

Arctic Geophysics Inc.



Geophysical Surveys • Prospecting • Consulting

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Geophysical Survey with 2D Resistivity for Placer Investigation, Cement Creek 2014

Prospecting Lease IW00401

LOCATION

UTM Zone7 V 564419 6808058

FOR

Andre Jeanson

Box 14

Burwash Landing, YT

Y0B1V0

AUTHOR

Philipp Moll

WORK PERFORMED

Aug 8th-11th 2014

DATE OF REPORT

Aug 13th 2014

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1 Introduction

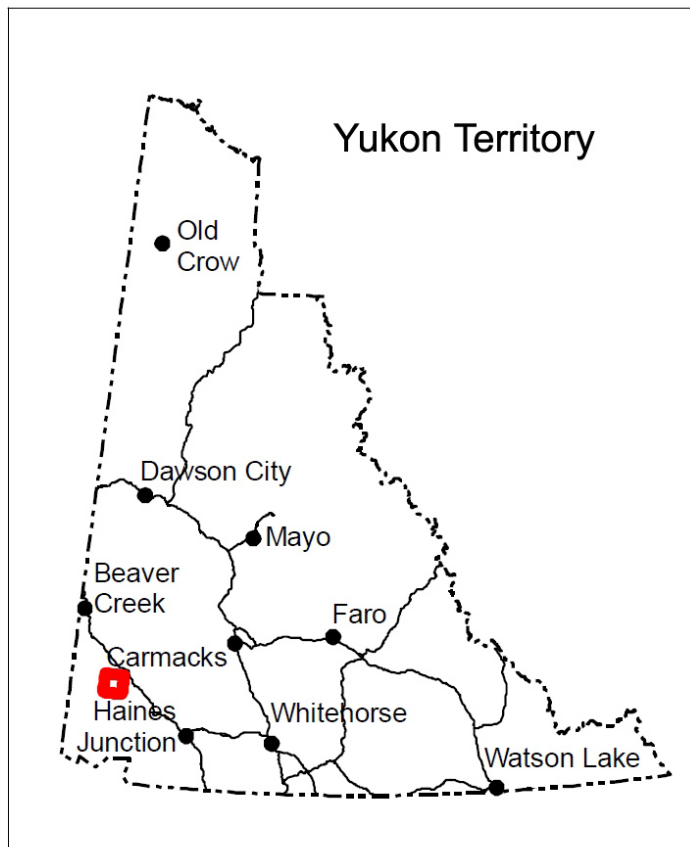
This geophysical investigation was done for Andre Jeanson. The survey, using 2D Resistivity, was conducted to prospect the placer tenure listed below for the localisation of possible targets for commercial placer gold. The ground was tested with three 2D measuring lines with a length of 77.5m to 93m. The depth of investigation is 12-15m. In the lower part of the lease the Cement valley shows a canyon-shaped profile; that's why the maximum length of cross valley profiles were limited at approx. 93m.

2 Placer Tenures

Grant Number	Name	Owner
IW00401	-	Andre Jeanson

3 Location

The placer claim property is located app. 250km west of Whitehorse, map number 115G05P, on Cement Creek being a left tributary of Donjek Creek



