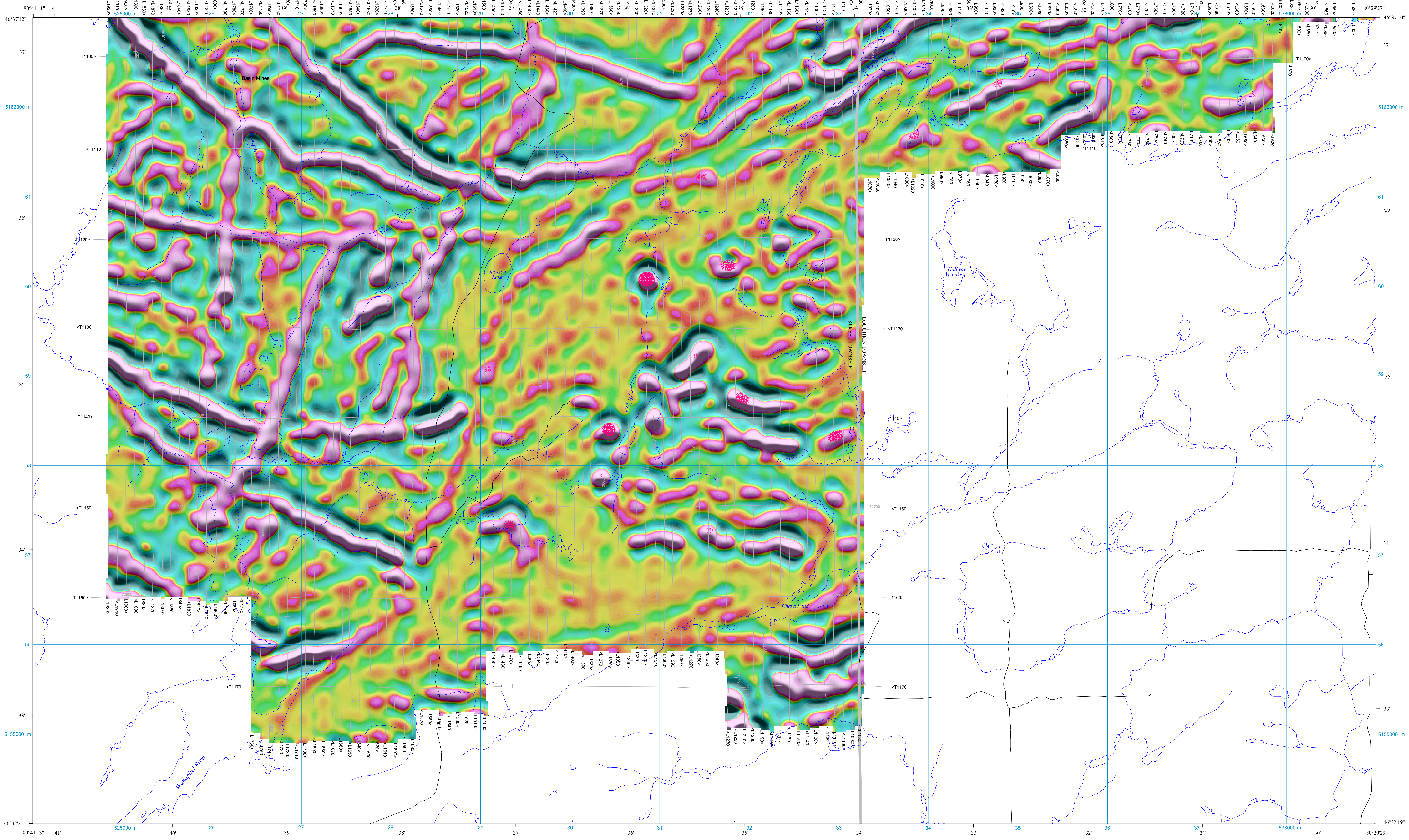
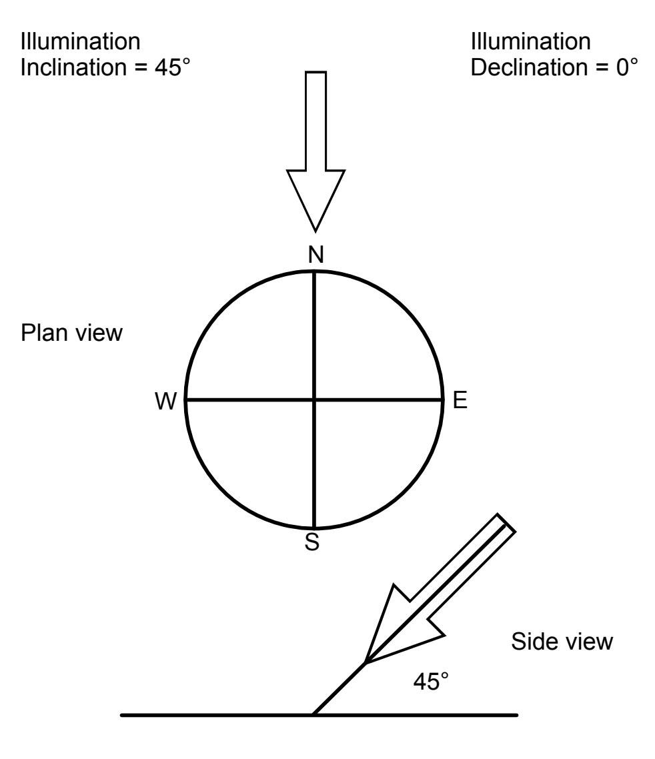


