Technical Report

Heliborne Magnetic and TDEM Survey

Chateau Fort Project, Blocks Target-C and Chateau Fort
Otish Mountains area, James Bay region, Québec
2015

Tarku Resources Ltd.
Suite 200, 16 – 11th Ave S.
Cranbrook, BC
Canada, V1C 2P1

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Prospectair Geosurveys

Dynamic Discovery Geoscience

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1515658

Prepared by:
Joël Dubé, Eng.

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Dynamic Discovery Geoscience
7977 Décarie Drive
Ottawa, ON, K1C 3K3
jdube@ddgeoscience.ca
819.598.8486

Survey flown by :
PROSPECTAIR

15 chemin de l'Étang
Gatineau, Québec J9J 3S9
(819)661-2029
Fax: 1.866.605.3653
contact@prospectair.ca

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I. INTRODUCTION

PROSPECTAIR conducted a high-resolution heliborne magnetic (MAG) and time-domain electromagnetic (TDEM) survey for the mineral exploration company Tarku Resources Ltd. on its Chateau Fort Property, located in the Otish Mountains area of the James Bay region, Province of Québec (Figure 1). The survey was flown from June 10th to 15th 2015.

Two survey blocks were flown for a total of 2184 l-km (Table 1). A total of 10 production flights were performed using PROSPECTAIR's Eurocopter EC120B, registration C-GEDI. The helicopter and survey crew operated out of the VGD Camp installed along Road 167 within NTS map sheet 032P09, and located about 45 km south of the Target-C block (Figure 2).

Table 1: **Survey blocks particulars**

Block	NTS Mapsheet	Line-km flown	Flight number	Date Flown
Chateau Fort	23D04, 23D05, 33A01 & 33A08	1939 l-km	Flt 1 to 10	June 10th to 15th
Target-C	33A01	245 l-km	Flt 10	June 15th

Figure 1: **General Survey Location**

The Chateau Fort and Target-C blocks were flown with traverse lines at 100 m spacing and control lines spaced every 1000 m. The survey lines were oriented N160. The control lines were oriented perpendicular to traverse lines. The average height above ground of the helicopter was 86 m, with the mag sensor and receiver coil at 61 m, and the transmitter loop at 36 m above the ground. The average survey flying speed (calculated equivalent ground speed) was 32.0 m/s. The survey area is covered by forest and lakes, and the topography is mostly undulating, with some significant hills locally, which are fairly typical characteristics of the Otish Mountains area. The elevation is ranging from 480 to 910 m above mean sea level (MSL) in the surveyed zones. Road 167 passes just outside the western edge of the Chateau Fort block. Coordinates outlining the survey blocks are given in Appendix A, with respect to NAD-83 datum, UTM projection zone 18N. The mineral titles worked by Tarku Resources (in red) are shown in Figure 3, together with survey lines.

Figure 2: **Survey location and base of operation**

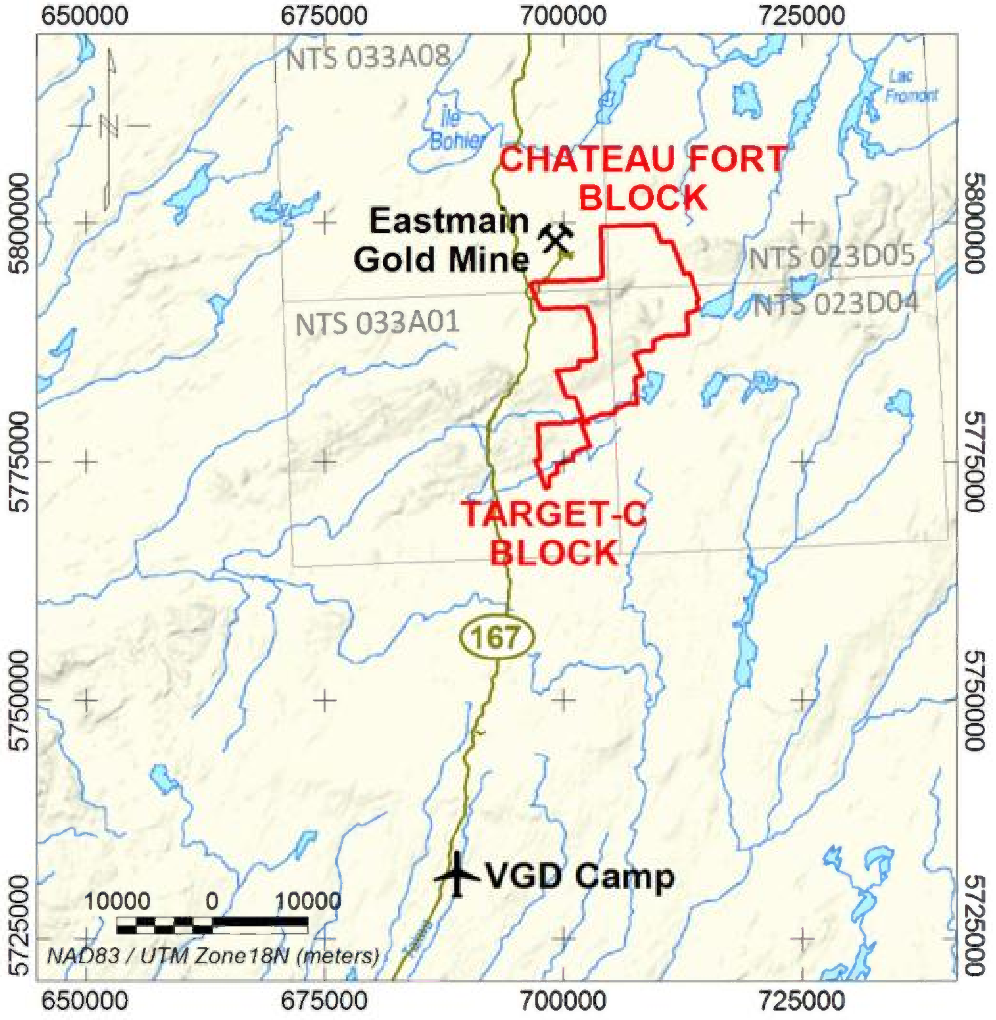
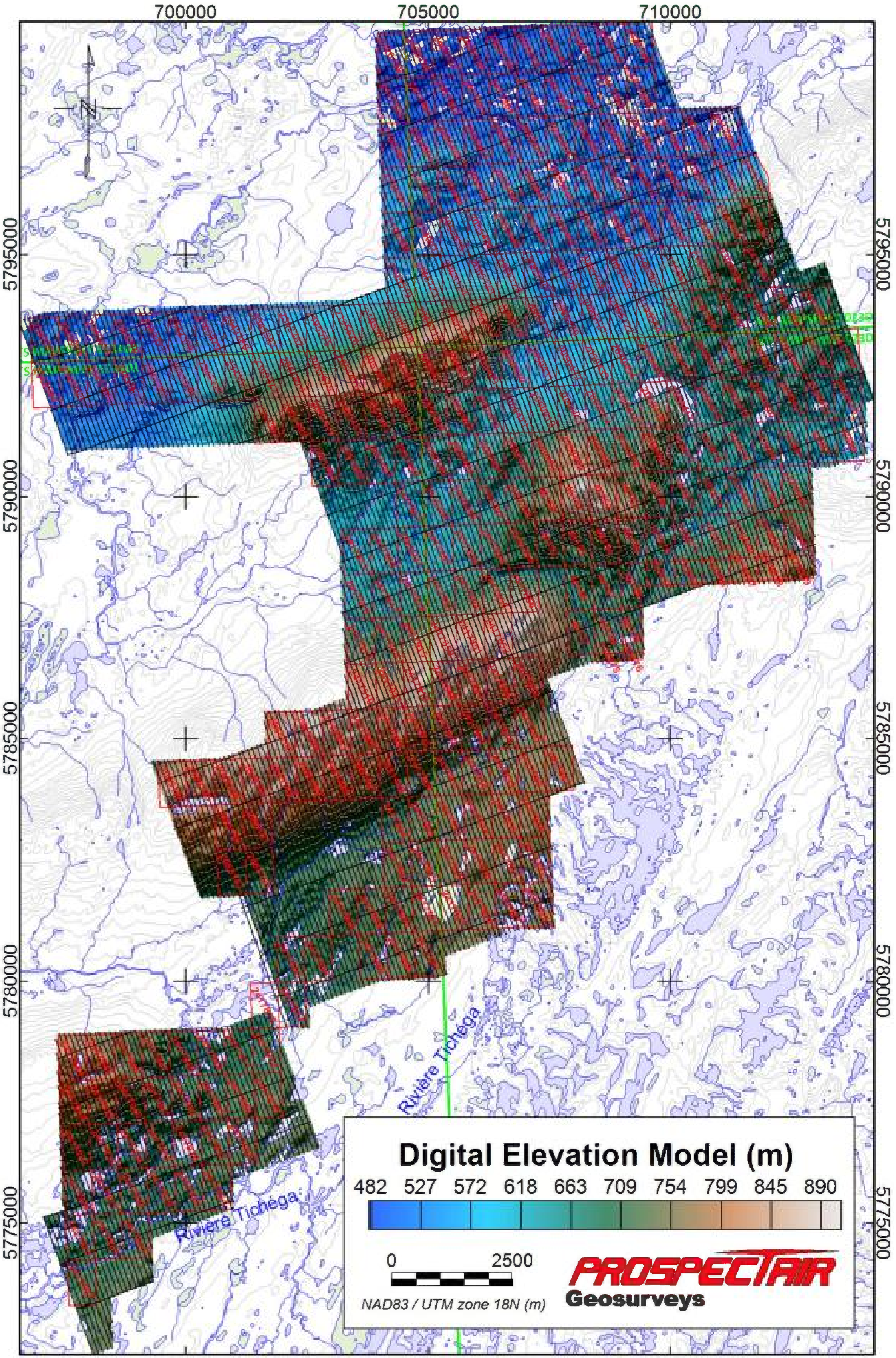


