



Ministry of Energy, Mines & Petroleum Resources  
Mining & Minerals Division  
BC Geological Survey

**BC Geological Survey  
Assessment Report  
38084**



Assessment Report  
Title Page and Summary

TYPE OF REPORT [type of survey(s)]: 3D Induced Polarization and Magnetometer

TOTAL COST: \$132,877.50

AUTHOR(S): Shawn Rastad, Brian Chen

SIGNATURE(S):

NOTICE OF WORK PERMIT NUMBER(S)/DATE(S): \_\_\_\_\_

YEAR OF WORK: 2018

STATEMENT OF WORK - CASH PAYMENTS EVENT NUMBER(S)/DATE(S): 5723411 December 18, 2018

PROPERTY NAME: Kathleen Mountain

CLAIM NAME(S) (on which the work was done): Kathleen Mountain (1055585)

Golden Bear (1029996), Golden Bear Cub (1030000), Mag 2 (1054090)

COMMODITIES SOUGHT: Copper, Molybdenum, gold

MINERAL INVENTORY MINFILE NUMBER(S), IF KNOWN: 092HNE034, 02HNE186

MINING DIVISION: Similkameen

NTS/BCGS: 92H16, 92H09 / 92H080

LATITUDE: 49 ° 44 ' 35 " LONGITUDE: 120 ° 05 ' 52 " (at centre of work)

OWNER(S):

1) Platinum Belt Resources 2) \_\_\_\_\_

MAILING ADDRESS:

Box 2369, Princeton, BC V0X 1W0

OPERATOR(S) [who paid for the work]:

1) Vizsla Resources Corp. 2) \_\_\_\_\_

MAILING ADDRESS:

907 - 1030 West Georgia St.

Vancouver, BC, Canada, V6E 3B9

PROPERTY GEOLOGY KEYWORDS (lithology, age, stratigraphy, structure, alteration, mineralization, size and attitude):

Pennask, Osprey Lake batholiths - Late Triassic, early to middle Jurassic

Area is centred at the contact between the Pennask and Osprey Lake batholiths. Property is considered prospective for porphyry style mineralization, skarn deposits and lode gold vein deposits

REFERENCES TO PREVIOUS ASSESSMENT WORK AND ASSESSMENT REPORT NUMBERS: 25753, 32015, 32760, 37508

TYPE OF WORK IN THIS REPORT	EXTENT OF WORK (IN METRIC UNITS)	ON WHICH CLAIMS	PROJECT COSTS APPORTIONED (incl. support)
<b>GEOLOGICAL (scale, area)</b>			
Ground, mapping			
Photo interpretation			
<b>GEOPHYSICAL (line-kilometres)</b>			
<b>Ground</b>			
Magnetic	34km	1055585	
Electromagnetic			
Induced Polarization	34km	1055585	
Radiometric			
Seismic			
Other			
<b>Airborne</b>			
<b>GEOCHEMICAL (number of samples analysed for...)</b>			
Soil			
Silt			
Rock			
Other			
<b>DRILLING (total metres; number of holes, size)</b>			
Core			
Non-core			
<b>RELATED TECHNICAL</b>			
Sampling/assaying			
Petrographic			
Mineralographic			
Metallurgic			
<b>PROSPECTING (scale, area)</b>			
<b>PREPARATORY / PHYSICAL</b>			
Line/grid (kilometres)			
Topographic/Photogrammetric (scale, area)			
Legal surveys (scale, area)			
Road, local access (kilometres)/trail			
Trench (metres)			
Underground dev. (metres)			
Other			

TOTAL COST:

\$132,877.50

**GEOPHYSICAL ASSESSMENT REPORT PREPARED**  
**FOR**  
**VIZSLA RESOURCES CORP.**

**DC RESISTIVITY/INDUCED POLARIZATION**  
**AND MAGNETICS ON THE**  
**KATHLEEN MOUNTAIN PROJECT**

SUMMERLAND, BRITISH COLUMBIA, CANADA

LATITUDE: 49° 44' 35" N LONGITUDE: 120° 05' 52" W

CLAIM WORKED ON: 1055585

BCGS SHEET: 92H080

NTS SHEET: 92H16, 92H09

MINING DIVISION: SIMILKAMEEN

SURVEY CONDUCTED BY SJ GEOPHYSICS LTD.  
OCTOBER-NOVEMBER 2018



REPORT PREPARED BY

SHAWN RASTAD, B.Sc.  
BRIAN CHEN, M.Sc., P.GEO.  
DECEMBER 14, 2018

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## **1. Introduction**

The Kathleen Mountain Property is located in the Interior Plateau area of south-central British Columbia. The property consists of four contiguous mineral claims located in the Similkameen Mining Division. Background property and geological information for this report comes from the technical report, “Technical Report on the Kathleen Mountain Property”, written by John R. Kerr (Kerr, 2018). Two BC Minfile showings of significance are located on the property, Golden Lode and Kathleen Mountain. Three other smaller showings have been found in the vicinity of Golden Lode. The property is considered prospective for porphyry style mineralization. Skarn deposits and lode vein gold deposits may also exist on the property, however are secondary targets.

Geophysical work completed on the property in 2018 consisted of a DC Resistivity/Induced Polarization (DCIP) survey and a ground magnetometer survey. The data were acquired by SJ Geophysics Ltd. for Vizsla Resources Corp. A total of 34 km of DCIP data and 34 km of ground magnetic data were acquired.

## **2. Property Description & Location**

The Kathleen Mountain Property is situated approximately 50 kilometers northeast of Princeton and approximately 30 kilometers northwest of Summerland, in south-central British Columbia (Figure 1). The property is located within NTS map sheet 92H/9E and has approximate geographic coordinates 49 degrees 44 minutes north and 120 degrees and 04 minutes east.

The Kathleen Mountain Property consists of four contiguous mineral claims covering 2,254.9 hectares and is located in the Similkameen Mining Division (Figure 2). All of the claims are recorded in the name of Platinum Belt Resources Inc. (Platinum Belt), a company controlled by Michael Adam. Platinum Belt has entered into an option agreement with Vizsla Resources Corp., whereby Vizsla can earn a 100% unconditional interest in the property by completing a specified amount of exploration work. Terms of the agreement are described in John Kerr’s technical report. The mining claims and current status are summarized in Table 1.

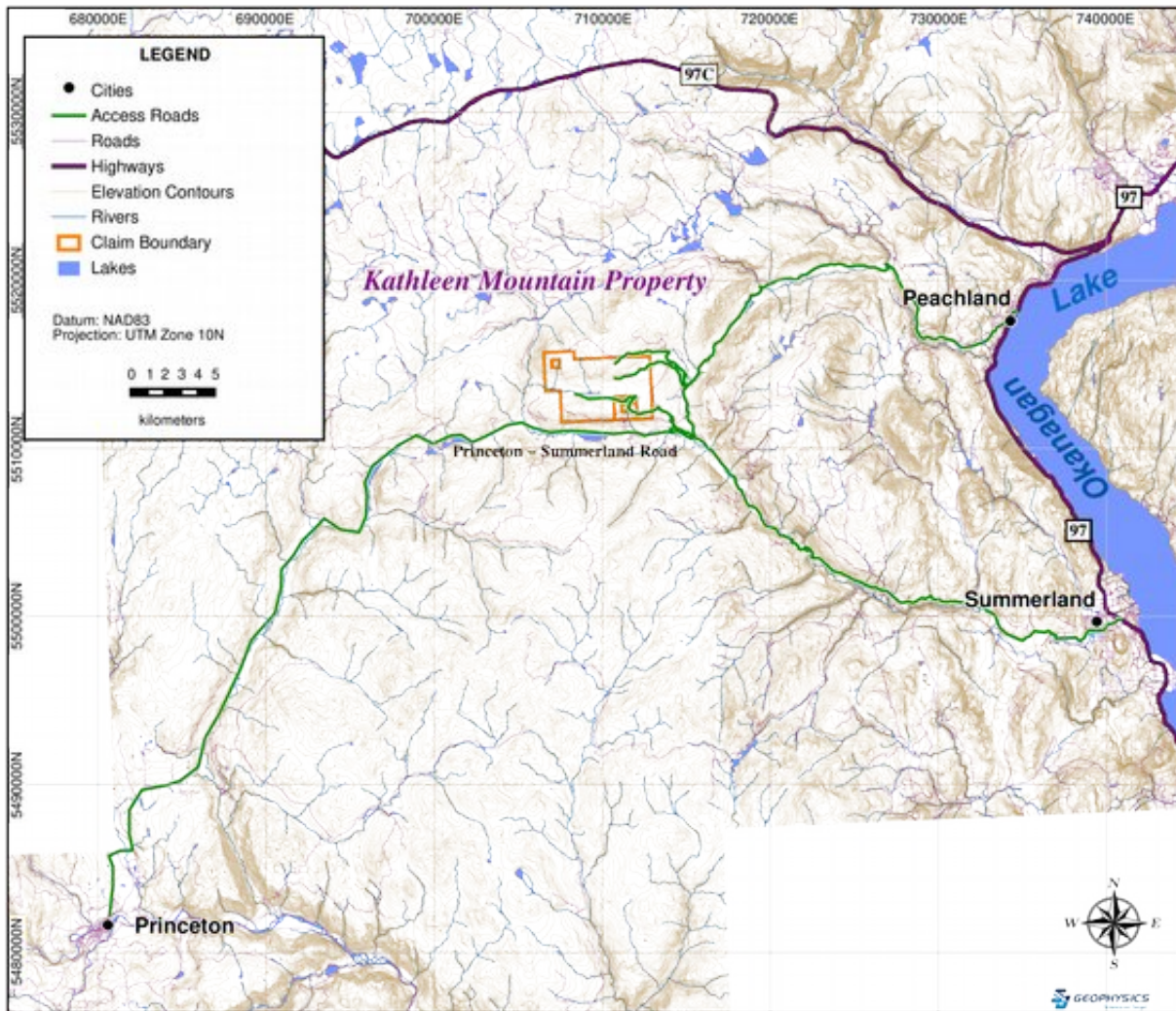


Figure 1: Location Map: Kathleen Mountain Property

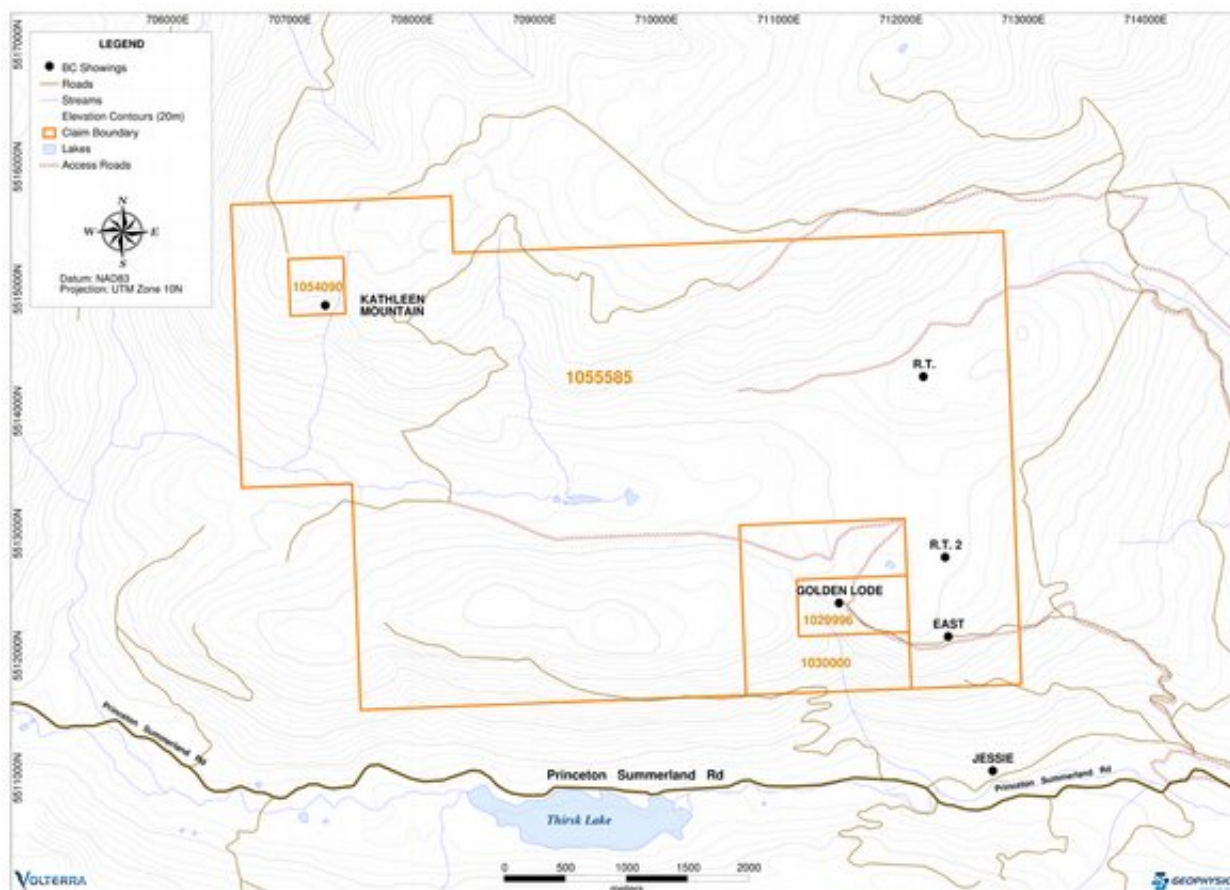


Figure 2: Claim Map: Platinum Belt Resources

#	MTO #	Claim Name	Area (ha)	Owner	Issue Date	Good to Date
1	1029996	Golden Bear	41.77	Platinum Belt Resources	2014/Aug/02	2023/Nov/03
2	1030000	Golden Bear Cub	146.18	Platinum Belt Resources	2014/Aug/02	2023/Nov/03
3	1054090	Mag 2	20.87	Platinum Belt Resources	2016/Aug/18	2023/Nov/03
4	1055585	Kathleen Mountain	2046.05	Platinum Belt Resources	2017/Oct/17	2022/Oct/31
		<b>Total Hectares:</b>	<b>2254.87</b>			

