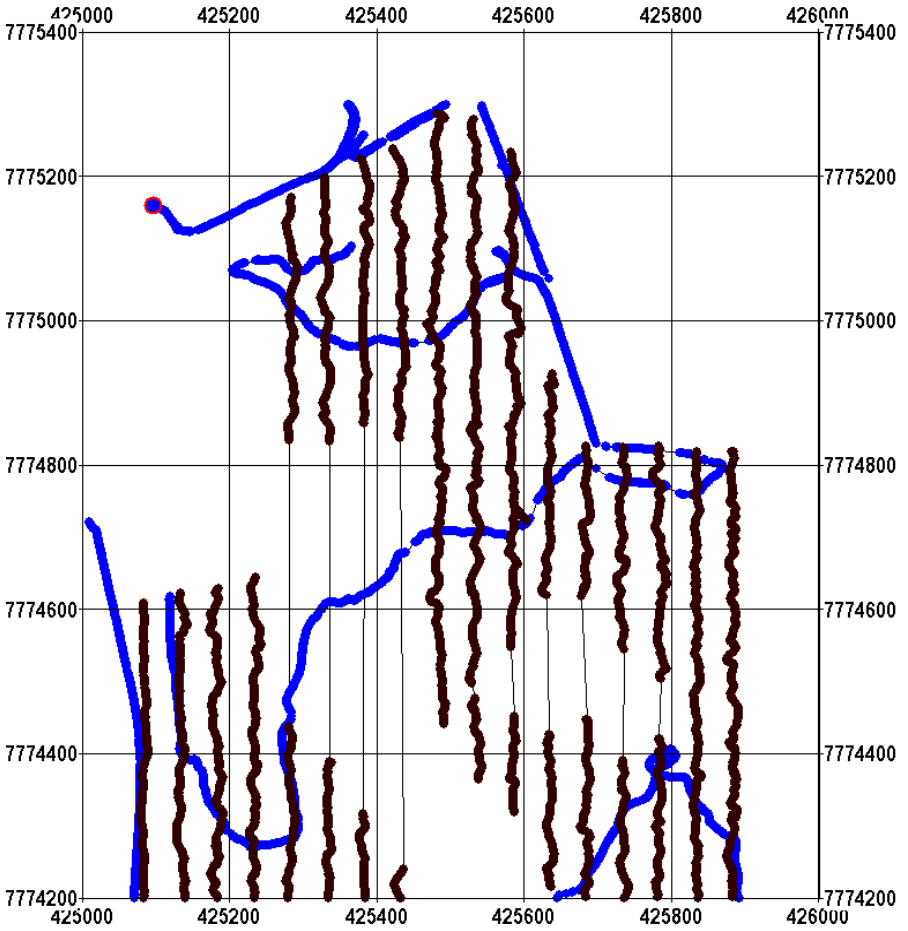


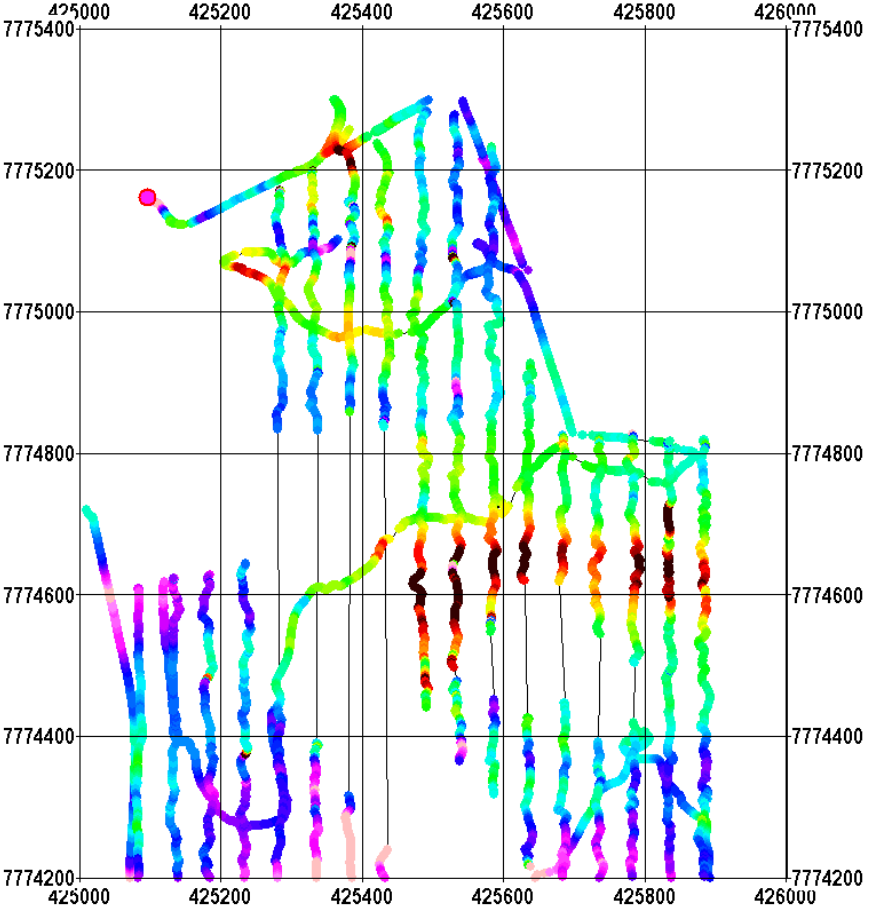
Figure 31: Final Processed 2008/2010 Data