Figure 3: **Survey lines and claims**



II. SURVEY EQUIPMENT

PROSPECTAIR provided the following instrumentation for this survey:

Airborne Magnetometers
Geometrics G-822A
Both the ground and heliborne systems used a non-oriented (strap-down) optically-pumped Cesium split-beam sensor. These magnetometers have a sensitivity of 0.005 nT and a range of 15,000 to 100,000 nT with a sensor noise of less than 0.02 nT. The heliborne sensor was mounted in a bird made of non-magnetic material located 25 m below the helicopter when flying. Total magnetic field measurements were recorded at 10 Hz in the aircraft. The ground system was recording magnetic data at 1 sample every second.

Time-Domain Electromagnetic Transmitter and Receiver
ProspecTEM
Prospectair Geosurveys significantly modified and improved the *Emosquito II* that was built by THEM Geophysics of Gatineau (Québec) to develop ProspecTEM. It is a powerful light-weight system adapted for small size helicopters and easy manoeuvrability enabling the system to be flown as close to the ground as safely possible and ensuring maximum data resolution. Advanced signal processing technique and a full processing package was developed in house to optimize the ProspecTEM data. The technical specifications are listed below in Table 2.

ProspecTEM system employs a transient or time-domain electromagnetic transmitter that drives an alternating current through an insulated electrical coil system. The towing bridle is constructed from a Kevlar rope and multi-paired shielded cables. It is attached to the helicopter by a weak link assembly. An onboard harness with outboard connectors mounted on a plate allows for quick disconnection or connection of the exterior elements. The system uses a 4 KW generator and a large condenser to transmit alternating 2.75-ms half sine pulses with intervening off-times of 13.916 ms electric pulse, 60 pulses per second.

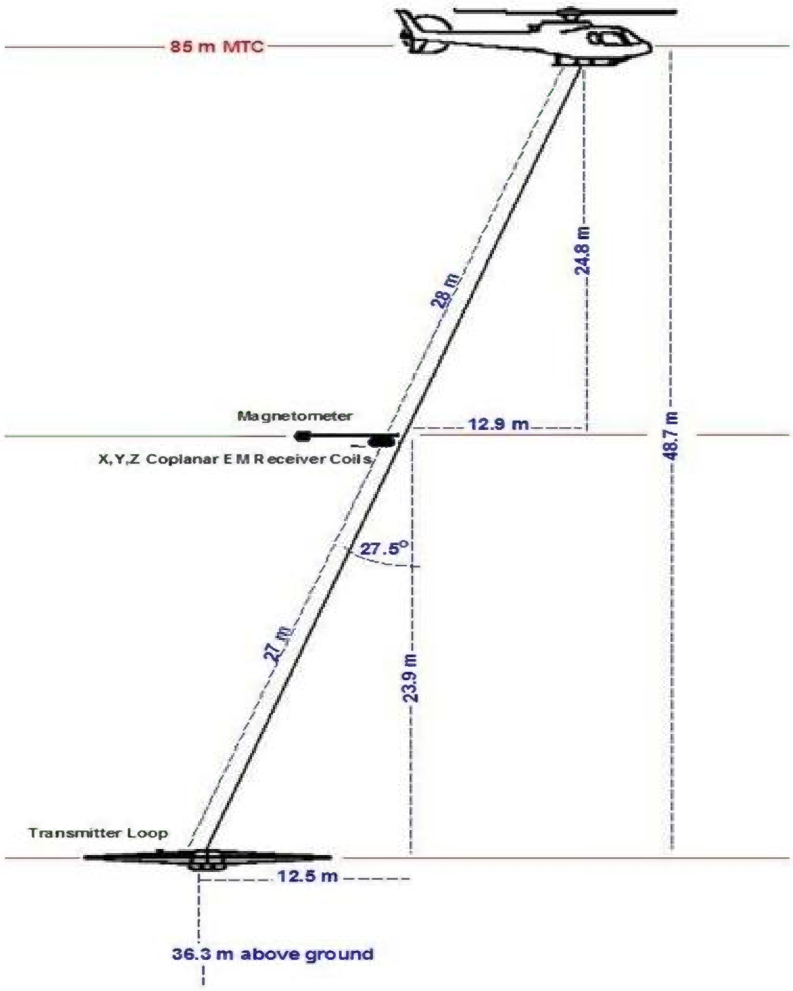
The current in the coil produces an electromagnetic field. Termination of the current flow is not instantaneous, but occurs over a very brief period of time (a few microseconds) known as the ramp time, during which the magnetic field is time-variant. The time-variant nature of the primary electromagnetic field, which propagates downward and outward into the subsurface, induces eddy currents which characteristics are governed by rocks conductivity distribution. These eddy currents generate a secondary electromagnetic field, in accordance with Faraday's Law. This secondary field immediately begins to decay in the process. Measurements of the secondary field are made only during the time-off period by a vertical component receiver located almost half way between the helicopter and the transmitter loop. It is placed with the magnetometer taped to a horizontal boom which supports the receiving coils tear-drop shape vessel at its end. The boom has an elastic suspension. A proprietary suspension system protects the orthogonal coils assembly and limits the total field excursions. The tear-drop vessel acts as a vane and maintains the mast in the line of flight.