\* Accessed from BC Mineral Title Online on December 09, 2018

Table 1: Kathleen Mountain property mineral claims

### ***3. Property Access***

The Kathleen Mountain property can be accessed either from Summerland or Princeton using the Princeton-Summerland Road. The Princeton-Summerland road roughly follows the old Kettle Valley railway line linking the Similkameen region (Princeton) to the west side of Okanagan Lake at Summerland. This road runs east-west approximately 1 km south of the property.

Traveling approximately 30 km from Summerland, access to the property is via a well-maintained gravel road (Glen Lake FSR) leading north. About 650 m along the road, a left at the junction allows access to the southern portion of the property, while remaining on the Glen Lake FSR will lead to further spur roads to the north that will provide access to the central and northern regions of the property. Some of the spur roads are in rough shape, requiring some minor repair and the use of 4x4 vehicles.

### ***4. Climate & Physiography***

The Kathleen Mountain property is situated on the interior plateau within the rain shadow of the Coast Mountains. The region has a semi-arid climate, where summers are typically warm and dry while winters are cold with light to moderate snowfalls. The region is generally snow free from April through November.

Terrain on the property is moderate with gently rolling hills. Total property relief ranges from from 1100 meters along the southern boundary of the property to 1910 meters at the peak of Kathleen Mountain in the northwest corner of the property. Locally, steep gullies are observed due to erosion from flowing water. A number of small lakes and streams are found on the property. The property is covered by forest comprised primarily of lodge-pole pine, with some spruce, fir, balsam, and willows. Extensive logging has been carried out on the property.

## 5. Previous Work

The following exploration history is extracted from the technical report on the property (Kerr, 2018) and presented in the following table.

Years	Work
1965 - 1970	The earliest work in the area of the Golden Lode showing was geochemistry, induced polarization survey and limited drilling by Halpen Mining Ltd.
1972 - 1976	Several operators spent limited time completing regional mapping and geochemistry over the area of the Golden Lode, East and RT showings. Exel Explorations Ltd. conducted surface surveys including geochemistry, geological mapping and limited geophysics on the Kathleen Mountain Showing in 1973, followed by six diamond drill holes in 1974 and 1975 totaling 170m.
1979	Grand Trunk Resources, Inc. completed detailed mapping, and sampling on the Golden Lode showing. It is believed that the long 50 – 60 meter trench that exists on the showing today was excavated to depths of 2 – 3 meters during this period.
1981 - 1985	Inco and others completed reconnaissance mapping and prospecting in the area of the Kathleen Mountain showing. In 1985, two short diamond drill holes totaling 176 meters were drilled. however results are not well documented.
1986 - 1988	Detailed grid work consisting of soil geochemistry, geological mapping and a magnetometer survey was completed on the Golden Lode showing.
1989 - 1994	Very little work was completed on either showing except for some reconnaissance mapping and property examination.
1995 - 2000	The current owners of the property (the Adam family) from Princeton completed an eleven hole diamond drill program under the Main Trench at Golden Lode, totaling 476m. All holes provided anomalous to economic quantities of gold and copper over short core lengths of 1 – 3.9 meters, the best values being 2.07 g/t Au; 9.69 g/t Ag; and 0.36% Cu over 3.1 meters. in hole GL2000-2 and 6.1 g/t Au; 23.79 g/t Ag; and 0.79% Cu over 1.38 meters in hole GL2000-3.
2001 - 2011	No work was completed on either property during this period. At the time of my examination of the Golden Lode and East showings in October, 2011, there was no evidence of work having been completed.
2011 - 2015	Limited geochemistry is reported on the Kathleen Showings (2011/12) and on the East and RT showings (2015). Evidence of either program was not apparent during my examination in November, 2017.

Table 2: Kathleen Mountain property exploration history

## **6. Geology**

The following geology description has been paraphrased from the “Technical Report on the Kathleen Mountain Property, Kamloops Mining Division, British Columbia” prepared for Vizsla Capital Corp. by John Kerr (Kerr, 2018). Full credit for the work is given to the author of that report.

The Kathleen Mountain property is situated within the Intermontane Belt of the Canadian Cordillera. The property is split north-south by two dominate batholiths, covered by glacial silts, till and gravel. To the north lies the early Jurassic to late Triassic Pennask batholith, predominantly grandioritic intrusive hosting the Kathleen Mountain showing. The Kathleen Mountain showing region is cut by small elongated stocks of early Tertiary Otter granitic bodies, having porphyritic characteristics. To the south lies Jurassic granites of the Osprey Lake batholith. The Golden Lode showing is situated within the Osprey Lake intrusive complex and is associated with small porphyry dykes. The geologic map for the property, indicating the Minfile showings, is shown in Figure 3.

The property is being considered prospective for various types of deposit types with a primary interest for the potential discovery of porphyry copper (Cu/Mo) mineralization, similar to that of Brenda Mines. Secondary targets, skarn copper/magnetite and lode gold vein may also be of merit on this property.

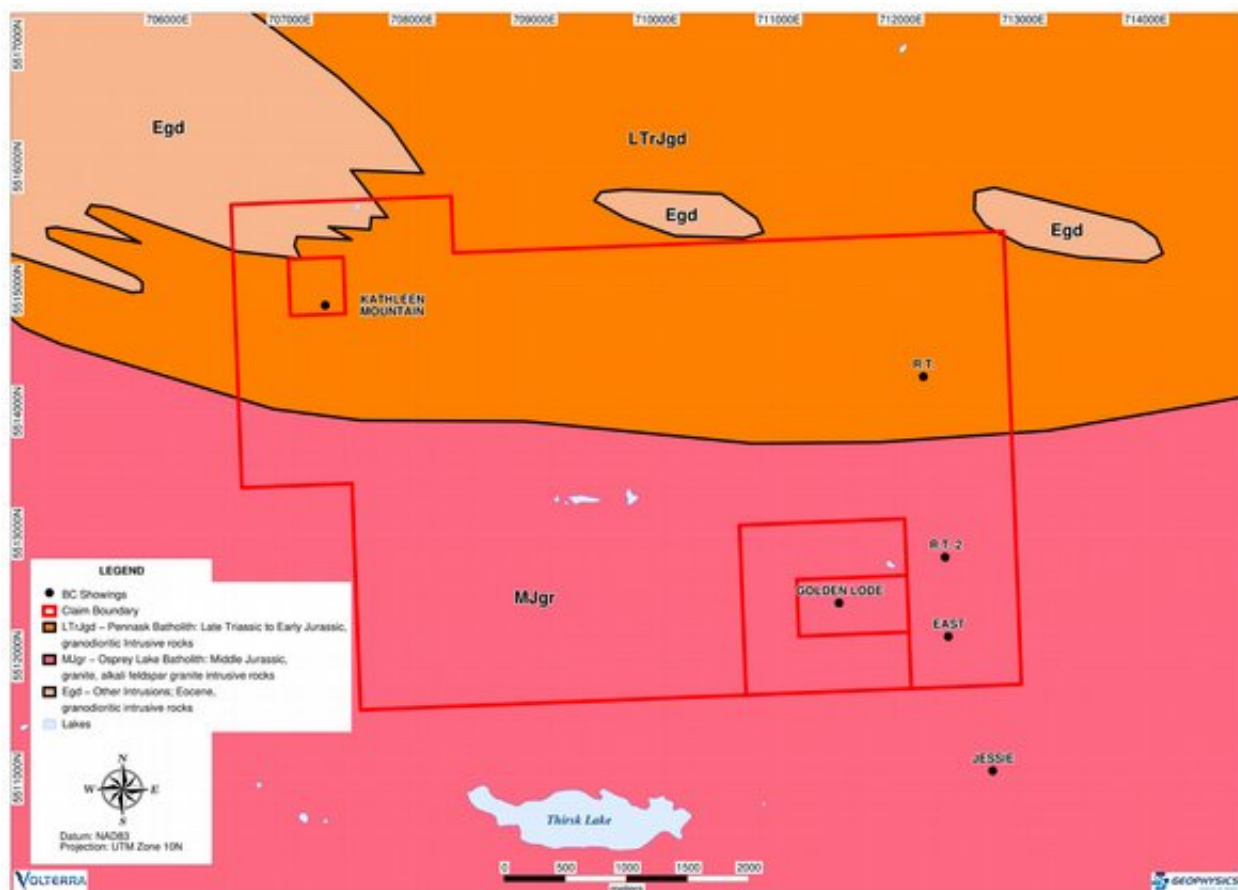


Figure 3: BC Geology: Kathleen Mountain Region

## 7. Field Work and Instrumentation

SJ Geophysics Ltd. acquired Volterra three-dimensional induced polarization (3DIP) and ground magnetic data on the Kathleen Mountain Property between October 17, 2018 and November 4, 2018. A total of 34 km of 3DIP data and magnetic data were acquired. Cost of the survey is provided as Appendix A. Additional information on the geophysical surveys can be found in the associated logistics report (Chen, 2018) contained in Appendix B.

The objective of the geophysical survey was to follow up the 2018 airborne magnetic results with a DCIP survey to map the electrical properties of the subsurface. The ground magnetic survey was acquired as secondary product and collected to ground truth the airborne survey, as well as provide additional resolution along the survey traverses. The north-central region of the

property was selected for the 3DIP and ground magnetic survey.

The SJ Geophysics field crew predominately consisted of a five man team. Although this number varied slightly as personnel rotations occurred during this project. This team oversaw all operational aspects including field logistics, data acquisition and initial field data quality control. Table 3 lists the SJ Geophysics crew members on this project.

<b>Crew Member Name</b>	<b>Role</b>	<b>Dates on Site</b>
Alex Tryon	Crew Lead/Field Geophysicist	October 17 – November 4
Brian Chen	Geophysicist/ Data Processor	October 17 – November 1
Erica Veglio	Field Geophysicist/Data Processor	October 28 – November 4
Clay McQuillan	Geophysical Technician	October 17 – November 4
Will Kahlert	Geophysical Technician	October 17 – November 1
Jordan Perk	Field Geophysicist	November 2 – November 4
Justin Hall	Geophysical Technician	October 18 – October 27
Raymond Dickof	Geophysical Technician	October 29 – November 4

Table 3: Details of the SJ Geophysics crew on site

The SJ Geophysics crew’s first day on site was October 17, 2018 and they remained on site through November 4, 2018. Mobilization to the project occurred on October 16, 2018 and demobilization to the next project occurred on November 5, 2018. The crew was accommodated at a rental house in Summerland and utilized trucks to reach the survey grid each day.

### **7.1. Volterra-3DIP**

The 3DIP survey grid consisted of 17 north-south lines, 2 km in length and spaced 200 m apart as shown in Figure 4. The survey lines were not prepared in advance, thus no cutting of trees occurred. Location data for each station was collected by the crew using handheld Garmin GPSMap 62s and 64s GPS units.