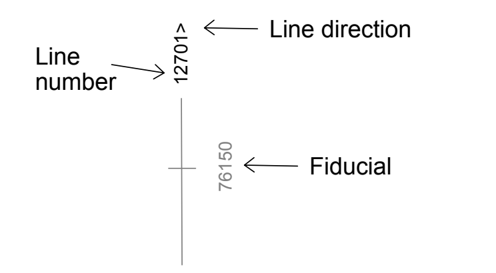
SHADED IMAGE SUN ANGLE



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

LEGEND

FLIGHT LINE INFORMATION

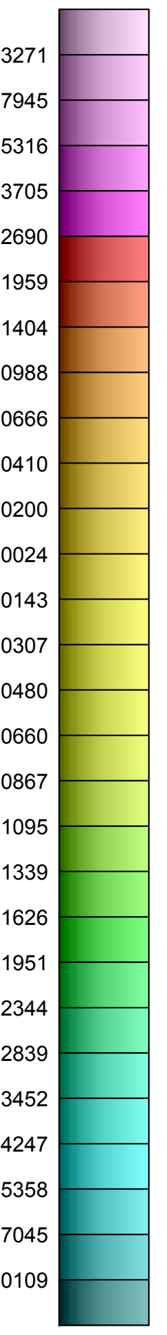


KEATING COEFFICIENTS

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

SECOND VERTICAL DERIVATIVE OF THE MAGNETIC FIELD GRID

nanoteslas per metre² (nT/m²)



SURVEY PARAMETERS

AIRCRAFT
  Type: Beechcraft® King Air® 90
  Registration: N41J

MAGNETOMETERS
  Type: Geometrics Ltd. G-822A cesium-vapour
  Sensitivity: 0.005 nT
  Sample interval: 10 readings per second
  Sensor locations: wingtips, tail stinger

ELECTROMAGNETIC SYSTEM
  Type: Terraquest Ltd. XDS broadband VLF-EM
  Base frequency: 22 to 26 kHz
  Parameters: line (Y), orthogonal (X) and vertical (Z) components of VLF-EM total field
  Sample interval: 10 readings per second

GAMMA-RAY SPECTROMETER SYSTEM
  Type: Pico Envirotec Inc. GRS 510
  Downward-looking crystal volume: 50.4 L
  Upward-looking crystal volume: 8.4 L
  Number of channels: 256
  Sample interval: 1 reading per second
  Sensor location: near centre of aircraft
  Potassium window: 1370 to 1570 keV
  Uranium window: 1680 to 1860 keV
  Thorium window: 2410 to 2810 keV
  Total count window: 410 to 2810 keV

NAVIGATION SYSTEM
  GPS receiver: Trimble® Ag-132
  GPS sample interval: 1 reading per second
  Radar altimeter: FreeFlight Systems RA 3500
  Radar sample interval: 10 readings per second
  Barometric altimeter: SenSym Inc. LX18001AN
  Barometric sample interval: 10 readings per second
  Video flight path recorder: Sony® DFW-SX910
  Guidance system: Ag-Nav Inc. LiNav P151
  Digital acquisition system: RMS Instruments DAARC 500

BASE STATION
  Magnetometer Type: Scintrex CS-2 cesium-vapour
  Magnetometer sample interval: 1 reading per second
  GPS type: Deluo 12-channel GPS
  GPS sample interval: 1 reading per second

SURVEY SPECIFICATIONS
  Survey dates: April 20 to 26, 2010
  Nominal aircraft terrain clearance: 80 m
  Traverse line spacing: 100 m
  Control line spacing: 1000 m
  Traverse line direction: 0° and 180°
  Control line direction: 90° and 270º

CO-ORDINATE SYSTEM
  Projection: Universal Transverse Mercator
  Datum: NAD83
  Central meridian: 81°W (UTM zone 17N)
  Central scale factor: 0.9996
  False easting: 500 000 m
  False northing: 0 m
  Ellipsoid: WGS 84

Data purchased from: True Claim Exploration Inc.

