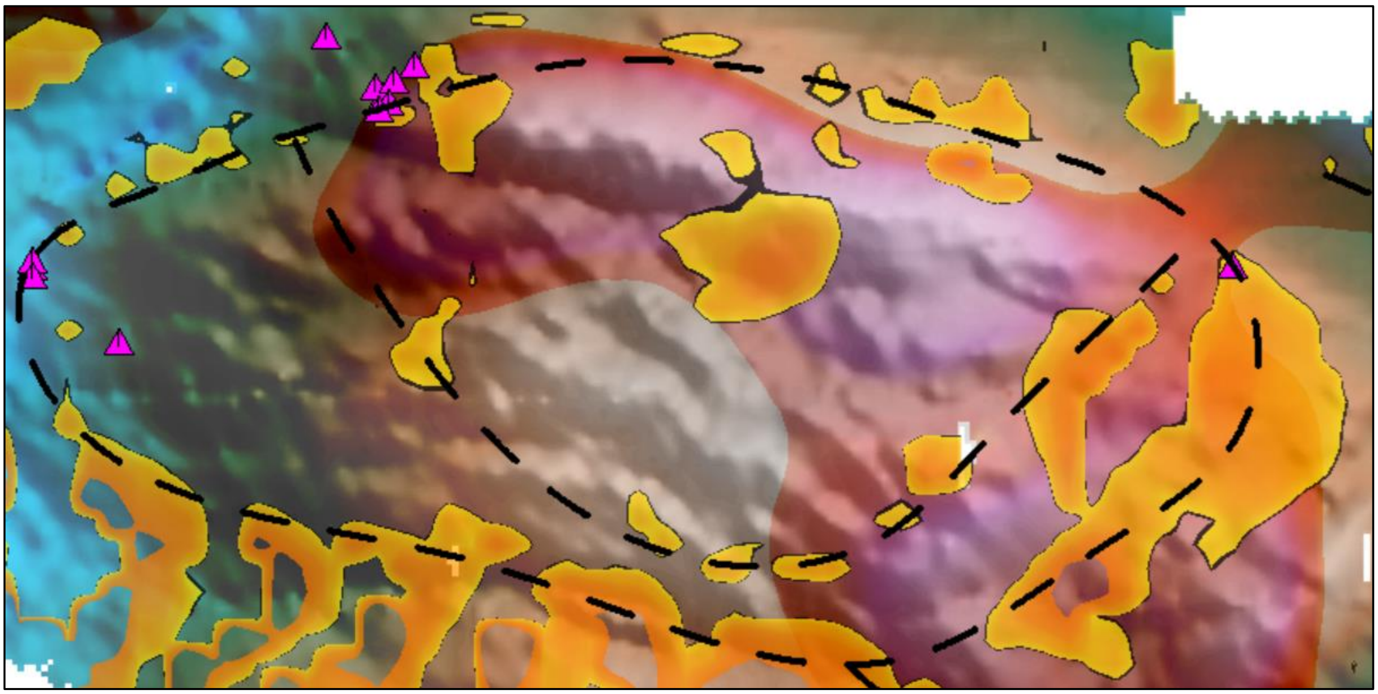
Sasquatch Resources

AeroTEM TDEM/MAG Inversion

Mount Sicker Project
British Columbia, Canada

Prepared by: Mike Anderson P.G.
May, 2022



Abstract

In May of 2022, Sasquatch Resources contracted Mike anderson P.G. to perform an inversion on Airborne Pulse Time Domain Electromagnetic (TDEM) and a Magnetic data. The original survey was flown in 2008. The TDEM inversion results show a concentric set of conductive anomalies at a depth of approximately 50 meters below surface. The TDEM features appear to bound a large magnetic structure extending from depth to 150 meters below surface. There is a noticeably clear contact running WNW along the southern side of the survey area.

1.0 Introduction

The Mount Sicker Project is located in the province of BC, Canada (figure 1), aproximitely 12-km from the town of Duncan. The airborne survey was made up of a single grid (the Fortuna block), over rugged terrain with elevations ranging from 10-m to over 700-m above sea level. The central and southern parts of the survey area contained a cultural interference such as transmission lines and buildings. A total 418.2-km were flown.

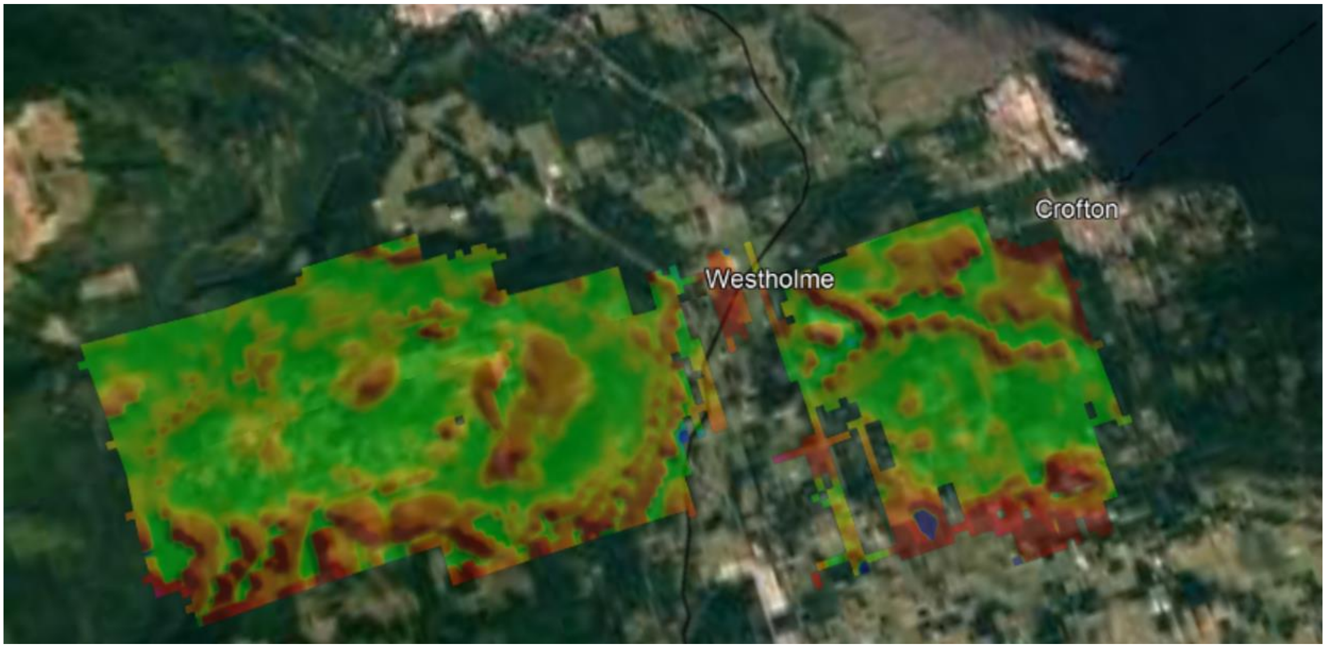


Figure 1: Site location

The terrain consists of flat hill-tops, rolling hills, very steep terrain, cliffs. There are valleys between the hills with thick vegitation. There are some roads/trails. There were cultural features such as power lines and buildings (figure 2) within the survey area.