2008/2010 - Northwest

Figure 32: 2008/2010 ground magnetic analyses



Black-2008 lines, Blue-2010 lines

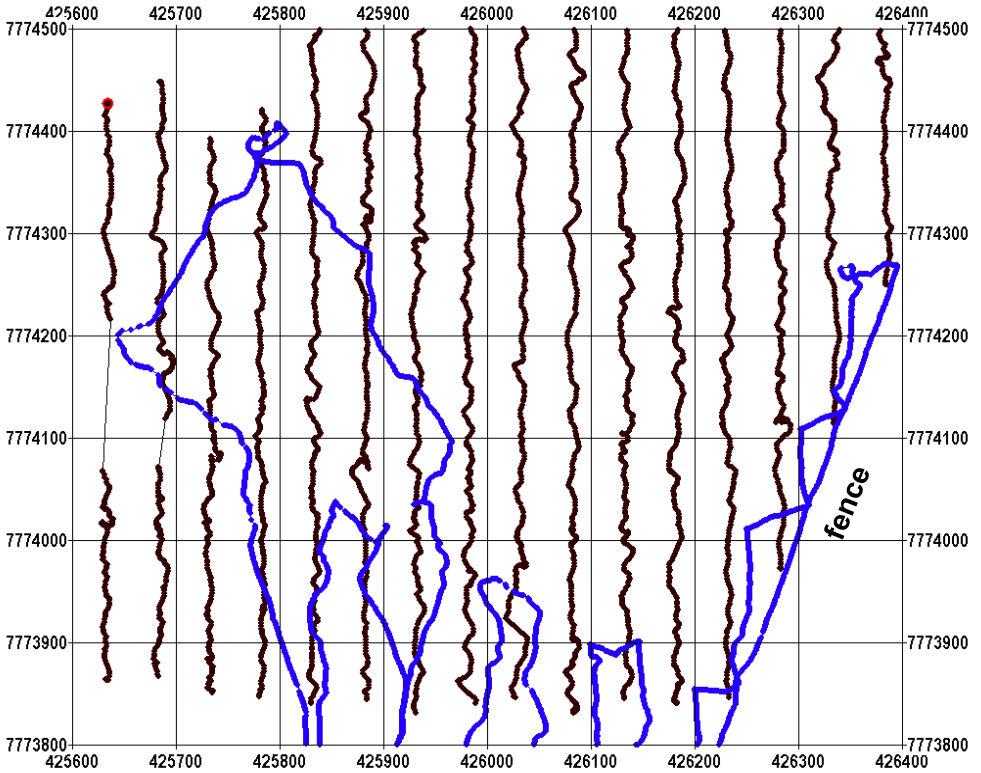


Processed data

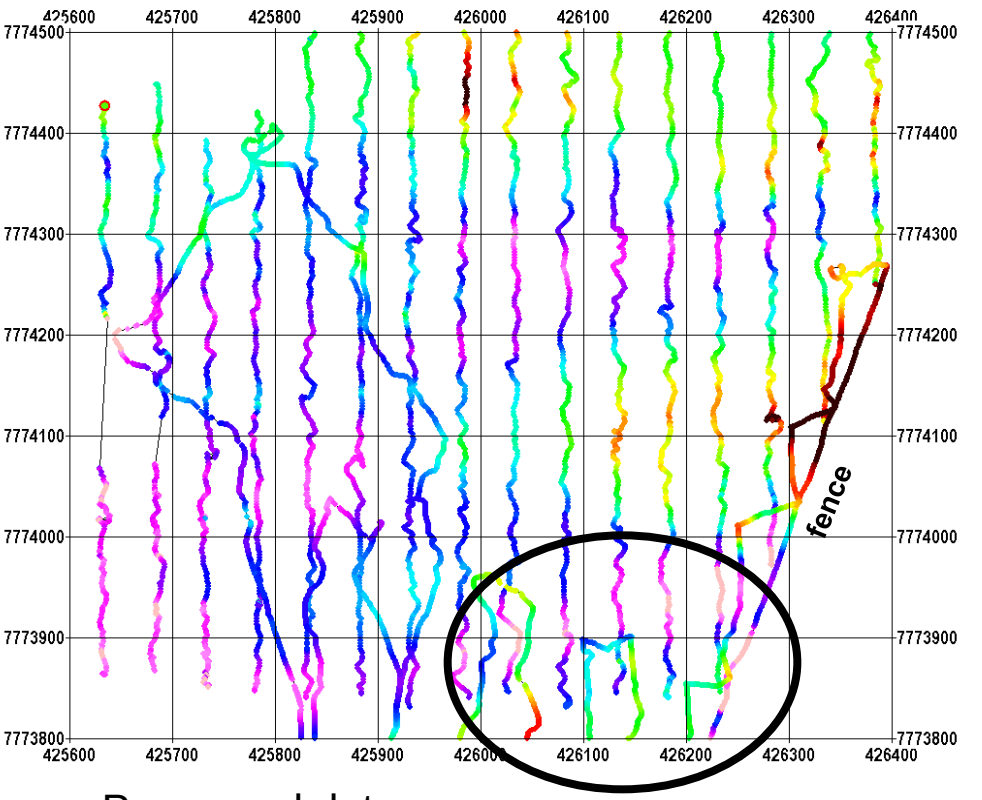
The 2010 data was shifted to the level of the 2008 data as the final step in the processing. The data was later compared at intersections and nearby lines in two areas to check for agreement: 1) Northwest and 2) South.

