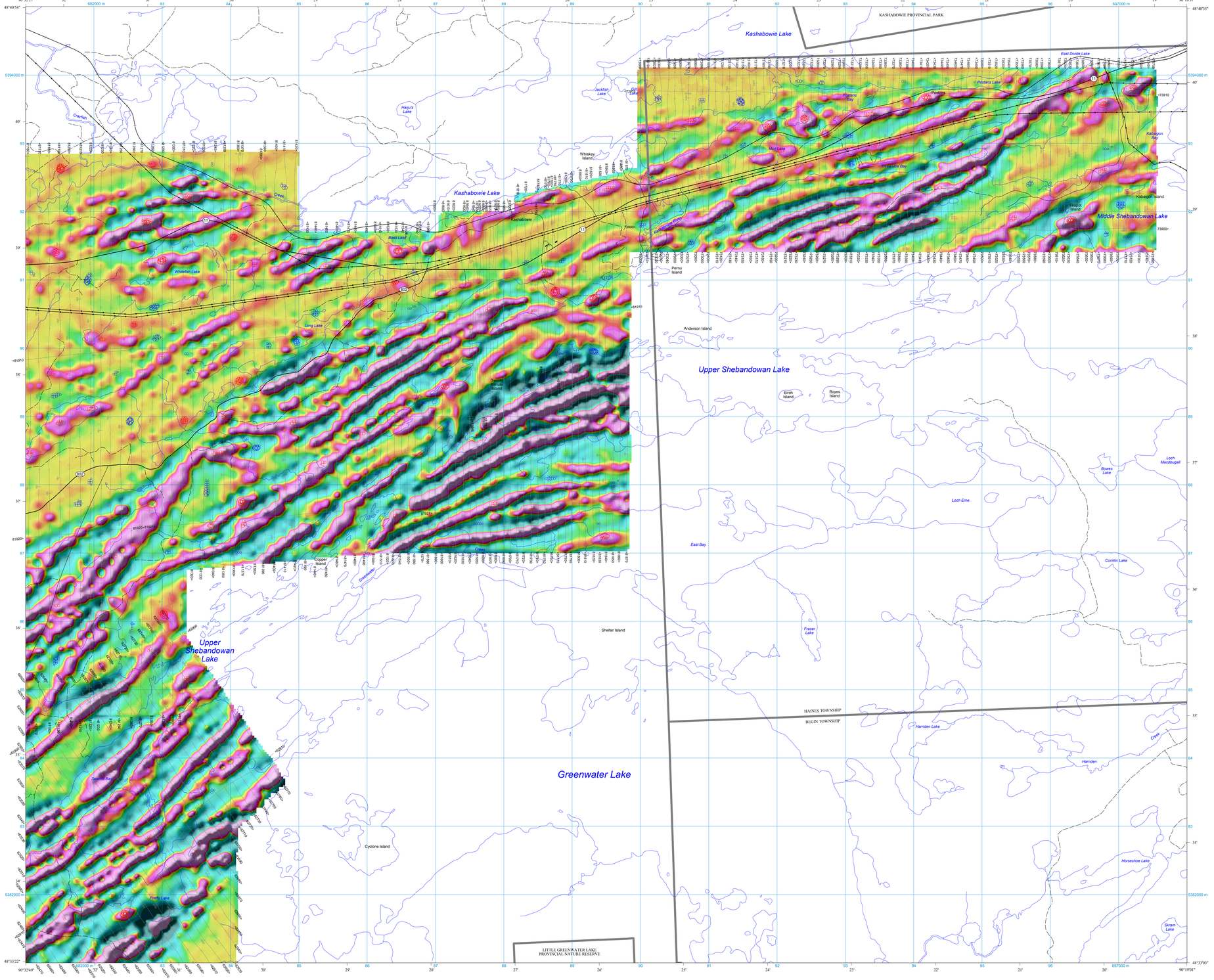


DESCRIPTIVE NOTES

Introduction

This map was compiled from multiple proprietary airborne surveys purchased by the Ontario Ministry of Northern Development and Mines. These surveys were flown using the Geotech VTEM helicopter-borne magnetic and electromagnetic system. The aircraft was also equipped with GPS navigation systems and digital data acquisition systems.