DESCRIPTIVE NOTES

Introduction

This map was compiled from a proprietary airborne survey purchased by the Ministry of Northern Development and Mines. The survey was flown using Terraquest Limited's fixed-wing magnetic, gamma-ray spectrometric and XDS VLF-EM (very low frequency 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 2-D FFT operator that contained a mild Butterworth low-pass filter of 150 m limiting high frequency aliasing. The second vertical derivative optimizes shallow surface anomalies and its zero contour outlines boundaries or contacts.

The shaded relief parameters are:
  Illumination inclination: 45°
  Illumination declination: 0°
  Vertical scale factor: 10

Magnetic declination on April 24, 2010, for the centre of the survey area, was 10.67°W. Inclination was 72.62°. Magnetic field strength was 55 992 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, 2001), 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: 0.7 m
Window size: 31 × 31 cells (620 m × 620 m)

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.

Ontario

Ontario Geological Survey

MAP 60 459

AIRBORNE MAGNETIC, ELECTROMAGNETIC AND GAMMA-RAY SPECTROMETRIC SURVEYS

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

SCADDING TOWNSHIP AREA

Purchased Data

Scale 1:20 000

500 m 0 0.5 1 km

NTS Reference: 41 I/9, 10

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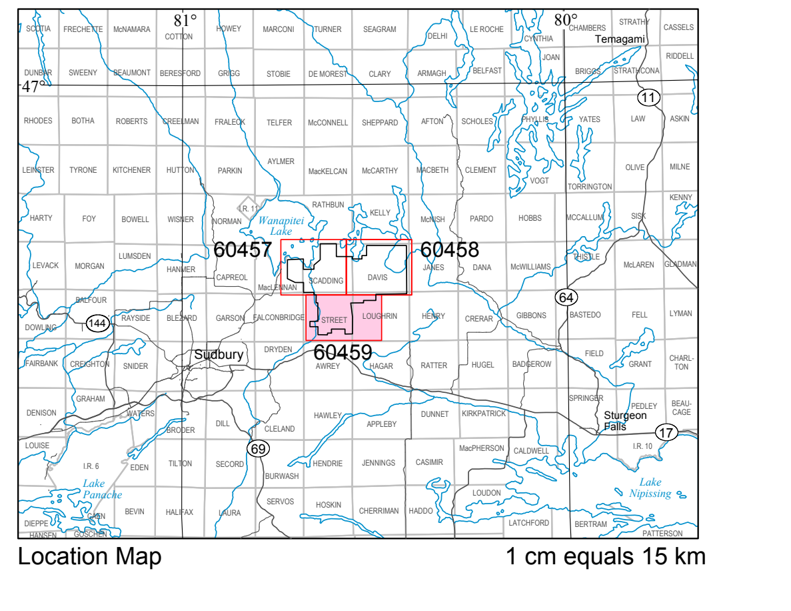

Location Map 1 cm equals 15 km

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°30.42′ W in 2015.

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.

Keating, P.B. 2001. Identification of kimberlite pipes from aeromagnetic surveys; oral presentation, Canadian Geophysical Union, Annual Meeting, May 2001.

Barrie, C. 2010. Operations report, gradient-magnetic, radiometric and XDS VLF-EM survey, Scadding Township property, Sudbury, Ontario, prepared for True Claim Exploration Inc. by Terraquest Ltd.; unpublished report, True Claim Exploration Inc., Sudbury Resident Geologist's office, assessment file AFRO# 2.45173, AFRI# 20000005511, 47p.

CREDITS

Data acquisition and data compilation by Terraquest Limited, Markham, Ontario, for True Claim Exploration Inc., Vancouver, British Columbia.

Data reprocessing and map production by Terraquest Limited, Markham, 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 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, electromagnetic and gamma-ray spectrometric data, grid and profile data (ASCII and Geosoft® formats) and vector data, Scadding Township area—Purchased data; Ontario Geological Survey, Geophysical Data Set 1247.

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, electromagnetic and gamma-ray spectrometric surveys, shaded colour image of the second vertical derivative of the residual magnetic field and Keating correlation coefficients, Scadding Township area—Purchased data; Ontario Geological Survey, Map 60 459, scale 1:20 000.