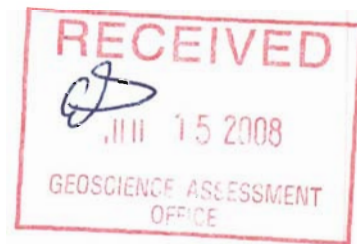


2.38623

**Logistics and Interpretation Report  
on a UTEM 3 Survey  
at the  
Montcalm Property  
Timmins, Ontario  
for  
International Nickel Ventures**

March - April, 2008



**LAMONTAGNE**

**GEOPHYSICS LTD  
GÉOPHYSIQUE LTÉE**

April, 2008  
Robert H. Sinclair, B.Sc.  
Stuart Elson

## CONTENTS

Introduction.....	2
Survey Design.....	4
Survey Logistics.....	6
Survey Results.....	7
Interpretation.....	8

### Figures

Figure 1: Survey Location Map.....	3
Figure 2: Loop Location Map .....	5
Figure 3: Interpreted Features Map- Loop 1.....	9
Figure 2: Interpreted Features Map- Loops 2-8.....	10

### Appendices

Appendix A.....	UTEM Profiles
Appendix B.....	Production Log
Appendix C.....	The UTEM System
Appendix D.....	Note on sources of anomalous Ch1

## INTRODUCTION

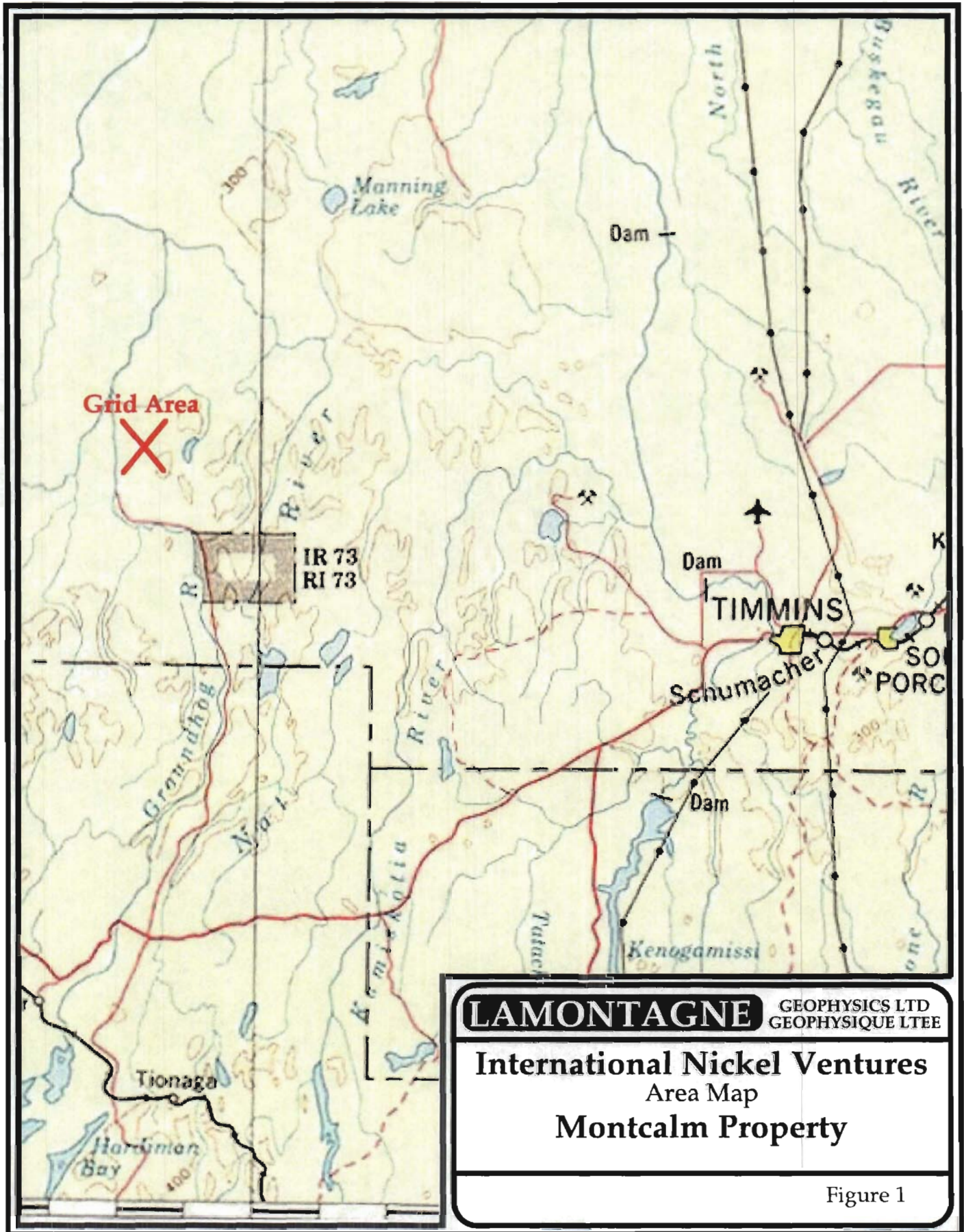
A UTEM 3 surface survey was conducted for International Nickel Ventures from March 12<sup>th</sup> to April 5<sup>th</sup>, 2008 on the Montcalm Property, Timmins, Ontario (Figure 1). Personnel employed by Lamontagne Geophysics conducted the survey on behalf of the client. The survey was carried out to test for responses of conductors in the immediate survey area.

A total of 116 kilometres of outside-the-loop UTEM 3 surface data was collected from eight loops, along survey lines spaced 100m apart with a nominal station spacing of 50 meters, reduced to 25 meters to detail any anomalies.

All lines were surveyed measuring the vertical (Hz) magnetic field. A transmitter frequency of 30.974 Hz in 10-channel mode was used throughout the survey.

This report documents the UTEM survey in terms of logistics, survey parameters, field personnel and includes an interpretation. Appendix A contains the data presented in profile form. Other appendices contain:

- Production Log (Appendix B)
- An Outline of the UTEM System (Appendix C)
- Notes on Sources of Anomalous Ch1 (Appendix D)



## SURVEY DESIGN

This UTEM survey was part of a nickel exploration program in the Montcalm Project area, north of Timmins, Ontario. The property is adjacent to the Montcalm Mine which has three Ni-Cu bearing sulphide deposits which extends about 250 meters in a north-south direction. The deposits are subvertical with the width varying from 30 metres to 60 metres. The UTEM survey was designed to detect conductive features similar to the Montcalm deposit.

Lamontagne Geophysics personnel configured the survey loops with the local geology and target orientation and depth in mind. The survey was designed to use approximately 1 kilometre x 1 kilometre loop with the transmitter operating frequency (30.974 Hz) with lines read outside the loop. The line spacing was 100 m and a nominal station spacing of 50m was used on each line.

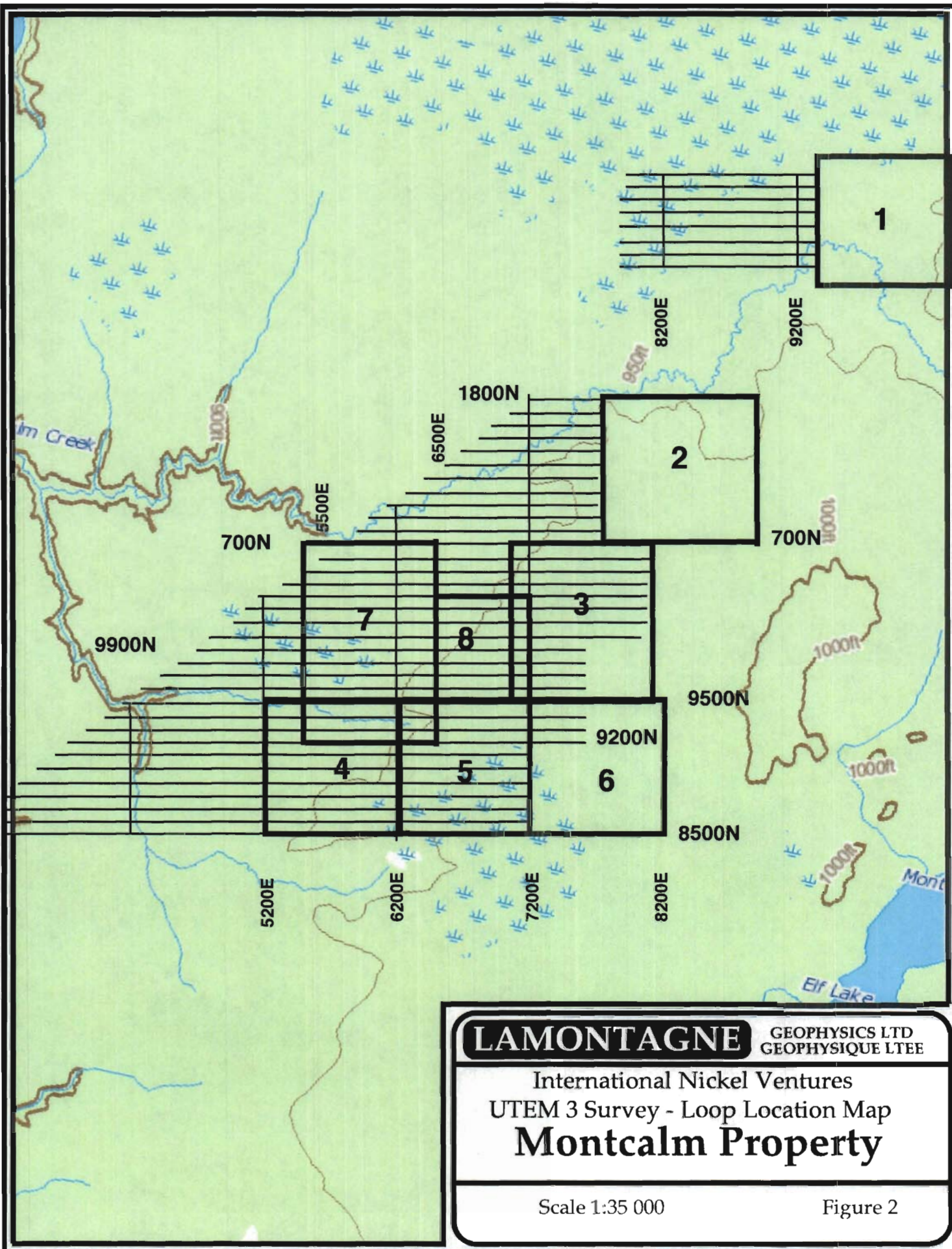
The survey parameters employed:

- outside-the-loop coverage with two UTEM receivers
- transmitter loop was approximately 1 kilometre x 1 kilometre
- line spacing of 100m,
- station interval of 50m or 25m depending on areas of interest
- vertical (Hz) component measurements
- 10-channel data at a frequency of 30.974 Hz,
- minimum 1K stacking (1024 full-cycles/2048 half-cycles) increased where noise levels dictated to maintain data quality.

The targets in this area may be subtle in Channel 1 so it is important that precise geometric control be obtained for each grid. Non-decaying Ch1 UTEM anomalies can reflect:

- i) the presence of mineralization
- ii) the presence of a magnetic anomaly
- iii) poor geometric control - either station location or loop location

These are outlined in more detail in Appendix D. From an interpretation perspective this means that magnetics and geometric control should be considered and evaluated as a part of any interpretation. From a field perspective it means that precise geometric control should be part of any UTEM survey where the target is non-decaying. Poor geometric control has the potential to both mask and invent Ch1 conductors.



## SURVEY LOGISTICS

The Lamontagne Geophysics crew mobilised from Geraldton, Ontario on March 11<sup>th</sup> and arrived Timmins later that day. Loop laying began the next day and surveying started on March 13<sup>th</sup>. The two receiver crew consisted of Robert Sinclair (geophysicist/ crew chief), Kevin Arsenault (operator), Andrew Van Roon (field assistant/ operator), and Ron Matansinine (field assistant). Gerry Lafortune (field assistant/ operator) joined the crew on March 13<sup>th</sup>.

Operations were based out the Cedar Meadows Lodge located in the west end of Timmins. Travel to the survey area took about 1.5 to 2 hours by 4 x 4 truck 15 kilometre west along highway 101 then north along the Malette Road for 70 km. The Malette road was a well maintained logging/ mining road which passed within 1 kilometre of the survey area.

Eight survey loop were used during the survey for a total coverage of 116 line kilometres surveyed at a frequency of 30.974 Hz. Figure 2 shows the loop layout and grid location.

Loops 1 to 7 were designed to survey outside the loop, reading to the west of the loop. The location of the mine to the east of the property prohibited the laying of a loop to the east of loop 3, as originally planned. To cover this section of the grid the lines were read to the east from loop 7. Reading the lines to the east or west of the loop would be equally effective due to the sub-vertical nature of the target conductor.

The data from two lines on loop 3 (9900N and 100N) could not be dumped from the receiver. These line sections were resurveyed using loop 7 and loop 8. Lamontagne did not charge for the day that the receiver malfunctioned.

The weather was good throughout the survey. The snow cover created no difficulties with loop laying or surveying.

The terrain was generally good, mostly forested areas and recent clear cut. Skidoo trails were broken along old logging roads and through open swamp which provided good access to all the loops and lines.

UTEM survey equipment employed in the field consisted of:

- Two UTEM 3 transmitter
- three UTEM 3 receivers and four coils

An iBook field computer was used to reduce and plot the data while on site and e-mailed to Celtic on a timely basis.

Additional information is available in the Production Log (Appendix B) which outlines the day-to-day operations of the survey and the members of the crew.

## SURVEY RESULTS

The results of the survey are summarised and presented as UTEM profiles in Appendix A. The survey went well and the overall data quality is good.

No Differential GPS information was gathered on this grid. Lamontagne personnel used hand held gps units to mark the location of the loops and where the lines intersected the loop. The location for the first station on each line was referenced from the loop front. All other station locations were extrapolated from this point assuming an idealised grid (line in an east-west direction with 25m station separation) with no elevation changes. Because of this extrapolation for each line, the overlap from different loops does not match up exactly. Some obvious near wire geometry errors were corrected for the final reduction.

The gps locations collected by Lamontagne personnel does not have the accuracy to eliminate all geometric error on channel 1 but the minimal elevation change on the grid and the fairly good line cutting meant the data has been reduced with only a slight geometric error.

For each line the Hz continuously-normalized data are presented as 3-axis profiles:

top axis	Ch 5-10	<i>Ch1 Reduced</i>
centre axis	Ch 2-5	<i>Ch1 Reduced</i>
bottom axis	Ch1	<i>Primary Field Reduced</i>

Continuous normalization is useful for the detection of anomalies at any position on a profile. The anomaly shape is distorted by the normalization to the local field. A description of the standard UTEM 3 plotting formats and of the UTEM System is presented in Appendix C.

### Discussion of the Grid

The Montcalm property grid was located approximately 50 kilometres north-west of Timmins. The grid was easily accessed along the Malette logging/mining road. For safety reason, radios were required on the road to communicate with other vehicles. The road was maintained but became muddy, rough and slippery as the job progressed due to melting as the weather warmed. It sometimes took over two hour to cover the 70 kilometres when the condition of the road was poor.

International Nickel Ventures made arrangements with Xtrata to access the Montcalm Grid through Xtrata's property. As part of the agreement the Lamontagne crew received safety orientation from Xtrata at the Montcalm Mine and followed all their Health and Safety policies.

The grid was well cut in general with few chaining or labelling errors. However, line 9500N was only cut to 5025 E while it should have extended to about 4150 E.



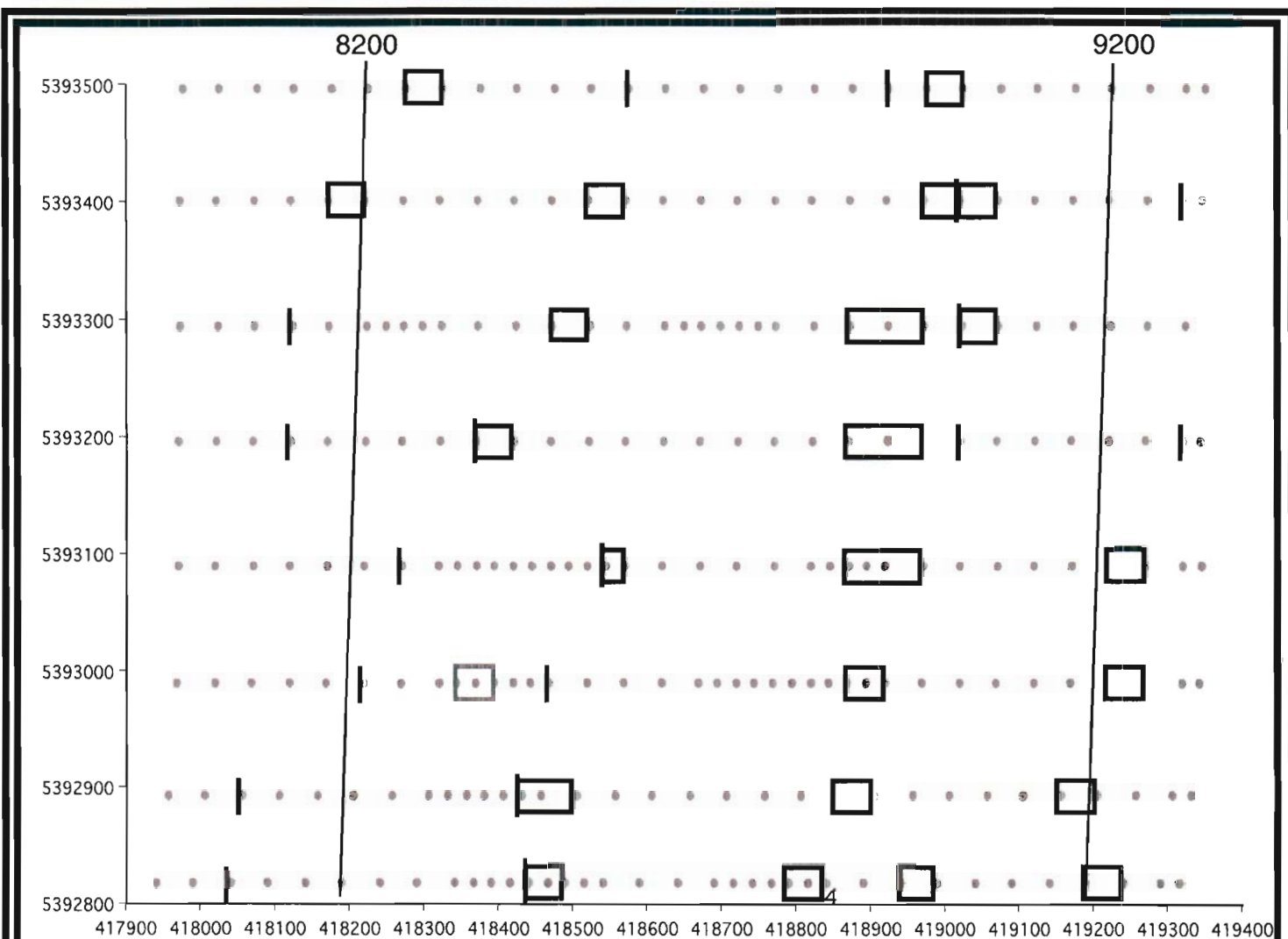
## INTERPRETATION

The following interpretation is of the collected UTEM alone, as such it should be used in conjunction with other available geologic and geophysical information on the Montcalm property.

A few comments can be said about the data in general. The overall background response indicates a resistive area with a thin overburden. The geometric control on the grid was provided by handheld GPS data with the stations extrapolated from a GPS point taken at the line-loop intersection. The grid was fairly flat and the line cutting was quite good, meaning the geometric control is fairly good but geometric errors are still present in the data.

The highest conductance response, and only UTEM Channel 1 response detected on the grid, was detected from Loop 2 on Lines 1000N to 1600N. The best inductive EM response from this structure was detected on Line **1500N** and then Line **1400N**. The top of this structure is positioned under the following stations on each line: Line 1000N at 7025E, Line 1100N at 7100E, Line 1200N 7150E, Line 1300N at 7225E, Line 1400N 7350E, Line 1500N 7450E and 7575E. This conductive body has a very subtle Ch1 response with a possible magnetic response associated with it. This body is interpreted as a steeply dipping (between 70 and 85 degrees) structure, dipping to the west on Lines 1000N to 1300N, and dipping northwest on Lines 1400N and 1500N. This body is striking roughly north-northeast from Lines 1000N to 1300N; then trends further to the east from Lines 1300N to 1500N, and likely continues east of the grid on Line 1600N, under Loop 2. The structure on Line 1500N appears to have two responses associated with it, indicating this structure either has increased in thickness or is two parallel conductive structures. The response at station 7575E on Line 1500N is a decaying response with the response at station 7450E on Line 1500N appearing as a Ch1 only response. This structure has an average depth to top between 50 and 70 metres deep along its strike. Its depth extent is a minimum of 125 metres but is not very well constrained. The amplitude and character of the Channel 1 response associated with this structure indicates the structure is not a continuous, massive conductive zone but a patchy, lattice work of conductive mineralization.

Other intermediate time channel (Channels 2 through 5) responses were detected on this grid. These responses are likely related to geologic and structural features such as contacts, dykes and faults. These responses tend to have a rapid decay and are barely detectable by Channel 2. They tend to have a higher amplitude response indicating in places that current is being channeled in the feature. Numerous early channel (channels 5 to 10), very low conductance responses were detected during this survey. These responses are from shallow features, or features with a shallow expression. Many of these responses are related to variations in overburden thickness and conductivity which is tied to variations in the bedrock topography. Other early channel responses are related to lake/swamp bottoms. These responses should be compared to other available geologic and geophysical data on the property. The majority of these responses can likely be correlated to surficial geology. Figures 3 and 4 outline the EM responses detected on the grid.



**Legend**

- X** late channel conductor
- X** channel 1 conductor of interest
- |** Structural feature such as a contact, intermediate to early channel, high amplitude response, possible current channeling response associated with it
- Early channel (ch 5-10), broad smooth response related to variations in overburden thickness/variations in bedrock topography
- Early to intermediate channel, conductive trough, near surface and horizontal
- |** Very early channel, at surface response, related to variations in overburden character, such as streams, marshes, swamps, lakes etc.
- ( ex. )<sub>1</sub>** Subscript denotes latest time channel the response was detected



**LAMONTAGNE** GEOPHYSICS LTD  
GEOPHYSIQUE LTEE

**International Nickel Ventures**  
Montcalm Property, Timmins, Ontario

**Interpreted Features**

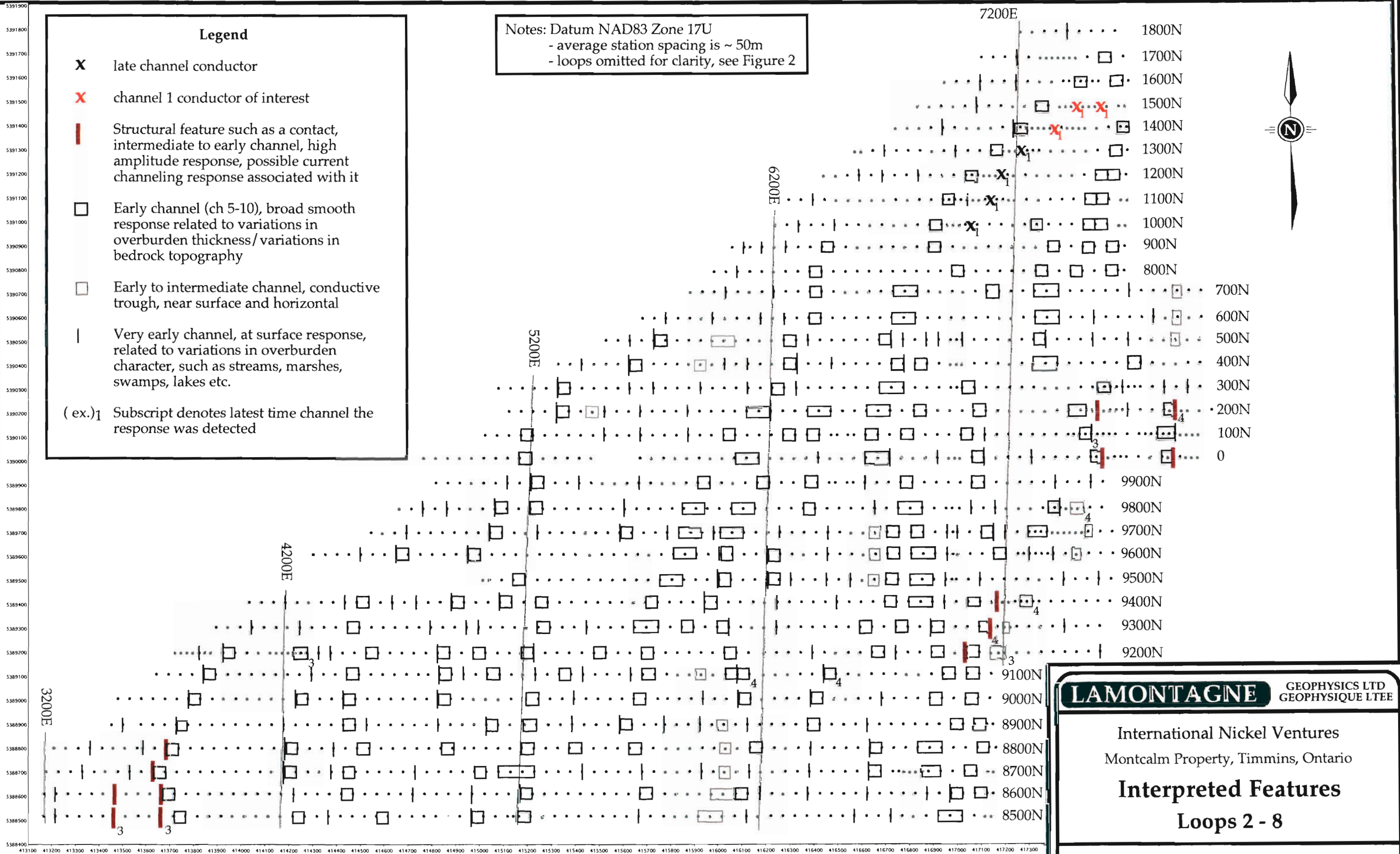
---

**LOOP 1** Figure 3

**Legend**

- X** late channel conductor
  - X** channel 1 conductor of interest
  - |** Structural feature such as a contact, intermediate to early channel, high amplitude response, possible current channeling response associated with it
  - Early channel (ch 5-10), broad smooth response related to variations in overburden thickness/ variations in bedrock topography
  - Early to intermediate channel, conductive trough, near surface and horizontal
  - |** Very early channel, at surface response, related to variations in overburden character, such as streams, marshes, swamps, lakes etc.
- ( ex.)<sub>1</sub> Subscript denotes latest time channel the response was detected

Notes: Datum NAD83 Zone 17U  
 - average station spacing is ~ 50m  
 - loops omitted for clarity, see Figure 2



**LAMONTAGNE** GEOPHYSICS LTD  
 GEOPHYSIQUE LTEE

International Nickel Ventures  
 Montcalm Property, Timmins, Ontario

**Interpreted Features**  
**Loops 2 - 8**

Scale 1:14 286

Figure 4

# **Appendix A**

**0809 UTEM Profiles**

**UTEM 3 Survey**

**Montcalm Property,  
Timmins, Ontario  
for  
International Nickel Ventures**

**March - April, 2008**

## Presentation

The results of the survey are summarized and presented as UTEM 3 profiles in Appendix A. An outline of profile types follows:

### UTEM 3 Surface Survey

For each line surveyed the continuously normalized profiles for the vertical (Hz) component have been plotted.

Hz    **continuous norm**                      *Ch1 reduced*  
    top axis - Ch5-10  
    middle axis - Ch2-4  
    bottom axis - Ch1

Continuous normalization is useful for the detection of anomalies at any position on a profile. The anomaly shape is distorted by the normalization to the local field. A description of the standard UTEM 3 plotting formats and of the UTEM System is presented in Appendix C.

## List of Data Collected and Plotted

### Montcalm Property

	<b>Line</b>	<b>coverage</b>	
Loop 1	Line 2800 N	7950 E - 9325 E	1375 m
	Line 2900 N	7950 E - 9325 E	1375 m
	Line 3000 N	7950 E - 9325 E	1375 m
	Line 3100 N	7950 E - 9325 E	1375 m
	Line 3200 N	7950 E - 9325 E	1375 m
	Line 3300 N	7950 E - 9300 E	1350 m
	Line 3400 N	7950 E - 9325 E	1375 m
	Line 3500 N	7950 E - 9325 E	1375 m
Loop 2	Line 800 N	5950 E - 7675 E	1725 m
	Line 900 N	6000 E - 7675 E	1675 m
	Line 1000 N	6200 E - 7675 E	1475 m
	Line 1100 N	6250 E - 7675 E	1425 m
	Line 1200 N	6400 E - 7675 E	1275 m
	Line 1300 N	6525 E - 7675 E	1150 m
	Line 1400 N	6700 E - 7675 E	975 m
	Line 1500 N	6800 E - 7675 E	875 m
	Line 1600 N	6900 E - 7675 E	775 m
	Line 1700 N	7050 E - 7650 E	600 m
	Line 1800 N	7200 E - 7600 E	400 m
Loop 3	Line 9500 N	5200 E - 6975 E	1775 m
	Line 9600 N	5200 E - 6975 E	1775 m
	Line 9700 N	5225 E - 6975 E	1750 m
	Line 9800 N	5200 E - 6975 E	1775 m
	Line 0 N	5650 E - 6975 E	1325 m
	Line 200 N	5100 E - 6950 E	1850 m
	Line 300 N	5050 E - 6975 E	1925 m
	Line 400 N	5300 E - 6975 E	1675 m
	Line 500 N	5500 E - 6975 E	1475 m
	Line 600 N	5650 E - 6950 E	1300 m
	Line 700 N	5850 E - 6950 E	1100 m
Loop 4	Line 8500 N	3200 E - 5175 E	1975 m
	Line 8600 N	3200 E - 5000 E	1800 m
	Line 8700 N	3200 E - 5150 E	1950 m
	Line 8800 N	3225 E - 4950 E	1725 m
	Line 8900 N	3450 E - 5150 E	1700 m
	Line 9000 N	3500 E - 5150 E	1650 m
	Line 9100 N	3650 E - 5150 E	1500 m
	Line 9200 N	3750 E - 5175 E	1425 m

## List of Data Collected and Plotted

### Montcalm Property

	<b>Line</b>	<b>coverage</b>	
Loop 5	Line 8500 N	4800 E - 6150 E	1350 m
	Line 8600 N	4800 E - 6175 E	1375 m
	Line 8700 N	4800 E - 6150 E	1350 m
	Line 8800 N	4800 E - 6150 E	1350 m
	Line 8900 N	4800 E - 6150 E	1350 m
	Line 9000 N	4800 E - 6150 E	1350 m
	Line 9100 N	4800 E - 6150 E	1350 m
	Line 9200 N	4800 E - 6150 E	1350 m
	Line 9300 N	4800 E - 6150 E	1350 m
	Line 9400 N	4800 E - 6150 E	1350 m
Loop 6	Line 8500 N	5800 E - 7175 E	1375 m
	Line 8600 N	5800 E - 7175 E	1375 m
	Line 8700 N	5800 E - 7175 E	1375 m
	Line 8800 N	5800 E - 7175 E	1375 m
	Line 8900 N	5800 E - 7175 E	1375 m
	Line 9000 N	5800 E - 7150 E	1350 m
	Line 9100 N	5800 E - 7150 E	1350 m
	Line 9200 N	5800 E - 7175 E	1375 m
	Line 9300 N	5800 E - 7175 E	1375 m
	Line 9400 N	5800 E - 7175 E	1375 m
Loop 7West	Line 9200 N	3750 E - 5450 E	1700 m
	Line 9300 N	3900 E - 5450 E	1550 m
	Line 9400 N	4050 E - 5450 E	1400 m
	Line 9500 N	5025 E - 5450 E	425 m
	Line 9600 N	4300 E - 5450 E	1150 m
	Line 9700 N	4550 E - 5450 E	900 m
	Line 9800 N	4650 E - 5450 E	800 m
	Line 9900 N	4800 E - 5450 E	650 m
	Line 0 N	4750 E - 5450 E	700 m
	Line 100 N	5000 E - 5450 E	450 m

## List of Data Collected and Plotted

### Montcalm Property

	<b>Line</b>	<b>coverage</b>	
Loop 7East	Line 9200 N	6550 E - 7600 E	1050 m
	Line 9300 N	6550 E - 7600 E	1050 m
	Line 9400 N	6550 E - 7650 E	1100 m
	Line 9500 N	6550 E - 7650 E	1100 m
	Line 9600 N	6525 E - 7650 E	1125 m
	Line 9700 N	6525 E - 7650 E	1125 m
	Line 9800 N	6525 E - 7600 E	1075 m
	Line 9900 N	6525 E - 7600 E	1075 m
	Line 0 N	6525 E - 8000 E	1475 m
	Line 100 N	6525 E - 8000 E	1475 m
	Line 200 N	6500 E - 8050 E	1550 m
	Line 300 N	6525 E - 8000 E	1475 m
	Line 400 N	6550 E - 8000 E	1450 m
	Line 500 N	6525 E - 8000 E	1475 m
	Line 600 N	6525 E - 8000 E	1475 m
Line 700 N	6525 E - 8000 E	1475 m	
Loop 8	Line 100 N	5200 E - 6475 E	1275 m
	Line 9900 N	5200 E - 6475 E	1275 m

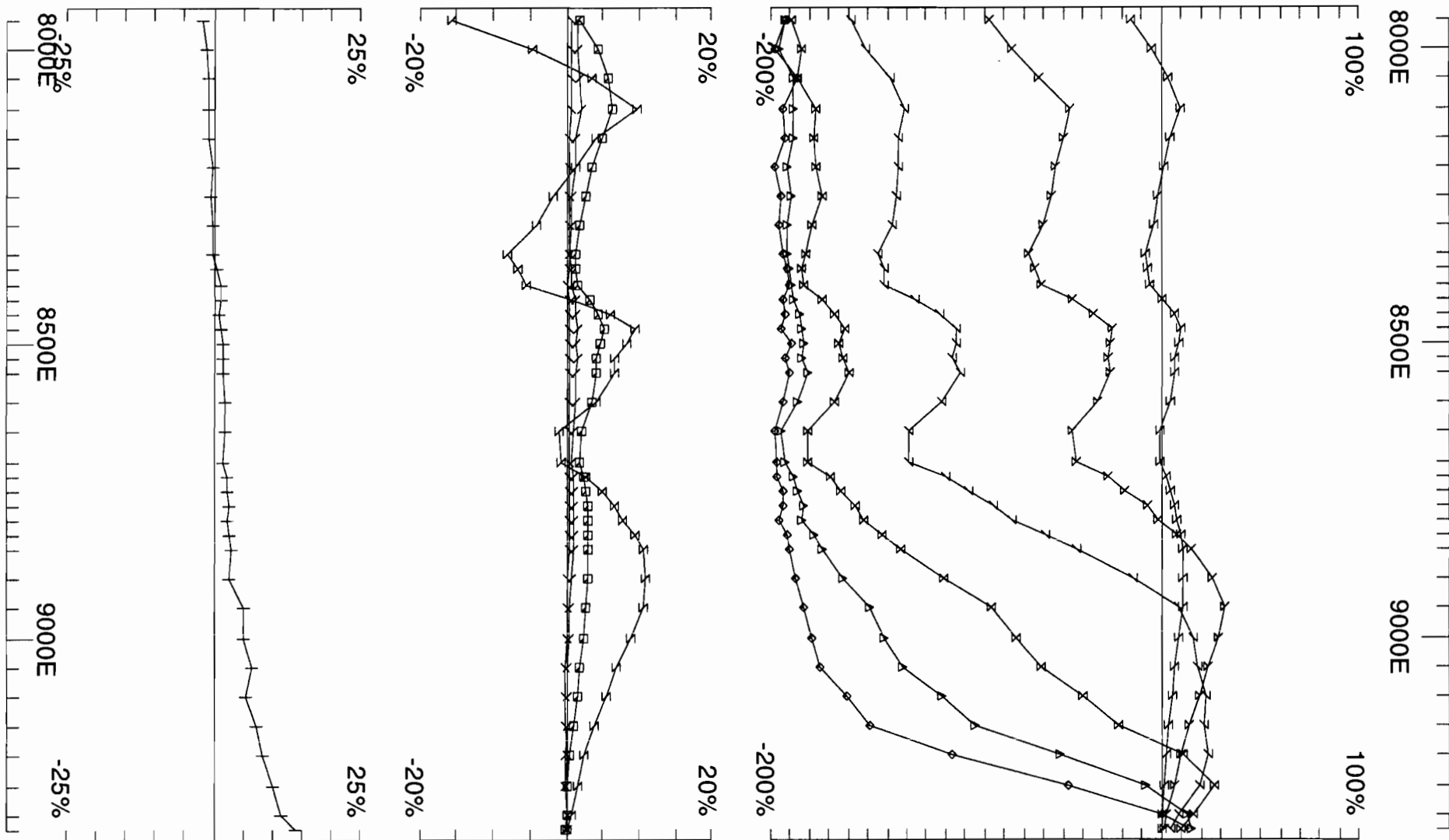


# Loop 1

Hz Profiles  
(continuous norm)

@ 30.974 Hz

	<b>Line</b>	<b>coverage</b>	
Loop 1	Line 2800 N	7950 E - 9325 E	1375 m
	Line 2900 N	7950 E - 9325 E	1375 m
	Line 3000 N	7950 E - 9325 E	1375 m
	Line 3100 N	7950 E - 9325 E	1375 m
	Line 3200 N	7950 E - 9325 E	1375 m
	Line 3300 N	7950 E - 9300 E	1350 m
	Line 3400 N	7950 E - 9325 E	1375 m
	Line 3500 N	7950 E - 9325 E	1375 m



Loop: 1

Line: 2800N

Compt: Hz

Secondary, (Chn - Ch1)/|Hp|

Contin. Norm at depth of 0 m

Base Freq. 30.974 Hz

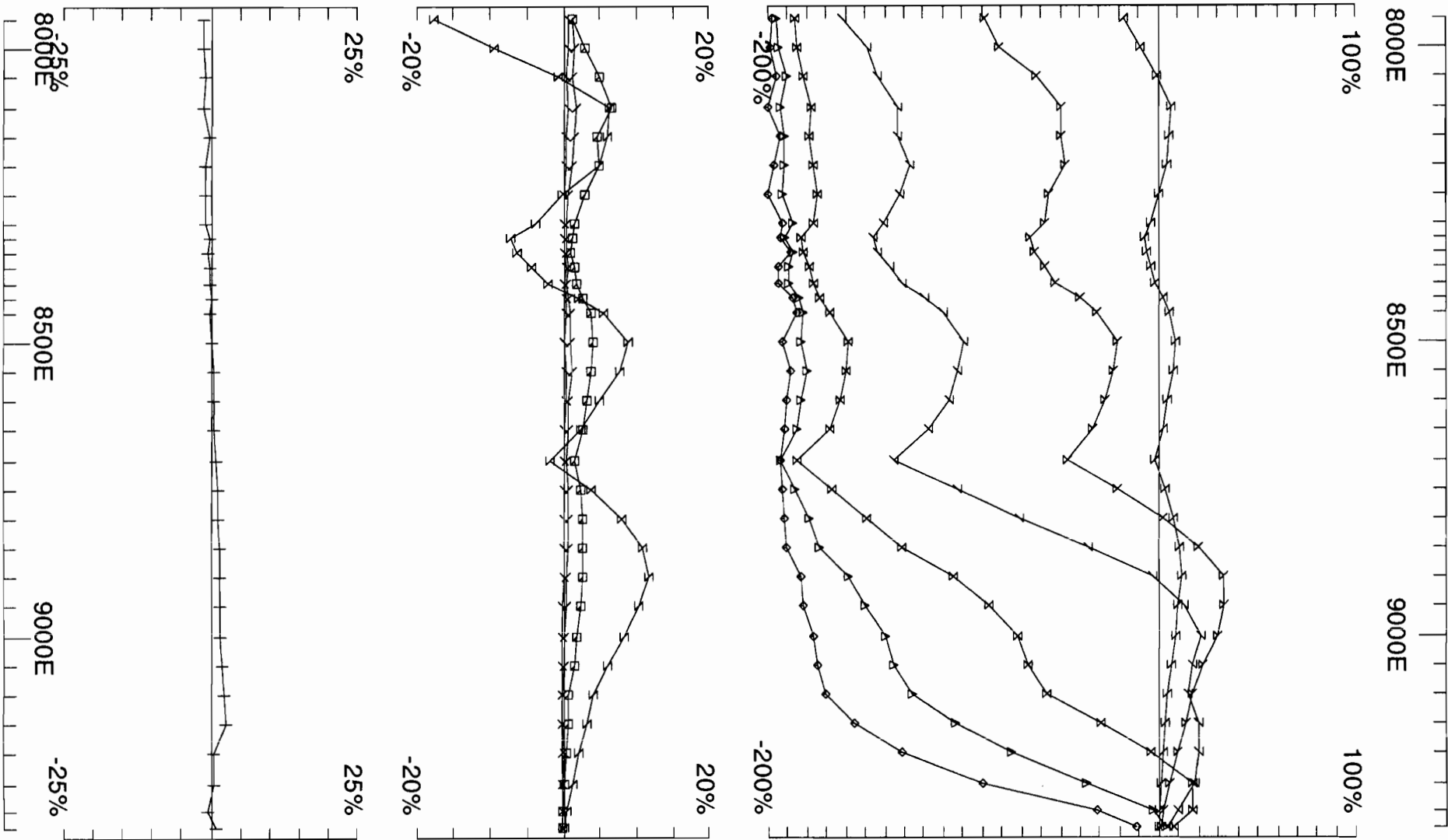
UTEM Survey at: Montcalm Property  
For: International Nickel Ventures Ltd.

**LAMONTAGNE**

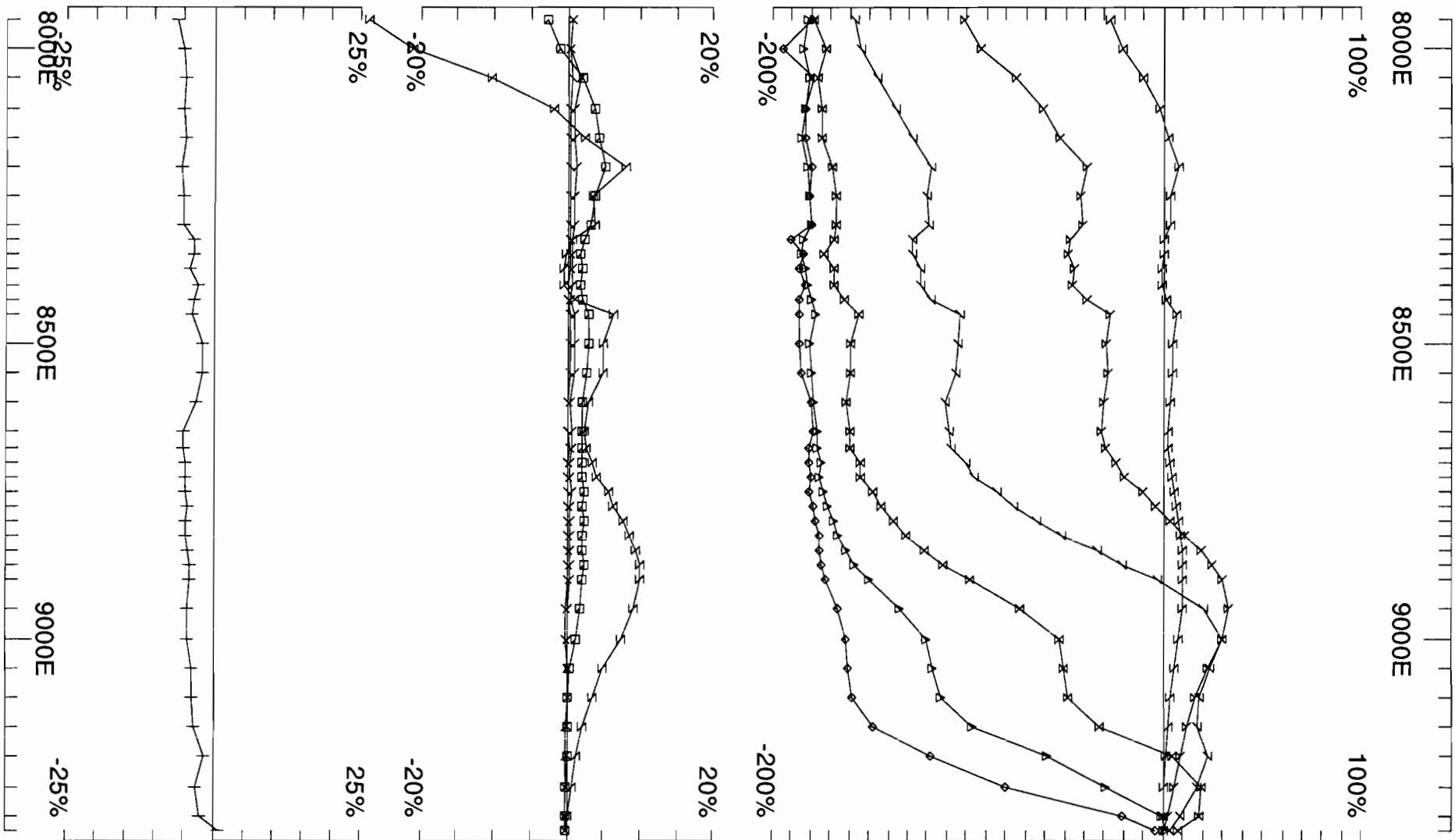
GEOPHYSICS LTD  
GEOPHYSIQUE LTEE

Job  
0809

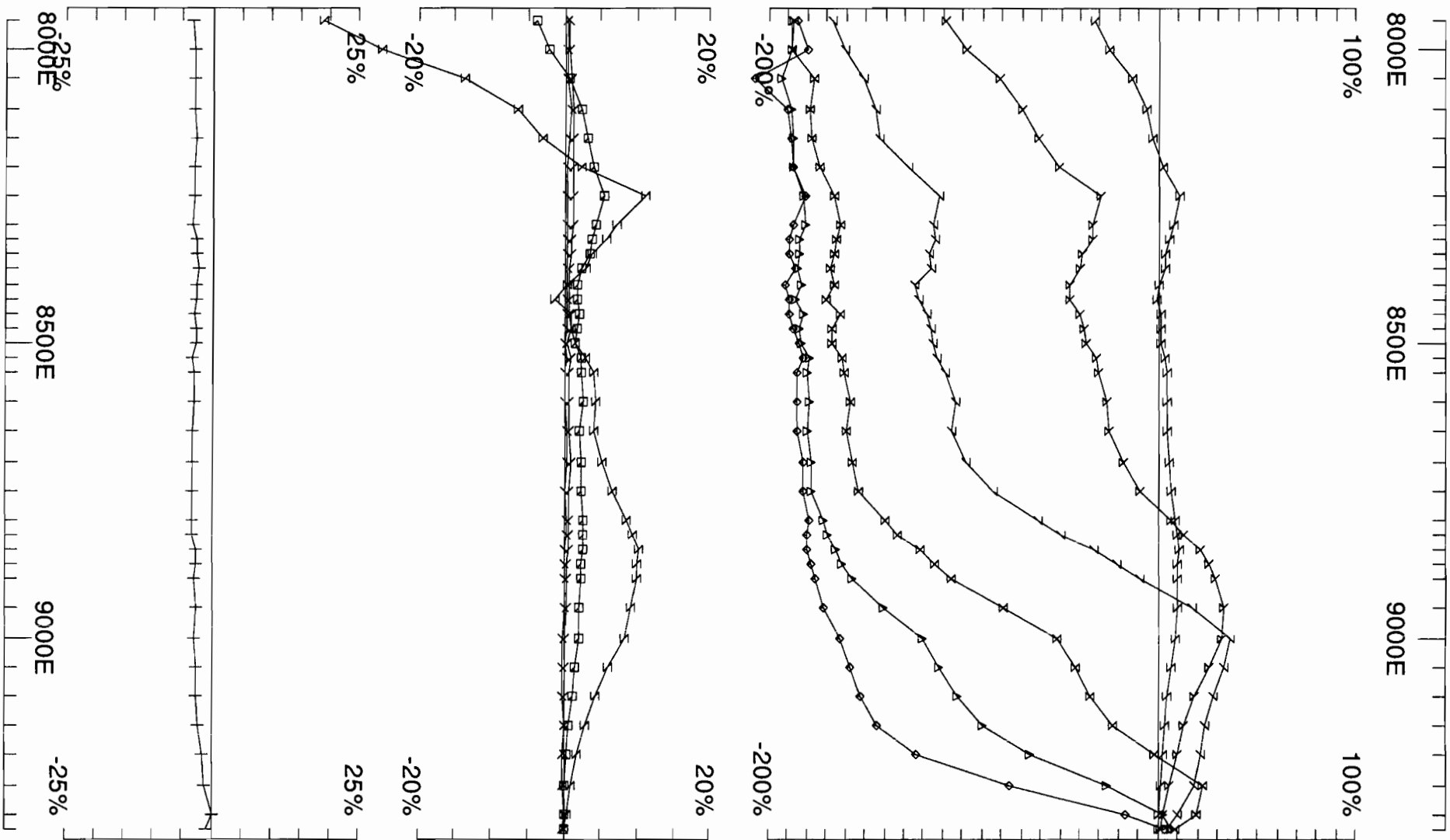
Surveyed : 14/3/8  
Reduced : 21/4/8  
Plotted : 28/4/8



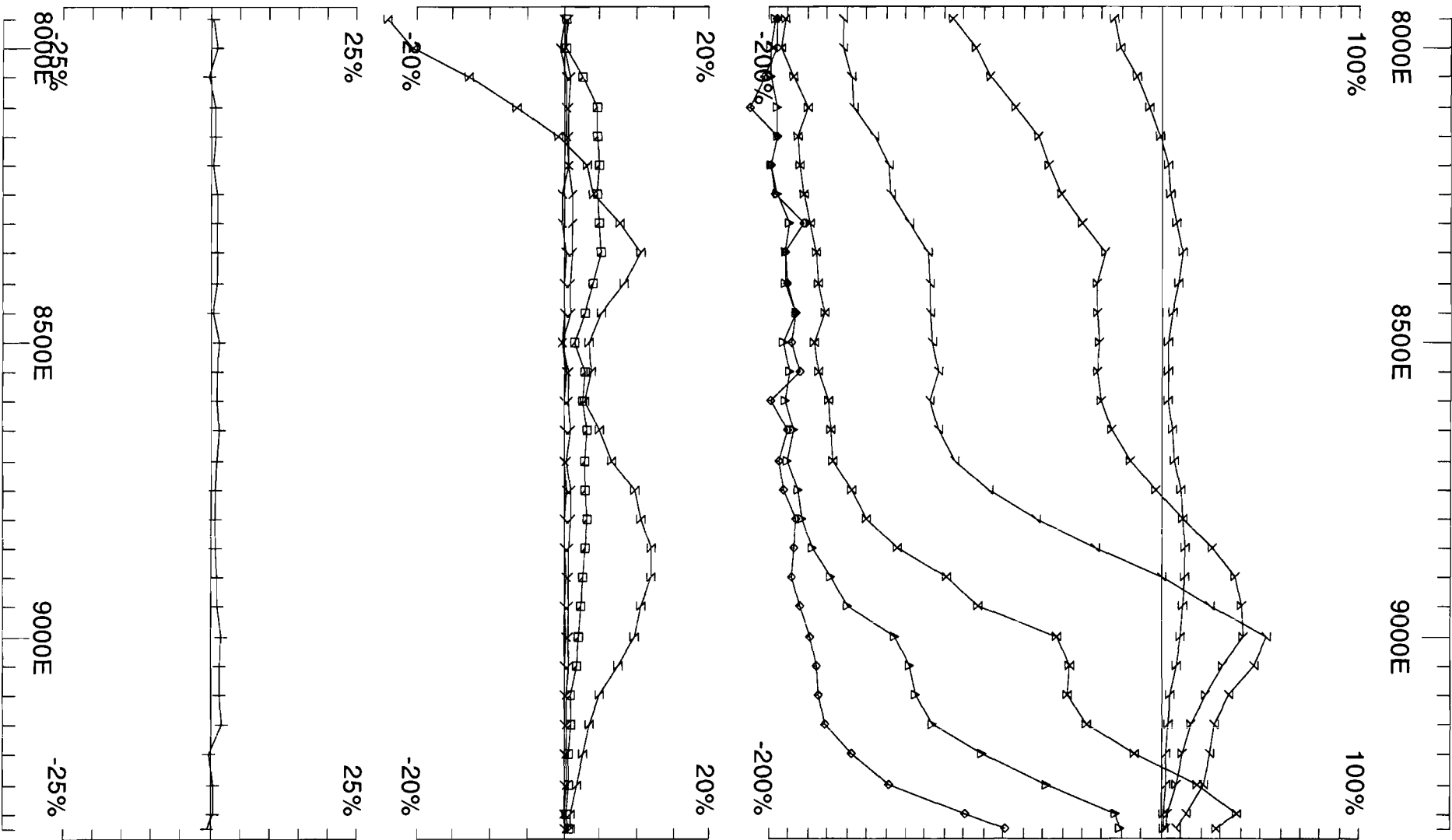
Loop: 1	Secondary, (Chn - Ch1)/ Hp	UTEM Survey at: Montcalm Property	
Line: 2900N	Contin. Norm at depth of 0 m	For: International Nickel Ventures Ltd.	
Compt: Hz	Base Freq. 30.974 Hz	<b>LAMONTAGNE</b>	GEOPHYSICS LTD GEOPHYSIQUE LTEE