Second Vertical Derivative of the Magnetic Field

The second vertical derivative values of the magnetic field were computed directly from the gridded residual magnetic intensity data using a fast Fourier transform, combining the transfer functions of the second vertical derivative with a 30 m Upward Continuation operator. The Upward Continuation was applied in order to attenuate unwanted high frequencies enhanced by the derivative operator.

The shaded relief parameters are:
Illumination inclination: 45°
Illumination declination: 315°

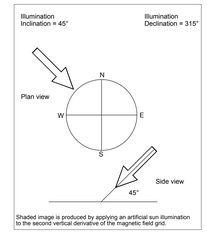
Magnetic declination on the mean survey date of April 10, 2004, for the centre of the survey area was 1.5°W and magnetic inclination was 75.01°N. Magnetic field strength was 58 003 nT (calculated using IGRF).

Keating Correlation Coefficients

Possible kimberlite targets have been identified from the residual magnetic intensity data, based on the identification of roughly circular anomalies. This procedure was automated by using a known pattern-recognition technique (Keating 1995), which consists of computing, over a moving window, a first-order regression between a vertical cylinder model anomaly and the gridded magnetic data. Only the results where the absolute value of the correlation coefficient is above a threshold of 75% were retained. The results are depicted as circular symbols, scaled to reflect the correlation value. The most favourable targets are those that exhibit a cluster of high-amplitude solutions. Correlation coefficients with a negative value correspond to reversely magnetized sources. It is important to be aware that other magnetic sources may correlate well with the vertical cylinder model, whereas some kimberlite pipes of irregular geometry may not.

The cylinder model parameters are as follows:
Cylinder diameter: 200 m
Cylinder length: infinite
Overburden thickness: 3.8 m
Window size: 10 x 10 cells (300 m x 300 m)

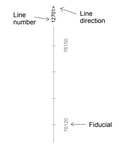
SHADED IMAGE SUN ANGLE



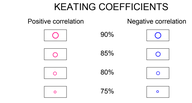
Shaded image is produced by applying an artificial sun illumination to the second vertical derivative of the magnetic field grid.

LEGEND

FLIGHT LINE INFORMATION

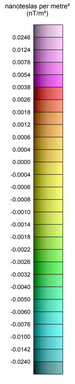


KEATING COEFFICIENTS



SECOND VERTICAL DERIVATIVE OF THE MAGNETIC FIELD GRID

nanoteslas per metre²
(nT/m²)



SURVEY PARAMETERS

AIRCRAFT
Type: Aerospatiale AS350B-2 (Blocks 1, 5, 6, 8)
Aerospatiale AS350BA (Blocks 2, 3, 7)
Aerospatiale AS350B+ (Block 4)
Registration: C-FQNS (Blocks 1, 5, 6, 8)
C-GHSM (Block 2)
C-GLNE (Blocks 3, 7)
C-GCYE (Block 4)

MAGNETOMETER
Type: cesium-vapour
Sensitivity: 0.02 nT
Sample interval: 10 readings per second
Sensor location: 10 m below aircraft (Blocks 1, 6, 8)
15 m below aircraft (Blocks 2, 3, 4, 5, 7)