Figure 2: Photo of the power line and building

2.0 Instrumentation

AeroTEM II TDEM

The electromagnetic system used was an Aeroquest AeroTEM II-time domain towed-bird system. The current AeroTEM II transmitter dipole moment is 38.8 kNIA. The AeroTEM bird is towed 38 meters (125 ft) below the helicopter with a 5-m diameter transmitter loop. The waveform is triangular with a symmetric transmitter on-time pulse of 1.10 ms and a base frequency of 150 Hz . The current alternates polarity every on-time pulse. During every Tx on-off cycle (300 per second), 120 contiguous channels of raw X and Z component (and a transmitter current monitor, itx) of the received waveform are measured. Each channel width is 27.78 microseconds starting at the beginning of the transmitter pulse. This 120-channel data is referred to as the raw streaming data. The AeroTEM system has two separate EM data recording streams, the conventional RMS DGR-33 and the AeroDAS system which records the full waveform The 120 channels of raw streaming data are recorded by the AeroDAS acquisition system onto a removable hard drive. The streaming data was processed post-survey to yield 33 stacked and binned on-time and off-time channels at a 10 Hz sample rate. The timing of the final processed EM channels is described in the following table:

Average TxOn 7.0406 us
Average TxOff 1090.7920 us

Channel	**Sample Range**	**Time Width (us)**	**Time Center (us)**	**Time After TxOn (us)**
On1	4 - 4	27.778	97.222	90.182
On2	5 - 5	27.778	125.000	117.959
On3	6 - 6	27.778	152.778	145.737
On4	7 - 7	27.778	180.556	173.515
On5	8 - 8	27.778	208.333	201.293
On6	9 - 9	27.778	236.111	229.071
On7	10 - 10	27.778	263.889	256.848
On8	11 - 11	27.778	291.667	284.626
On9	12 - 12	27.778	319.444	312.404
On10	13 - 13	27.778	347.222	340.182
On11	14 - 14	27.778	375.000	367.959
On12	15 - 15	27.778	402.778	395.737
On13	16 - 16	27.778	430.556	423.515
On14	17 - 17	27.778	458.333	451.293
On15	18 - 18	27.778	486.111	479.071
On16	19 - 19	27.778	513.889	506.848

Channel	**Sample Range**	**Time Width (us)**	**Time Center (us)**	**Time After TxOff (us)**
Off0	44 - 44	27.778	1208.333	117.541
Off1	45 - 45	27.778	1236.111	145.319
Off2	46 - 46	27.778	1263.889	173.097
Off3	47 - 47	27.778	1291.667	200.875
Off4	48 - 48	27.778	1319.444	228.652
Off5	49 - 49	27.778	1347.222	256.430
Off6	50 - 51	55.556	1388.889	298.097
Off7	52 - 53	55.556	1444.444	353.652
Off8	54 - 55	55.556	1500.000	409.208
Off9	56 - 57	55.556	1555.556	464.764
Off10	58 - 60	83.333	1625.000	534.208
Off11	61 - 63	83.333	1708.333	617.541
Off12	64 - 67	111.111	1805.556	714.764
Off13	68 - 72	138.889	1930.556	839.764
Off14	73 - 80	222.222	2111.111	1020.319
Off15	81 - 93	361.111	2402.778	1311.986
Off16	94 - 113	555.556	2861.111	1770.319

Survey Specifications

The survey coverage was calculated by adding up the along-line distance of the survey lines and control (tie) lines as presented in the final Geosoft database. The survey was flown with a line spacing of 100 meters. The control (tie) lines were flown perpendicular to the survey lines with a spacing of 1000 meters. The nominal EM bird terrain clearance was 30 meters but can be higher in more rugged terrain due to safety considerations and the capabilities of the aircraft. The magnetometer sensor is mounted in a smaller bird connected to the tow rope 17 meters above the EM bird and 21metres below the helicopter (Figure 4). A second magnetometer is installed on the tail of the EM bird. Nominal survey speed over relatively flat terrain was 75 km/hr and is generally lower in rougher terrain. Scan rates for ancillary data acquisition was 0.1 second for the magnetometer and altimeter, and 0.2 second for the GPS determined position. The EM data is acquired as a data stream at a sampling rate of 36,000 samples per second and was processed to generate final data at 10 samples per second. The 10 samples per second translate to a geophysical reading about every 1.5 to 2.5 meters along the flight path.

3.0 Inversion Results (TDEM)

For this and any geophysical exploration project, we attempt to project a block approximately 12 kilometers long by 10 kilometers wide onto a 20x30 centimeter sheet of paper. As such, visual distortion of data can become an inhibiting factor. One effect of this is termed "bleeding" from an anomaly and other gridding artifacts where anomalies can appear larger than they actually are in real space. Many of the features we will discuss appear irregular caused by the spatial interpolation algorithms embedded in the gridding routines. The reader should consider these points as they review the maps.

The data was 2D inverted using Geosoft software. The inversion utilizes cloud based processing capabilities to best fit the model. Horizontal grids at various depths are extracted from the models. We can also produce cross sections cutting through the model. Figure 5 is looking at the grid from the west. We see a noticeably clear contact along the southern side of the grid.

