

Arctic Geophysics Inc.



Geophysical Surveys • Prospecting • Consulting

www.arctic-geophysics.com

Box 747, Dawson City Y.T., Y0B-1G0, Canada

Phone: 867-993-3671 (Cell), info@arctic-geophysics.com

Geophysical Survey with 2D Resistivity Dycer Creek, Yukon

Livingstone Creek Area, P 41977, P 47178

134°15'34,951"W 61°26'46,26"N

FOR

Stephen A. Swaim
737 Downie Street
Kamloops BC V2B 5T1

AUTHORS

Stefan Ostermaier
Franz Piechotta

WORK PERFORMED

September 7th - 8th 2012

DATE OF REPORT

Feb 18th 2013

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1 Introduction

This geophysical investigation was done for Stephen Swaim. The survey, using 2D Resistivity, was conducted to prospect the tenures listed below for the localisation of possible prospecting targets for placer gold deposits. The ground was tested with two 2D measuring lines with a length of 128m each; the depth of investigation is approx. 20m.

2 Placer Tenure

Grant Number	Name	Owner
P 41977	DYCER 2	Stephen A. Swaim
P 47178	DYCER 10	Stephen A. Swaim

3 Location

The placer property is located app. 90km north-east of Whitehorse on Dycer Creek a tributary to Mendocina Creek, in the Pelly Mountains, map number 105E08.

4 Access

The exploration site was accessed by helicopter from Whitehorse.

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 Method

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.



Figure 1: 2D Resistivity measurement, Stefan Ostermaier, Arctic Geophysics Inc., Yukon 2009

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
- 64 ELECTRODE CONTROL MODULES²
- 64 STAINLESS STEEL ELECTRODES³
- 320m MULTICORE CABLE: CONNECTOR SPACING: 5m⁴

This system weighs approximately 120 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 layers as is needed for placer prospecting.

The 2D Resistivity imaging system, used for this survey, allows measurements with a depth of up to 100m. With a depth to bedrock of more than 6m, an electrode spacing of 5m can be used for placer surveys. This allows the measuring of large profile lengths in short time with a horizontal measuring resolution of 2.5m. This system has proven itself to be reliable in the determination of the bedrock topography and sedimentary arrangement for placer investigation at the most environmental conditions.

7.3 Processing

Resistivity

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

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)

7.4 Interpretation

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

8 Profile image

In the Resistivity profile the interpreted layer interfaces are marked with a black line. The profiles show ground-layers approximately 15% thicker than they are in reality. The thickening of the model layers is caused by the inversion software. The correction factor of 0.85 for the determination of the true layer thickness has been established by the Arctic Geophysics Inc. team on the basis of numerous geoelectrical profiles verified by drilling, trenching, and mining done by our customers⁶.

The graphical markings showing the interpreted layer interfaces in the profiles (using a black line) are done according to the data structure in the profile itself. This means: the layers there will also show up approximately 15% thicker than they are expected in reality. In the interpretation text, the layer thicknesses and depths have been recalculated to the expected real values.

9 Geology

In the survey area of Dycer Creek, the **bedrock** basically shows resistivity data of 40-4000 Ohm. This data can be interpreted in accordance with the information on the Bedrock Geology Map: According to the bedrock map the bedrock should consist of amphibolites that may belong to the Nisling, Nasina and Slide Mountain assemblages (400-4000 Ohm) but may locally include significant Klondike Schist Assemblages (40-400 Ohm). Especially the Klondike Schist could explain the very low resistivity values seen in the bedrock.

The V-shape of the Dycer Creek Valley in the survey area suggests that there was no glaciation in the valley that would have influenced the formation of placers. The local **overburden** consists of original river gravel showing a matrix consisting of sand, silt, mud, and poor amounts of clay. On the flanks of the valley the river gravel can be mixed or covered with colluvium (slide rock). The investigated section of Dycer Creek seems to show relatively high sedimentary transportation energy which makes avoiding the deposition of thicker overburden layers. The schist would be less erosion resistant than amphibolites and usually provides pockets to trap placer gold.