Depth of investigation depends on the time interval after shutoff of the current, since at later times the receiver is sensing eddy currents at progressively greater depths. The intensity of the eddy currents at specific times and depths is determined by the bulk conductivity of subsurface rock units and their contained fluids.

Table 2: **Technical specifications of the ProspecTEM Time-Domain system**

Item	Specification
Transmitter:	
Loop Diameter:	5.6 meters
Current Waveform:	Half-Sine
Turns:	2
Pulse Length	2.75 ms
Frequency	30 Hz
Loop Area	25 m^2
Peak Current	3000A
Tow Cable Length	65 meters
Self-Powered	13HP Honda coupled with 28 Volts Alternator
Receiver:	
Coils axis	Z
Configuration	Coaxial (Z)
Two channels	Current and Z
Max Sampling rate	1000 points per half cycle at 90 Hz
Survey sampling rate	1000 per half cycle at 30Hz
Sampling	Full waveform
Gates	Programmable
On time signal	Recorded
Mechanical:	
Maximum survey speed:	110 km per hour
Transmitter height	30 meters AGL
Receiver height	60 meters
Weight (Total)	200 kg

Figure 4: **ProspecTEM system configuration**



Real-Time Differential GPS

Omnistar DGPS

PROSPECTAIR uses an OmniStar differential GPS navigation system to provide real-time guidance for the pilot and to position data to an absolute accuracy of better than 5 m. The *Omnistar* receiver provides real-time differential GPS for the Agis on-board navigation system. The differential data set was relayed to the helicopter via the Omnistar network appropriate geosynchronous satellite for the survey location. The receiver optimizes the corrections for the current location.

Airborne Navigation and Data Acquisition System

Pico-Envirotec AGIS-XP system

The Airborne Geophysical Information System (AGIS-XP) is advanced, software driven instrument specifically designed for mobile aerial or ground geophysical survey work. The AGIS instrumentation package includes an advanced satellite navigation system (GPS), real-time flight path information that is displayed over a map image of the area, and reliable data acquisition software. Thanks to simple interfacing, the radar and barometric altimeters, the TDEM system and the Geometrics magnetometer are easily integrated into the system and digitally recorded. Automatic synchronization to the GPS position and time provides very close correlation between data and geographical position. The AGIS is equipped with a software suite allowing easy maintenance, upgrades, data QC, and project and survey area layout planning.

Magnetic Base Station

GEM GSM-19

A GEM GSM-19 Overhauser magnetometer, a computer workstation and a complement of spare parts and test equipment serve as the base station. PROSPECTAIR establish the base station in a secure location with low magnetic noise. The GSM-19 magnetometer has resolution of 0.01 nT, and 0.2 nT accuracy over its operating range of 20,000- to 100,000 nT. The ground system was recording magnetic data at 1 Hz.

Altimeters

Free Flight Radar Altimeter

The Free Flight radar altimeter measures height above ground to a resolution of 0.5 m and an accuracy of 5% over a range up to 2,500 ft. The radar altimeter data is recorded and sampled at 10 Hz.

Prospectair Digital Barometric Pressure Sensor

The barometric pressure sensor measures static pressure to an accuracy of ± 4 m and resolution of 2 m over a range up to 30,000 ft above sea level. The barometric altimeter data are sampled at 10 Hz.

Survey helicopter

Eurocopter EC120B (registration C-GEDI)

The survey was flown using Prospectair's EC120B helicopter that handles efficiently the equipment load and the required survey range. Table 3 presents the EC120B technical specifications and capacity, and the aircraft is shown in Figure 5.

Table 3: **Technical specifications of the EC120B Eurocopter helicopter**

Item	Specification
Powerplant	One 376kW (504hp) Turbomeca Arrius 2F
Rate of climb	1,150 ft/min
Cruise speed	223 km/h – 120 kts
Service ceiling	17,000 ft
Range with no reserve	710 km
Empty weight	991 kg
Maximum takeoff weight	1,715 kg

Figure 5: **Eurocopter EC120B**

III. SURVEY SPECIFICATIONS

Data Recording

The following parameters were recorded during the course of the survey:

In the helicopter:

- GPS positional data: (time, latitude, longitude, altitude, heading and accuracy (PDOP)) recorded at intervals of 0.1 s;
- Total magnetic field: recorded at intervals of 0.1 s;
- Pressure as measured by the barometric altimeter at intervals of 0.1 s;
- Terrain clearance as measured by the radar altimeter at intervals of 0.1 s;
- Z and Current TDEM channels at 90000Hz.

At the base and remote magnetic ground stations:

- Total magnetic field: recorded at intervals of 1 s;
- GPS time recorded every 1s to synchronize with airborne data.

Technical Specifications

The data quality control was performed on a daily basis. The following technical specifications were adhered to:

- *Height* – 85m target terrain clearance for the MAG-TDEM survey except in areas where Transport Canada regulations prevent flying at this height, or as deemed necessary by the pilot to ensure safety. Traverse lines and control lines must be flown at the same altitude at points of intersection; the altitude tolerances are limited to no more than 30 m difference between traverse lines and control lines.
- *Airborne Magnetometer Data* - The noise envelope not to be exceeded 0.5 nT more than 500 m line-length without a reflight.
- *Diurnal Specifications* – A maximum tolerance of 5.0 nT (peak to peak) deviation from a long chord of one minute at the base station.
- *EM data* – No spikes on Z channel and constant current confirmed.
- *Flying Speed* – The average ground speed for the survey aircraft should be 120 kph. The acceptable high limit is 160 kph over flat topography.
- *Radar Altimeter* – minimal accuracy of 5%, minimum range of 0-2500 m.
- *Barometer* – Absolute air pressure to 0.1 kPa.
- *Flight Path Following*

  Traverse lines: Azimuth N160, 100 m spacing.
  Control Lines: Azimuth N070, 1000 m spacing.