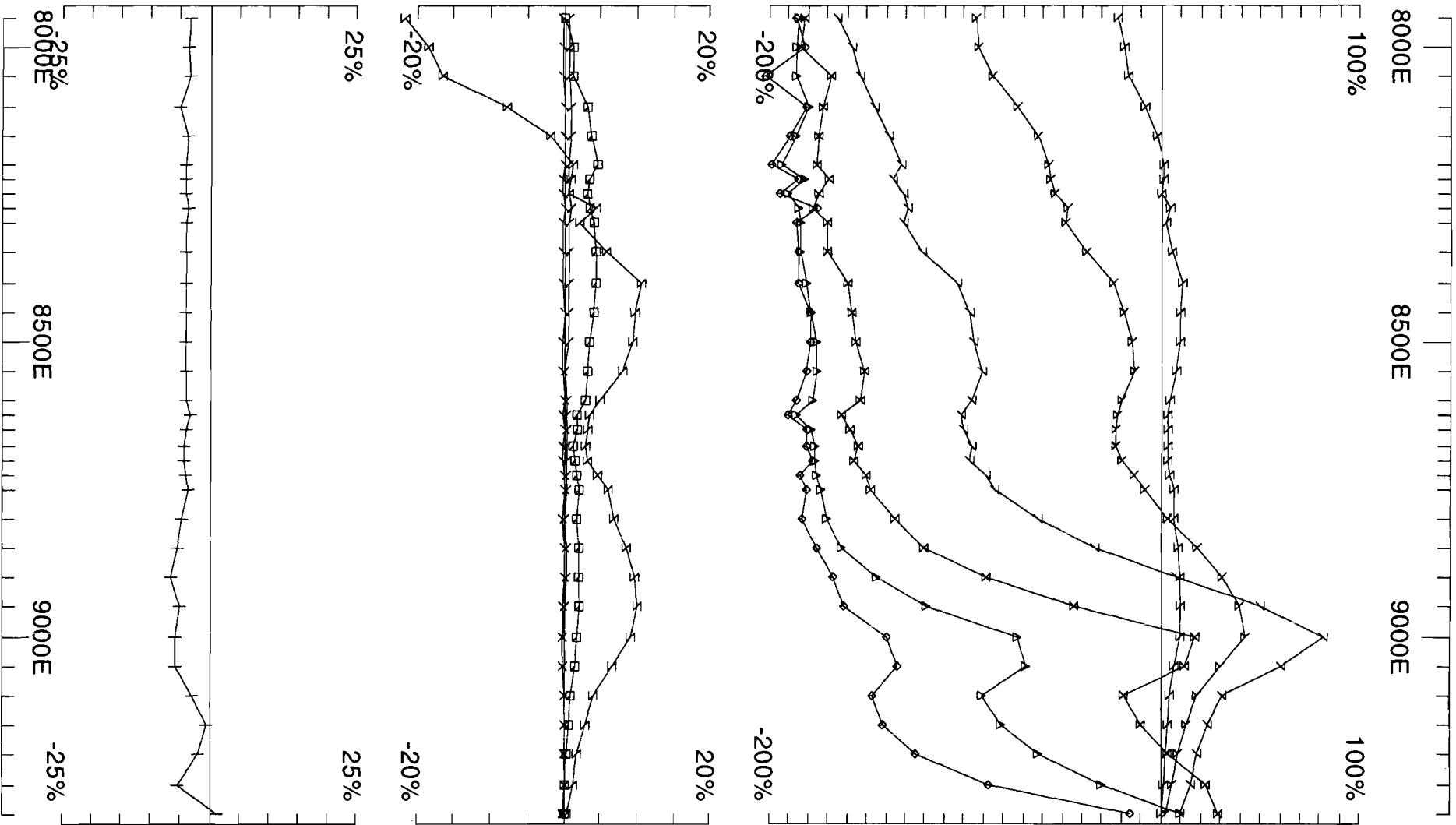
Loop: 1	Secondary, (Chn - Ch1)/ Hp	UTEM Survey at: Montcalm Property	
Line: 3000N	Contin. Norm at depth of 0 m	For: International Nickel Ventures Ltd.	
Compt: Hz	Base Freq. 30.974 Hz	<b>LAMONTAGNE</b>	GEOPHYSICS LTD Job GEOPHYSIQUE LTEE 0809



Loop: 1	Secondary, (Chn - Ch1)/ Hp	UTEM Survey at: Montcalm Property	
Line: 3100N	Contin. Norm at depth of 0 m	For: International Nickel Ventures Ltd.	
Compt: Hz	Base Freq. 30.974 Hz	<b>LAMONTAGNE</b>	GEOPHYSICS LTD GEOPHYSIQUE LTEE



Loop: 1	Secondary, (Chn - Ch1)/ Hp	UTEM Survey at: Montcalm Property	
Line: 3200N	Contin. Norm at depth of 0 m	For: International Nickel Ventures Ltd.	
Compt: Hz	Base Freq. 30.974 Hz	<b>LAMONTAGNE</b> GEOPHYSICS LTD	Job 0809
		GEOPHYSIQUE LTEE	Surveyed : 14/3/8 Reduced : 21/4/8 Plotted : 28/4/8

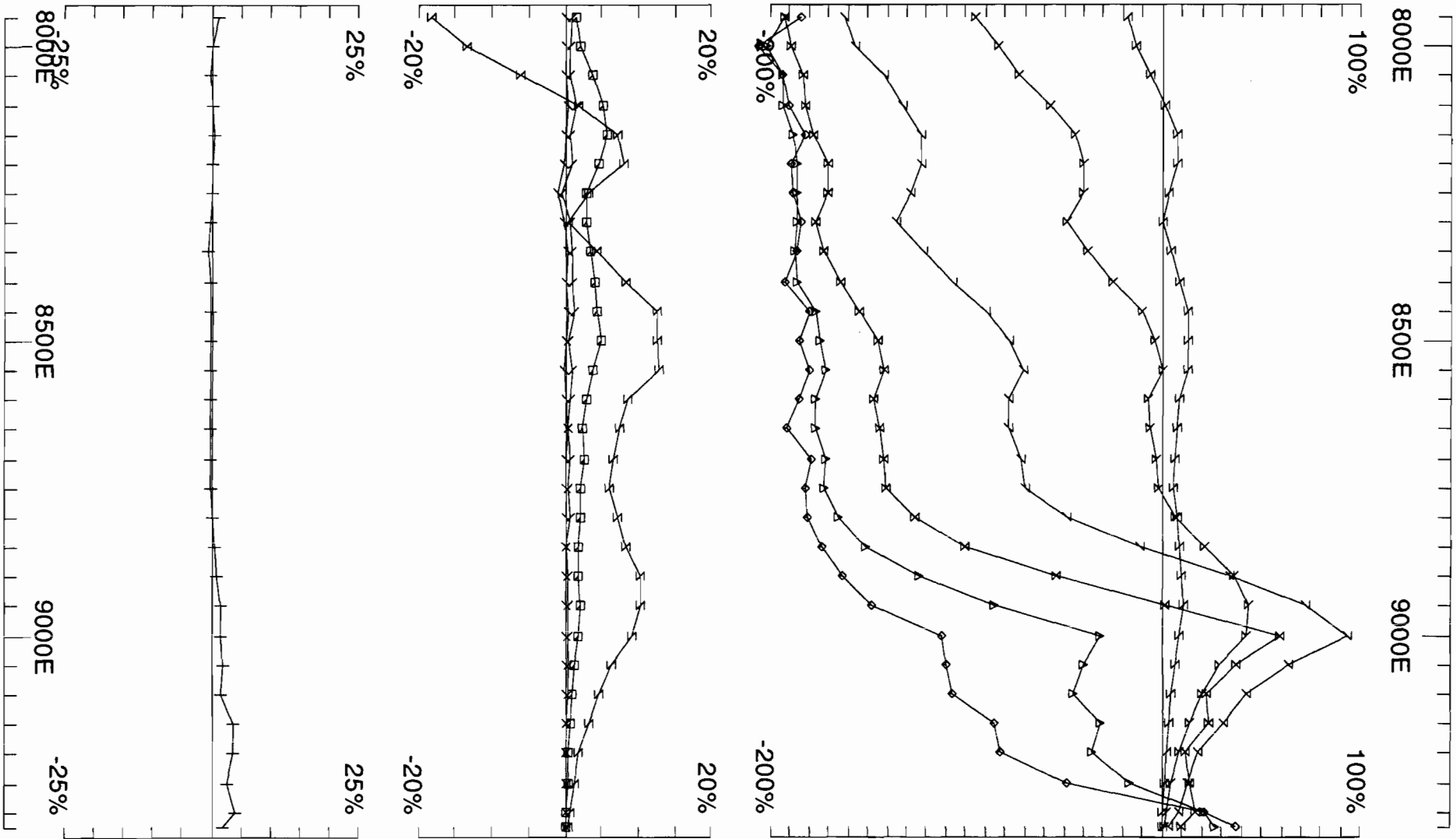


Loop: 1  
 Line: 3300N  
 Compt: Hz

Secondary, (Chn - Ch1)/|Hp|  
 Contin. Norm at depth of 0 m  
 Base Freq. 30.974 Hz

UTEM Survey at: Montcalm Property  
 For: International Nickel Ventures Ltd.

**LAMONTAGNE** GEOPHYSICS LTD Job 0809  
 GEOPHYSIQUE LTEE  
 Surveyed : 14/3/8  
 Reduced : 21/4/8  
 Plotted : 28/4/8



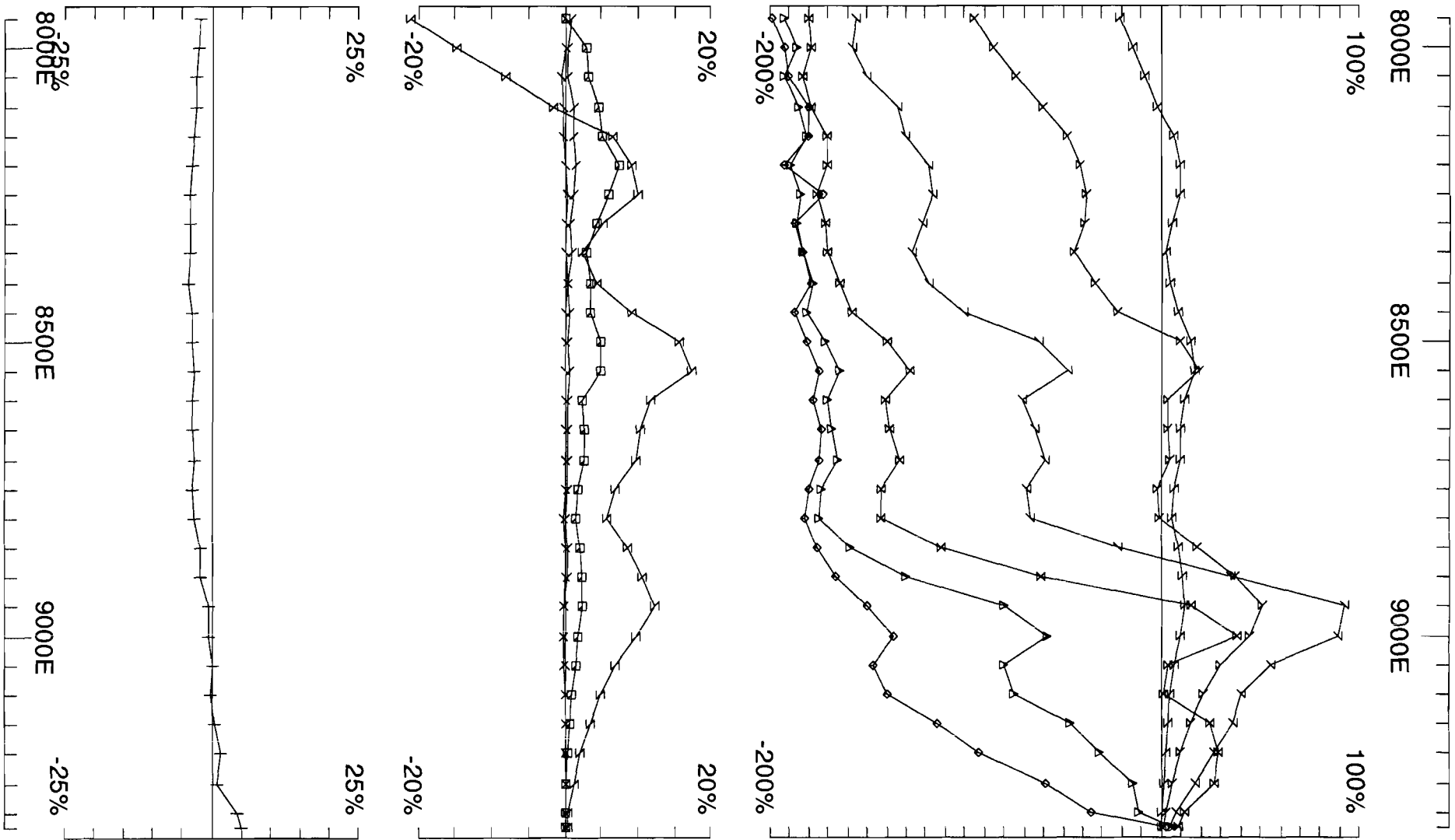
Loop: 1  
 Line: 3400N  
 Compt: Hz

Secondary, (Chn - Ch1)/|Hp|  
 Contin. Norm at depth of 0 m  
 Base Freq. 30.974 Hz

UTEM Survey at: Montcalm Property  
 For: International Nickel Ventures Ltd.

**LAMONTAGNE** GEOPHYSICS LTD  
 GEOPHYSIQUE LTEE Job 0809  
 Surveyed : 13/3/8  
 Reduced : 21/4/8  
 Plotted : 28/4/8





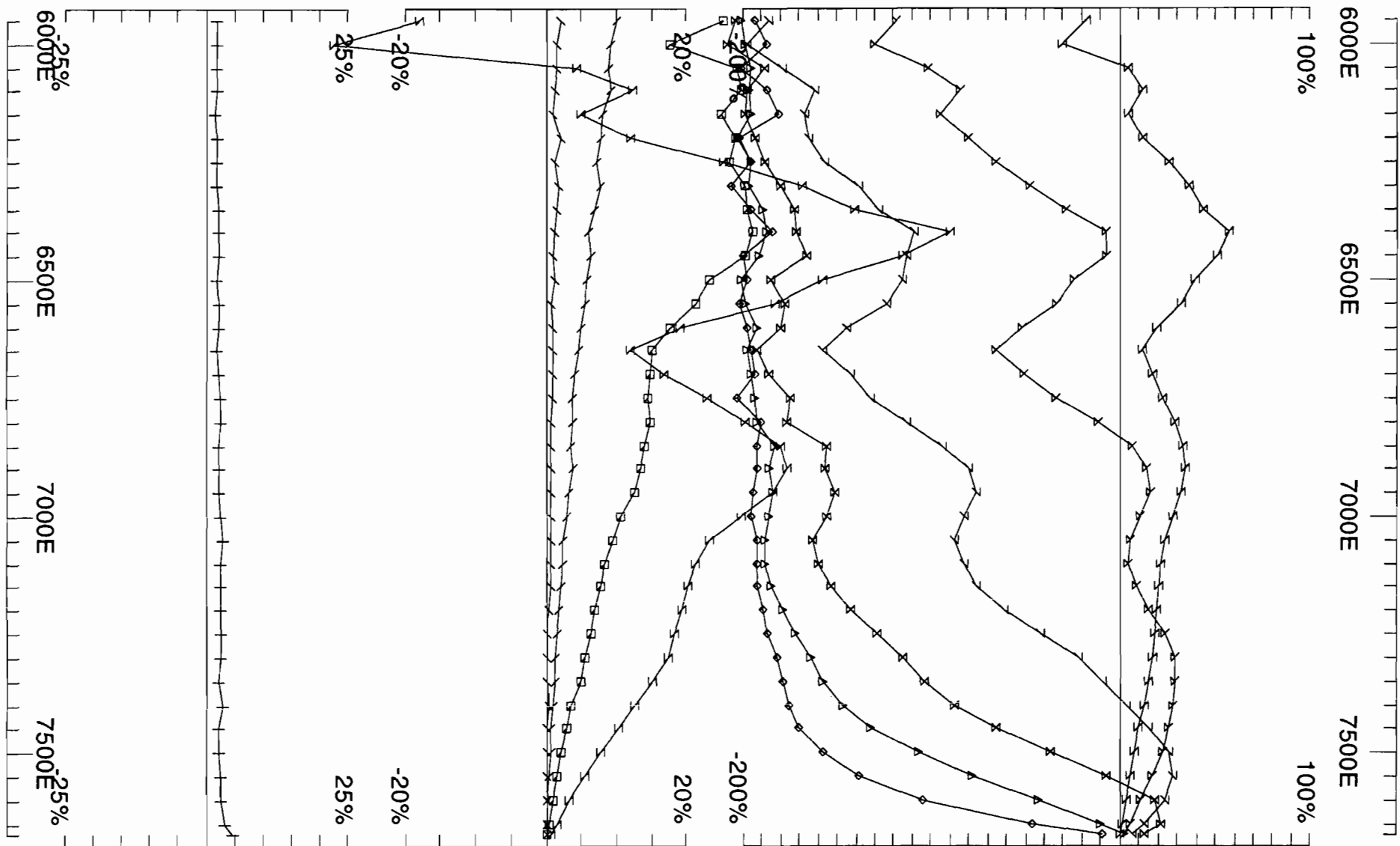
Loop: 1	Secondary, (Chn - Ch1)/ Hp	UTEM Survey at: Montcalm Property	
Line: 3500N	Contin. Norm at depth of 0 m	For: International Nickel Ventures Ltd.	
Compt: Hz	Base Freq. 30.974 Hz	<b>LAMONTAGNE</b> GEOPHYSICS LTD	Job 0809
		GEOPHYSIQUE LTEE	Surveyed : 13/3/8 Reduced : 21/4/8 Plotted : 28/4/8

# Loop 2

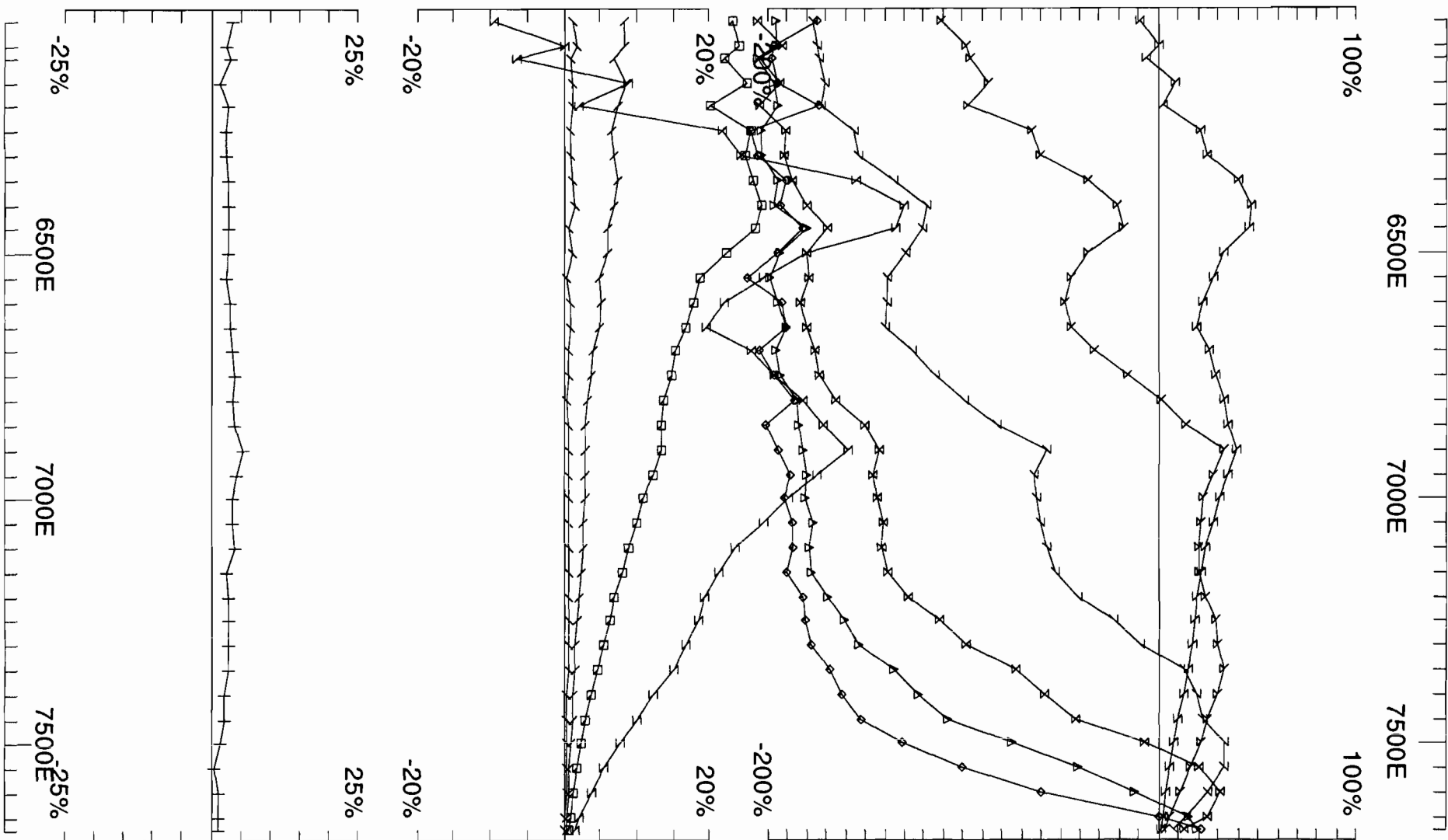
## Hz Profiles (continuous norm)

@ 30.974 Hz

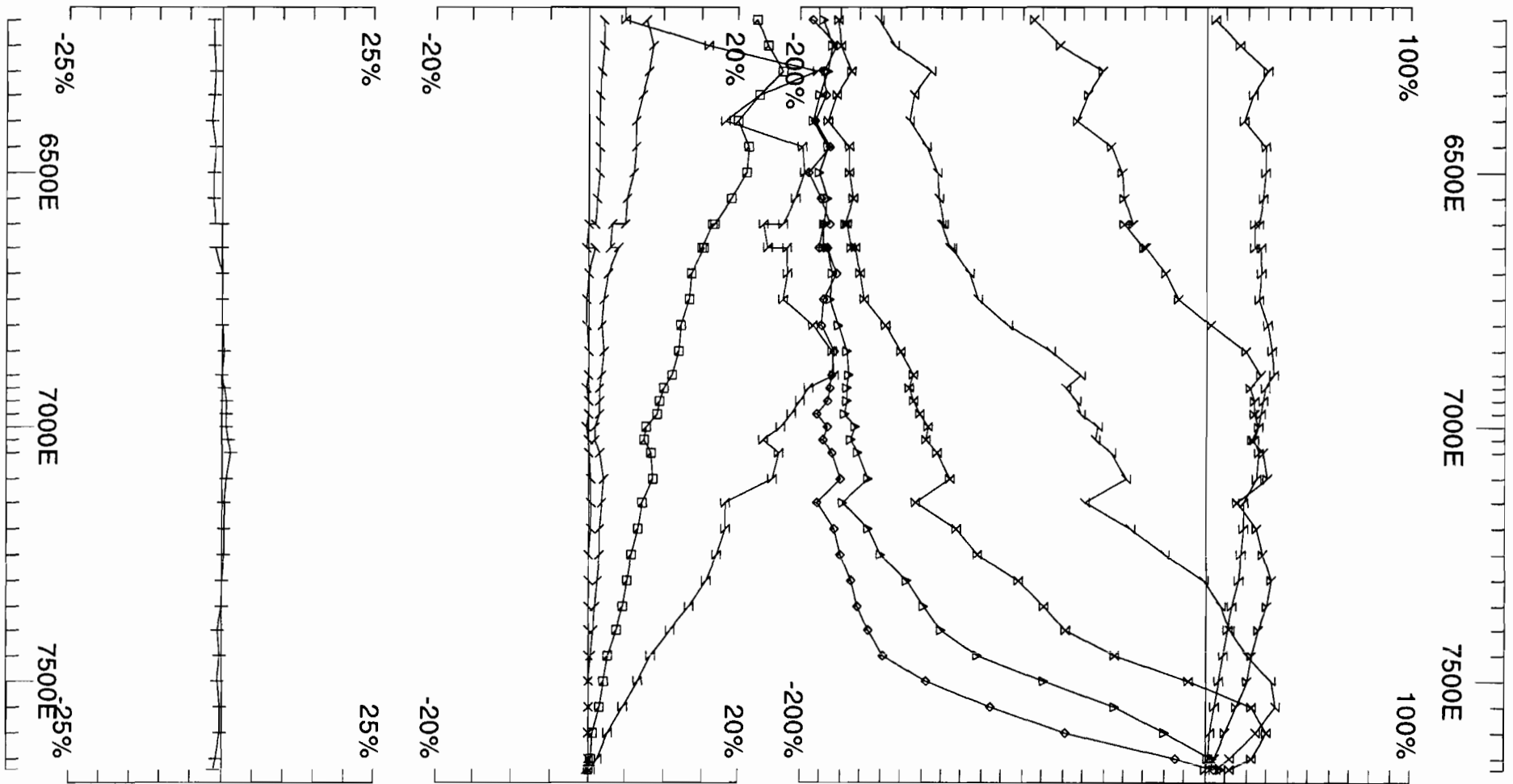
	<b>Line</b>	<b>coverage</b>	
Loop 2	Line 800 N	5950 E - 7675 E	1725 m
	Line 900 N	6000 E - 7675 E	1675 m
	Line 1000 N	6200 E - 7675 E	1475 m
	Line 1100 N	6250 E - 7675 E	1425 m
	Line 1200 N	6400 E - 7675 E	1275 m
	Line 1300 N	6525 E - 7675 E	1150 m
	Line 1400 N	6700 E - 7675 E	975 m
	Line 1500 N	6800 E - 7675 E	875 m
	Line 1600 N	6900 E - 7675 E	775 m
	Line 1700 N	7050 E - 7650 E	600 m
	Line 1800 N	7200 E - 7600 E	400 m



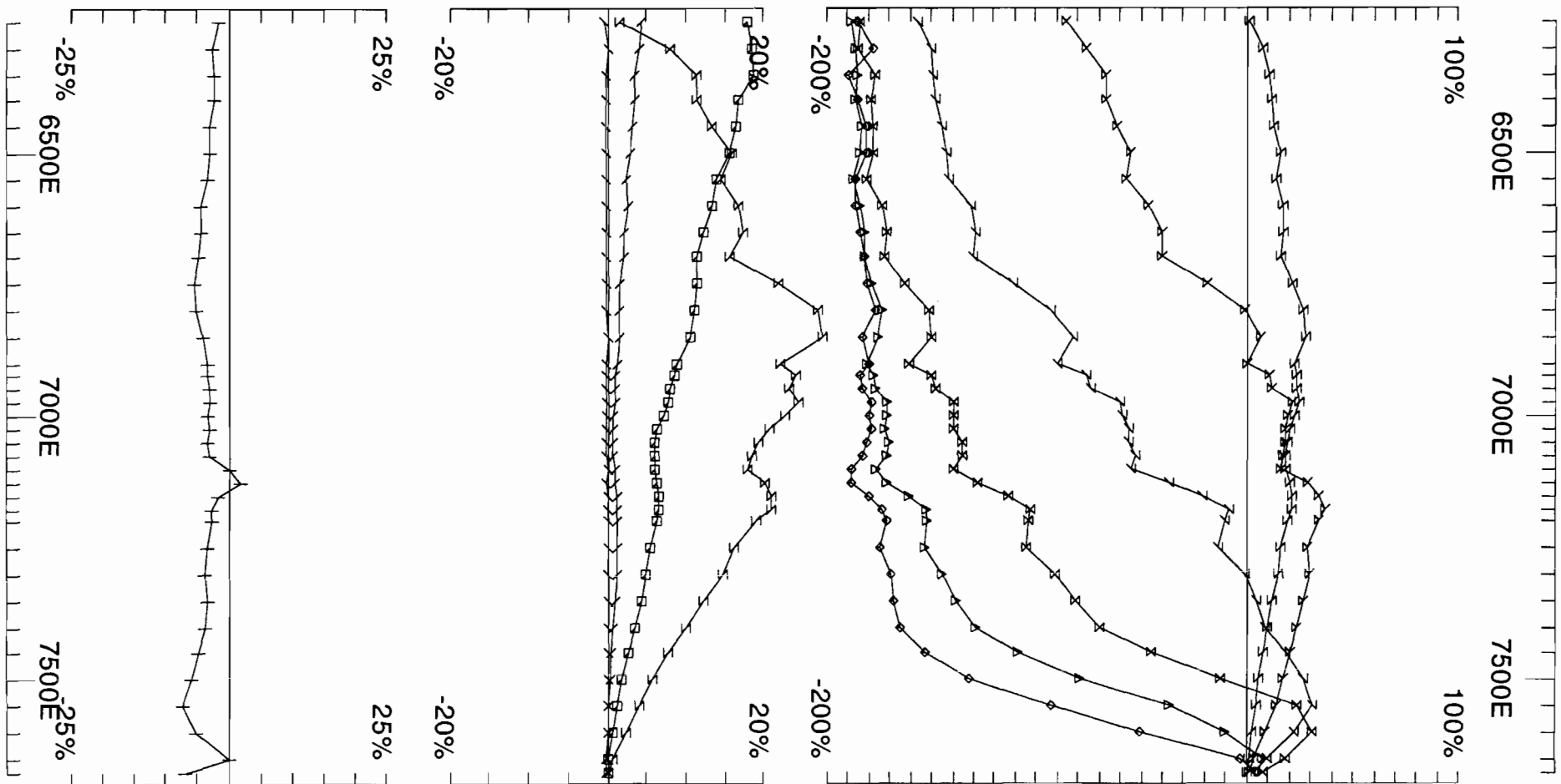
Loop: 2	Secondary, (Chn - Ch1)/ Hp	UTEM Survey at: Montcalm Property	
Line: 800N	Contin. Norm at depth of 0 m	For: International Nickel Ventures Ltd.	
Compt: Hz	Base Freq. 30.974 Hz	<b>LAMONTAGNE</b> GEOPHYSICS LTD	Job 0809
		GEOPHYSIQUE LTEE	Surveyed : 16/3/8 Reduced : 21/4/8 Plotted : 29/4/8



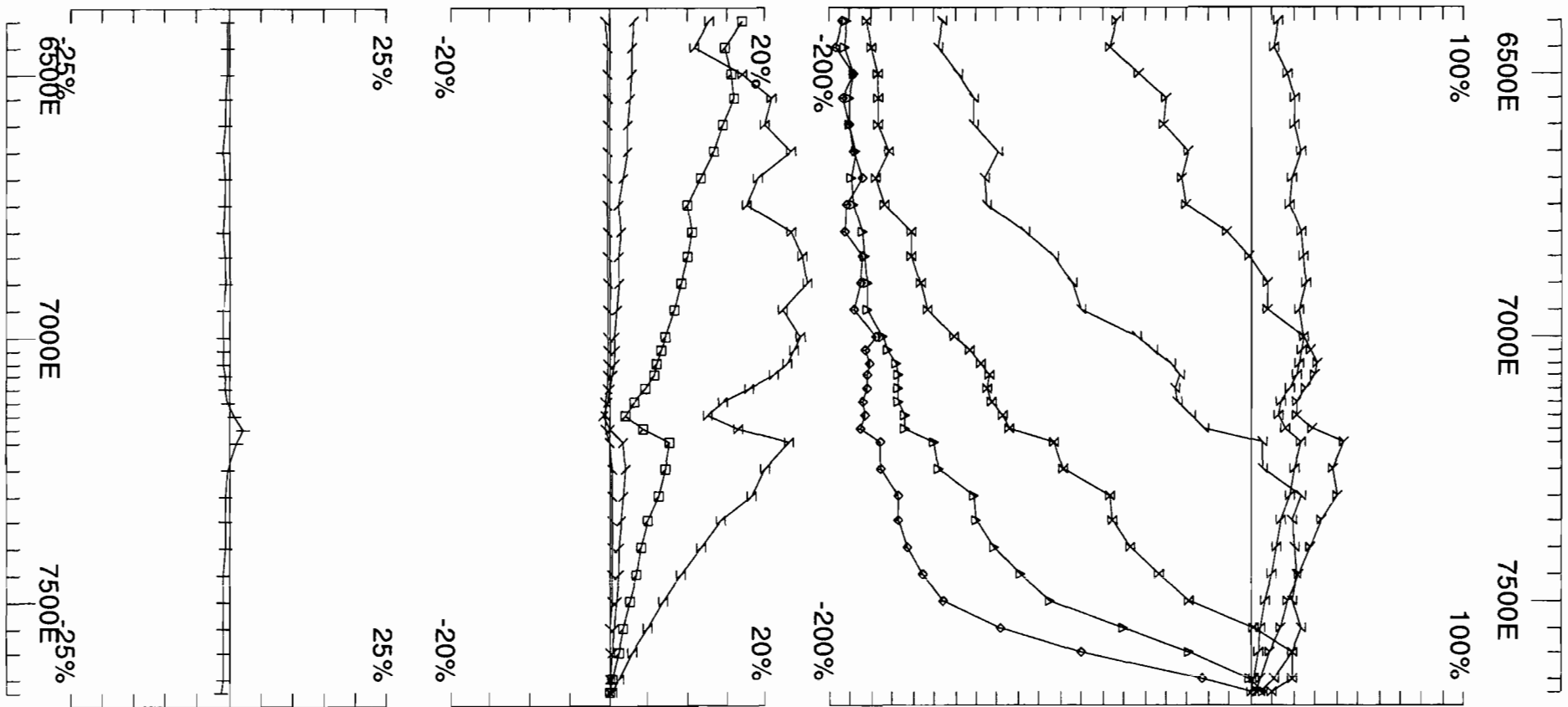
Loop: 2	Secondary, (Chn - Ch1)/ Hp	UTEM Survey at: Montcalm Property	
Line: 900N	Contin. Norm at depth of 0 m	For: International Nickel Ventures Ltd.	
Compt: Hz	Base Freq. 30.974 Hz	<b>LAMONTAGNE</b>	GEOPHYSICS LTD GEOPHYSIQUE LTEE



Loop: 2	Secondary, (Chn - Ch1)/ Hp	UTEM Survey at: Montcalm Property	
Line: 1000N	Contin. Norm at depth of 0 m	For: International Nickel Ventures Ltd.	
Compt: Hz	Base Freq. 30.974 Hz	<b>LAMONTAGNE</b> GEOPHYSICS LTD	Job 0809
		GEOPHYSIQUE LTEE	Surveyed : 17/3/8 Reduced : 17/3/8 Plotted : 29/4/8



Loop: 2	Secondary, (Chn - Ch1)/ Hp	UTEM Survey at: Montcalm Property	
Line: 1100N	Contin. Norm at depth of 0 m	For: International Nickel Ventures Ltd.	
Compt: Hz	Base Freq. 30.974 Hz	<b>LAMONTAGNE</b> GEOPHYSICS LTD	Job 0809
			Surveyed : 17/3/8 Reduced : 21/4/8 Plotted : 29/4/8



Loop: 2  
 Line: 1200N  
 Compt: Hz

Secondary, (Chn - Ch1)/|Hp|  
 Contin. Norm at depth of 0 m  
 Base Freq. 30.974 Hz

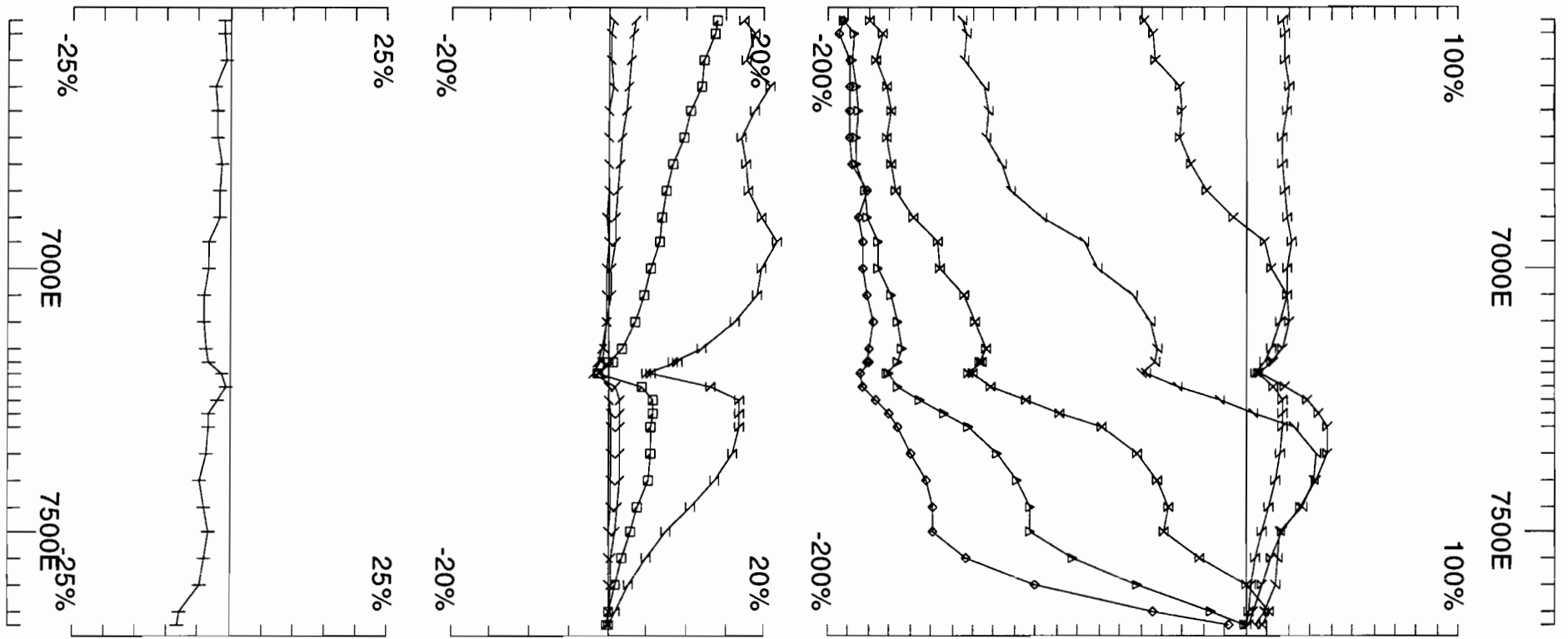
UTEM Survey at: Montcalm Property  
 For: International Nickel Ventures Ltd.

**LAMONTAGNE**

GEOPHYSICS LTD  
 GEOPHYSIQUE LTEE

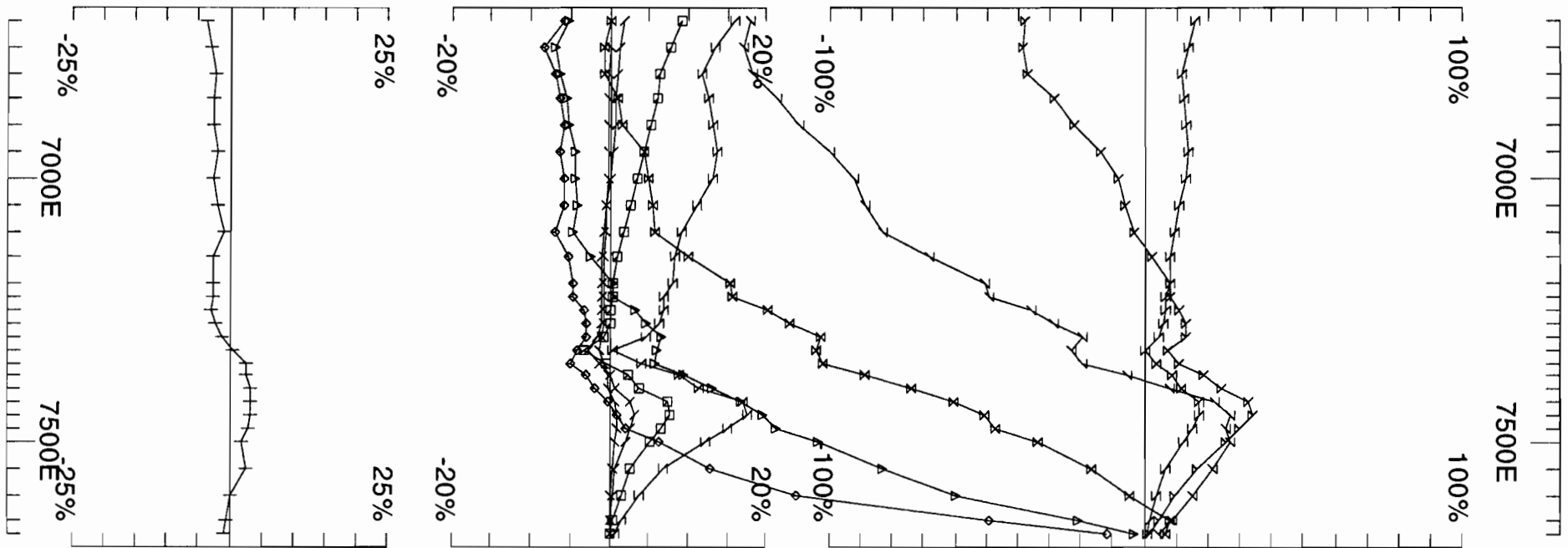
Job  
 0809

Surveyed : 17/3/8  
 Reduced : 21/4/8  
 Plotted : 29/4/8

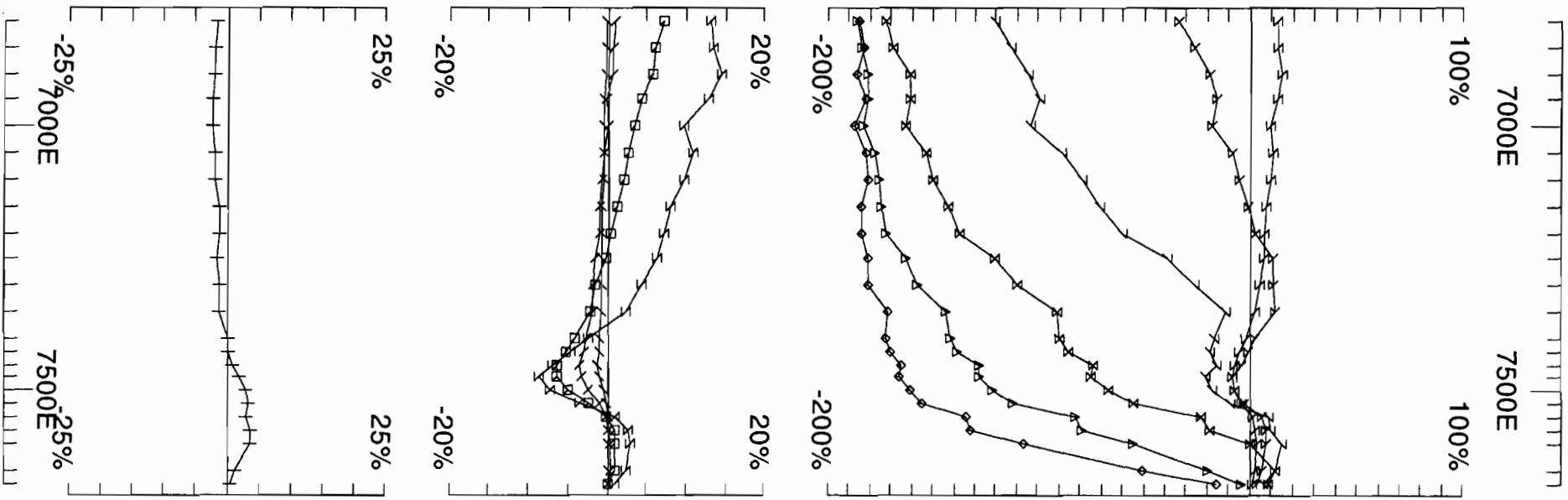


Loop: 2 Line: 1300N Compt: Hz	Secondary, (Chn - Ch1)/ Hp  Contin. Norm at depth of 0 m Base Freq. 30.974 Hz	UTEM Survey at: Montcalm Property For: International Nickel Ventures Ltd. <b>LAMONTAGNE</b> GEOPHYSICS LTD    Job 16/3/8 GEOPHYSIQUE LTEE    0809    Reduced : 21/4/8 Plotted : 29/4/8	
-------------------------------------	---	--	--

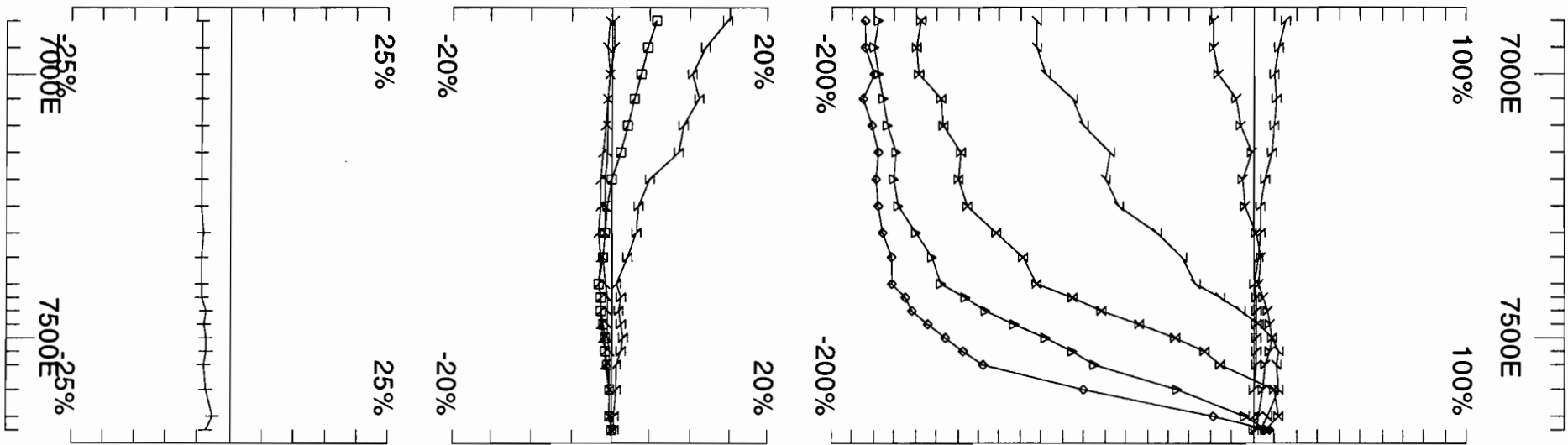




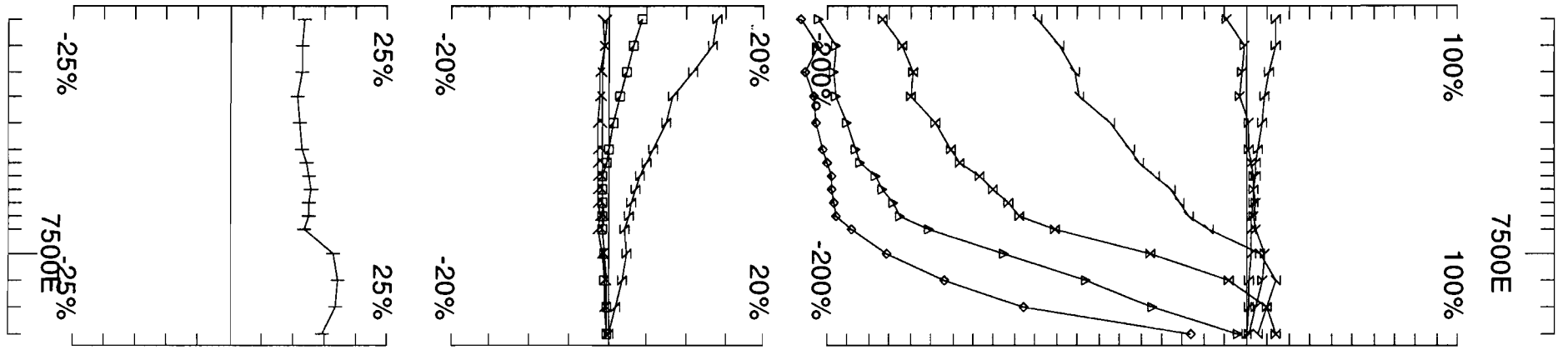
Loop: 2	Secondary, (Chn - Ch1)/ Hp	UTEM Survey at: Montcalm Property	
Line: 1400N	Contin. Norm at depth of 0 m	For: International Nickel Ventures Ltd.	
Compt: Hz	Base Freq. 30.974 Hz	<b>LAMONTAGNE</b> GEOPHYSICS LTD	Job 0809
		GEOPHYSIQUE LTEE	Surveyed : 16/3/8 Reduced : 21/4/8 Plotted : 29/4/8



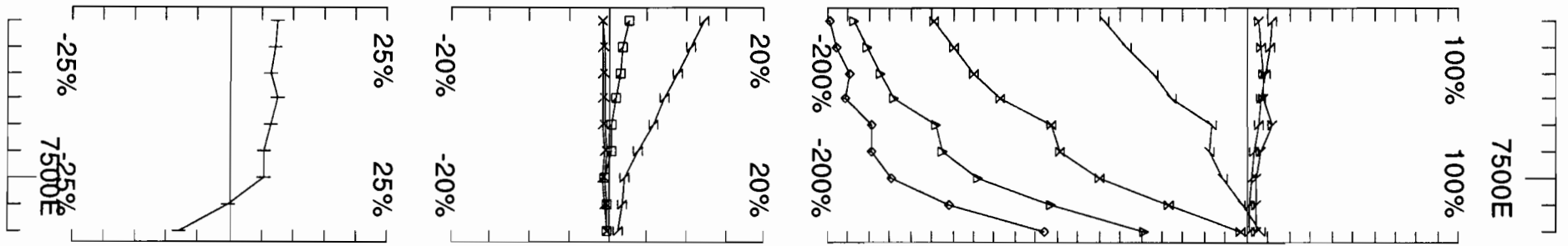
Loop: 2 Line: 1500N Compt: Hz	Secondary, (Chn - Ch1)/ Hp  Contin. Norm at depth of 0 m Base Freq. 30.974 Hz	<b>UTEM Survey at: Montcalm Property</b> <b>For: International Nickel Ventures Ltd.</b> <b>LAMONTAGNE</b> GEOPHYSICS LTD Job 0809 GEOPHYSIQUE LTEE Surveyed : 16/3/8 Reduced : 21/4/8 Plotted : 29/4/8
-------------------------------------	---	--



