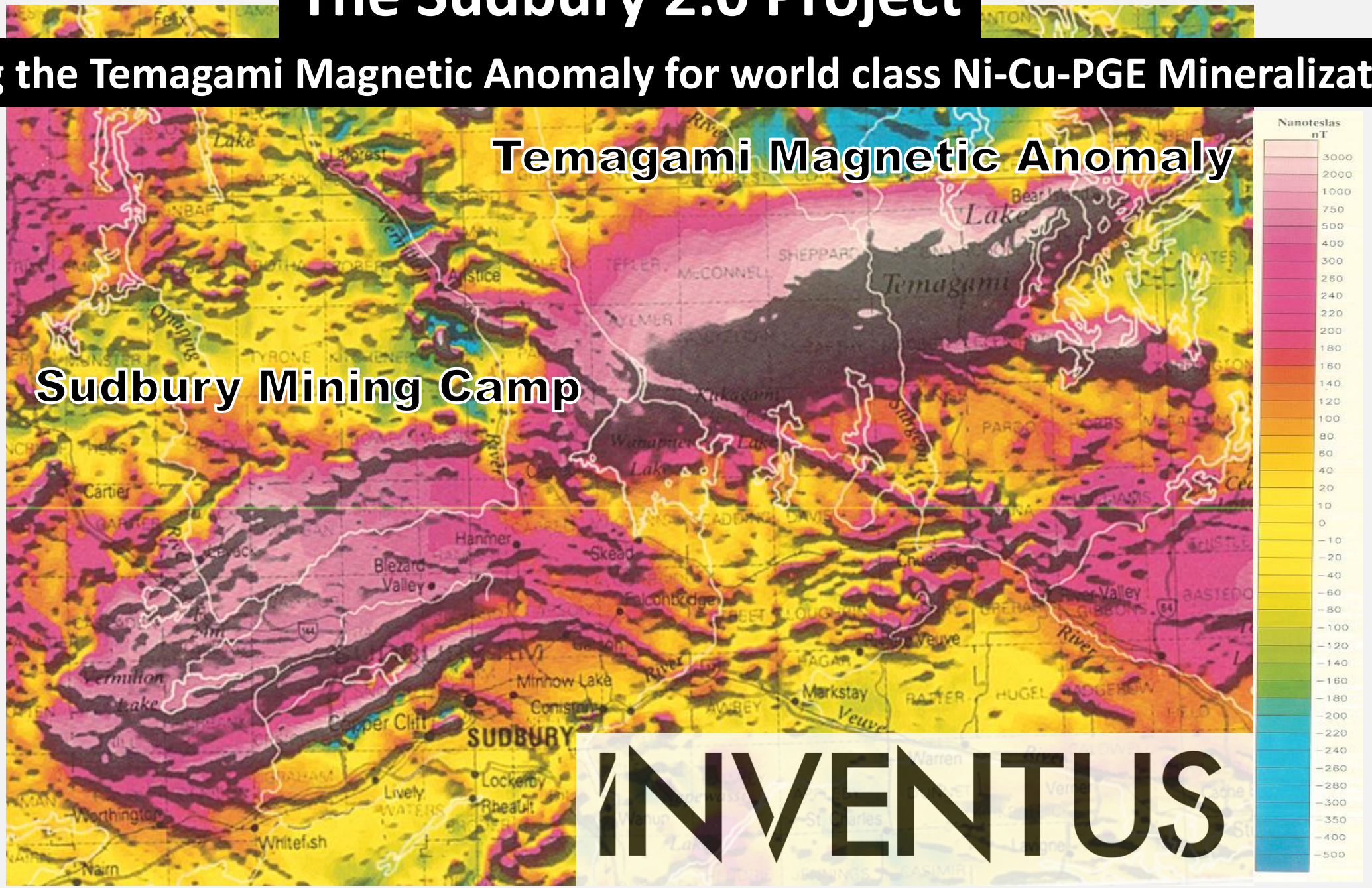
The Sudbury 2.0 Project

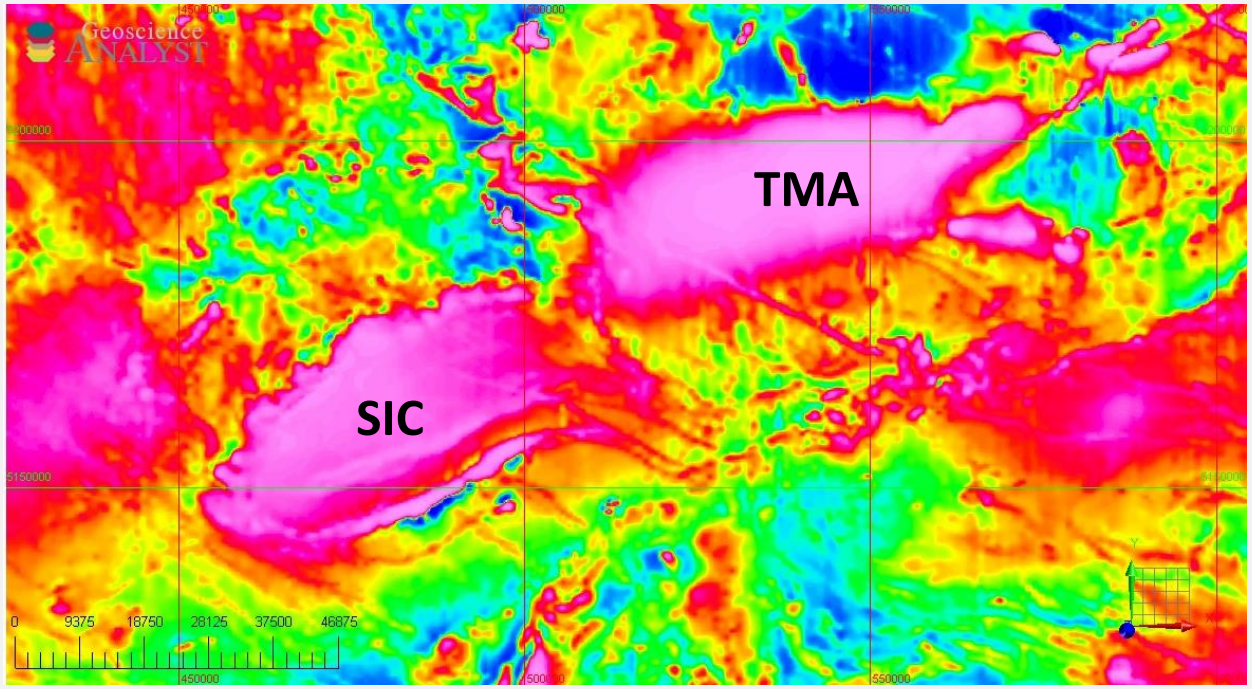
Exploring the Temagami Magnetic Anomaly for world class Ni-Cu-PGE Mineralization