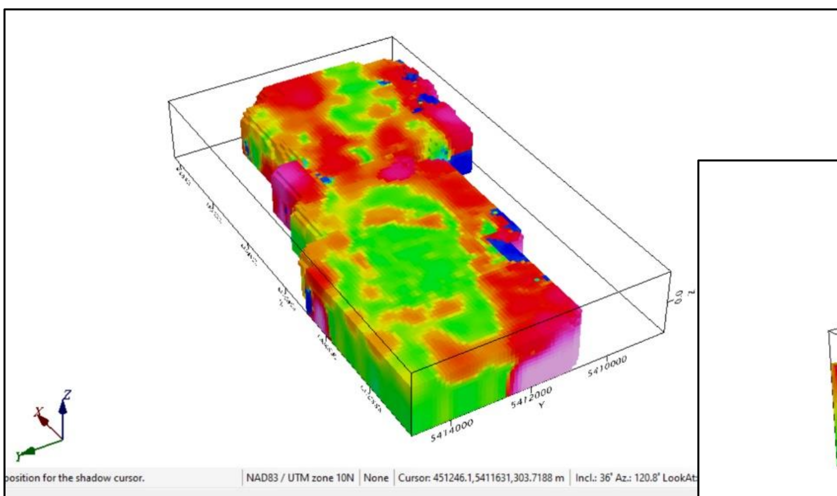


Figure 3: TDEM Inversion

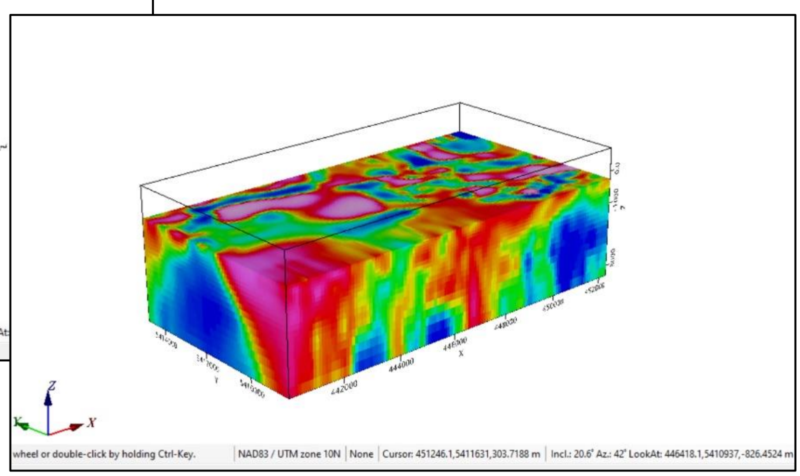


Figure 4: Mag Inversion

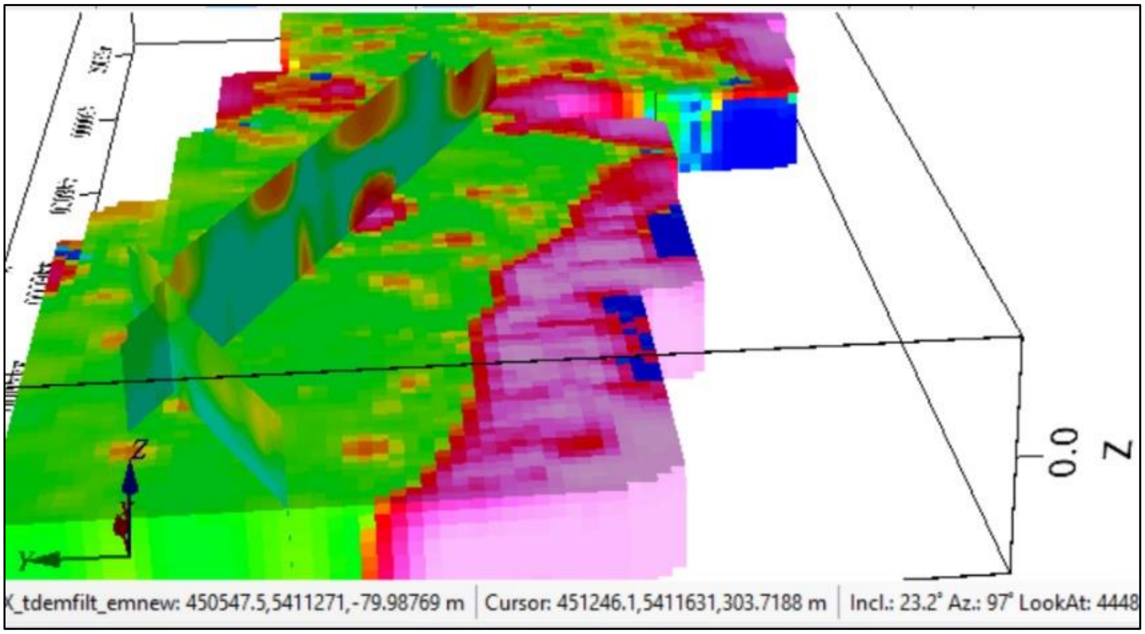


Figure 5: Geological Contact

A grid at depth 50-m was extracted from the TDEM inversion (figure 6). We see what appear to be circular and lines conductive zones. The magenta triangles are known showing. Figure 7 includes the interpretation.