The agreement in the northwest (shown here) is excellent.
The values were compared at nine intersection points, and all were within 5 nT, most within 3 nT which is well within the repeatability levels of the Geometrics instrument.

2008/2010 - South



Black-2008 lines, Blue-2010 lines



Processed data

Figure 33: 2008/2010 ground magnetic analyses

The other area with significant overlap is in the southern area. Results agree very well to the except to the southeast part of the south section. The reason for this discrepancy is not known. Note, however, that all of the 2010 data that is in disagreement was collected on the same morning and not likely to be affected by significant instrument drift.

Merged Ground Data (2008/2010)

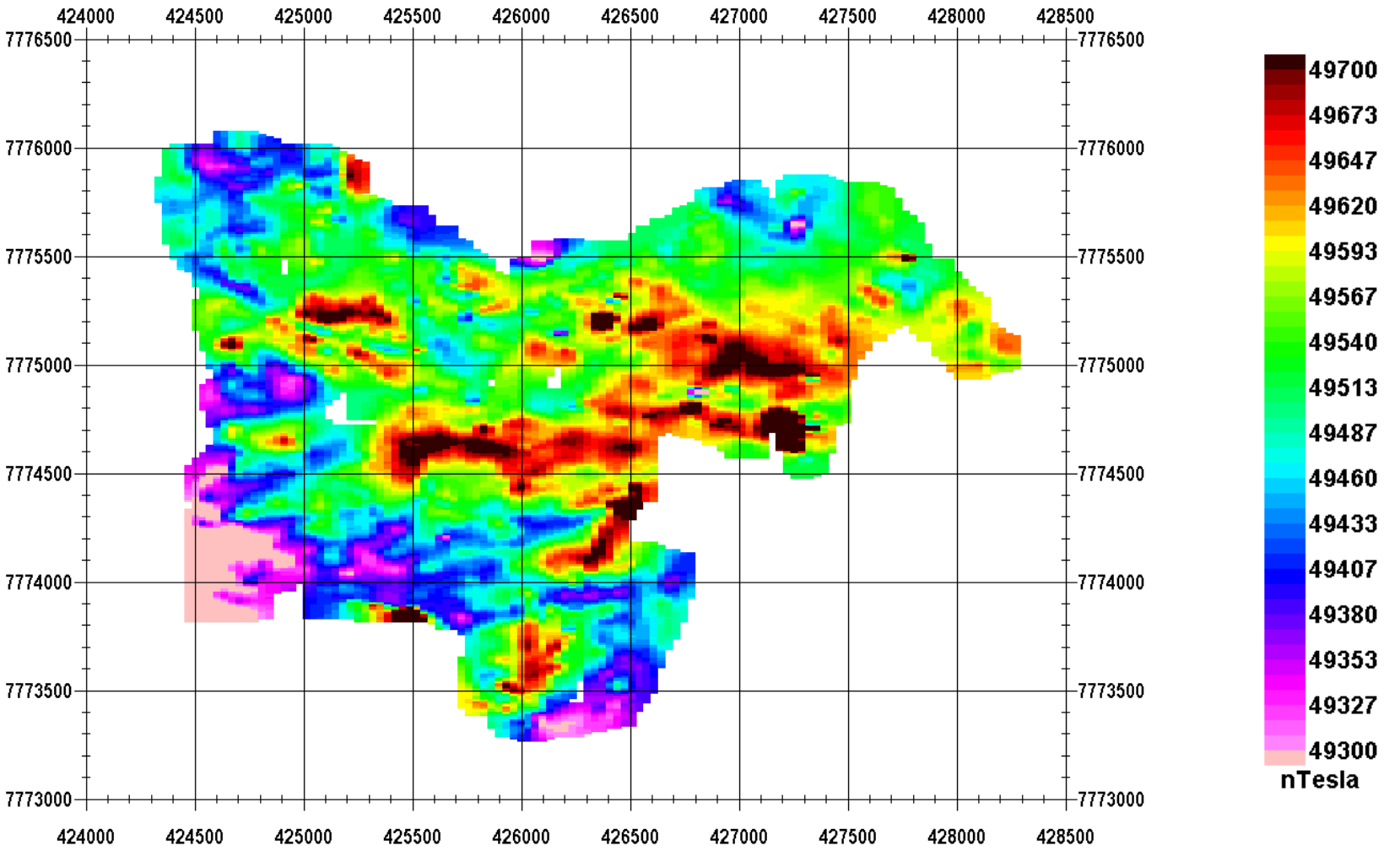


Figure 34: ***Final Processed 2008/2010 Data – Interpolated.***

Merged Ground Data

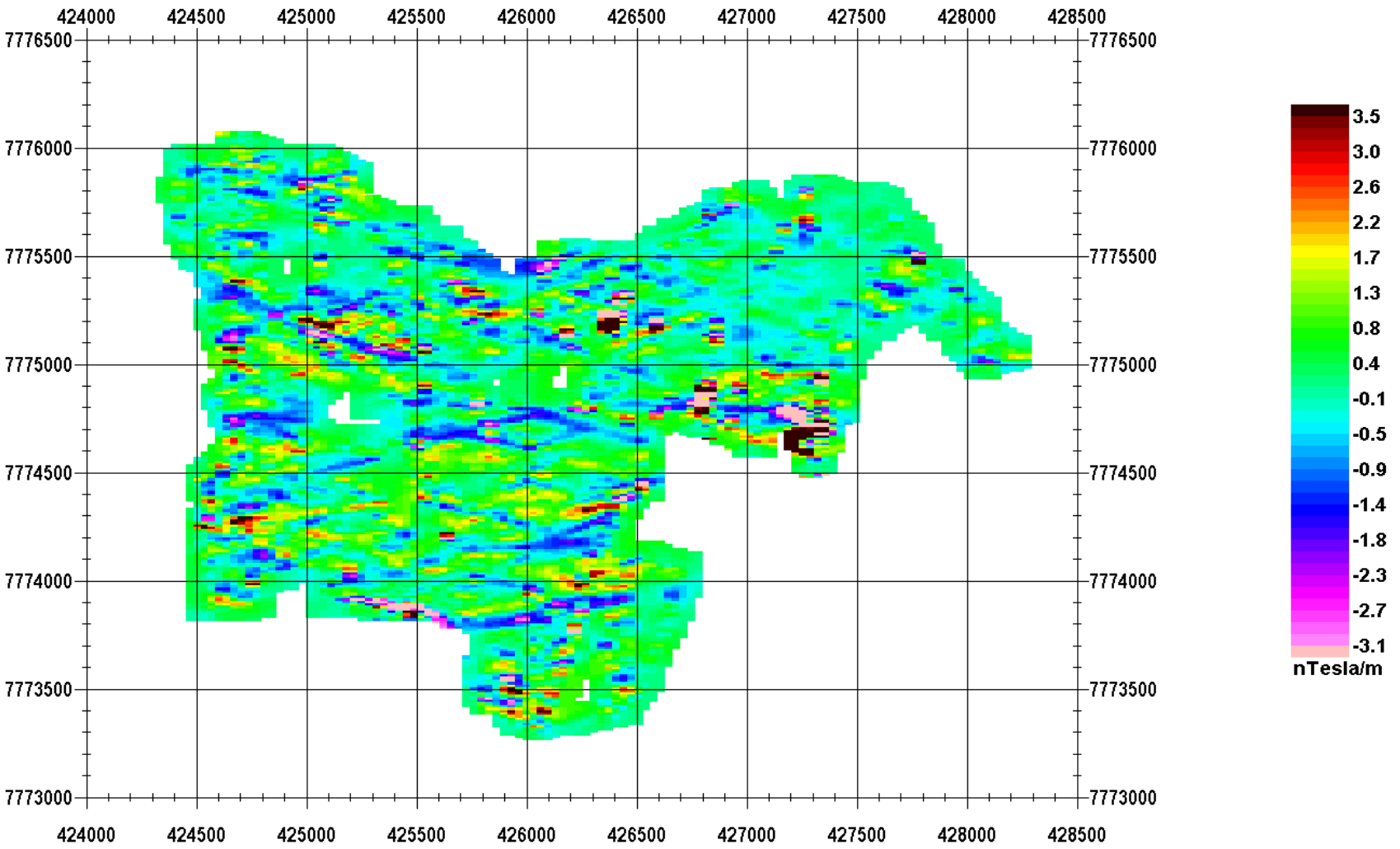


Figure 35: ***2008/2010 Ground Data – North-South Derivative***

A processed image of the variation in the magnetic field in the NS direction. This processing better resolves boundaries in magnetic structures.