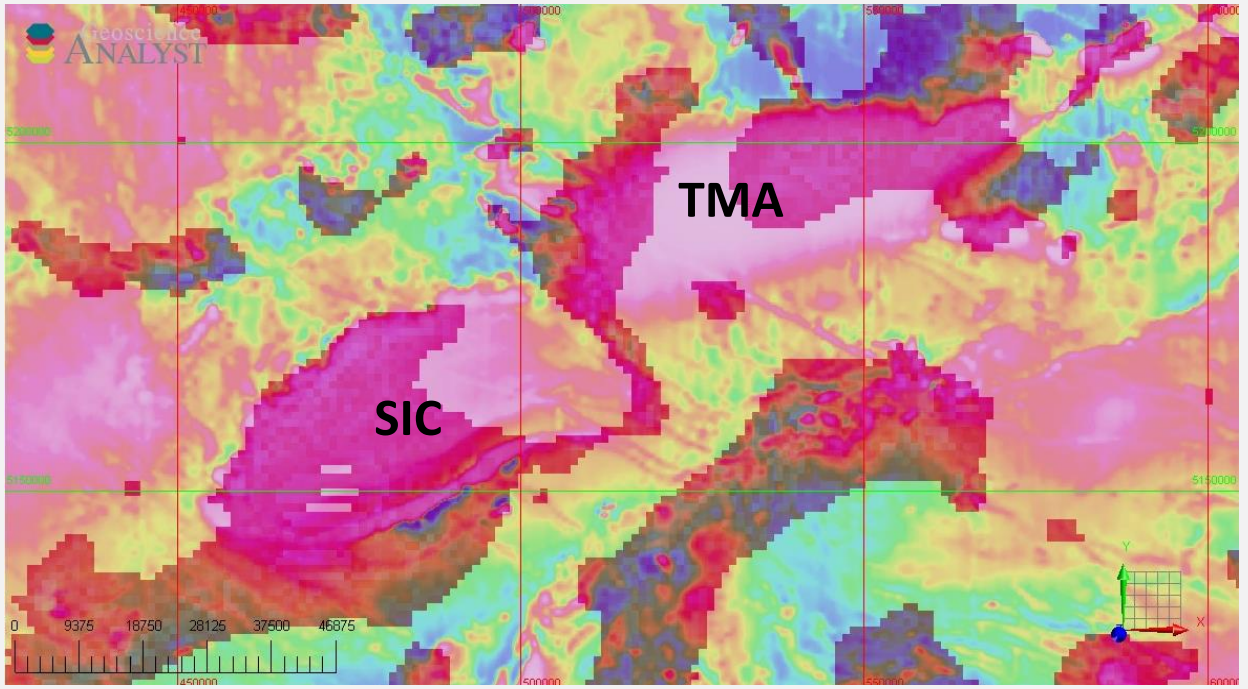
What is the Temagami Magnetic Anomaly?

The Temagami Magnetic Anomaly (TMA) is one of the **largest unexplained positive magnetic anomalies in North America.** The source of its magnetism is thought to be a large mafic intrusive known to host world class magmatic Ni-Cu-PGE deposits. An example of such a deposit is the Sudbury Igneous Complex (SIC), one of the richest magmatic Ni-Cu-PGE mining camps in the world. The SIC is situated in the immediate vicinity of the Temagami Anomaly and coincidently both have a similar size, shape and magnetic intensity.