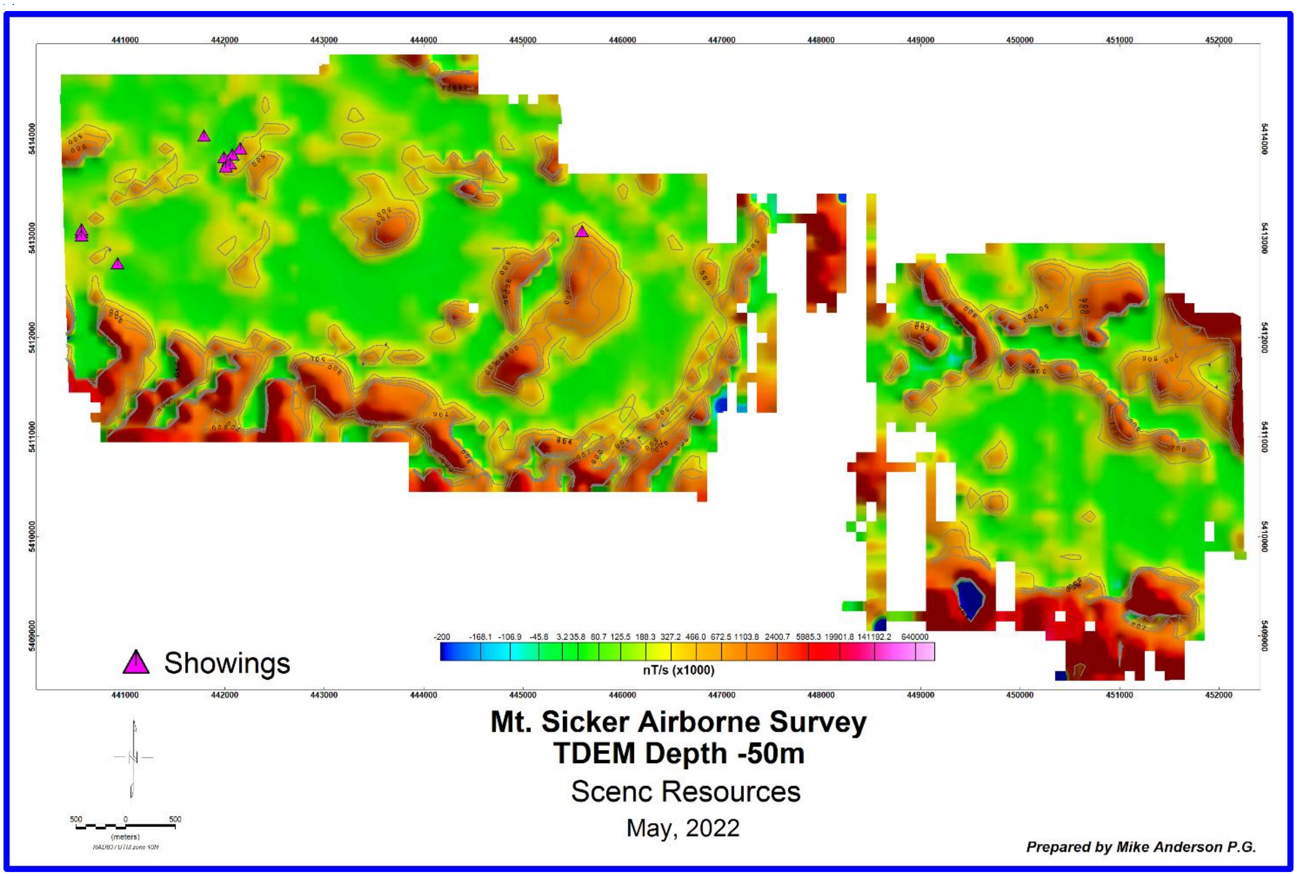


Figure 6: TDEM depth -50-m

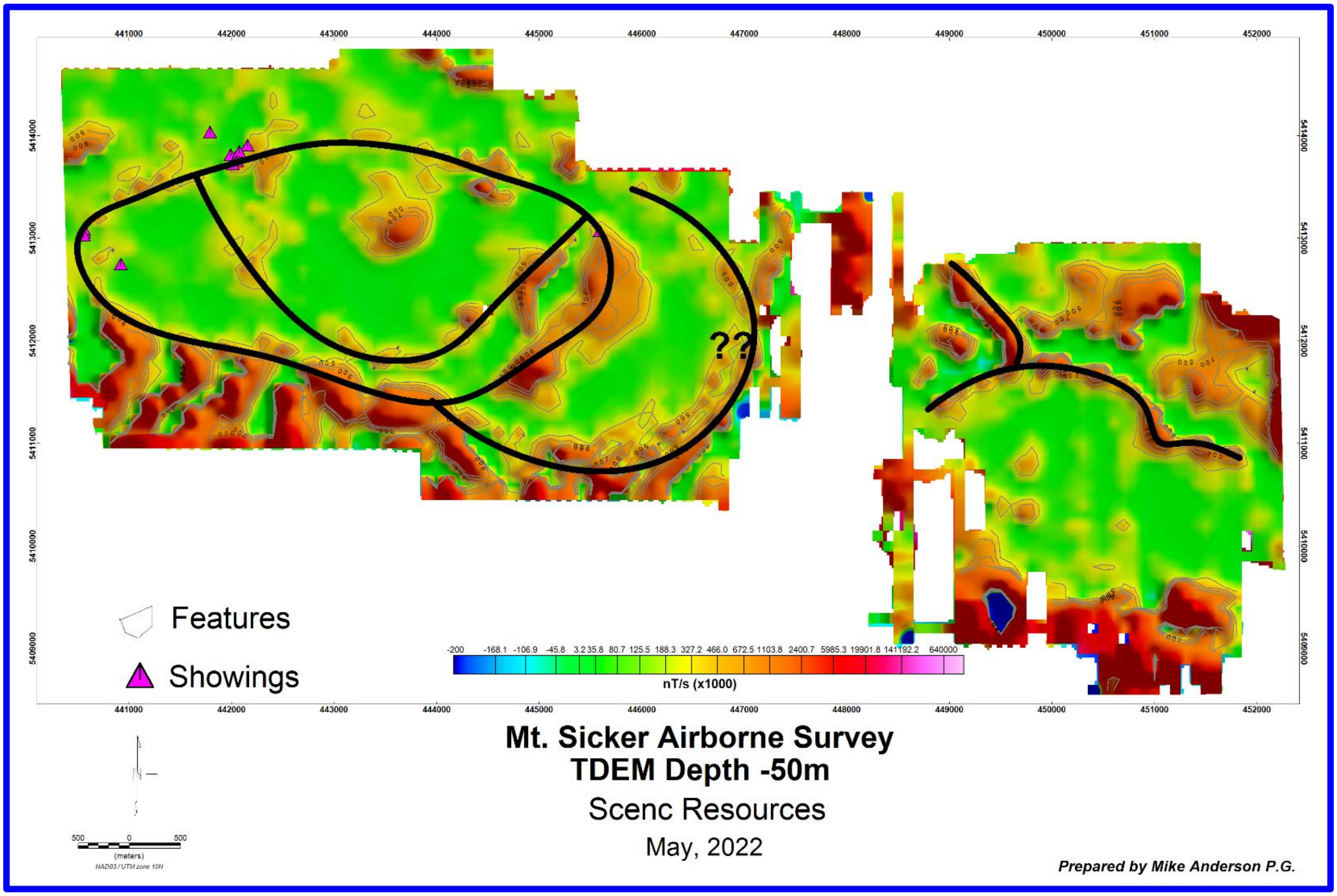


Figure 7: TDEM features

Figure 8 shows the magnetic data inversion at a depth of 850-m. we see a large structure or intrusive. The TDEM features are located near and along the edge of the magnetic structure. Figure 9 is the mag at depth 450 and shows that the structure appears to split. TDEM anomalies are located along this split.