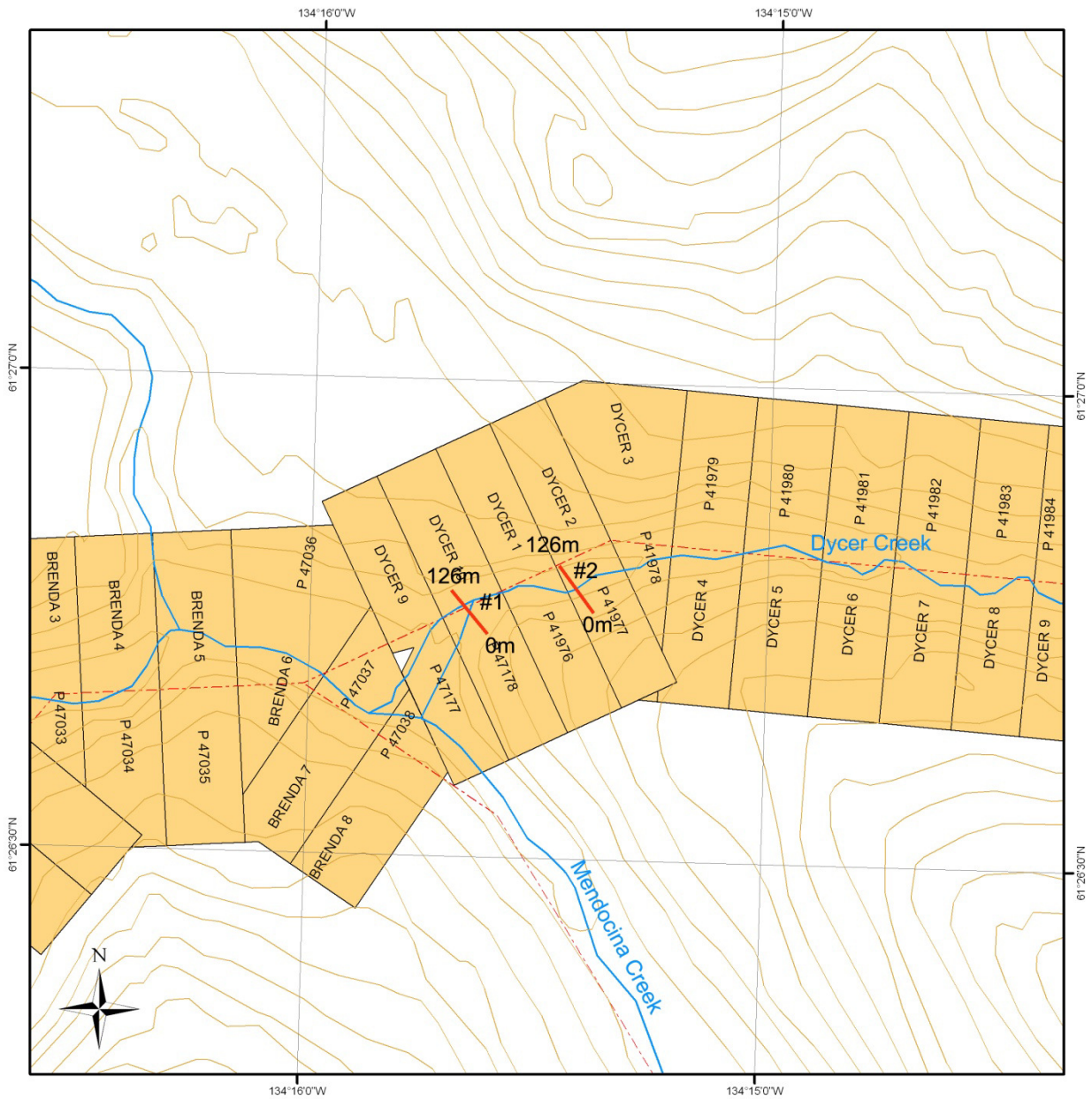
10 Resistivity Survey at Dycer Creek

Preliminary Note!

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

⁶ Program settings in RES2DINV for modifying the layer thickness do frequently not work well for our use and could falsify the profile. That's why this mode was not used.