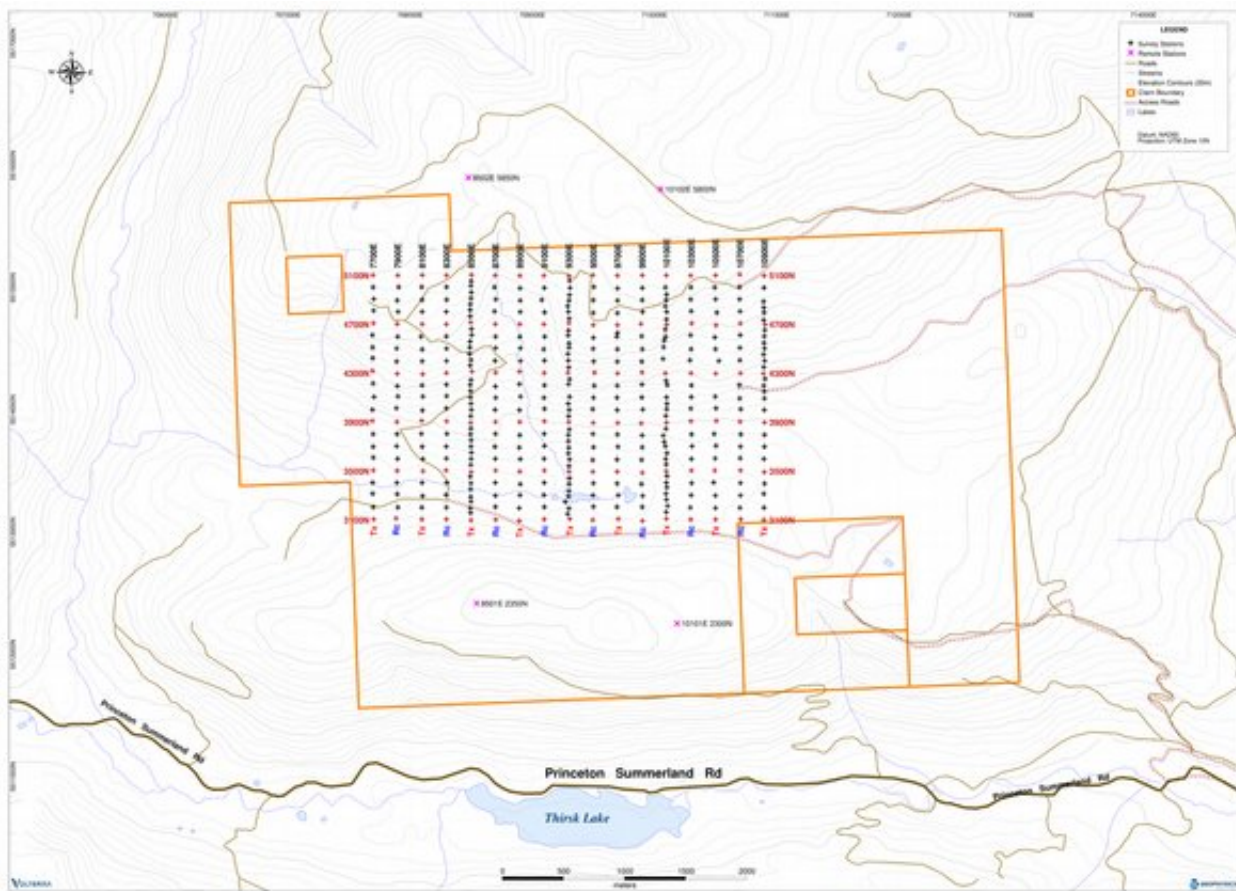


Figure 4: Geophysical Grid : Kathleen Mountain DCIP and Magnetics

The DC Resistivity/Induced Polarization (IP) data was collected using SJ Geophysics Ltd's Volterra Acquisition System. The Volterra system utilizes four-channel data acquisition units to record the full waveform signal from the attached sensor. Current injections were controlled using a GDD TxII IP transmitter. The data was acquired in the time-domain using a 2 second on, 2 second off, square waveform with a reading length of 120 seconds. Stainless steel electrodes were used for the receiver dipoles and current injections. Two electrodes were utilized at each current injection site to improve ground contact. Four different remote electrode stations were utilized over the course of the survey. The locations of the remote current electrodes are listed in Table 4 below.

Name	Label	Easting WGS84 UTM 10N	Northing WGS84 UTM 10N
South Remote 1	8501E2350	708547	5512418
North Remote 1	8502E8500	708480	5515900
South Remote 2	10101E2300	710187	5512254
North Remote 2	10102E8500	710051	5515807

Table 4: Location of 3DIP remote sites

The Volterra-3DIP system was configured to acquire a five-line acquisition set, with alternating transmitter and receiver lines. Each receiver line consisted of a 2000 m linear array (Figure 5) with dipoles 100 m in length. Currents were injected at 100 m intervals along each transmitter line and acquired by the two receiver lines with all dipoles active. Once each acquisition set was completed, the acquisition set was shifted over four lines and the next set acquired.

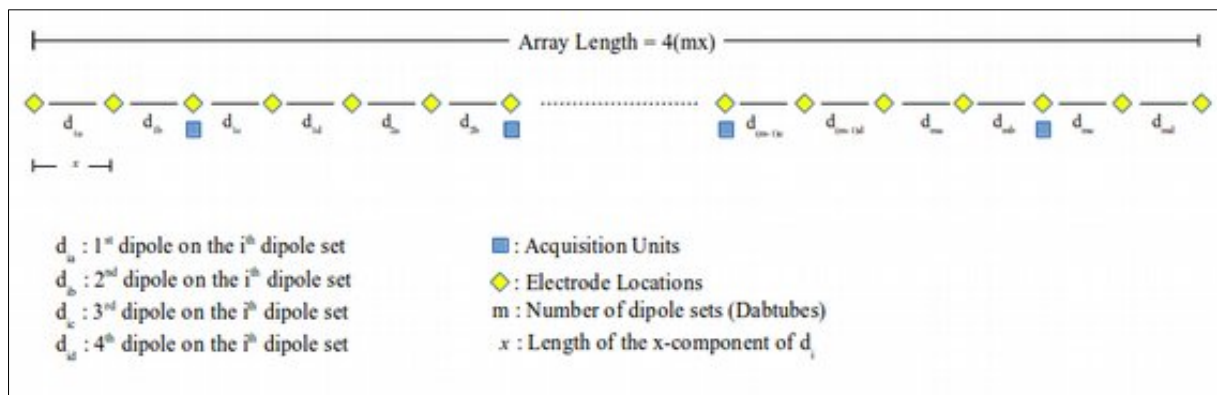


Figure 5: Schematic representation of the in-line dipole array

## 7.2. Magnetometer

The magnetometer survey was carried out on the same survey grid as the 3DIP survey. For the magnetometer survey GEM GSM-19W Overhauser magnetometers with integrated GPS antennas were utilized. One unit was setup as a base station to record the diurnal variations in the magnetic field with a recording interval of 3 seconds. Two additional units were used as rovers to collect total magnetic field measurements along the survey lines. The magnetic data was acquired

with a station spacing of 12.5 m. The rover data was diurnally corrected each night using the base station data.

The ground magnetic data results are shown below and match the airborne survey very well. The gridding results of the ground magnetic data is a bit spotty due to the tight station spacing (12.5 m) along the lines and the coarse spacing across the lines (200 m). Additional work can be completed to draw more information out of the ground magnetic data. Applying additional filters to the gridded data, such as derivative filters, will simplify an interpretation to extract structural details from the magnetic data. In addition, performing a 3D magnetic inversion on the data will provide added insight into the understanding of the subsurface volume of magnetic rock that contribute to surface results.

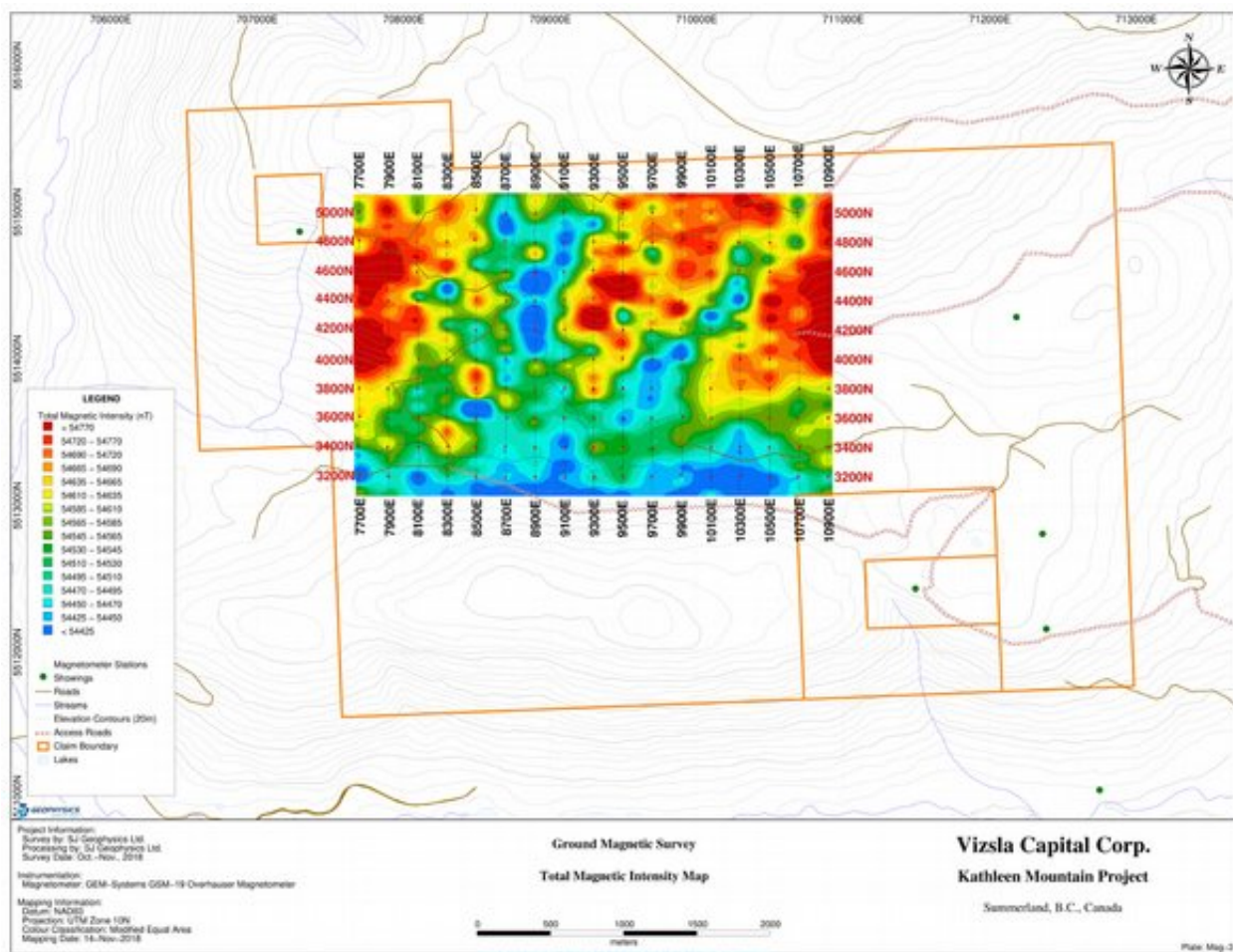


Figure 6: Total Magnetic Intensity: 2018 Ground Survey

## **8. Discussion of DCIP Results**

Inversion models (3D) for resistivity and chargeability were produced from the Volterra-3DIP dataset acquired on the Kathleen Mountain property using the UBC-GIF DCIP3D inversion software.

The resistivity model highlights three zones of distinct resistivity characteristics within the data set. A undulating change in resistivity values, approximately along 5513700N, separates the model into a northern and southern zones. This resistivity change most likely maps the contact between the Pennask and the Osprey Lake batholiths. To the south exist a zone of relatively low resistivity rocks (on the order of a few hundred Ohm-metres) associated with the Osprey Lake batholith. The northern zone associated with the granitoids of the Pennask Batholith are on the order of a magnitude larger ranging from 1250 Ohm-m to a few thousand Ohm-metres. Unlike the southern zone which is mostly homogeneous, the northern zone appears to be divided by a kilometre wide, north-south corridor of low and moderate resistivity features that appear to be highly fractured. This corridor representing the third resistivity zone is approximately situated between 708300E and 709300E.