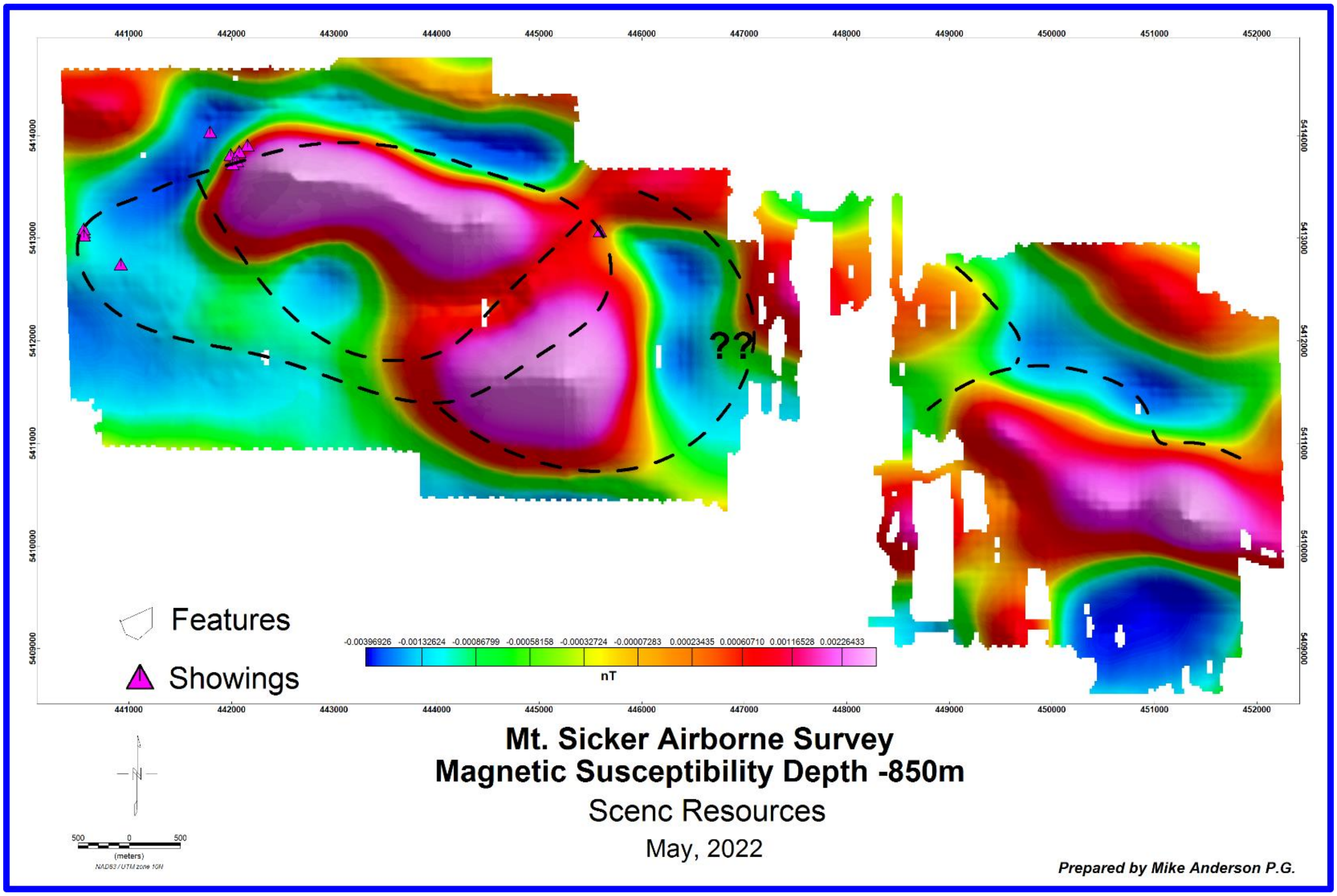


Figure 8: Mag depth -850-m

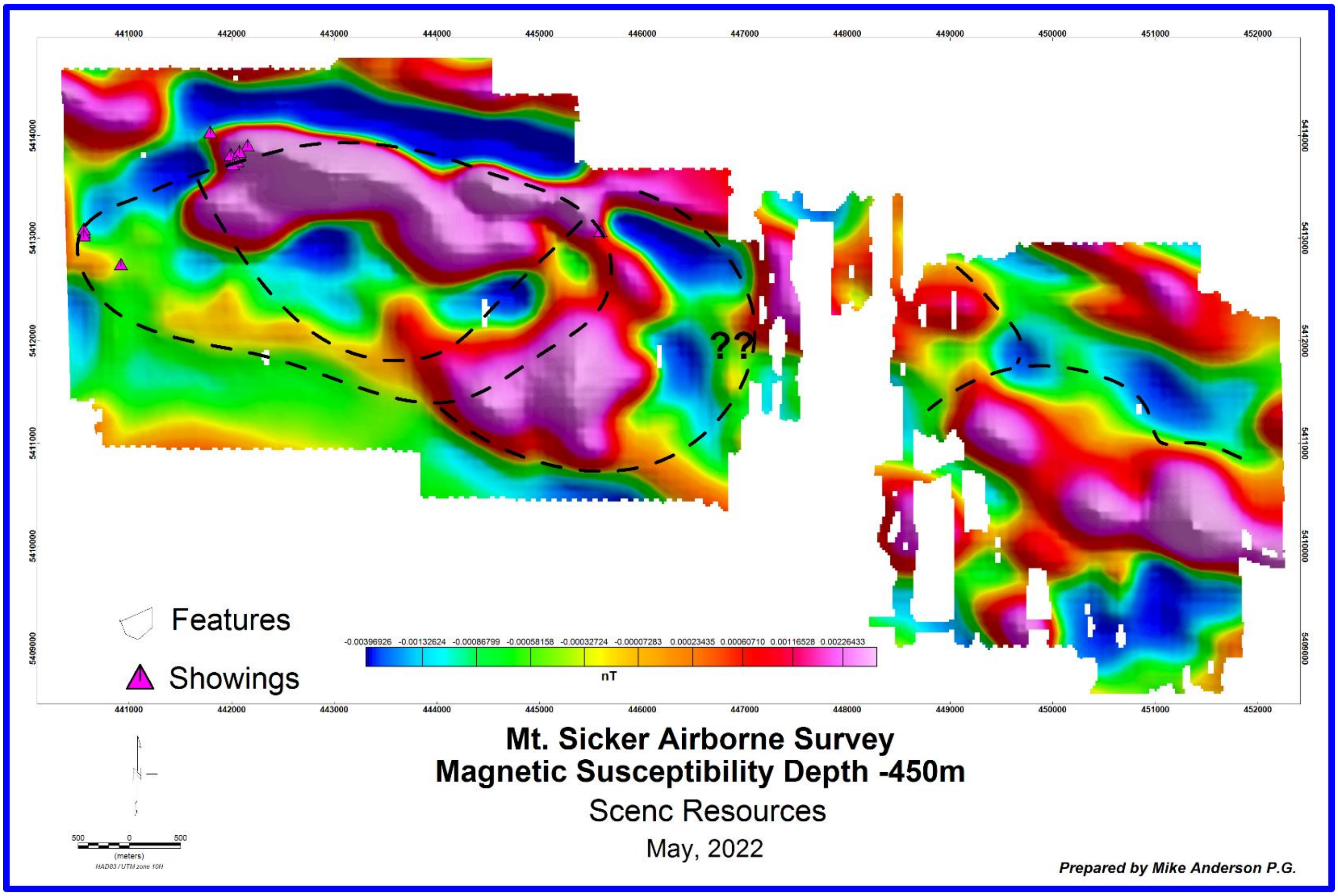


Figure 9: Mag depth -450-m

Figure 10 shows the TDEM with the magnetic anomaly.

