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Ontario Geological Survey 2015. Airborne magnetic and electromagnetic surveys, shaded colour image of the second vertical derivative of the residual magnetic field and Keating coefficients, Matachewan–Timmins area—Purchased data; Ontario Geological Survey, Map 60 429, scale 1:20 000.

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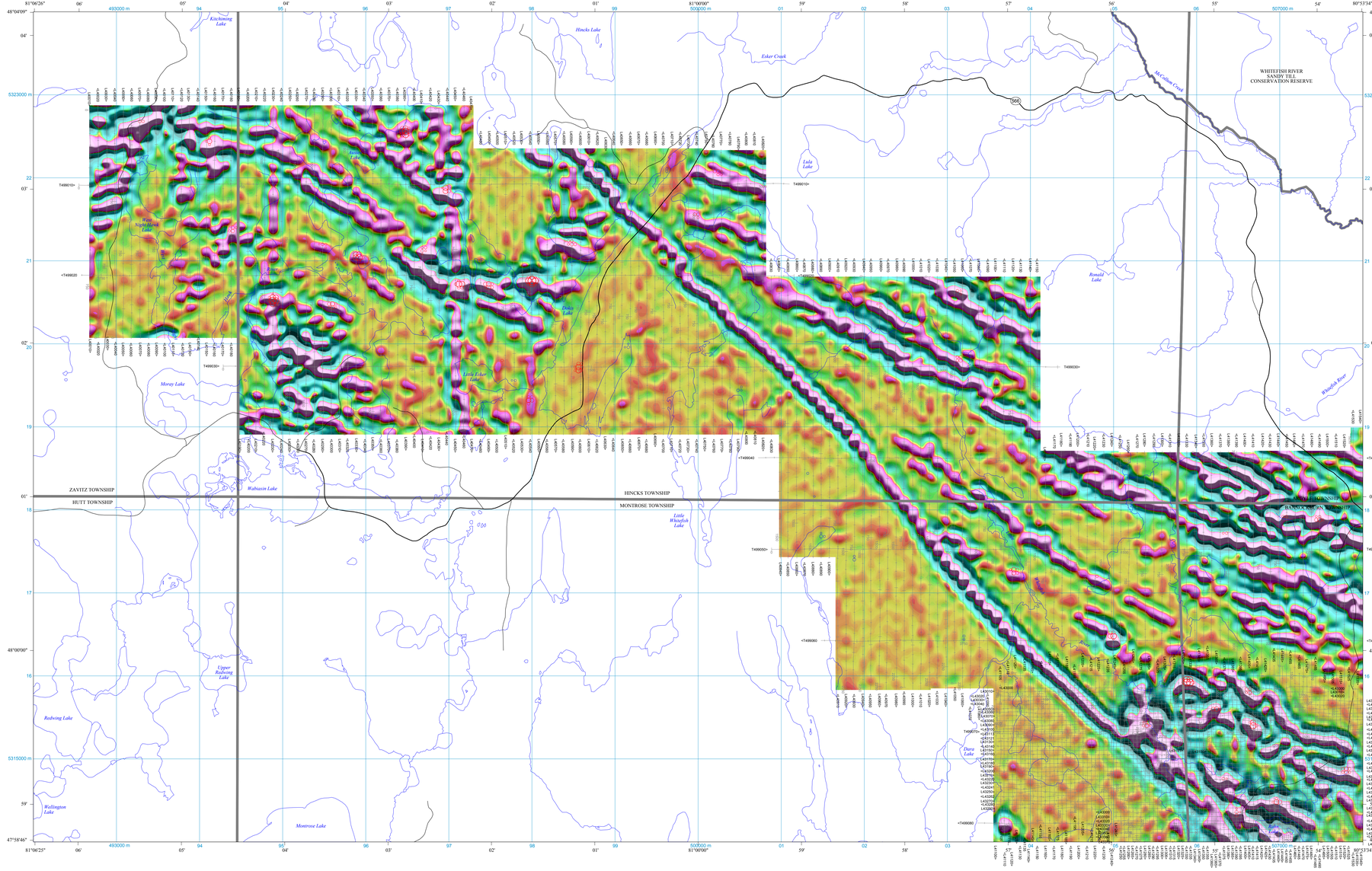
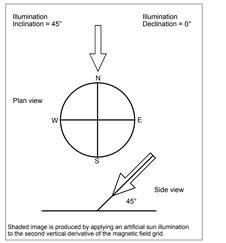


SHADED IMAGE SUN ANGLE



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)

DESCRIPTIVE NOTES

Introduction

This survey was flown using the Aeroquest AeroTEM™ helicopter-borne magnetic and electromagnetic system. The aircraft was also equipped with a GPS navigation system and a digital data acquisition system.

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 and a half-cosine low-pass filter (100 m cut-off wavelength). The low-pass filter was aimed at attenuating unwanted high frequencies enhanced by the derivative operator.