11 Survey Map⁷



Legend

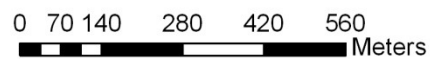
- measuring line
- - - placer baseline
- contour line
- - - trail
- water course
- water body
- placer claims**
- Active
- Expired

Survey Map

105E08 (Livingstone Creek)

Universal Transverse Mercator Zone 8
North American Datum 1983

Scale 1:10,000



⁷ Government of Canada, Natural Resources Canada, Centre for Topographic Information
<ftp://ftp.geomatics.yukon.ca/Mining>

12 Profiles – Interpretation

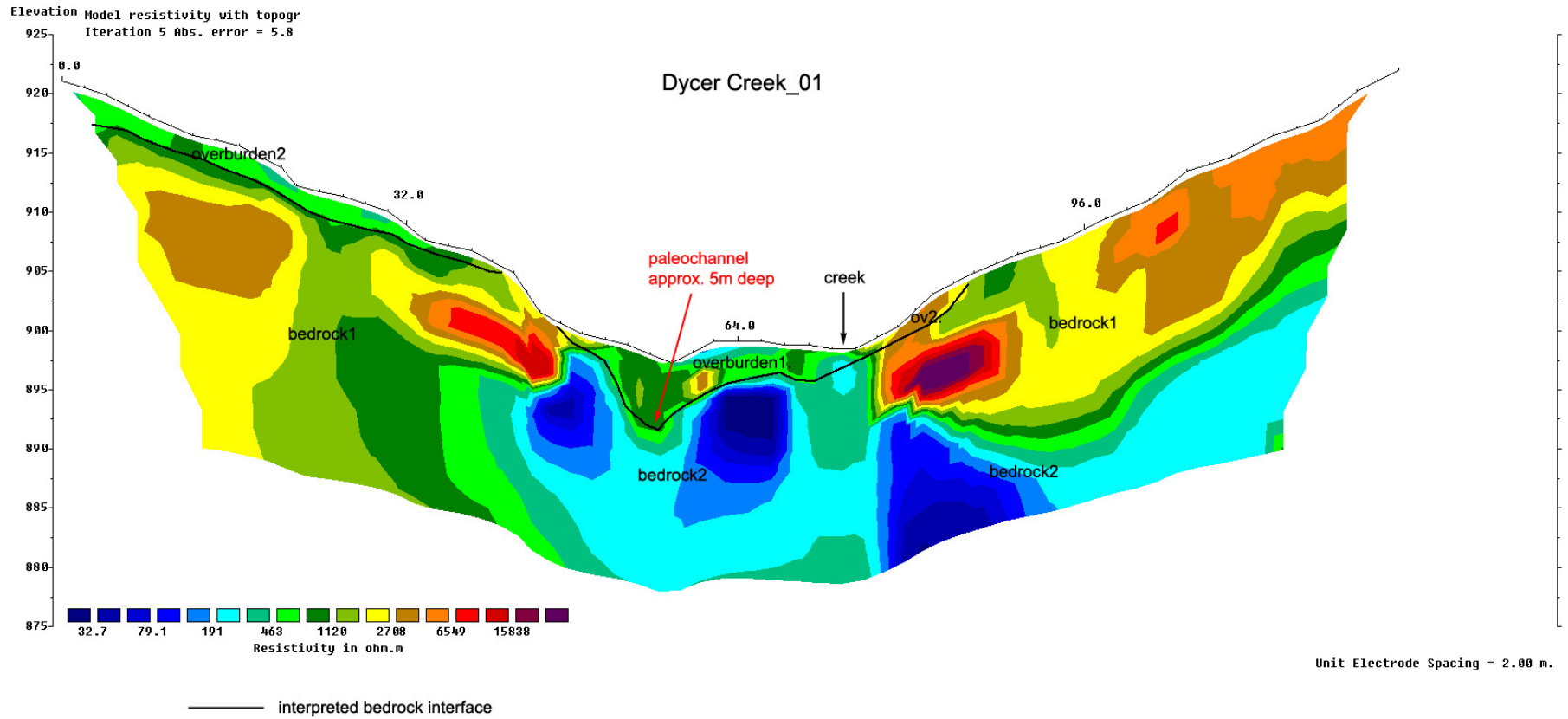
Dycer Creek Line 01
 2D Resistivity/IP, Schlumberger array
 64 Electrodes: spacing 2m, Horizontal resolution 1 m
 Horizontal and vertical measure in [meter], Iteration error in [%]
 Vertical exaggeration in model section display = 1.00
 Data acquisition: Stefan Ostermaier, Franz Plechotta, 7th September 2012
 Processing: Stefan Ostermaier, 7th September 2012
 Arctic Geophysics Inc., Yukon

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Interpretation

Resistivity profile_01 shows 2 layers with different resistivity values, interpreted to represent different overburden compositions. Most likely there are also 2 different types of bedrock.

At 0-41m the overburden is single-layered. It is interpreted to be colluvially transported gravel (overburden1). The bedrock beneath is most likely mafic or ultramafic metamorphic rock (rich in amphibolite).