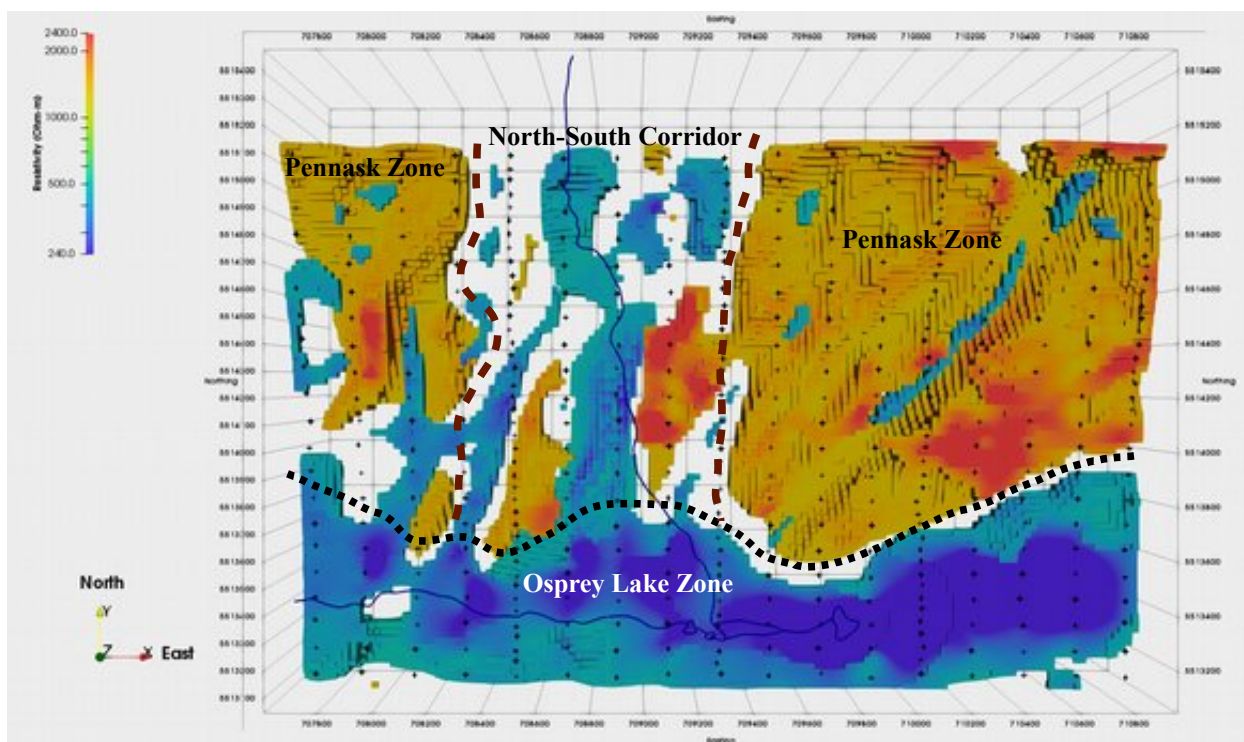


Figure 7: 3D Inversion Model: Resistivity Zones

Resistivity Threshold: Blue < 500 Ohm-m; Orange/Red > 1250 Ohm-m

At the centre of the corridor is a strong low resistivity feature (< 500 Ohm-m), approximately 200 m wide and extending to depth. This feature follows a north-south trending tributary, suggesting that the feature may be associated with a fault. This low appears to get cut off by a secondary fault trending (30° ENE) and appears to shift the feature to the west near 5514600N. Similarly, the tributary bends approximately at the same spot, providing additional evidence for the existence of this secondary fault. This feature is highlighted in Figure 7 below.

Also notable in the resistivity model are the presence of a couple NE-SW (60° ENE) trending lineaments existing in the Pennask rock unit. These are recognized as near-surface low- moderate resistivity linear features, with limited depth. These are highlighted in Figure 7 as the two parallel cyan coloured lines. These match well with the NE trending magnetic lineaments features highlighted in John Kerr’s technical report.

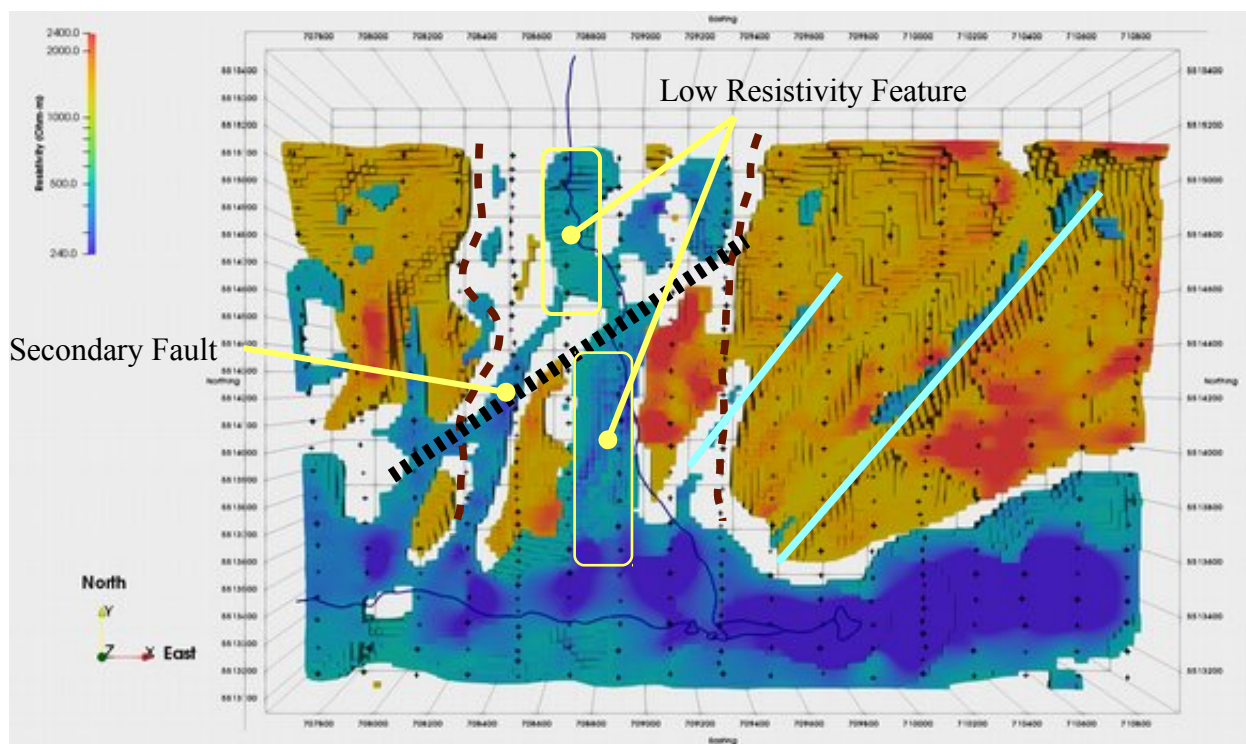


Figure 8: 3D Inversion Model: Resistivity lineaments

Resistivity Threshold: Blue < 500 Ohm-m; Orange/Red > 1250 Ohm-m

The inverted chargeability models are not as intriguing as expected. This is the result of a narrow range of chargeable values (2 to 8 ms) across the survey grid; therefore, not providing distinct anomalous features that stand out. With the intention of discovering a porphyry target, one would expect a higher response from disseminated sulphides associated with a system. The analogous porphyry target, Brenda Mine to the northeast, should be studied to determine if its known mineralization provided a similar chargeability response. Despite the narrow range, careful examination depicts trends in the data that match geology and correlate well with the resistivity model. Figure 9 below shows the chargeability model with a threshold of values greater than 6.5 ms and showing regions with resistivity values less than 500 Ohm-m.

Two subtle anomalous features are highlighted (Figure 9) that have interesting resistivity features associated with them and are highlighted as areas that may warrant additional investigation. The western most feature is a subtle chargeability high, associated with more resistive rocks. This feature is bounded by the low resistivity fault to the west and an anomalous high magnetic feature to the east. The fault may be a conduit for fluids, while the magnetic

feature may be indicative of a small intrusive feature providing a seat source, resulting in a narrow zone of mineralization leading to the subtle chargeability feature. This feature may also be associated with a magnetic alteration zone as it flanks the general elevated magnetic high. Conducting a 3D inversion of the magnetic data may help define the magnetic bodies, providing some evidence of a small intrusive body and enhance the interpretation of the exploration model.

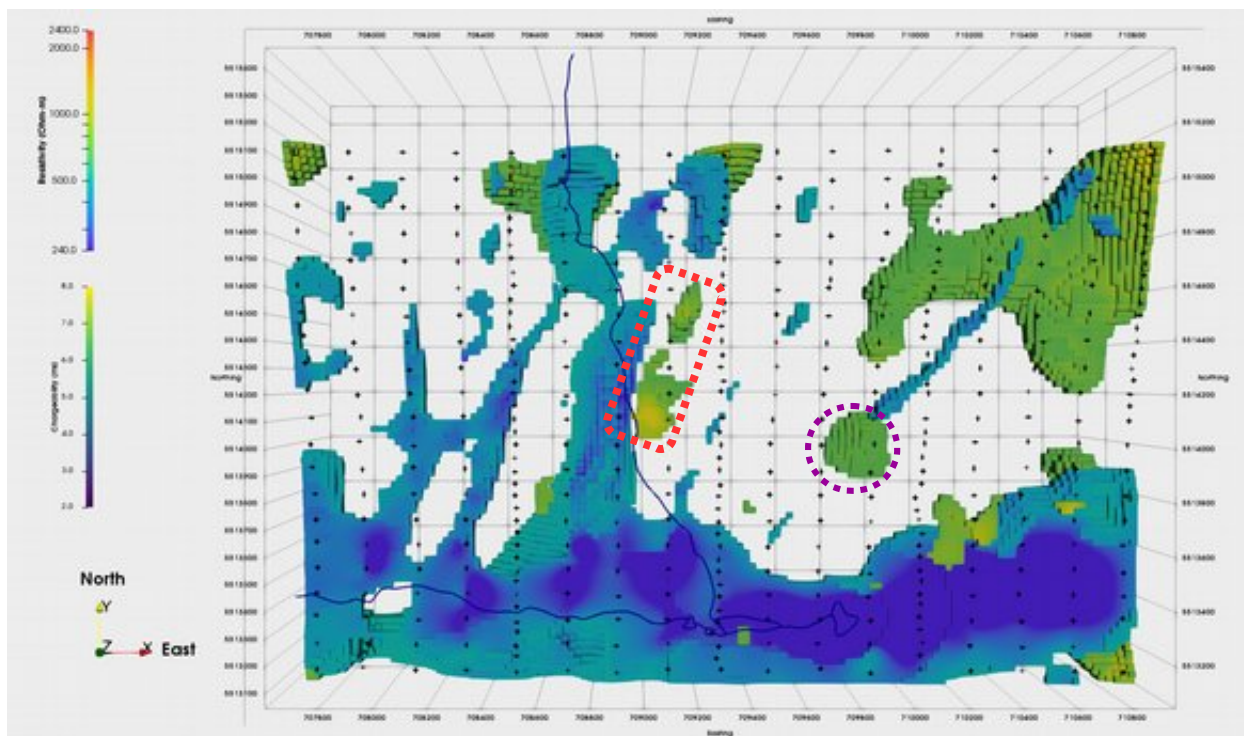


Figure 9: 3D Inversion Model: Chargeability and Resistivity

Resistivity Threshold: Blue < 500 Ohm-m; Chargeability Threshold: Green > 6.5 ms

A second chargeability feature of interest would be a circular pod, around 200 m in diameter centred at 709800E/5513900N and is situated approximately 200 m below the surface. This feature is situated along the prominent NE-SW lineament, as well as appears to be correlated with a strong magnetic low. To the northeast, the model (chargeability > 6.5ms) illustrates a larger feature that may also be associated with the strong NE-SW lineament. However, when manipulating the chargeability model's threshold values, this features appears map the Pennask unit with a slight increase in chargeable material towards the east.