Total Magnetic Intensity



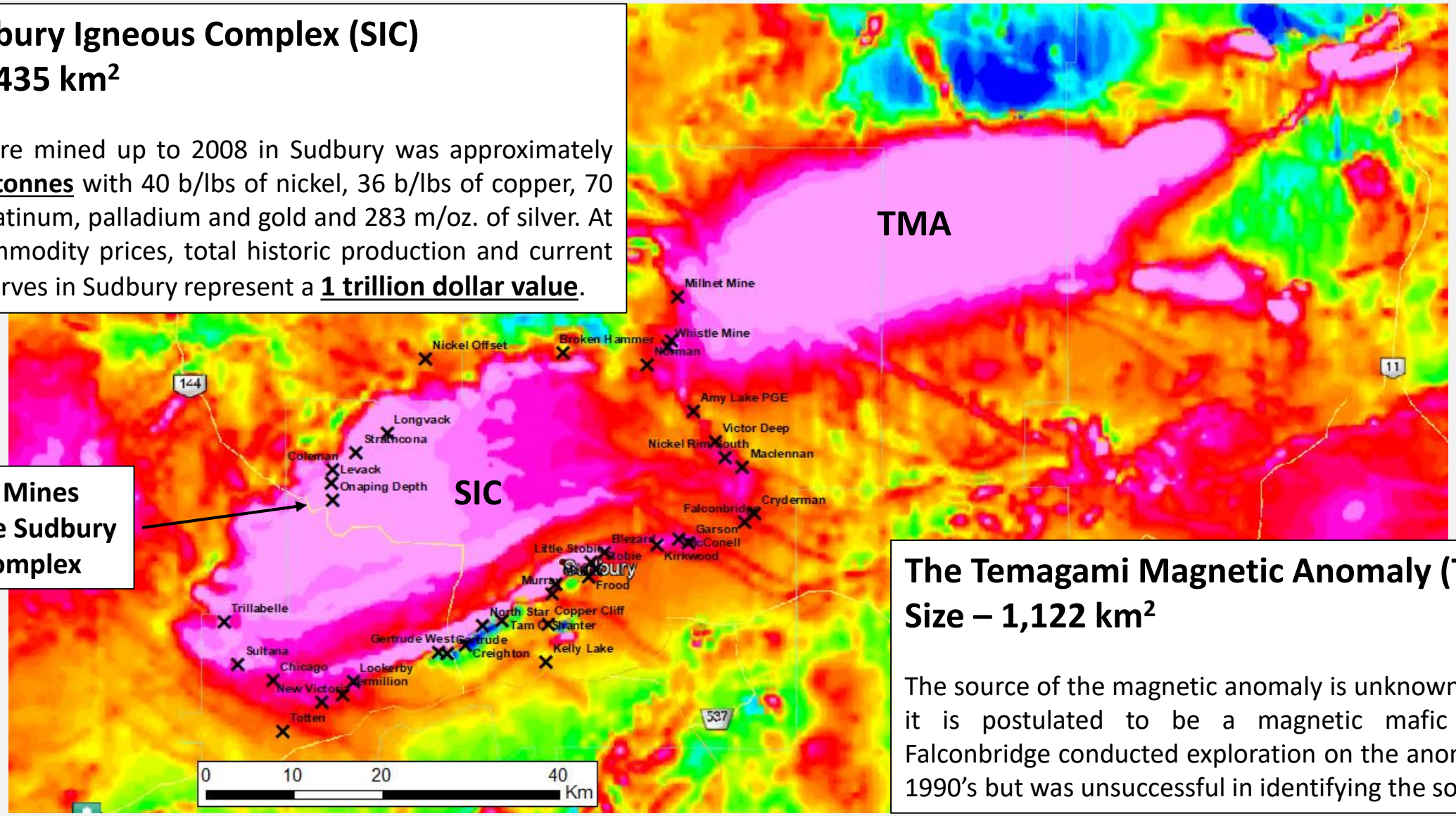
Total Gravity with Magnetic background



How Much is Another Sudbury Worth?

The Sudbury Igneous Complex (SIC)
Size – 1,435 km²

The total ore mined up to 2008 in Sudbury was approximately **1.7 billion tonnes** with 40 b/lbs of nickel, 36 b/lbs of copper, 70 m/oz. of platinum, palladium and gold and 283 m/oz. of silver. At today's commodity prices, total historic production and current known reserves in Sudbury represent a **1 trillion dollar value**.



Ni-Cu-PGE Mines around the Sudbury Igneous Complex

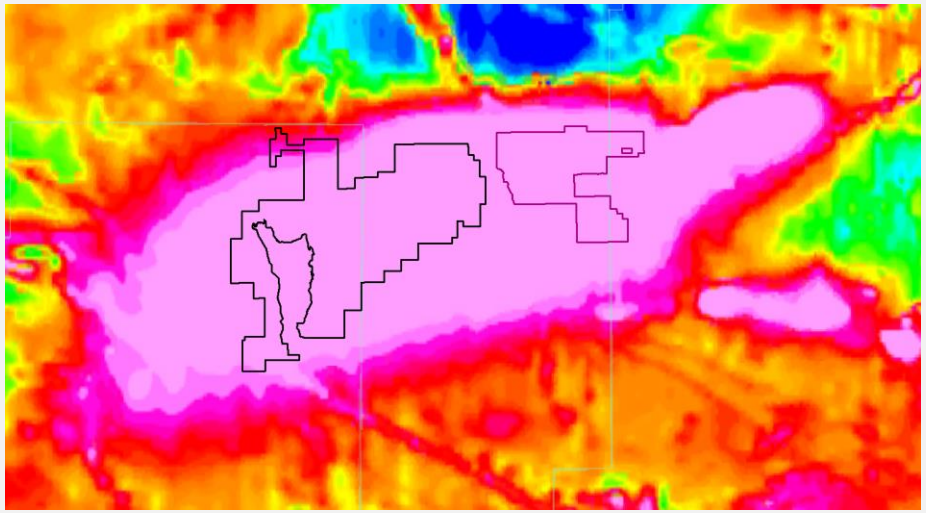
The Temagami Magnetic Anomaly (TMA)
Size – 1,122 km²

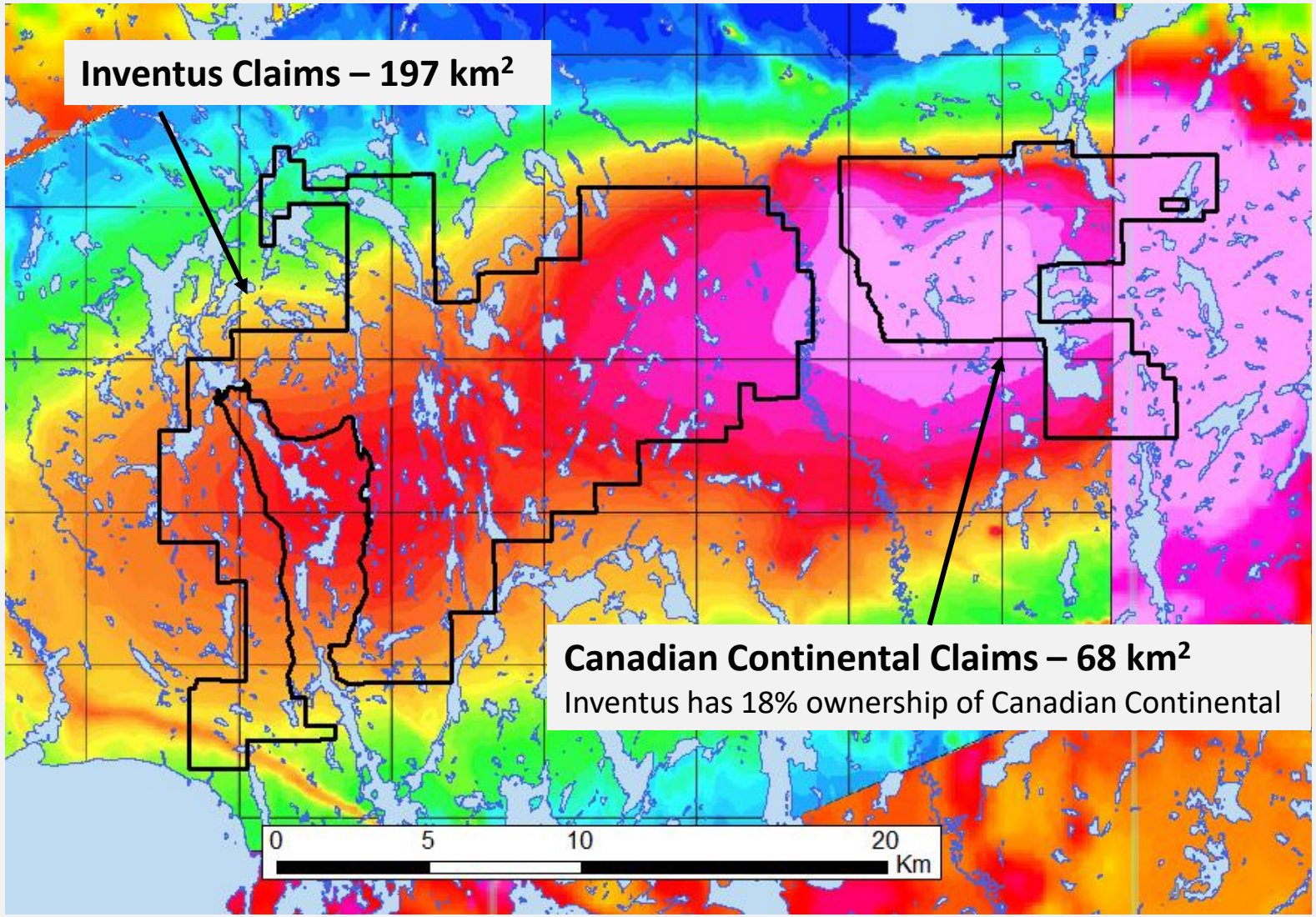
The source of the magnetic anomaly is unknown, however, it is postulated to be a magnetic mafic intrusion. Falconbridge conducted exploration on the anomaly in the 1990's but was unsuccessful in identifying the source.