IV. SYSTEM TESTS

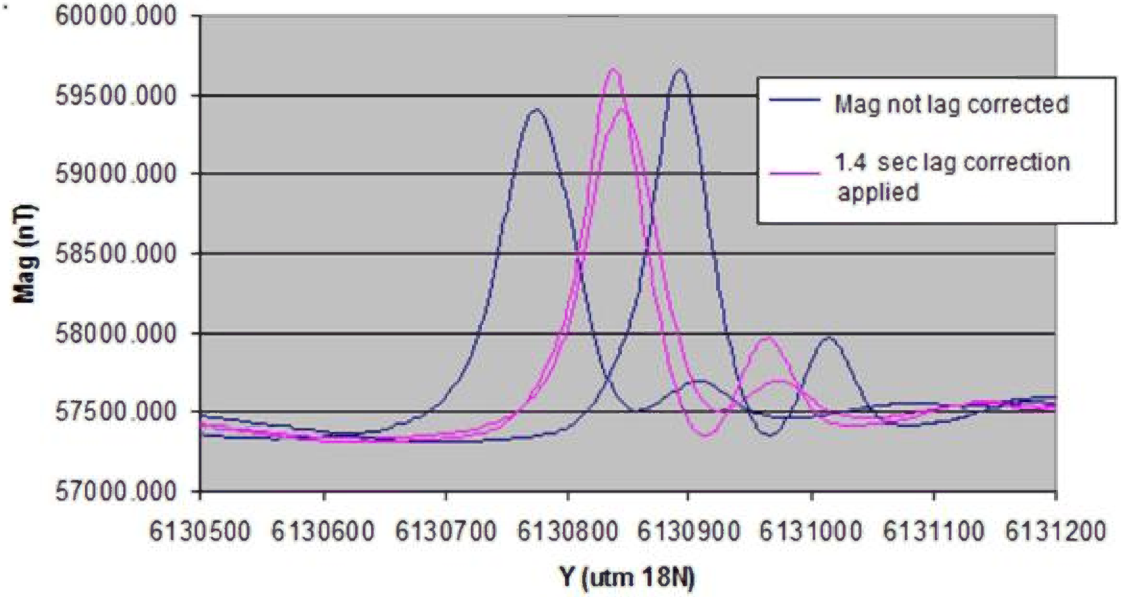
Magnetometer System Calibration

The survey configuration using a bird towed 25 m below any magnetic piece of the helicopter allows the simplification of the magnetic calibration requirement. Consequently, heading error and aircraft movement noise was considered negligible and no correction was applied to the data.

Instrumentation Lag

The data lag is a combination of two factors: 1) the time difference between when a reading is sensed, and when that value is recorded by the acquisition system, and 2) the time taken for the sensor to arrive at the location of the GPS antenna. The second factor is defined by the physical distance between the GPS antenna and any given sensor, and the speed of the aircraft. The total magnetic lag value for the AGIS acquisition system has been calculated to be 1.35 s. Figure 6 shows a graph of the lag corrected magnetic data compared to raw data over a significant magnetite anomaly. The TDEM lag was calculated to be 0.35 s.

Figure 6: **Comparison between lag corrected and raw magnetic data**



V. FIELD OPERATIONS

The survey operations were conducted out of the VGD Camp from June 10th to 15th, 2015. The MAG-TDEM data acquisition required 10 flights. At the end of each production day, the data were sent to the DD GEOSCIENCE office via internet. The data were then checked for Quality Control to ensure they fulfilled contractual specifications. The full dataset was inspected prior to provide authorization for the field crew to demobilize. The GEM-19 magnetic base station was set up in a magnetically quiet area close to the VGD Camp, at latitude 51.7062945 °N, longitude 72.2665521 °W. The survey pilot was Alain Tremblay and the survey system technician was Jonathan Drolet.

Figure 7: **Example of a magnetic base station setup**

VI. DIGITAL DATA COMPILATION

Data compilation including editing and filtering, quality control, and final data processing was performed by Joël Dubé, Eng. Processing was performed on high performance desktop computers optimized for quick daily QC and processing tasks. Geosoft software Oasis Montaj version 8.4 and Matlab 7 R2009B were used.

Magnetometer Data

The airborne magnetometer data, recorded at 10 Hz, were plotted and checked for spikes and noise on a flight basis. A 1.35 second lag correction was applied to all data to correct for the time delay between detection and recording of the airborne data.

Ground magnetometer data were recorded at 1 sample per second and interpolated by a spline function to 10 Hz to match airborne data. Data were inspected for cultural interference and edited where necessary. Some low-pass filtering was deemed necessary on the ground station magnetometer data to remove minor high frequency noise. The diurnal variations were removed by subtracting the ground magnetometer data to the airborne data and by adding back the average of the ground magnetometer value.

Levelling corrections were performed using intersection statistics from traverse and tie lines. After statistical levelling was considered satisfactory, decorrugation was applied on the data to remove any remaining subtle non-geological features oriented in the direction of the traverse lines.

Once the Total Magnetic Intensity (TMI) was gridded, its First Vertical Derivative (FVD) and Second Vertical Derivative (SVD) were calculated to enhance narrower geological features. Finally, the regional component of the Earth's magnetic field, described by the International Geomagnetic Reference Field (IGRF), has been removed from the TMI to yield the residual TMI. This ensures that the very long wavelength signal within the block is indeed originating from the local geology and not from the regional gradient.

Radar Altimeter Data

The terrain clearance measured by the radar altimeter in metres was recorded at 10 Hz. The data were filtered to remove high frequency noise using a 1 sec low pass filter. The final data were plotted and inspected for quality.

Positional Data

Real time DGPS correction provided by Omnistar was applied to the recorded GPS positional data. No post-flight DGPS processing was made using a GPS base station.

Positional data (Lat, long, UTM X, UTM Y, geoid height) were recorded at 10 Hz sampling rate and all data processing was performed in the WGS-84 datum. The delivered data are provided in X, Y locations in UTM projection zone 18 North, with respect to the NAD-83 datum. Altitude data were initially recorded relative to the GRS-80 ellipsoid, but are delivered as orthometric heights (MSL elevation).

TDEM Data

The PicoEnvirotec EM Digital Acquisition System records the vertical component (Z) of the receiver coils at a sampling rate of 90000Hz. There is 30 full cycles (60 half cycles) of the full waveform (Tx ON and OFF time) every second.

The first data manipulation involves a stacking procedure where each half cycle is weighted with respect to the previous cycle (±¼), the next cycle (±¼) and its own value (± ½). The positive and negative signs of the respective multiplication coefficients are used to make positive all negative half cycles. The next step is the half cycle averaging corresponding to the desired sampling rate. In the present case, from the 60 stacked positive half cycles per second, 6 consecutive half cycles are averaged to produce one sample every 0.1 sec.

The windowing settings for the 40 different channels are presented in Table 4. Channels 1 to 11 correspond to the ON-time measurements and channels 12 to 40 correspond to the OFF-time. Channel 12 isn't used for interpretation and mapping as it exists some 'ramp-off' effect that alters the data quality. Each window is filtered with a median filter removing spikes and with a finite impulse response (FIR) selective filter of the 251th order improving the signal to noise ratio. A lag correction of 0.35 sec was applied to the data after being empirically determined by flying a sharp anomaly in two opposite direction.