ELECTROMAGNETIC SYSTEM
Type: VTEM (Blocks 1, 2, 4, 5, 6, 8)
Type: Dreamcatcher (Blocks 3, 7)
Base frequency: 30 Hz
Current waveform: trapezoid
Peak dipole moment (NIA): 250 000 Am² (Blocks 1, 6, 8)
230 000 Am² (Block 2)
147 800 Am² (Blocks 3, 7)
424 800 Am² (Blocks 4, 5)
Pulse width: 7400 µsec (Blocks 1, 6, 8)
7600 µsec (Blocks 2, 4, 5)
8333 µsec (Blocks 3, 7)
Off-time: 18 533 µsec (Blocks 1, 6, 8)
18 133 µsec (Block 2, 4, 5)
16 667 µsec (Blocks 3, 7)
Parameters: Z-component of dB/dt
Sample interval: 10 readings per second
Bird location: 45 m below aircraft (Blocks 1, 3, 4, 5, 6, 7, 8)
35 m below aircraft (Block 2)

NAVIGATION SYSTEM
GPS receiver: Novatel® OEM4-G2-3151W
GPS sample interval: 5 readings per second
Radar altimeter: Terra 3000/TRI-40
Radar sample interval: 5 readings per second
Guidance system: Geotech
Digital acquisition system: Geotech

BASE STATION
Type: Geometrics® cesium-vapour
Magnetometer sample interval: 1 reading per second
GPS sample interval: 1 reading per second

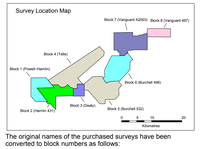
SURVEY SPECIFICATIONS
Survey dates:
December 17, 2004 to December 20, 2004 (Blocks 1, 6)
February 21, 2004 to February 22, 2004 (Block 2)
February 11, 2003 to February 16, 2003 (Block 3)
May 20, 2005 to June 7, 2005 (Blocks 4, 5)
February 11, 2003 to February 12, 2003 (Block 7)
December 10, 2004 to December 18, 2004 (Block 8)

Nominal aircraft terrain clearance: 75 m (Blocks 1, 6, 8)
65 m (Block 2)
80 m (Blocks 3, 7)
85 m (Blocks 4, 5)
Traverse line spacing: 150 m (Blocks 1, 6)
100, 200 m (Block 2)
100 m (Blocks 3, 4, 8)
200 m (Block 5)
150/100 m (Block 7)
Control line spacing: 2000 m (Blocks 1, 8)
2000 m (Blocks 2, 6)
single line only (Block 3)
1500 m (Block 4)
2800 m (Block 5)
2600 m (Block 7)
Traverse line direction: N39°W (Block 1)
E51°S (Block 2)
North - south (Blocks 3, 7, 8)
N140°E (Blocks 4, 5)
N35.2°W (Block 6)
Control line direction: N52.7°E (Block 1)
N50°E (Blocks 2, 5)
East - west (Blocks 3, 8)
N57°E (Block 4)
N55.2°E (Block 6)
N85°E (Block 7)

CO-ORDINATE SYSTEM
Projection: Universal Transverse Mercator
Datum: NAD83
Central meridian: 93°00' W (UTM Zone 15N)
Central scale factor: 0.9996
False easting: 500 000 m
False northing: 0 m
Ellipsoid: GRS80

Data purchased from:
East West Resource Corp. and Maple Mineral Corporation. (Blocks 1, 2, 6)
East West Resource Corp. (Blocks 3, 4, 5)
Canadian Golden Dragon Resources Corp. (Blocks 7, 8)

Survey Location Map



The original names of the purchased surveys have been converted to block numbers as follows:

Block 1: Powell–Hamlin
Block 2: Hamlin (431)
Block 3: Deaty
Block 4: Telle
Block 5: Burchell (532)
Block 6: Burchell (496)
Block 7: Vanguard (A2003)
Block 8: Vanguard (497)

Ontario

Ontario Geological Survey

MAP 60 406

AIRBORNE MAGNETIC AND ELECTROMAGNETIC SURVEYS

Shaded colour image of the second vertical derivative of the residual magnetic field and Keating coefficients

BURCHELL LAKE AREA

Purchased Data

Scale 1:20 000

500 m 0 0.5 1 km

NTS References: 52 B/9, 10

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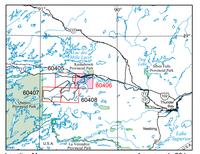

Location Map 1 cm equals 20 km

SOURCES OF INFORMATION

Base map information derived from the Land Information Ontario Data Warehouse, Land Information Ontario, Ontario Ministry of Natural Resources and Forestry, scale 1:50 000.