Loop: 2 Line: 1600N Compt: Hz	Secondary, (Chn - Ch1)/ Hp  Contin. Norm at depth of 0 m Base Freq. 30.974 Hz	UTEM Survey at: Montcalm Property For: International Nickel Ventures Ltd. <b>LAMONTAGNE</b> GEOPHYSICS LTD Job 0809 GEOPHYSIQUE LTEE Surveyed : 16/3/8 Reduced : 21/4/8 Plotted : 29/4/8	
-------------------------------------	---	--	--



Loop: 2	Secondary, (Chn - Ch1)/ Hp	UTEM Survey at: Montcalm Property	
Line: 1700N	Contin. Norm at depth of 0 m	For: International Nickel Ventures Ltd.	
Compt: Hz	Base Freq. 30.974 Hz	<b>LAMONTAGNE</b>	GEOPHYSICS LTD Job GEOPHYSIQUE LTEE 0809 Surveyed : 18/3/8 Reduced : 21/4/8 Plotted : 29/4/8



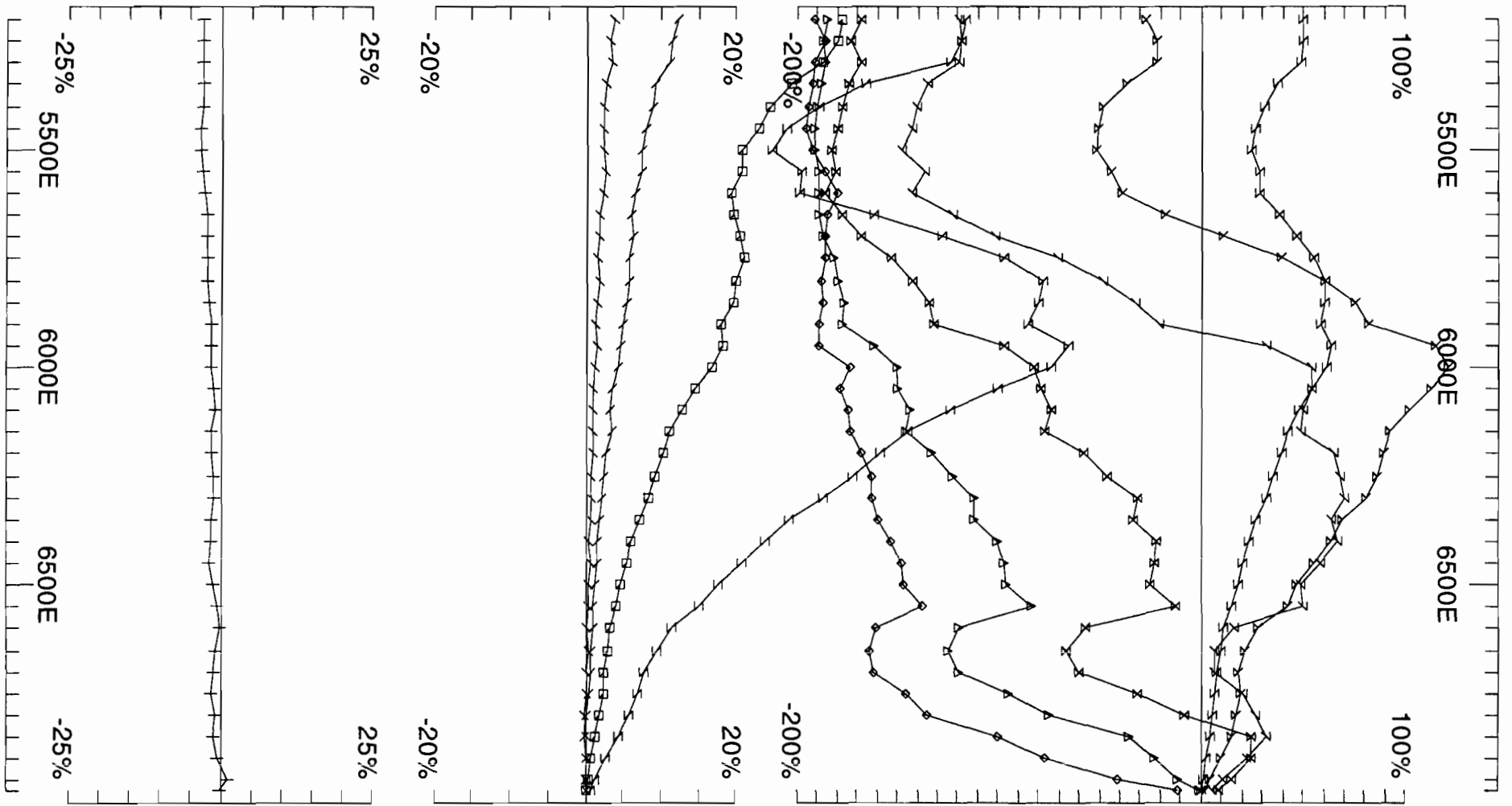
Loop: 2	Secondary, (Chn - Ch1)/ Hp	UTEM Survey at: Montcalm Property	
Line: 1800N	Contin. Norm at depth of 0 m	For: International Nickel Ventures Ltd.	
Compt: Hz	Base Freq. 30.974 Hz	<b>LAMONTAGNE</b> GEOPHYSICS LTD	Job 0809
		GEOPHYSIQUE LTEE	Surveyed : 18/3/8 Reduced : 21/4/8 Plotted : 29/4/8

# Loop 3

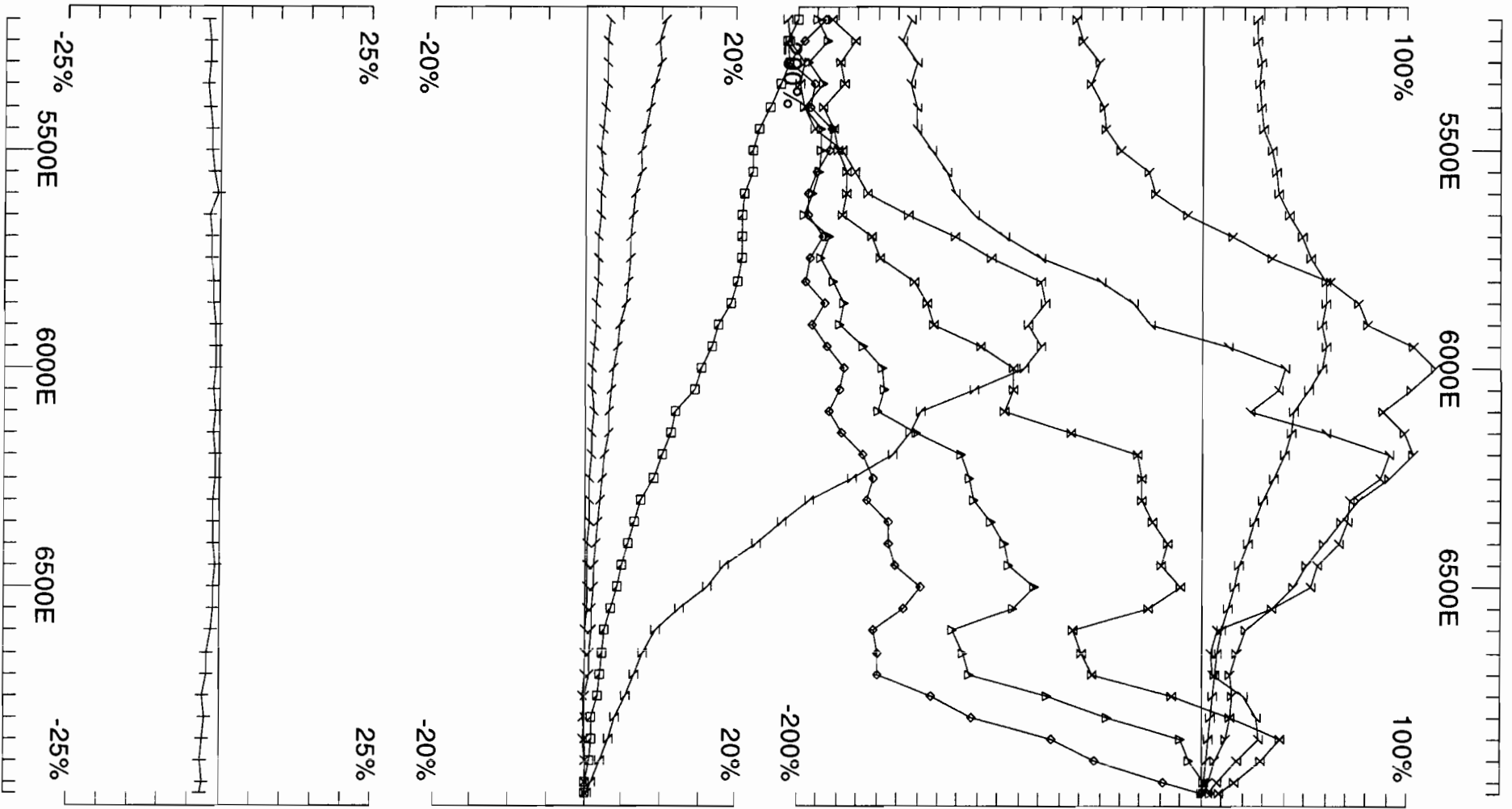
## Hz Profiles (continuous norm)

@ 30.974 Hz

	<b>Line</b>	<b>coverage</b>	
Loop 3	Line 9500 N	5200 E - 6975 E	1775 m
	Line 9600 N	5200 E - 6975 E	1775 m
	Line 9700 N	5225 E - 6975 E	1750 m
	Line 9800 N	5200 E - 6975 E	1775 m
	Line 0 N	5650 E - 6975 E	1325 m
	Line 200 N	5100 E - 6950 E	1850 m
	Line 300 N	5050 E - 6975 E	1925 m
	Line 400 N	5300 E - 6975 E	1675 m
	Line 500 N	5500 E - 6975 E	1475 m
	Line 600 N	5650 E - 6950 E	1300 m
	Line 700 N	5850 E - 6950 E	1100 m



Loop: 3	Secondary, (Chn - Ch1)/ Hp	UTEM Survey at: Montcalm Property	
Line: 9500N	Contin. Norm at depth of 0 m	For: International Nickel Ventures Ltd.	
Compt: Hz	Base Freq. 30.974 Hz	<b>LAMONTAGNE</b> GEOPHYSICS LTD	Job 0809
		GEOPHYSIQUE LTEE	Surveyed : 19/3/8 Reduced : 22/4/8 Plotted : 29/4/8



Loop: 3  
 Line: 9600N  
 Compt: Hz

Secondary, (Chn - Ch1)/|Hp|  
 Contin. Norm at depth of 0 m  
 Base Freq. 30.974 Hz

UTEM Survey at: Montcalm Property  
 For: International Nickel Ventures Ltd.

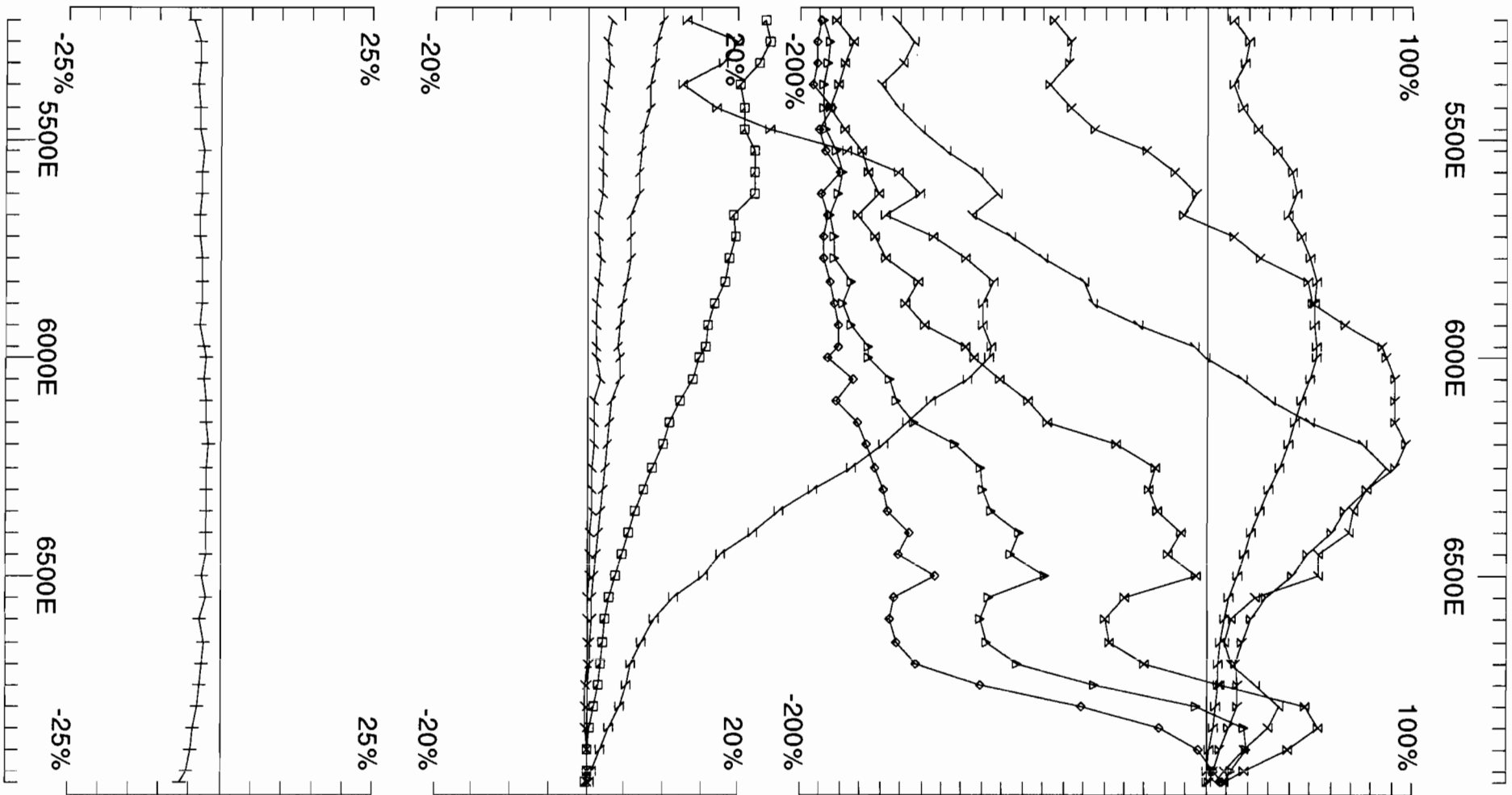
**LAMONTAGNE**

GEOPHYSICS LTD  
 GEOPHYSIQUE LTEE

Job  
 0809

Surveyed : 19/3/8  
 Reduced : 22/4/8  
 Plotted : 29/4/8





Loop: 3  
 Line: 9700N  
 Compt: Hz

Secondary, (Chn - Ch1)/|Hp|  
 Contin. Norm at depth of 0 m  
 Base Freq. 30.974 Hz

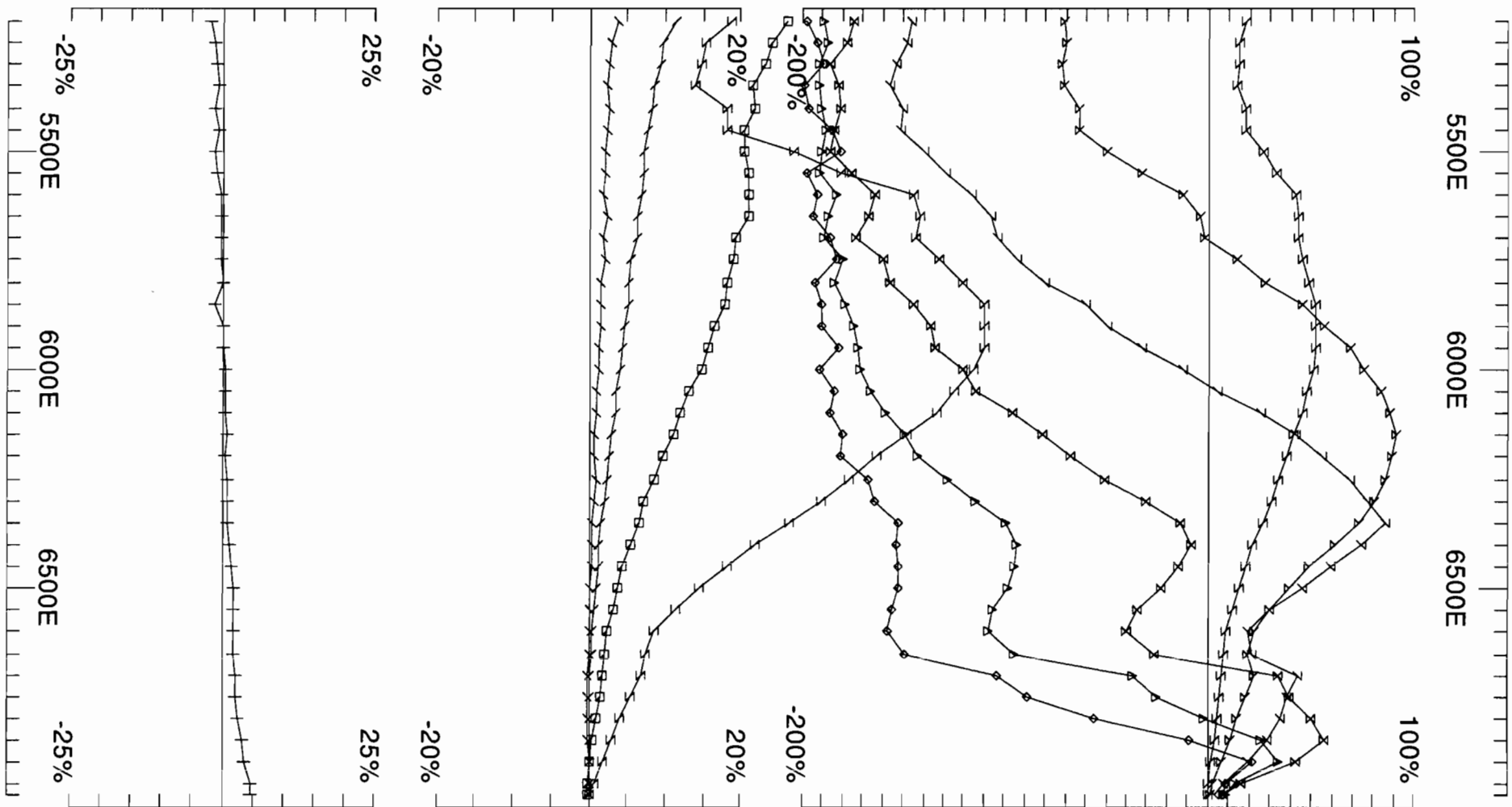
UTEM Survey at: Montcalm Property  
 For: International Nickel Ventures Ltd.

**LAMONTAGNE**

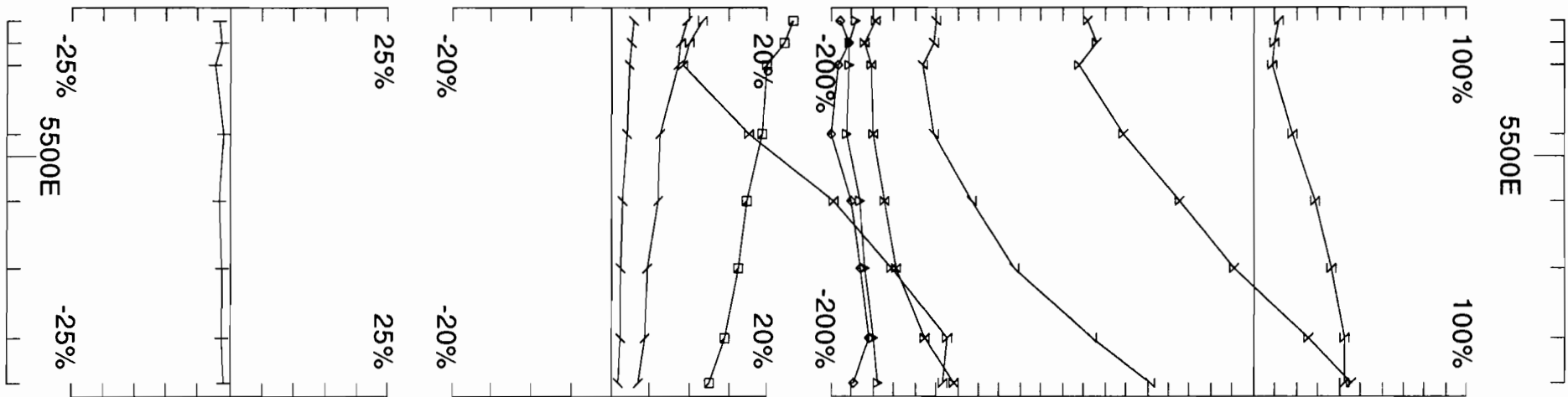
GEOPHYSICS LTD  
 GEOPHYSIQUE LTEE

Job  
 0809

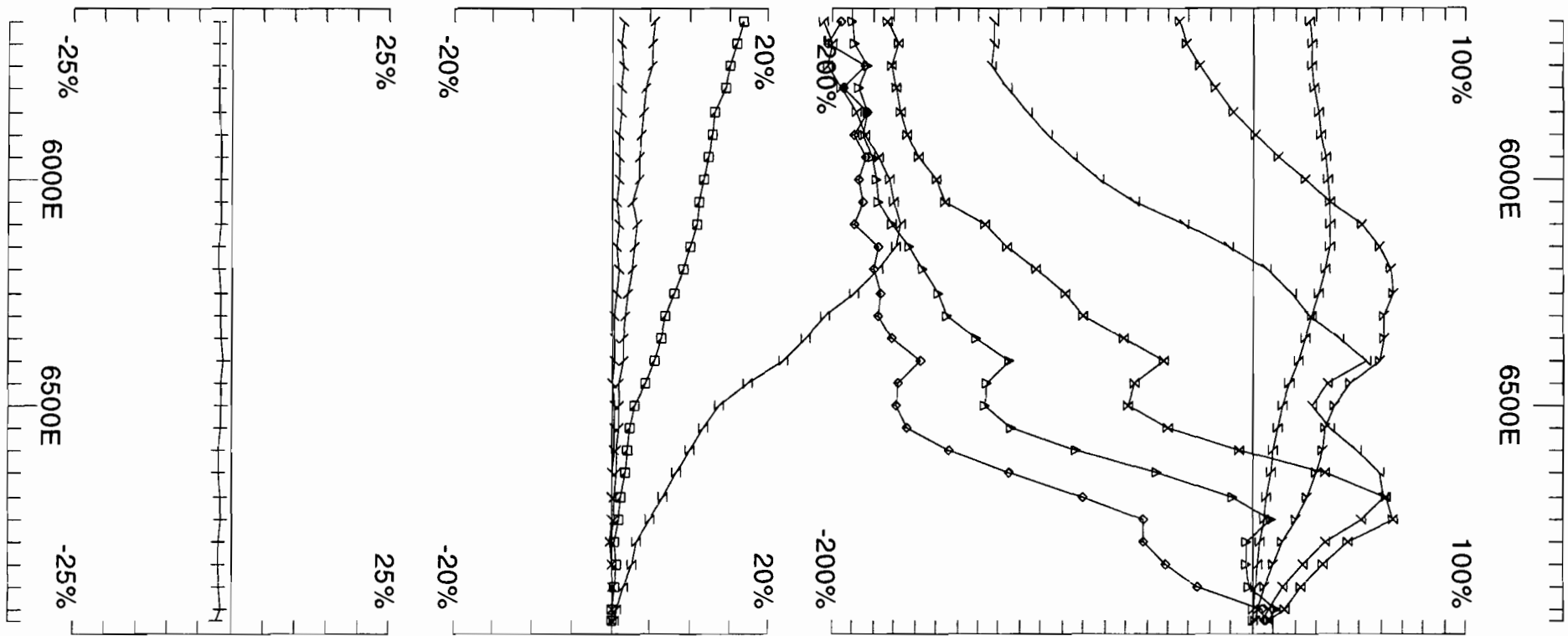
Surveyed : 20/3/8  
 Reduced : 22/4/8  
 Plotted : 29/4/8



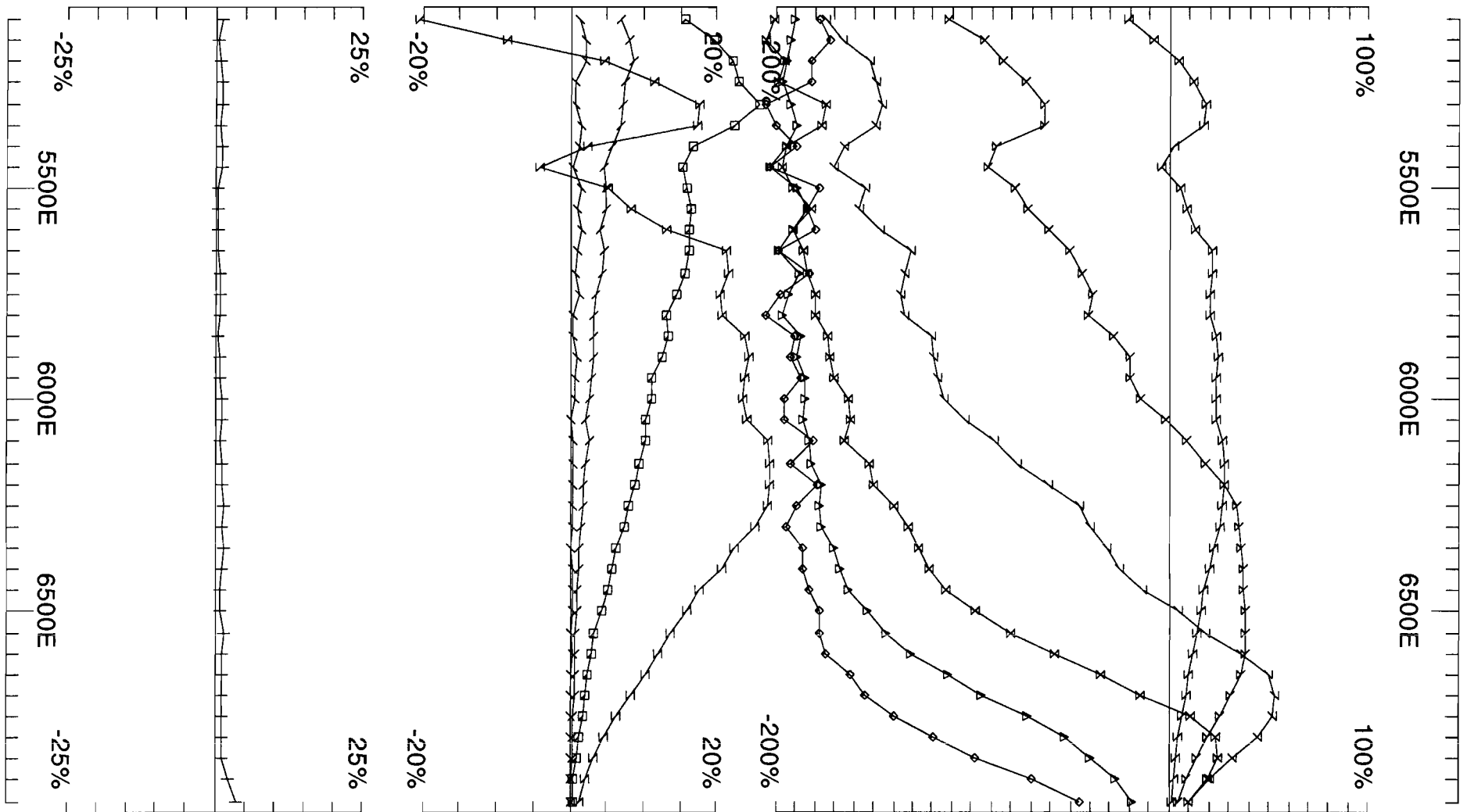
Loop: 3	Secondary, (Chn - Ch1)/ Hp	UTEM Survey at: Montcalm Property	
Line: 9800N	Contin. Norm at depth of 0 m	For: International Nickel Ventures Ltd.	
Compt: Hz	Base Freq. 30.974 Hz	<b>LAMONTAGNE</b> GEOPHYSICS LTD	Job 0809
		GEOPHYSIQUE LTEE	Surveyed : 20/3/8 Reduced : 22/4/8 Plotted : 29/4/8



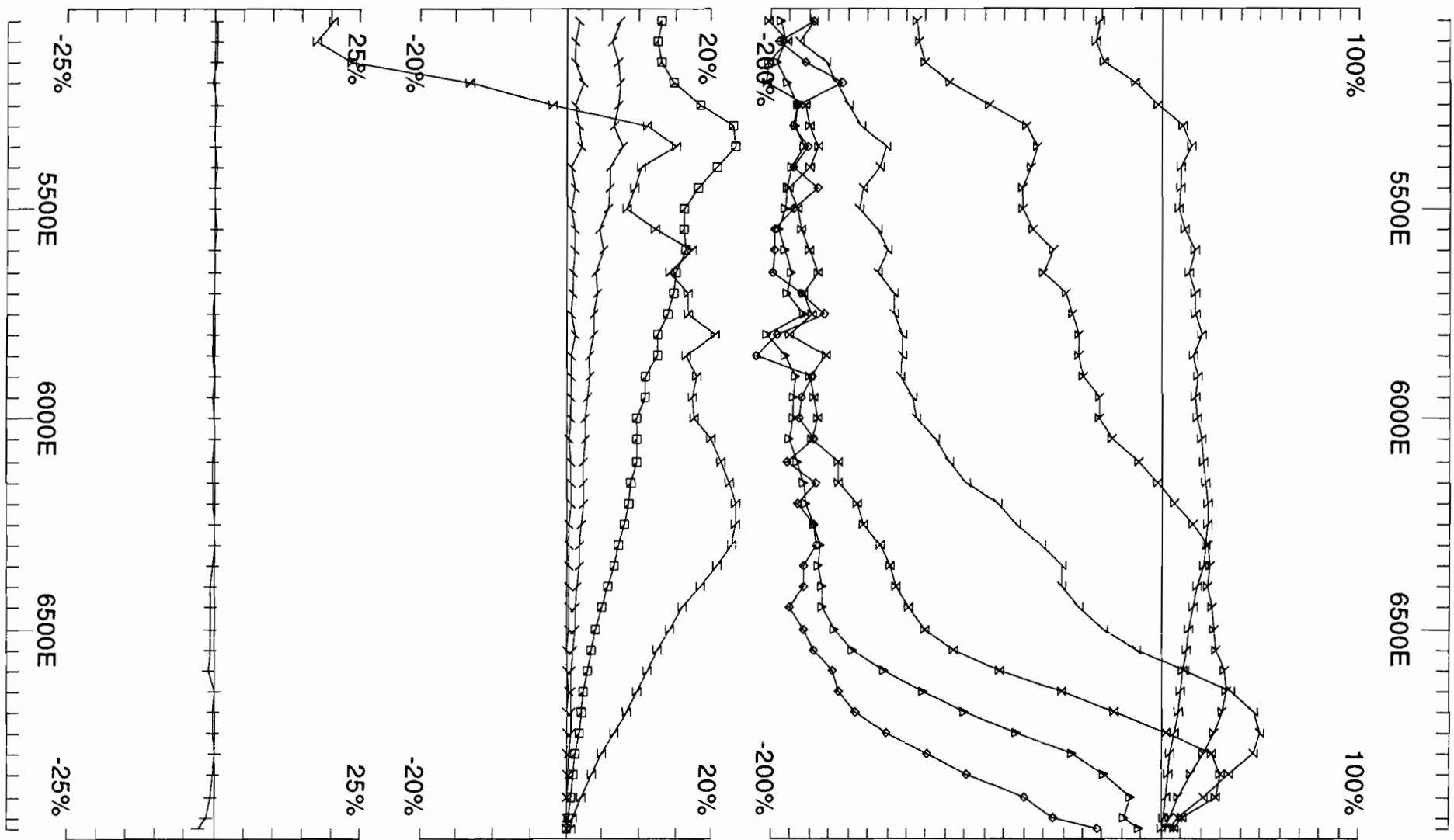
Loop: 3	Secondary, (Chn - Ch1)/ Hp	UTEM Survey at: Montcalm Property	
Line: 9900N	Contin. Norm at depth of 0 m	For: International Nickel Ventures Ltd.	
Compt: Hz	Base Freq. 30.974 Hz	<b>LAMONTAGNE</b>	Job 0809
			Surveyed : 20/3/8 Reduced : 22/4/8 Plotted : 29/4/8



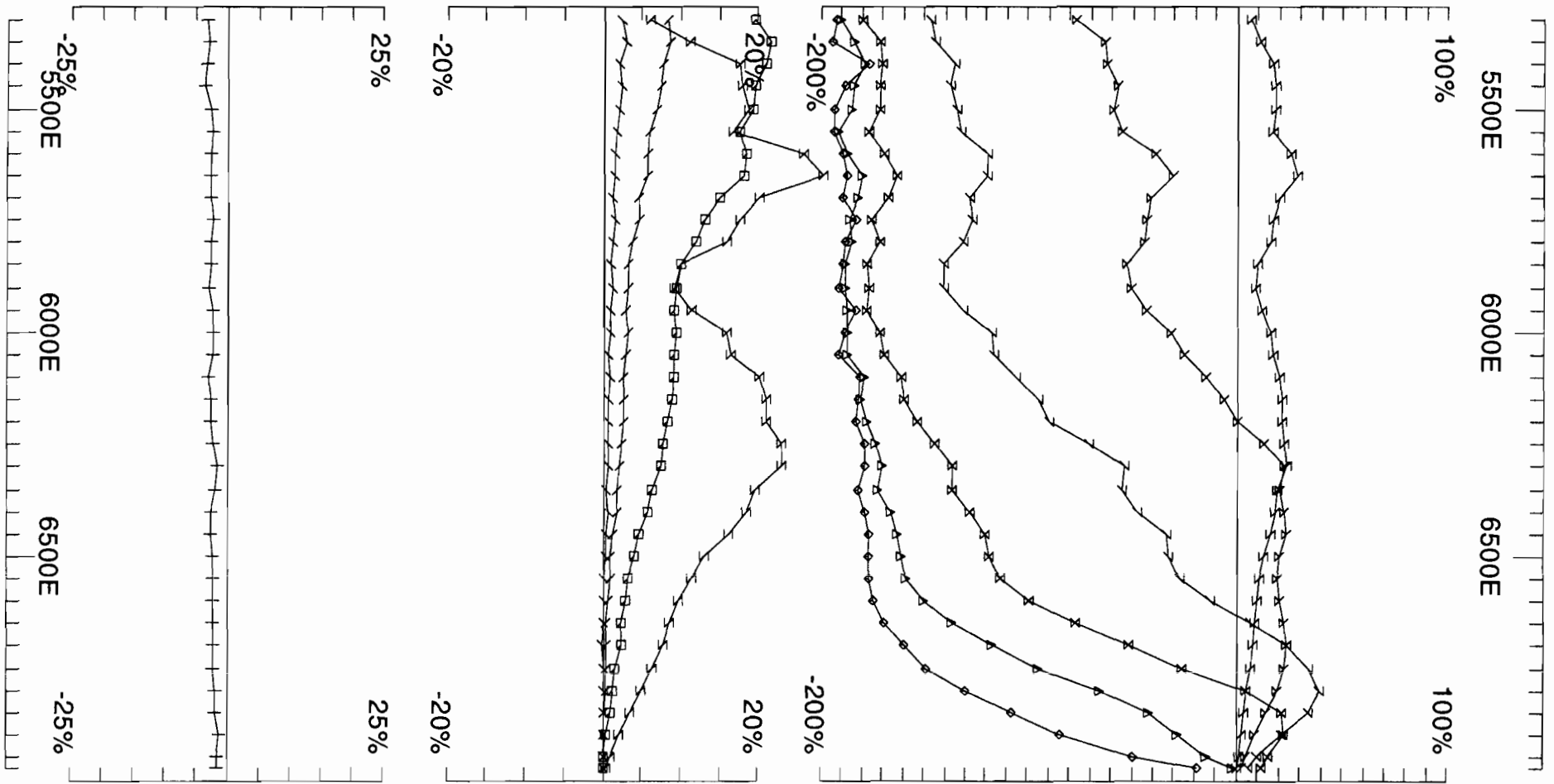
Loop: 3	Secondary, (Chn - Ch1)/ Hp	UTEM Survey at: Montcalm Property	
Line: 0N	Contin. Norm at depth of 0 m	For: International Nickel Ventures Ltd.	
Compt: Hz	Base Freq. 30.974 Hz	<b>LAMONTAGNE</b> GEOPHYSICS LTD	Job 0809
		GEOPHYSIQUE LTEE	Surveyed : 20/3/8 Reduced : 22/4/8 Plotted : 29/4/8



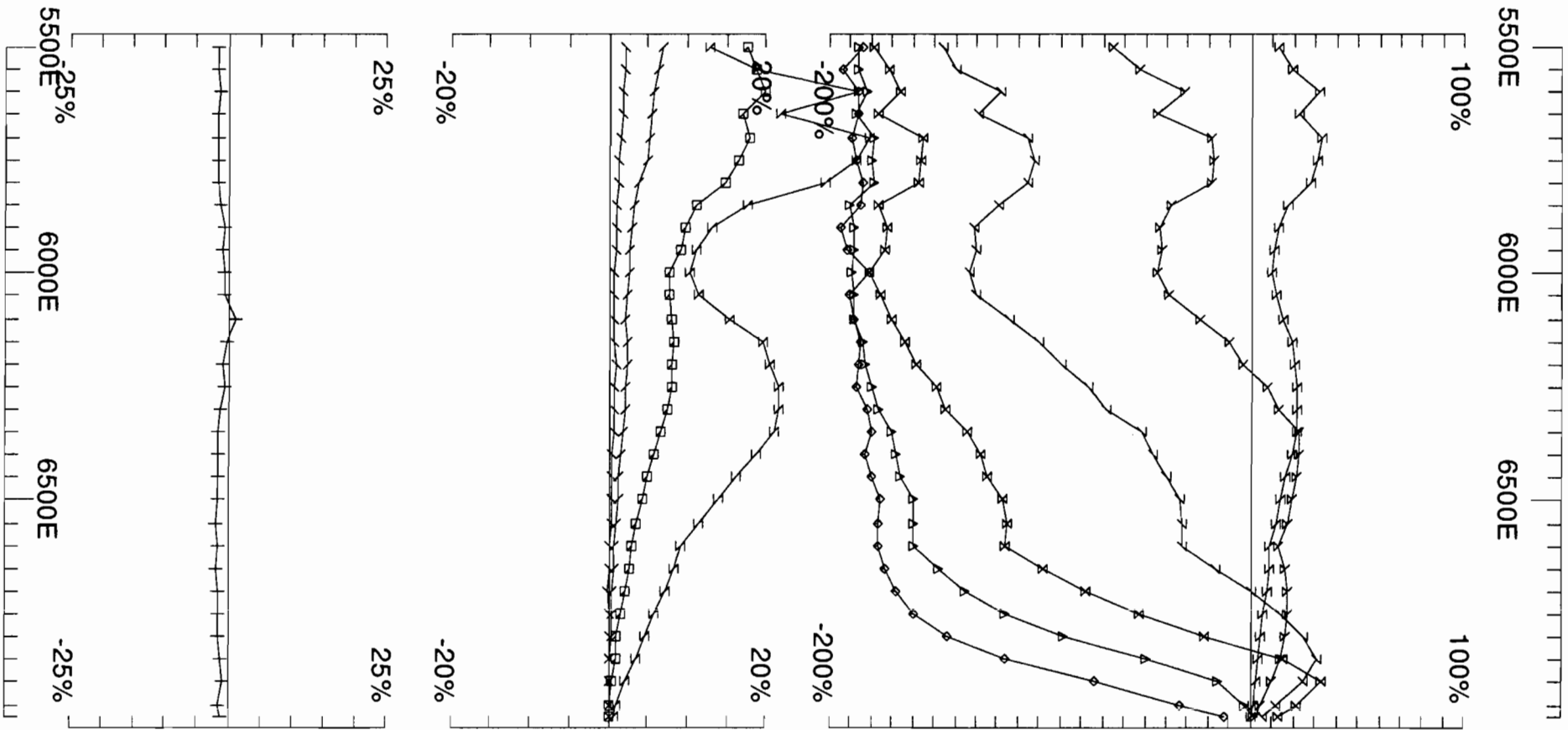
Loop: 3	Secondary, (Chn - Ch1)/ Hp	UTEM Survey at: Montcalm Property	
Line: 200N	Contin. Norm at depth of 0 m	For: International Nickel Ventures Ltd.	
Compt: Hz	Base Freq. 30.974 Hz	<b>LAMONTAGNE</b>	GEOPHYSICS LTD    Job GEOPHYSIQUE LTEE    0809 Surveyed : 19/3/8 Reduced : 22/4/8 Plotted : 29/4/8



Loop: 3	Secondary, (Chn - Ch1)/ Hp	UTEM Survey at: Montcalm Property	
Line: 300N	Contin. Norm at depth of 0 m	For: International Nickel Ventures Ltd.	
Compt: Hz	Base Freq. 30.974 Hz	<b>LAMONTAGNE</b>	GEOPHYSICS LTD    Job GEOPHYSIQUE LTEE    0809 Surveyed : 19/3/8 Reduced : 22/4/8 Plotted : 29/4/8

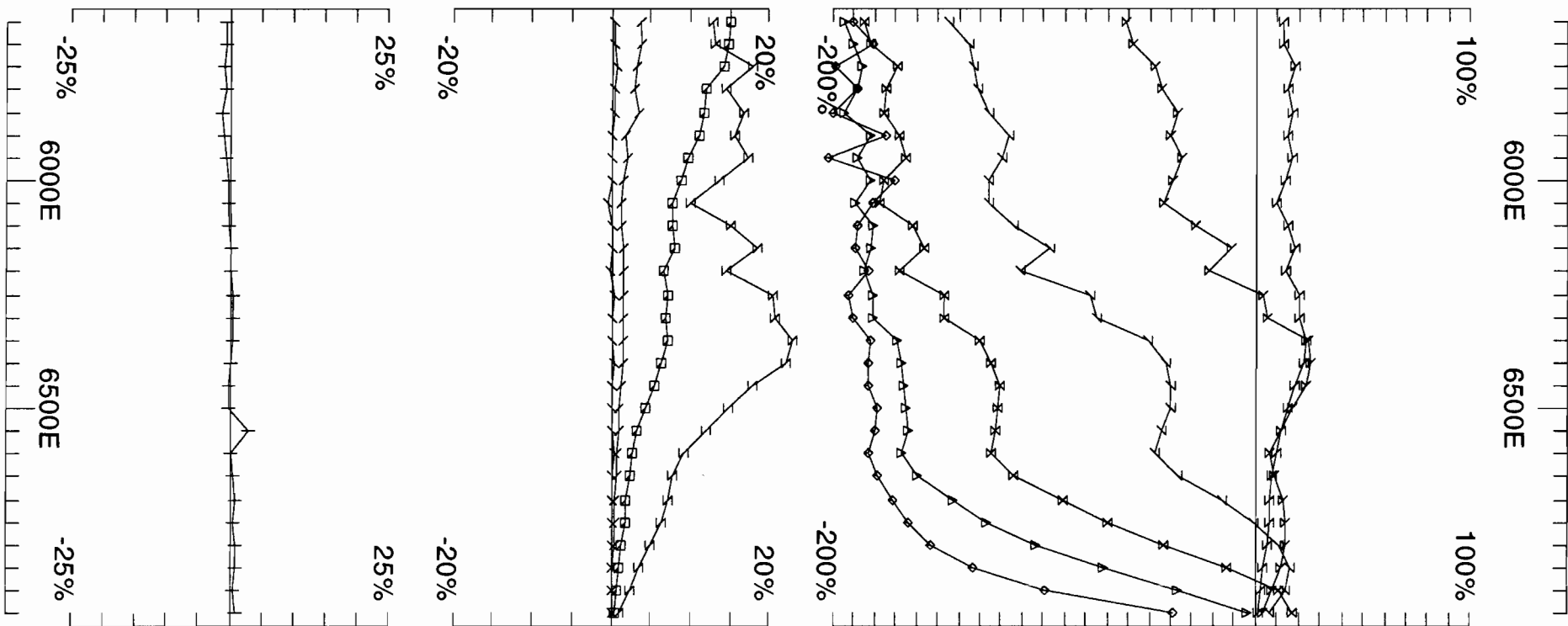


Loop: 3	Secondary, (Chn - Ch1)/ Hp	UTEM Survey at: Montcalm Property	
Line: 400N	Contin. Norm at depth of 0 m	For: International Nickel Ventures Ltd.	
Compt: Hz	Base Freq. 30.974 Hz	<b>LAMONTAGNE</b> GEOPHYSICS LTD	Job 0809
		GEOPHYSIQUE LTEE	Surveyed : 18/3/8 Reduced : 22/4/8 Plotted : 29/4/8



Loop: 3	Secondary, (Chn - Ch1)/ Hp	UTEM Survey at: Montcalm Property	
Line: 500N	Contin. Norm at depth of 0 m	For: International Nickel Ventures Ltd.	
Compt: Hz	Base Freq. 30.974 Hz	<b>LAMONTAGNE</b> GEOPHYSICS LTD	Job 0809
		GEOPHYSIQUE LTEE	Surveyed : 18/3/8 Reduced : 22/4/8 Plotted : 29/4/8





Loop: 3  
 Line: 600N  
 Compt: Hz

Secondary, (Chn - Ch1)/|Hp|  
 Contin. Norm at depth of 0 m  
 Base Freq. 30.974 Hz

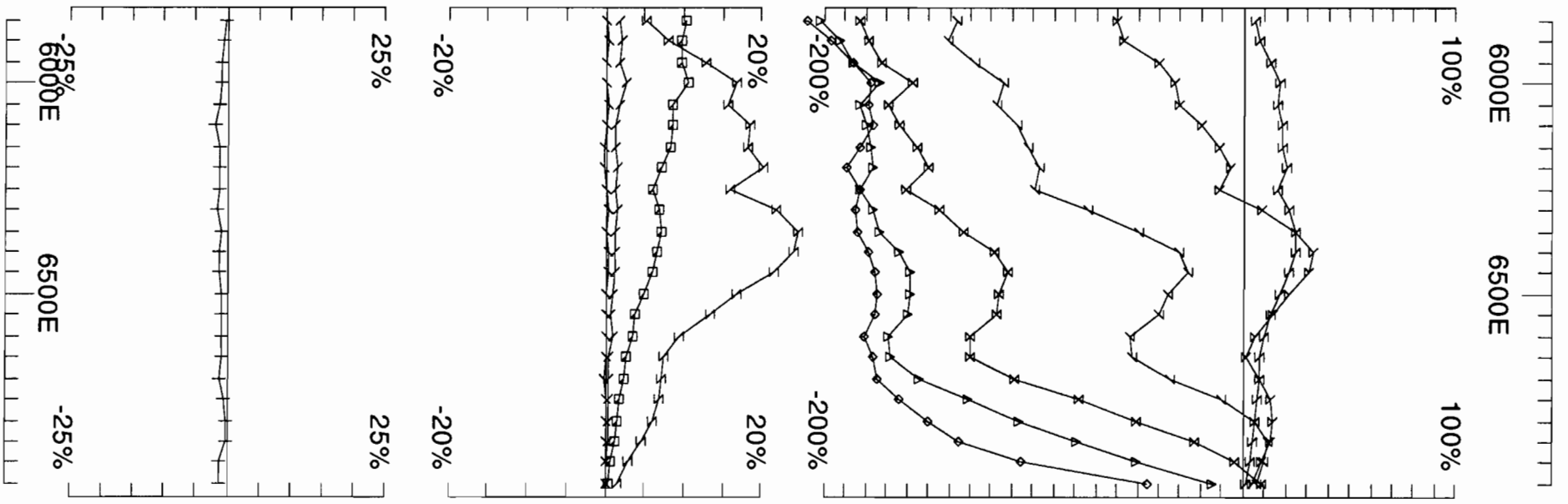
UTEM Survey at: Montcalm Property  
 For: International Nickel Ventures Ltd.

**LAMONTAGNE**

GEOPHYSICS LTD  
 GEOPHYSIQUE LTEE

Job  
 0809

Surveyed : 18/3/8  
 Reduced : 22/4/8  
 Plotted : 29/4/8



Loop: 3  
 Line: 700N  
 Compt: Hz

Secondary, (Chn - Ch1)/|Hp|  
 Contin. Norm at depth of 0 m  
 Base Freq. 30.974 Hz

UTEM Survey at: Montcalm Property  
 For: International Nickel Ventures Ltd.