Table 4: **Setting used in the windowing of the full waveform**

Channel #	Starting time (msec)	Width (msec)	Pulse	Channel #	Starting time (msec)	Width (msec)	Pulse
1	0.16667	0.01667	**ON**	**21**	3.15000	0.53333	**OFF**
2	0.25000	0.01667	**ON**	**22**	3.26667	0.53333	**OFF**
3	0.33333	0.01667	**ON**	**23**	3.40000	0.53333	**OFF**
4	1.30000	0.01667	**ON**	**24**	3.40000	1.10000	**OFF**
5	1.31667	0.01667	**ON**	**25**	3.45000	1.10000	**OFF**
6	1.33333	0.01667	**ON**	**26**	3.65000	1.10000	**OFF**
7	2.58333	0.01667	**ON**	**27**	3.88333	1.10000	**OFF**
8	2.66667	0.01667	**ON**	**28**	4.13333	1.10000	**OFF**
9	2.80000	0.08333	**ON**	**29**	4.43333	1.10000	**OFF**
10	2.81667	0.08333	**ON**	**30**	4.76667	1.10000	**OFF**
11	2.83333	0.08333	**ON**	**31**	5.16667	1.10000	**OFF**
12	2.85000	0.16667	**RAMP**	**32**	5.20000	2.20000	**OFF**
13	2.86667	0.18333	**OFF**	**33**	5.55000	2.20000	**OFF**
14	2.86667	0.25000	**OFF**	**34**	6.13333	2.20000	**OFF**
15	2.86667	0.36667	**OFF**	**35**	6.78333	2.20000	**OFF**
16	2.91667	0.36667	**OFF**	**36**	7.51667	2.20000	**OFF**
17	2.91667	0.53333	**OFF**	**37**	8.36667	2.20000	**OFF**
18	2.95000	0.53333	**OFF**	**38**	9.33333	2.20000	**OFF**
19	3.00000	0.53333	**OFF**	**39**	10.4500	2.20000	**OFF**
20	3.03333	0.53333	**OFF**	**40**	11.7000	2.20000	**OFF**

Gridding

The magnetic and early off-time TDEM (channel 13) data were interpolated onto a regular grid using a bi-directional gridding algorithm to create a two-dimensional grid equally incremented in x and y directions.

The final grids were created with 20 m grid cell size, appropriate for the survey lines spaced at 100 m. Traverse lines were used in the gridding process.

VII. RESULTS AND DISCUSSION

General

The following discussion presents the helicopter-borne MAG and TDEM data as well as a basic interpretation, which is solely based on the data acquired in this project. Further interpretation work should include other geoscientific information, but is beyond the scope of this report. Nevertheless, the data was analysed to identify areas considered most prospective for mineralized occurrences.

Magnetic data

The residual Total Magnetic Intensity (TMI), together with interpreted TDEM anomalies, is shown in Figure 8.

On both blocks, the magnetic data varies over a range of 2039 nT, with a standard deviation of 121 nT. Areas where the magnetic signal depicts dynamic variations are indicative of intrusive and/or volcanic rocks occurrences. Several families of magnetic lineaments are found within the surveyed area. In the northern half of the Chateau Fort block, the dominant lineaments are striking from E-W to NW-SE. In the southern half of the Chateau Fort block and within the Target-C block, dominant lineaments are rather aligned ENE-WSW to NE-SW. On top of these two main families of lineaments, a third one preferentially striking NNW-SSE to NNE-SSW is seen in some areas. Some lineaments are curved, suggesting that deformation and shearing occurred in the area. Within the Target-C block, a strong magnetic regional dyke, oriented NNW-SSE and extending for tens of kilometers further outside, is also seen.

In the northwestern parts of both blocks, the magnetic sources appear to be sub-outcropping. The types of rocks found in theses areas are clearly extending further towards the southeast, but the longer wavelength response found to the southeast of the blocks indicates that these same rock units are found deeper under non-magnetic sedimentary rocks of the Otish Basin.

Magnetic lineaments found in the blocks are relating to rocks formations that are enriched in magnetic minerals (magnetite and/or pyrrhotite). In both blocks, it is possible to detect structural features offsetting observed magnetic lineaments and causing abrupt interruption or changes of the magnetic response. These features are typically caused by faults, fractures and shear zones. As well, narrow magnetic highs or lows can sometime indicate faults or shear zones enriched or depleted in magnetic minerals. If they are thought to be favorable structures in the exploration context of the Chateau Fort Project, they should be paid particular attention and should be the object of a comprehensive structural interpretation, which is beyond the scope of this report. Nonetheless, possible major structures have been indicated as dashed black lines on the figures of this section.

Shorter wavelength anomalies are greatly enhanced on the First Vertical Derivative (FVD) of the TMI (Figure 9). Since the FVD attenuates longer wavelength anomalies, it is the preferred product for structural interpretation.