The Sudbury 2.0 Project

The Sudbury 2.0 property was staked in late 2017 and designed to cover the Temagami Magnetic Anomaly.

Magnetic map of the TMA

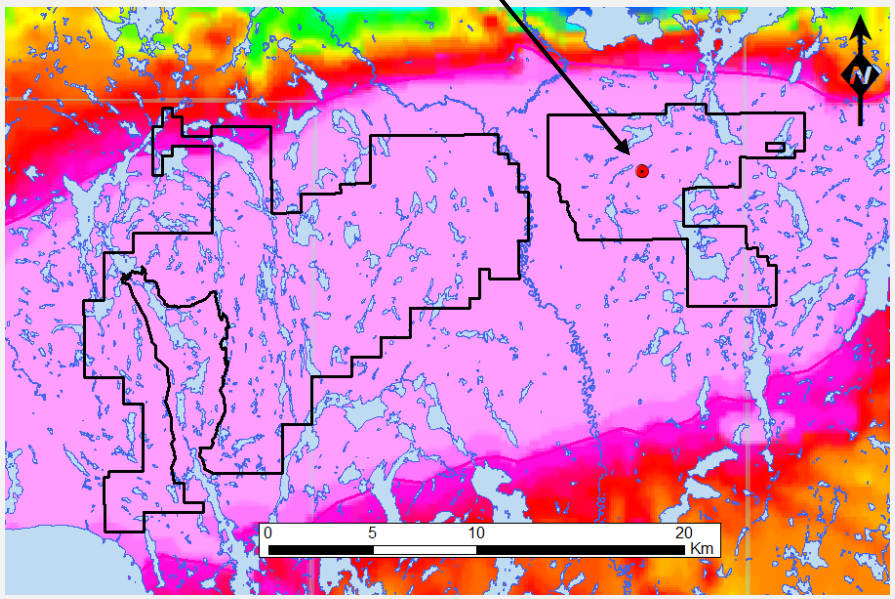




Major Discovery in 2017

- A **~100 metre thick unit of quartz diorite was discovered in drill hole AT-14-01**, drilled over the Temagami Anomaly.
- The Quartz diorite was determined to have equivalent major- and trace geochemistry to the unique Sudbury Igneous Complex (SIC).
- Quartz diorite is known to occur radially and concentrically around the SIC, locally referred to as Offset Dykes that host many Ni-Cu-PGE deposits in the Sudbury mining camp.
- Inventus acted on this information and staked the Temagami Anomaly in late 2017.

Location of AT-14-01



Matching trace geochemistry between SIC offset dykes and the quartz diorite in AT-14-01

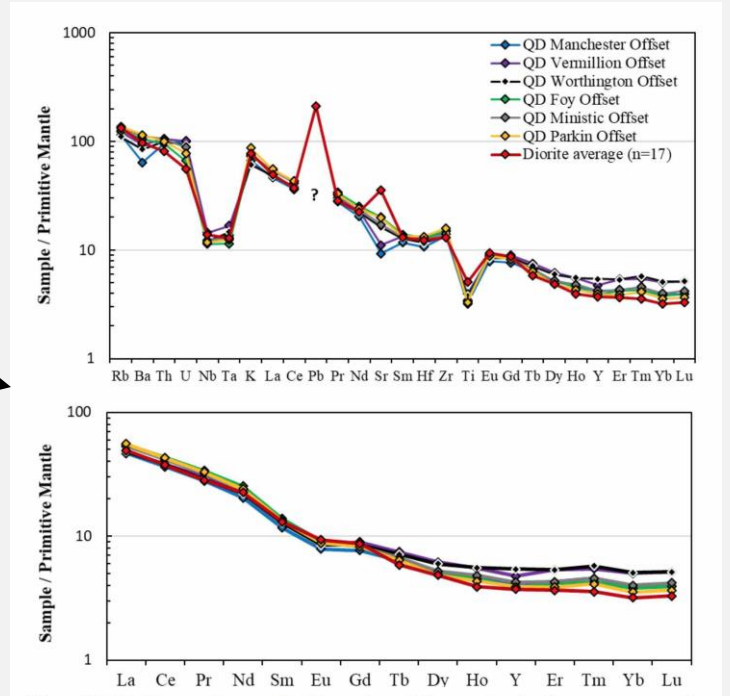


Figure 13: Primitive mantle-normalized trace element diagram showing the average composition of the diorite in AT-14-01 (shown in red) and the average composition of other quartz-diorite offset dykes (Lightfoot 2016).