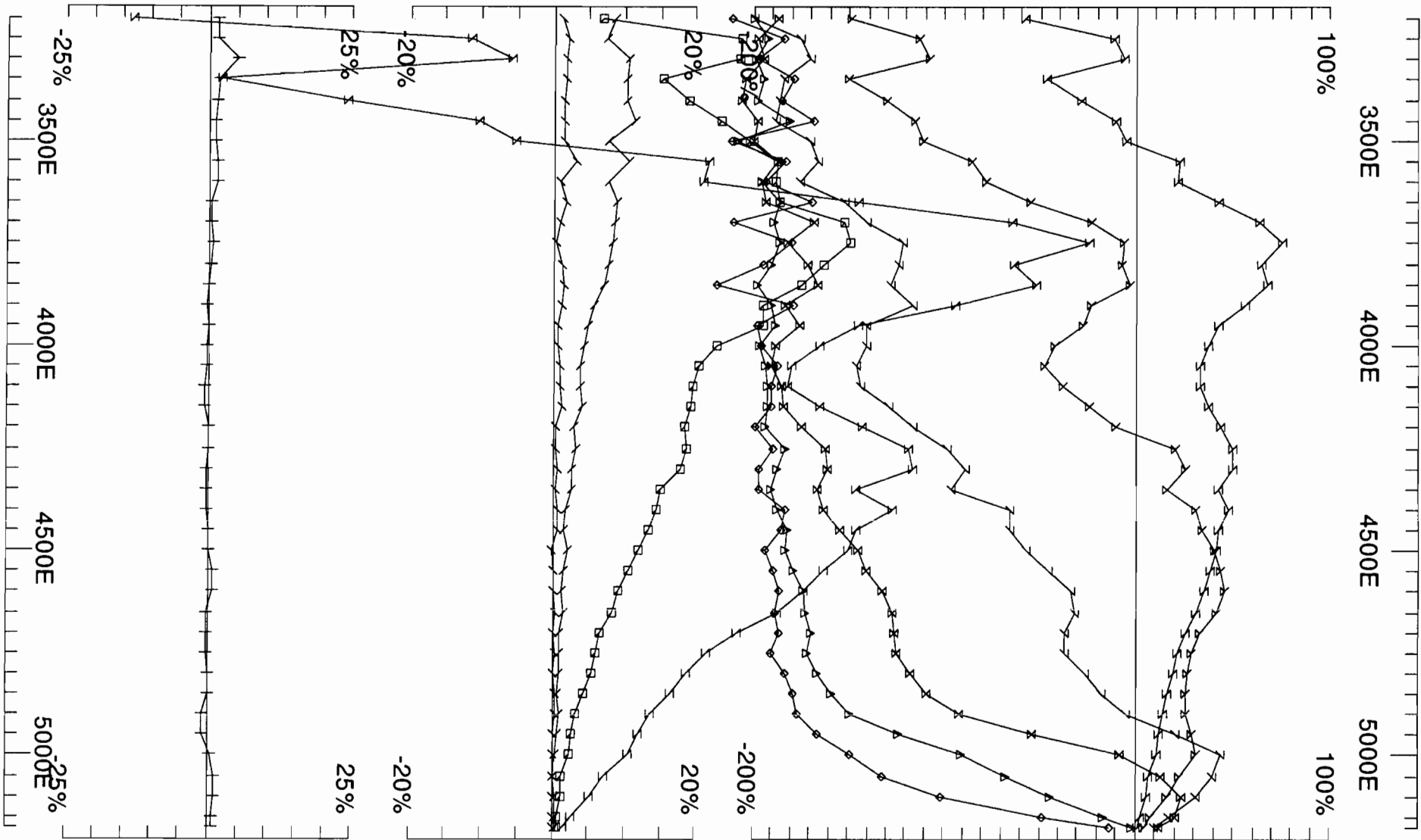
**LAMONTAGNE** GEOPHYSICS LTD Job 0809  
 GEOPHYSIQUE LTEE  
 Surveyed : 18/3/8  
 Reduced : 22/4/8  
 Plotted : 29/4/8

# Loop 4

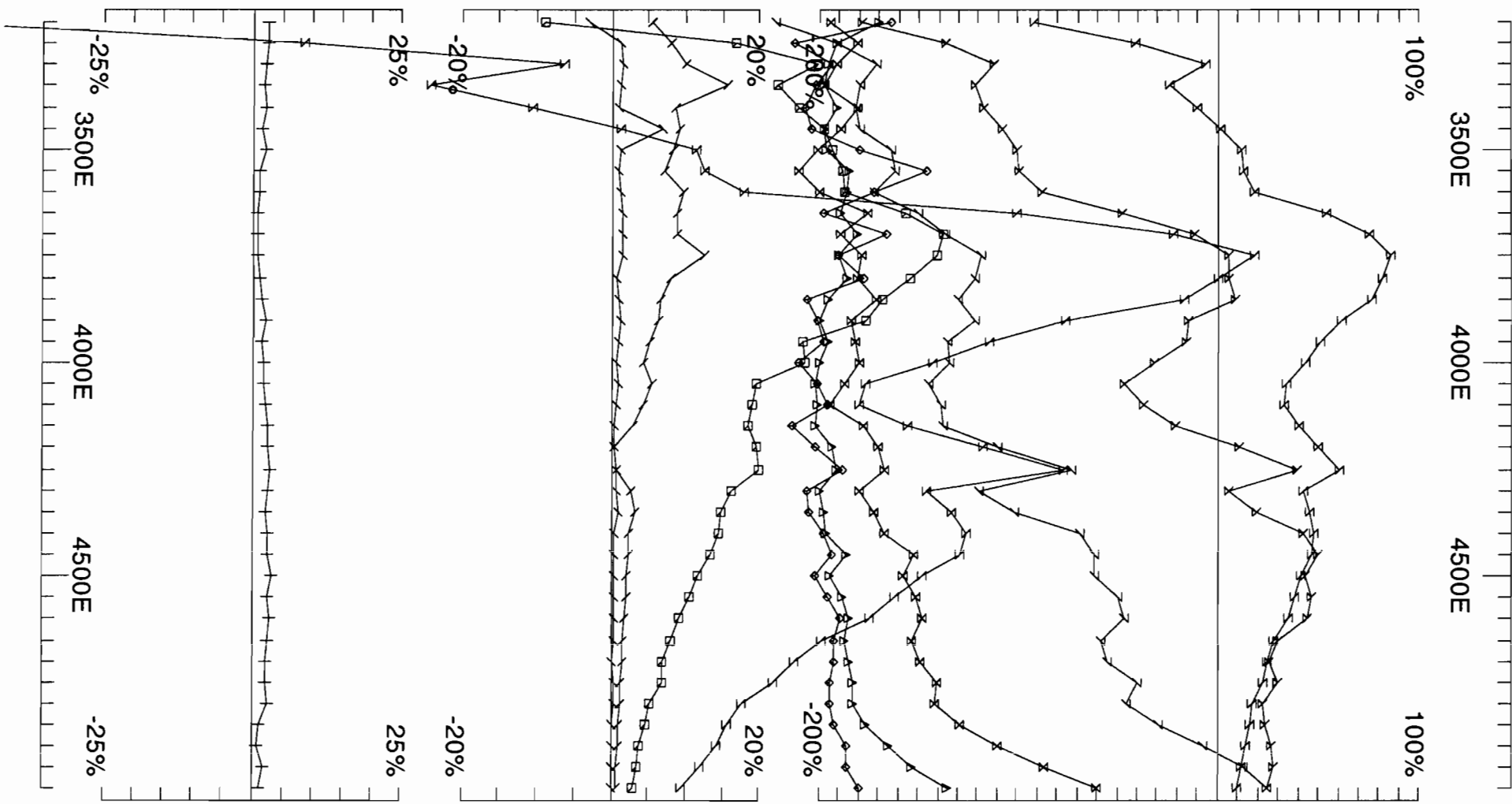
## Hz Profiles (continuous norm)

@ 30.974 Hz

	<b>Line</b>	<b>coverage</b>	
Loop 4	Line 8500 N	3200 E - 5175 E	1975 m
	Line 8600 N	3200 E - 5000 E	1800 m
	Line 8700 N	3200 E - 5150 E	1950 m
	Line 8800 N	3225 E - 4950 E	1725 m
	Line 8900 N	3450 E - 5150 E	1700 m
	Line 9000 N	3500 E - 5150 E	1650 m
	Line 9100 N	3650 E - 5150 E	1500 m
	Line 9200 N	3750 E - 5175 E	1425 m



Loop: 4	Secondary, (Chn - Ch1)/ Hp	UTEM Survey at: Montcalm Property	
Line: 8500N	Contin. Norm at depth of 0 m	For: International Nickel Ventures Ltd.	
Compt: Hz	Base Freq. 30.974 Hz	<b>LAMONTAGNE</b>	GEOPHYSICS LTD
			Job 0809
			Surveyed : 22/3/8 Reduced : 22/4/8 Plotted : 29/4/8

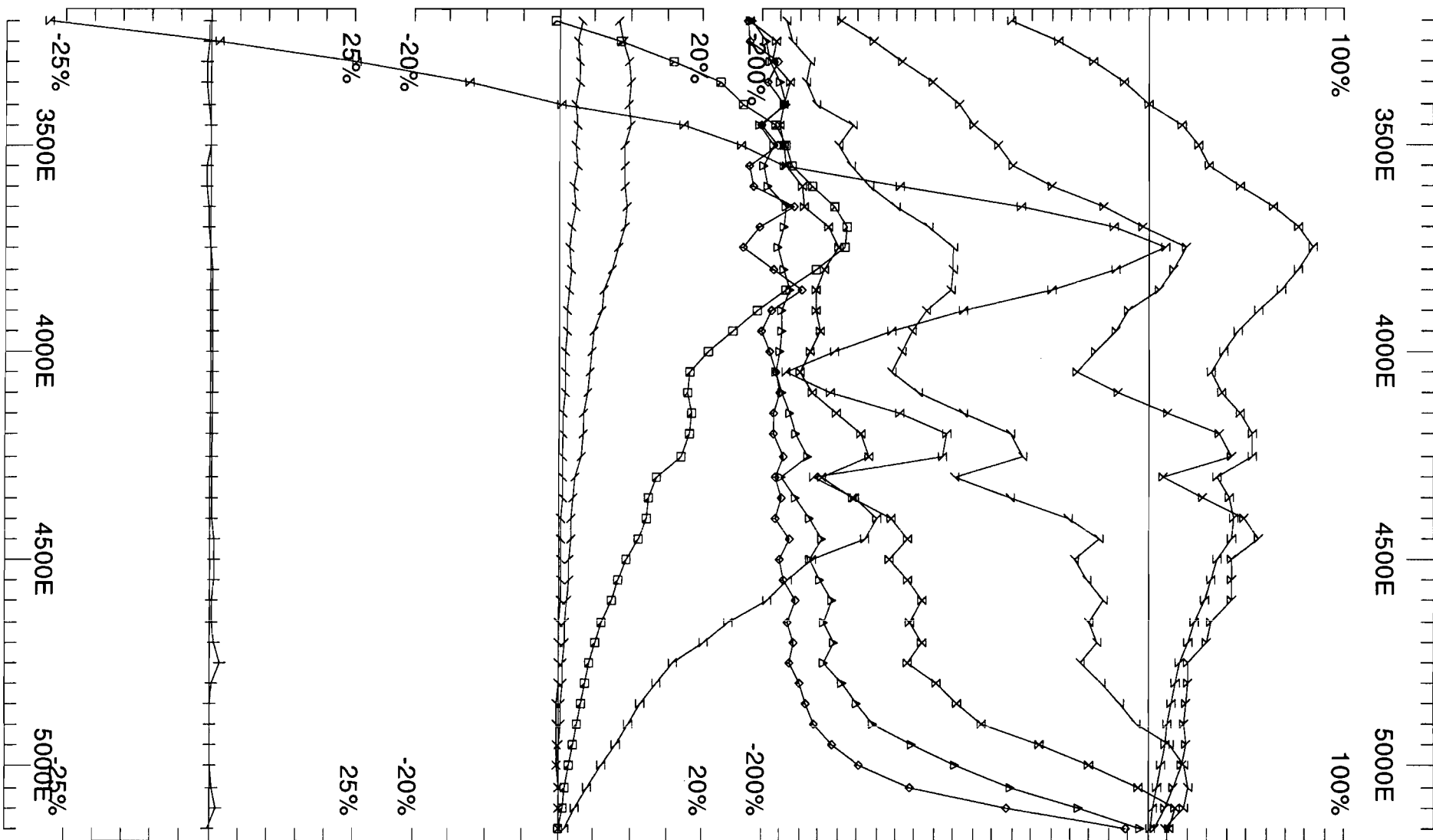


Loop: 4  
 Line: 8600N  
 Compt: Hz

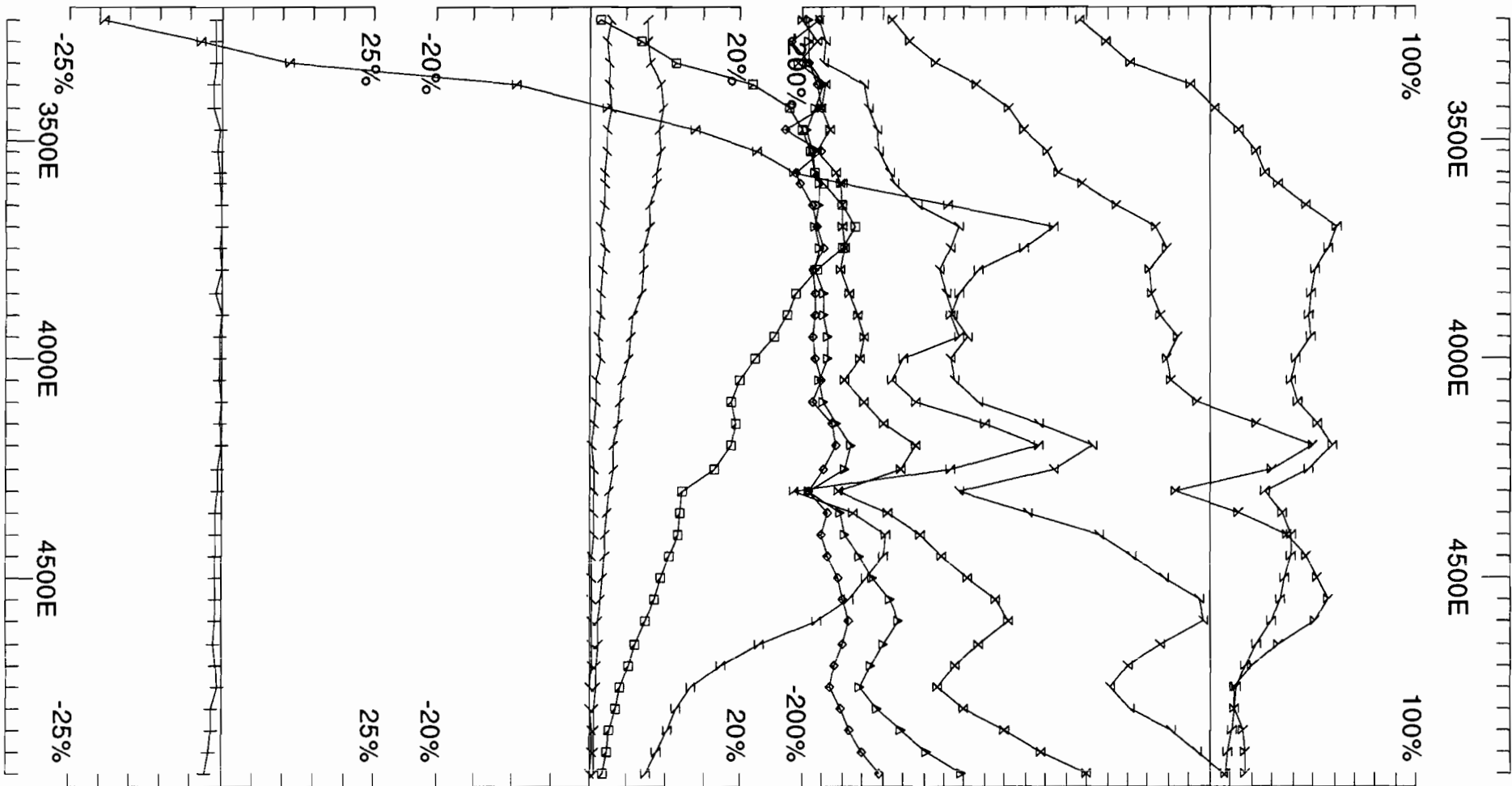
Secondary, (Chn - Ch1)/|Hp|  
 Contin. Norm at depth of 0 m  
 Base Freq. 30.974 Hz

UTEM Survey at: Montcalm Property  
 For: International Nickel Ventures Ltd.

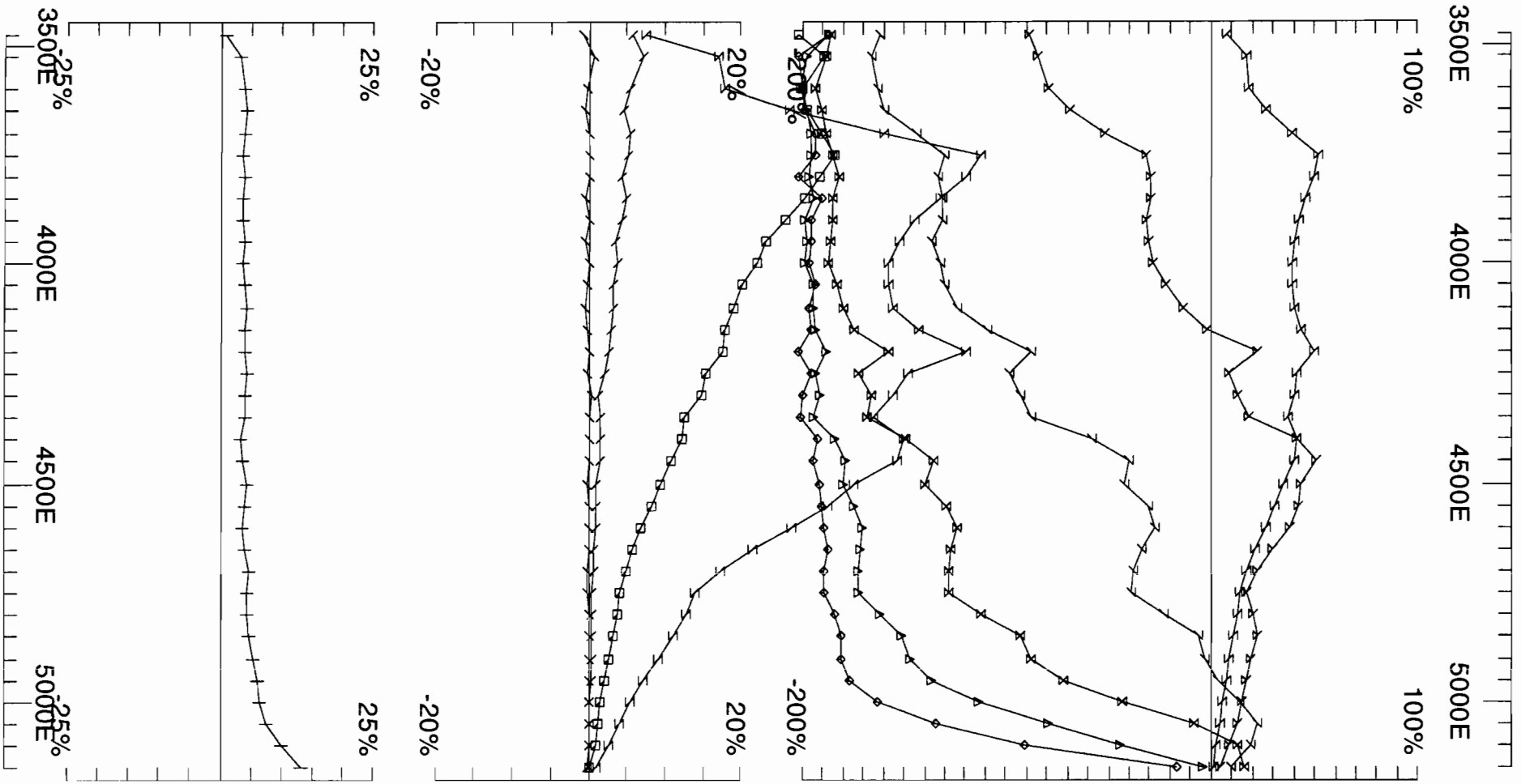
**LAMONTAGNE** GEOPHYSICS LTD  
 GEOPHYSIQUE LTEE Job 0809  
 Surveyed : 22/3/8  
 Reduced : 22/4/8  
 Plotted : 29/4/8



Loop: 4	Secondary, $(Chn - Ch1)/ Hp $	UTEM Survey at: Montcalm Property	
Line: 8700N	Contin. Norm at depth of 0 m	For: International Nickel Ventures Ltd.	
Compt: Hz	Base Freq. 30.974 Hz	<b>LAMONTAGNE</b>	GEOPHYSICS LTD GEOPHYSIQUE LTEE

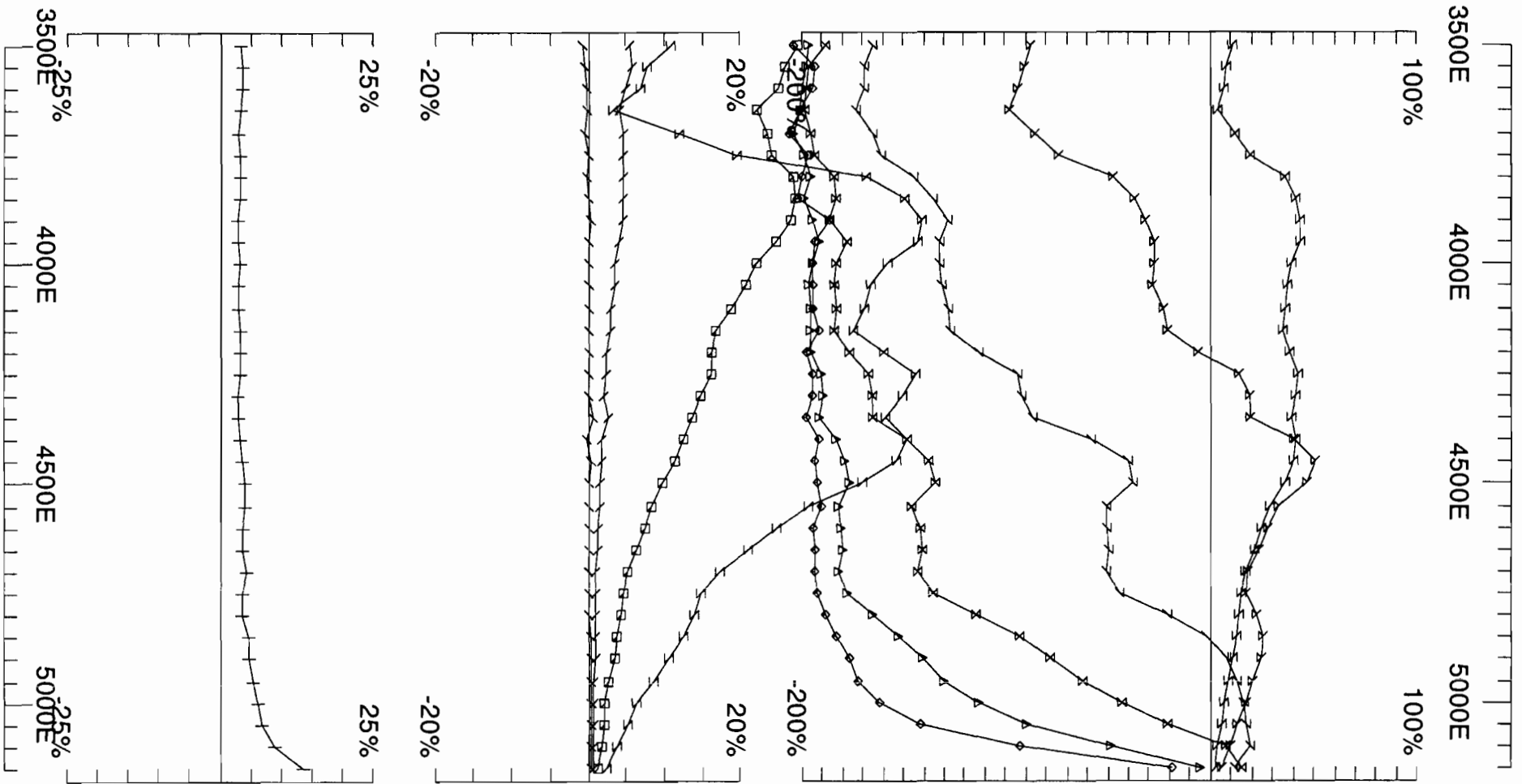


Loop: 4	Secondary, (Chn - Ch1)/ Hp	UTEM Survey at: Montcalm Property	
Line: 8800N	Contin. Norm at depth of 0 m	For: International Nickel Ventures Ltd.	
Compt: Hz	Base Freq. 30.974 Hz	<b>LAMONTAGNE</b>	GEOPHYSICS LTD GEOPHYSIQUE LTEE



Loop: 4	Secondary, (Chn - Ch1)/ Hp	UTEM Survey at: Montcalm Property	
Line: 8900N	Contin. Norm at depth of 0 m	For: International Nickel Ventures Ltd.	
Compt: Hz	Base Freq. 30.974 Hz	<b>LAMONTAGNE</b> GEOPHYSICS LTD	Job 0809
		GEOPHYSIQUE LTEE	Surveyed : 23/3/8 Reduced : 22/4/8 Plotted : 29/4/8





Loop: 4

Line: 9000N

Compt: Hz

Secondary, (Chn - Ch1)/|Hp|

Contin. Norm at depth of 0 m

Base Freq. 30.974 Hz

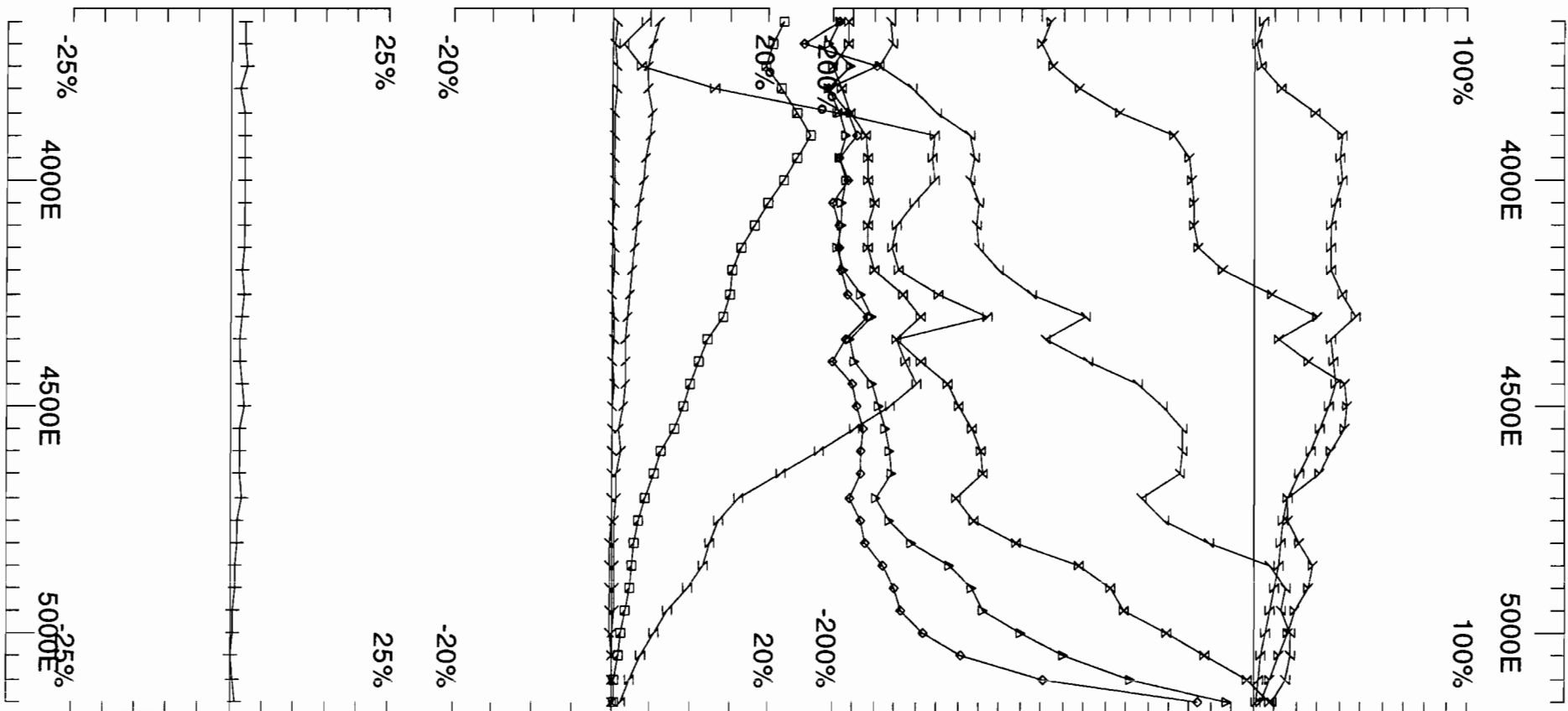
UTEM Survey at: Montcalm Property  
For: International Nickel Ventures Ltd.

**LAMONTAGNE**

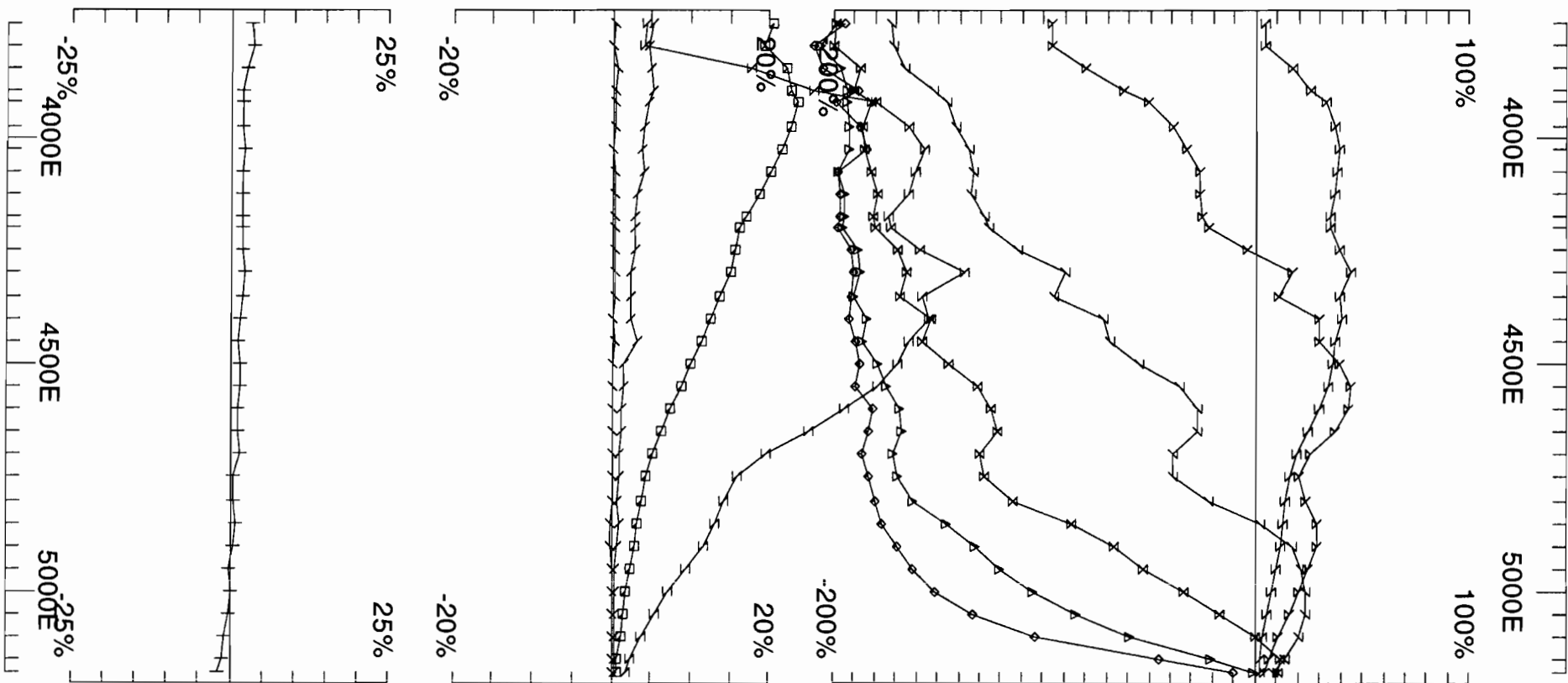
GEOPHYSICS LTD  
GEOPHYSIQUE LTEE

Job  
0809

Surveyed : 23/3/8  
Reduced : 22/4/8  
Plotted : 29/4/8



Loop: 4 Line: 9100N Compt: Hz	Secondary, (Chn - Ch1)/ Hp  Contin. Norm at depth of 0 m Base Freq. 30.974 Hz	UTEM Survey at: Montcalm Property For: International Nickel Ventures Ltd. <b>LAMONTAGNE</b> GEOPHYSICS LTD Job 0809 GEOPHYSIQUE LTEE Surveyed : 23/3/8 Reduced : 22/4/8 Plotted : 29/4/8
-------------------------------------	---	--



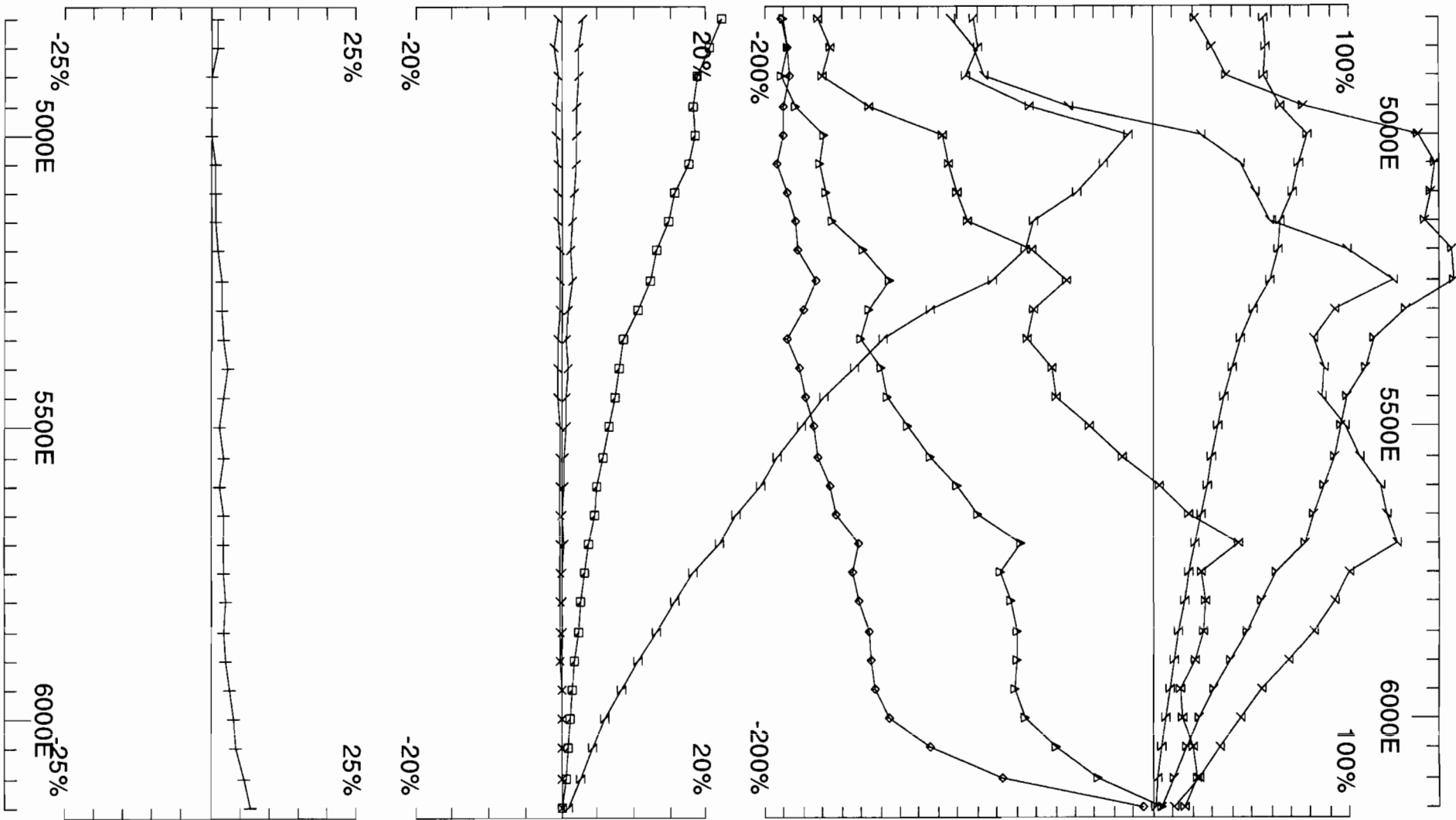
Loop: 4	Secondary, (Chn - Ch1)/ Hp	UTEM Survey at: Montcalm Property	
Line: 9200N	Contin. Norm at depth of 0 m	For: International Nickel Ventures Ltd.	
Compt: Hz	Base Freq. 30.974 Hz	<b>LAMONTAGNE</b> GEOPHYSICS LTD	Job 0809
		GEOPHYSIQUE LTEE	Surveyed : 23/3/8 Reduced : 22/4/8 Plotted : 29/4/8

# Loop 5

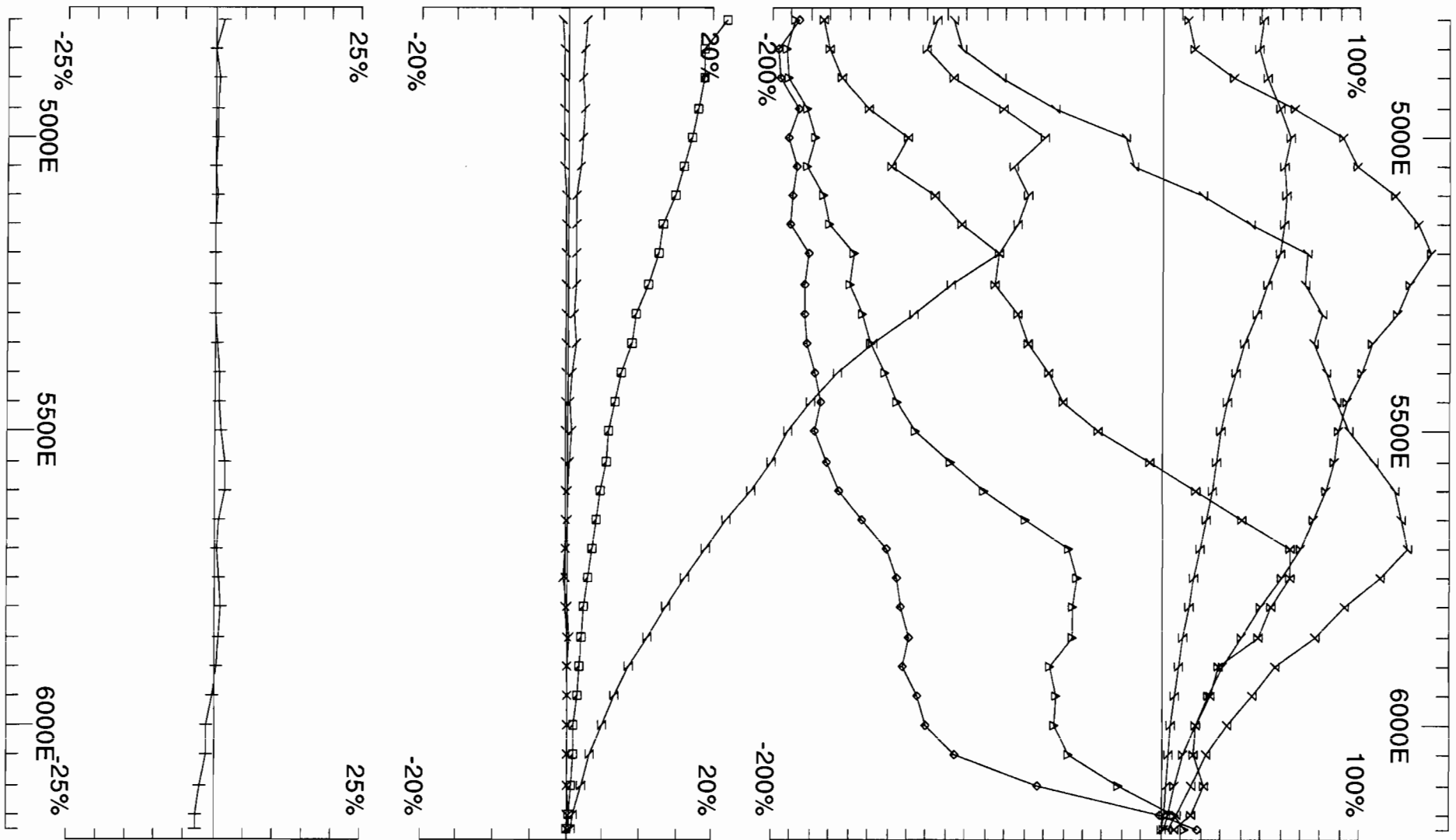
## Hz Profiles (continuous norm)

@ 30.974 Hz

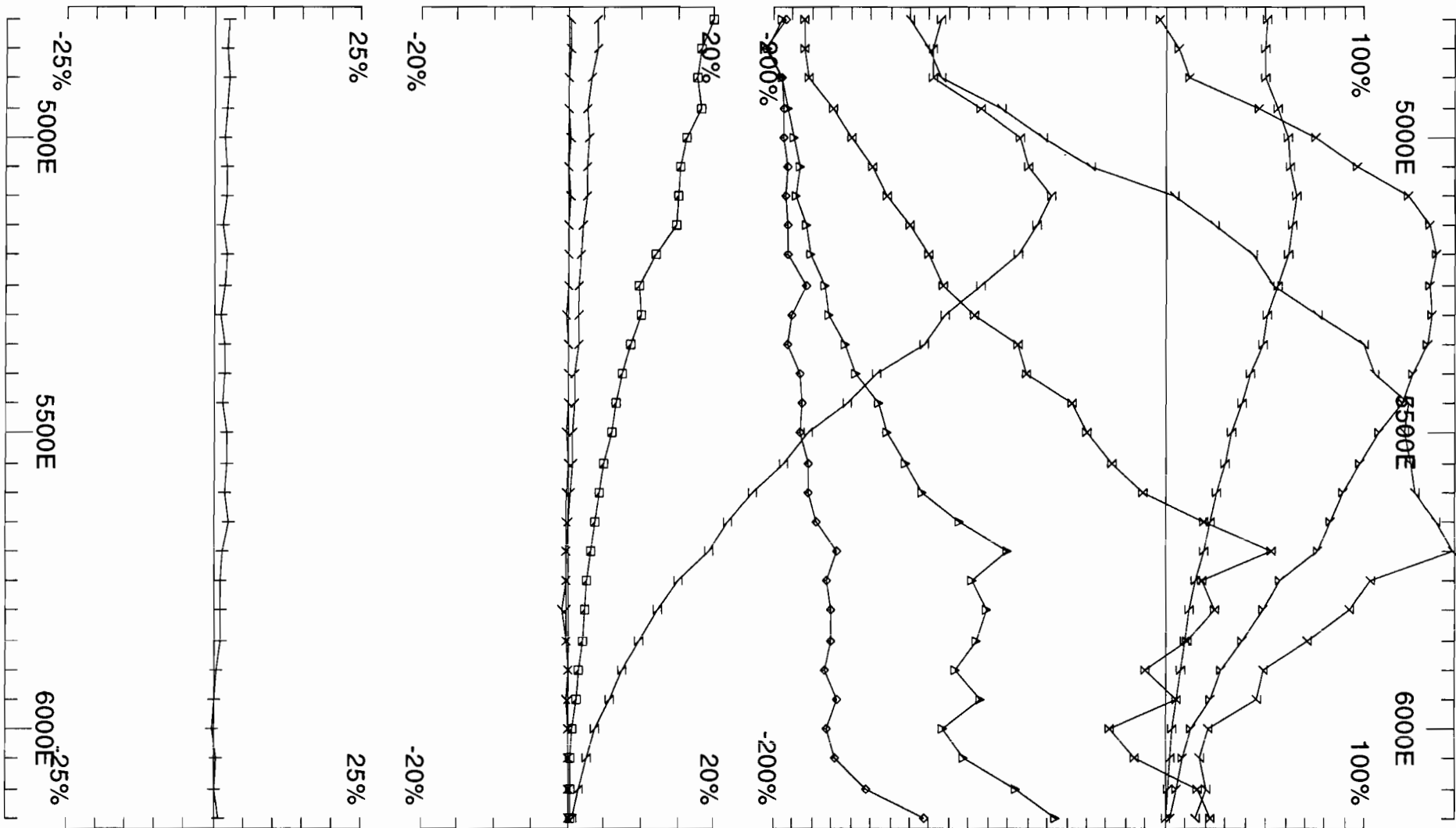
	<b>Line</b>	<b>coverage</b>	
Loop 5	Line 8500 N	4800 E - 6150 E	1350 m
	Line 8600 N	4800 E - 6175 E	1375 m
	Line 8700 N	4800 E - 6150 E	1350 m
	Line 8800 N	4800 E - 6150 E	1350 m
	Line 8900 N	4800 E - 6150 E	1350 m
	Line 9000 N	4800 E - 6150 E	1350 m
	Line 9100 N	4800 E - 6150 E	1350 m
	Line 9200 N	4800 E - 6150 E	1350 m
	Line 9300 N	4800 E - 6150 E	1350 m
	Line 9400 N	4800 E - 6150 E	1350 m



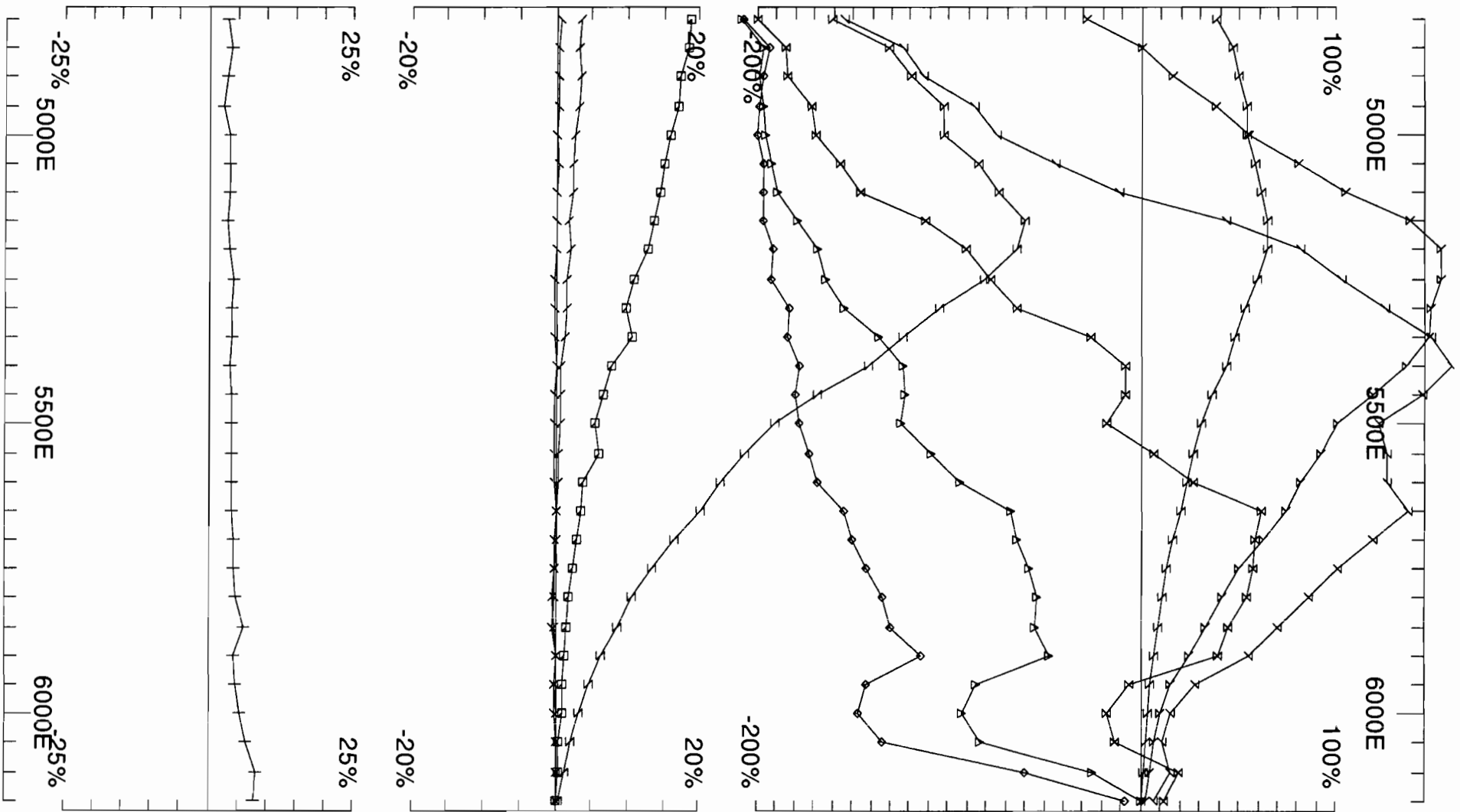
Loop: 5	Secondary, (Chn - Ch1)/ Hp	UTEM Survey at: Montcalm Property	
Line: 8500N	Contin. Norm at depth of 0 m	For: International Nickel Ventures Ltd.	
Compt: Hz	Base Freq. 30.974 Hz	<b>LAMONTAGNE</b>	GEOPHYSICS LTD GEOPHYSIQUE LTEE



Loop: 5 Line: 8600N Compt: Hz	Secondary, (Chn - Ch1)/ Hp  Contin. Norm at depth of 0 m Base Freq. 30.974 Hz	UTEM Survey at: Montcalm Property For: International Nickel Ventures Ltd.	
<b>LAMONTAGNE</b>		GEOPHYSICS LTD GEOPHYSIQUE LTEE	Job 0809 Surveyed : 25/3/8 Reduced : 22/4/8 Plotted : 28/4/8



Loop: 5 Line: 8700N Compt: Hz	Secondary, (Chn - Ch1)/ Hp  Contin. Norm at depth of 0 m Base Freq. 30.974 Hz	<b>UTEM Survey at: Montcalm Property</b> <b>For: International Nickel Ventures Ltd.</b> <b>LAMONTAGNE</b>	GEOPHYSICS LTD GEOPHYSIQUE LTEE Job 0809 Surveyed : 25/3/8 Reduced : 22/4/8 Plotted : 28/4/8
-------------------------------------	---	---	---



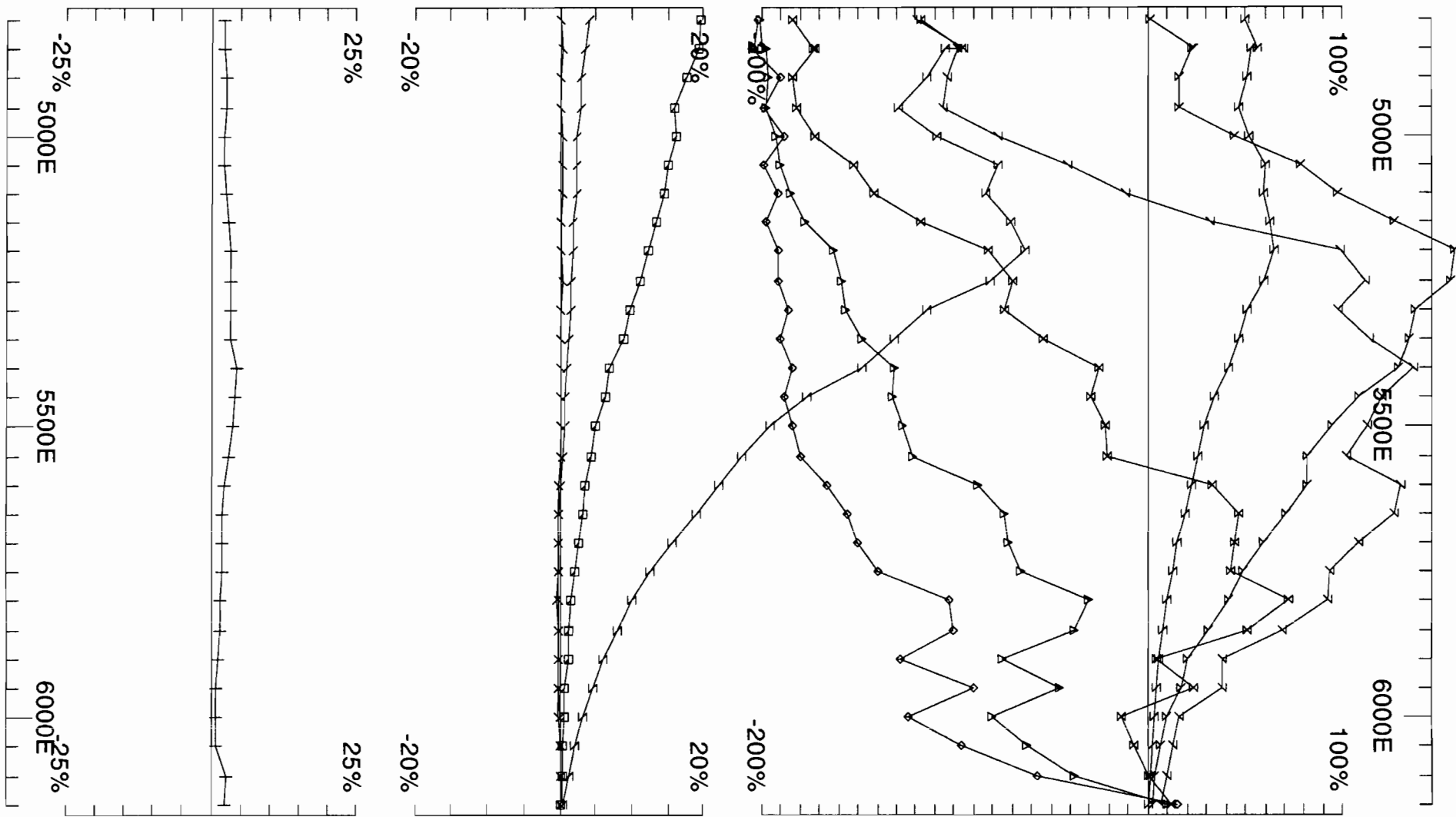
Loop: 5  
 Line: 8800N  
 Compt: Hz

Secondary, (Chn - Ch1)/|Hp|  
 Contin. Norm at depth of 0 m  
 Base Freq. 30.974 Hz

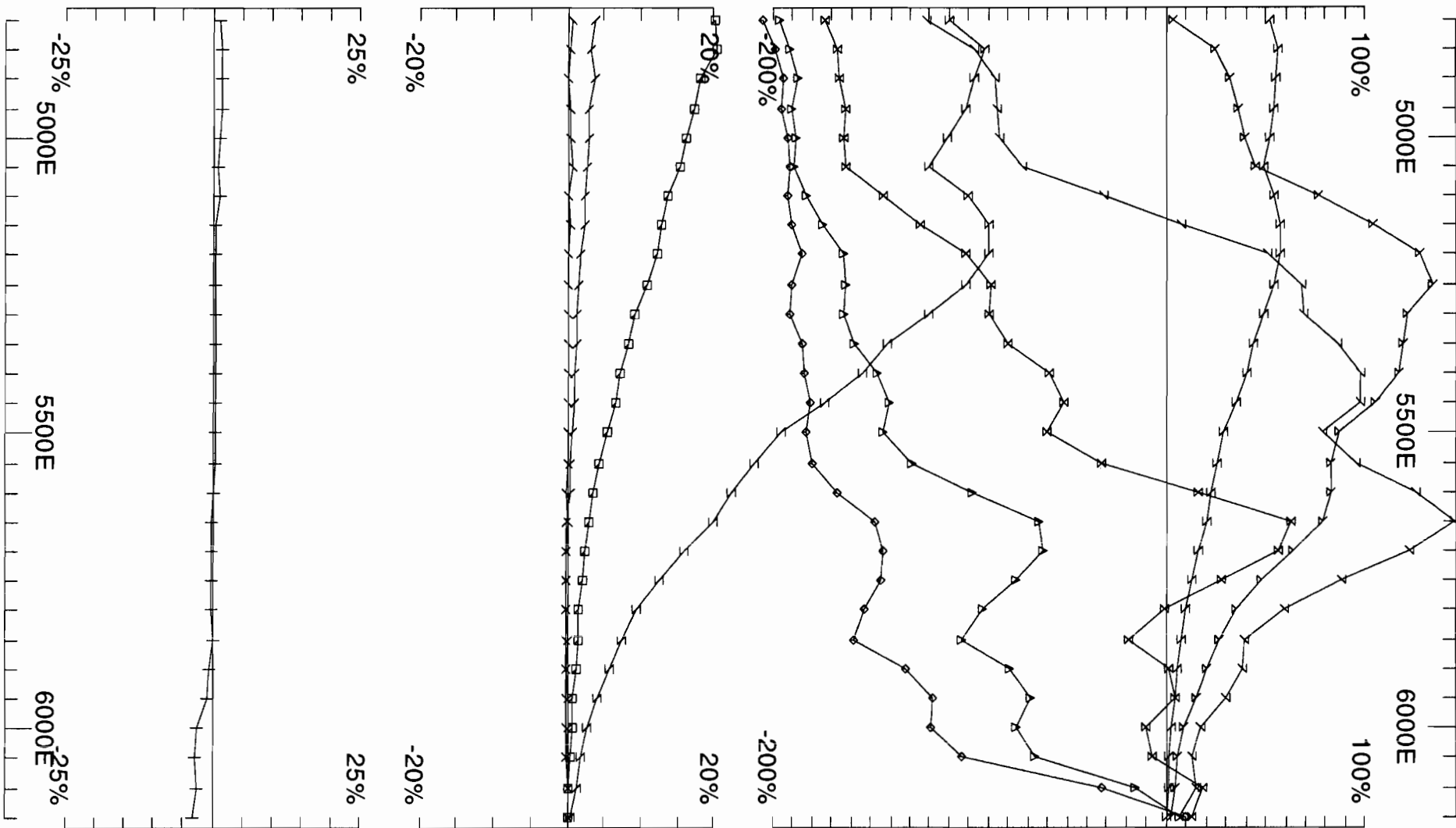
UTEM Survey at: Montcalm Property  
 For: International Nickel Ventures Ltd.