Figure 8: **Residual Total Magnetic Intensity and TDEM anomalies**

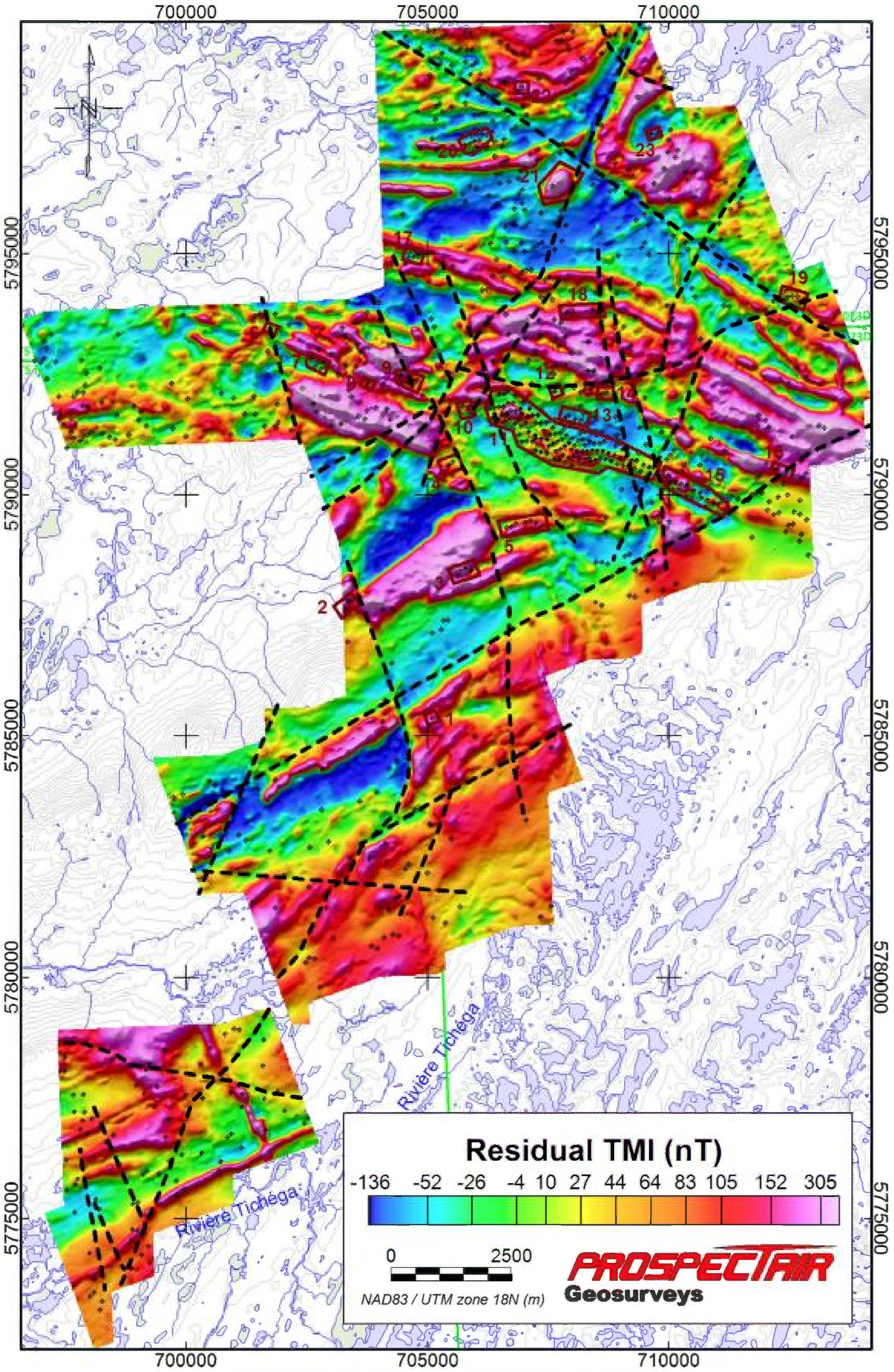
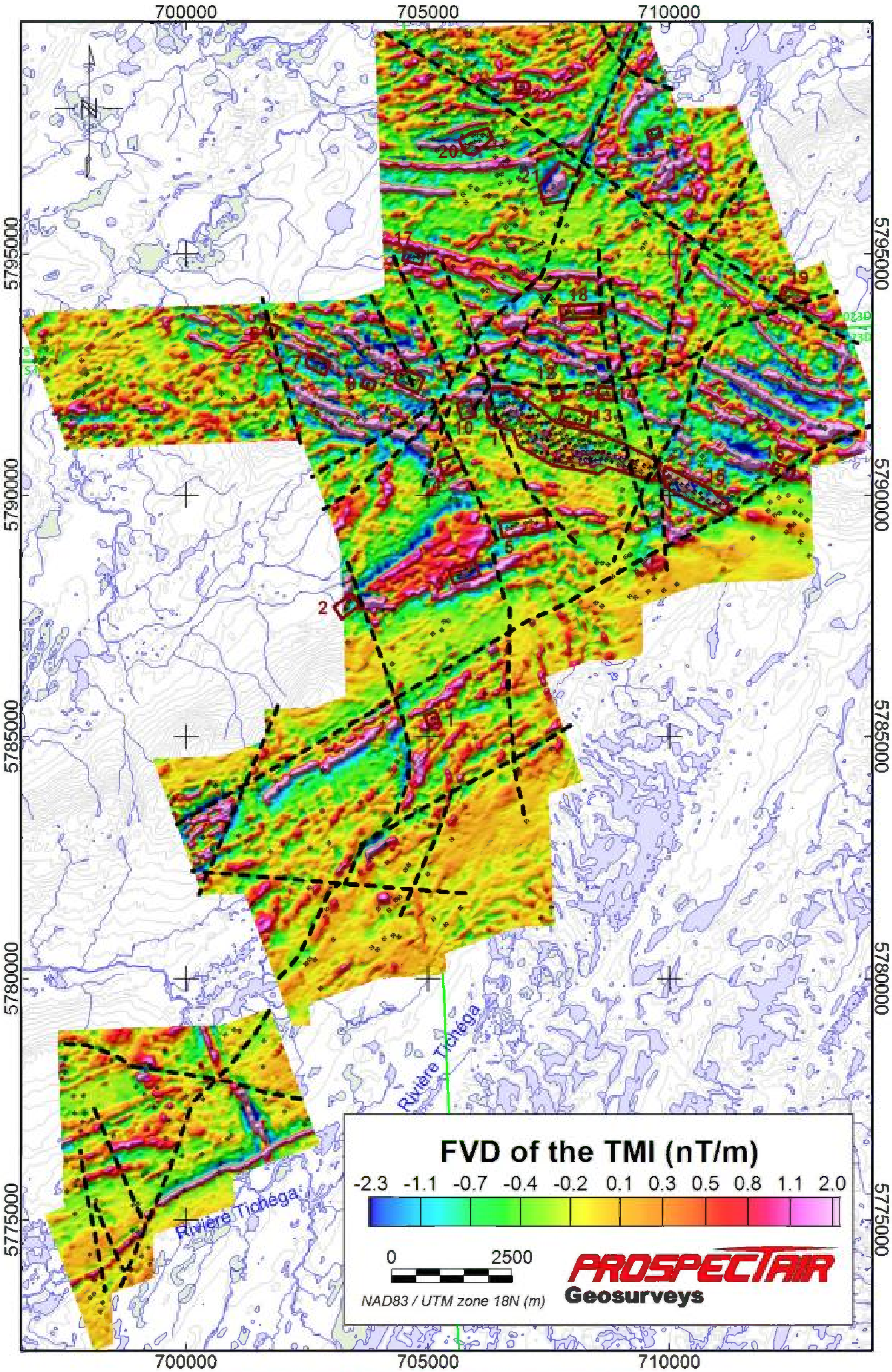


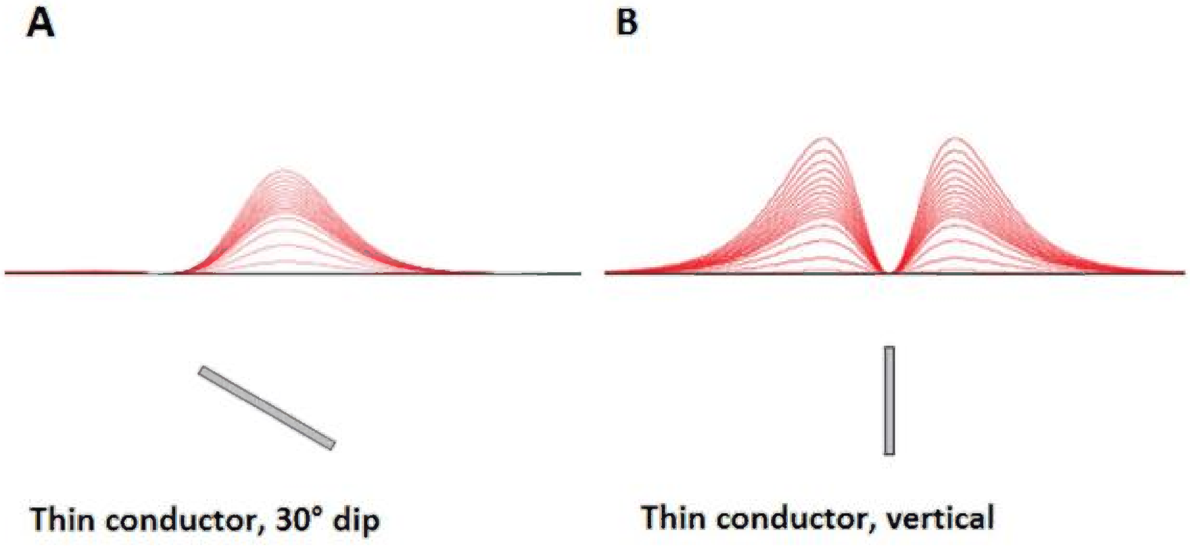
Figure 9: **First Vertical Derivative of TMI and TDEM anomalies**



Time-Domain Electromagnetic data

There is no automatic picking program involved in the interpretation procedures of the ProspecTEM system. Identification of the EM anomalies is made from the EM profiles. Most of the time, the location of anomalies is based on the assumption that the causative source is a somewhat thick or flat lying conductor, which would generate an anomaly mostly centered over the conductor (Figure 10, A). It is important to understand that some other conductive bodies could generate a strong EM response that is offset from the mass centre of the source. For instance, a thin conductor with a steep dip would generate an "M" shape anomaly (Figure 10, B), with the stronger shoulder on the dip side. Therefore, caution must be taken when planning work at the location of an anomaly. It is recommended to combine other available geoscientific information and to review the EM anomaly location before to investigate an anomaly of interest.