Merged Ground Data

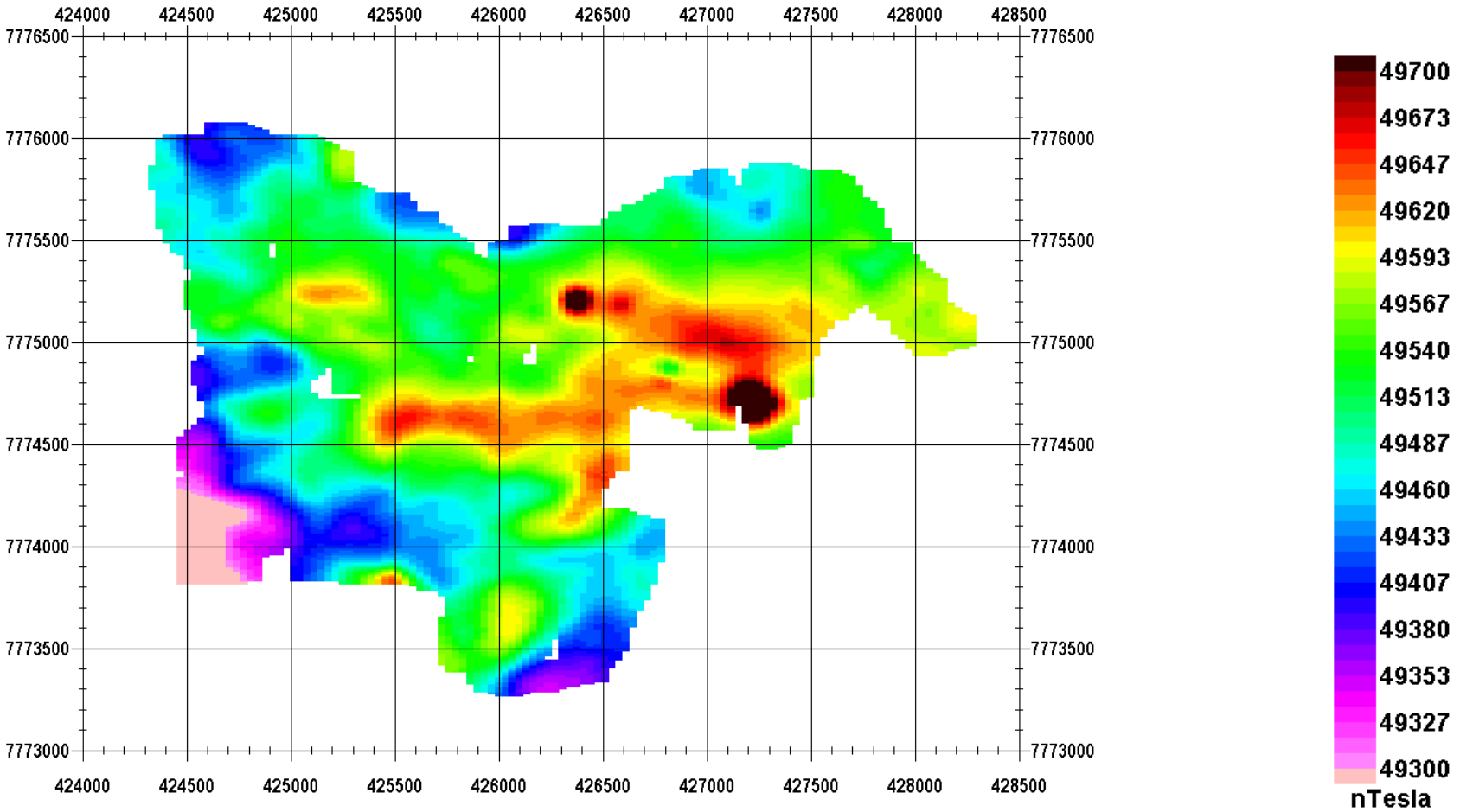


Figure 36*: 2008/2010 Ground Data – Upward Continued to 50 m*

The integrated data is processed to produce the estimated response if measured at an elevation of 50m equivalent to the average of the 1999 (UTS) data.

Merged Ground Data

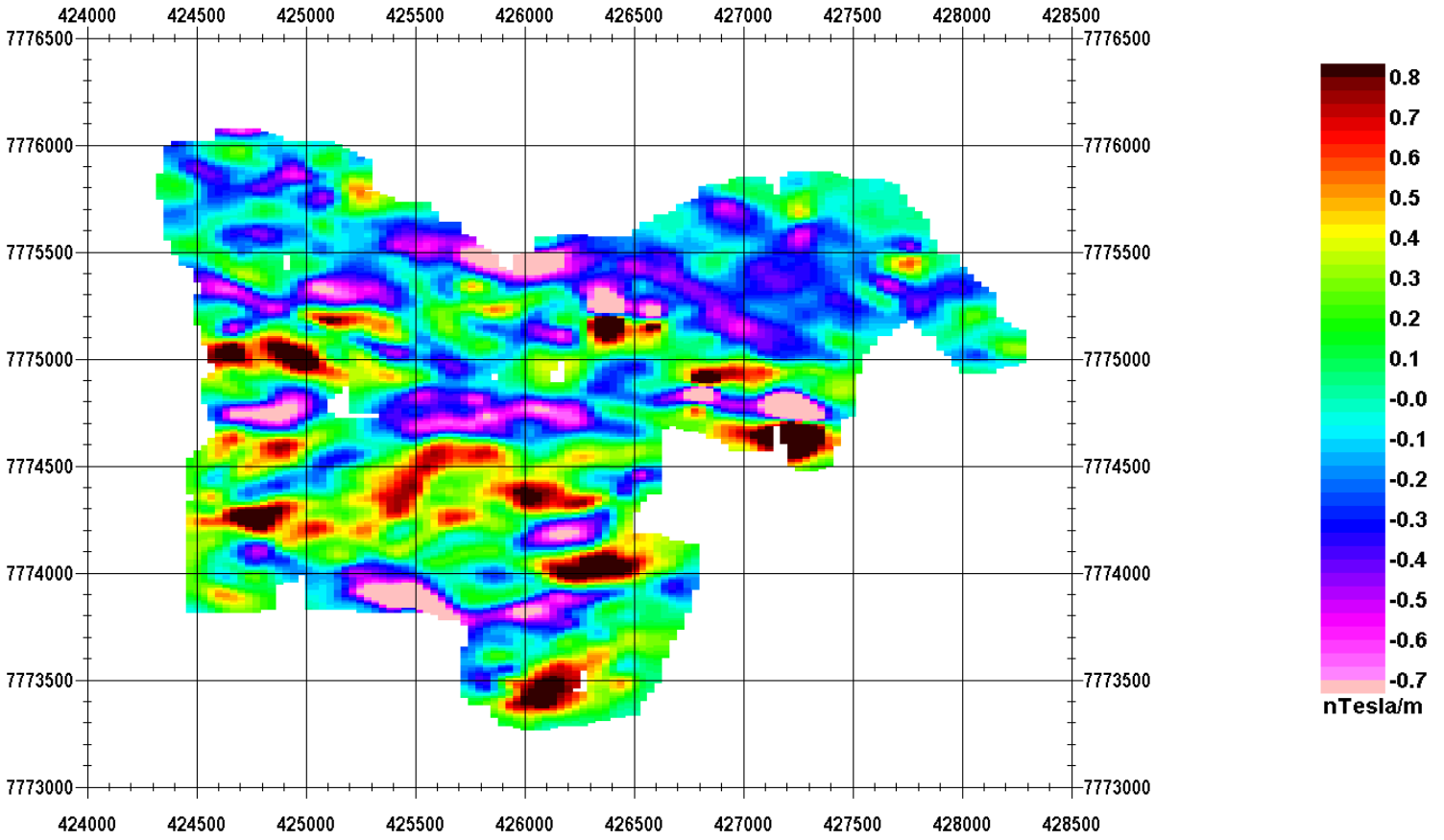


Figure 37*: 2008/2010 Ground Data – Upward Continued to 50 m, North-South Derivative*