**LAMONTAGNE** GEOPHYSICS LTD  
 GEOPHYSIQUE LTEE Job 0809  
 Surveyed : 25/3/8  
 Reduced : 22/4/8  
 Plotted : 28/4/8

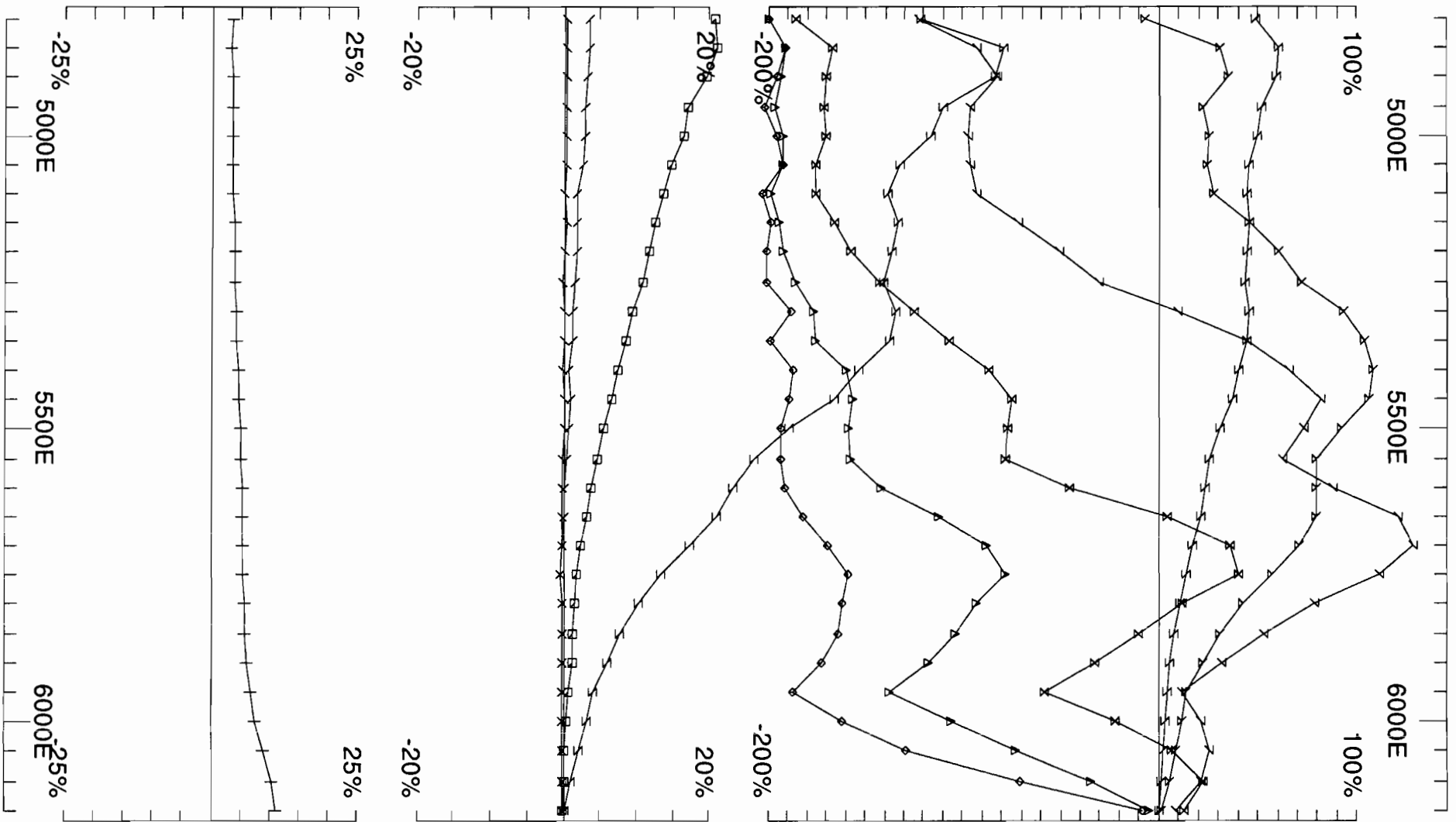




Loop: 5	Secondary, (Chn - Ch1)/ Hp	UTEM Survey at: Montcalm Property	
Line: 8900N	Contin. Norm at depth of 0 m	For: International Nickel Ventures Ltd.	
Compt: Hz	Base Freq. 30.974 Hz	<b>LAMONTAGNE</b> GEOPHYSICS LTD	Job 0809
		GEOPHYSIQUE LTEE	Surveyed : 24/3/8 Reduced : 22/4/8 Plotted : 28/4/8



Loop: 5	Secondary, (Chn - Ch1)/ Hp	UTEM Survey at: Montcalm Property	
Line: 9000N	Contin. Norm at depth of 0 m	For: International Nickel Ventures Ltd.	
Compt: Hz	Base Freq. 30.974 Hz	<b>LAMONTAGNE</b> GEOPHYSICS LTD	Job 0809
		GEOPHYSIQUE LTEE	Surveyed : 24/3/8 Reduced : 22/4/8 Plotted : 28/4/8

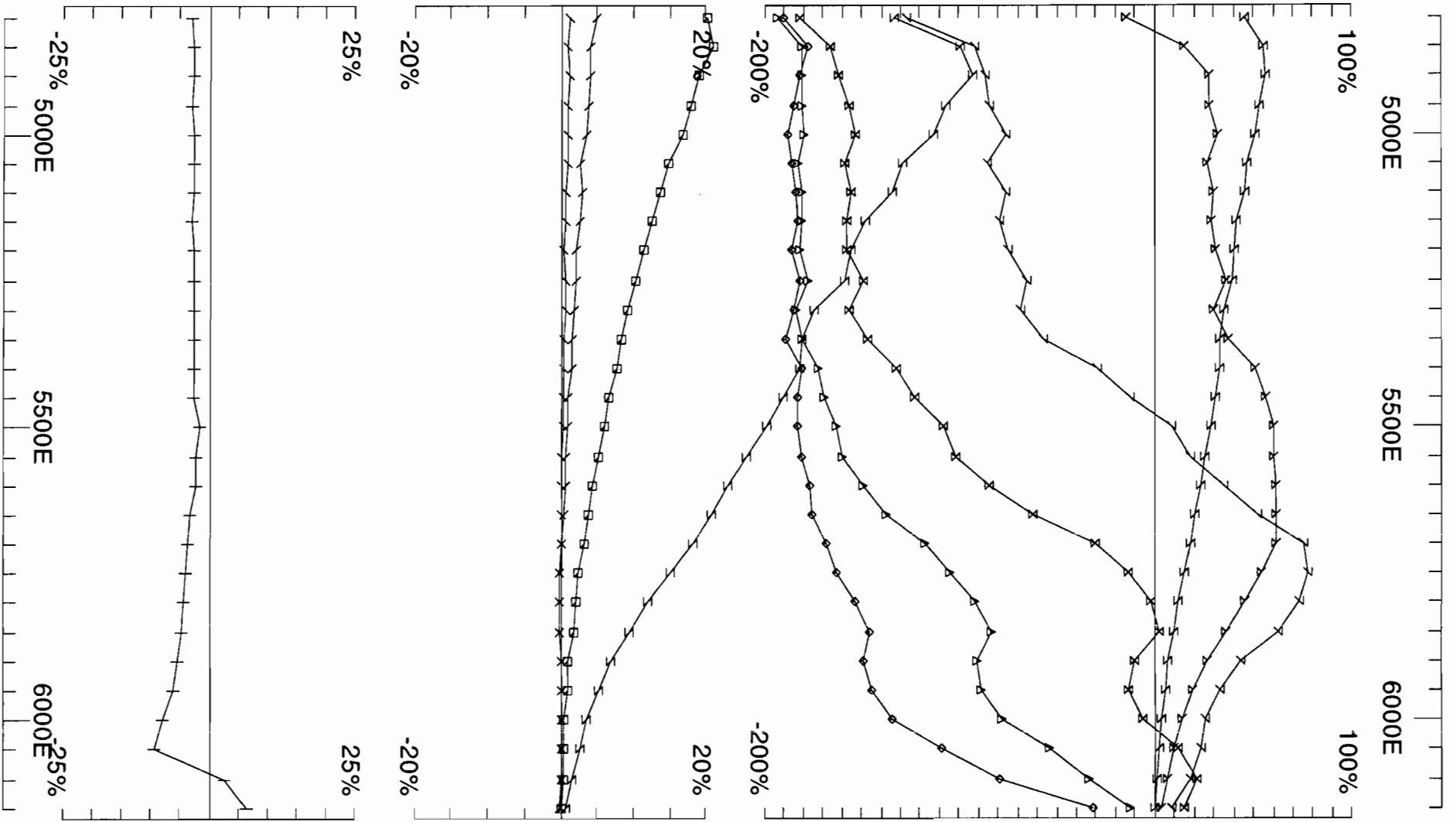


Loop: 5  
 Line: 9100N  
 Compt: Hz

Secondary, (Chn - Ch1)/|Hp|  
 Contin. Norm at depth of 0 m  
 Base Freq. 30.974 Hz

UTEM Survey at: Montcalm Property  
 For: International Nickel Ventures Ltd.

**LAMONTAGNE** GEOPHYSICS LTD  
 GEOPHYSIQUE LTEE Job 0809  
 Surveyed : 24/3/8  
 Reduced : 22/4/8  
 Plotted : 28/4/8



Loop: 5  
 Line: 9200N  
 Compt: Hz

Secondary, (Chn - Ch1)/|Hp|  
 Contin. Norm at depth of 0 m  
 Base Freq. 30.974 Hz

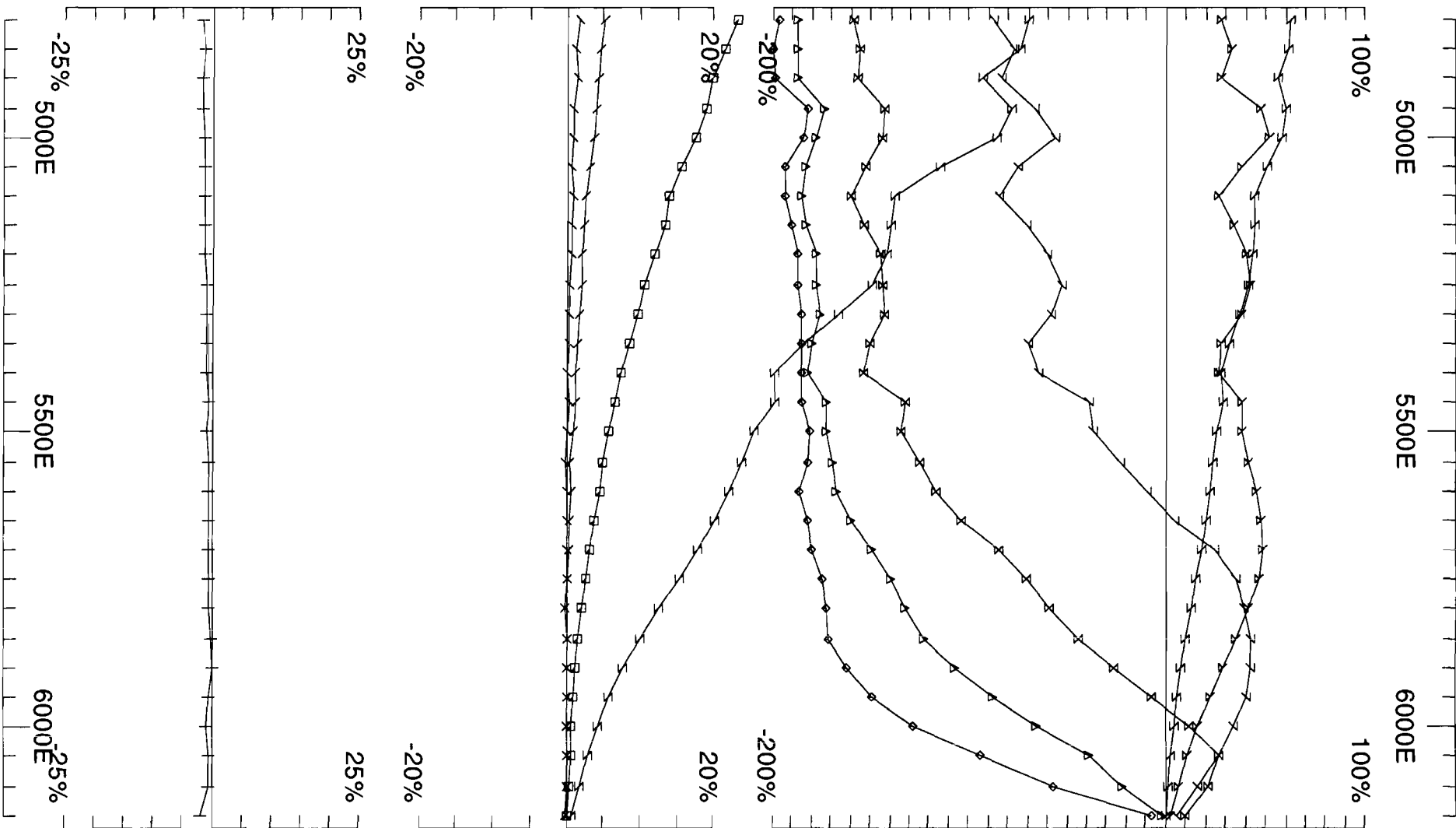
UTEM Survey at: Montcalm Property  
 For: International Nickel Ventures Ltd.

**LAMONTAGNE**

GEOPHYSICS LTD  
 GEOPHYSIQUE LTEE

Job  
 0809

Surveyed : 24/3/8  
 Reduced : 22/4/8  
 Plotted : 28/4/8



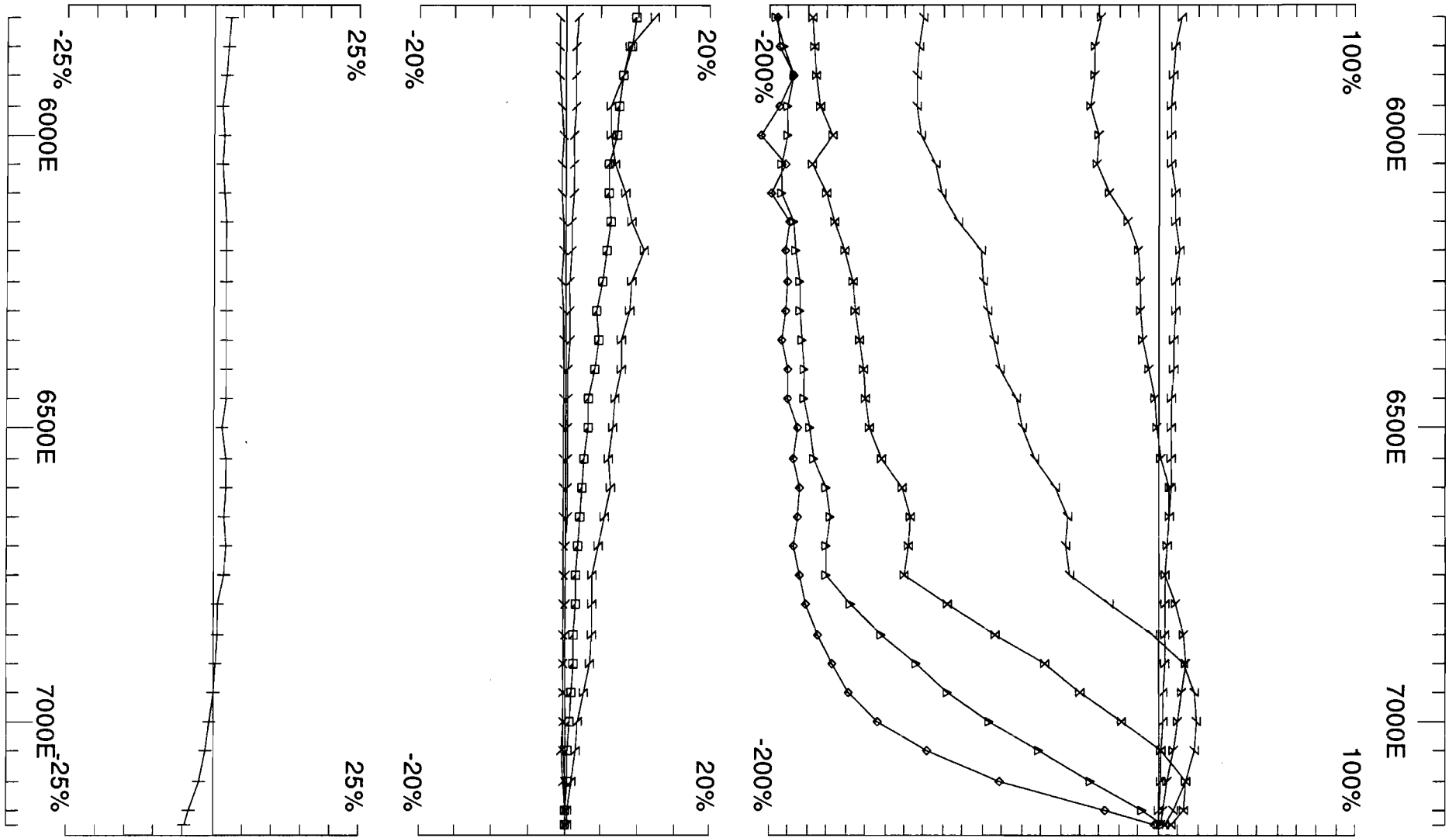
Loop: 5	Secondary, (Chn - Ch1)/ Hp	UTEM Survey at: Montcalm Property	
Line: 9300N	Contin. Norm at depth of 0 m	For: International Nickel Ventures Ltd.	
Compt: Hz	Base Freq. 30.974 Hz	<b>LAMONTAGNE</b> GEOPHYSICS LTD	Job 0809
		GEOPHYSIQUE LTEE	Surveyed : 24/3/8 Reduced : 22/4/8 Plotted : 28/4/8

# Loop 6

## Hz Profiles (continuous norm)

@ 30.974 Hz

	<b>Line</b>	<b>coverage</b>	
Loop 6	Line 8500 N	5800 E - 7175 E	1375 m
	Line 8600 N	5800 E - 7175 E	1375 m
	Line 8700 N	5800 E - 7175 E	1375 m
	Line 8800 N	5800 E - 7175 E	1375 m
	Line 8900 N	5800 E - 7175 E	1375 m
	Line 9000 N	5800 E - 7150 E	1350 m
	Line 9100 N	5800 E - 7150 E	1350 m
	Line 9200 N	5800 E - 7175 E	1375 m
	Line 9300 N	5800 E - 7175 E	1375 m
	Line 9400 N	5800 E - 7175 E	1375 m

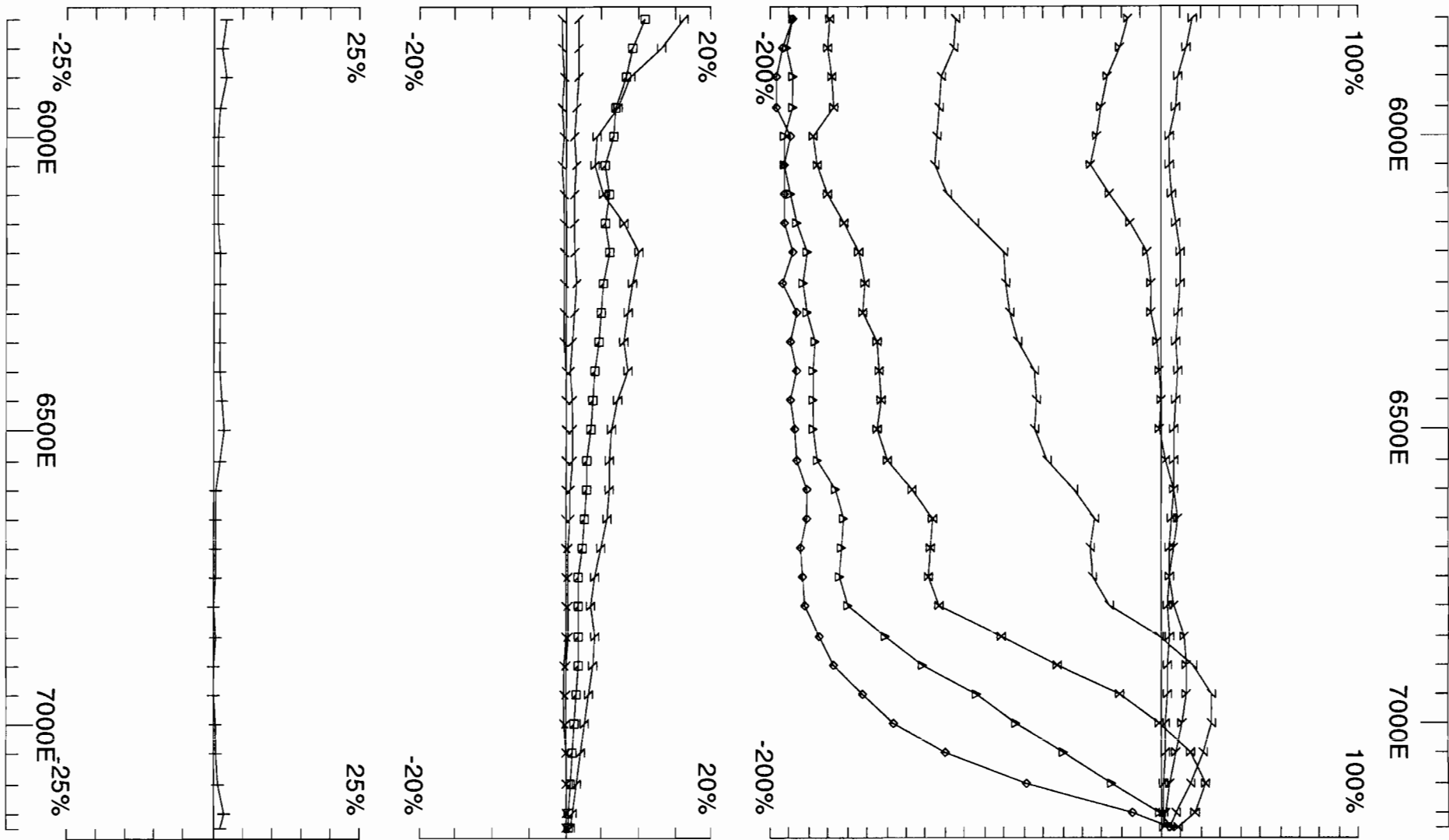


Loop: 6  
 Line: 8500N  
 Compt: Hz

Secondary, (Chn - Ch1)/|Hp|  
 Contin. Norm at depth of 0 m  
 Base Freq. 30.974 Hz

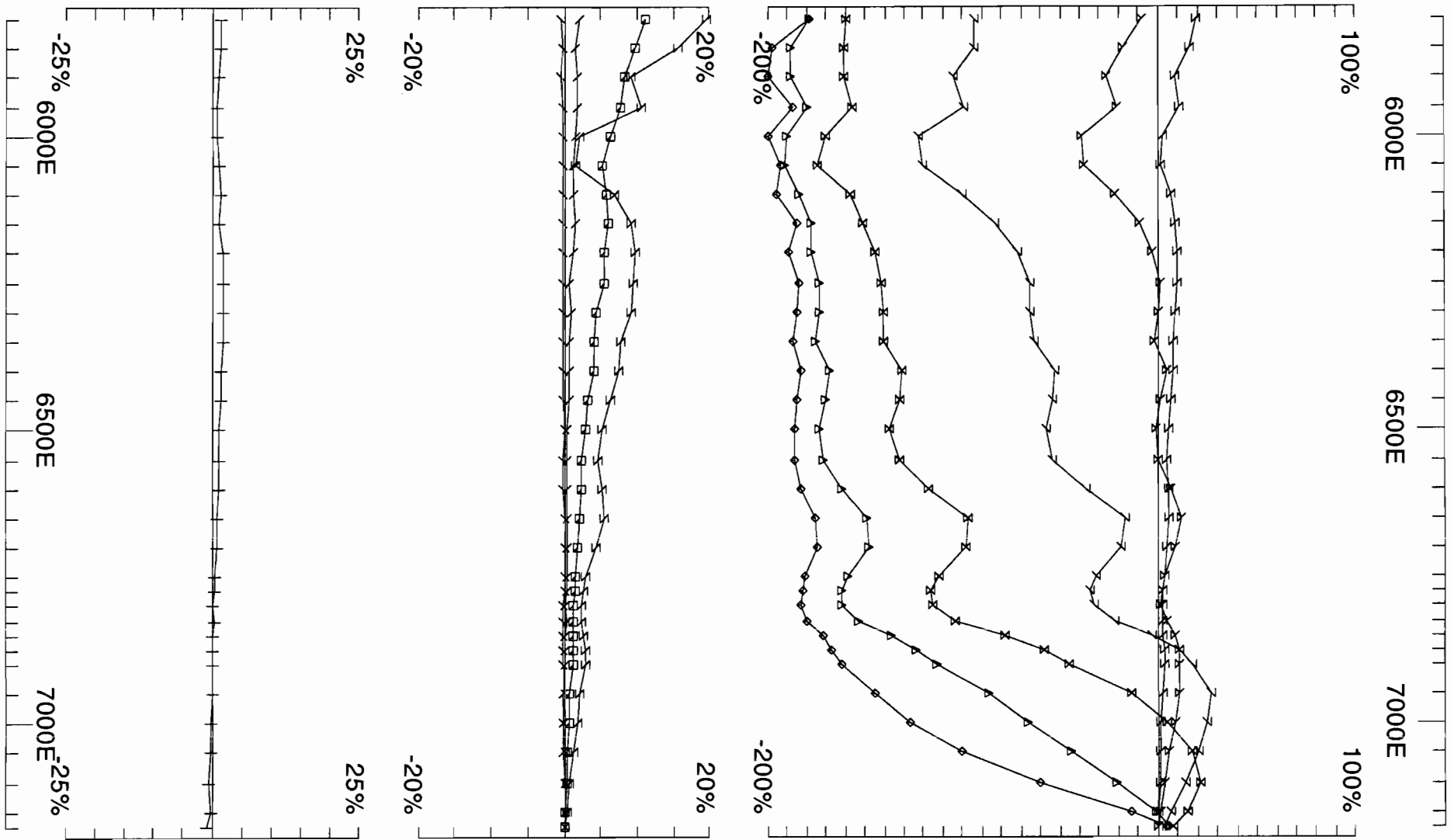
UTEM Survey at: Montcalm Property  
 For: International Nickel Ventures Ltd.

**LAMONTAGNE** GEOPHYSICS LTD  
 GEOPHYSIQUE LTEE Job 0809  
 Surveyed : 27/3/9  
 Reduced : 22/4/8  
 Plotted : 29/4/8

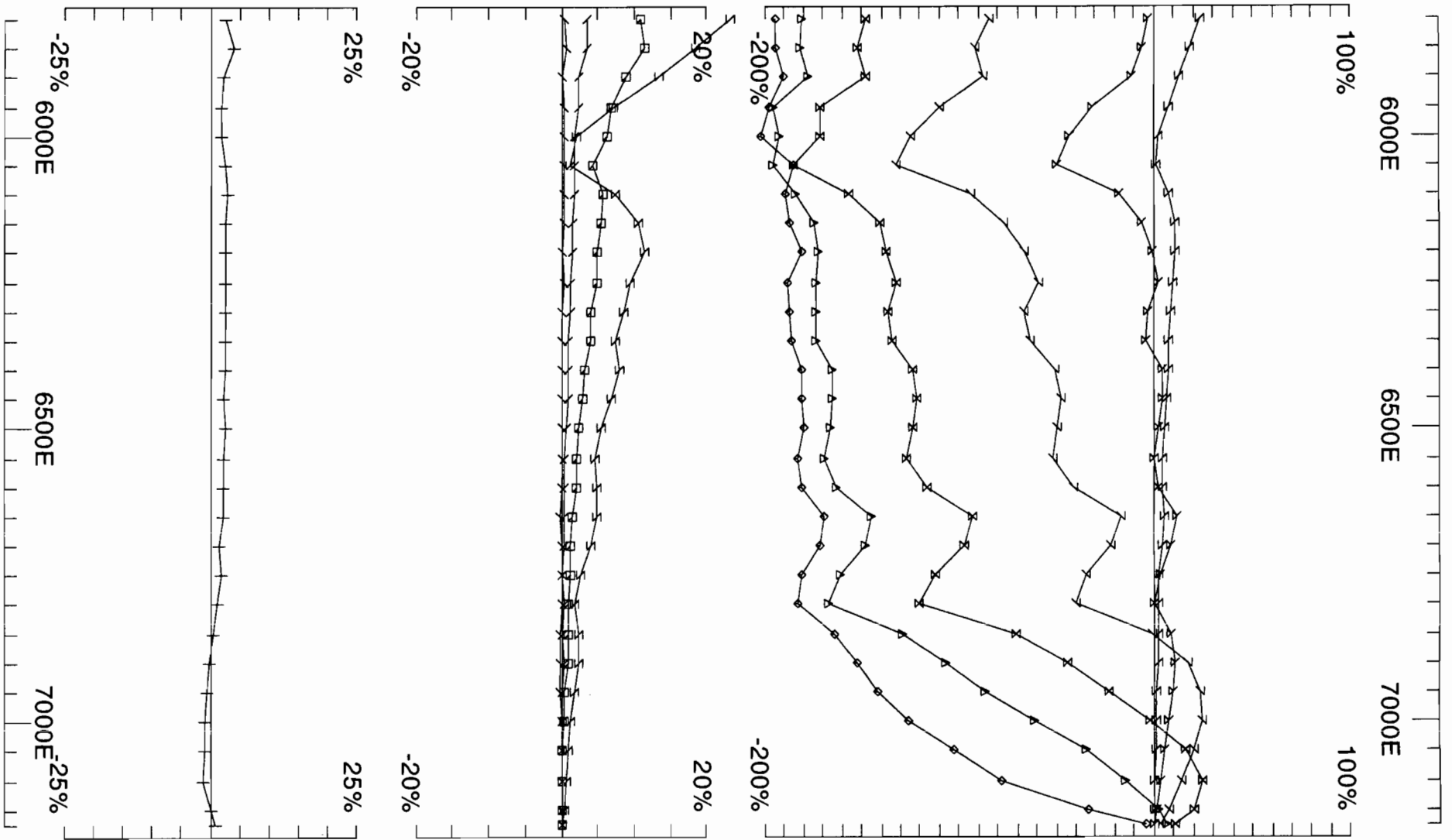


Loop: 6 Line: 8600N Compt: Hz	Secondary, (Chn - Ch1)/ Hp  Contin. Norm at depth of 0 m Base Freq. 30.974 Hz	<b>UTEM Survey at: Montcalm Property</b> <b>For: International Nickel Ventures Ltd.</b> <b>LAMONTAGNE</b> GEOPHYSICS LTD GEOPHYSIQUE LTEE Job 0809 Surveyed : 27/3/9 Reduced : 22/4/8 Plotted : 29/4/8
-------------------------------------	---	--

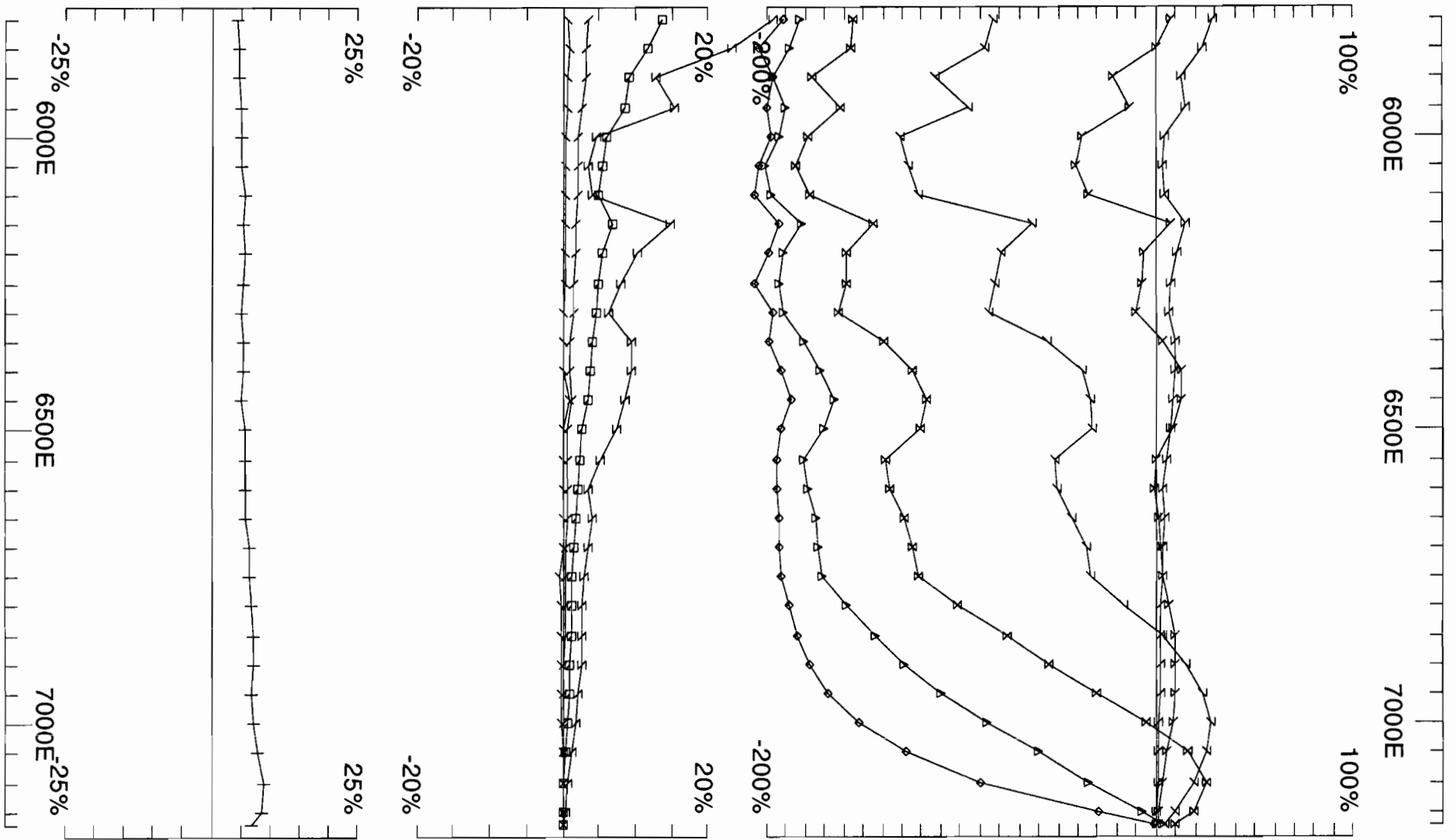




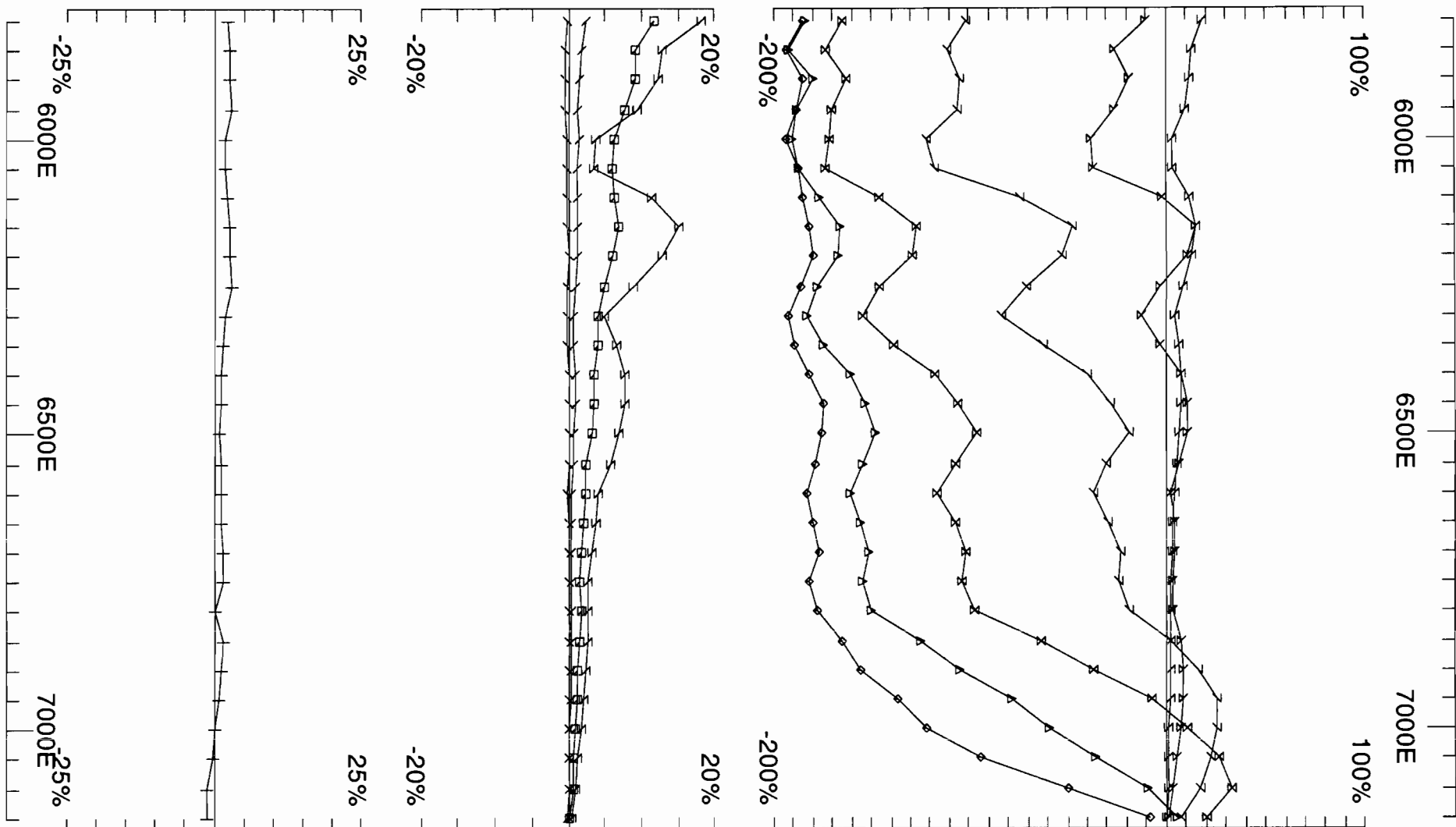
Loop: 6	Secondary, (Chn - Ch1)/ Hp	UTEM Survey at: Montcalm Property	
Line: 8700N	Contin. Norm at depth of 0 m	For: International Nickel Ventures Ltd.	
Compt: Hz	Base Freq. 30.974 Hz	<b>LAMONTAGNE</b> GEOPHYSICS LTD	Job 0809
		GEOPHYSIQUE LTEE	Surveyed : 27/3/9 Reduced : 22/4/8 Plotted : 29/4/8



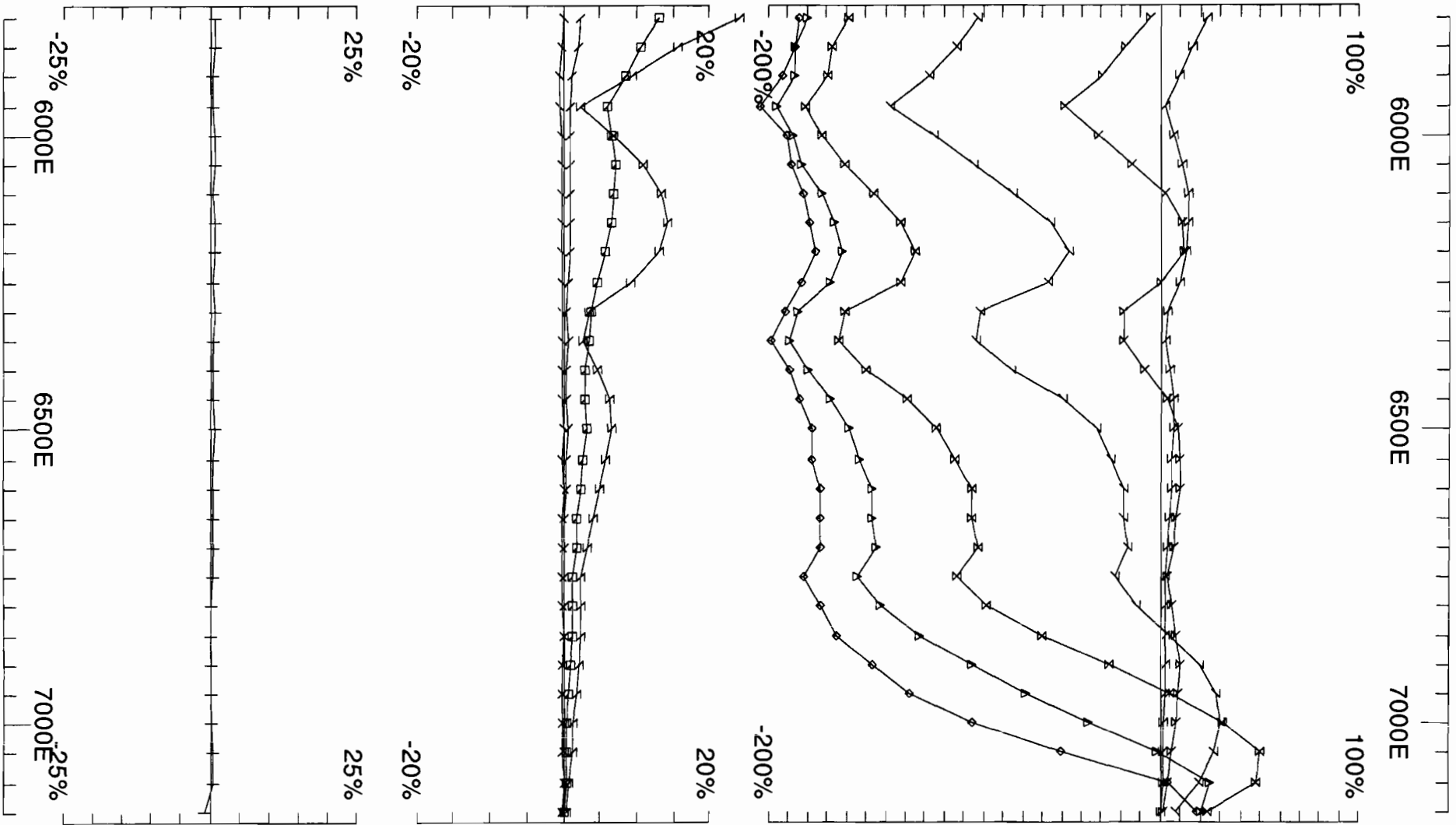
Loop: 6	Secondary, (Chn - Ch1)/ Hp	UTEM Survey at: Montcalm Property	
Line: 8800N	Contin. Norm at depth of 0 m	For: International Nickel Ventures Ltd.	
Compt: Hz	Base Freq. 30.974 Hz	<b>LAMONTAGNE</b>	GEOPHYSICS LTD GEOPHYSIQUE LTEE



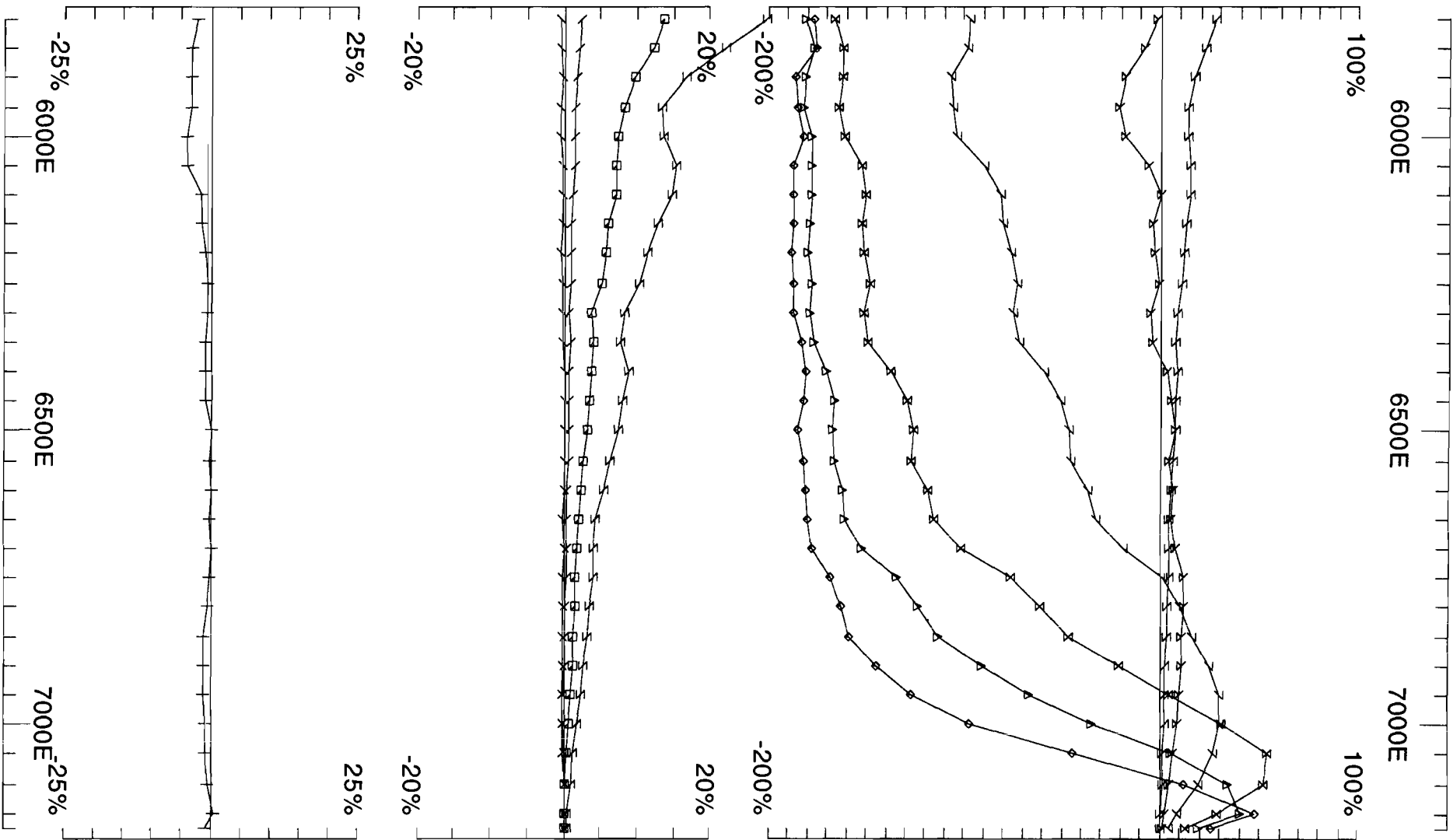
Loop: 6	Secondary, (Chn - Ch1)/ Hp	UTEM Survey at: Montcalm Property	
Line: 8900N	Contin. Norm at depth of 0 m	For: International Nickel Ventures Ltd.	
Compt: Hz	Base Freq. 30.974 Hz	<b>LAMONTAGNE</b> GEOPHYSICS LTD	Job 0809
		GEOPHYSIQUE LTEE	Surveyed : 29/3/8 Reduced : 22/4/8 Plotted : 29/4/8



Loop: 6	Secondary, (Chn - Ch1)/ Hp	UTEM Survey at: Montcalm Property	
Line: 9000N	Contin. Norm at depth of 0 m	For: International Nickel Ventures Ltd.	
Compt: Hz	Base Freq. 30.974 Hz	<b>LAMONTAGNE</b> GEOPHYSICS LTD	Job 0809
		GEOPHYSIQUE LTEE	Surveyed : 28/3/8 Reduced : 22/4/8 Plotted : 29/4/8



Loop: 6	Secondary, (Chn - Ch1)/ Hp	UTEM Survey at: Montcalm Property	
Line: 9100N	Contin. Norm at depth of 0 m	For: International Nickel Ventures Ltd.	
Compt: Hz	Base Freq. 30.974 Hz	<b>LAMONTAGNE</b> GEOPHYSICS LTD	Job 0809
		GEOPHYSIQUE LTEE	Surveyed : 28/3/8 Reduced : 22/4/8 Plotted : 29/4/8

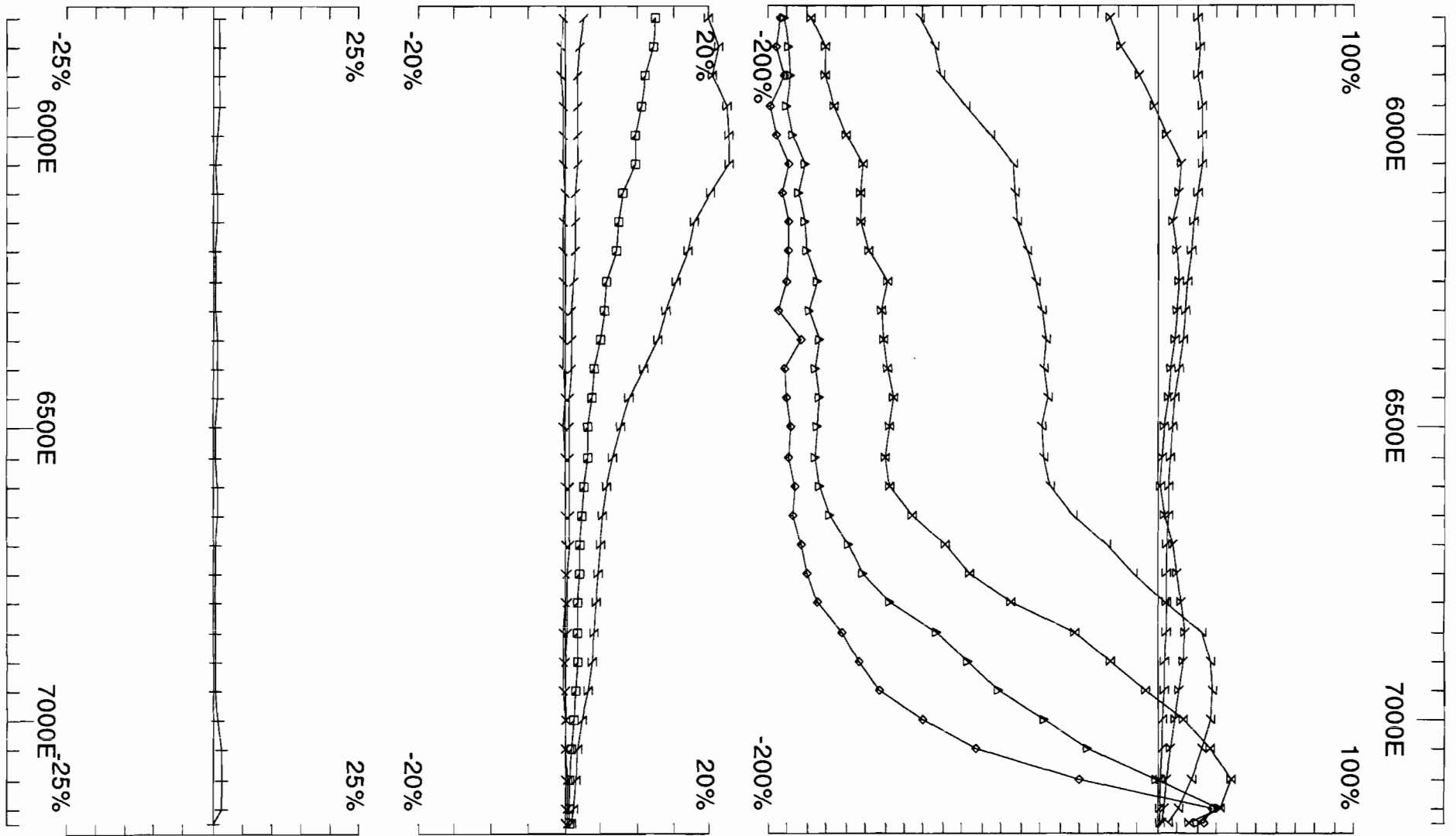


Loop: 6  
 Line: 9200N  
 Compt: Hz

Secondary, (Chn - Ch1)/|Hp|  
 Contin. Norm at depth of 0 m  
 Base Freq. 30.974 Hz

UTEM Survey at: Montcalm Property  
 For: International Nickel Ventures Ltd.