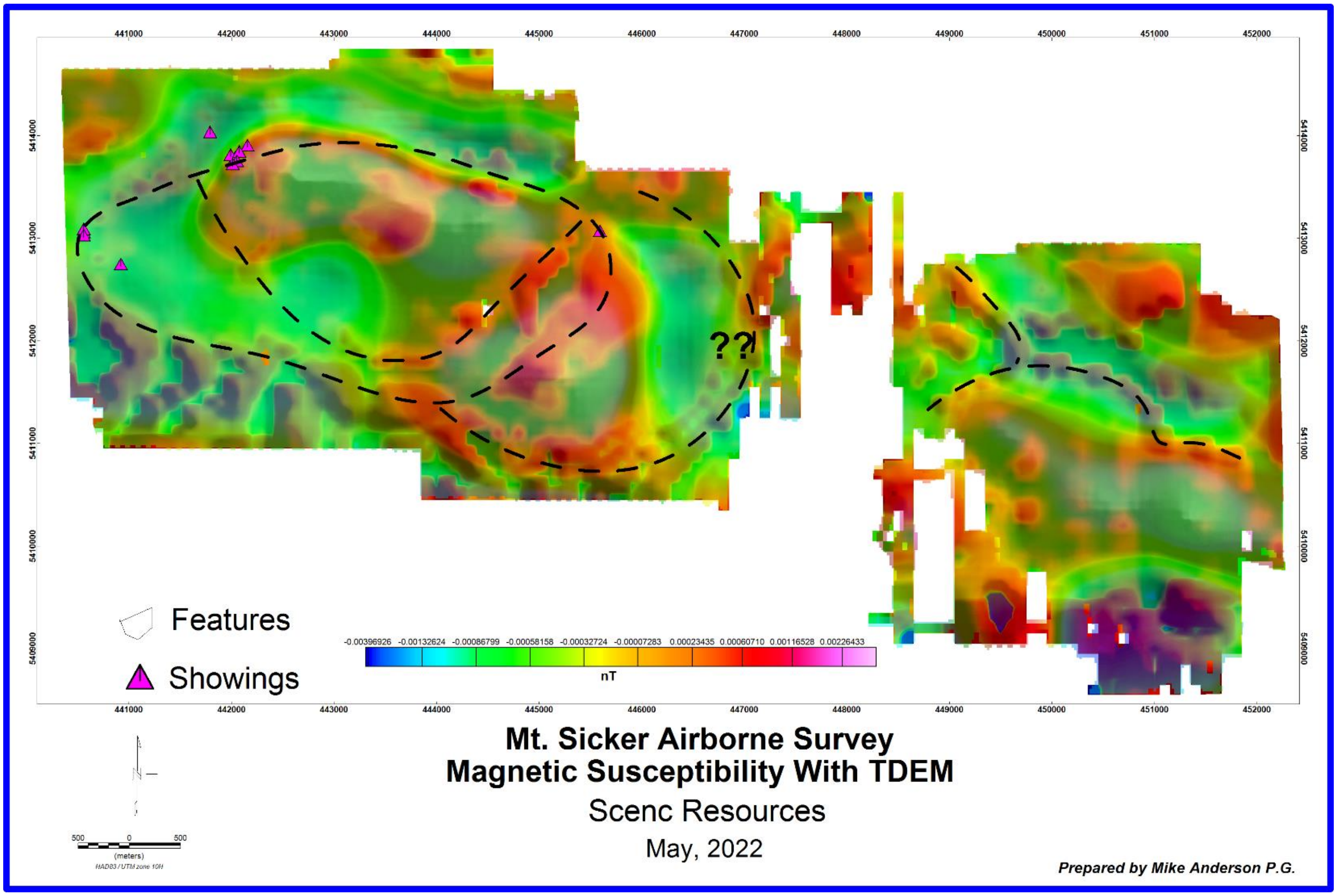


Figure 10: Mag and TDEM data

There appear to be correlation between the mag, TDEM and topographical changes with the TDEM anomalies located at a constant elevation (500-550 meters above see level). Only a portion of the mountain is associated with the magnetic structure/intrusion as indicated in figure 12.