Figure 10: **Example of EM response over thin conductors**



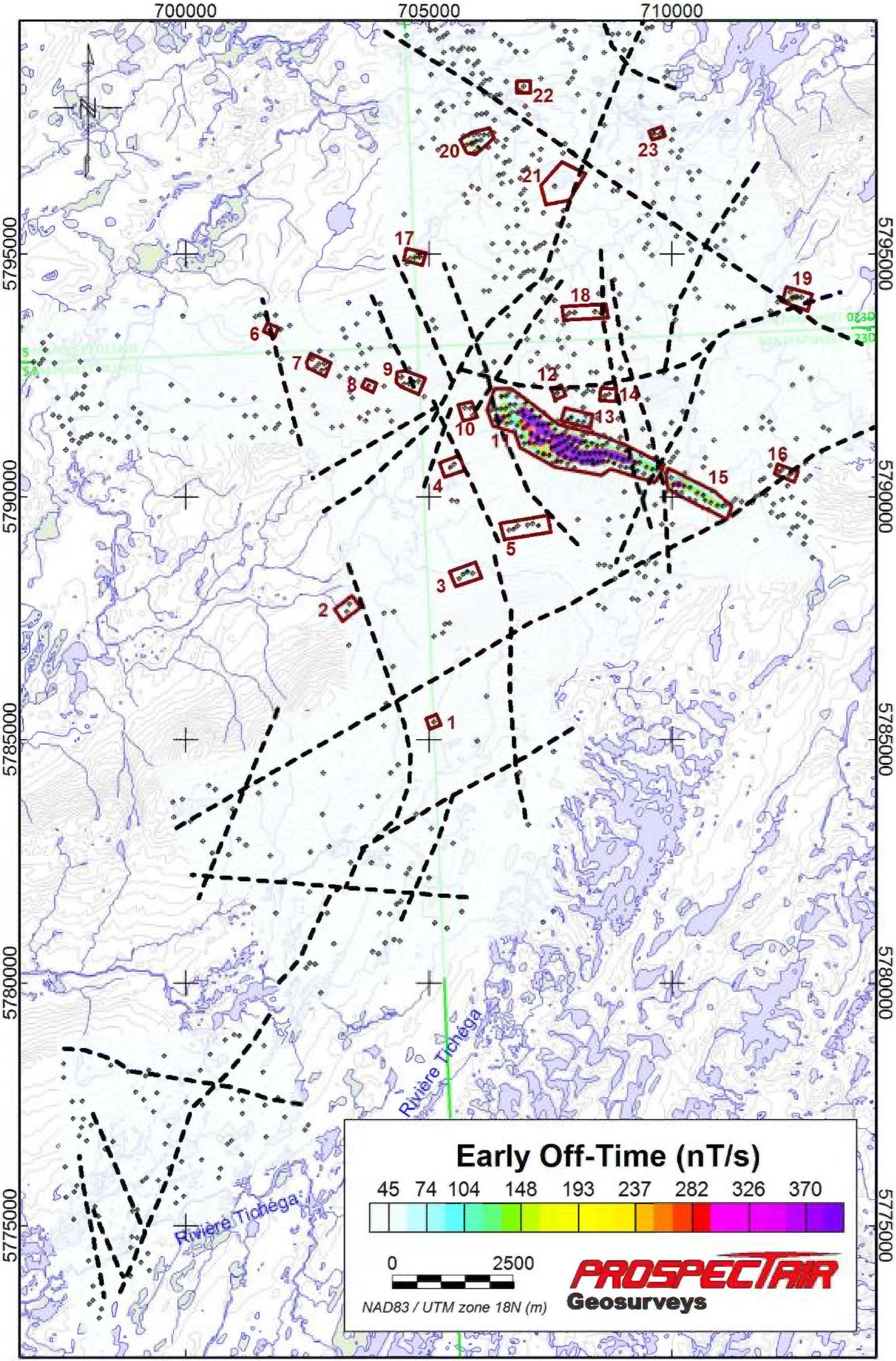
The classification of anomalies is based on the calculated time constant (TAU). The EM time constant is a general measure of the speed of decay of the electromagnetic response and reflects the "conductance quality" of a source. The decay rate of the secondary EM field recorded by the TDEM system is a function of the conductivity and geometry of conductors detected. A weak conductor, such as shallow conductive overburden, will show rapid response decay, thus a small value of the time constant. Conversely, a good conductor, such as a graphite or sulfide orebody, will have a response decaying slowly, relating to a large TAU value. The TAU is calculated using proprietary software and is derived from the best exponential least squares fit for channels Z13 to Z27. Calculating TAU for low amplitude anomalies that have their first off-time channel (channel 13) amplitude smaller than 75 nT/s can yield unreliable results given the weak response. No best fit were tried on these low signal anomalies and an arbitrary minimal time constant of 0.10 msec was attributed. Moreover, the resulting exponential best fit of the decay curve is extrapolated to the zero delay time, which can be used to compare the amplitude of anomalies.

On the Chateau Fort block, 743 EM anomalies are identified, classified and listed. All marginal/weak anomalies with TAU lower than 0.25 msec are included in a group represented by an empty circle on the anomaly map. In total, 612 anomalies are reported in this class. The remaining anomalies are classified in 4 other groups, with time-constant considered small (0.25 to 0.50 msec, 46 anomalies), intermediate (0.50 to 0.75 msec, 72 anomalies), strong (0.75 to 1.00 msec, 12 anomalies) and very strong (over 1.00 msec, 1 anomaly). On the Target-C block, 79 EM anomalies are identified, all classified in the marginal/weak anomaly class. All interpreted anomalies are shown on the data figures (Figure 8, 9 and 11).

Note that given the high number of EM anomalies interpreted, they are not listed as tables in this report, but rather as separate Excel spreadsheet tables.

In areas where anomalies are very continuous along flight lines, anomaly symbols are indicated where the strongest EM signal is obtained. It is recommended to use the early off-time map (Figure 11) to see the actual extents of anomalous areas. In many cases, EM anomalies can be followed on multiple lines, and are outlining conductive lineaments.

Figure 11: **Early Off-Time TDEM response and anomalies**



Prospective areas

It is important to point that the TDEM response amplitude is governed by three main factors: the conductivity of the source, the volume of the conductive source, and the distance between the source and the TDEM sensor. The connectivity between the conductive minerals is also critical for a source to be conductive. As a result, mostly disseminated sulfides or graphite occurrences are not responding very strongly to EM techniques, if at all. On the other hand, massive graphite horizons, or sulfide rich zones (with or without base metals), either in the form of veins/stringer or massive/semi-massive lenses, will respond very strongly to EM. Consequently, depending on the exploration context, areas with the strongest EM response may not necessarily imply the best potential for economic mineralization.

