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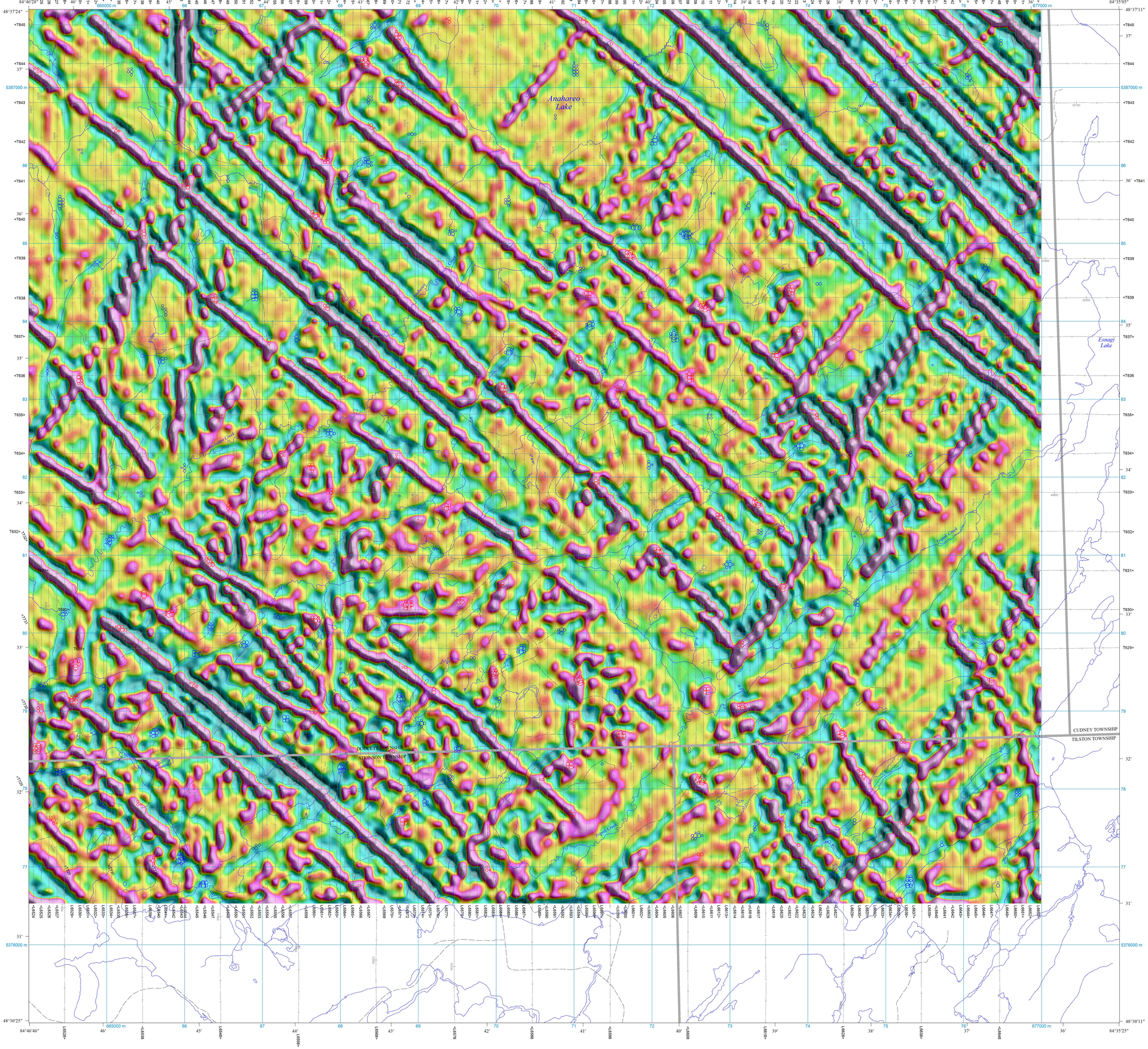


SURVEY PARAMETERS

AIRCRAFT
Type: Cessna® 208B Grand Caravan®
Registration: C-GSGL

MAGNETOMETER
Type: Geometrics Ltd. G-822A cesium split beam
Sensitivity: 0.005 nT
Noise level: 0.0005 nT
Sample interval: 10 readings per second
Sensor location: tail stinger
Compensation: Sander Geophysics Ltd. AIRComp
Data acquisition: SGDAS

AIRBORNE GRAVIMETER SYSTEM
Type: Sander Geophysics Ltd. AIRGrav
Initial sample interval: 128 readings per second
Final sample interval: 2 readings per second
Noise level: <0.2 mGal, with half sine wave resolution of 1.8 to 2 km