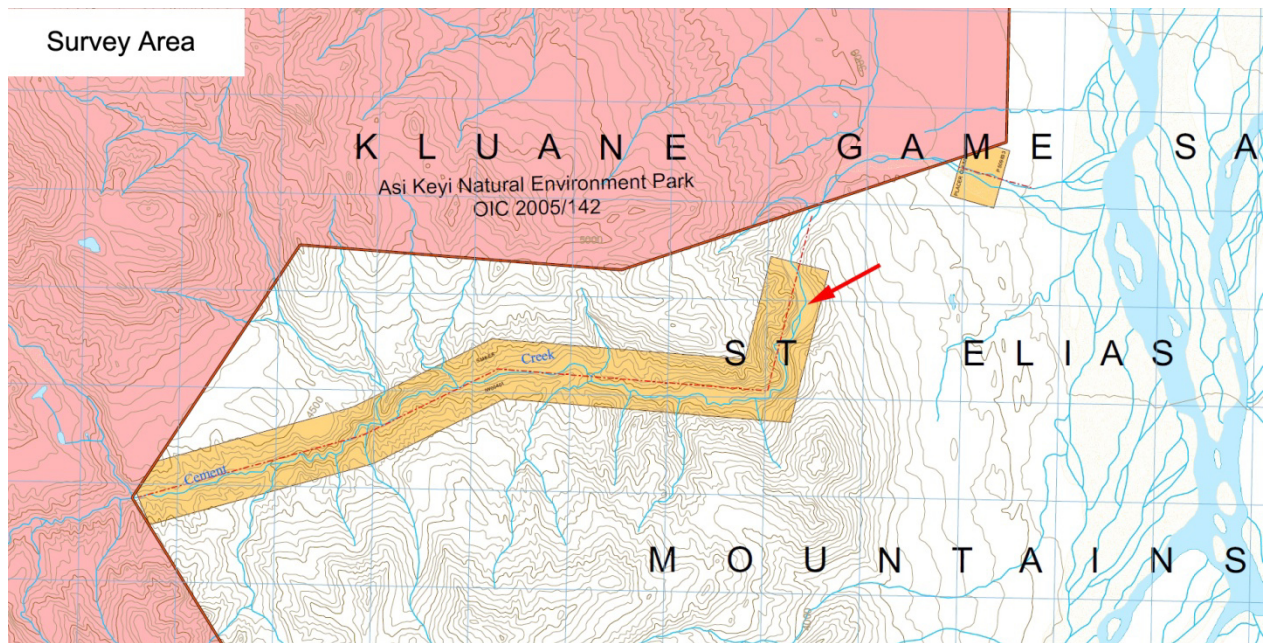


Figure. 1: Topographic map with placer tenures

4 Access

The survey crew was flown by fixed wing aircraft from Burwash Landing to a landing strip 1 km upstream (southern) from the confluence of Donjek Creek and Cement Creek. The landing strip in the field was a dry riverbed where the vegetation was roughly cut off.

5 Goal

The survey was focussed on measuring and interpreting the following subsurface characteristics:

1. Depth and topography of bedrock
 - Paleochannels
 - Bedrock benches
2. Sedimentary stratification
3. Permafrost conditions
4. Groundwater table
5. Mining/prospecting history

6 Geophysical Methods

Resistivity is not a time domain geophysical method such as Ground Penetrating Radar or Seismic. Resistivity measures a material property. In the Resistivity model the different underground zones are material-dependently differentiated according to their electrical conductivity. Thus, Resistivity promises good chances in respect of measuring the kind and character of the subsurface materials as well as the groundwater distribution, which would be of interest for placer mining. The equipment used (see below)

allows for measuring of layer interfaces in depths from 0.5m to 100m by varying the electrode spacing. – Therefore, this prospecting concept is based on the use of 2D Resistivity.

Induced Polarization (IP): IP data are simultaneously taken when measuring Resistivity, with the same equipment and line staking. So these data are automatically at hand when using Resistivity. The IP model serves as basis for the interpretation of the mineral and petrologic conditions in hardrock. Thus, IP is an industry proven standard method for the detection of primary mineral deposits. However, the IP model can also support the interpretation of the Resistivity profile.



Figure 2: 2D Resistivity measurement, Stefan Ostermaier, Arctic Geophysics Inc., Atlin, BC 2013

7 Use of Geophysical Methods

7.1 Instrumentation

For this survey a lightweight, custom-built 2D RESISTIVITY and INDUCED POLARIZATION (IP) imaging system with rapid data acquisition was used. The system includes:

- “4 POINT LIGHT” EARTH RESISTIVITY METER¹
- 4 ELECTRODE CONTROL MODULES²
- 64 STAINLESS STEEL ELECTRODES³
- 320m MULTICORE CABLE: CONNECTOR SPACING: 5m⁴

This system weighs approximately 150 kg which is about one third of regular standard equipment. It can be run with a 12V lead battery. The equipment facilitates high mobility and rapid data acquisition with a small crew.

7.2 Data Acquisition

Resistivity

The data acquisition is carried out by the automatic activation of 4-point-electrodes. Thus several thousand measurements are taken, one every 1-2 seconds. The AC transmitter current of 0.26 to 30 Hz is amplified by the electrode control modules, up to a maximum of 100mA and 400V peak to peak. The voltage measured at the receiver electrodes (M, N) is also amplified.

In this geoelectrical survey the Schlumberger-array was used. This array is appropriate to image horizontal structures in the subsurface as is needed for placer prospecting.