**LAMONTAGNE** GEOPHYSICS LTD  
 GEOPHYSIQUE LTEE Job 0809  
 Surveyed : 26/3/8  
 Reduced : 22/4/8  
 Plotted : 29/4/8

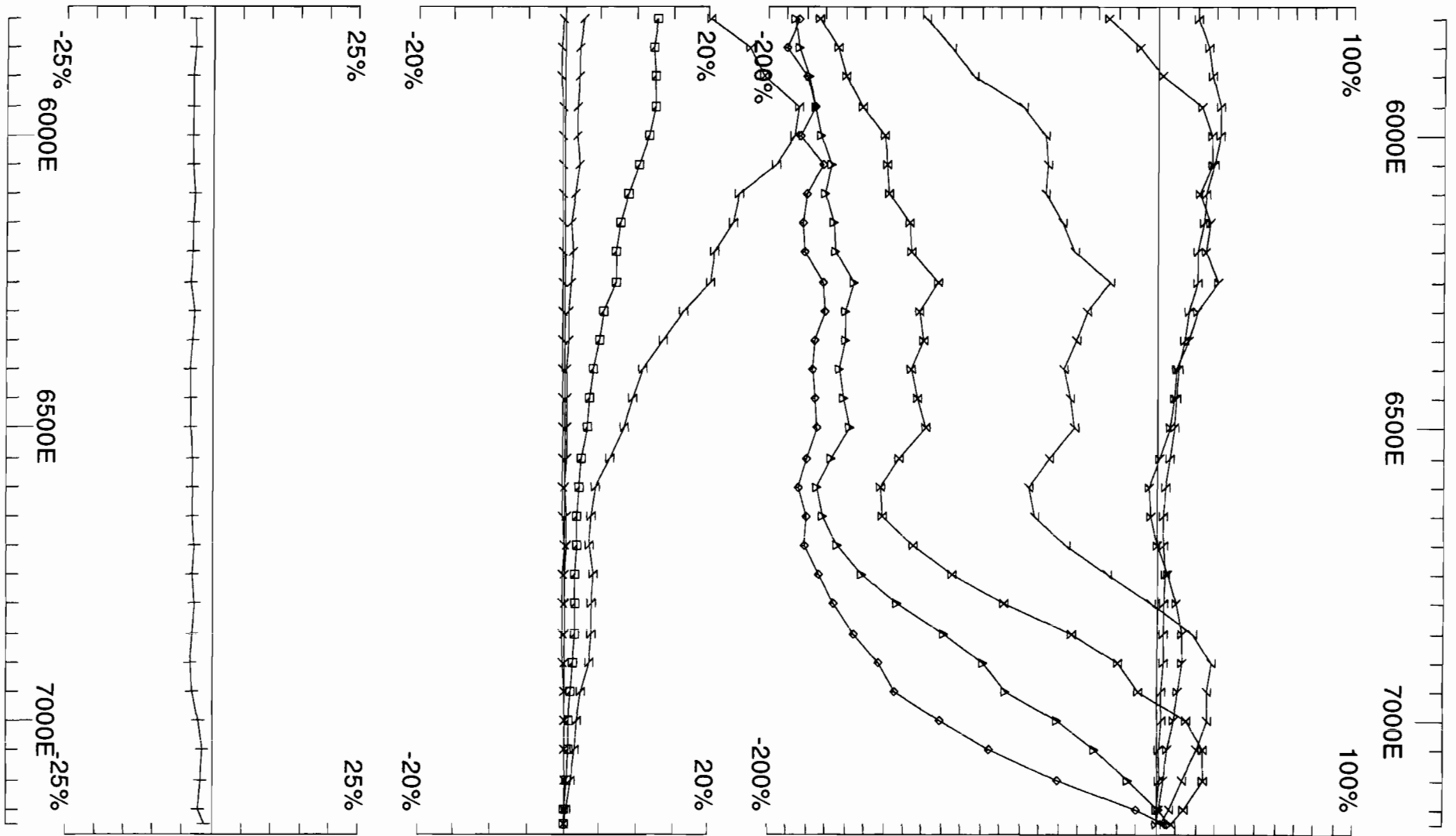


Loop: 6  
 Line: 9300N  
 Compt: Hz

Secondary, (Chn - Ch1)/|Hp|  
 Contin. Norm at depth of 0 m  
 Base Freq. 30.974 Hz

UTEM Survey at: Montcalm Property  
 For: International Nickel Ventures Ltd.

**LAMONTAGNE** GEOPHYSICS LTD  
 GEOPHYSIQUE LTEE Job 0809  
 Surveyed : 26/3/8  
 Reduced : 22/4/8  
 Plotted : 29/4/8



Loop: 6  
 Line: 9400N  
 Compt: Hz

Secondary, (Chn - Ch1)/|Hp|  
 Contin. Norm at depth of 0 m  
 Base Freq. 30.974 Hz

UTEM Survey at: Montcalm Property  
 For: International Nickel Ventures Ltd.

**LAMONTAGNE**

GEOPHYSICS LTD  
 GEOPHYSIQUE LTEE

Job  
 0809

Surveyed : 26/3/8  
 Reduced : 22/4/8  
 Plotted : 29/4/8

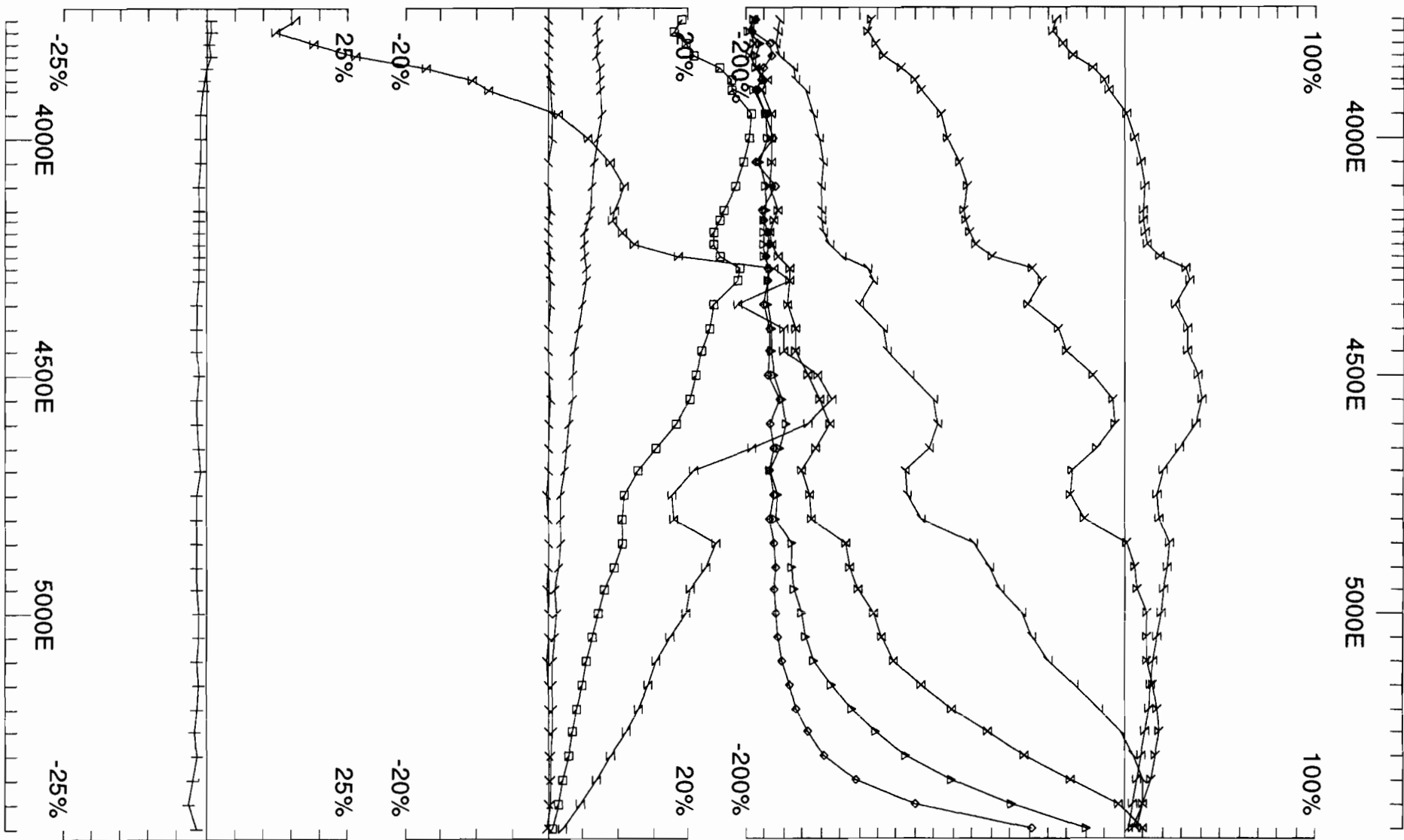


# Loop 7 West

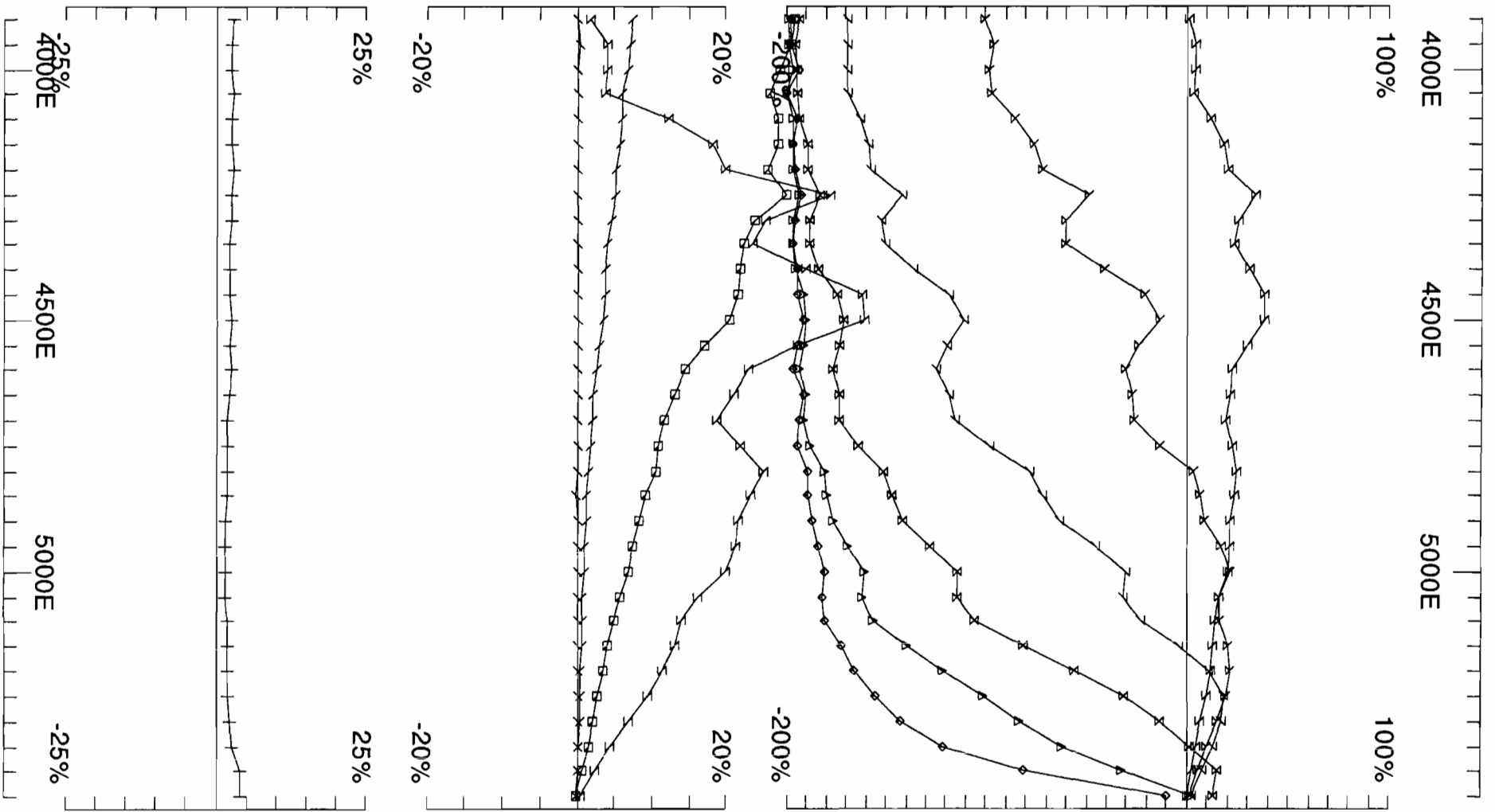
Hz Profiles  
(continuous norm)

@ 30.974 Hz

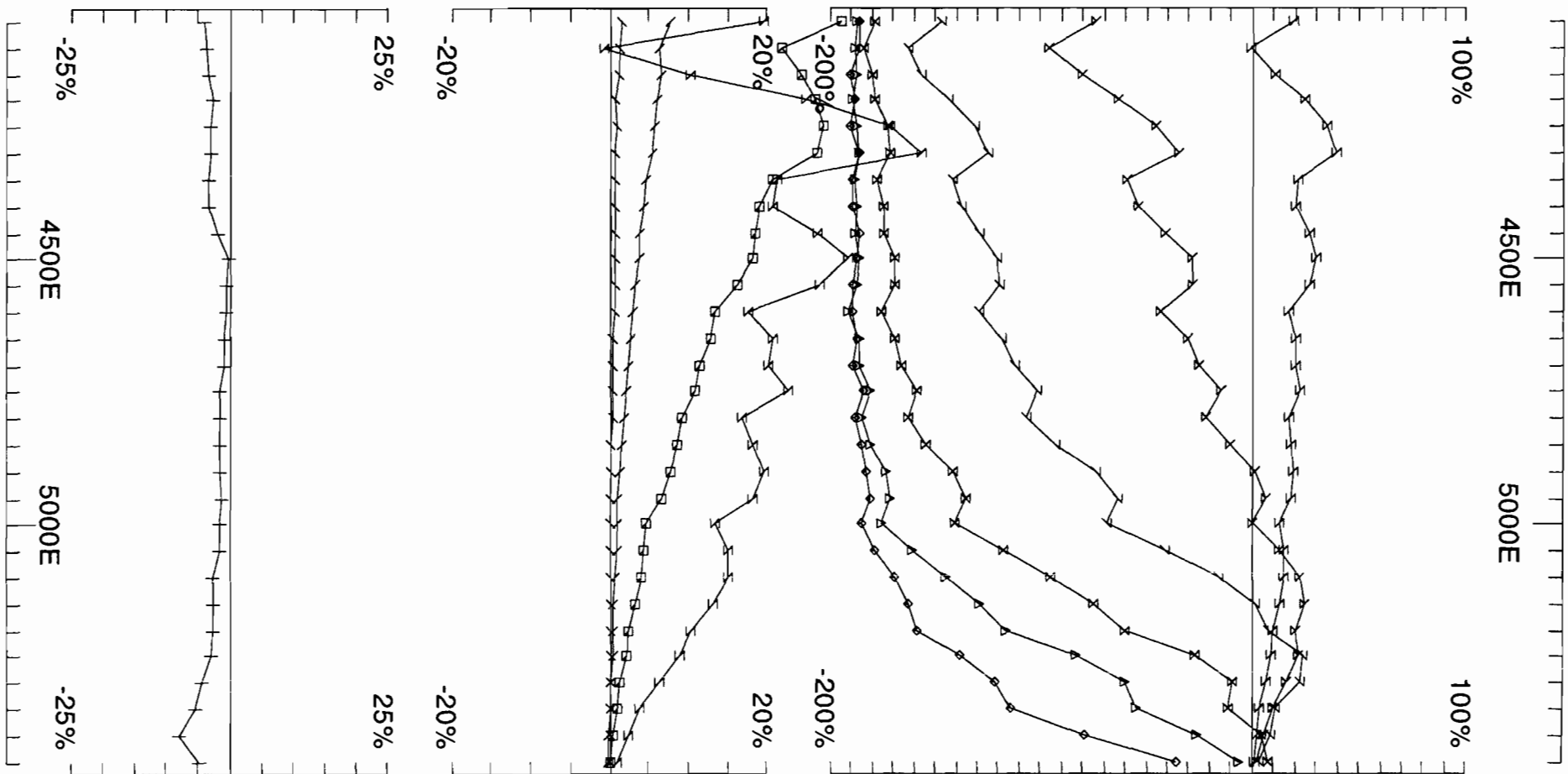
	<b>Line</b>	<b>coverage</b>	
Loop 7West	Line 9200 N	3750 E - 5450 E	1700 m
	Line 9300 N	3900 E - 5450 E	1550 m
	Line 9400 N	4050 E - 5450 E	1400 m
	Line 9500 N	5025 E - 5450 E	425 m
	Line 9600 N	4300 E - 5450 E	1150 m
	Line 9700 N	4550 E - 5450 E	900 m
	Line 9800 N	4650 E - 5450 E	800 m
	Line 9900 N	4800 E - 5450 E	650 m
	Line 0 N	4750 E - 5450 E	700 m
	Line 100 N	5000 E - 5450 E	450 m



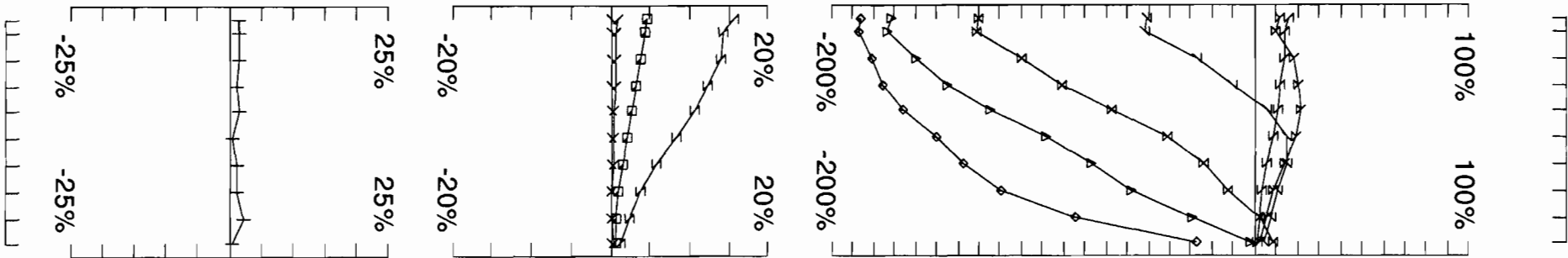
Loop: 7 Line: 9200N Compt: Hz	Secondary, (Chn - Ch1)/ Hp  Contin. Norm at depth of 0 m Base Freq. 30.974 Hz	UTEM Survey at: Montcalm Property For: International Nickel Ventures Ltd. <b>LAMONTAGNE</b> GEOPHYSICS LTD Job GEOPHYSIQUE LTEE 0809		Surveyed : 30/3/8 Reduced : 22/4/8 Plotted : 29/4/8
-------------------------------------	---	---	--	---



Loop: 7 Line: 9300N Compt: Hz	Secondary, (Chn - Ch1)/ Hp  Contin. Norm at depth of 0 m Base Freq. 30.974 Hz	UTEM Survey at: Montcalm Property For: International Nickel Ventures Ltd. <b>LAMONTAGNE</b>	GEOPHYSICS LTD GEOPHYSIQUE LTEE Job 0809	Surveyed : 30/3/8 Reduced : 22/4/8 Plotted : 29/4/8
-------------------------------------	---	---	--	---



Loop: 7	Secondary, (Chn - Ch1)/ Hp	UTEM Survey at: Montcalm Property	
Line: 9400N	Contin. Norm at depth of 0 m	For: International Nickel Ventures Ltd.	
Compt: Hz	Base Freq. 30.974 Hz	<b>LAMONTAGNE</b> GEOPHYSICS LTD	Job 0809
		GEOPHYSIQUE LTEE	Surveyed : 2/4/8 Reduced : 22/4/8 Plotted : 29/4/8



Loop: 7  
 Line: 9500N  
 Compt: Hz

Secondary, (Chn - Ch1)/|Hp|  
 Contin. Norm at depth of 0 m  
 Base Freq. 30.974 Hz

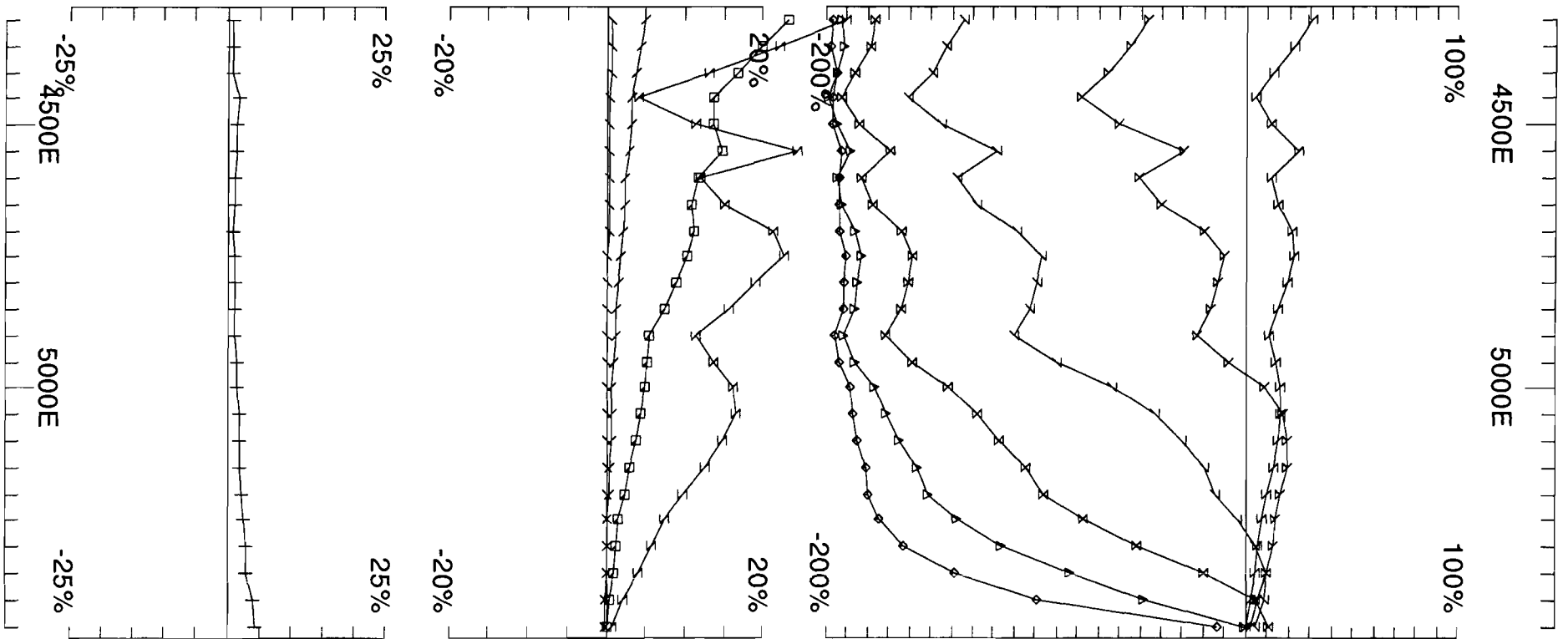
UTEM Survey at: Montcalm Property  
 For: International Nickel Ventures Ltd.

**LAMONTAGNE**

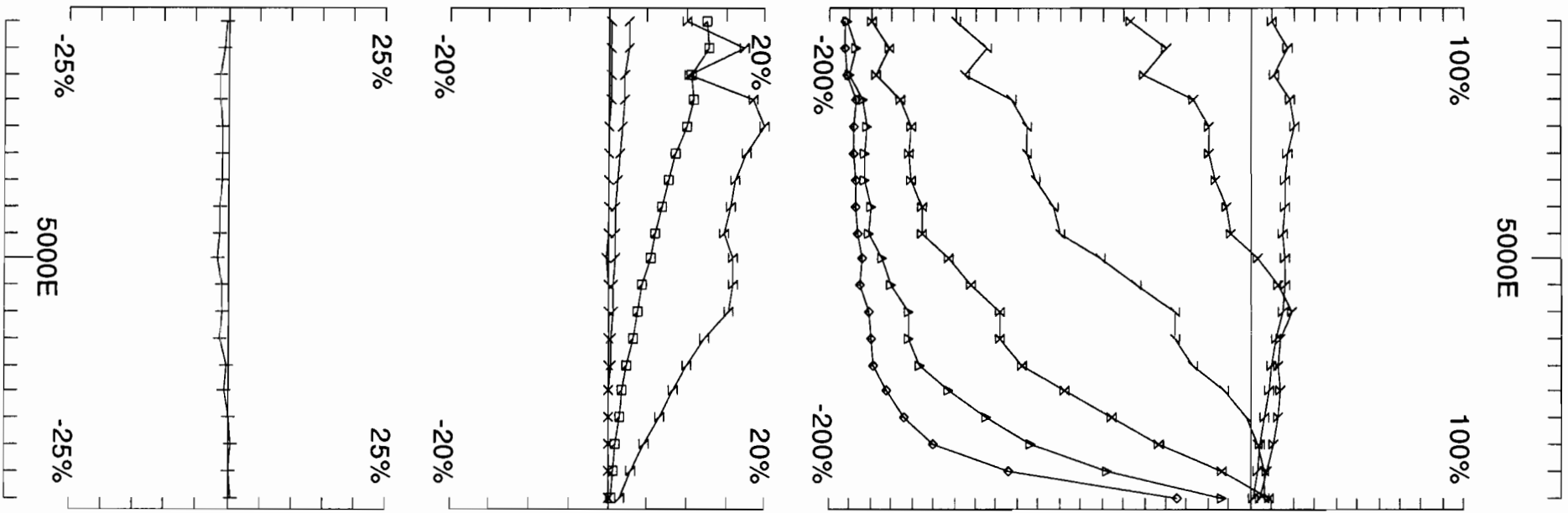
GEOPHYSICS LTD  
 GEOPHYSIQUE LTEE

Job  
 0809

Surveyed : 2/4/8  
 Reduced : 22/4/8  
 Plotted : 29/4/8



Loop: 7	Secondary, (Chn - Ch1)/ Hp	UTEM Survey at: Montcalm Property	
Line: 9600N	Contin. Norm at depth of 0 m	For: International Nickel Ventures Ltd.	
Compt: Hz	Base Freq. 30.974 Hz	<b>LAMONTAGNE</b> GEOPHYSICS LTD	Job 0809
		GEOPHYSIQUE LTEE	Surveyed : 29/3/8 Reduced : 22/4/8 Plotted : 29/4/8



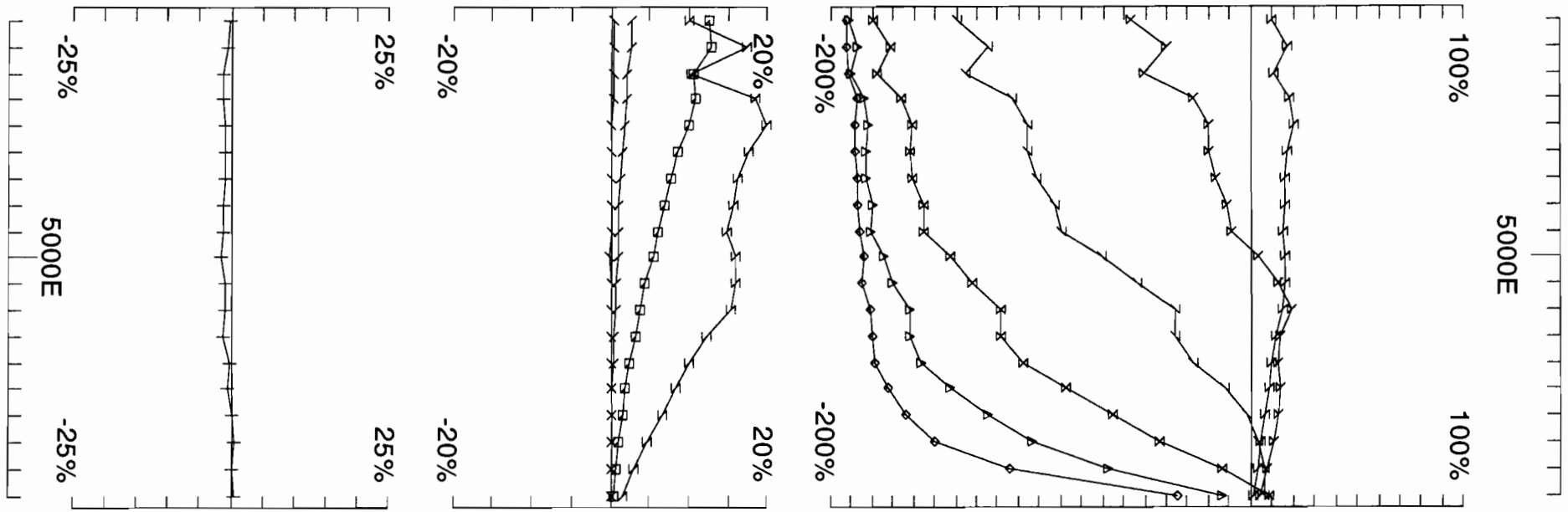
Loop: 7  
 Line: 9700N  
 Compt: Hz

Secondary, (Chn - Ch1)/|Hp|  
 Contin. Norm at depth of 0 m  
 Base Freq. 30.974 Hz

UTEM Survey at: Montcalm Property  
 For: International Nickel Ventures Ltd.

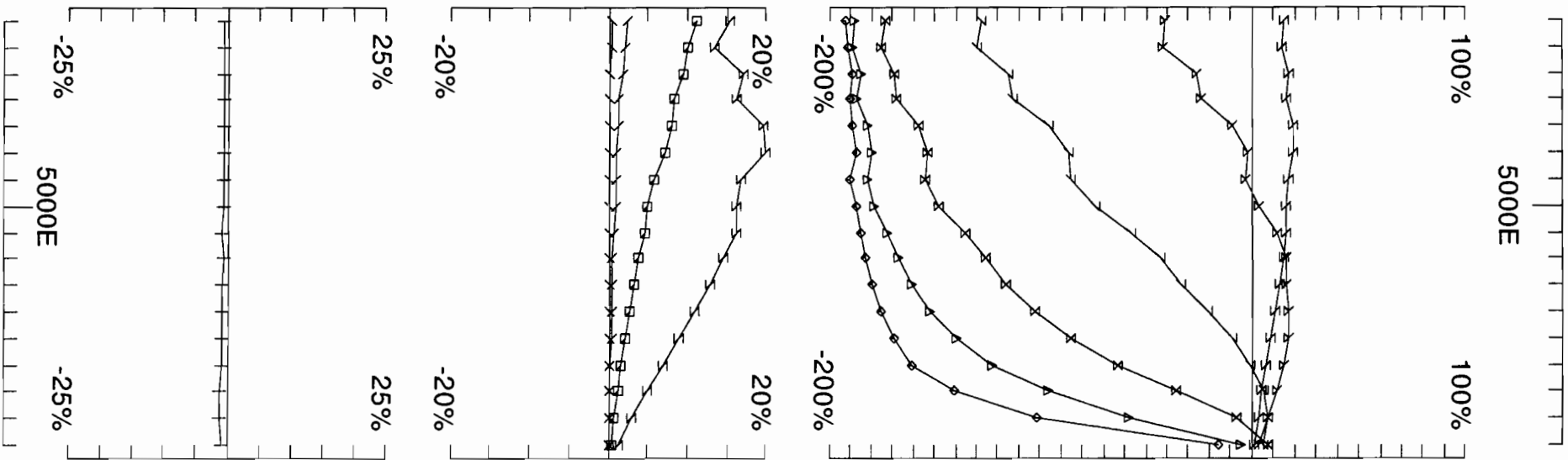
**LAMONTAGNE** GEOPHYSICS LTD  
 GEOPHYSIQUE LTEE 0809

Job 0809  
 Surveyed : 29/3/8  
 Reduced : 22/4/8  
 Plotted : 29/4/8

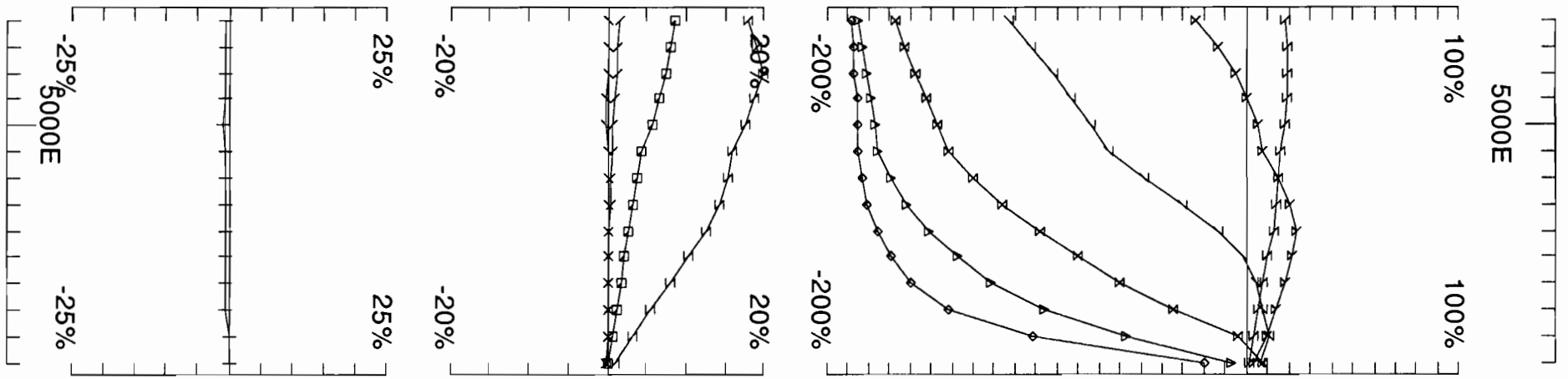


Loop: 7 Line: 9700N Compt: Hz	Secondary, (Chn - Ch1)/ Hp  Contin. Norm at depth of 0 m Base Freq. 30.974 Hz	UTEM Survey at: Montcalm Property For: International Nickel Ventures Ltd. <b>LAMONTAGNE</b>	GEOPHYSICS LTD GEOPHYSIQUE LTEE Job 0809	Surveyed : 29/3/8 Reduced : 22/4/8 Plotted : 29/4/8
-------------------------------------	---	---	--	---





Loop: 7	Secondary, (Chn - Ch1)/ Hp	UTEM Survey at: Montcalm Property	
Line: 9800N	Contin. Norm at depth of 0 m	For: International Nickel Ventures Ltd.	
Compt: Hz	Base Freq. 30.974 Hz	<b>LAMONTAGNE</b>	GEOPHYSICS LTD Job 0809
			Surveyed : 29/3/8 Reduced : 22/4/8 Plotted : 29/4/8

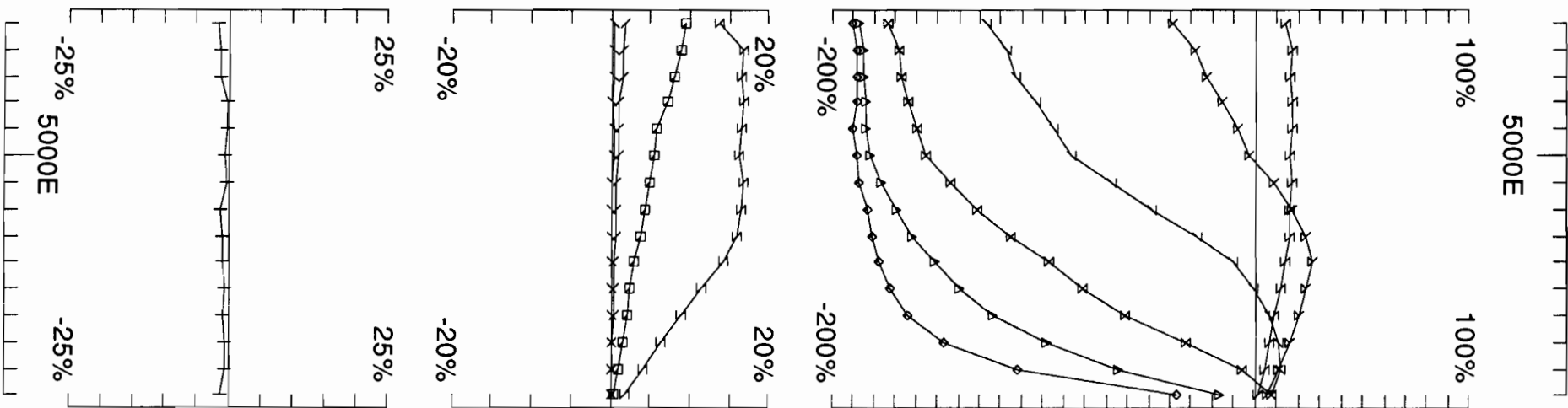


Loop: 7  
 Line: 9900N  
 Compt: Hz

Secondary, (Chn - Ch1)/|Hp|  
 Contin. Norm at depth of 0 m  
 Base Freq. 30.974 Hz

UTEM Survey at: Montcalm Property  
 For: International Nickel Ventures Ltd.

**LAMONTAGNE** GEOPHYSICS LTD  
 GEOPHYSIQUE LTEE Job 0809  
 Surveyed : 29/3/8  
 Reduced : 22/4/8  
 Plotted : 29/4/8



Loop: 7  
 Line: 0N  
 Compt: Hz

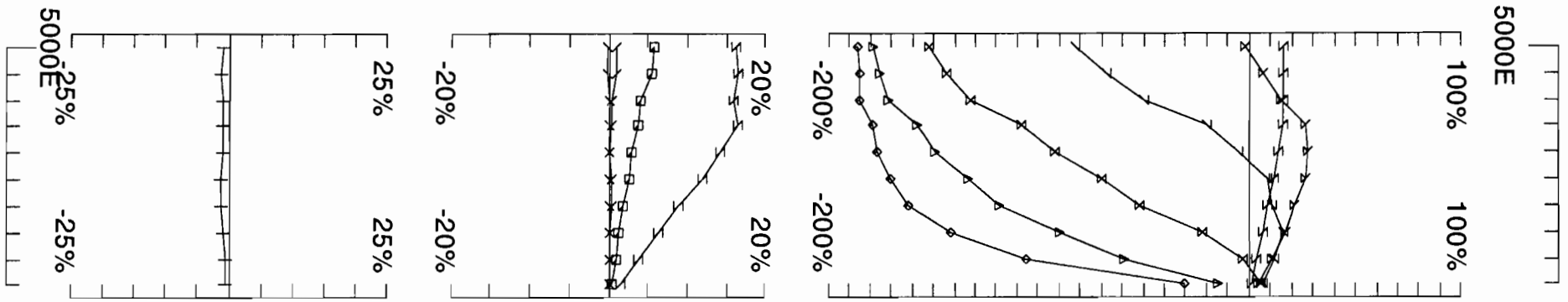
Secondary, (Chn - Ch1)/|Hp|  
 Contin. Norm at depth of 0 m  
 Base Freq. 30.974 Hz

UTEM Survey at: Montcalm Property  
 For: International Nickel Ventures Ltd.

**LAMONTAGNE**

GEOPHYSICS LTD  
 GEOPHYSIQUE LTEE 0809

Job  
 Surveyed : 29/3/8  
 Reduced : 22/4/8  
 Plotted : 29/4/8



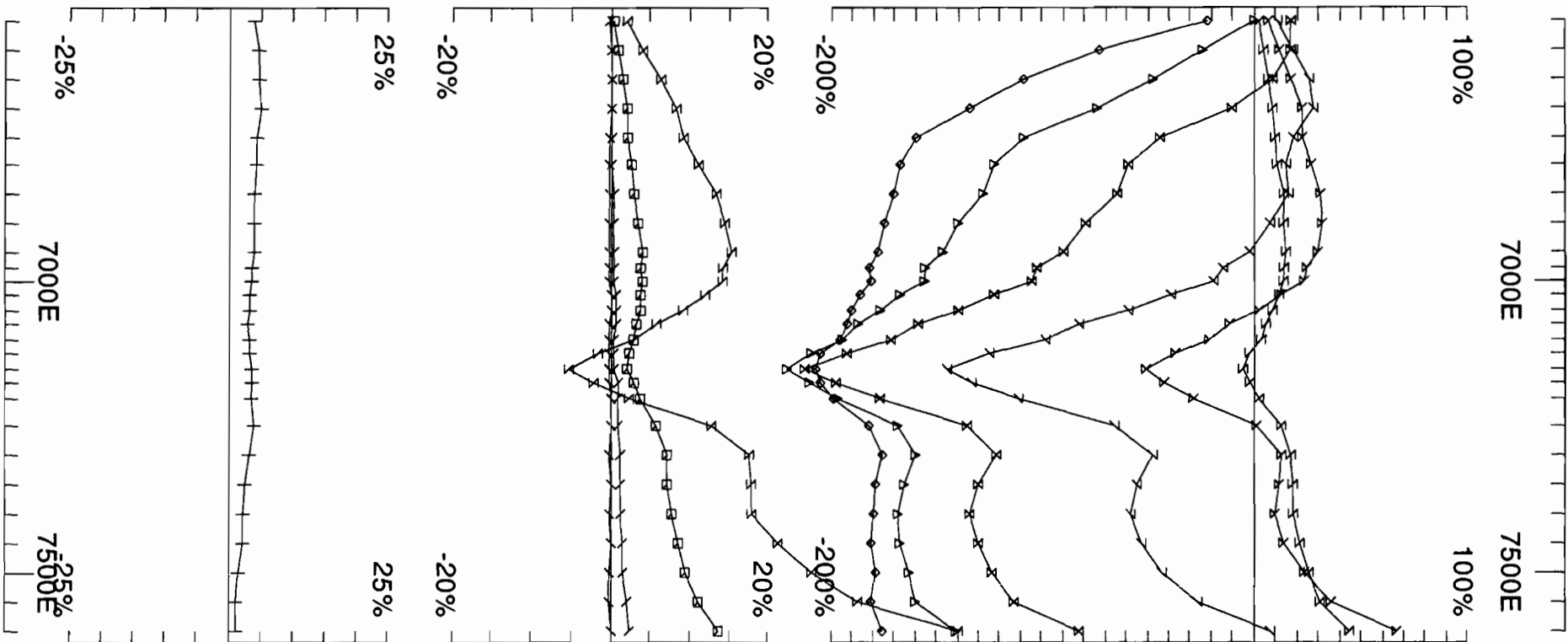
Loop: 7	Secondary, (Chn - Ch1)/ Hp	UTEM Survey at: Montcalm Property	
Line: 100N	Contin. Norm at depth of 0 m	For: International Nickel Ventures Ltd.	
Compt: Hz	Base Freq. 30.974 Hz	<b>LAMONTAGNE</b>	GEOPHYSICS LTD    Job GEOPHYSIQUE LTEE    0809 Surveyed : 29/3/8 Reduced : 22/4/8 Plotted : 29/4/8

# Loop 7 East

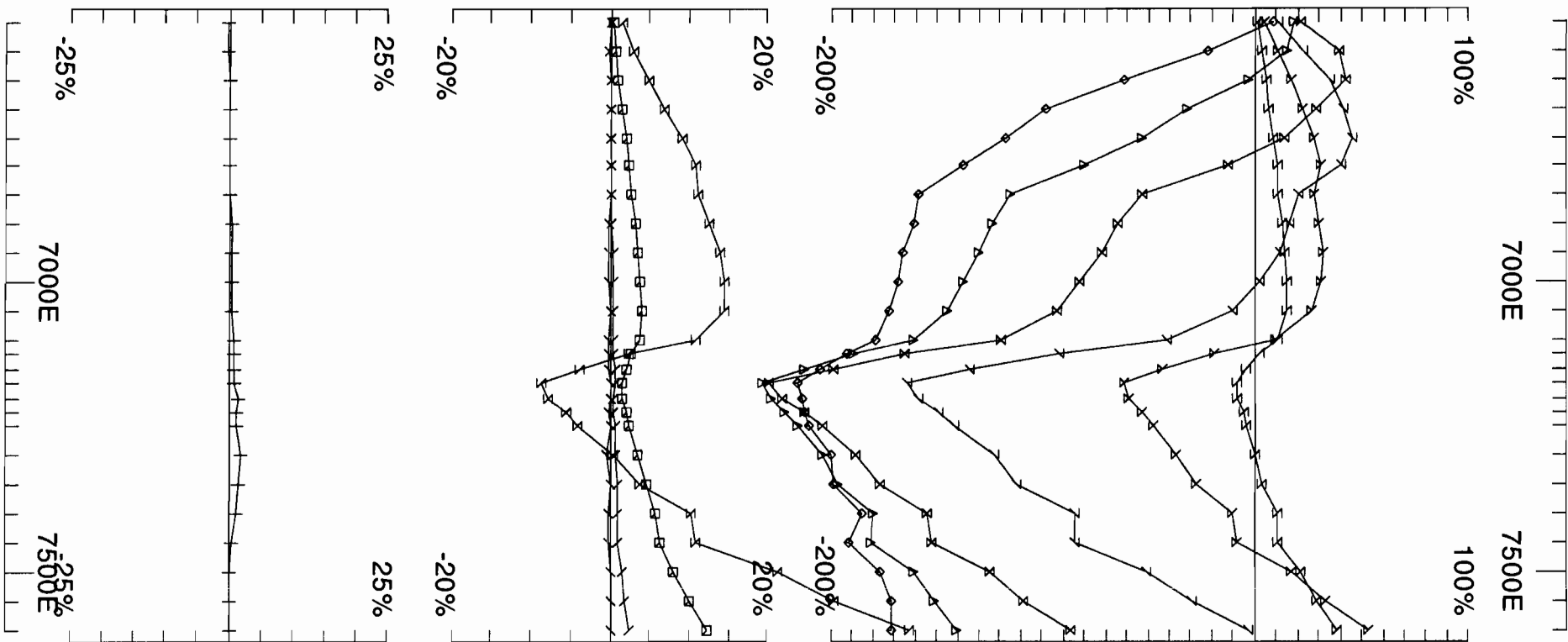
Hz Profiles  
(continuous norm)