A scientific paper on the quartz diorite in AT-14-01 is now published by the **Precambrian Research Journal (2019)**

Kawohl, A., Frimmel, H.E., Bite, A., Whymark, W., Debaille, V., 2019. **Very Distant Sudbury Impact Dykes Revealed by Drilling the Temagami Geophysical Anomaly.**

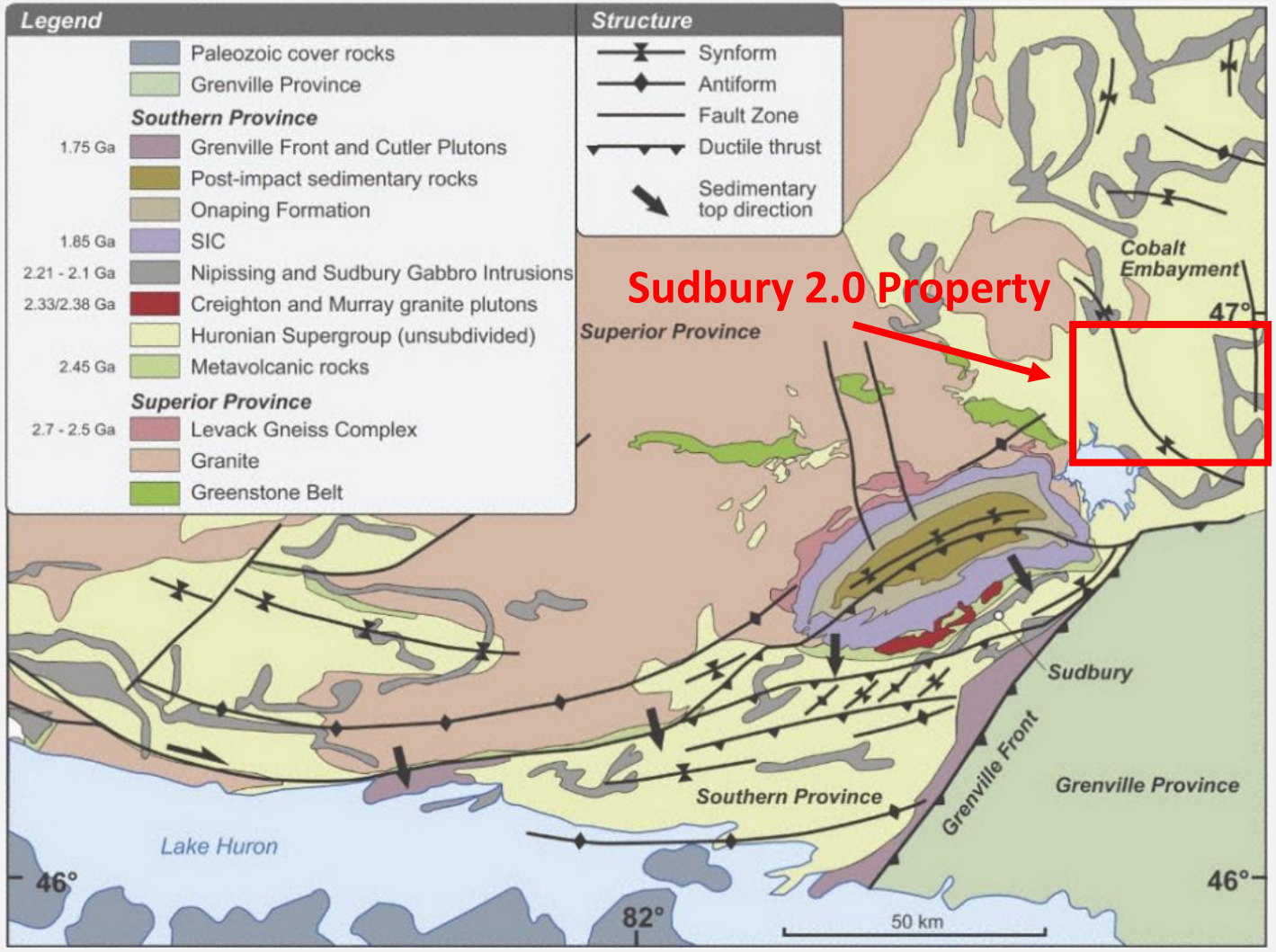
The paper indicates that there is exploration potential for Ni-Cu-PGE-sulfide deposits over the Temagami Magnetic Anomaly.

Regional Geology over the Temagami Anomaly

The Temagami Anomaly is situated under rocks of the Huronian Supergroup, a sedimentary basin that deposited between 2.45 to 2.2 billion years ago (Ga).

The Huronian Sediments likely rest on meta-sedimentary and meta-volcanic rocks of the Archean that are likely an extension of the ~2.7 Ga Temagami greenstone belt.

Situated to the west of the Temagami Anomaly is the Sudbury basin, a 1.85 Ga suite of mafic rocks recognized as the remnant of an impact crater melt sheet.