7.3 Processing

Resistivity

The measured Resistivity data were processed with the RES2DINV inversion program⁵.

7.4 Interpretation

The interpretation of the profile should be verified by physical prospecting methods such as digging test holes/trenches, drilling, or shafting.

¹ Constructed and produced by LGM (Germany)

² Ditto

³ Constructed and produced by GEOANALYSIS.DE (Germany)

⁴ Ditto

⁵ Produced by GEOTOMO SOFTWARE SDN. BHD (Malaysia)

8 Profile image

The 2D Resistivity profile is providing a model of the electrical resistivity of the different ground materials/zones.

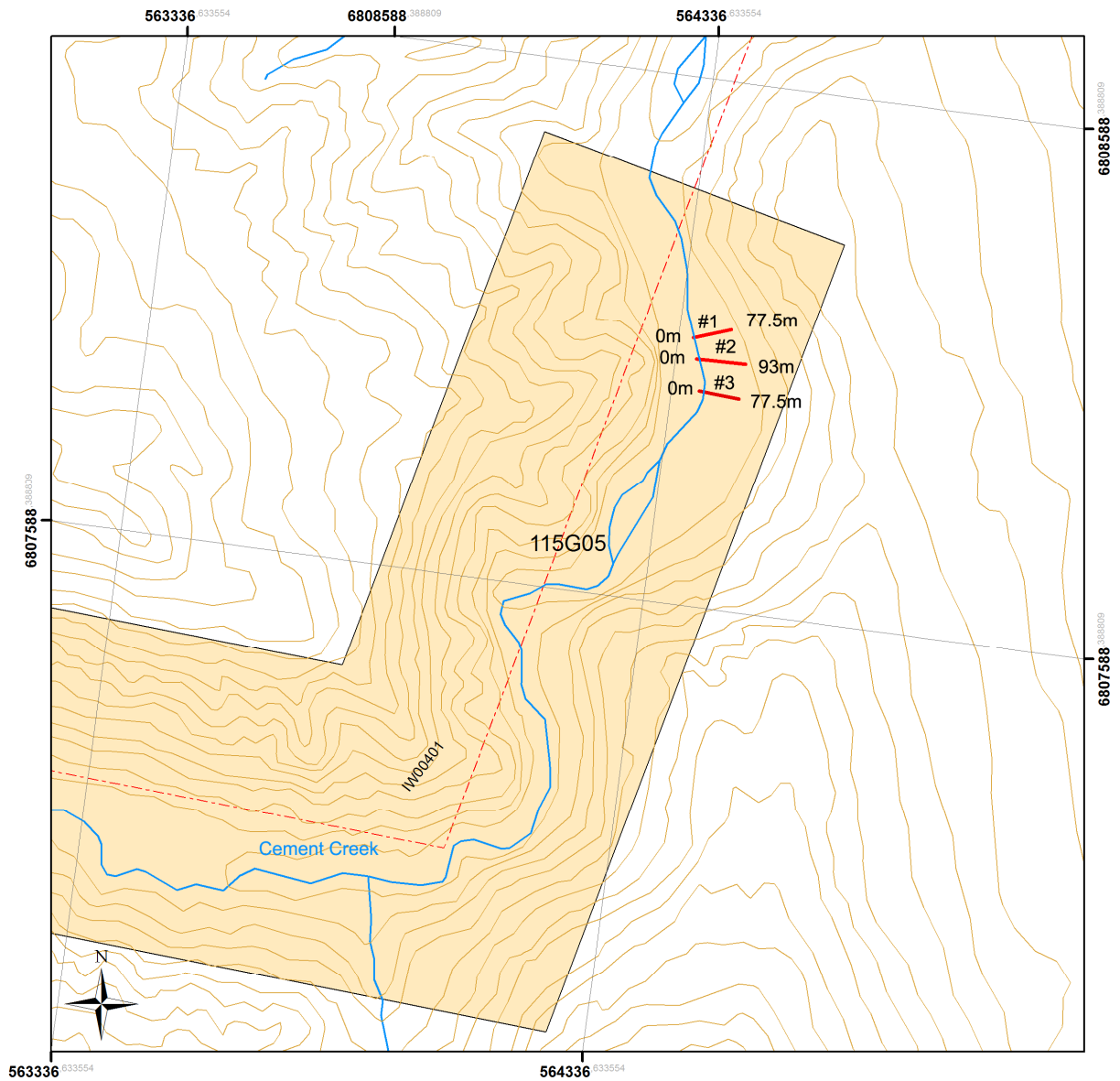
In the Resistivity profile the interpreted bedrock interface is marked with a black line.