Between 41-48m there is no overburden on top of bedrock. The bedrock outcrop likely presents the same amphibolite as elsewhere in the profile.

From 48m to 64m there seems to be a depression within bedrock. The estimated depth of this paleochannel is 5m. The depression might be covered by fluvial gravel, which may contain a fine sediment matrix consisting of sand, silt, mud and less likely clay (overburden2). The bedrock is interpreted to be micaeous, schistose rocks of intermediate or mafic composition.

At 64-86m the overburden is single-layered. At about 74m there is a transition zone, where the overburden composition might change. Between 64 and 74m the overburden composition is likely similar to the overburden covering the depression (overburden1). From 74 to 86m it is likely colluvial gravel (overburden2). The bedrock might be schist.

From 86m to the end of the profile the bedrock is uncovered. It is interpreted to be mafic or ultramafic metamorphic rock (rich in amphibolite), like it can be found on the other side of the valley.

Based on the observations of the survey team, the survey area doesn't seem to be influenced by glacial activity. Potential placer gold deposits in the interpreted paleochannels of the resistivity profiles would most likely be deposited in association with original river gravel.

In Profile_01 the overburden is quite thinner than in profile_02, most likely because at profile location_01 the valley is narrower which produces greater outwash.

Recommendation

It is recommended to confirm geophysical measuring results by digging, shafting, trenching or drilling.

A point of interest is at 56m: Here an interpreted bedrock channel with an estimated depth of 5m might be located.

At 70m there is another target for physical exploration. There could be a slight depression in bedrock with a depth of approximately 2.5m, which could contain commercial placer gold concentrations as well.

It should be easy to reach these shallow prospecting targets with an excavator to check for potential placer gold.

While running the survey the water level at Dycer Creek was high (3 feet) and the current was fast. Compared to this the resistivity data

measured on the valley bottom were relatively high; this means: not much groundwater was in the overburden. Thus the overburden has a good seal effect.⁸ This might support all kinds of physical prospecting - even near to the current stream.

⁸ In accordance with this the survey crew has observed a hole on the bottom near the creek which did show a quite lower water level than the creek.

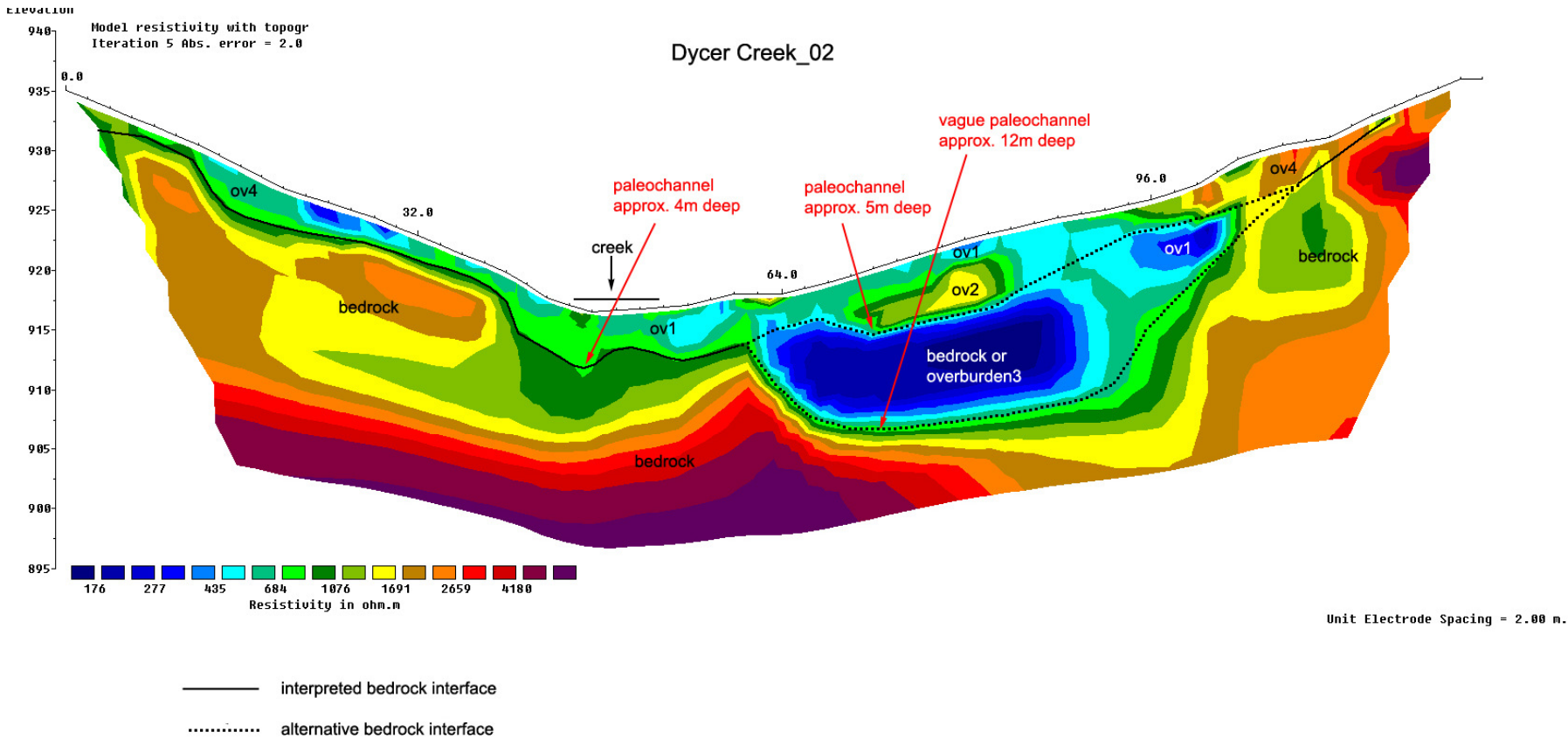
Dycer Creek Line 02
 2D Resistivity/IP, Schlumberger array
 64 Electrodes: spacing 2m, Horizontal resolution 1 m
 Horizontal and vertical measure in [meter], Iteration error in [%]
 Vertical exaggeration in model section display = 1.00
 Data acquisition: Stefan Ostermaier, Franz Plechotta, 8th September 2012
 Processing: Stefan Ostermaier, 8th September 2012
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Interpretation