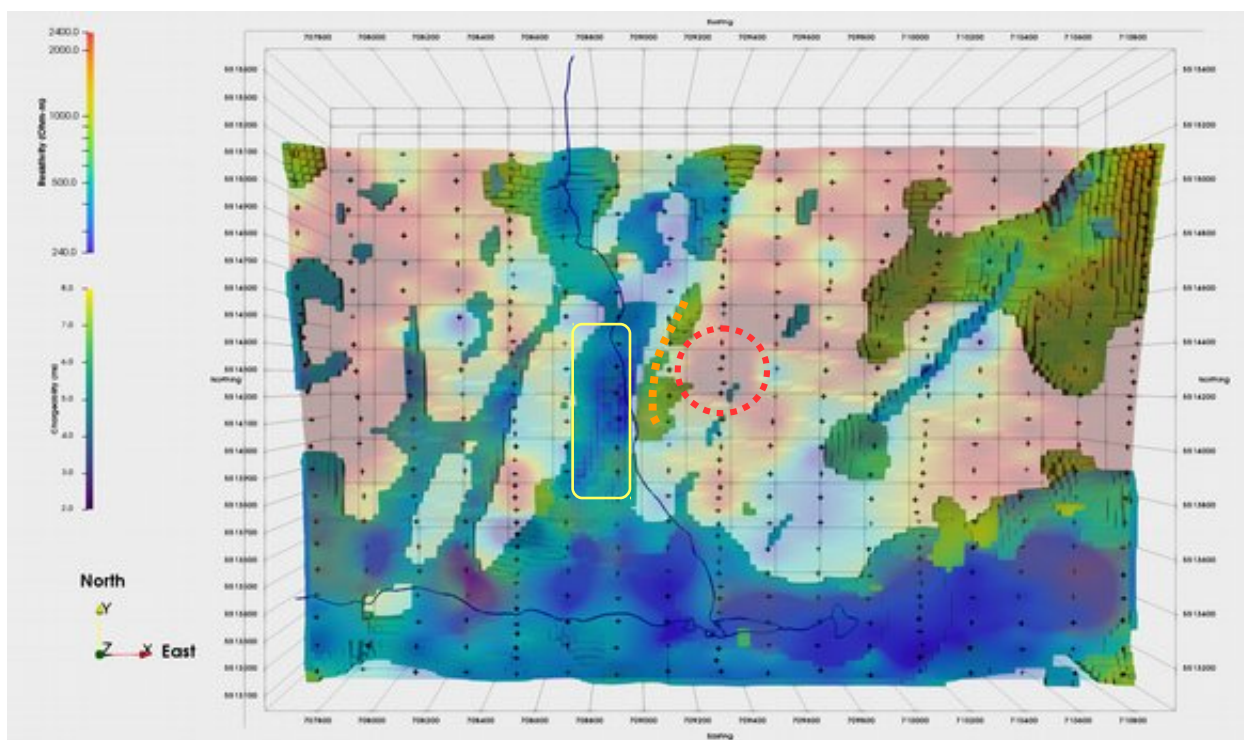


Figure 10: 3D Inversion model, Magnetic Compilation

## 9. Recommendations

It is recommended that this brief discussion of the geophysical results be reviewed and integrated into a more in-depth interpretation by an Exploration Geologist familiar with the exploration model for the property. This geological driven in-depth interpretation should incorporate the historical geophysical data sets such as the airborne magnetic and radiometric results, as well as include results from a recent geochemical soil sampling survey, and geology.

The kilometre-wide corridor warrants further investigation. This corridor encompasses a dominant north-south trending low resistivity feature extending north from the Osprey Lake batholith and separates rocks of the Pennask group. With a coincident magnetic high and a subtle near-surface chargeability flanking its eastern boundary, this low may be a controlling structure for potential mineralization. In addition, the inverted models provide additional evidence of other lineaments that indicate a well fractured environment and additional reasons for further investigation within the corridor.

## ***10. References***

Chen, Brian., November 2018, Logistics Report Prepared for Vizsla Resources Corp., Max Investment Inc.: Volterra-3DIP & Magnetics on the Kathleen Mountain Property.

Kerr, John R., July 2014, Technical Report on the Kathleen Mountain Property, Similkameen Mining Division, British Columbia, for Vizsla Capital Corp.

## ***11. Statement of Qualifications:***

### ***Shawn Rastad***

I, Shawn Rastad, of the city of Coquitlam, Province of British Columbia, hereby certify that:

- 1) I graduated from the University of British Columbia with a B.Sc. Specialization in Geophysics degree in 1996.
- 2) I have been involved with geophysics since that period, working both the in the Oil & Gas and mineral exploration industries.
- 3) My work is regularly monitored and reviewed by a registered Professional Geoscientist in good standing with the Association of Professional Engineers and Geoscientists of British Columbia.
- 4) I have no interest in Vizsla Resources Corp. or Platinum Belt Resources nor do I expect to receive any.

**Signed by:** \_\_\_\_\_

Shawn Rastad, B.Sc., Geophysics

SJ Geophysics Ltd.

**Brian Chen**

I, Brian (PuGang) Chen, of the city of Delta, Province of British Columbia, hereby certify that:

- 1) I graduated from the University of Science and Technology of China with a B.Sc. Specialization in Geophysics degree in 1989 and from South China Sea Institute of Oceanology, CAS, with a M.Sc in Mathematical Geology degree in 1992 .
- 2) I have been practiced geophysics for more than 20 years.
- 3) I am a Professional Geoscientist registered (# 34223) in good standing with Engineers and Geoscientists of British Columbia.
- 4) I have no interest in Vizsla Resources Corp. or Platinum Belt Resources nor do I expect to receive any.

**Signed by:** \_\_\_\_\_

Brian Chen, M.Sc., P.Geo.

Geophysicist

SJ Geophysics Ltd.

## ***Appendix A: Cost Breakdown***

<b>EXPLORATION WORK TYPE</b>	<b>DESCRIPTION</b>	<b>DATES</b>	<b>UNIT</b>	<b>QTY</b>	<b>SUB TOTAL (\$)</b>
<b>Geophysics</b>					
SJ Geophysics Ltd.	Field work, processing and deliverables	October 16, 2018 to November 5, 2018	Days	13	\$108,400.00
SJ Geophysics Ltd.	DCIP Inversion, Ground Mag Processing and Assessment Report		1	1	\$18,500.00
<b>GST (CAN\$):</b>					\$6,345.00
<b>Total (CAN\$):</b>					<b>\$132,877.50</b>

## ***Appendix B: Logistics Report***



**LOGISTICS REPORT PREPARED**

**FOR**

**VIZSLA RESOURCES CORP.**

**MAX INVESTMENT INC.**

**Volterra-3DIP & Magnetometer**

**ON THE**

**KATHLEEN MOUNTAIN PROJECT**

SUMMERLAND, BRITISH COLUMBIA, CANADA

SURVEY CONDUCTED BY SJ GEOPHYSICS LTD.  
OCTOBER-NOVEMBER 2018

REPORT PREPARED BY  
BRIAN CHEN  
NOVEMBER, 2018

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## ***1. Survey Summary***

SJ Geophysics Ltd. was contracted by Max Investment Inc. to acquire Volterra three-dimensional induced polarization (3DIP) and ground magnetometer data on Vizsla Resources Corp.’s Kathleen Mountain project. Table 1 provides a brief summary of the project.

<b>Client</b>	Vizsla Resources Corp.
<b>Project Name</b>	Kathleen Mountain
<b>Location</b> (approx. centre of the grid)	Latitude: 49° 44' 35'' N Longitude: 120° 05' 52'' W 709306E, 5514108N; NAD83 UTM Zone 10N
<b>Survey Type</b>	Volterra 3D Induced Polarization, ground magnetometer
<b>Total Line Kilometers</b>	34 km
<b>Production Dates</b>	October 17 – November 4, 2018
<b>SJ Project Number</b>	SJ821

Table 1: Survey Summary

The Kathleen Mountain project area has been explored over the past 100 years. The Kathleen Mountain showing was discovered in 1947. Modern day exploration did not commence until the mid 1960s. Past exploration includes geochemistry, geological mapping and limited geophysics, followed by trenching and drilling. An airborne magnetic/radiometric survey over the property was completed in February 2018. On the Kathleen Mountain property, the porphyry style of mineralization is most significant for discovery and development of mineral resource. Skarn deposits, similar to Craigmont Mines, and lode vein gold deposits may also exist on the property, however are secondary targets (Technical Report-Kathleen Mountain Property, John R. Kerr, April 2018).

The 3DIP and ground magnetic survey project follows up on an airborne magnetic survey, designed to establish suitable drill targets and identify any features of interest. As well as investigate the distribution and extent of known sulphide mineralization observed at the surface.

## 2. Location and Access

The Kathleen Mountain Project is located in the Interior Plateau area of South Central British Columbia, approximately 23 kilometers west of Peachland and approximately 30 kilometers northwest of Summerland in British Columbia, Canada (Figure 1).



Figure 1: Overview map of the Kathleen Mountain Project

The nearest town to the project is Peachland, BC. The project area can be accessed from Summerland or Peachland by the following directions.

From Summerland,

- Head west on Prairie Valley Rd and turn north onto Doherty Ave.
- Turn left onto Bathville Rd for approximately 250 m and turn right on to Princeton Summerland Rd approximately 30 km.
- Turn right onto Glen Lake FSR (Forest Service Road) before a bridge, continue for 650 meters and arrive at an junction.
- From the junction, turn right on a spur road up hill, drive northwest and west approximate 8.5 km arrived at the southern portion of the project site (Approximately 4.8 km of the road is bumpy, narrow, and dead falls stick out on both side).
- Or, from the junction, follow the Glen Lake FSR east approximately 1 km then north approximately 3.3 km, turn right on to a spur road then travel northwest and west and arrive at the southern portion of the project site (Better road condition).

From Peachland,

- From Highway 97, turn onto Princeton Avenue heading west for 5.5 km.
- Princeton Avenue will transition into the Peachland Main FSR (Radio controlled road, Road Channel label RR-12, Frequency 150.5 MHz). Continue on the Peachland Main FSR for 15 km.
- At the 15 km marker keep left to turn onto the Glen Lake FSR.

Continue on the Glen Lake FSR for 10 km, turn right on to a spur road then travel northwest and west and arrive at the southern portion of the project site.

A map of the project area is shown in Figure 2.

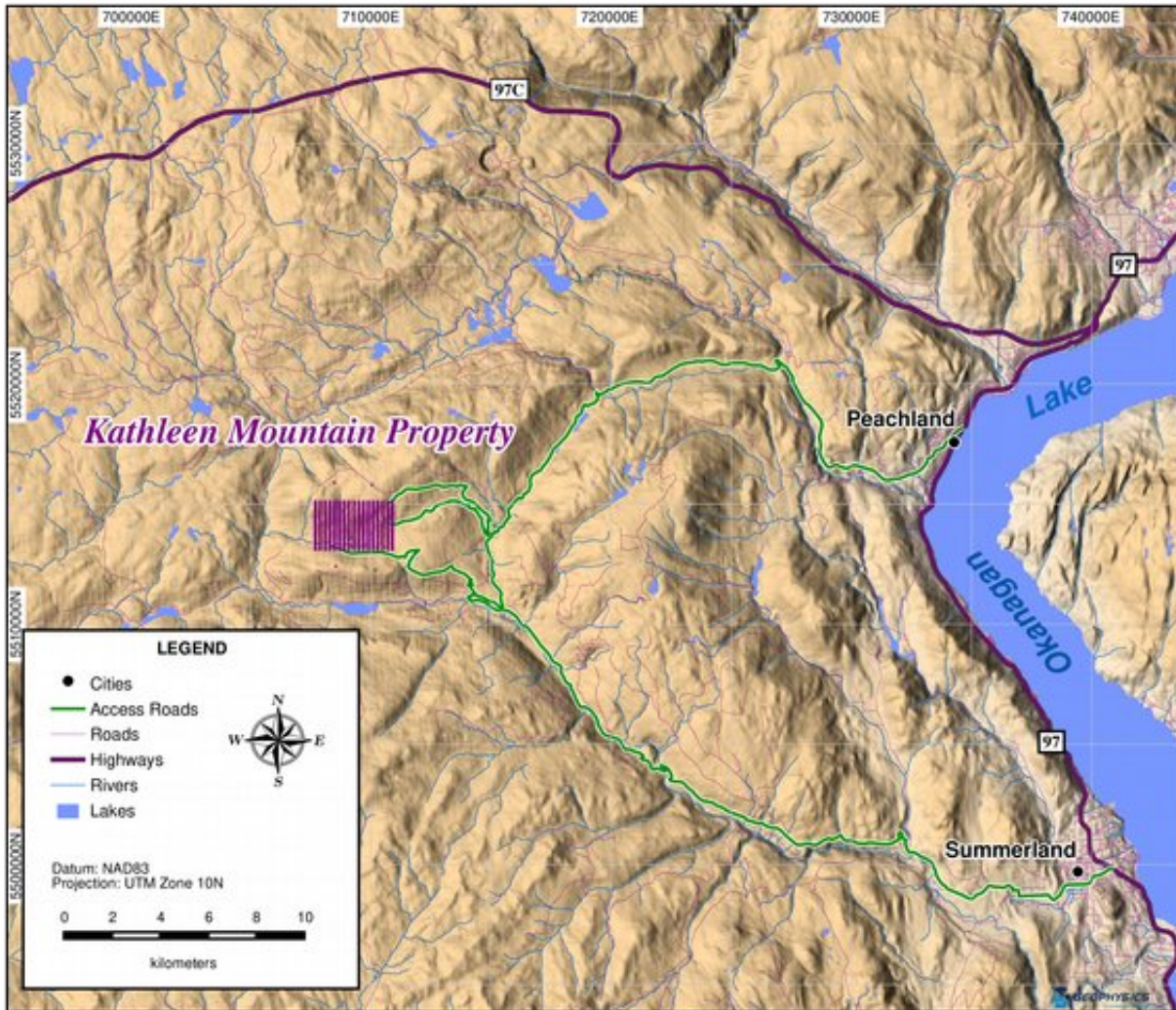


Figure 2: Location map for the Kathleen Mountain Project

The project area lies is situated on the interior plateau within the rain shadow of the Coast Mountains. The climate is relatively dry and can be described as humid continental having an annual average precipitation of 290 mm of rain and 95 cm of snow. The average summer temperature is 30°C. Winters are generally mild with average temperatures near 0°C. The dry conditions and prevailing sunshine foster unique flora and support abundant orchards and vineyards.