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

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: 4.9 m to 24.0 m
Window size: 10 x 10 cells (400 m x 400 m)

SURVEY PARAMETERS

AIRCRAFT
Type: Aerospatiale AS350B2
Registration: C-FAVI

MAGNETOMETER
Type: Geometrics® G823A cesium-vapour
Sensitivity: 0.001 nT
Sample interval: 10 readings per second
Sensor location: 19 m below aircraft

ELECTROMAGNETIC SYSTEM
Type: AeroTEM™
Base frequency: 150 Hz
Current waveform: bipolar triangular
Peak dipole moment (NiA): 38 800 Am²
Pulse width: 1150 µsec
Off-time: 2183 µsec
Parameters: X- and Z-components of dB/dt
Sample interval: 10 readings per second
Bird Location: 40 m below aircraft

NAVIGATION SYSTEM
GPS receiver: Trimble® AgGPS®132
GPS sample interval: 5 readings per second
Radar altimeter: Terra 3500TRI-30
Video flight path recorder: 8 mm high resolution colour video
Guidance system: Ag-Nav Inc. AG-NAV2
Digital acquisition system: AeroDAS, RMS Instruments DOR33A

BASE STATION
Magnetometer: Scintrex® CS-2 cesium
GPS receiver: Leica® MX9212
Sample interval: 1 reading per second

SURVEY SPECIFICATIONS
Survey date: April 24 to May 12, 2004
Nominal aircraft terrain clearance: 70 m
Traverse line spacing: 50 and 100 m
Control line spacing: 200 m
Traverse line direction: North-South and East-West
Control line direction: East-West

CO-ORDINATE SYSTEM
Projection: Universal Transverse Mercator
Datum: NAD83
Central meridian: 93°00'W (UTM zone 17)
Central scale factor: 0.9996
False easting: 500 000 m
False northing: 0 m

CREDITS

Data acquisition, data compilation by Aeroquest International, Mississauga, Ontario for Mustang Minerals Corp., Toronto, Ontario.

Data reprocessing and map production by Scott Hogg and Associates, Toronto, Ontario.

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

Every possible effort has been made to ensure the accuracy of the information presented on this map; however, the Ministry of Northern Development and Mines does not assume liability for any errors that may occur. Users should verify critical information.

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.

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

Ontario Geological Survey 2015. Ontario airborne geophysical surveys, magnetic and electromagnetic data, grid and profile data (ASCII and Geosoft® formats) and vector data, Matachewan–Timmins area—Purchased data; Ontario Geological Survey, Geophysical Data Set 1243.

Issued 2015.

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 2015. Airborne magnetic and electromagnetic surveys, shaded colour image of the second vertical derivative of the residual magnetic field and Keating coefficients, Matachewan–Timmins area—Purchased data; Ontario Geological Survey, Map 60 429, scale 1:20 000.

Ontario

Ontario Geological Survey

MAP 60 429

AIRBORNE MAGNETIC AND ELECTROMAGNETIC SURVEYS

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

MATACHEWAN–TIMMINS AREA

Purchased Data

Scale 1:20 000

500 m 0 0.5 1 km

NTS References: 41 P/14, 15; 42 A/2, 3

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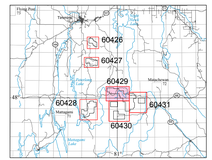

1 cm equals 15 km

SOURCES OF INFORMATION

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

Magnetic declination for the centre of the map area was approximately 10°41'W in 2015.

Fiset, N. 2004. Report on a helicopter-borne magnetic and electromagnetic survey, featuring the Aeroquest AeroTEM™ system, Redstone Property, Adams Township, Timmins area, Ontario; unpublished report for Mustang Minerals Corp., Sudbury Resident Geologist's office, assessment file AFRO# 2.28786, AFRI# 42A08SE2024, 45p.

Fiset, N. 2004. Report on a helicopter-borne magnetic and electromagnetic survey, featuring the Aeroquest AeroTEM™ system, Bannockburn Property, Bannockburn Township, Matachewan area, Ontario; unpublished report for Mustang Minerals Corp., Sudbury Resident Geologist's office, assessment file AFRO# 2.29671, AFRI# 41P15NW2014, 42p.

Fiset, N. 2004. Report on a helicopter-borne magnetic and electromagnetic survey, featuring the Aeroquest AeroTEM™ system, McArthur Property, McArthur Township, Timmins area, Ontario; unpublished report for Mustang Minerals Corp., Sudbury Resident Geologist's office, assessment file AFRO# 2.29089, AFRI# 42A03NE2010, 41p.

Fiset, N. 2004. Report on a helicopter-borne magnetic and electromagnetic survey, featuring the Aeroquest AeroTEM™ system, Midlothian Property, Midlothian Township, Matachewan area, Ontario; unpublished report for Mustang Minerals Corp., Sudbury Resident Geologist's office, assessment file AFRO# 2.29935, AFRI# 20000000463, 41p.

Fiset, N. 2004. Report on a helicopter-borne magnetic and electromagnetic survey, featuring the Aeroquest AeroTEM™ system, Montrose Property, Montrose Township, Matachewan area, Ontario; unpublished report for Mustang Minerals Corp., Sudbury Resident Geologist's office, assessment file AFRO# 2.29887, AFRI# 20000000456, 39p.

Fiset, N. 2004. Report on a Helicopter-borne magnetic and electromagnetic survey, featuring the Aeroquest AeroTEM™ system, Powell Property, Powell Township, Matachewan area, Ontario; unpublished report for Mustang Minerals Corp., Sudbury Resident Geologist's office, assessment file AFRO# 2.29869, AFRI# 20000000457, 41p.

Fiset, N. 2004. Report on a helicopter-borne magnetic and electromagnetic survey, featuring the Aeroquest AeroTEM™ system, Serpentine Property, Semple and Sothman townships, Matachewan area, Ontario; unpublished report for Mustang Minerals Corp., Sudbury Resident Geologist's office, assessment file AFRO# 2.28603, AFRI# 41P14NE2014, 52p.

Ontario Geological Survey 1999. Single master gravity and aeromagnetic data for Ontario, Geophysical Data Set 1036.

REFERENCE

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.

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.