9 Resistivity Survey

Preliminary Note!

The subsurface information of this study is an interpretation and cannot be guaranteed.

9.1 Survey Map⁶



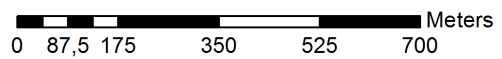
Legend

- | | |
|----------------|--------------------------|
| contour line | placer baseline |
| road | placer_claims |
| trail | Active |
| watercourse | Expired |
| waterbody | prospecting_lease |
| swamp | Active |
| measuring line | Expired |

Survey Map

115G05 (Steele Creek)
 Universal Transverse Mercator Zone7
 North America Datum 1983

Scale 1:10.000



⁶ Government of Canada, Natural Resources Canada, Centre for Topographic Information
<ftp://ftp.geomaticsyukon.ca/Mining>

9.2 Profile: Interpretation, Recommendation

Line 01

2D Resistivity, Schlumberger array

32 Electrodes: spacing 2.5m, Horizontal resolution 1.25m

Horizontal and vertical measure in [meter], Iteration error in [%]

Vertical exaggeration in model section display: RES 1.0

Data acquisition: Stefan Ostermaier, 9h August 2014

Processing: Stefan Ostermaier, 9th August 2014

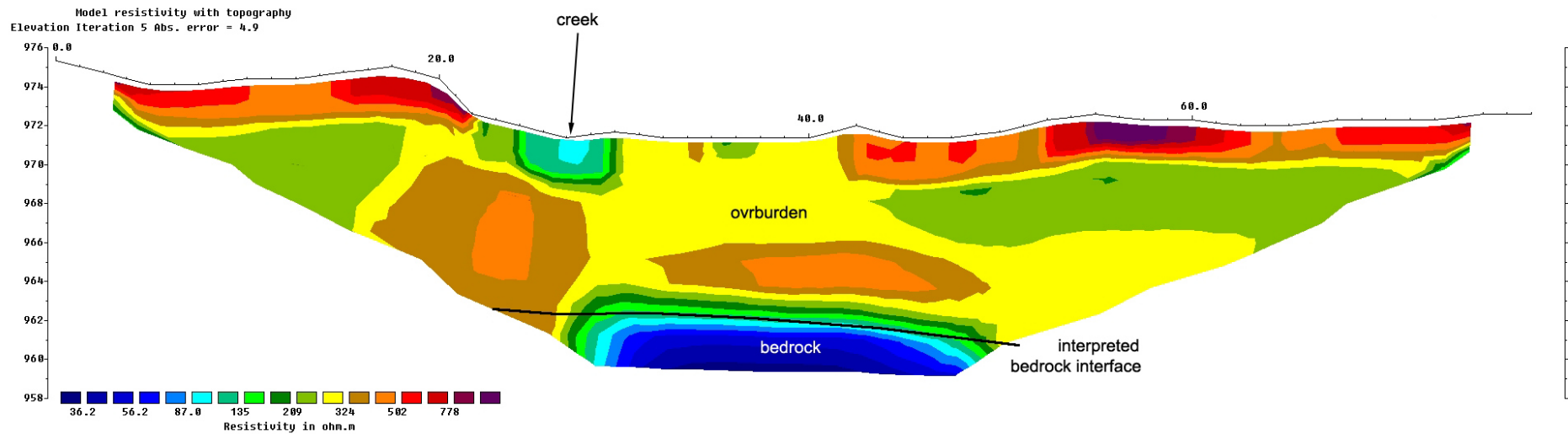
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Interpretation



The profile might show the ground-layers up to approximately 15% thicker than they are in reality.

This 2D Resistivity measuring result is an interpretation of geophysical data. We recommend the verification of the profile by drilling or trenching.

Interpretation

Resistivity Line_01 shows about 9m of overburden on top of bedrock.

The topmost data layer (violet/red/orange), about 2m thick, is alluvial gravel which is seen on the surface. At this gravel the matrix⁷ of finer sediments is partly washed out resulting in lower capacity holding water.