Ground Data Comparison with 1999 Airborne Data

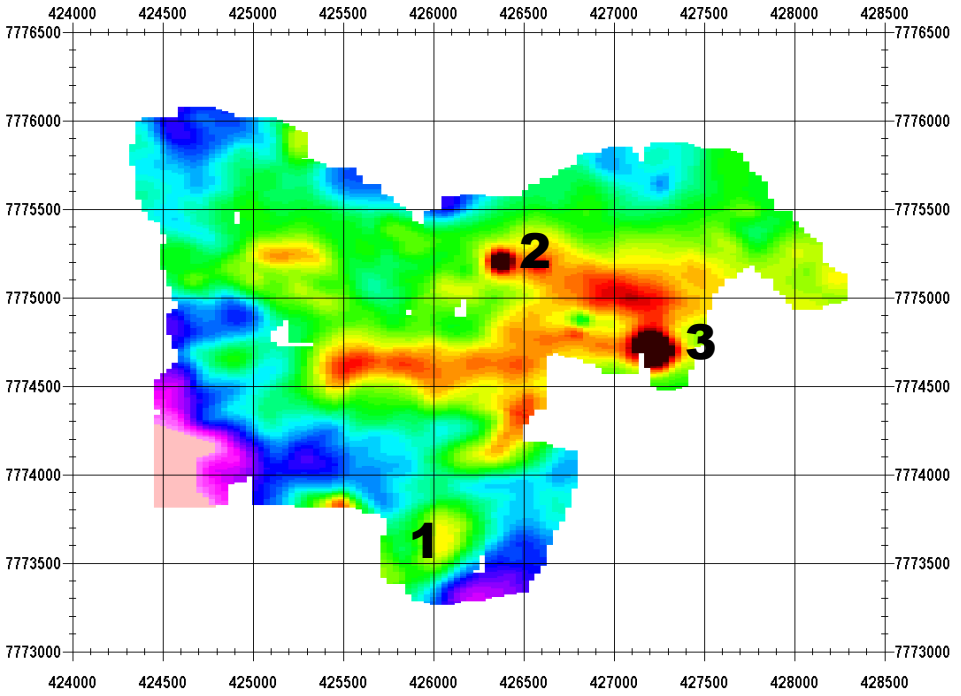


Figure 38: 2008/2010 Ground Data – Upward Continued to 50 m

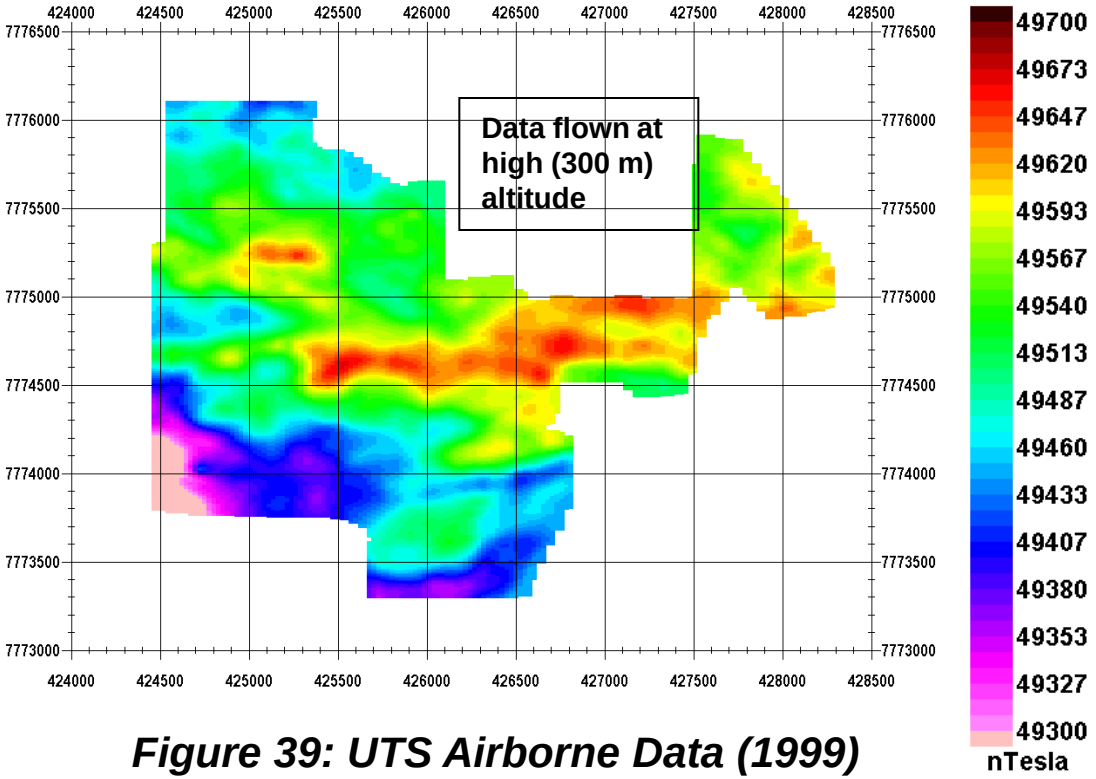


Figure 39: UTS Airborne Data (1999) Average Altitude: ~50 m

Comparison of the upward-continued ground data with the UTS airborne data over the same area. The level of the airborne data has been adjusted by -290 nT to match the amplitude of the ground data due to the variation in the Earth's field in the intervening years. Note that the background magnetic field varies over time, and this is close to the difference in response expected between 1999 and 2008 at this location.