The higher elevations in the Okanagan region are covered in coniferous forest. The predominant tree species are White Fir, various Spruce types, and Ponderosa Pine. Fauna of the region is typical of British Columbia. It includes various species of the Cervidae family, an abundant bear population, deer, cougar, and smaller mammals such as squirrel. Birds that are commonly present are Gray and Steller’s Jays, Lewis’s Woodpecker, and some owl types.

### **3. Survey Grid**

The 2018 Kathleen Mountain geophysical survey grid consists of 17 north-south oriented lines, spaced at 200 m with a line length of 2000 m. From south to north, the grid has an elevation gain of approximately 500 m. The north portion of the grid is situated in the plateau part of a mountain. Towards the south, the survey lies on relatively flat land with a stream and swampy areas. Along the slope of the hill to the north, the grid is covered by old and new growth pine trees and bushes. Dead tree falls were encountered on all lines. Traversing on the dead fall zone was challenging. No line was cut or flagged prior to the geophysical survey. All survey stations were located in the field in real-time using hand-held GPS units and flagged with flagging tapes. The survey grid parameters are summarized in Tables 2 and displayed in Figure 3.

<b>Grid</b>	<b>Kathleen Mountain</b>
<b>Number of Surveyed Lines</b>	17
<b>Survey Line Azimuth</b>	0°
<b>Line Spacing</b>	200 m
<b>Station Spacing</b>	50 m
<b>Elevation Range</b>	1300 – 1800 m

Table 2: Kathleen Mountain grid parameters

Line and station labels were based on the UTM coordinate system. Line numbers increased from west to east, labeled by using the last 5 digits of the UTM easting coordinates. Station numbers began at the south end of the lines and increased to the north at 50 m intervals, labeled

by using the last 4 digits of the UTM northing coordinates.

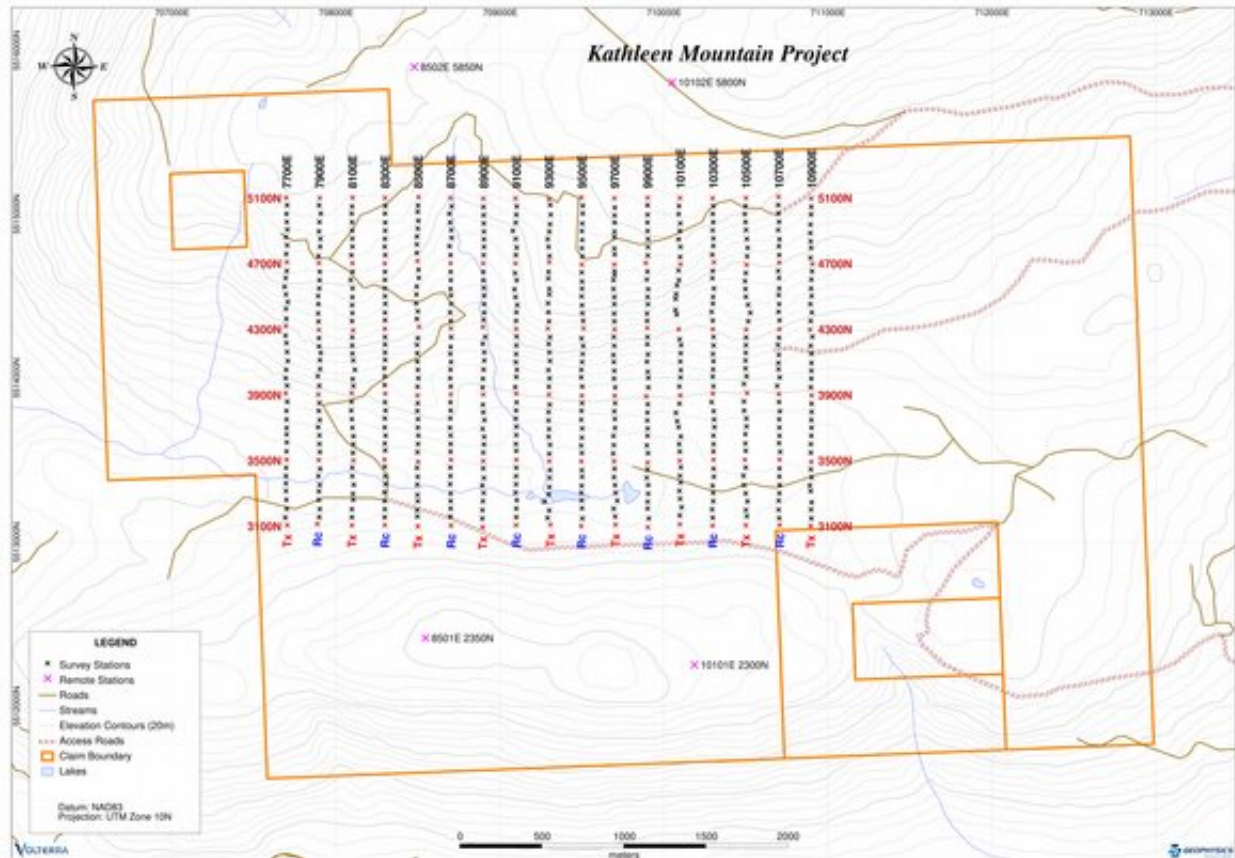


Figure 3: Grid map showing the Kathleen Mountain Project.

## **4. Survey Parameters and Instrumentation**

### **4.1. Volterra Distributed Acquisition System**

The Volterra Distributed Acquisition System was developed internally by SJ Geophysics. The heart of the system is the Volterra data acquisition unit, internally known as a Dabtube. Each four-channel Volterra acquisition unit contains 24-bit analog-to-digital electronics that record the full waveform signal from various sensor configurations. This allows for varying suites of geophysical techniques to be measured; such as induced polarization (IP), electromagnetics (EM), magnetotellurics (MT), controlled source audio-frequency magnetotellurics (CSAMT), etc. The recorded full-waveform data is then passed through proprietary signal processing software to calculate the relevant geophysical attributes (ie. apparent resistivity and chargeability for IP surveys).

### **4.2. Volterra-3DIP Survey**

SJ Geophysics Ltd.'s proprietary Volterra Distributed Acquisition System was utilized for the induced polarization (IP) survey. Current injections were controlled using a GDD TxII transmitter and the resulting ground response was measured using each Volterra data acquisition unit.

The distributed nature of the Volterra-3DIP system allows for highly customizable array and survey configurations. The resulting flexibility is a huge benefit in challenging terrain conditions where rivers, roads, cliffs, or other obstacles can easily be avoided. The crew took full advantage of these features to optimize the field logistics and maximize production.

The transmitter and IP signal recording/processing parameters used for the survey are described in Table 3. The full instrument specifications are listed in Appendix B.

<b>IP Transmitter</b>	GDD TxII (Serial #270, #302)
Duty Cycle	50%
Waveform	Square
Cycle and Period	2 s on / 2 s off; 8 s
<b>IP Signal Recording</b>	Volterra Acquisition Unit (Dabtube 7000 series)
Reading Length	120 s
<b>IP Signal Processing</b>	CSProc (SJ Geophysics proprietary software)
Vp Delay, Vp Integration	1200 ms, 600 ms
Mx Delay, # of Windows Width (Window Width)	50 ms, 26 26, 28, 30, 32, 34, 36, 39, 42, 45, 48, 52, 56, 60, 65, 70, 75, 81, 87, 94, 101, 109, 118, 128, 140, 154, 150 (50–1950 ms)
Mx Integration (Inversion)	50–1950 ms (windows 1–26)
Properties Calculated	Vp, Mx, Sp, Apparent Resistivity and Chargeability

Table 3: 3DIP transmitter and reading parameters

Receiver dipoles were set up using 50 cm long and 10 mm diameter stainless steel electrodes hammered into the ground and connected into the array by single and dual conductor 22 AWG wire. The electrodes used for current injections were significantly larger (1 m x 15 mm) with two electrodes used at each injection site to improve ground contact. Current electrodes were connected to the current transmitter by a single conductor 18 AWG wire.

The Volterra-3DIP system was configured using a in-line array. For the in-line array, receiver dipoles were laid out in a line with a dipole spacing of 100 m. A Volterra acquisition unit was set up in the centre of each set of four dipoles, corresponding to a Volterra acquisition unit every 400 m. Details of the survey configuration are described in Table 4. A schematic of the in-line array is shown in Figure 4.

<b>Array Type</b>	Volterra 3D Distributed Array
<b>Array Configuration</b>	In-line Array
<b>Acquisition Set</b>	5 Lines (Tx-Rc-Tx-Rc-Tx)
<b>Active Array Length per Receiver Line</b>	2000 m
<b>Total Active Dipoles per Current Injection</b>	40
<b>Dipole Length</b>	100 m
<b>Current Interval</b>	100 m

Table 4: Volterra-3DIP survey parameters.

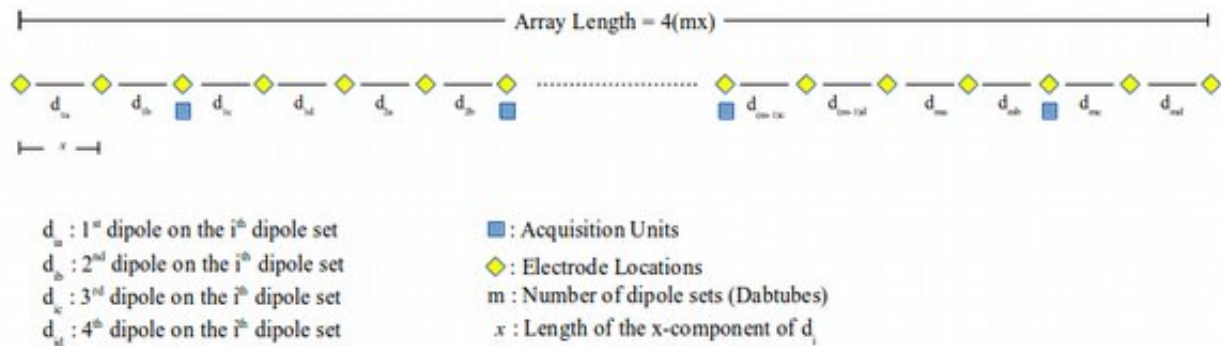


Figure 4: In-line array schematic

The grids were surveyed in swath of five lines with the fifth line duplicated on the next swath. Receiver units were deployed on the second and fourth lines of a swath. Current injections occurred along the first, third and fifth lines of a swath with 100 m spacing.

Four remote electrode stations were utilized over the course of the survey. The locations of the remote current electrodes are listed in Table 5 below.