In an attempt to guide ground follow up efforts, individual EM anomalies deemed of good quality have been grouped together to define prospective areas (burgundy lines on the figures found in this section) based on the continuity of the conductors and their association or dissociation to magnetic lineaments. Within each prospective area, EM anomalies are likely to have similar source. This implies that ground investigation can be conducted in only one or two locations of each area, where access is easier or bedrock outcropping is more likely for instance, in order to provide explanation for anomalies found within the entire prospective area. This should help simplifying the follow-up effort.

In total 23 prospective areas have been defined in the Chateau Fort block, and none in the Target-C block. In some areas, a good correlation is found between the location of magnetic and conductive lineaments, as is seen on the FVD data, suggesting that sulphides are indeed composing at least part of the sources. Even in the absence of good correlation between magnetic and EM data, EM anomalies identified as prospective should be investigated to confirm the nature of the source, as gold and base metal bearing sulphides are sometimes devoid of pyrrhotite. It should be noted that the prospective area #21 does not include EM anomalies deemed of interest. However, it hosts the strongest magnetic anomaly of the survey, which occurs in a compact shape near the intersection point of the rock formations hosting the series of Eastmain Mine gold showings (further to the WNW) with a major NNE-SSW structural accident. It is therefore considered of great interest.

Aside from EM anomalies included within prospective areas, most EM anomalies found in both blocks are very marginal, being only slightly above the noise threshold of the TDEM system, and rarely continuous enough to define conductive lineaments. These marginal anomalies should only be investigated if other geoscientific data are prompting for further investigation in the vicinity of one of these non-prospective anomalies.

It is also worth pointing out that magnetic features outside the prospective areas that have been defined in this report can still be of interest for mineral exploration. Mafic intrusive or volcanic rocks, which may be associated to several mineralization types, can also have enough magnetite to cause strong magnetic anomalies.

VIII. WORK RECOMMENDATION

The discussion on the geological implication of the survey data is minimal in this report. A more general study including information regarding the local geology and all other geoscientific data available in the area would be necessary to extract the full potential of the geophysical data.

The prospective areas defined in this report should be investigated in priority with basic ground prospective methods at first. If interesting results are obtained, it is recommended to use ground resistivity/IP or EM techniques, depending on the nature of the sources, to accurately define drilling targets.

IX. FINAL PRODUCTS

Digital line data

Geosoft databases are provided with the channels detailed in Table 5.

Table 5: **MAG-TDEM line data channels**

No.	Name	Description	Units
1	UTM_X	UTM Easting, NAD-83, Zone 18N	m
2	UTM_Y	UTM Northing, NAD-83, Zone 18N	m
3	Lat_deg	Latitude in decimal degrees (WGS-84)	Deg
4	Long_deg	Longitude in decimal degrees (WGS-84)	Deg
5	GPS_Z	Helicopter altitude (w.r.t. MSL)	m
6	Gtm_sec	Second since midnight GMT	Sec
7	Radar	Ground clearance given by the radar altimeter	m
8	DEM	Digital Elevation Model (w.r.t. MSL)	m
9	Mag_Raw	Raw magnetic data	nT
10	Mag_Lag	1.35s lagged magnetic data	nT
11	Gnd_mag	Base station magnetic data	nT
12	Mag_Cor	Magnetic data corrected for diurnal variation	nT
13	TMI	Fully levelled Total Magnetic Intensity	nT
14	TMIres	Residual TMI (IGRF removed)	nT
15	OFF_TIME	Amplitude of Off-time channels (13 to 36)	nT/s

Maps

All maps are referred to NAD-83 in the UTM projection Zone 18 North, with coordinates in metres. Maps are at a 1:50,000 scale. They are provided in PDF, PNG, Geotiff and Geosoft MAP formats for the products detailed in Table 6.

Table 6: **Maps delivered**

No.	Name	Description
1	DEM+FlightPath	Digital Elevation Model with flight path and properties claims
2	TMI+Contours	Residual Total Magnetic Intensity with contours
3	FVD	First Vertical Derivative of the TMI
4	Early_OffTime	Early_Off-Time TDEM response (Channel 13)
5	TDEM_Profiles+Anomalies	TDEM profiles with anomalies
6	TMI+TDEM_Anomalies	Residual Total Magnetic Intensity with TDEM anomalies

Grids

All grids are referred to NAD-83 in the UTM projection Zone 18 North, with coordinates in metres. Grids are provided in Geosoft GRD format, with a 20m grid cell size, for the products listed in Table 7.

Table 7: **Grids delivered**

No.	Name	Description	Units
1	DEM	Digital Elevation Model	m
2	TMI	Total Magnetic Intensity	nT
3	FVD	First Vertical Derivative of TMI	nT/m
4	SVD	Second Vertical Derivative of TMI	nT/m^2
5	TMIres	Residual TMI (IGRF removed)	nT
6	Early_Off-Time	Early Off-Time TDEM response (Channel 13)	nT/s

Project report

The report is submitted in PDF format. Anomaly tables are provided as separate Excel spreadsheets.

Prospective areas and possible faults

The prospective areas outlined in this report for follow-up work, as well as interpreted possible major structures, are supplied in the Esri shapefile SHP format.

Respectfully submitted,

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Joël Dubé, Eng.
August 14th 2015

X. Statement of Qualifications

Joël Dubé
7977 Décarie Drive
Ottawa, ON, Canada, K1C 3K3

Telephone: 819.598.8486
E-mail: jdube@ddgeoscience.ca

I, Joël Dubé, Eng., do hereby certify that:

1. I am a consultant in geophysics, President of Dynamic Discovery Geoscience Ltd, registered in Canada.
2. I earned a Bachelor of Engineering in Geological Engineering in 1999 from the École Polytechnique de Montréal.
3. I am an Engineer registered with the Ordre des Ingénieurs du Québec, No. 122937, and a Professional Engineer with Professional Engineers Ontario, No. 100194954 (CofA No. 100219617) and with the Association of Professional Engineers and Geoscientists of New Brunswick, No. L5202 (CofA No. F1853).
4. I have practised my profession for 16 years in exploration geophysics.
5. I have not received and do not expect to receive a direct or indirect interest in the properties covered by this report.

Dated this 14th of August, 2015

Joël Dubé, Eng. #122937

1515658

XI. Appendix A – Survey blocks outline

Chateau Fort Block

Easting	Northing
702191	5779019
701194	5781750
700292	5781714
699265	5784539
700736	5784597
701635	5784924
701610	5785558
702631	5785599
703302	5785843
703182	5788930
702379	5791137
697535	5790946
696565	5793611
697067	5793793
703367	5794041
704095	5794306
703892	5799530
704095	5799604
709487	5799816
710148	5798001
711415	5798051
712658	5794635
713181	5794826
714209	5792000
714036	5791937
714076	5790892
713332	5790621
712916	5790605
713003	5788373
712658	5788248
710687	5788170
709423	5787710
709462	5786717
709146	5786602
708342	5786570
707424	5786236
708209	5784079
707501	5783821
707607	5781086
706834	5781055

705356	5780518
705371	5780133
705162	5780056
704023	5780012
702533	5779469
702551	5779033

Target-C Block

Easting	Northing
698091	5772293
697062	5775118
697463	5775264
697321	5778907
700789	5779043
701738	5779389
702766	5776566
701811	5776218
701799	5776218
700969	5775916
700993	5775308
699301	5774692
699336	5773805
698452	5773484
698493	5772439