Resistivity profile_02 shows heterogeneous resistivity values in the overburden. There could be several paleochannels in the bedrock.

At 0-12m the overburden is single-layered and very thin. It is interpreted to be colluvially transported gravel containing fine sediments. Bedrock is likely mafic or ultramafic metamorphic rock containing high amounts of amphibolite.

Between 12m and 40m the overburden seems to be 2-3m thick. It is interpreted to be colluvially transported gravel with fine sediment matrix.

Starting at 40m and continuing up to 61m there could be two slight depressions in the bedrock, 3 to 4m deep, which are likely filled with a mixture of fluvial and colluvial gravel, rich in fine sediments (sand, silt, mud, perhaps clay).

At 61-96m there could be a bowl-shaped bedrock channel, 12-15m deep. In this channel there might be 3 different layers of overburden: The topmost layer is likely to be fluvial gravel, rich in fine sediment (overburden1). The layer beneath might be a layer of gravel containing less fine sediments - possibly showing a permafrost lens (yellow data zone) (overburden2). The third layer (overburden3), on top of bedrock, might be a thick layer of fluvial gravel likely being rich in fine sediments and groundwater. The lower portion of this layer could potentially be rich in pay.

Alternatively, the third layer could be schist bedrock. If this would be the case, a shallower paleochannel, 5m deep, would most likely be

located at 72m. This channel would be filled with overburden 2 (gravel containing less fine sediments).

From 102m to 118m the overburden seems to be single-layered. It is interpreted to be dry colluvial gravel, containing less fine sediment, but more and bigger pieces of bedrock debris.

Recommendation

It is recommended to confirm geophysical measuring results by digging, shafting, trenching or drilling.

One target is at 47m, there is a depression in the bedrock, which might contain placer gold, its depth is approximately roughly 4m.

At 78m there is another point of interest. There could be the deepest spot of a pronounced channel, which may be around 12m deep. It is likely to be filled with fluvial gravel, which would likely contain significant amounts of placer gold.

If the channel at around 78m does not exist, a shallower channel, 5m deep, could be located at 72m. This would be a promising placer target as well.