<b>Name</b>	<b>Label</b>	<b>Easting NAD83 UTM 10N</b>	<b>Northing NAD83 UTM 10N</b>
South Remote 1	8501E2350	708547	5512418
North Remote 1	8502E8500	708480	5515900
South Remote 2	10101E2300	710187	5512254
North Remote 2	10102E8500	710051	5515807

Table 5: Location of 3DIP remote electrode sites

### ***4.3. Magnetometer Survey***

For the magnetometer survey four GEM GSM-19 Overhauser magnetometers were utilized. The three units were used as rovers to collect total magnetic field measurements along the survey lines. The fourth unit was set up as a base station to record diurnal variations in the magnetic field. A recording interval of 3 seconds was selected for the base station unit. Data was acquired in station mode with stations acquired every 12.5 m.

The UTM locations of the magnetic base station and the calibration points are listed in Table 6. The detailed instrument specifications are described in Appendix A.

<b>Name</b>	<b>Easting NAD83 Zone 10</b>	<b>Northing NAD83 Zone 10</b>
Magnetic Base Station	712212	5513323
Magnetic Calibration Point	712218	5513335

Table 6: Location of magnetic base station and magnetic calibration points

### ***4.4. GPS***

GPS measurements for the 3DIP survey were collected using Garmin GPSMap 64s hand-held GPS units for all stations. All recorded points were collected in NAD83 UTM zone 10N.

## 5. Field Logistics

The SJ Geophysics field crew consisted of one geophysicist, one to two field geophysicist(s), and two geophysical technicians. This team oversaw all operational aspects including field logistics, data acquisition and initial field data quality control. Table 7 lists the SJ Geophysics crew members on this project.

<b>Crew Member Name</b>	<b>Role</b>	<b>Dates on Site</b>
Alex Tryon	Crew Lead/Field Geophysicist	October 17 – November 4, 2018
Brian Chen	Geophysicist/Data Processor	October 17 – November 1, 2018
Clay McQuillan	Geophysical Technician	October 17 – November 4, 2018
Will Kahlert	Geophysical Technician	October 17 – November 1, 2018
Justin Hall	Geophysical Technician	October 18 – 27, 2018
Erica Veglio	Field Geophysicist	October 28 – November 4, 2018
Raymond Dickof	Geophysical Technician	October 29 – November 4, 2018
Jordon Perk	Field Geophysicist	November 2 – 4, 2018

Table 7: Details of the SJ Geophysics crew on site

The SJ Geophysics crew's first day on site at the Kathleen Mountain Project was October 17 and they remained on site through November 4. Mobilization to the project occurred on October 16, and demobilization to the next project occurred on November 5.

During the course of the geophysical survey the SJ Geophysics crew conducted an initial orientation meeting and daily safety/logistics meetings at the transmitter site. The orientation meeting included a comprehensive review of safe work practices specific to our geophysical surveys and field operations. At the daily safety meetings personnel discussed issues related to the working conditions, reminders about how to work safely, efficient organization of daily tasks, and any other work-related questions or concerns.

The SJ Geophysics crew was accommodated at a rental house in Summerland. The house functioned well as a base of operations.

Communication with SJ Geophysics' office in Delta, BC was via WiFi and phone. Two

trucks, provided by SJ Geophysics, were used to transport the crew and equipment to the grid. The drive from the house to the grid took approximately one hour and 45 minutes one-way.

During the Volterra-3DIP survey each acquisition day began with the setup of the Volterra acquisition units along the receiver lines and the setup of the transmitter site as well as locating breaks in the wire linking the transmitter to the remote sites. Breaks in the transmission wires, caused by wildlife, were encountered daily and were often difficult to find. Locating and fixing these breaks was unavoidable and time-consuming. Prior to field data acquisition, a contact resistivity test was performed using a small waveform generator attached in parallel to a each Volterra acquisition channel. This was done for each dipole in the array and allowed the operator to identify breaks in the wire or areas of poor ground contact which could degrade input signal quality. Furthermore, this test allowed the operator to inspect the raw signal ensuring that the Volterra acquisition units were functioning correctly and to ensure that the receiver was synchronizing with the correct GPS time.

Upon completion of these tasks acquisition would begin. During acquisition stages a dedicated 'transmitter' Volterra acquisition unit and a current monitor were used to measure the current being injected at each station. By inspecting the quality of the current output the transmitter operator can detect current leakage and ensure the transmitter is functioning correctly. An Android tablet with proprietary Volterra software was used to record the current injection start time and duration as well as to visually monitor the transmitter signal.

On October 17, a crew of four began setting up wire on the first swath of five lines on the western portion of the grid. IP data acquisition commenced the following day. Justin Hall mobilized from Vancouver and joined the crew for the start of acquisition. Surveying of the first swath took two days with a crew of five. On October 20, four team members setup wire on the second swath while one crew member started collecting magnetic data.

There was more tree coverage on the second swath. The crew had to fight through the survey with the combination of thick bush, dead fall, and many breaks (animal chews) in the wire. In addition to these typical issues, a number of acquisition units were inadvertently disconnected by a group of soil samplers working the same grid. Once the cause was determined, communication with the soil samplers eliminated future occurrences. Unfortunately, this issue

did cause a day of production for the IP crew, as they were required to resurvey sections of the grid to fill in the gap in the data coverage

On October 24, the crew finished wire setup on the third swath. Poor road access and lots of dead falls combined with the wet weather made the survey even more challenging. Two very long days were spent for the IP data acquisition on this swath. Setup on the fourth (last) swath started on October 27. Weather changed on October 28. Heavy snow started falling on the survey area. The slushy snow caused problems with current wire burnout and receiver channel crosstalk.

Workers from a forestry company showed up and set fire to large slash piles around the survey area. The geophysical had to carefully move some of their gear, to ensure the safety of the geophysical instrumentation and personnel. Heavy smoke filled the air over the entire valley and project site.

The IP data acquisition was not completed on the last swath until November 1. The crew spent the following next three days on magnetic data collection and wire clean up. In general, the survey had been carried out in a safely manner. No major safety related issues occurred during the survey. However, due to a combination of different factors, overall production was slower than expected. The key factor was most likely the unexpected large amount of dead fall, with the unexpected bad weather (snow) on the last week making traversing the survey lines very difficult.

## **6. Data Quality**

### **6.1. Locations**

The locations for IP grid were collected with Garmin GPSMap 64s hand-held GPS units. On the area with thick bush canopy, the GPS reception was poor. On the open area, the GPS measurements are relatively accurate. The horizontal position error ranged from 3-9 m. Elevation accuracy for the hand-held GPS is lower, with error ranging from 10-20 m. GPS elevation values of the survey stations were replaced by the data derived from the gridded DEM of CDED (Canadian Digital Elevation Data, 25m resolution) over the survey area.

### **6.2. Volterra-3DIP Data**

IP data collected on the Kathleen Mountain project were of good quality in general. Surface contact resistance for most dipoles was less than 20 k $\Omega$ . The background calculated resistivity is approximately 800 Ohm-m. The relatively resistive ground resulted in acceptable Vp amplitude for a measured dipole. The injected current ranged from 230 – 1200 mA with most greater than 400 mA. The resultant Vp's were frequently greater than 2 mV. Repeat readings were also observed to be consistent. As for the apparent chargeability, the decay curves look noisy due to the low background value (below 5 ms). The chargeability data set are considered to be good quality. They are the true response from the low chargeability environment. Data gaps due to broken wire issue and current burn out were re-surveyed.

Figure 5 shows data that is relatively clean. Figure 6 shows data from the west side of the grid that has slightly lower measured chargeability values.

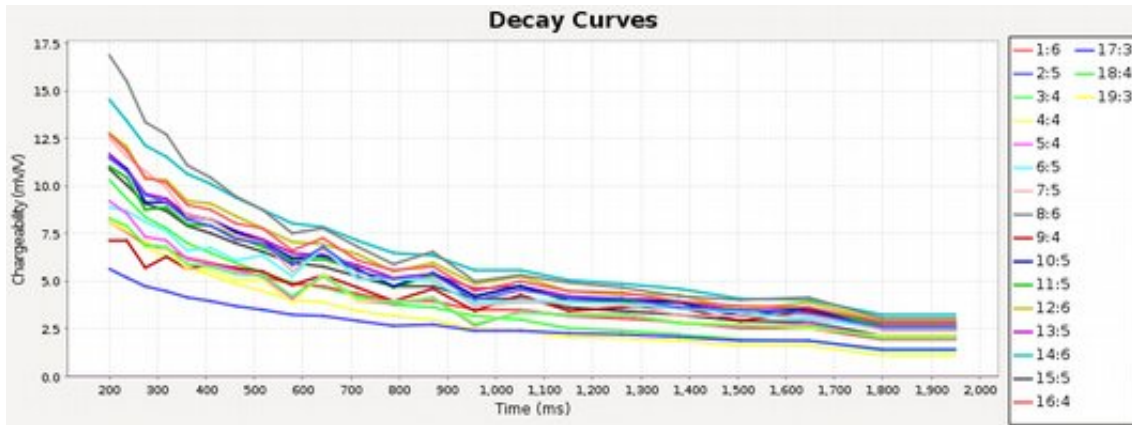


Figure 5: Example of clean decay curve

Receiver Line 10700E, Current Line 10900E, Station 5100N

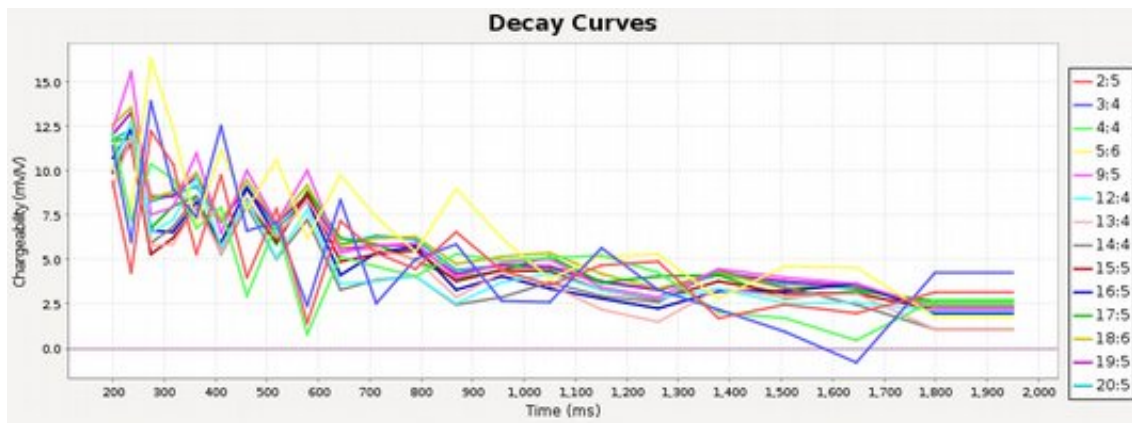


Figure 6: Example of relatively low amplitude decay curves

Receiver Line 8700E, Current Line 9300E, Station 3800N

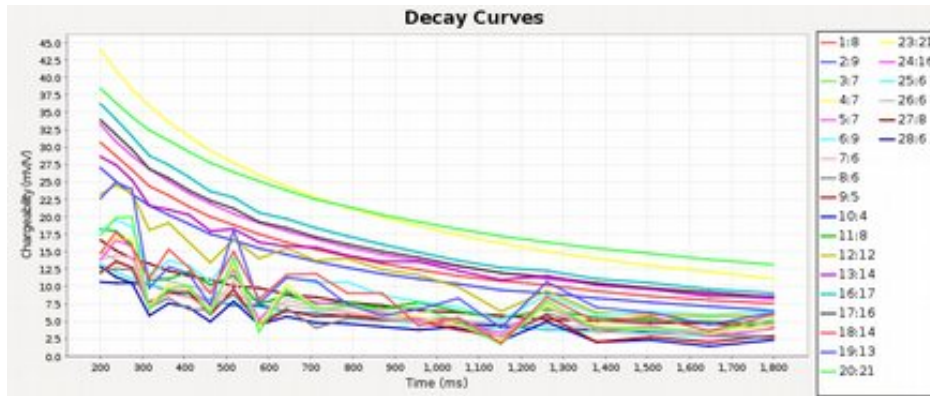


Figure 7: Example of relatively noisy decay curves

Caballito grid, receiver line 8N, current station 1075E

### 6.3. Magnetometer Data

Daily calibration readings were consistent and the operators magnetic signature was generally less than 30 nT while recording control points. Throughout the survey, care was taken to ensure the operator, sensor position, and recordings were consistent and repeatable. Several repeats were taken to verify any fluctuations in the data, especially in areas with high gradients and large magnetic fluctuations. There were a number of high gradient areas encountered in the survey area that resulted in a couple of low signal quality readings. In general, the collected magnetic data are of good quality.