The data layer underneath (brown/yellow/green), approx. 7m thick, might indicate alluvial gravel which a richer matrix and water-saturation. Around the current creek the gravel is higher saturated producing higher data (turquoise).

At approx. 9m depth the bedrock (blue) might start. The bedrock below the overburden seems to be the same bedrock type as the bedrock seen on the wall of the canyon which was identified as sedimentary rock created by lithification of alluvial gravel deposits.⁸

⁷ The matrix of a sediment means the finer sediments where the gravels are embedded. These fine sediments are usually sand, mud, silt, and clay.

⁸ The low resistivity data of the bedrock is caused by the porosity of this sedimentary bedrock containing stationary water with high concentrations of solved minerals.

Line 02

2D Resistivity, Schlumberger array
32 Electrodes: spacing 3m, Horizontal resolution 1.5m
Horizontal and vertical measure in [meter], Iteration error in [%]
Vertical exaggeration in model section display: RES 1.0
Data acquisition: Stefan Ostermaier, 10th August 2014
Processing: Stefan Ostermaier, 10th August 2014

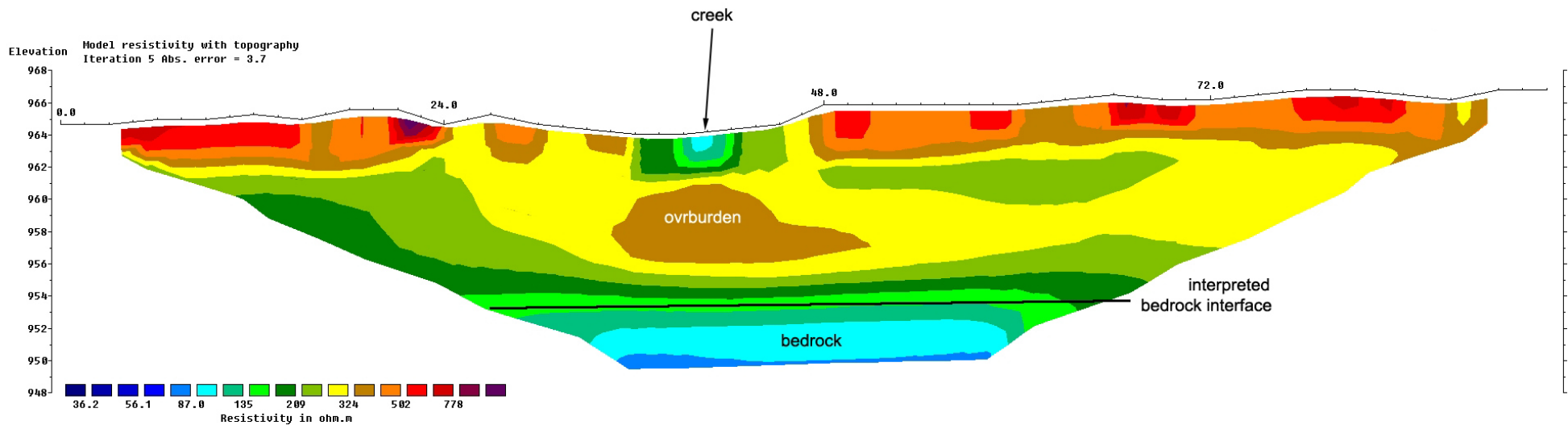
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Interpretation



The profile might show the ground-layers up to approximately 15% thicker than they are in reality.

This 2D Resistivity measuring result is an interpretation of geophysical data. We recommend the verification of the profile by drilling or trenching.

Interpretation

Resistivity Line_02 shows the same data structure as Line_01. Line_02 presents 11-13m of overburden on top of bedrock.

The topmost data layer (violet/red/orange), about 2-3m thick, is alluvial gravel which is seen on the surface. At this gravel the matrix of finer sediments is partly washed out resulting in lower capacity holding water.

The data layer underneath (brown/yellow/green), 9-11m thick, might be alluvial gravel which a richer matrix and water-saturation. Below the current creek the gravel is higher saturated producing higher data (turquoise/bright green).

At 11-13m depth the bedrock (blue) might start. The bedrock should be the same bedrock type as interpreted in Line_01.