13 References

13.1 Literature

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13.2 Maps

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

Gordey, S.P. and Makepeace, A.J. (comp.) 1999: Yukon bedrock geology in Yukon digital geology, S.P. Gordey and A.J. Makepeace (comp.); Geological Survey of Canada Open File D3826 and Exploration and Geological Services Division, Yukon, Indian and Northern Affairs Canada, Open File 1999-1(D)

14 Qualification

Stefan Ostermaier

Box 747, Dawson City, Yukon, Y0B 1G0

Phone: 001-867-993 3671 (Canada)

01149 (0)7021 -59866 (Germany)

E-mail: stefan.ostermaier@arctic-geophysics.com

- Study of geology, University of Tübingen, Germany
- Visit of geophysical field courses, University of Karlsruhe and University of Stuttgart, 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

- Geological Prospecting for precious metals and minerals in the Yukon, NWTs, and Alaska since 2001
- 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"

Franz Piechotta

Box 747, Dawson City, Yukon, Y0B 1G0

Phone: 001-867-993 3671 (Canada)

01149 177 239 55 98 (Germany)

E-mail: franz.piechotta@arctic-geophysics.com

- Study of Applied Geosciences at the Martin-Luther-University Halle-Wittenberg, Germany
- Passed a Practical Course as a Geophysical Prospector.
- Working for Arctic Geophysics Inc. since May 2012. For this company I have worked on geophysical field surveys using 2D Resistivity, Induced Polarization and Magnetics: Data acquisition, processing, interpretation, documentation.
- Geophysical surveying for mining exploration in the Yukon and British Columbia since 2012.

15 Confirmation

I have prepared this report entitled "Geophysical Survey with 2D Resistivity Dycer Creek, Yukon" for assessment credit, and have collected and reviewed the data contained in the report titled: "Geophysical Survey with 2D Resistivity Dycer Creek, Yukon".

The survey was carried out by Arctic Geophysics Inc.

Dettingen unter Teck, Germany, 18th October 2013

"Signed and Sealed" Stefan Ostermaier



Stefan Ostermaier

16 Addendum

16.1 Cost

Arctic Geophysics Inc.



Geophysical Surveys • Prospecting •

Stephen A. Swaim
737 Downie Street
Kamloops
V2B5T1

Arctic Geophysics Inc.
Box 747
Dawson City, Yukon
Y0B 1G0, Canada
Phone: 867-993-3671 (Cell)
info@arctic-geophysics.com
www.arctic-geophysics.com

Survey Location: Dycer Creek

Invoice # 201208231

Date: 15th Sept, 2012

Quantity	Description	Amount \$CAN
Mob/Demob		
2 days	Vehicle 70.--/ day [50%]	70.--
1100 Km	\$ 0.55/km [50%]	302.50
2 days	Driving 450.--/day, operator + assistant (Dawson-Whitehorse-Dawson) [50%]	450.--
Geophysical Survey		
2 days	Geoelectrical 2D-Resistivity Imaging System + operator, 880.--/day	1760.--
2 days	Field Assistant, 250.--/ day	500.--
1/2 day	Data processing, Documentation, operator + assistant 600.-- /day	300.--
NET Amount		\$ 3 382.50
GST Number 846363216RT0001		G.S.T. (5%) \$ 169.12
Total		\$ 3 551.62
Access with helicopter, invoice Trans North		\$ 4 712.93
Total Due		\$ 8 264.55

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Stephen A. Swaim
737 Downie Street
Kamloops
V2B5T1

Arctic Geophysics Inc.
Box 747
Dawson City, Yukon
Y0B 1G0, Canada
Phone: 867-993-3671 (Cell)
info@arctic-geophysics.com
www.arctic-geophysics.com

Survey Location: Dycer Creek

Invoice # 20130218

Date: 18th February, 2013

Quantity	Description	Amount \$CAN
Documentation		
1 day	Report writing @ 350.--/day	350.--
	Printing/Binding/Shipping	60.--
		NET Amount \$ 410.--
GST Number 846363216RT0001		G.S.T. (5%) \$ 20.50
Total due		\$ 430.50