Overall, the datasets agree very well, though there are some small differences. Both datasets have a high at position (1), but it is more significant in the ground data than in the airborne. Note that this is near the area where the 2010 data disagreed with the south end of the 2008 (page 52). These results suggest that there may be some issues with the 2010 data here. At (2) and (3) there are strong, localized anomalies that are not seen in the airborne data. Both of these coincide with buildings. It is believed that the buildings, or another manmade structures, are the cause of the anomalies.

Comparison with Airborne

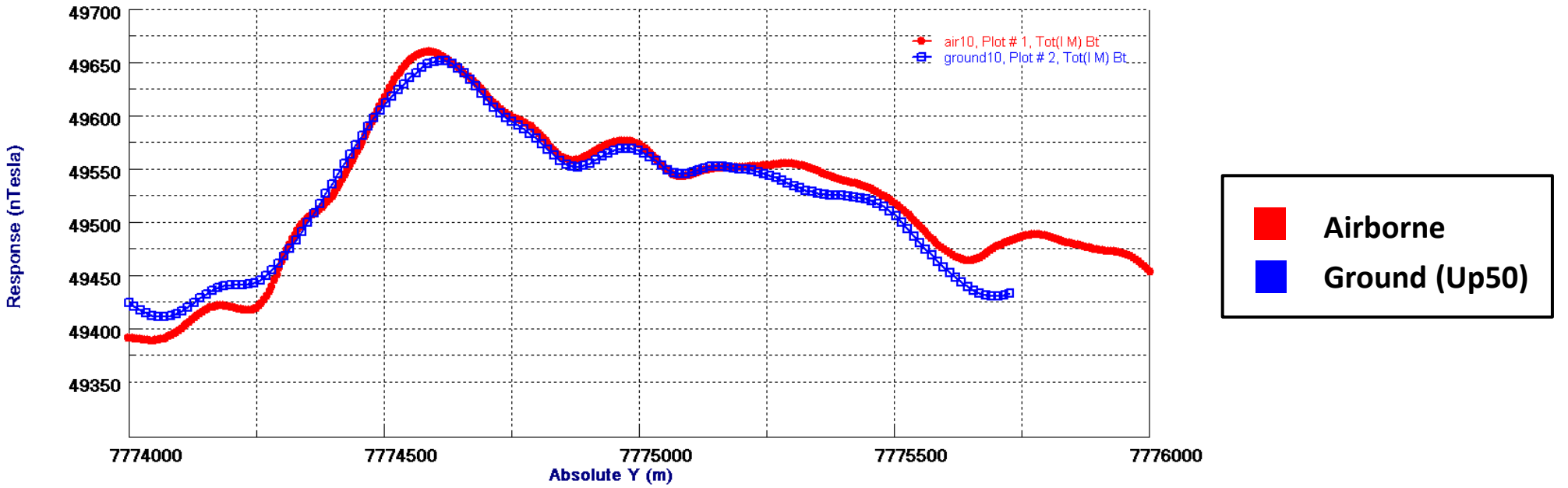
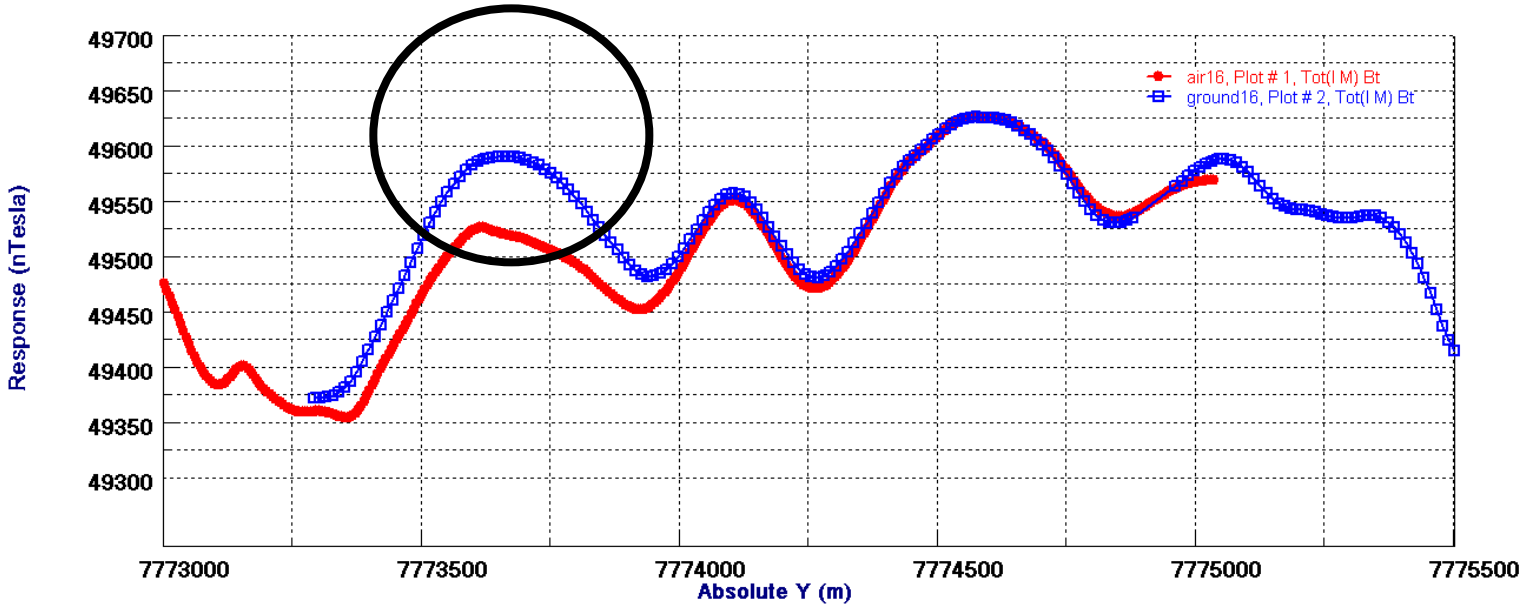