Line 03

2D Resistivity, Schlumberger array
32 Electrodes: spacing 2.5m, Horizontal resolution 1.25m
Horizontal and vertical measure in [meter], Iteration error in [%]
Vertical exaggeration in model section display: RES 1.0
Data acquisition: Stefan Ostermaier, 11th August 2014
Processing: Stefan Ostermaier, 11th August 2014

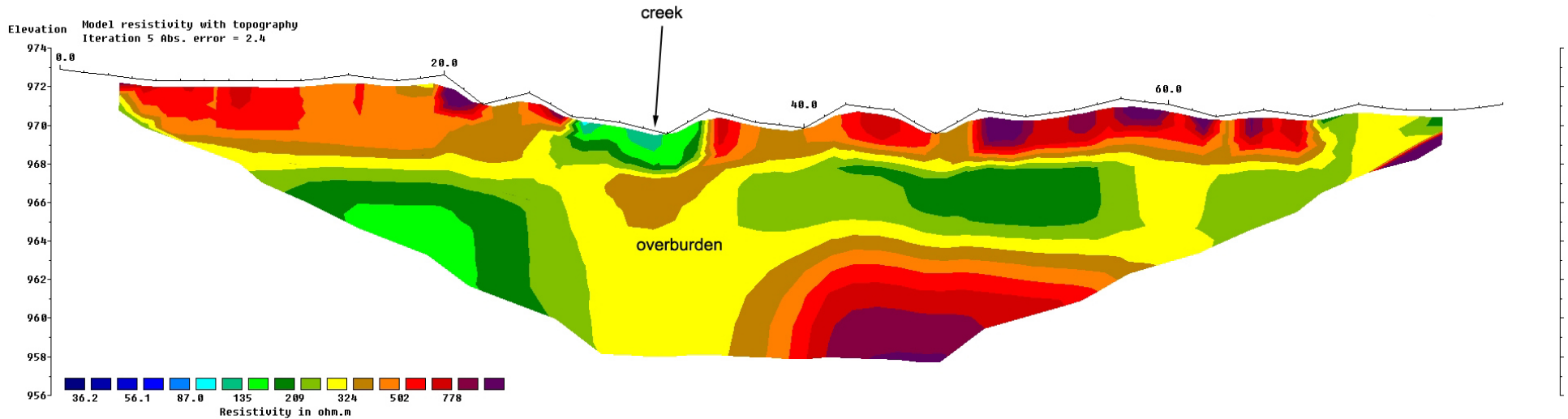
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Interpretation



The profile might show the ground-layers up to approximately 15% thicker than they are in reality.

This 2D Resistivity measuring result is an interpretation of geophysical data. We recommend the verification of the profile by drilling or trenching.

Interpretation

Resistivity Line_03 shows the data structure of the two overburden layers described in Lines_01 and _02 again. The bedrock doesn't seem to be reached. It must be over 12m deep. The bedrock seems to drop in upstream direction.

Other than in the other two lines we see a violet/red data layer after 40m on the measuring line, starting at about 8m depth. This layer seem to represent a dryer gravel unit.

Recommendation

In upstream direction (from Line_01 to Line_03) the bedrock is deepening. This deepening could lead to a bedrock pit whose deepest point was not located in this survey because of limited budget. This hypothetical bedrock pit would be a target for further prospecting with 2D Resistivity.

A paleochannel in the bedrock has not been identified in the profile series. The valley bottom is quite narrow and there is not much room for the creation of a bedrock channel. The bedrock seems to be eroded by alluvial movement across the whole valley bottom! In other words: the whole valley bottom seems to represent one big channel which would be typical for a canyon-shaped valley. Thus the bedrock all around the valley bottom could contain pay gravel on top of bedrock.

Further upstream there are widenings of the valley bottom: There could be enough room for paleochannels sitting in bedrock. This scenario could be found 200m upstream from the mouth of the right tributary 1.2km upstream from Line_03 (see Survey Map page 8). The inspection of this section was not covered by the budget of this survey. But this section upstream would be a promising target for further geophysical prospection with 2D Resistivity.

10 Gallery



Figure 3: 2D Resistivity Line_01 - data acquisition



Figure 4: Cement Creek at the border of the Lease downstream. Field assistant David Jennings



Figure 5: Canyon wall downstream from Line_01. Lithification of alluvial deposits.