NAVIGATION SYSTEM
GPS receiver: NovAtel® OEMV®
GPS sample interval: 10 readings per second
Laser altimeter: Riegl® LD90-31K-HP
Radar altimeter: Thomson-CSF ERT 530A
Radar sample interval: 10 readings per second
Barometric altimeter: Honeywell Sensotec digital barometric pressure sensor
Barometric sample interval: 10 readings per second
Video flight-path camera: Datatoys Video Systems™ E600
Navigation acquisition: SGDAS

BASE STATION
Type: Geometrics Ltd. G-822A cesium split beam
Magnetometer sample interval: 10 readings per second
GPS sample interval: 10 readings per second

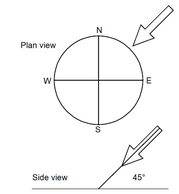
SURVEY SPECIFICATIONS
Survey dates: July 31 to October 6, 2015
Nominal aircraft terrain clearance: 80 m
Traverse-line spacing: 100 m
Control-line spacing: 500 m
Traverse-line direction: north-south
Control-line direction: east-west

CO-ORDINATE SYSTEM
Projection: Universal Transverse Mercator
Datum: NAD83
Central meridian: 87°W (UTM zone 16N)
Central scale factor: 0.9996
False easting: 500 000 m
False northing: 0 m

SHADED IMAGE SUN ANGLE

Illumination Declination = 45°

Illumination Inclination = 45°



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

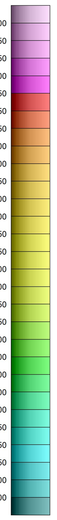
LEGEND

KEATING CORRELATION COEFFICIENTS

Positive correlation		Negative correlation
○	90%	○
○	85%	○
○	80%	○
○	75%	○

SECOND VERTICAL DERIVATIVE OF THE RESIDUAL MAGNETIC FIELD GRID

nanoteslas per metre squared (nT/m²)



Ontario

Ontario Geological Survey

MAP 60 499

AIRBORNE MAGNETIC AND GRAVIMETRIC SURVEYS

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

NAMEIGOS LAKE AREA

Scale 1:20 000

500 m 0 0.5 1 km

NTS Reference: 42 C/10

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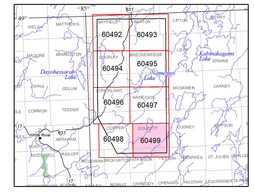

Location map 1 cm equals 10 km

DESCRIPTIVE NOTES

INTRODUCTION

The data comprising this map are derived from the results of an airborne magnetic and gravimetric survey carried out by Sander Geophysics Ltd. The survey was flown using a Cessna® 208B Grand Caravan® aircraft. The aircraft was equipped with a Geometrics Ltd. magnetic sensor, a Sander Geophysics Ltd. AIRGrav airborne gravity system, a GPS navigation system and a digital data acquisition system.

SECOND VERTICAL DERIVATIVE OF THE MAGNETIC FIELD

The second vertical derivative of the magnetic field is the rate of change of the magnetic field in the vertical direction. Computation of the second vertical derivative removes long wavelength features of the magnetic field and significantly improves the resolution of closely spaced and superposed anomalies. The values for the second vertical derivative of the magnetic field were computed directly from the gridded gradient-enhanced residual magnetic intensity data using a fast Fourier transform.

The shaded relief parameters are:
Illumination inclination: 045°
Illumination declination: 045°

Magnetic declination on August 1, 2015, for the centre of the survey area, was 7.0°W, magnetic inclination was 74.3° and the magnetic field strength was 56 670 nT at 470 m above World Geodetic System 1984 (WGS84) (calculated using International Geomagnetic Reference Field (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: 5.5 m (average)
Magnetic inclination: 74.3° N
Magnetic declination: 7.0° W
Window size: 10 × 10 cells (400 m × 400 m)

SOURCES OF INFORMATION

Base map information derived from the Land Information Ontario Data Warehouse, Land Information Ontario, scale 1:50 000, with modifications by staff of the Ministry of Northern Development, Mines, Natural Resources and Forestry.

Magnetic declination, for centre of the map area, was approximately 7°36.6' W in 2021, and was calculated using the International Geomagnetic Reference Field (IGRF-13, version December 2019)

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.

ACKNOWLEDGMENT

The geophysical data that comprise this survey were generously donated by the Nuclear Waste Management Organization (NWMO). The survey was flown for the NWMO under the original name of "Township of White River and Area".

CREDITS

Data acquisition and data compilation by Sander Geophysics Ltd., Ottawa, Ontario for Nuclear Waste Management Organization, Toronto, Ontario.

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

Contract management, base maps and map surrounds by the Ministry of Northern Development, Mines, Natural Resources and Forestry, 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, Mines, Natural Resources and Forestry does not assume liability for errors that may occur. Users should verify critical information.

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

Ontario Geological Survey 2021. Ontario airborne geophysical surveys, magnetic and gravimetric data, grid and profile data (ASCII and Geosoft® formats) and vector data, Nameigos Lake area; Ontario Geological Survey, Geophysical Data Set 1250.

Issued 2021.

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