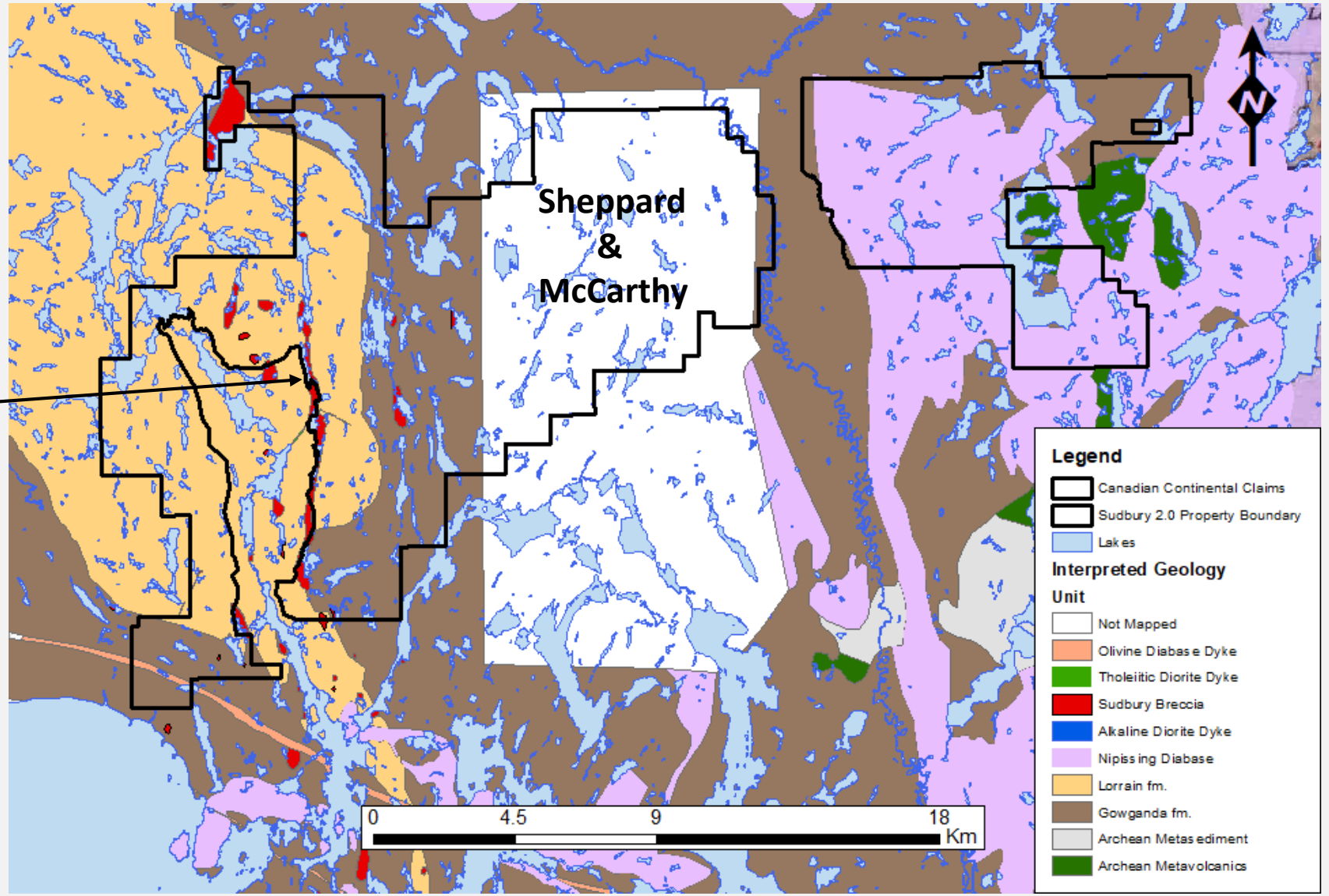
from Lightfoot, 2017

Sudbury 2.0 Property Geology

The Temagami Magnetic Anomaly resides below or within the Lorrain and Gowganda Formations.

Abundant outcrops of Sudbury Breccia have been found within the Sudbury 2.0 property.

Sheppard and McCarthy townships have never mapped and the occurrence of the source of the Temagami Anomaly on surface in that area is unknown.



Sudbury 2.0 Mineralized Showings

Wolf Lake - **Cu-Au**
- Hydrothermal breccia in Huronian sediment

Cobalt Hill – **Au-Co-Ni**
- Hydrothermal breccia in Huronian sediment

G Anomaly – **Au-Co**
- Hydrothermal breccia in Huronian sediment

Rathbun Lake – **Ni-Cu-PGE**
- Quartz diorite (likely SIC offset dyke)

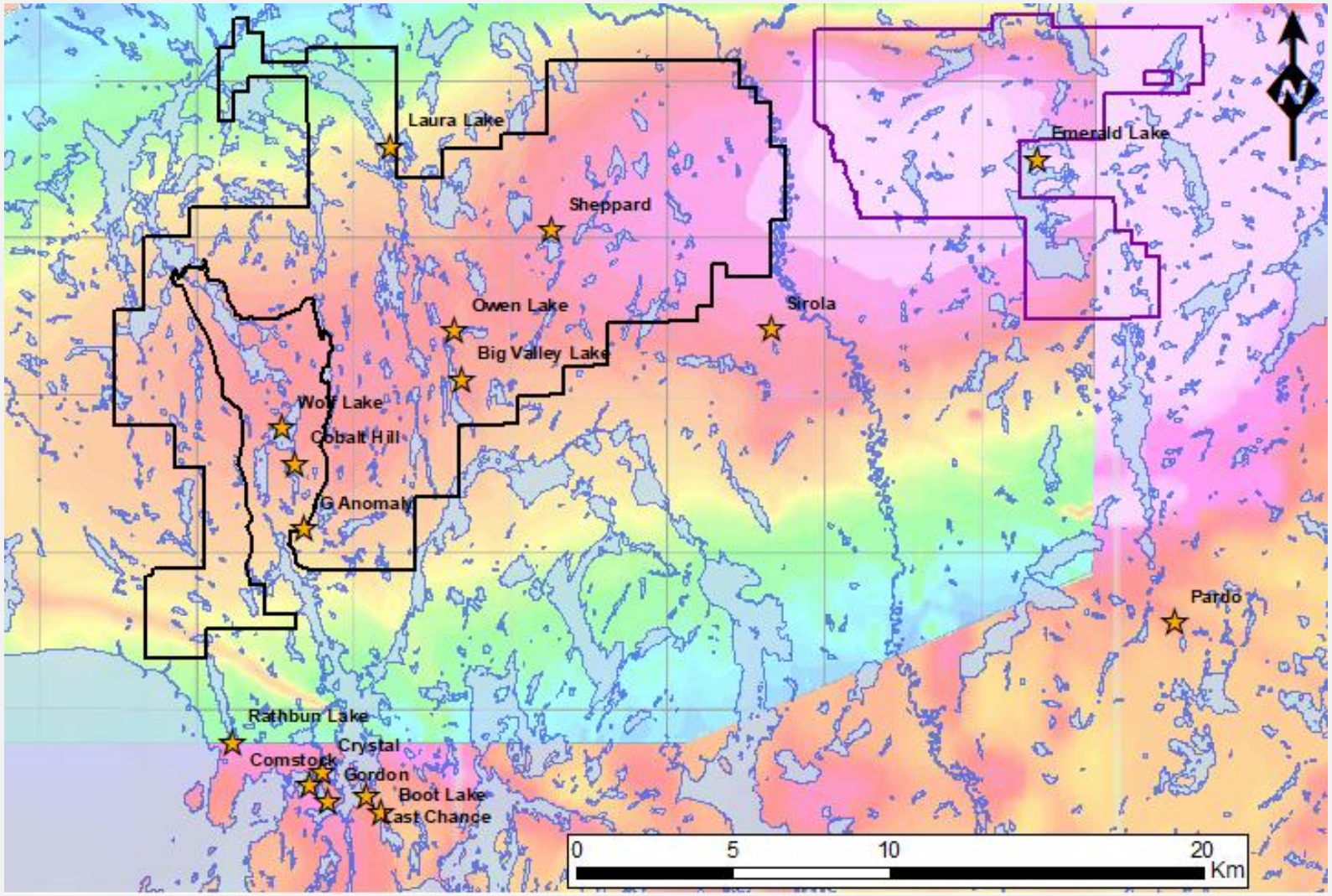
Comstock/Crystal/Gordon/Boot Lake/Last Chance – **Au**
- Quartz veins in Huronian sediment