11 References

11.1 Literature

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Griffiths, D.H. and Barker, R.D. Two-dimensional resistivity imaging and modeling in areas of complex geology. Journal of Applied Geophysics 29 : 211 - 226. (1993)

Keller, G.V. and Frischknecht, F.C. Electrical methods in geophysical prospecting. Oxford: Pergamon Press Inc. (1966)

Loke M.H. and Barker R.D. Rapid least-squares inversion of apparent resistivity pseudosections by a quasi-Newton method. Geophysical Prospecting 44: 131-152 (1996)

Press F., Siever R., Grotzinger J., Thomas H.J. Understanding Earth, W.H. Freeman and Company, New York (2004)

Robb L. Introducing to Ore-Forming Processes, Backwell Science Ltd., 2005

11.2 Maps

Government of Canada, Natural Resources Canada, Centre for Topographic Information

<ftp://ftp.geomaticsyukon.ca/Mining>

12 Qualification

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- Study of geology, University of Freiburg, Germany
- Visit of geophysical field courses, University of Karlsruhe, Germany
- Working for Arctic Geophysics Inc. since June 2007 (foundation)
Geophysical field surveys using 2D Resistivity, Induced Polarization, Magnetics: Data acquisition, processing, interpretation, documentation
- Geophysical surveying for Mining Exploration in the Yukon since 2005, and geological prospecting for precious metals and minerals in the Yukon, NWTs, and Alaska since 1989
- Publications:
 - a. Numerous Assessment Reports about geophysical surveys done for Yukon mining companies, filed at Yukon Mining Recorder
 - b. Geophysical survey (45 field days) for Yukon Government: Yukon Geological Survey,
 - c. <http://virtua.gov.yk.ca:8080/lib/item?id=chamo:164867&theme=emr> "2D resistivity / IP data release for placer mining and shallow quartz mining - Yukon 2010 : Los Angeles Creek, Wolf Creek, Ladue River, and Rice Creek ; Philipp Moll and Stefan Ostermaier"

13 Confirmation

I have prepared this report entitled "Geophysical Geophysical Survey with 2D Resistivity for Placer Investigation, Cement Creek 2014" for assessment credit, and have interpreted the data. The survey was carried out by Arctic Geophysics Inc.

Schutterwald, Germany, 13th Dec 2014

"Signed" Philipp Moll



Philipp Moll

14 Addendum

14.1 Cost

Arctic Geophysics Inc.



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Survey Location: Cement Creek, Lease IW00401

Invoice # 20140813

Date: 13th Aug, 2014

Quantity	Description	Amount \$CAN
Mob/Demob		
1 day	Vehicle 70.--/ day	70.--
552 Km	\$ 0.55/km	303.60
1day	Driving, operator + assistant, 550.--/day Whitehorse – Burwash Landing – Whitehorse	550.--
Geophysical Survey		
3 days	Geoelectrical 2D-Resistivity Imaging System: Earth Resistivity Meter, 64 electrodes, 320m multi-core cable, PC, software, GPS, altimeter etc., Plus Survey leader, 880.--/day	2 640.--
1 day	Survey leader, inspection of survey ground, preparing lines, building cable transitions over the stream, 400.--	400.--
4 days	/day Field Assistant, 250.--/ day	1 000.--
4 days	Generator, 20.--/day	80.--
	Fuel	25.--
4 days	Camp equipment, 30.-- / day	120.--
4 days	Satellite phone, 25.--/day	100.--

20 min	Satellite calls, 1.99/min	39.80
1 1/2 days	Working data, Documentation, 400.-- /day	600.--
	Printing / Binding /Shipping	80.--
		<hr/>
	NET Amount	\$ 6 008,04
GST Number 846363216RT0001	G.S.T. (5%)	\$ 300.42
		<hr/>
Total Due		\$ 6 308.46
		<hr/>