@ 30.974 Hz

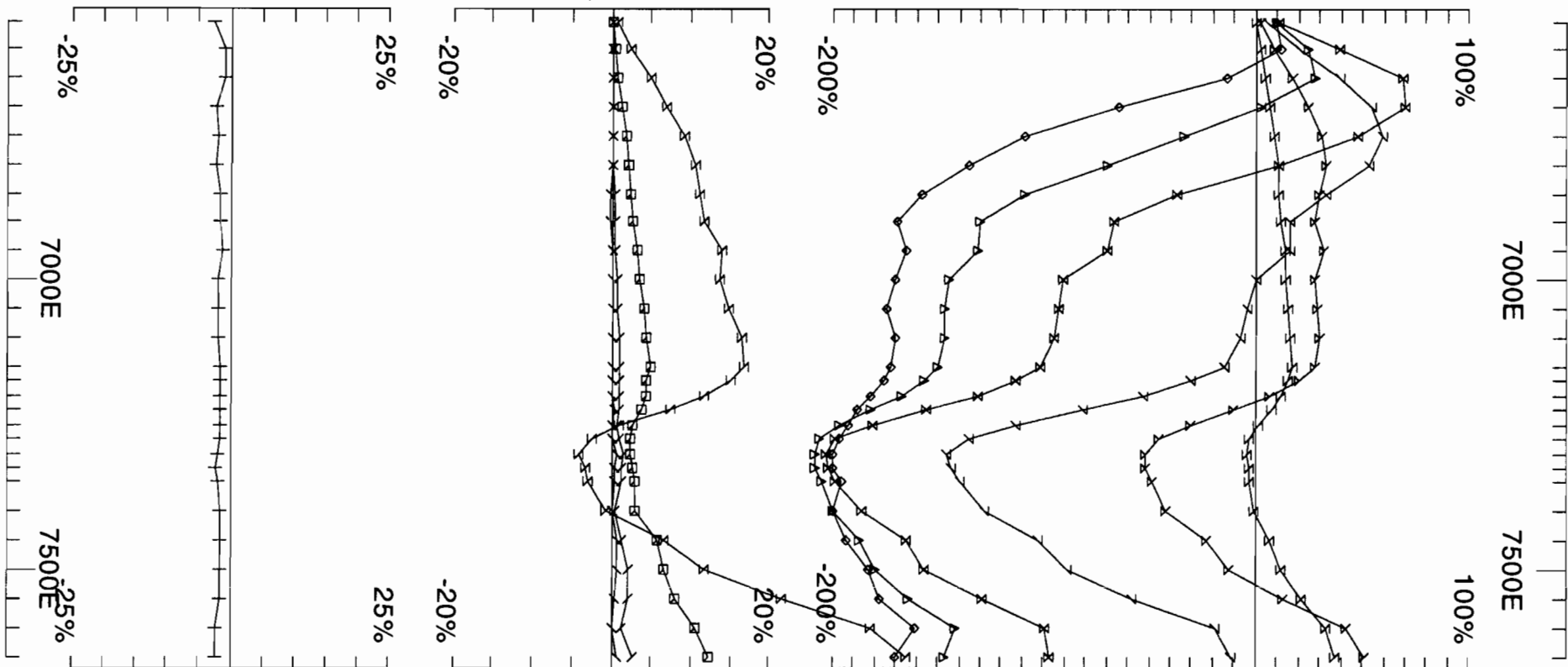
	Line	coverage	
Loop 7East	Line 9200 N	6550 E - 7600 E	1050 m
	Line 9300 N	6550 E - 7600 E	1050 m
	Line 9400 N	6550 E - 7650 E	1100 m
	Line 9500 N	6550 E - 7650 E	1100 m
	Line 9600 N	6525 E - 7650 E	1125 m
	Line 9700 N	6525 E - 7650 E	1125 m
	Line 9800 N	6525 E - 7600 E	1075 m
	Line 9900 N	6525 E - 7600 E	1075 m
	Line 0 N	6525 E - 8000 E	1475 m
	Line 100 N	6525 E - 8000 E	1475 m
	Line 200 N	6500 E - 8050 E	1550 m
	Line 300 N	6525 E - 8000 E	1475 m
	Line 400 N	6550 E - 8000 E	1450 m
	Line 500 N	6525 E - 8000 E	1475 m
	Line 600 N	6525 E - 8000 E	1475 m
	Line 700 N	6525 E - 8000 E	1475 m



Loop: 7	Secondary, (Chn - Ch1)/ Hp	UTEM Survey at: Montcalm Property	
Line: 9200N	Contin. Norm at depth of 0 m	For: International Nickel Ventures Ltd.	
Compt: Hz	Base Freq. 30.974 Hz	<b>LAMONTAGNE</b> GEOPHYSICS LTD	Job 0809
		GEOPHYSIQUE LTEE	Surveyed : 31/3/8 Reduced : 22/4/8 Plotted : 29/4/8



Loop: 7	Secondary, (Chn - Ch1)/ Hp	UTEM Survey at: Montcalm Property	
Line: 9300N	Contin. Norm at depth of 0 m	For: International Nickel Ventures Ltd.	
Compt: Hz	Base Freq. 30.974 Hz	<b>LAMONTAGNE</b> GEOPHYSICS LTD	Job 0809
		GEOPHYSIQUE LTEE	Surveyed : 31/3/8 Reduced : 22/4/8 Plotted : 29/4/8



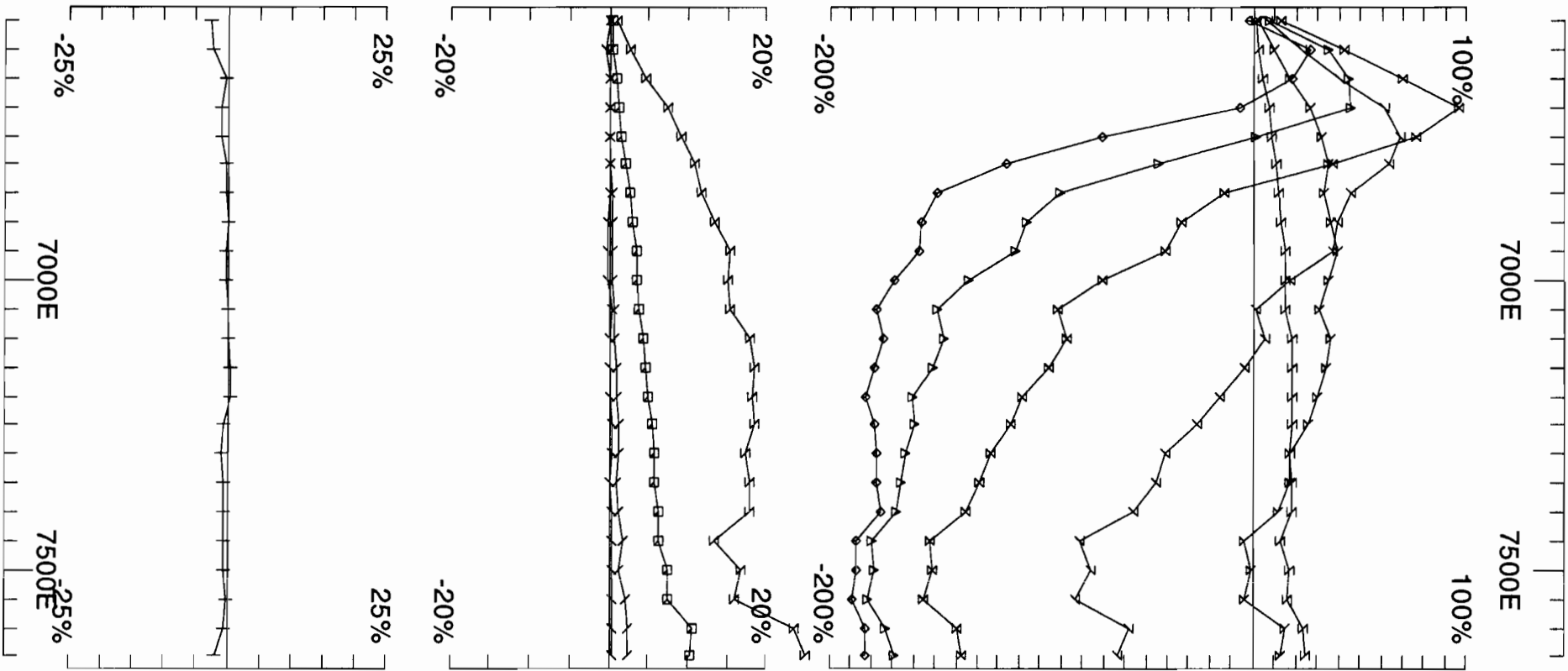
Loop: 7  
 Line: 9400N  
 Compt: Hz

Secondary, (Chn - Ch1)/|Hp|  
 Contin. Norm at depth of 0 m  
 Base Freq. 30.974 Hz

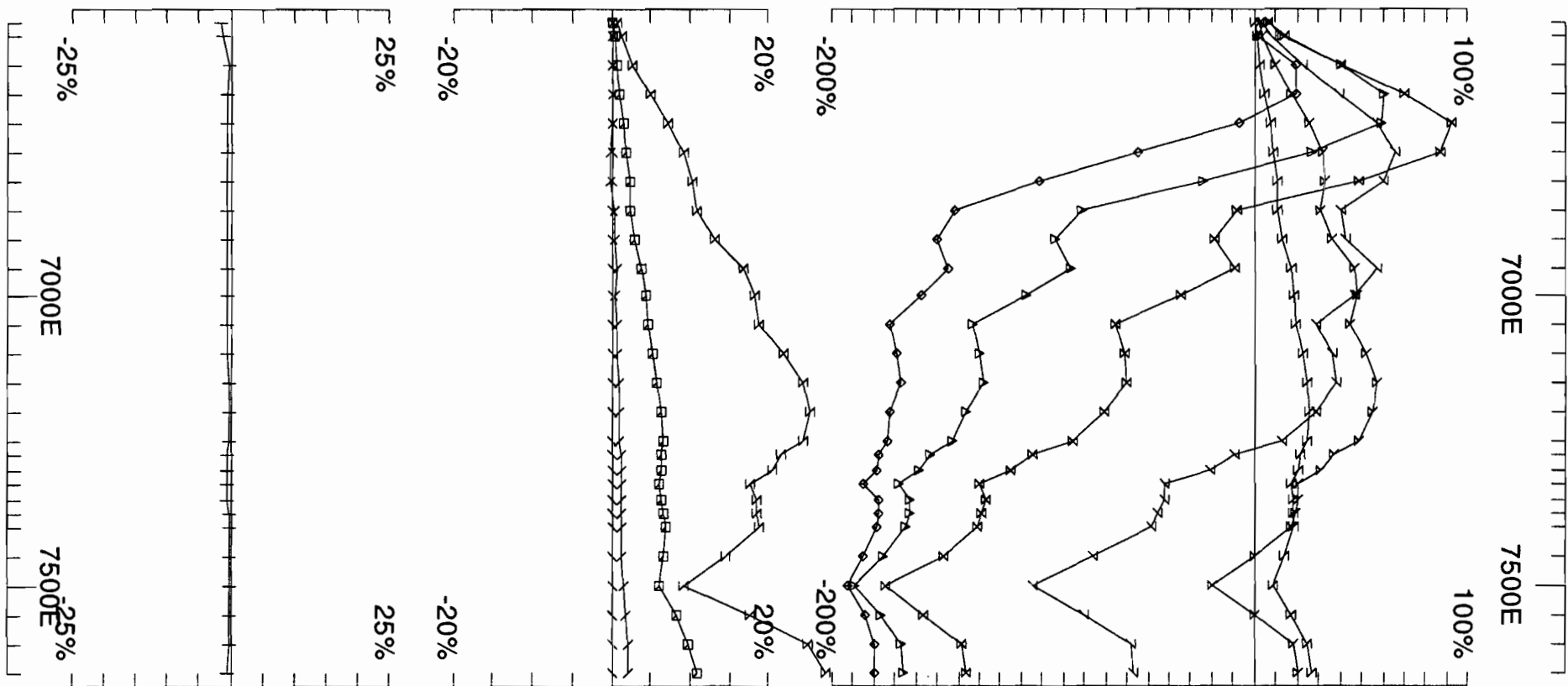
UTEM Survey at: Montcalm Property  
 For: International Nickel Ventures Ltd.

**LAMONTAGNE** GEOPHYSICS LTD Job 0809  
 GEOPHYSIQUE LTEE  
 Surveyed : 31/3/8  
 Reduced : 22/4/8  
 Plotted : 29/4/8

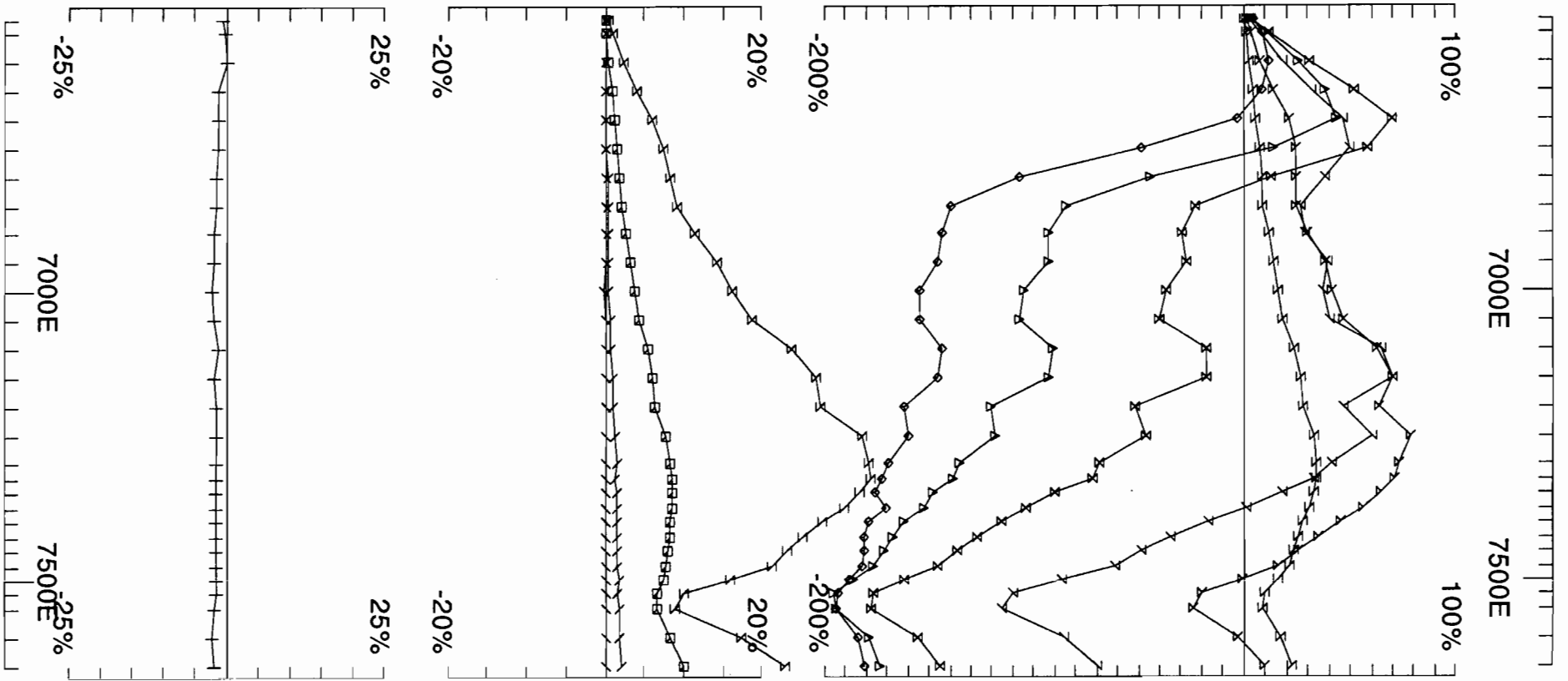




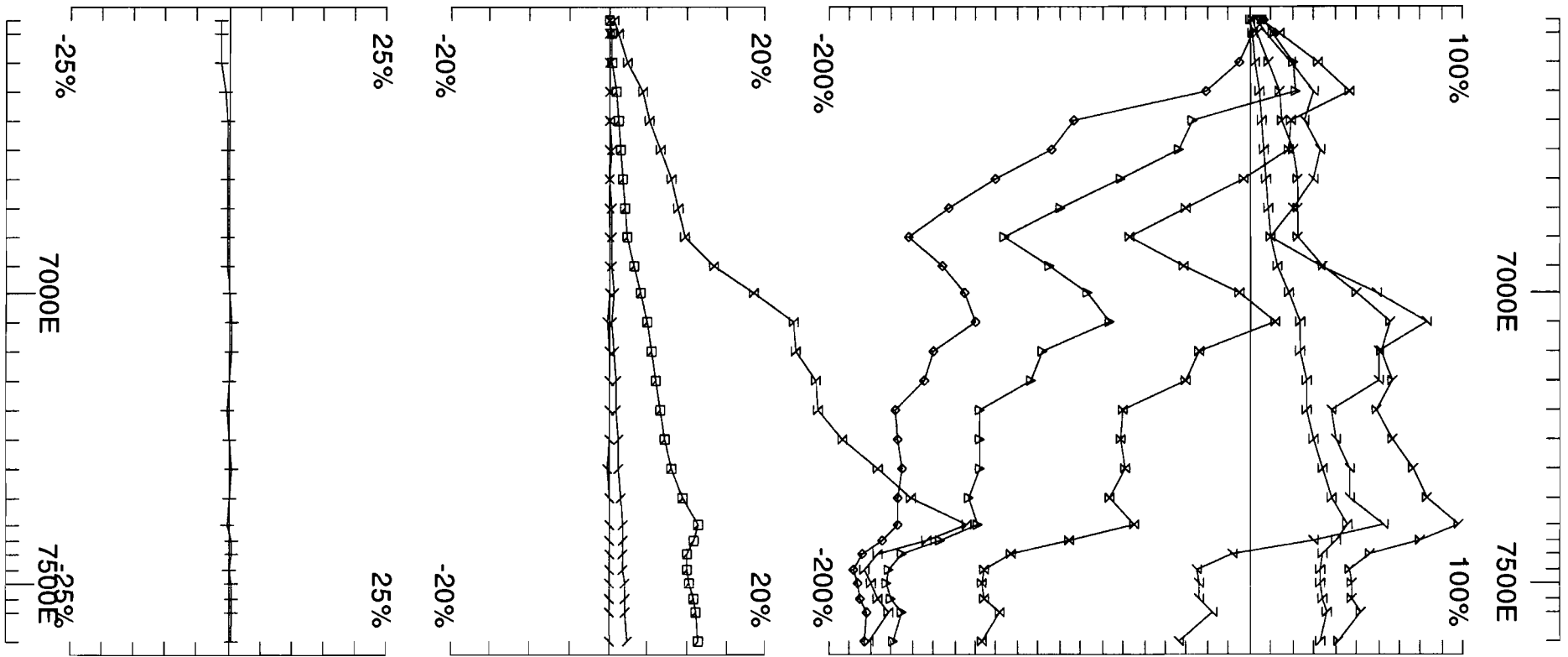
Loop: 7	Secondary, (Chn - Ch1)/ Hp	UTEM Survey at: Montcalm Property			
Line: 9500N	Contin. Norm at depth of 0 m	For: International Nickel Ventures Ltd.			
Compt: Hz	Base Freq. 30.974 Hz	<b>LAMONTAGNE</b>	GEOPHYSICS LTD	Job	Surveyed : 31/3/8
			GEOPHYSIQUE LTEE	0809	Reduced : 22/4/8 Plotted : 29/4/8



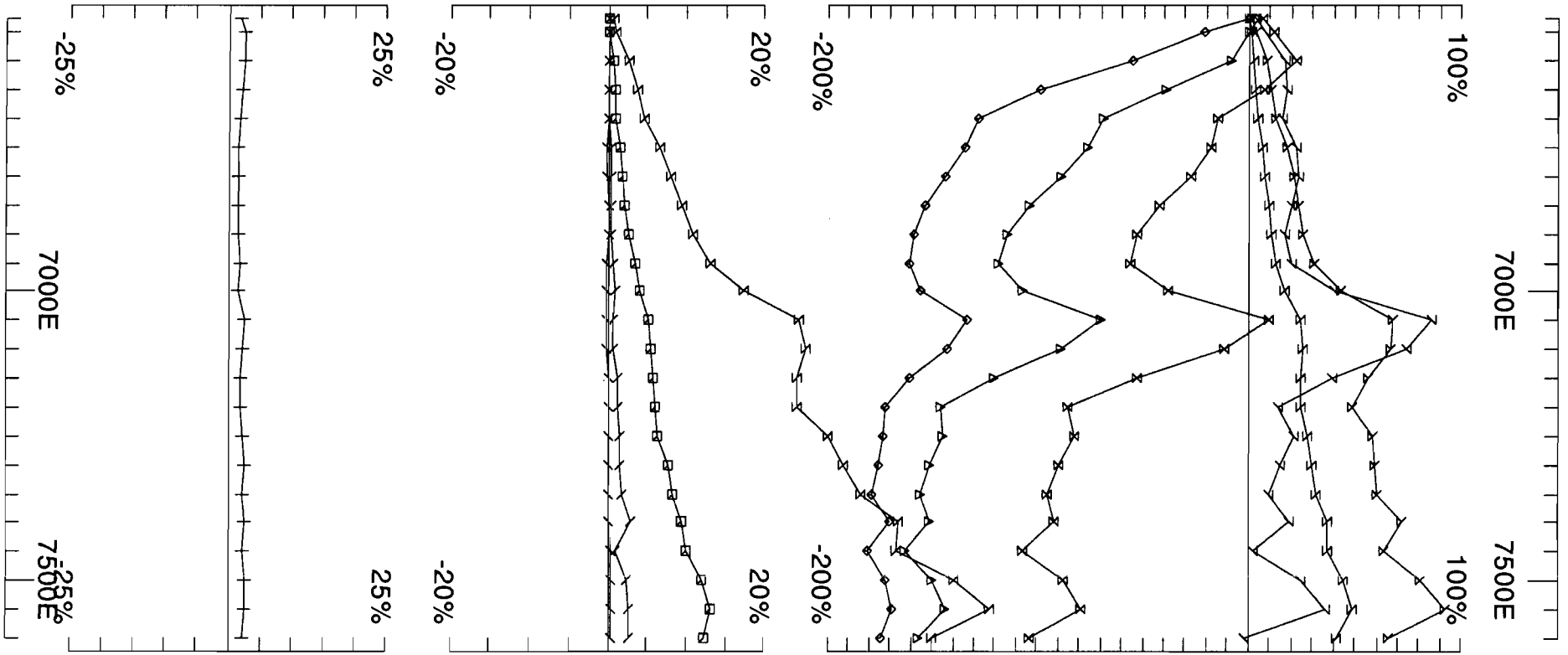
Loop: 7 Line: 9600N Compt: Hz	Secondary, (Chn - Ch1)/ Hp  Contin. Norm at depth of 0 m Base Freq. 30.974 Hz	UTEM Survey at: Montcalm Property For: International Nickel Ventures Ltd.	
<b>LAMONTAGNE</b>		GEOPHYSICS LTD GEOPHYSIQUE LTEE	Job 0809 Surveyed : 3/4/8 Reduced : 22/4/8 Plotted : 29/4/8



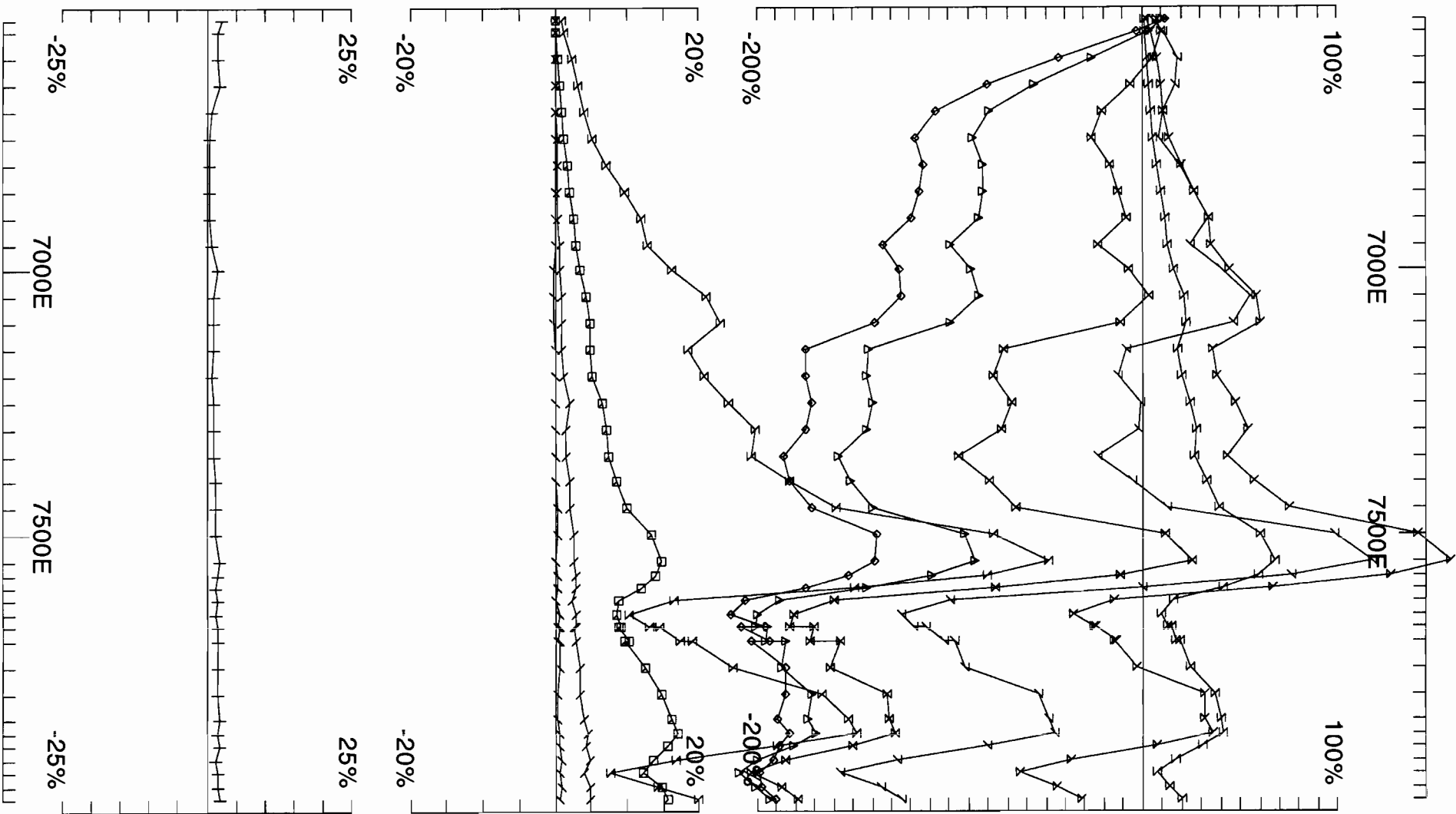
Loop: 7	Secondary, (Chn - Ch1)/ Hp	UTEM Survey at: Montcalm Property	
Line: 9700N	Contin. Norm at depth of 0 m	For: International Nickel Ventures Ltd.	
Compt: Hz	Base Freq. 30.974 Hz	<b>LAMONTAGNE</b> GEOPHYSICS LTD	Job 0809
		GEOPHYSIQUE LTEE	Surveyed : 3/4/8 Reduced : 22/4/8 Plotted : 29/4/8



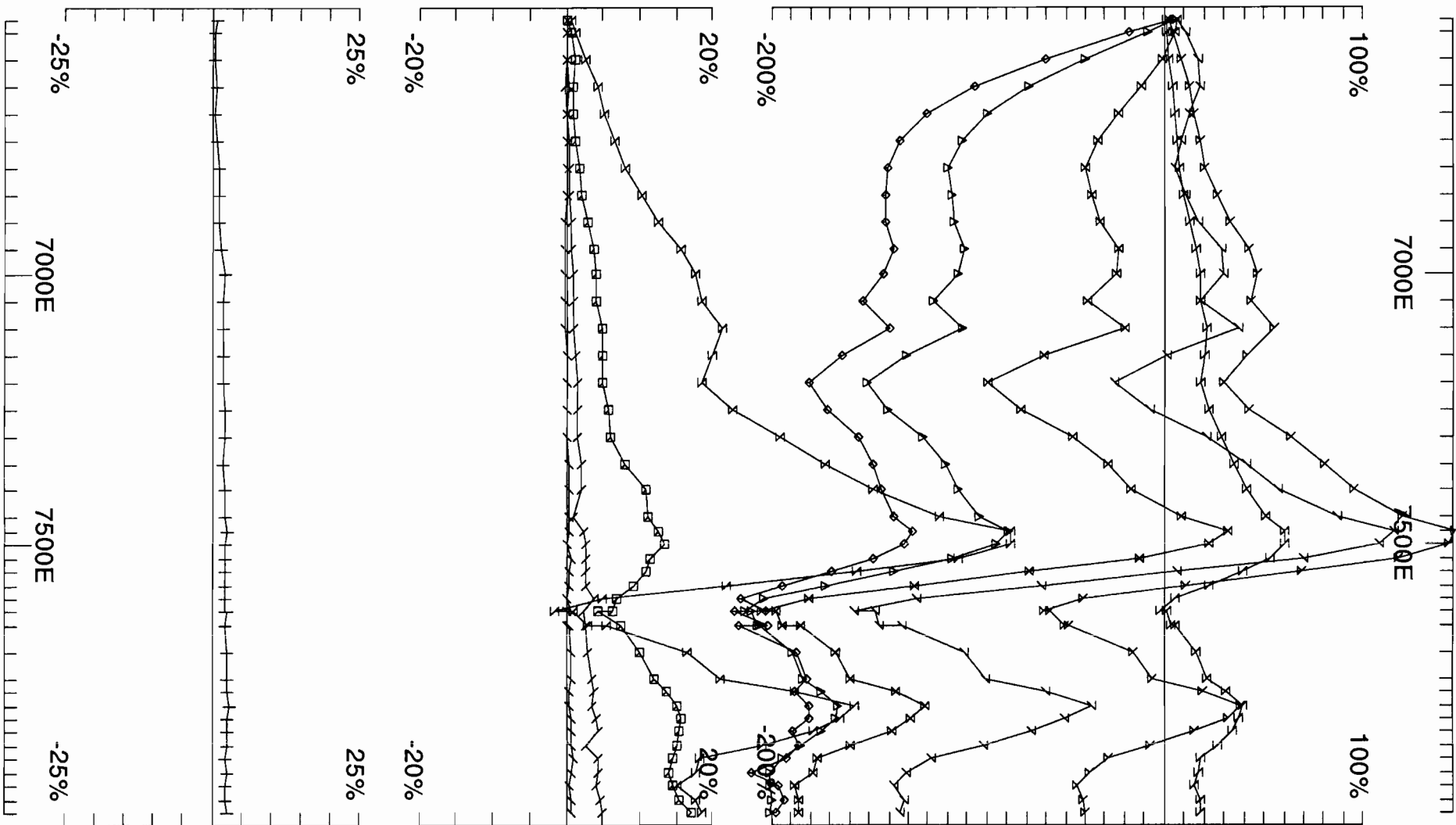
Loop: 7	Secondary, (Chn - Ch1)/ Hp	UTEM Survey at: Montcalm Property	
Line: 9800N	Contin. Norm at depth of 0 m	For: International Nickel Ventures Ltd.	
Compt: Hz	Base Freq. 30.974 Hz	<b>LAMONTAGNE</b>	GEOPHYSICS LTD Job 0809
			Surveyed : 3/4/8 Reduced : 22/4/8 Plotted : 29/4/8



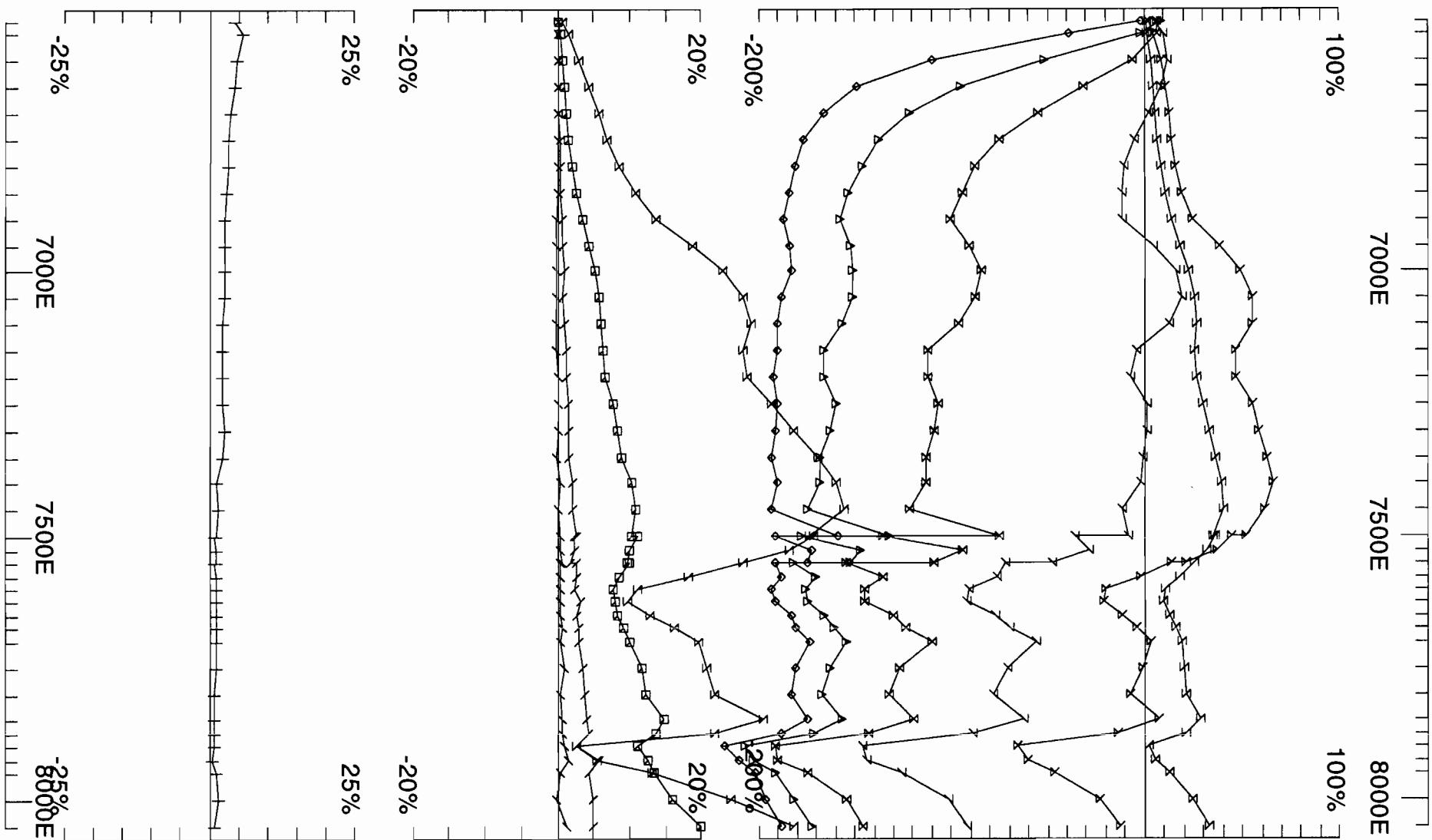
Loop: 7	Secondary, (Chn - Ch1)/ Hp	UTEM Survey at: Montcalm Property	
Line: 9900N	Contin. Norm at depth of 0 m	For: International Nickel Ventures Ltd.	
Compt: Hz	Base Freq. 30.974 Hz	<b>LAMONTAGNE</b> GEOPHYSICS LTD	Job 0809
		GEOPHYSIQUE LTEE	Surveyed : 3/4/8 Reduced : 22/4/8 Plotted : 29/4/8



Loop: 7	Secondary, (Chn - Ch1)/ Hp	UTEM Survey at: Montcalm Property	
Line: 0N	Contin. Norm at depth of 0 m	For: International Nickel Ventures Ltd.	
Compt: Hz	Base Freq. 30.974 Hz	<b>LAMONTAGNE</b> GEOPHYSICS LTD	Job 0809
		GEOPHYSIQUE LTEE	Plotted : 29/4/8

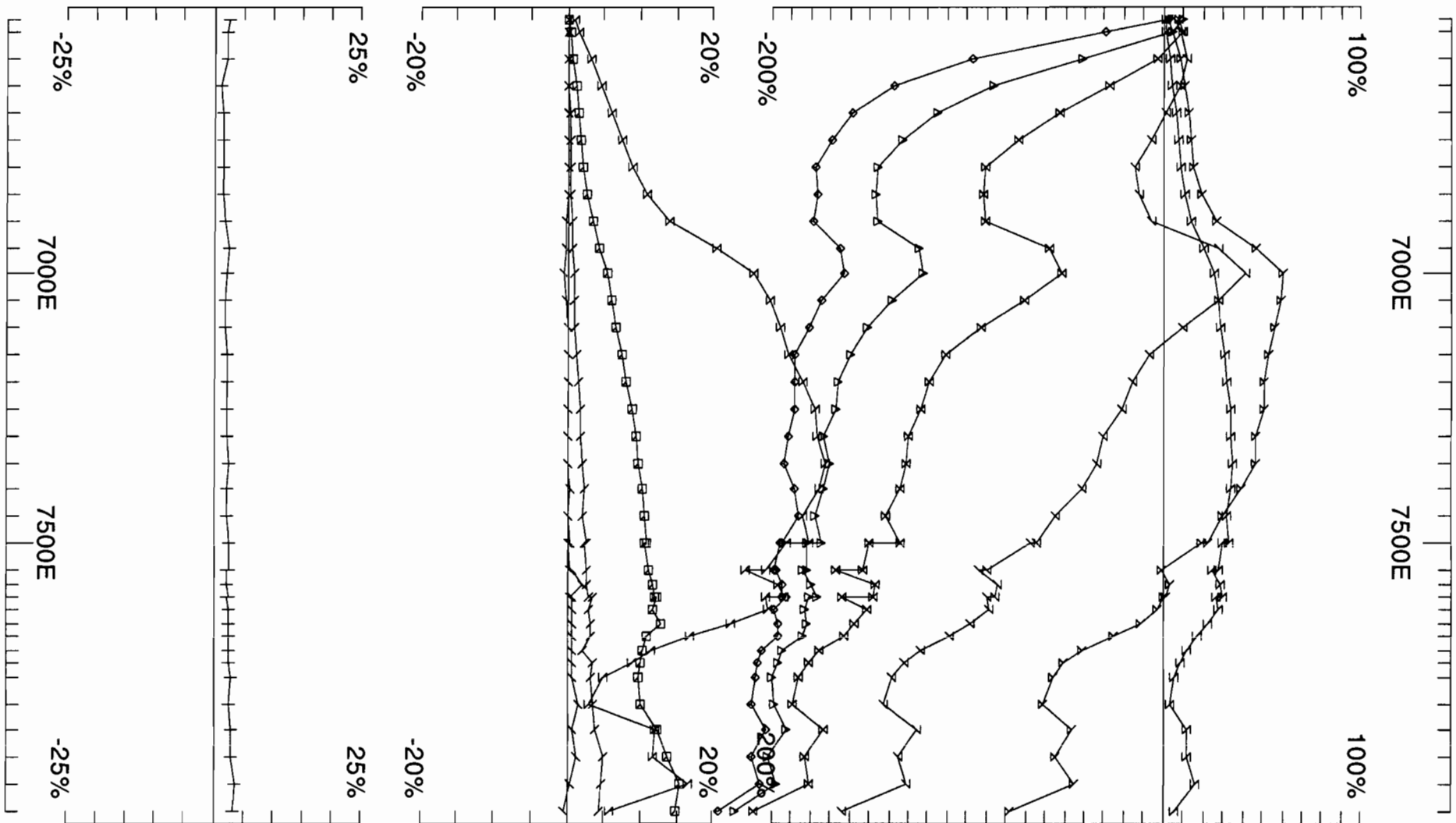


Loop: 7	Secondary, (Chn - Ch1)/ Hp	UTEM Survey at: Montcalm Property	
Line: 100N	Contin. Norm at depth of 0 m	For: International Nickel Ventures Ltd.	
Compt: Hz	Base Freq. 30.974 Hz	<b>LAMONTAGNE</b>	GEOPHYSICS LTD Job 0809 GEOPHYSIQUE LTEE Plotted : 29/4/8

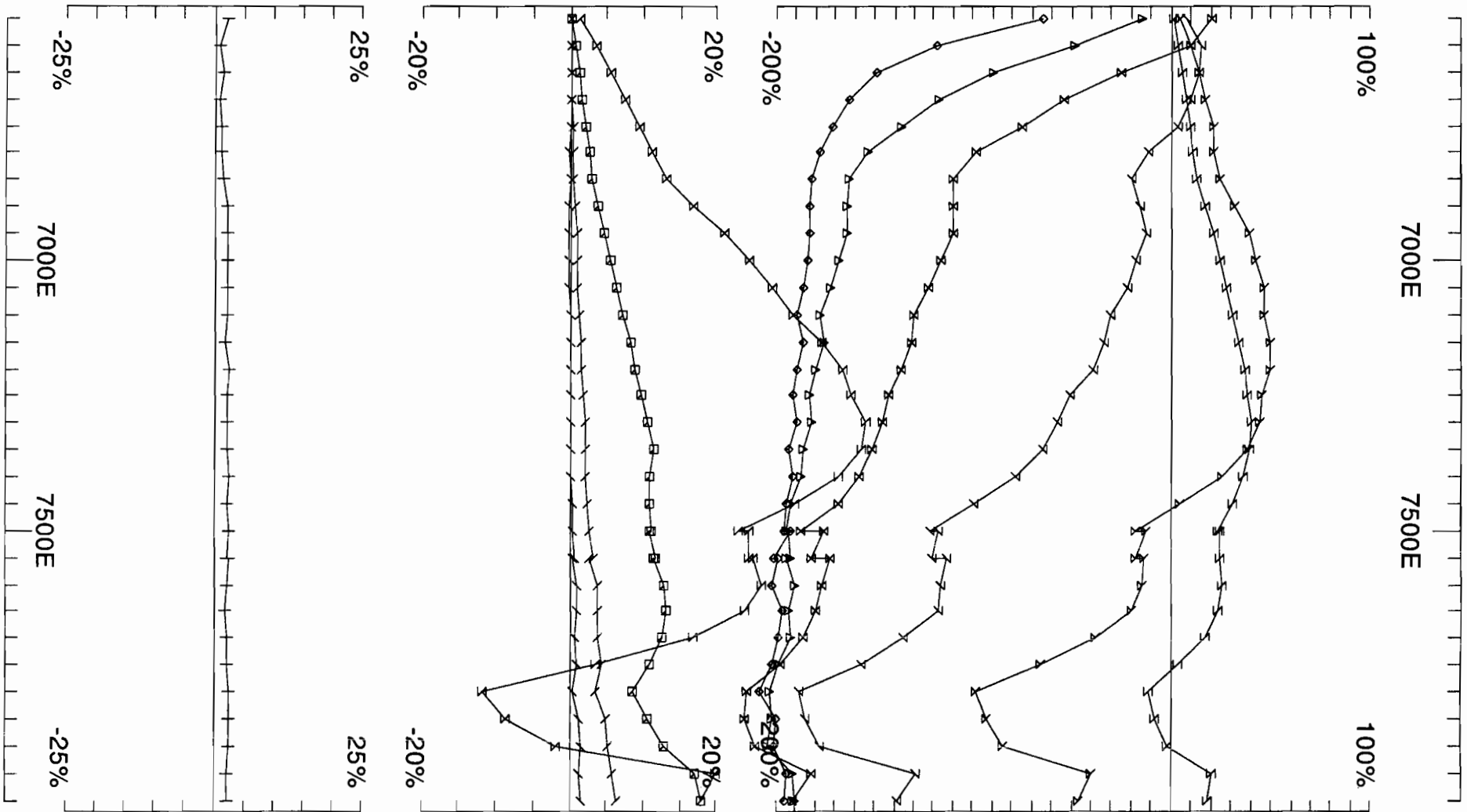


Loop: 7	Secondary, (Chn - Ch1)/ Hp	UTEM Survey at: Montcalm Property		
Line: 200N	Contin. Norm at depth of 0 m	For: International Nickel Ventures Ltd.		
Compt: Hz	Base Freq. 30.974 Hz	<b>LAMONTAGNE</b>	GEOPHYSICS LTD GEOPHYSIQUE LTEE	Job 0809 Surveyed : 30/3/8 Reduced : 30/3/8 Plotted : 29/4/8

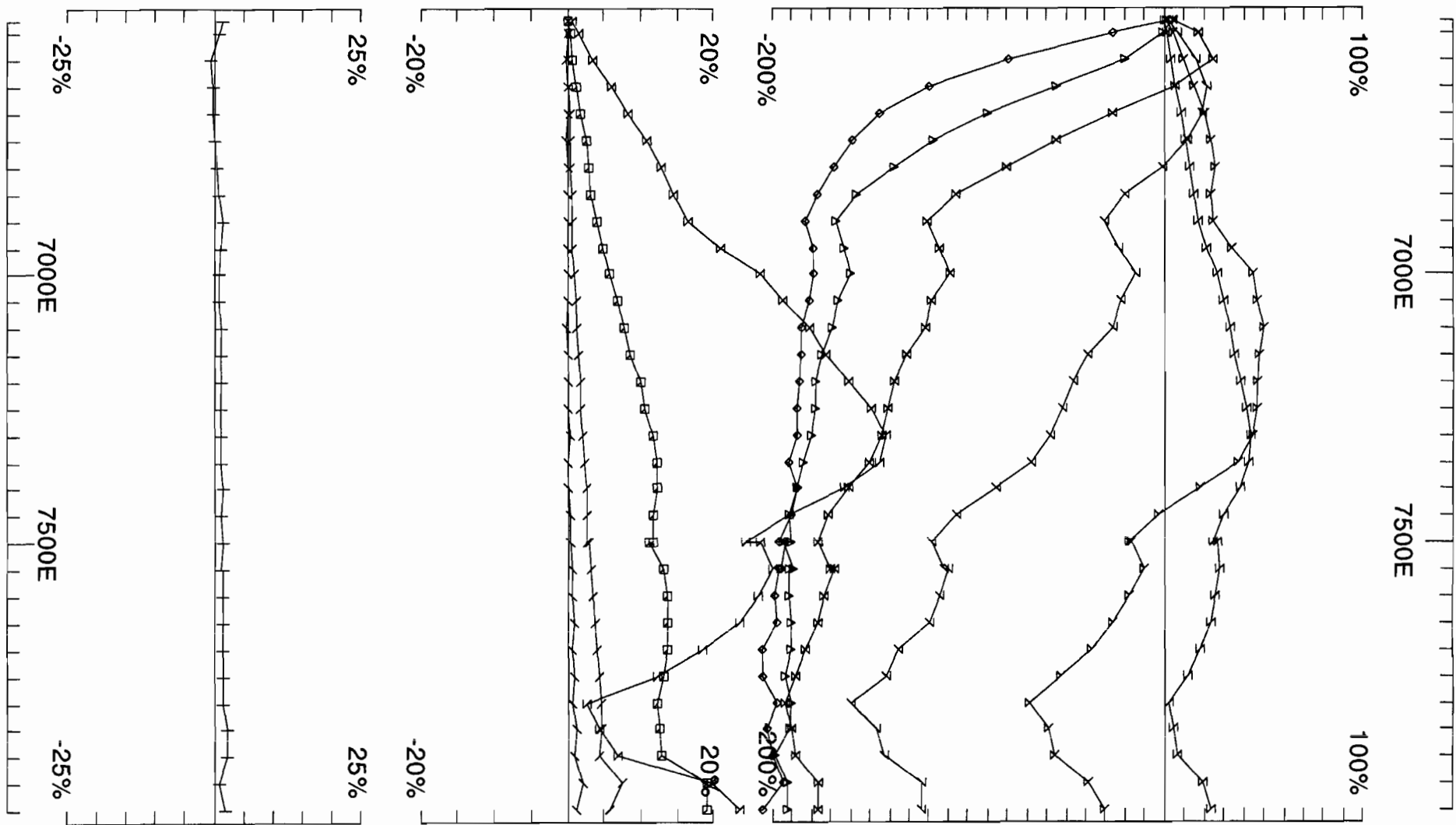




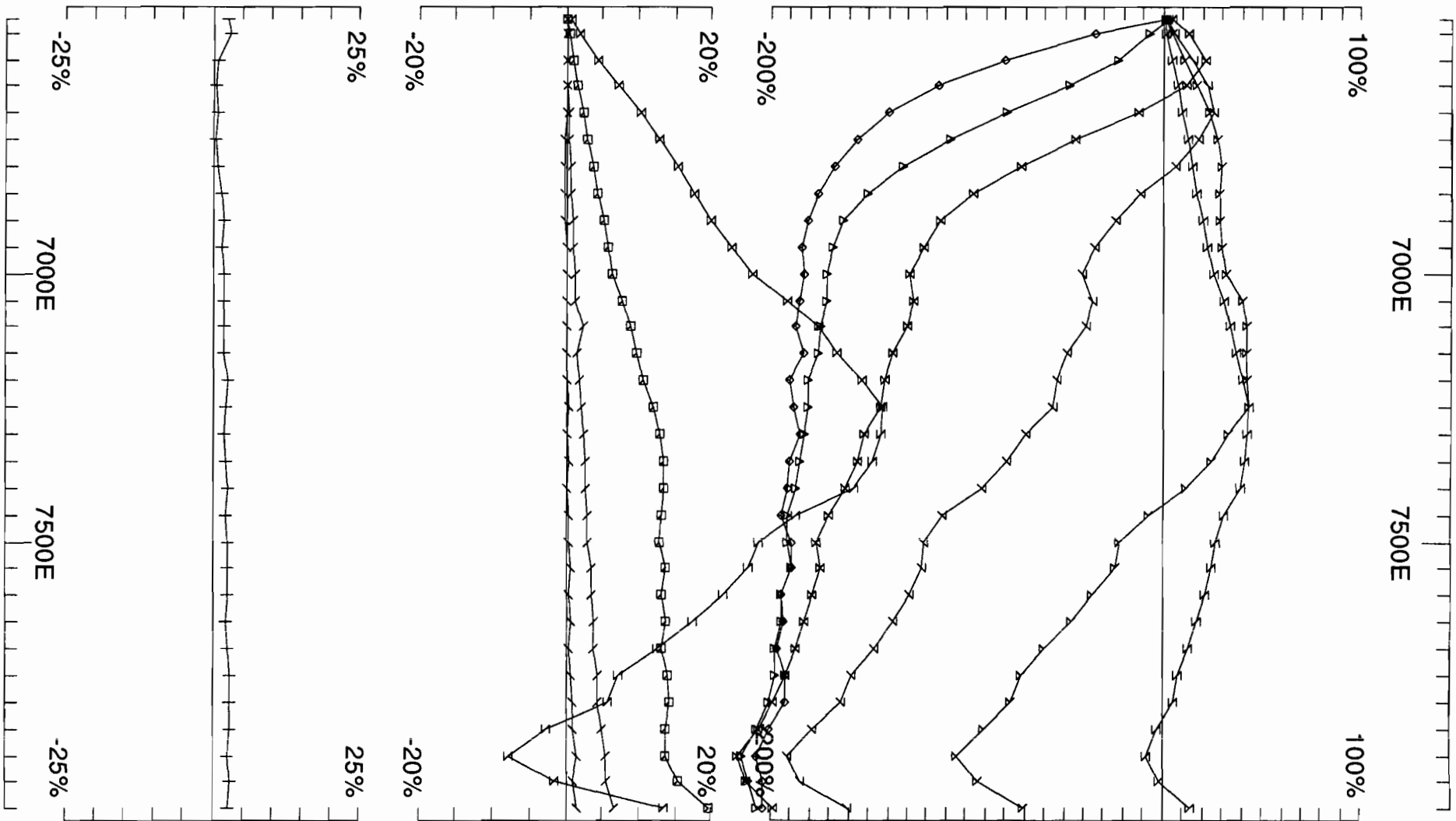
Loop: 7	Secondary, (Chn - Ch1)/ Hp	UTEM Survey at: Montcalm Property	
Line: 300N	Contin. Norm at depth of 0 m	For: International Nickel Ventures Ltd.	
Compt: Hz	Base Freq. 30.974 Hz	<b>LAMONTAGNE</b>	Job 0809
			GEOPHYSICS LTD GEOPHYSIQUE LTEE Surveyed : 30/3/8 Reduced : 30/3/8 Plotted : 29/4/8