Magnetic declination for the centre of the map area was approximately 2°49.7'W in 2014.

Bagrianski, A. 2003. Report on a helicopter-borne time domain electromagnetic geophysical survey, Norton Lake, Linsey Bay, Dealty Creek blocks, Thunder Bay area, Ontario; unpublished report for East West Resource Corp. by Geotech Ltd.

Bagrianski, A. 2003. Report on a helicopter-borne time domain electromagnetic geophysical survey, Vanguard property, Kashabowie area; Thunder Bay area, Ontario; unpublished report for Canadian Golden Dragon Resources Corp. by Geotech Ltd.

Bagrianski, A. 2004. Report on a helicopter-borne time domain electromagnetic geophysical survey, Hamlin Property, Kashabowie area, Ontario; unpublished report for East West Resource Corp. and Maple Minerals Inc. by Geotech Ltd.

Keating, P.B. 1995. A simple technique to identify magnetic anomalies due to kimberlite pipes; Exploration and Mining Geology, v.4, no.2, p.121-125.

Orta, M. 2005. Report on a helicopter-borne time domain electromagnetic geophysical survey, Vanguard East block, Ontario; unpublished report for Canadian Golden Dragon Resources Corp. by Geotech Ltd.

Orta, M. 2005. Report on a helicopter-borne time domain electromagnetic geophysical survey, Telle and Burchell-2 blocks, Ontario; unpublished report for East West Resource Corp. by Geotech Ltd.

Orta, M. 2005. Report on a helicopter-borne time domain electromagnetic geophysical survey, Powell–Hamlin and Burchell blocks, Ontario; unpublished report for Maple Minerals Corp. and East West Resource Corp. by Geotech Ltd.

CREDITS

Data acquisition, data compilation by Geotech Limited, Aurora, Ontario, for East West Resource Corp., Maple Minerals Inc. and Canadian Golden Dragon Resources Corp., Vancouver, British Columbia.

Data reprocessing and map production by CGI Controlled Geophysics Inc., Thornhill, Ontario.

Contract management, base maps and map surrounds by the Ontario Ministry of Northern Development and Mines, Sudbury, Ontario.

To enable the rapid dissemination of information, this map has not received a technical edit. Every possible effort has been made to ensure the accuracy of the information presented; however, the Ontario Ministry of Northern Development and Mines does not assume liability for any errors that may occur. Users may wish to verify critical information.

Corresponding digital data for this survey are available from the following Ontario Geological Survey publication:

Ontario Geological Survey 2014. Ontario airborne geophysical surveys, magnetic and electromagnetic data, grid and profile data (ASCII and Geosoft® formats) and vector data, Burchell Lake area—Purchased data; Ontario Geological Survey, Geophysical Data Set 1241.

The geophysical data on this map were purchased from the private sector. The original data acquisition was neither supervised by the Ontario Geological Survey (OGS) nor carried out to OGS technical specifications. However, the purchased data do meet a pre-defined valuation criteria set out by the OGS. Some quality assurance and quality control checks have been carried out on the digital data.

Issued 2014.

Information from this publication may be quoted if credit is given. It is recommended that reference be made in the following form:

Ontario Geological Survey 2014. Airborne magnetic and electromagnetic surveys, shaded colour image of the second vertical derivative of the residual magnetic field and Keating coefficients, Burchell Lake area—Purchased data; Ontario Geological Survey, Map 60 406, scale 1:20 000.

Users of OGS products are encouraged to contact those Aboriginal communities whose traditional territories may be located in the mineral exploration area to discuss their project.