14.2 GPS-Data

2014 Line01

Electrode No.	Location in Profile [m]	GPS-Coordinates UTM WGS 1984	GPS-Accuracy [m]	Post [*]
1	0	7 V 564363 6808096	4	*
2	2.5	7 V 564363 6808099	4	
3	5	7 V 564365 6808099	4	
4	8	7 V 564390 6808100	4	
5	10	7 V 564389 6808101	4	
6	12.5	7 V 564387 6808102	4	
7	15	7 V 564386 6808103	4	
8	17.5	7 V 564380 6808105	4	
9	20	7 V 564382 6808105	4	
10	23	7 V 564384 6808104	4	
11	25	7 V 564385 6808104	4	
12	27.5	7 V 564385 6808100	4	
13	30	7 V 564387 6808100	4	
14	32.5	7 V 564388 6808098	4	
15	35	7 V 564392 6808100	4	
16	38	7 V 564393 6808099	4	
17	40	7 V 564394 6808100	4	
18	42.5	7 V 564395 6808100	4	
19	45	7 V 564397 6808101	4	
20	47.5	7 V 564401 6808103	4	
21	50	7 V 564404 6808105	4	
22	53	7 V 564407 6808106	4	
23	55	7 V 564410 6808109	4	
24	57.5	7 V 564413 6808112	4	
25	60	7 V 564416 6808113	4	
26	62.5	7 V 564419 6808116	4	
27	65	7 V 564423 6808117	4	
28	68	7 V 564424 6808117	4	
29	70	7 V 564426 6808119	4	
30	72.5	7 V 564429 6808120	4	
31	75	7 V 564431 6808120	4	
32	77.5	7 V 564433 6808121	4	*

2014 Line02

Electrode No.	Location in Profile [m]	GPS-Coordinates UTM WGS 1984	GPS-Accuracy [m]	Post [*]
1	0	7 V 564375 6808056	4	*
2	3	7 V 564380 6808053	4	
3	6	7 V 564385 6808052	4	
4	9	7 V 564387 6808055	4	
5	12	7 V 564387 6808055	4	
6	15	7 V 564390 6808059	4	
7	18	7 V 564392 6808059	4	
8	21	7 V 564395 6808059	4	
9	24	7 V 564398 6808056	4	
10	27	7 V 564402 6808057	4	
11	30	7 V 564406 6808056	4	
12	33	7 V 564408 6808061	4	
13	36	7 V 564408 6808059	4	
14	39	7 V 564412 6808057	4	
15	42	7 V 564416 6808058	4	
16	45	7 V 564419 6808058	4	
17	48	7 V 564424 6808058	4	
18	51	7 V 564428 6808057	4	
19	54	7 V 564430 6808058	4	
20	57	7 V 564432 6808059	4	
21	60	7 V 564436 6808058	4	
22	63	7 V 564438 6808058	4	
23	66	7 V 564441 6808058	4	
24	69	7 V 564445 6808060	4	
25	72	7 V 564448 6808061	4	
26	75	7 V 564452 6808061	4	
27	78	7 V 564454 6808062	4	
28	81	7 V 564457 6808061	4	
29	84	7 V 564459 6808061	4	
30	87	7 V 564462 6808060	4	
31	90	7 V 564465 6808059	4	
32	93	7 V 564468 6808059	4	*

2014 Line03

Electrode No.	Location in Profile [m]	GPS-Coordinates UTM WGS 1984	GPS-Accuracy [m]	Post [*]
1	0	7 V 564388 6807997	4	*
2	2.5	7 V 564388 6807999	4	
3	5	7 V 564390 6808000	4	
4	8	7 V 564393 6808001	4	
5	10	7 V 564394 6808000	4	
6	12.5	7 V 564397 6808002	4	
7	15	7 V 564401 6808001	4	
8	17.5	7 V 564403 6807998	4	
9	20	7 V 564406 6807999	4	
10	23	7 V 564408 6807999	4	
11	25	7 V 564411 6807996	4	
12	27.5	7 V 564413 6807999	4	
13	30	7 V 564414 6807998	4	
14	32.5	7 V 564416 6807999	4	
15	35	7 V 564420 6807999	4	
16	38	7 V 564423 6807998	4	
17	40	7 V 564424 6807998	4	
18	42.5	7 V 564427 6807998	4	
19	45	7 V 564430 6807999	4	
20	47.5	7 V 564433 6807998	4	
21	50	7 V 564434 6807998	4	
22	53	7 V 564436 6807998	4	
23	55	7 V 564438 6807997	4	
24	57.5	7 V 564441 6807998	4	
25	60	7 V 564444 6807999	4	
26	62.5	7 V 564447 6807997	4	
27	65	7 V 564450 6807996	4	
28	68	7 V 564452 6807995	4	
29	70	7 V 564454 6807995	4	
30	72.5	7 V 564456 6807994	4	
31	75	7 V 564461 6807993	4	
32	77.5	7 V 564464 6807992	4	*