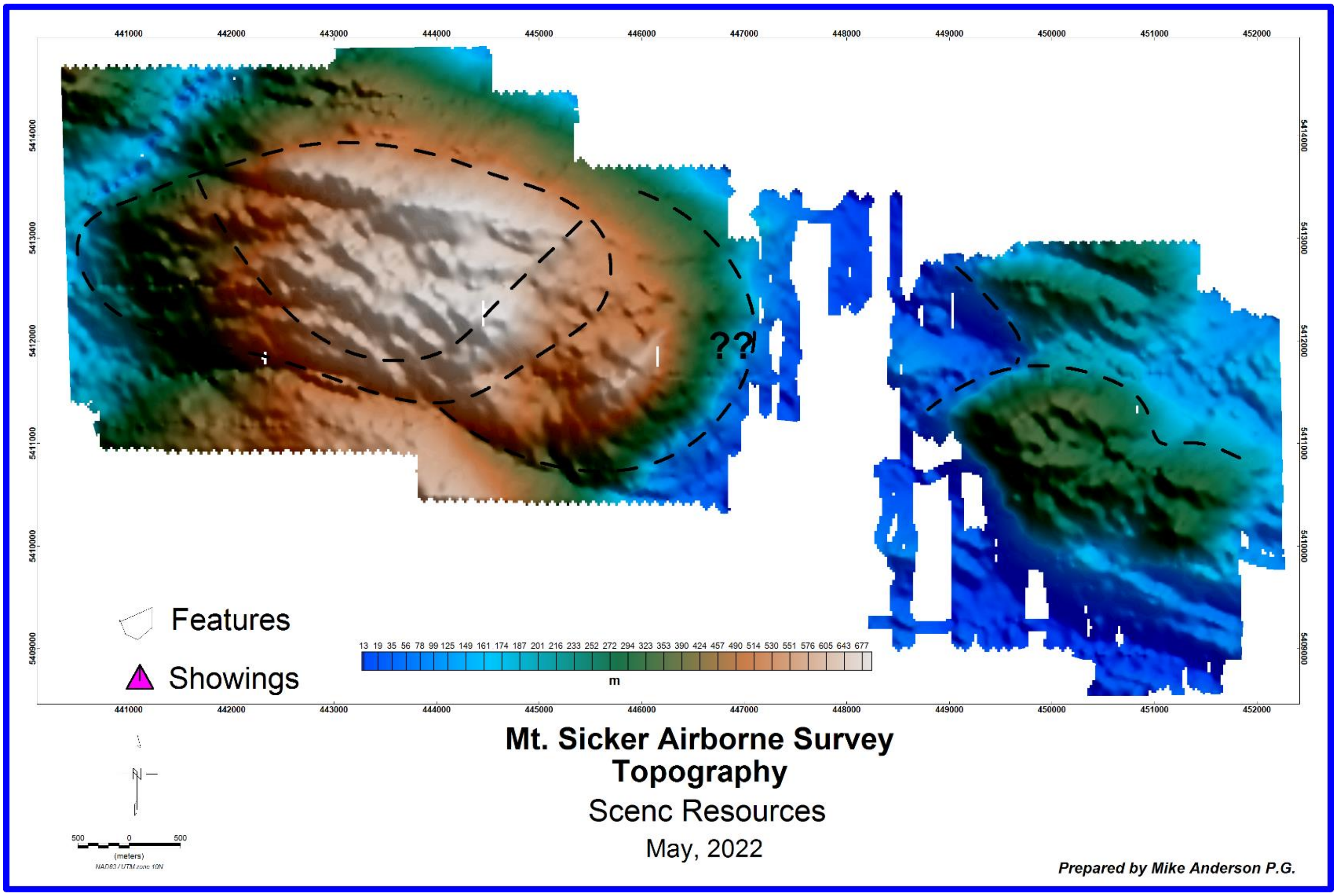


Figure 11: Topography with Features

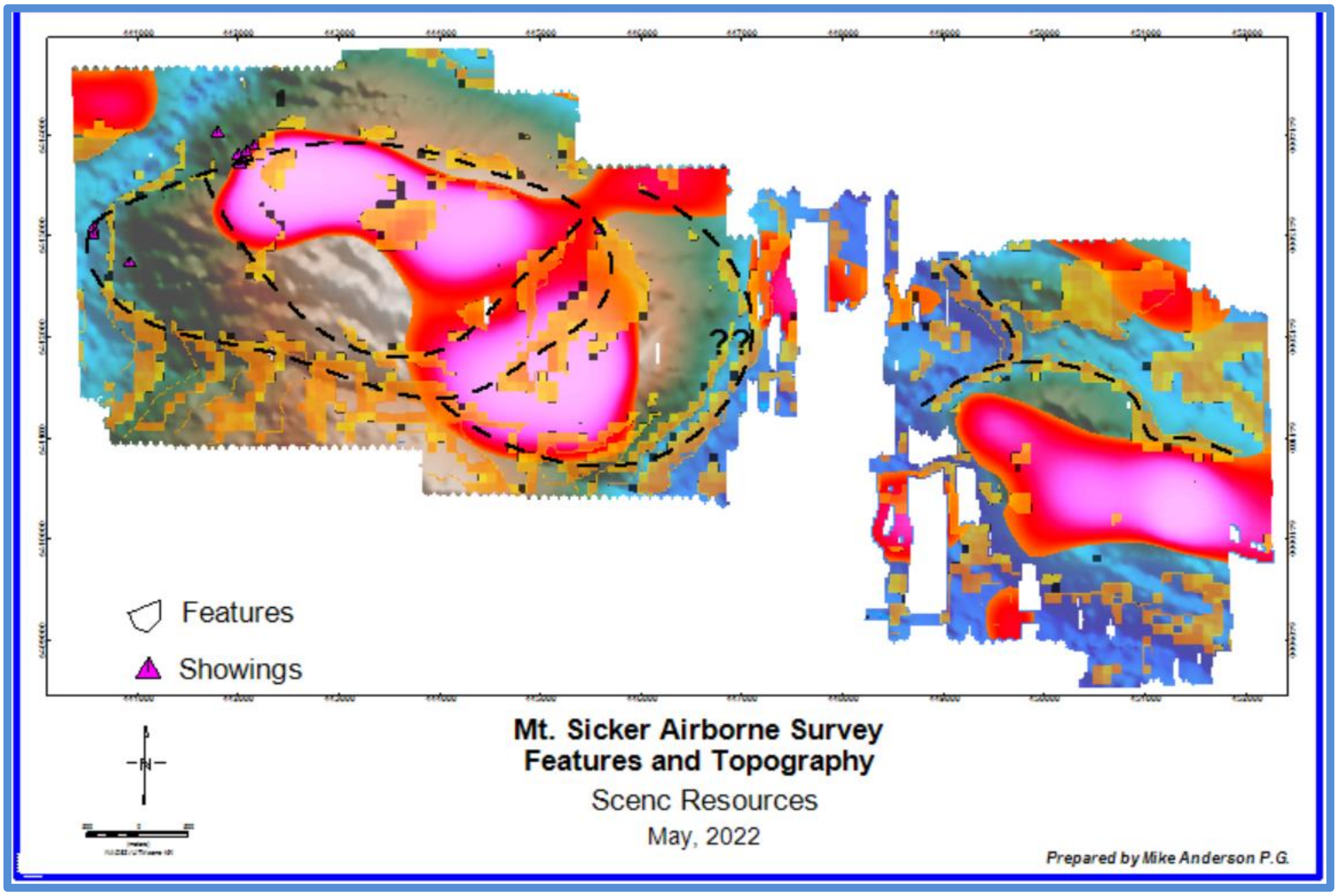


Figure 12: Topography with TDEM and Mag data

There are a set of small but strong conductors at a depth of 450-m. Because the system uses a small diameter coil, we have less confidence in the results at this depth than nearer surface. As single line anomalies these features would be completely disregarded however they do cover multiple lines (figure 14) indicating they may be real. We feel that at the frequency associated with these depth measurements was highly influenced by surface powerlines on the east side of the survey area and is less believable.