Figure 40*: Profile response comparisons of upward continued ground data to airborne data*

The upward-continued grid was exported to north-south profiles, and these were compared with the data along corresponding lines in the airborne survey. Line 100710 in the airborne is shown. This line is over the 2010 data. The two datasets agree very well.

*Note: Some differences would be expected due to the variable height of the airborne system, which typically varies between 40 m and 60 m over a line.

Comparison with Airborne



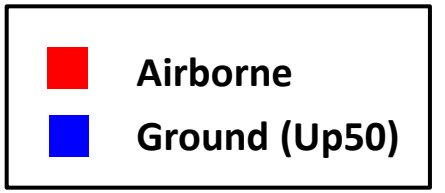


Figure 41*: Profile response comparisons of upward continued ground data to airborne data*

A second example – Line 100580. The upward-continued ground data agree very well with the airborne except for the south anomaly (circled). This is the same feature marked at (1) on page 57.

Ground Magnetics Conclusions

The processed 2010 data was integrated with the 2008 ground data, and was determined to be of good quality after extensive processing with comparison with the 2008 data and the UTS airborne data. Agreement between overlapping sections of the 2008 and 2010 datasets is good. The upward-continued ground data is in agreement with the UTS data based on comparison of the gridded data and along profiles. Therefore, despite the issues with the 2010 ground survey, including the lack of base station, the data is of good quality based on its agreement with overlapping areas of the 2008 survey as well as with the UTS airborne data.

Further ground magnetic data could be collected to the northeast of the 2008/2010 data, and west of Bluff Road if desired. However, the airborne data is of good quality, and this is not considered a priority.

Further study of the ground data should focus on whether the fine features on the ground (which are not observed in the airborne data) are of interest.

Overall January, 2010 Conclusions

The surface TEM data collected with loop 1 allowed refinement of the Warrior model developed for the October data. The main findings from the modeling were:

1) E03 extended across the length of the survey and the data suggested no significant breaks in the structure. Its properties appear fairly constant across the survey.
2) The ground data was not particularly sensitive to the dip of E03, but is more sensitive to its dip extent, which is 400 m in the model. Although it is believed that the structure extends deeper than 400 m, it may be less conductive or it maybe electrically disconnected from the top of the structure.
3) There is good agreement between E03 and drill results, but more drill information will be useful in evaluating the model.
4) There is a set of three structures, E10, an average of 100 m to the south of E03. A response due to E10 was observed on all survey lines.

5) The ground magnetic data has been processed and integrated with the previous (2008) ground survey. It is in agreement with both the 2008 ground data and the 1999 airborne data.

Recommendations

1) TEM Analysis – Further interpretation of the ground TEM data collected In November/December: extension of Warrior to the west of Bluff Road (Loop 3 data) and Son's of Freedom (Loops 1, 2, and 3). Preliminary modeling does indicate that Warrior extends to the west. The detail of the modeling will depend on Citigold's interests.

2) TEM Surveying – At present, further ground TEM surveying is not recommended as the data collected thus far provides fairly extensive coverage over Warrior as well as Sons of Freedom. Further borehole EM is recommended, as discussed in the February-March Geophysical Proposal. Ground data is not particularly sensitive to the finer details of the model (such as dip), which are better resolved with the borehole data. Before this data can be collected, appropriate boreholes must be opened.

3) Magnetic Analysis – Further study of the ground magnetic and UTS airborne data should focus on determining the source of the magnetic structure and how they related to Warrior, as well as determining the usefulness of the fine-scale features in the ground data.

4) Ground Magnetic Surveying – Further collection of ground magnetic data is not considered a priority at this time. Additional data could be collected to the northeast (where airborne data was collected at high altitude), and potentially further west and east of the present ground data, depending on Citigold's interests. However, other geophysical work is considered more important and further analysis of the present magnetic data is recommended before any further collection of magnetic data.