## **7. Deliverables**

This logistics report and maps are provided as two paper copies and digitally in PDF format. All data including the geophysical survey and location data are also provided digitally. The locations of the data and models are in NAD 83, UTM Zone 10N. A brief description of the provided data is below

- 3DIP Data – Raw DCIP data exported as an ASCII .txt file
- Magnetic data – Raw instrument dump files for each survey day and a post-processed text file with all data (labels corrected and QC flags added)
- 3D Models (NAD 83, UTM Zone 10N coordinates)
  - UBC-GIF – Inverted model in UBC-GIF format: chg, con, res, sensitivity, and mesh files
  - VTK – Inverted model in open-source vtk format: chg, res, and sen files
  - XYZ – Inverted model in ASCII XYZ format (converted from UBC-GIF format); value of each cell is located at the centre of the model cell: chg, con, res, sen files
- Location – Locations of the survey stations
  - SJ Geophysics Survey – Locations collected by the field crew using hand-held GPS
- Maps – Volterra-3DIP
  - Chargeability plan maps at constant depth (in metres) below topography
    - 25, 50, 75, 100, 150, 200, 250, 300, 350, 400, 450, 500
  - Resistivity plan maps at constant depth (in metres) below topography
    - 25, 50, 75, 100, 150, 200, 250, 300, 350, 400, 450, 500
  - Plan maps in GeoTiff format
  - Section maps along survey lines
  - Grid map
- Maps - Magnetic

- Stacked Profile map of the Total Magnetic Intensity (TMI)
- Gridded TMI map
- Shadow enhanced TMI maps
- Reports
  - Logistics Report

Respectfully submitted,

Brian Chen, P.Geol.  
Geophysicist

**Appendix A: Survey Details****Kathleen Mountain Project**

Line	Series	Type	Start Station	End Station	Survey Length (m)
7700	E	Tx/Mag	3100	5100	2000
7900	E	Rc/Mag	3100	5100	2000
8100	E	Tx/Mag	3100	5100	2000
8300	E	Rc/Mag	3100	5100	2000
8500	E	Tx/Mag	3100	5100	2000
8700	E	Rc/Mag	3100	5100	2000
8900	E	Tx/Mag	3100	5100	2000
9100	E	Rc/Mag	3100	5100	2000
9300	E	Tx/Mag	3100	5100	2000
9500	E	Rc/Mag	3100	5100	2000
9700	E	Tx/Mag	3100	5100	2000
9900	E	Rc/Mag	3100	5100	2000
10100	E	Tx/Mag	3100	5100	2000
10300	E	Rc/Mag	3100	5100	2000
10500	E	Tx/Mag	3100	5100	2000
10700	E	Rc/Mag	3100	5100	2000
10900	E	Tx/Mag	3100	5100	2000

*Total Linear Meters = 34000m*

*Rc = Receiver Line, Tx = Transmitter Line, Mag = Magnetometer*

## **Appendix B: Instrument Specifications**

### **Volterra Acquisition Unit (Dabtube 7000 Series)**

<b>Technical:</b>	
Input impedance:	20M $\Omega$
Input overvoltage protection:	5.6V
Internal memory:	Variable USB flash memory stick (currently 16GB)
Number of inputs:	4 galvanically isolated inputs
Synchronization:	GPS
Selectable Sampling Rates (samples/second):	128000, 64000, 32000, 16000, 8000, 4000, 2000, 1000
Common mode rejection:	More than 80dB (for Rs=0)
Voltage sensitivity:	Range: 10V (peak to peak, $\pm 5V$ ) Resolution: 0.24 $\mu V$
Communication:	Bluetooth and USB
Serial Port:	
Digital I/O:	6 time stamped ports
Features:	Programmable Gain, AC/DC Coupling
<b>General:</b>	
Dimensions:	Diameter: 43mm, Length: 405mm
Weight:	0.5kg
Battery:	5.0VDC nominal
Operating temperature range:	-40 $^{\circ}C$ to 40 $^{\circ}C$

### **GDD Tx II IP Transmitter**

Input voltage:	120V / 60Hz or 240V / 50Hz (optional)
Output power:	3.6kW maximum
Output voltage:	150 to 2400V
Output current:	0.030 to 10A
Time domain:	1, 2, 4, 8 second on/off cycle
Operating temp. range:	-40 $^{\circ}C$ to +65 $^{\circ}C$
Display:	Digital LCD read to 0.001A
Dimensions (h w d):	34 x 21 x 39cm
Weight:	20kg

## **GEM GSM-19 Magnetometer**

Resolution:	0.01 nT, magnetic field and gradient
Accuracy:	0.2 nT over operating range
Gradient Tolerance:	up to 5000 nT/metre
Operating Interval:	4 seconds minimum, faster optional
Reading:	Initiated by keyboard depression, external trigger or carriage return via RS-232C
Input/Output:	6 Pin weatherproof connector, RS-232C, and optional analog output
Power Requirements:	12v 300 mA peak(during polarization), 35 mA standby, 600 mA peak in gradiometer
Power Source:	Internal 12 V, 1.9 Ah sealed lead-acid battery standard External 12 V power source can be used
Battery Charger:	Input: 110/220 VAC, 50/60 Hz and/or 12 VDC Output: 12 V dual level charging
Operating Range Temperature:	-40 °C to +600 °C
Battery Voltage:	10 V min to 15 V max
<b>Dimensions:</b>	
Console:	223 x 69 x 240 mm
Sensor staff:	4 x 450 mm sections
Sensor:	170 x 71 mm diameter
<b>Weight:</b>	
Console:	2.1 kg
Staff:	0.9 kg
Sensor:	1.1 kg each

## ***Appendix C: Geophysical Techniques***

### ***IP Method***

The time domain IP technique energizes the ground by injecting square wave current pulses via a pair of current electrodes. During current injection, the apparent (bulk) resistivity of the ground is calculated from the measured primary voltage and the input current. Following current injection, a time decaying voltage is also measured at the receiver electrodes. This IP effect measures the amount of polarizable (or “chargeable”) particles in the subsurface rock.

Under ideal circumstances, high chargeability corresponds to disseminated metallic sulfides. Unfortunately, IP responses are rarely uniquely interpretable as other rock materials are also chargeable, such as some graphitic rocks, clays, and some metamorphic rocks (e.g. serpentinite). Therefore, it is prudent from a geological perspective to incorporate other data sets to assist in interpretation.

IP and resistivity measurements are generally considered repeatable to within about five percent. However, changing field conditions, such as variable water content or electrode contact, reduce the overall repeatability. These measurements are influenced to a large degree by the rock materials near the surface or, more precisely, near the measurement electrodes. In the past, interpretation of a traditional IP pseudosection was often uncertain because strong responses located near the surface could mask a weaker one at depth. Geophysical inversion techniques help to overcome this uncertainty.

### ***Volterra-3DIP Method***

Three dimensional IP surveys are designed to take advantage of recent advances in 3D inversion techniques. Unlike conventional 2DIP, the electrode arrays in 3DIP are not restricted to an in-line geometry. This means that data can be collected from a large variety of azimuths simultaneously leading to a highly sampled dataset containing more information about the Earth's physical properties. In an ideal world, a 3DIP survey would consist of randomly located current injections and receiver dipoles with random azimuths. Unfortunately, logistical considerations usually prohibit a completely randomized approach.

The Volterra-3DIP distributed acquisition system is based on state-of-the-art 4-channel, full-waveform, 32-bit Volterra acquisition units. The system is highly flexible and can utilize any

number of Volterra units. The Volterra-3DIP system's untethered, distributed design, eliminates the need for specialized receiver cables and a centralized receiver control station. The dipoles can be in any orientation, can have varying lengths, and completely avoid inaccessible areas if necessary.

A typical Volterra-3DIP configuration establishes alternating current and receiver lines in sets of 5, but can be customized based on the project. The current lines are located on adjacent lines to the receiver line and current injections are performed sequentially at fixed increments (25m, 50m, 100m, 200m) along each current line. By injecting current at multiple locations along each current line, the data acquisition rates are significantly improved over conventional surveys. Customized receiver arrays are utilized to provide greater cross-line focus for a better azimuthal distribution of the data. Cross-dipoles are frequently used to maximize signal coupling and improve the surface resolution.

### ***Geophysical Inversion***

The purpose of geophysical inversion is to estimate the 3D distribution of subsurface physical properties (density, resistivity, chargeability, and magnetic susceptibility) from a series of geophysical measurements collected at the surface. Unfortunately this is a challenging problem – the subsurface distribution of physical properties is complex and only a finite number of measurements can be collected. These complications lead to an under-determined problem. As a result, there are many different possible 3D physical property models that can be obtained which mathematically fit the observed data. Utilizing known geological and geophysical information to evaluate the model allows the best or most geologically realistic model to be selected and leads to a better understanding of the subsurface.

Geophysical inversions are commonly performed for every survey carried out by SJ Geophysics. Several inversion programs are available, but SJ Geophysics primarily uses the UBC-GIF algorithms (e.g. DCIP2D, DCIP3D, MAG3D, GRAV3D) which were developed by a consortium of major mining companies under the auspices of the University of British Columbia's Geophysical Inversion Facility.

In general, multiple inversions are carried out for each dataset and the resultant inversion models are compared with known information to evaluate the model. For example, known

geology, drill assays, the estimated depth of investigation, and the quality of the input data are all used during the evaluation. The most geologically reasonable model that fits the data is then chosen as the best model. When available, additional information such as geological boundaries and down-hole geophysical data can be incorporated into the inversion in order to constrain the inversion model.

Once the final inversion model is selected, the model is gridded and mapped for interpretation. Typically, cross-sections and plan maps are created, sliced at different depths beneath the surface. The inversion results can be visualized in 3D using open source software packages such as Mayavi and Paraview in both 2D and 3D views. Additional data can then be overlain to aid in interpretation and help facilitate the identification of potential drilling targets.

## ***Appendix D: Field Data Processing & Quality Assurance Procedures***

### ***Volterra-2D/3DIP Data***

The Volterra-IP data go through a series of quality assurance checks both in the field and in the office to ensure that the data are of good quality. At the end of each acquisition day the recorded signal was downloaded from the Volterra acquisition units to a personal computer. The signals were then clipped to the GPS time windows of each current injection, lightly filtered for noise, and imported into SJ Geophysics' proprietary QA/QC software package called JavIP. This software package integrates location data with DCIP data in order to calculate the apparent resistivity and apparent chargeability values. JavIP contains interactive quality control tools to allow the field geophysicist to display decay curves, view a dot plot of the calculated parameters, and manually reject bad data points.

The majority of the data points flagged for removal were due to null-coupling, a phenomena typical in IP surveys related to the survey configuration. Null-coupling occurs when a receiver dipole is sub-parallel to lines of constant potential, leading to a significant decrease in signal strength and corresponding poor data quality. Additional data can also be deemed untrustworthy due to low signal quality or dipoles being inadvertently disconnected (usually due to animal activity).

After the first data quality review in the field, the database was delivered to SJ Geophysics' head office for a second review. The data were then carefully checked to ensure that erroneous data points had been removed and were not passed along to the final stage of processing: the inversion.

### ***Magnetometer Data***

All magnetometer data were subjected to a rigorous quality control procedure to ensure that only clean and reliable data are collected. In order to reduce the risk of collecting bad data, space weather was regularly monitored and the data inspected for any non-terrestrial influences present. Magnetic calibration points were measured at the beginning and end of each survey day to ensure that no operator related changes in magnetism are present in the data. The calibration data was also used to estimate the level shift present between two different rover units. Throughout the survey, field crew members made note of any metal cultural features (e.g. fences, pipelines,

culverts) encountered during the survey that could cause spikes in the data.

Each night the magnetic data was downloaded to a personal computer. The dump files were then imported into a spreadsheet and corrected for the diurnal drift. The corrected data were plotted as profiles within the spreadsheet to give a field level quality check on the data before being sent to the SJ Geophysics head office for a final review.

Afterwards the QC'd magnetic data was processed with different linear filters designed to remove or minimize any apparent noise related to single station anomalies present in the data. A single filter may not be suitable for the entire survey, and as such different filters were used for the analysis as the observed local responses dictated.