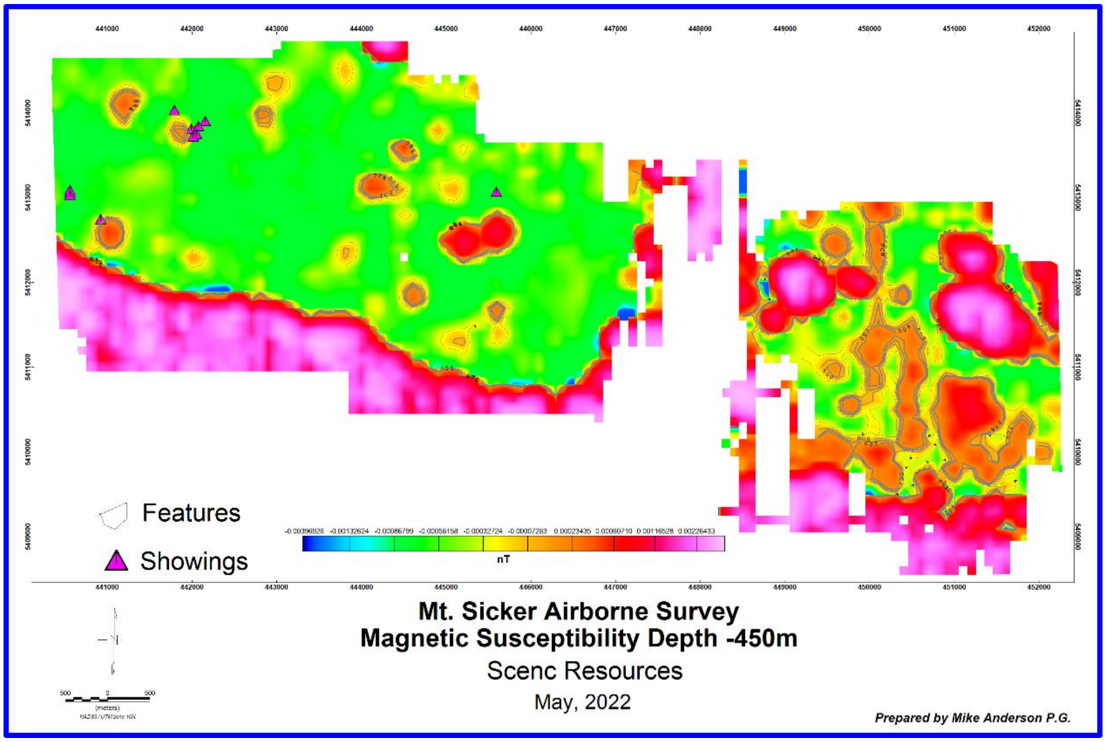


Figure 13: TDEM depth -450-m

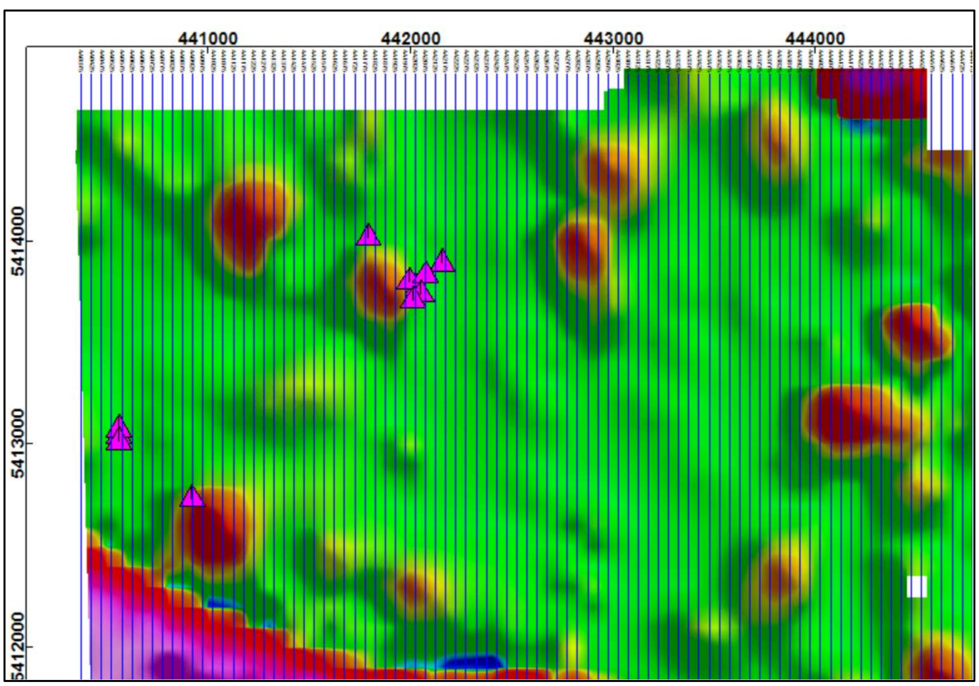


Figure 14: TDEM depth -450-m line path

Figure 15 shows the 350 mT/s TDEM iso-surface

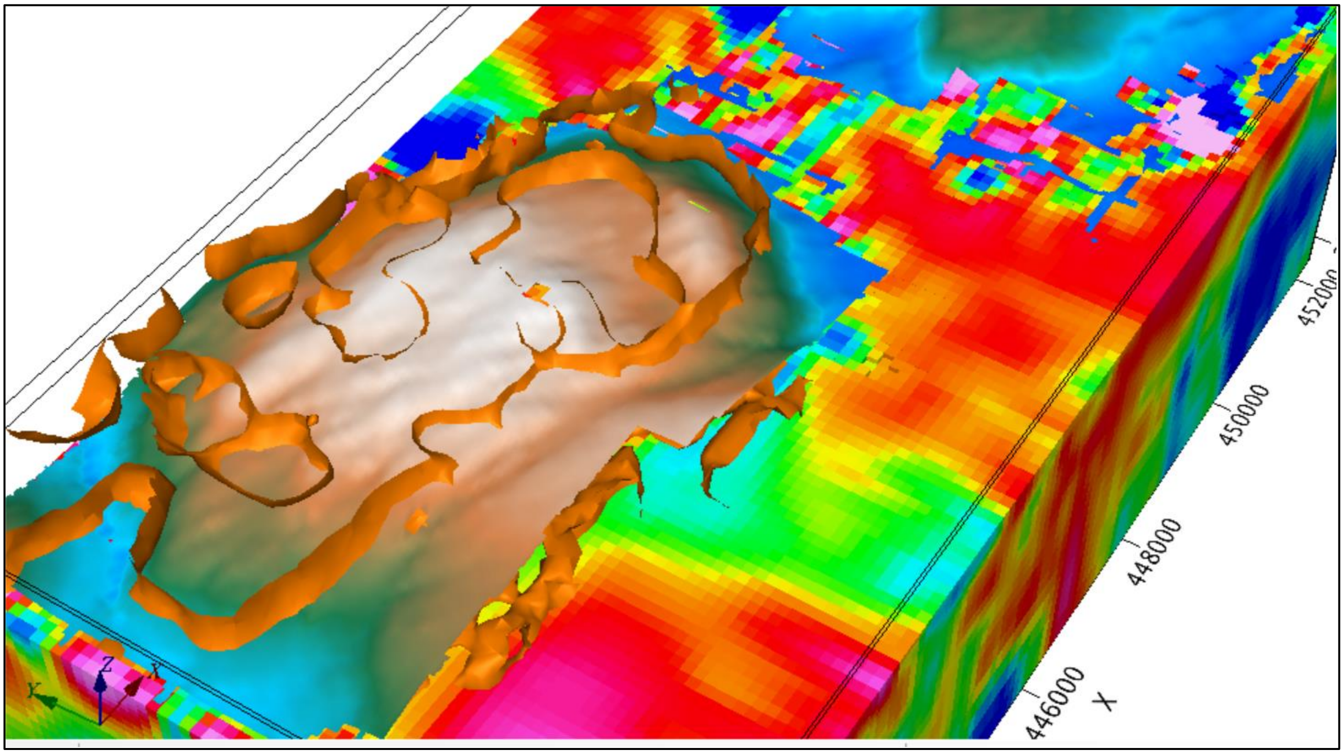


Figure 15: TDEM iso-surface

4.0 Recommendations

1. The Deep TDEM survey should be completed to better understand the deep anomalies detected during the airborne survey.
2. A gravity survey is recommended to better define the magnetic anomaly.
3. A drill and trenching program should be performed to determine the nature of the TDEM anomalies.

5.0 Deliverables

Digital data was delivered via dropbox. The digital data deliverable included:

- **Final Report -** PDF
- **Processed Data -** Geosoft GDB, GRD, PNG and MAP

Mike Anderson P. Geo

Disclaimer: This report is an interpretation of a geophysical survey. The opinions are the authors alone.

References

Report on a Helicopter-Borne AeroTEM System Electromagnetic & Magnetic Survey, Aeroquest 2008

VECTOR PULSE ELECTROMAGNETOMETER SURVEY On Behalf of SEREM LTD.
Mt. Sicker project, Duncan, B. C, Victoria Mining Division. AUTHOR: Glen E. White, B.Sc, P. Eng. Geophysicist DATE OP REPORT: March 20, 1979

Diamond Drilling MT. SICKER PROPERTY VICTORIA MINING DIVISION BRITISH COLUMBIA P. Ronning 1980

Jansen, J. and Witherly, K., 2004, The Tli Kwi Cho Kimberlite complex, Northwest Territories, Canada: A geophysical case study, 74th Ann. Internat. Mtg.: Soc. of Expl. Geophys., 1147-1150.

Lane, R., Green, A., Golding, C., Owens, M., Pik, P., Plunkett, C., Sattel, D. and Thorn, B., **2000,** An example of 3D conductivity mapping using the TEMPEST airborne electromagnetic system: 14th Geophysical Conference, Austr. Soc. Expl. Geophys., 31, 162-172.

Smith, R., Fountain, D. and Allard, M., 2003, The MEGATEM fixed-wing transient EM system applied to mineral exploration: a discovery case history: First Break, 21, no. 7. **Visser, S., Pezzot, E. and Carter, N., 2002**, Time domain EM and magnetic mapping of the Ferguson Lake Nickel-Copper-Cobalt-PGE property, 72nd Ann. Internat. Mtg: Soc. of Expl. Geophys., 408-411.

Witherly, K., Irvine, R. and Morrison, E., 2004, The Geotech VTEM time-domain helicopter EM system, 74th Ann. Internat.