16.2 GPS-Data

Dycer Creek 2012 Line01

Electrode No.	Location in Profile [m]	GPS-Coordinates Latitude/ Longitude hddd° mm' ss.s"	GPS-Accuracy [m]	Post [*]
1	0.0	N61 26 44.0 W134 15 36.7	3	*
2	4.0	N61 26 44.1 W134 15 36.8	3	
3	8.0	N61 26 44.2 W134 15 37.0	3	
4	12.0	N61 26 44.3 W134 15 37.2	3	
5	16.0	N61 26 44.4 W134 15 37.3	3	
6	20.0	N61 26 44.5 W134 15 37.5	3	
7	22.0	N61 26 44.6 W134 15 37.7	3	
8	26.0	N61 26 44.7 W134 15 37.8	3	
9	30.0	N61 26 44.8 W134 15 38.0	3	
10	34.0	N61 26 44.9 W134 15 38.2	3	
11	38.0	N61 26 44.9 W134 15 38.3	3	
12	42.0	N61 26 45.1 W134 15 38.4	3	
13	46.0	N61 26 45.1 W134 15 38.5	3	
14	50.0	N61 26 45.2 W134 15 38.6	3	
15	54.0	N61 26 45.3 W134 15 38.8	3	
16	58.0	N61 26 45.4 W134 15 39.0	3	
17	62.0	N61 26 45.4 W134 15 39.2	3	
18	66.0	N61 26 45.5 W134 15 39.4	3	
19	68.0	N61 26 45.5 W134 15 39.2	3	
20	70.0	N61 26 45.5 W134 15 39.3	3	
21	72.0	N61 26 45.6 W134 15 39.3	3	*
22	74.0	N61 26 45.6 W134 15 39.4	3	
23	78.0	N61 26 45.7 W134 15 39.8	3	
24	82.0	N61 26 45.8 W134 15 40.0	3	
25	86.0	N61 26 45.9 W134 15 40.2	3	
26	90.0	N61 26 46.0 W134 15 40.4	3	
27	94.0	N61 26 45.9 W134 15 40.5	3	
28	98.0	N61 26 46.0 W134 15 40.7	3	
29	102.0	N61 26 46.1 W134 15 40.8	3	
30	106.0	N61 26 46.3 W134 15 40.9	3	
31	110.0	N61 26 46.4 W134 15 41.0	3	
32	114.0	N61 26 46.5 W134 15 41.2	3	
33	118.0	N61 26 46.6 W134 15 41.3	3	
34	122.0	N61 26 46.7 W134 15 41.5	3	
35	126.0	N61 26 46.7 W134 15 41.6	3	*

Dycer Creek 2012 Line02

Electrode No.	Location in Profile [m]	GPS-Coordinates Latitude/ Longitude hddd° mm' ss.s"	GPS-Accuracy [m]	Post [*]
1	0.0	N61 26 45.5 W134 15 22.8	3	*
2	4.0	N61 26 45.6 W134 15 23.0	3	
3	8.0	N61 26 45.7 W134 15 23.2	3	
4	12.0	N61 26 45.8 W134 15 23.3	3	
5	16.0	N61 26 45.9 W134 15 23.4	3	
6	20.0	N61 26 46.0 W134 15 23.5	3	
7	24.0	N61 26 46.1 W134 15 23.7	3	
8	28.0	N61 26 46.2 W134 15 23.8	3	
9	32.0	N61 26 46.3 W134 15 23.9	3	
10	36.0	N61 26 46.4 W134 15 24.1	3	
11	40.0	N61 26 46.5 W134 15 24.3	3	
12	44.0	N61 26 46.6 W134 15 24.4	3	
13	48.0	N61 26 46.6 W134 15 24.6	3	
14	52.0	N61 26 46.8 W134 15 24.8	3	
15	56.0	N61 26 46.9 W134 15 24.9	3	
16	60.0	N61 26 47.0 W134 15 25.0	3	
17	64.0	N61 26 47.1 W134 15 25.1	3	*
18	68.0	N61 26 47.1 W134 15 25.2	3	
19	72.0	N61 26 47.2 W134 15 25.4	3	
20	76.0	N61 26 47.3 W134 15 25.5	3	
21	80.0	N61 26 47.3 W134 15 25.7	3	
22	84.0	N61 26 47.5 W134 15 25.8	3	
23	88.0	N61 26 47.6 W134 15 26.0	3	
24	92.0	N61 26 47.8 W134 15 26.2	3	
25	96.0	N61 26 47.9 W134 15 26.3	3	
26	100.0	N61 26 48.0 W134 15 26.5	3	
27	104.0	N61 26 48.1 W134 15 26.6	3	
28	108.0	N61 26 48.2 W134 15 26.8	3	
29	112.0	N61 26 48.3 W134 15 27.0	3	
30	116.0	N61 26 48.3 W134 15 27.1	3	
31	120.0	N61 26 48.4 W134 15 27.3	3	
32	124.0	N61 26 48.4 W134 15 27.5	3	*