Laura Lake – **Au**
- Quartz vein in Huronian sediment

Owen Lake/Big Valley Lake/Sheppard – **unknown**
- Pre 1950 patented claims with no record of mineralization type

Sirola – **Ni-Cu**
- Magmatic sulphide in Nipissing Diabase

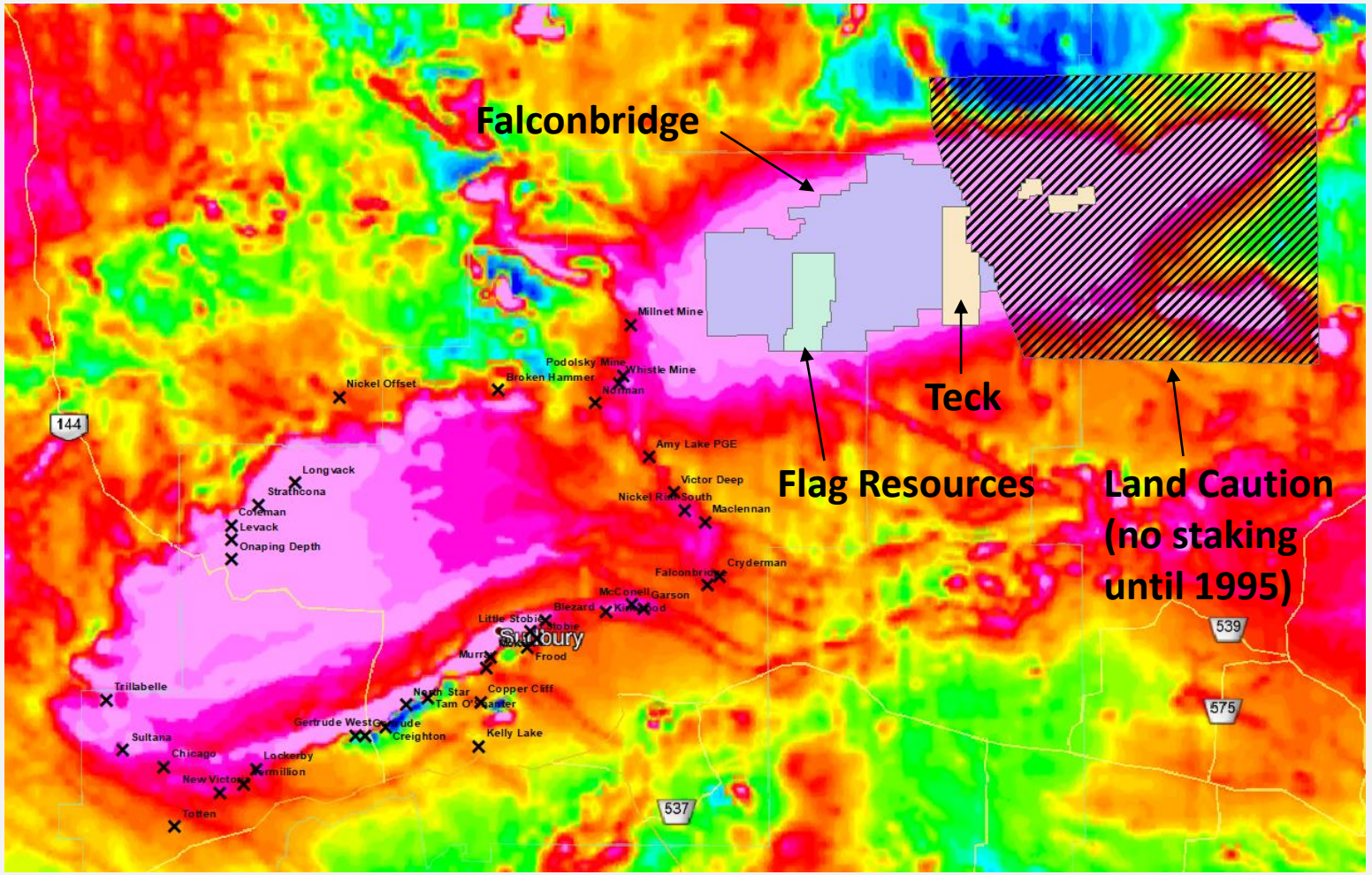
Emerald Lake – **Au**
- Archean banded iron formation hosted mineralization



Magnetic Map with mineralized showings

Temagami Anomaly Exploration History
Falconbridge, Teck & Flag Resources in the 1990's

- Falconbridge staked the entire Anomaly in the 1990's.
- They conducted geophysical surveys including a seismic survey, airborne magnetic survey, MT survey and drilled one bore hole.
- Falconbridge's seismic survey illustrated a mafic intrusive at depth.
- The bore hole was drilled to 2,200 metres and deviated 800 metres laterally.
- **The Anomaly was never explained. Inventus' 3D inversion of the magnetic data suggests they drilled in the center of the anomaly, which actually forms a bowl (see page 25)**