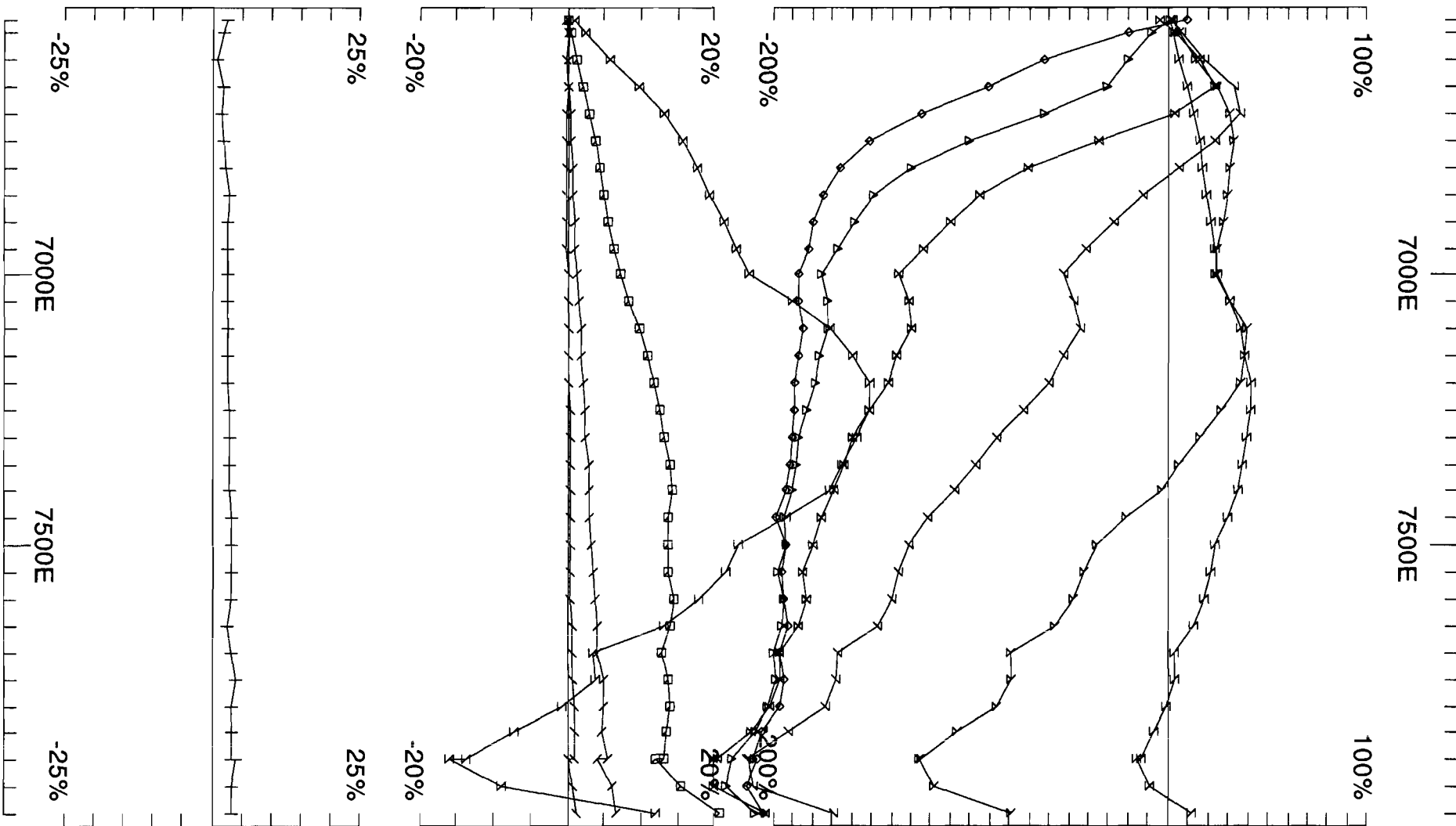
Loop: 7	Secondary, (Chn - Ch1)/ Hp	UTEM Survey at: Montcalm Property	
Line: 400N	Contin. Norm at depth of 0 m	For: International Nickel Ventures Ltd.	
Compt: Hz	Base Freq. 30.974 Hz	<b>LAMONTAGNE</b> GEOPHYSICS LTD	Job 0809
		GEOPHYSIQUE LTEE	Surveyed : 29/3/8 Reduced : 29/3/8 Plotted : 29/4/8



Loop: 7	Secondary, (Chn - Ch1)/ Hp	UTEM Survey at: Montcalm Property	
Line: 500N	Contin. Norm at depth of 0 m	For: International Nickel Ventures Ltd.	
Compt: Hz	Base Freq. 30.974 Hz	<b>LAMONTAGNE</b> GEOPHYSICS LTD	Job 0809
		GEOPHYSIQUE LTEE	Surveyed : 29/3/8 Reduced : 29/3/8 Plotted : 29/4/8



Loop: 7	Secondary, (Chn - Ch1)/ Hp	UTEM Survey at: Montcalm Property	
Line: 600N	Contin. Norm at depth of 0 m	For: International Nickel Ventures Ltd.	
Compt: Hz	Base Freq. 30.974 Hz	<b>LAMONTAGNE</b>	GEOPHYSICS LTD GEOPHYSIQUE LTEE



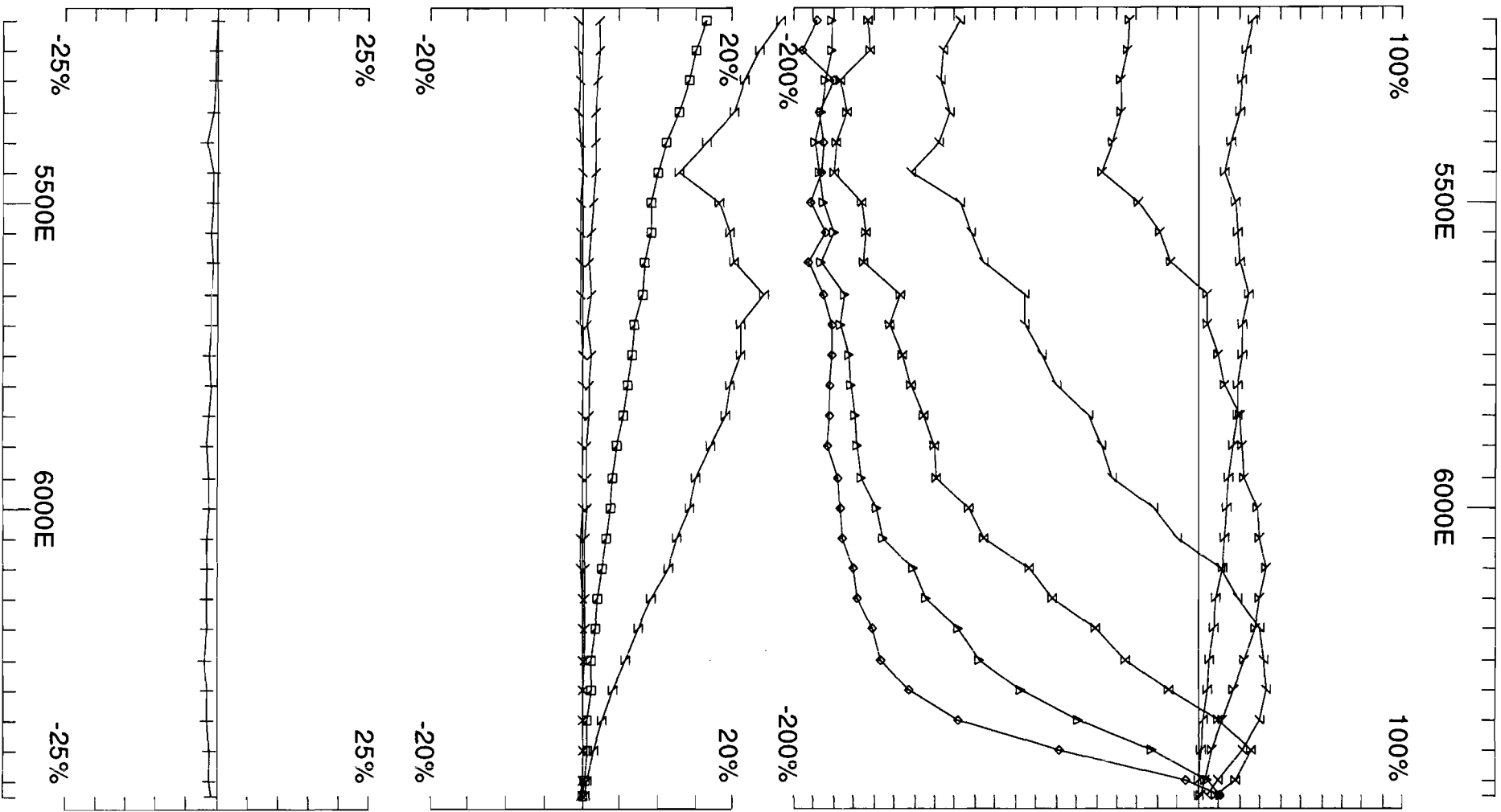
Loop: 7	Secondary, (Chn - Ch1)/ Hp	UTEM Survey at: Montcalm Property	
Line: 700N	Contin. Norm at depth of 0 m	For: International Nickel Ventures Ltd.	
Compt: Hz	Base Freq. 30.974 Hz	<b>LAMONTAGNE</b> GEOPHYSICS LTD	Job 0809
		GEOPHYSIQUE LTEE	Surveyed : 29/3/8 Reduced : 22/4/8 Plotted : 29/4/8

# Loop 8

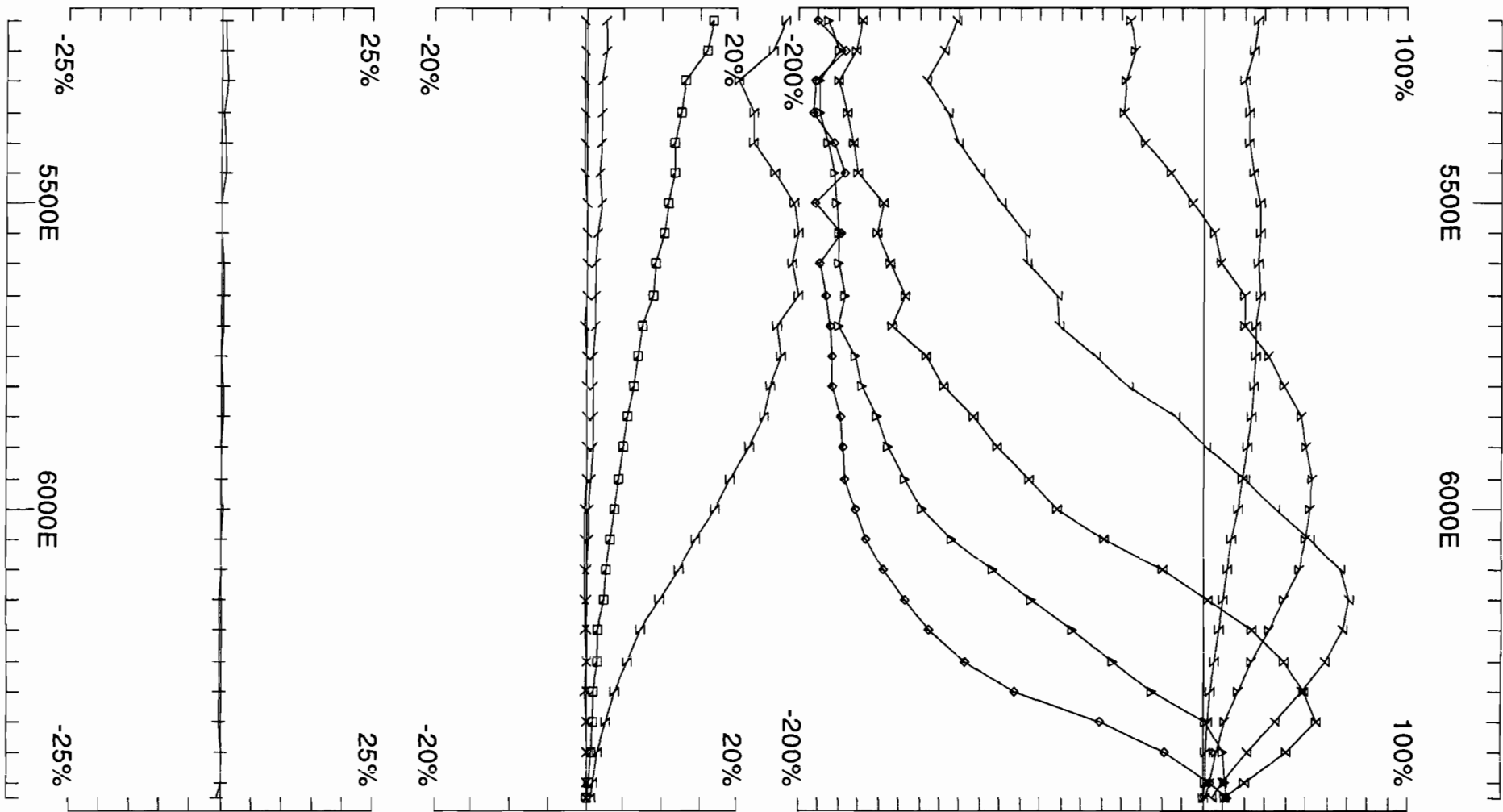
Hz Profiles  
(continuous norm)

@ 30.974 Hz

	<b>Line</b>	<b>coverage</b>	
Loop 8	Line 100 N	5200 E - 6475 E	1275 m
	Line 9900 N	5200 E - 6475 E	1275 m



Loop: 8	Secondary, (Chn - Ch1)/ Hp	UTEM Survey at: Montcalm Property	
Line: 100N	Contin. Norm at depth of 0 m	For: International Nickel Ventures Ltd.	
Compt: Hz	Base Freq. 30.974 Hz	<b>LAMONTAGNE</b>	GEOPHYSICS LTD GEOPHYSIQUE LTEE Job 0809 Surveyed : 5/4/8 Reduced : 22/4/8 Plotted : 29/4/8



Loop: 8	Secondary, (Chn - Ch1)/ Hp	UTEM Survey at: Montcalm Property			
Line: 9900N	Contin. Norm at depth of 0 m	For: International Nickel Ventures Ltd.			
Compt: Hz	Base Freq. 30.974 Hz	<b>LAMONTAGNE</b>	GEOPHYSICS LTD	Job	Surveyed : 5/4/8
			GEOPHYSIQUE LTEE	0809	Reduced : 22/4/8 Plotted : 29/4/8



# **Appendix B**

**0809 Production Log**

**UTEM 3 Survey**

**Montcalm Property,  
Timmins, Ontario**

**2008**

**for**

**International Nickel Ventures**

**Production Log (0809)**  
**Montcalm Property, Timmins, Ontario**  
**International Nickel Ventures**

<u>Date</u>	<u>Rate</u>	<u>Production</u>	<u>Comments</u>
Mar. 11	Mob		Travelled from Beardmore to Timmins. Set up base of operation at the Cedar Meadows in Timmins. Crew: R. Sinclair, K. Arsenault, A. Van Roon, and R. Matansinine .
Mar. 12	S (2) - 4		Went to the Redpath office in Timmins for road safety orientation. Made trails into loop 1 and laid the wire for loop 1. Crew: R. Sinclair, K. Arsenault, A. Van Roon, and R. Matansinine .
Mar. 13	P(2) - 4	5500m	Read : <b>Loop 1</b> at Montcalm. <b>30.974 Hz</b> Lines: 2800 N 7950 E - 9325 E 2900 N 7950 E - 9325 E 3400 N 7950 E - 9325 E 3500 N 7950 E - 9325 E Started reading loop 1, used two receivers. Crew: R. Sinclair, K. Arsenault, A. Van Roon, and R. Matansinine . <p style="text-align: right;"><b>Total: 5.500 km</b></p>
Mar. 14	P(2) - 4	5475m	Read : <b>Loop 1</b> at Montcalm. <b>30.974 Hz</b> Lines: 3200 N 7950 E - 9325 E 3300 N 7950 E - 9300 E 3000 N 7950 E - 9325 E 3100 N 7950 E - 9325 E Went to Montcalm for Xtrada field safety orientation. Finished reading loop 1. Crew: R. Sinclair, K. Arsenault, A. Van Roon, and R. Matansinine . <p style="text-align: right;"><b>Total: 10.975 km</b></p>
Mar. 15	P(2) - 4 Mob		Picked up loop 1 and laid loop 2. Set up transmitter site at loop 2. G. LaFortune travelled up from Sudbury to join the crew and arrives in the afternoon. Crew: R. Sinclair, K. Arsenault, A. Van Roon, and R. Matansinine. <p style="text-align: right;"><b>Total: 10.975 km</b></p>

**Production Log (0809)**  
**Montcalm Property, Timmins, Ontario**  
**International Nickel Ventures**

<u>Date</u>	<u>Rate</u>	<u>Production</u>	<u>Comments</u>
Mar. 16	P(2) - 5	7175m	<p>Read : <b>Loop 2</b> at Montcalm. <b>30.974 Hz</b></p> <p>Lines:  <b>800 N</b> 5950 E - 7675 E  <b>900 N</b> 6000 E - 7675 E  <b>1300 N</b> 6525 E - 7675 E  <b>1400 N</b> 6700 E - 7675 E  <b>1500 N</b> 6800 E - 7675 E  <b>1600 N</b> 6900 E - 7675 E</p> <p>Started reading loop 2, used two receivers. One crew member laid half of loop 3 and made trails into the other loops.</p> <p>Crew: R. Sinclair, K. Arsenault, A. Van Roon, R. Matansinine and G. LaFortune.</p> <p style="text-align: right;"><b>Total: 18.150 km</b></p>
Mar. 17	P(2) - 3	3775m	<p>Read : <b>Loop 2</b> at Montcalm. <b>30.974 Hz</b></p> <p>Lines:  <b>1000 N</b> 6600 E - 7675 E  <b>1100 N</b> 6250 E - 7675 E  <b>1200 N</b> 6400 E - 7675 E</p> <p>R. Matansinine was taken to the doctor by K. Arsenault to get medicine for his back. One receiver reads loop 2. One crew member finishes laying loop 3.</p> <p>Crew: R. Sinclair, K. Arsenault, A. Van Roon, R. Matansinine and G. LaFortune.</p> <p style="text-align: right;"><b>Total: 21.925 km</b></p>
Mar. 18	P(2) - 4	7000m	<p>Read : <b>Loop 2</b> at Montcalm. <b>30.974 Hz</b></p> <p>Lines:  <b>1000 N</b> 6200 E - 6650 E  <b>1700 N</b> 7050 E - 7650 E  <b>1800 N</b> 7200 E - 7600 E</p> <p>Read : <b>Loop 3</b> at Montcalm. <b>30.974 Hz</b></p> <p>Lines:  <b>400 N</b> 5300 E - 6975 E  <b>500 N</b> 5500 E - 6975 E  <b>600 N</b> 5650 E - 6950 E  <b>700 N</b> 5850 E - 6950 E</p> <p>Read with two receivers. Finished loop 2 then moved the transmitter site and began reading loop 3. R. Matansinine took day off to rest his back. Rented a Tundra Skidoo to help break trails on the grid.</p> <p>Crew: R. Sinclair, K. Arsenault, A. Van Roon, R. Matansinine and G. LaFortune.</p> <p style="text-align: right;"><b>Total: 28.925 km</b></p>

**Production Log (0809)**  
**Montcalm Property, Timmins, Ontario**  
**International Nickel Ventures**

<u>Date</u>	<u>Rate</u>	<u>Production</u>	<u>Comments</u>
Mar. 19	P(2) - 5	7325m	<p>Read : <b>Loop 3</b> at Montcalm. <b>30.974 Hz</b></p> <p>Lines:  <b>200 N</b> 5100 E - 6950 E  <b>300 N</b> 5050 E - 6975 E  <b>9500 N</b> 5200 E - 6975 E  <b>9600 N</b> 5200 E - 6975 E</p> <p>Continued reading loop 3 with two receivers. One crew member picked up loop 2. Very difficult going due to warm wet weather.</p> <p>Crew: R. Sinclair, K. Arsenault, A. Van Roon, R. Matansinine and G. LaFortune.</p> <p style="text-align: right;"><b>Total: 36.250 km</b></p>
Mar. 20	P(1) - 3	5650m	<p>Read : <b>Loop 3</b> at Montcalm. <b>30.974 Hz</b></p> <p>Lines:  <b>0 N</b> 5650 E - 6975 E  <b>9700 N</b> 5225 E - 6975 E  <b>9800 N</b> 5200 E - 6975 E  <b>9900 N</b> 5200 E - 6000 E</p> <p>Finished reading loop 3 with two receivers. Some of the data collected was lost because of problems with the data logger board on one of the receivers. These lines will be re-read later from loop 8. The loop laying was stopped because the loop planned to the east of loop 3 crossed onto the mine property. The loop will have to be redesigned and laid the next day.</p> <p>Crew: R. Sinclair, K. Arsenault, A. Van Roon, R. Matansinine and G. LaFortune.</p> <p style="text-align: right;"><b>Total: 41.900 km</b></p>
Mar. 21	P(2) - 5		<p>Picked up loop 3 and wire laid the previous day. Laid the new loop 4. Broke trail into the grid.</p> <p>Crew: R. Sinclair, K. Arsenault, A. Van Roon, R. Matansinine and G. LaFortune.</p> <p style="text-align: right;"><b>Total: 41.900 km</b></p>

**Production Log (0809)**  
**Montcalm Property, Timmins, Ontario**  
**International Nickel Ventures**

<u>Date</u>	<u>Rate</u>	<u>Production</u>	<u>Comments</u>
Mar. 22	P(2) - 5	7450m	<p>Read : <b>Loop 4</b> at Montcalm. <b>30.974 Hz</b></p> <p>Lines:  <b>8500 N</b> <b>3200 E - 5175 E</b>  <b>8600 N</b> <b>3200 E - 5000 E</b>  <b>8700 N</b> <b>3200 E - 5150 E</b>  <b>8800 N</b> <b>3225 E - 4950 E</b></p> <p>Read with two receivers. A problem with one of the receivers was solved in the field. One crew member laid loop 5.</p> <p>Crew: R. Sinclair, K. Arsenault, A. Van Roon, R. Matansinine and G. LaFortune.</p> <p style="text-align: right;"><b>Total: 49.350 km</b></p>
Mar. 23	P(2) - 5	6275m	<p>Read : <b>Loop 4</b> at Montcalm. <b>30.974 Hz</b></p> <p>Lines:  <b>8900 N</b> <b>3450 E - 5150 E</b>  <b>9000 N</b> <b>3500 E - 5150 E</b>  <b>9100 N</b> <b>3650 E - 5150 E</b>  <b>9200 N</b> <b>3750 E - 5175 E</b></p> <p>Used two receivers to finish reading loop 4. Moved the transmitter site to loop 5. One crew member laid loop 6.</p> <p>Crew: R. Sinclair, K. Arsenault, A. Van Roon, R. Matansinine and G. LaFortune.</p> <p style="text-align: right;"><b>Total: 55.625 km</b></p>
Mar. 24	P(2) - 4, Demob	8100m	<p>Read : <b>Loop 5</b> at Montcalm. <b>30.974 Hz</b></p> <p>Lines:  <b>8900 N</b> <b>4800 E - 6150 E</b>  <b>9000 N</b> <b>4800 E - 6150 E</b>  <b>9100 N</b> <b>4800 E - 6150 E</b>  <b>9200 N</b> <b>4800 E - 6150 E</b>  <b>9300 N</b> <b>4800 E - 6150 E</b>  <b>9400 N</b> <b>4800 E - 6150 E</b></p> <p>Started surveying loop 5, used two receivers. R. Matansinine leaves for Thunder Bay. The crew will complete the survey with four crew members.</p> <p>Crew: R. Sinclair, K. Arsenault, A. Van Roon, and G. LaFortune.</p> <p style="text-align: right;"><b>Total: 63.725 km</b></p>

**Production Log (0809)**  
**Montcalm Property, Timmins, Ontario**  
**International Nickel Ventures**

<u>Date</u>	<u>Rate</u>	<u>Production</u>	<u>Comments</u>
Mar. 25	P(2) - 4	5425m	<p>Read : <b>Loop 5</b> at Montcalm. <b>30.974 Hz</b></p> <p>Lines:  <b>8700 N</b>                      <b>4800 E - 6150 E</b>  <b>8800 N</b>                      <b>4800 E - 6150 E</b>  <b>8500 N</b>                      <b>4800 E - 6150 E</b>  <b>8600 N</b>                      <b>4800 E - 6175 E</b></p> <p>Finished reading loop 5 with two receivers. Picked up two sides of loop 4.  Crew: R. Sinclair, K. Arsenault, A. Van Roon, and G. LaFortune.</p> <p style="text-align: right;"><b>Total: 69.150 km</b></p>
Mar. 26	P(2) - 4	4125m	<p>Read : <b>Loop 6</b> at Montcalm. <b>30.974 Hz</b></p> <p>Lines:  <b>9200 N</b>                      <b>5800 E - 7175 E</b>  <b>9300 N</b>                      <b>5800 E - 7175 E</b>  <b>9400 N</b>                      <b>5800 E - 7175 E</b></p> <p>Started reading loop 6, used one receiver. Two crew member picked up loop 5 and the remainder of loop 4. Then started breaking trail into loop 7.  Crew: R. Sinclair, K. Arsenault, A. Van Roon, and G. LaFortune.</p> <p style="text-align: right;"><b>Total: 73.275 km</b></p>
Mar. 27	P(2) - 4	4125m	<p>Read : <b>Loop 6</b> at Montcalm. <b>30.974 Hz</b></p> <p>Lines:  <b>8500 N</b>                      <b>5800 E - 7175 E</b>  <b>8600 N</b>                      <b>5800 E - 7175 E</b>  <b>8700 N</b>                      <b>5800 E - 7175 E</b></p> <p>Continued reading loop 6, used one receiver. Two crew members laid loop 7. The heavier 14 gauge wire was used for this loop to ensure a strong signal.  Crew: R. Sinclair, K. Arsenault, A. Van Roon, and G. LaFortune.</p> <p style="text-align: right;"><b>Total: 77.400 km</b></p>

**Production Log (0809)**  
**Montcalm Property, Timmins, Ontario**  
**International Nickel Ventures**

<u>Date</u>	<u>Rate</u>	<u>Production</u>	<u>Comments</u>
Mar. 28	P(2) - 4	5450m	<p>Read : <b>Loop 6</b> at Montcalm. <b>30.974 Hz</b></p> <p>Lines:            8800 N 5800 E - 7175 E            8900 N 5800 E - 7175 E            9000 N 5800 E - 7150 E            9100 N 5800 E - 7150 E</p> <p>Finished reading loop 6 with two receivers. Moved the transmitter site to loop 7. Picked up two sides of loop 6.</p> <p>Crew: R. Sinclair, K. Arsenault, A. Van Roon, and G. LaFortune.</p>

**Total: 82.850 km**

Mar. 29	P(2) - 4	9625m	<p>Read : <b>Loop 7W</b> at Montcalm. <b>30.974 Hz</b></p> <p>Lines:            0 N 4750 E - 5450 E            100 N 5000 E - 5450 E            9600 N 4300 E - 5450 E            9700 N 4550 E - 5450 E            9800 N 4650 E - 5450 E            9900 N 4800 E - 5450 E</p> <p>Read : <b>Loop 7E</b> at Montcalm. <b>30.974 Hz</b></p> <p>Lines:            400 N 6550 E - 7550 E            500 N 6525 E - 7550 E            600 N 6525 E - 8000 E            700 N 6525 E - 8000 E</p> <p>Started reading loop 7, used two receivers. The lines were read to the east and west of this loop.</p> <p>Crew: R. Sinclair, K. Arsenault, A. Van Roon, and G. LaFortune.</p>
---------	----------	-------	--

**Total: 92.475 km**

**Production Log (0809)**  
**Montcalm Property, Timmins, Ontario**  
**International Nickel Ventures**

<u>Date</u>	<u>Rate</u>	<u>Production</u>	<u>Comments</u>
Mar. 30	P(2) - 4	6375m	<p>Read : <b>Loop 7W</b> at Montcalm. <b>30.974 Hz</b></p> <p>Lines:  <b>9200 N</b> 3750 E - 5450 E  <b>9300 N</b> 3900 E - 5450 E</p> <p>Read : <b>Loop 7E</b> at Montcalm. <b>30.974 Hz</b></p> <p>Lines:  <b>200 N</b> 6500 E - 7550 E  <b>300 N</b> 6525 E - 7600 E  <b>400 N</b> 7500 E - 8000 E  <b>500 N</b> 7500 E - 8000 E</p> <p>Continued reading loop 7, used two receivers. The lines were read to the east and west of this loop.  Crew: R. Sinclair, K. Arsenault, A. Van Roon, and G. LaFortune.</p> <p style="text-align: right;"><b>Total: 98.850 km</b></p>
Mar. 31	P(2) - 4	4300m	<p>Read : <b>Loop 7E</b> at Montcalm. <b>30.974 Hz</b></p> <p>Lines:  <b>9200 N</b> 6550 E - 7600 E  <b>9300 N</b> 6550 E - 7600 E  <b>9400 N</b> 6550 E - 7650 E  <b>9500 N</b> 6550 E - 7650 E</p> <p>Continued reading loop 7, used two receivers. It was very warm and wet as the temperature did not get to freezing overnight.  Crew: R. Sinclair, K. Arsenault, A. Van Roon, and G. LaFortune.</p> <p style="text-align: right;"><b>Total: 103.150 km</b></p>
Apr. 1	S(2) - 4		<p>Heavy snowfall and high winds made driving to the grid unsafe. No work was done in the field today.  Crew: R. Sinclair, K. Arsenault, A. Van Roon, and G. LaFortune.</p> <p style="text-align: right;"><b>Total: 103.150 km</b></p>



**Production Log (0809)**  
**Montcalm Property, Timmins, Ontario**  
**International Nickel Ventures**

<u>Date</u>	<u>Rate</u>	<u>Production</u>	<u>Comments</u>
Apr. 2	P(2) - 4	5175m	<p>Read : <b>Loop 7W</b> at Montcalm. <b>30.974 Hz</b></p> <p>Lines:  <b>9400 N</b>                      <b>4050 E - 5450 E</b>  <b>9500 N</b>                      <b>5025 E - 5450 E</b></p> <p>Read : <b>Loop 7E</b> at Montcalm. <b>30.974 Hz</b></p> <p>Lines:  <b>0 N</b>                              <b>6525 E - 7700 E</b>  <b>100 N</b>                         <b>6525 E - 7650 E</b>  <b>200 N</b>                         <b>7500 E - 8050 E</b>  <b>300 N</b>                         <b>7500 E - 8000 E</b></p> <p>Continued reading loop 7, used two receivers. The lines were read to the east and west of this loop. Line 9500N was not cut to the end. It was about 1 km shorter than expected. The weather was warm and wet once again. The lines to the east required extra stacking because of noise. G. LaFortune was not available for work today but was replaced by R. Matansinine for the day.</p> <p>Crew: R. Sinclair, K. Arsenault, A. Van Roon, and R. Matansinine.</p> <p style="text-align: right;"><b>Total: 108.325 km</b></p>
Apr. 3	P(2) - 4	5100m	<p>Read : <b>Loop 7E</b> at Montcalm. <b>30.974 Hz</b></p> <p>Lines:  <b>9600 N</b>                         <b>6525 E - 7650 E</b>  <b>9700 N</b>                         <b>6525 E - 7650 E</b>  <b>9800 N</b>                         <b>6525 E - 7600 E</b>  <b>9900 N</b>                         <b>6525 E - 7600 E</b>  <b>0 N</b>                               <b>7675 E - 8000 E</b>  <b>100 N</b>                         <b>7625 E - 8000 E</b></p> <p>Finished reading loop 7, used two receivers. Another warm and wet day. The rented Tundra Skidoo was returned today.</p> <p>Crew: R. Sinclair, K. Arsenault, A. Van Roon, and G. LaFortune.</p> <p style="text-align: right;"><b>Total: 113.425 km</b></p>
Apr. 4	P(2) - 3 Demob		<p>Crew picked up most of loop 7 and laid loop 8. Another wet and warm day. K. Arsenault departed for Sudbury.</p> <p>Crew: R. Sinclair, K. Arsenault, A. Van Roon, and G. LaFortune.</p> <p style="text-align: right;"><b>Total: 113.425 km</b></p>

**Production Log (0809)**  
**Montcalm Property, Timmins, Ontario**  
**International Nickel Ventures**

<u>Date</u>	<u>Rate</u>	<u>Production</u>	<u>Comments</u>
Apr. 5	P(2) - 3	2550m	Read : <b>Loop 8</b> at Montcalm. <b>30.974 Hz</b> Lines: <b>100 N</b> <b>5200 E - 6475 E</b> <b>9900 N</b> <b>5200 E - 6475 E</b> Read the two lines on loop 8 with one receiver. These lines were read to replace the lost data from loop 3. The remainder of loop 6 and loop 8 was picked up. The gear, skidoos and trailer was taken out of the field. All the equipment was packed and the truck was loaded for demob to Kingston. Crew: R. Sinclair, A. Van Roon, and G. LaFortune. <b>Total: 115.975 km</b>
Apr. 6	Demob		A. Van Roon, and G. LaFortune stay in Timmins to work on another project. R. Sinclair drove truck from Timmins to Pembroke where he stayed overnight. Crew: R. Sinclair <b>Total: 115.975 km</b>
Apr. 7	Demob		R. Sinclair drove from Pembroke to Kingston. Unloaded and unpacked the equipment at the office. Crew: R. Sinclair <b>Total: 115.975 km</b>
Apr. 11	Demob		R. Sinclair flew home to Halifax. Crew: R. Sinclair <b>Total: 115.975 km</b>

---

**LEGEND**

P(r)-x - Production (# of receivers) - # of personnel  
 S(r)-x - Standby (# of receivers) - # of personnel  
 D-x - Down - # of personnel



# Appendix C

## The UTEM SYSTEM

The UTEM System

UTEM Data Reduction and Plotting Conventions

Data Presentation

## The UTEM SYSTEM

UTEM uses a large, fixed, horizontal transmitter loop as its source. Loops range in size from 300m x 300m up to as large as 4km x 4km. Smaller loops are generally used over conductive terrain or for shallow sounding work. The larger loops are only used over resistive terrain. The UTEM receiver is typically synchronized with the transmitter at the beginning of a survey day and operates remotely after that point. The clocks employed - one in each of the receiver and transmitter - are sufficiently accurate to maintain synchronisation.

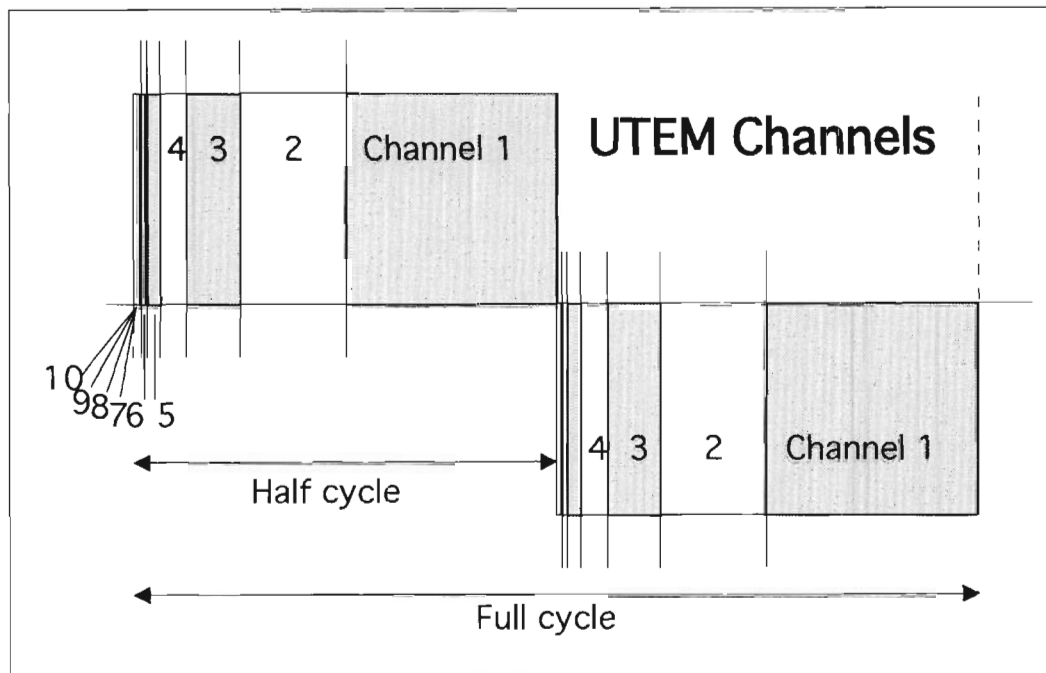
Measurements are routinely taken to a distance of 1.5 to twice the loop dimensions, depending on the local noise levels, and can be continued further. Lines are typically surveyed out from the edge of the loop but may also be read across the loop wire and through the centre of the loop, a configuration used mainly to detect horizontal conductors. BHUTEM - the borehole version of UTEM - surveys have been carried out to depths up to 3000+ metres.

### System Waveform

The UTEM transmitter passes a low-frequency (4 Hz to 90 Hz) current of a precisely regulated triangular waveform through the transmitter loop. The frequency can be set to any value within the operating range of the transmitter, however, it is usually set at 31 Hz to minimise power line (60 Hz in North America) effects. Since a receiver coil responds to the time derivative of the magnetic field, the UTEM system really "sees" the step response of the ground. UTEM is the only time domain system which measures the step response of the ground. All other T.D.E.M. systems to date transmit a modified step current and "see" the (im)pulse response of the ground at the receiver. In practice, the transmitted UTEM waveform is tailored to optimize signal-to-noise. Deconvolution techniques are employed within the system to produce an equivalent to the conceptual "step response" at the receiver.

### System Sampling

The UTEM receiver measures the time variation of the magnetic field in the direction of the receiver coil at 10 delay times (channels). UTEM channels are spaced in a binary, geometric progression across each half-cycle of the received waveform. Channel 10 is the earliest channel and it is  $1/2^{10}$  of the half-cycle wide. Channel 1, the latest channel, is  $1/2^1$  of the half-cycle wide (see Figure below). The measurements obtained for each of 10 channels are accumulated over many half-cycles. Each final channel value, as stored, is the average of the measurements for that time channel. The number of half-cycles averaged generally ranges between 2048 (1024 full-cycles - 1K in UTEM jargon) to 32768 (16K) depending on the level of ambient noise and the signal strength.



### System Configurations

For surface work the receiver coil is mounted on a portable tripod and oriented. During a surface UTEM survey the vertical component of the magnetic field ( $H_z$ ) of the transmitter loop is always measured. Horizontal in-line ( $H_x$ ) and cross-line ( $H_y$ ) components are also measured if more detailed information is required. The UTEM System is also capable of measuring the two horizontal components of the electric field,  $E_x$  and  $E_y$ . A dipole sensor comprised of two electrodes is used to measure the electric field components. This is generally used for outlining resistive features to which the magnetic field is not very sensitive.

BHUTEM surveys employ a receiver coil that is smaller in diameter than the surface coil. The borehole receiver coil forms part of a down-hole receiver package used to measure the axial (along-borehole) component of the magnetic field of the transmitter loop. Due to the distance between coil and receiver in borehole surveys the signal must be transmitted up to the receiver. In BHUTEM the signal is transmitted to surface digitally using a kevlar-reinforced fibre-optic cable as a data link. Using a fibre-optic link avoids signal degradation problems and allows surveying of boreholes to 3000+m. The cable is also very light - the specific gravity is nearly 1.0 - making the cable handling hardware quite portable.

## The EM Induction Process

Any time-varying transmitted ("primary") field induces current flow in conductive regions of the ground below and around the transmitter loop (i.e. in the earth or "half-space"). This current flow produces a measurable EM field, the secondary field, which has an inherent "inertia" that resists the change in primary field direction. This "inertial" effect is called self-inductance; it limits the rate at which current can change and is only dependent on the shape and size of a conductive path.

It takes a certain amount of time for the transmitted current flow to be redirected (reversed) and reestablished to full amplitude after the rate-of-change of the primary field reverses direction. This measurable reversal time is characteristic for a given conductor. In general, for a good conductor this time is greater than that of a poor conductor. This is because in a good conductor the terminal current level is greater, whereas its rate of change is limited by the inductance of the current path. The time-varying current causes an Emf in the sensor proportional to the time derivative of the current. This Emf decays with time - it vanishes when the reversal is complete - and the characteristic time of the Emf decay as measured by the sensor is referred to as the **decay time** of the conductor.

The large-scale current which is induced in the half-space by the primary field produces the half-space response as seen in typical UTEM profiles. This background response is influenced by the finite conductivity of the surrounding rock. Other currents may be induced in locally more conductive zones (conductors) that have longer decay times than the half-space response. The responses of these conductors are superimposed upon the background response. The result is that the UTEM receiver detects:

- the primary field waveform, a square-wave
- the half-space (background) response of the surrounding rock
- a slight-to-large response due to any conductors present.

The result is that in the presence of conductors the primary field waveform is substantially (and anomalously) distorted.

## UTEM DATA REDUCTION and PLOTTING CONVENTIONS

The UTEM data as it appears in the data files is in total field, continuously normalized form. In this form, the magnetic field data collected by the receiver is expressed as a % of the calculated primary magnetic field vector magnitude at the station. These are total field values - the UTEM system measures during the "on-time" and as such samples both the primary and secondary fields.

For plotting purposes, the reduced magnetic field data (as it appears in the data file) are transformed to other formats as required. The following is provided as a description of the various plotting formats used for the display of UTEM data. A plotting format is defined by the choice of the *normalization* and *field type* parameters selected for display.

### NORMALIZATION

UTEM results are always expressed as a % of a normalizing field at some point in space.

In **continuously normalized** form the normalizing factor (the denominator) is the magnitude of the computed local primary field vector. As the primary exciting field magnitude diminishes with increasing distance from the transmitter loop the response is continuously amplified as a function of offset from the loop. Although this type of normalization considerably distorts the response shape, it permits anomalies to be easily identified at a wide range of distances from the loop.

Note: An optional form of continuous normalization permits the interpreter to normalize the response to the magnitude of the primary field vector at a fixed depth below each station. This is useful for surface profiles which come very close to the loop. Without this adjustment option, the normalizing field is so strong near the loop that the secondary effects become too small in the presence of such a large primary component. In such circumstances interpretation is difficult, however; by "normalizing at some depth" the size of the normalizing field, near the loop in particular, is reduced and the resulting profile can be more effectively interpreted to a very close distance from the transmitter wire. The usual choice for the depth is the estimated target depth is used.

In **point normalized form** the normalizing factor is the magnitude of the computed primary field vector at a single point in space. When data is presented in this form, the point of normalization is displayed in the title block of the plot. Point normalized profiles show the non-distorted shape of the field profiles. Unfortunately, the very large range in magnitude of anomalies both near and far from the loop means that small anomalies, particularly those far from the loop, may be overlooked on this type of plot in favor of presenting larger amplitude anomalies.

Note: Selecting the correct plot scales is critical to the recognition of conductors over the entire length of a point normalized profile. Point normalized data is often used for interpretation where an analysis of the shape of a specific anomaly is required. Point normalized profiles are therefore plotted selectively as required during interpretation. An exception to this procedure occurs where surface data has been collected entirely inside a transmitter loop. The primary field does not vary greatly inside the loop, therefore, the benefits of continuous normalization are not required in the display of such results. In these cases data is often point normalized to a fixed point near the loop centre.

### FIELD TYPE

The type of field may be either the **Total field** or the **Secondary field**. In general, it is the secondary field that is most useful for the recognition and interpretation of discrete conductors.

### **UTEM Results as Secondary Fields**

Because the UTEM system measures during the transmitter on-time the determination of the secondary field requires that an estimate of the primary signal be subtracted from the observations. Two estimates of the primary signal are available:

#### 1) UTEM Channel 1

One estimate of the primary signal is the value of the latest time channel observed by the UTEM System, channel 1. When Channel 1 is subtracted from the UTEM data the resulting data display is termed **Channel 1 Reduced**. This reduction formula is used in situations where it can be assumed that all responses from any target bodies have decayed away by the latest time channel sampled. The Channel 1 value is then a reasonable estimate of the primary signal present during Channels 2....10.

In practice the **Channel 1 Reduced** form is most useful when the secondary response is very small at the latest delay time. In these cases channel 1 is indeed a good estimate of the primary field and using it avoids problems due to geometric errors or transmitter loop current/system sensitivity errors.



## 2) Calculated primary field

An alternate estimate of the primary field is obtained by computing the primary field from the known locations of the transmitter loop and the receiver stations. When the computed primary field is subtracted from the UTEM data the resulting data display is termed *Primary Field Reduced*.

The calculated primary field will be in error if the geometry is in error - mislocation of the survey stations or the loop vertices - or if the transmitter loop current/system sensitivity is in error. Mislocation errors from loop/station geometry may give rise to very large secondary field errors depending on the accuracy of the loop and station location method used. Transmitter loop current/system sensitivity error is rarely greater than 2%. *Primary Field Reduced* is plotted in situations where a large Channel 1 response is observed. In this case the assumption that the Channel 1 value is a reasonable estimate of the primary field effect is not valid.

Note: When UTEM data is plotted in the *Channel 1 Reduced* form the secondary field data for Channel 1 itself are always presented in *Primary Field Reduced* form and are plotted on a separate axis. This plotting format serves to show any long time-constant responses, magnetostatic anomalies and/or geometric errors present in the data.

### Mathematical Formulations

In the following expressions:

$R_{nj}$  is the result plotted for the  $n^{\text{th}}$  UTEM channel,

$R_{1j}$  is the result plotted for the latest-time UTEM channel, channel 1,

$Ch_{nj}$  is the raw component sensor value for the  $n^{\text{th}}$  channel at station  $j$ ,

$Ch_{1j}$  is the raw component sensor value for channel 1 at station  $j$ ,

$H^P_j$  is the computed primary field component in the sensor direction

$|H^P|$  is the magnitude of the computed primary field at:

- a fixed station for the entire line (point normalized data)
- the local station of observation (continuously normalized data)
- a fixed depth below the station (continuously normalized at a depth).

**Channel 1 Reduced Secondary Fields** : Here, the latest time channel, Channel 1 is used as an "estimate" of the primary signal and channels 2-10 are expressed as:

$$R_{nj} = (Ch_{nj} - Ch_{1j}) / |H^P| \times 100\%$$

Channel 1 itself is reduced by subtracting a calculation of the primary field observed in the direction of the coil,  $H^P$  as follows:

$$R_{1j} = (Ch_{1j} - H^P_j) / |H^P| \times 100\%$$

**Primary Field Reduced Secondary Fields** : In this form all channels are reduced according to the equation used for channel 1 above:

$$R_{nj} = (Ch_{nj} - H^P_j) / |H^P| \times 100\%$$

This type of reduction is most often used in cases where very good geometric control is available (leading to low error in the calculated primary field,  $H^P_j$ ) and where very slowly decaying responses result in significant secondary field effects remaining in channel 1 observations.

#### UTEM Results as a Total Field

In certain cases results are presented as a % of the **Total Field**. This display is particularly useful, in borehole surveys where the probe may actually pass through a very good conductor. In these cases the shielding effect of the conductor will cause the observed (total) field to become very small below the intersection point. This nullification due to shielding effects on the total field is much easier to see on a separate *Total Field* plot. In cases where the amplitude of the anomalies relative to the primary field is small, suggesting the presence of poorly conductive bodies, the *Total Field* plot is less useful.

The data contained in the UTEM reduced data files is in *Total Field*, continuously normalized form if:

$$R_{nj} = Ch_{nj} / |H^P| \times 100\%$$

## DATA PRESENTATION

All UTEM survey results are presented as profiles in an Appendix of this report. For BHUTEM surveys the requisite Vectorplots, presented as plan and section views showing the direction and magnitude of the calculated primary field vectors for each transmitter loop, are presented in a separate Appendix.

The symbols used to identify the channels on all plots as well as the mean delay time for each channel is shown in the table below.

<b><u>UTEM System Mean Delay Times</u></b>		
<b>10 Channel Mode @ 31 hz.(approx.)</b>		
<b>( base freq:    30.974        hertz )</b>		
<b><u>Channel #</u></b>	<b><u>Delay time (ms)</u></b>	<b><u>Plot Symbol</u></b>
1	12.11	
2	6.053	\
3	3.027	/
4	1.513	□
5	0.757	M
6	0.378	N
7	0.189	V
8	0.095	X
9	0.047	△
10	0.024	◇

### Notes on Standard plotting formats:

10 channel data in Channel 1 Reduced form - The data are usually displayed on three separate axes. This permits scale expansion, allowing for accurate determination of signal decay rates. The standard configuration is:

Bottom axis - Channel 1 (latest time) is plotted alone in *Primary Field Reduced* form using the same scale as the center axis.

Center axis - The intermediate to late time channels, ch5 to ch2 are plotted on the center axis using a suitable scale.

Top axis - The early time channels, ch10 to ch6 and a repeat of ch5 for comparison are plotted on the top axis at a reduced scale. The earliest channels, ch8 to ch10, may not be plotted to avoid clutter.

10 channel data in *Primary Field Reduced* form: The data are displayed using a single axis plot format. Secondary effects are plotted using a Y axis on each data plot with peak to peak values up to 200%.

BHUTEM data plotted as *total field profiles*: Data are expressed directly as a percentage of the *Total Field* value. The Y axis on each single axis data plot shows peak values of up to 100%. These departures are always relative to the measured total field value at the observation station.

BHUTEM data plotted as *secondary field profiles*: Check the title block of the plot to determine if the data is in *Channel 1 Reduced* form or in *Primary Field Reduced* form.

Note that on all BHUTEM plots the ratio between the axial component of the primary field of the loop and the magnitude of the total primary field strength (**dc**) is plotted as a profile without symbols. In UTEM jargon this is referred to as the "primary field" and it is plotted for use as a polarity reference tool.

# **Appendix D**

**Note on sources of anomalous Ch1**

## Note on sources of anomalous Ch1

This section outlines the possible sources of anomalous channel 1 which is not correlated to the Ch2-10 data plotted on the upper axes of a *channel 1 normalized* plot.

### 1) **Mislocation of the transmitter loop and/or survey stations**

Mislocating the transmitter loop and/or the survey stations results in an error in the calculated primary field at the station and appears as an anomalous Ch1 value not correlated to *channel 1 normalized* Ch2-10. The effect is amplified near the loop front. This can be seen in the profiles - the error in Ch1 generally increases approaching the loop. As a rule a 1% error in measurement of the distance from the loop will result in, for outside the loop surveys, an error in Ch1 of:

- 1% near the loop front (long-wire field varies as  $1/r$ )
- 3% at a distance from the loop front (dipolar field varies as  $1/r^3$ )
- 2% at intermediate distances (intermediate field varies as  $\sim 1/r^2$ )

Errors in elevation result in smaller errors but as they often affect the chainage they accumulate along the line.

The in-loop survey configuration generally diminishes geometric error since the field gradients are very low. At the centre of the loop the gradient in the vertical field is essentially zero so it is difficult to introduce geometric anomalies near the loop centre. Near the loop sides and at the closest approach of the lines to the wire mislocation of the loop and the station becomes more critical. Typically loop sides are designed to be >200m from any survey stations.

### 2) **Magnetostatic UTEM responses**

Magnetostatic UTEM responses arise over rocks which generate magnetic anomalies. Such magnetic materials will amplify the total (primary + secondary) field of the UTEM transmitter which is sensed by the receiver coil. The secondary field is generated by subtracting a computed primary which does not include magnetic effects. This can give rise to strong and abrupt channel 1 anomalies when the source of the magnetics is at surface. This is the case in a number of places on these grids. UTEM magnetostatic anomalies differ from DC magnetic anomalies in the following three major ways:

- 1) In the case of DC magnetics the field is dipping N and is very uniform over the scale of the survey area while the UTEM field inside the loop is vertical and it is stronger near the loop edges.
- 2) Most aeromagnetics are collected as total field while with UTEM we measure a given (in this case the z) component.
- 3) DC magnetic instruments observe the total magnetization of the causative body which is due to its susceptibility as well as any remnant magnetization. An AC method such as UTEM will not respond to the remnant portion of the magnetization.

The larger amplitude of the UTEM Ch1 response is explained by the fact that the UTEM primary field is often more favourably coupled (magnetostatically speaking) to magnetic mineralization as compared to the earth's field. Another factor could be the presence of a reverse remnant component to the magnetization.

Note that positive (*negative*) magnetic anomalies will cause:

- positive (*negative*) Ch1 anomalies in data collected outside the loop
- negative (*positive*) Ch1 anomalies in data collected inside the loop

### 3) **Extremely good conductors**

An extremely good conductor will be characterized by a time constant much longer than the half-period (@ 30Hz >>16ms). This will give rise to an anomalous Ch1 which is not correlated to the Ch2-10 data plotted on the upper axes of a *channel 1 normalized* plot.