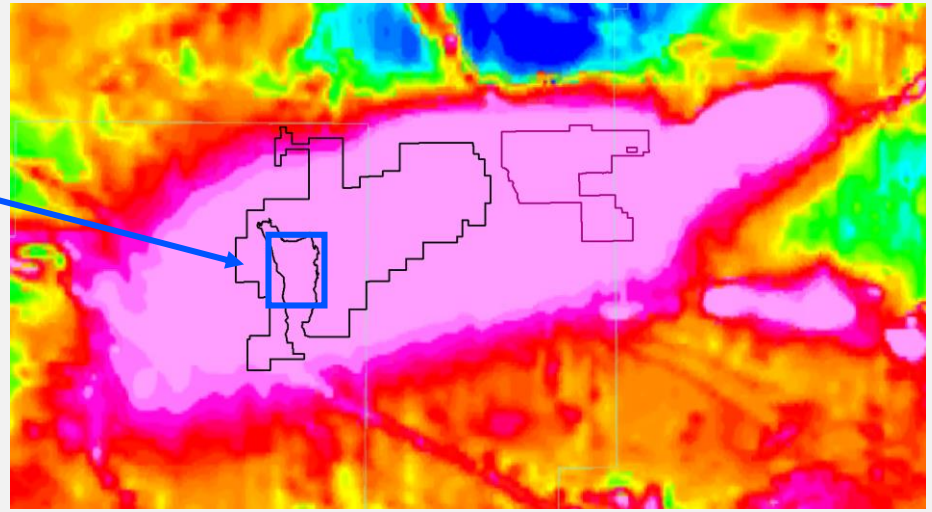


Temagami Anomaly Exploration History
Flag Resources

Flag Resources explored the western part of the Anomaly from 1984 to 2011.

They targeted hydrothermal Cu-Au-Co mineralization in the Huronian sediments.

- The company had many high grade gold (>31 g/t) and copper (up to 7%) drill intercepts.
- Multiple mineralized hydrothermal breccia structures with Au ± Cu, Co and Ni were explored.
- The immobile nickel mineralization and fuchsite was determined to be from an underlying mafic intrusive.
- In the late 1990's up until 2011 Flag Resources began looking for the source of their mineralization, however, at that time the company had deteriorated and no serious exploration effort was completed.



Albitized pyritic breccia with gold-cobalt-nickel mineralization from Cobalt Hill

SIC-type sulfide inclusions at Cobalt Hill

The Canadian Mineralogist
Vol. 42, pp. 1541-1562 (2004)

THE ROLE OF SALINE FLUIDS BASE-METAL AND GOLD MINERALIZATION AT THE COBALT HILL PROSPECT NORTHEAST OF THE SUDBURY IGNEOUS COMPLEX, ONTARIO: A FLUID-INCLUSION AND MINERALOGICAL STUDY

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ABSTRACT

Pyrite-rich quartz veins that cut Huronian sediments at Cobalt Hill, Mackelcan Township, Ontario, *ca.* 20 km northeast of the Sudbury Igneous Complex (SIC), crystallized from saline hydrothermal fluids. The coarse-grained pyrite in the quartz veins contains minute inclusions of millerite, gersdorffite, pentlandite, chalcopyrite, chalcocite, pyrrhotite, coloradoite and gold, and primary fluid inclusions in the veins contain halite as a daughter mineral, and inclusions of pyrite, iron carbonate and micas. The primary fluid inclusions in the quartz veins have salinities of 26–46 equiv. wt% NaCl, an entrapment temperature close to 400°C, and pressure of *ca.* 1.3 kbar. The presence of chromian muscovite stringers in the quartz–pyrite veins suggests that the hydrothermal fluids were in contact with Cr-rich mafic or ultramafic rocks at some depth, whereas the variety of sulfide inclusions in pyrite suggests that the source rocks were enriched in base metals and possibly gold. The mobilization of base metals, Hg telluride and gold, and their subsequent precipitation in the quartz veins at Cobalt Hill, were facilitated by saline hydrothermal fluids that postdate the Sudbury Event. The fluids probably represent heated Canadian Shield brines mixed with hydrothermal fluids that crystallized the host quartz veins. The salinity and homogenization temperature of fluid inclusions in the veins are comparable to those of fluids that mobilized base-metal sulfides and possibly PGE in the South Range deposits, and base-metal sulfides in the North Range deposits of the SIC. The relative proximity of Cobalt Hill to the SIC, the ubiquitous presence of small Sudbury-type sulfide inclusions in pyrite in the Cobalt Hill quartz veins, the comparable salinity and homogenization temperature of fluid inclusions in these veins to those of metal-rich fluids of the SIC, and the presence of chromian muscovite, imply a spatial relationship of the veins to Sudbury-type base metals and to a Cr-rich mafic or ultramafic intrusion at depth.

Keywords: base metals, gold, saline fluids, fluid inclusions, Cobalt Hill prospect, Lake Wanapitei, Ontario.

SOMMAIRE

Les veines de quartz riches en pyrite qui recoupent les roches métasédimentaires d'âge huronien à Cobalt Hill, canton de Mackelcan, en Ontario, environ 20 km au nord-est du complexe igné de Sudbury, a cristallisé à partir de fluides hydrothermaux à salinité élevée. La pyrite à granulométrie grossière dans ces veines contient d'infimes inclusions de millerite, gersdorffite, pentlandite, chalcopyrite, chalcocite, pyrrhotite, coloradoïte et or, et des inclusions fluides primaires contenant la halite précipitée à partir du fluide piégé, et des inclusions accidentelles de pyrite, carbonate de fer et de micas. Les inclusions fluides primaires ont une salinité comprise entre 26 et 46% NaCl (ou équivalents, en poids), une température de piégeage voisine de 400°C, et une pression d'environ 1.3 kbar. La présence de muscovite chromifère en lambeaux dans les veines de quartz–pyrite fait penser que la phase fluide est entrée en contact avec des roches mafiques ou ultramafiques riches en Cr à profondeur. Aussi, la variété d'inclusions de sulfures dans la pyrite indique que les roches à la source étaient enrichies en métaux de base, et peut-être en or. La mobilisation des métaux de base, du tellurure de mercure, et de l'or, et leur précipitation par la suite dans des veines de quartz, ont été facilitées par les fluides hydrothermaux à salinité élevée postérieurs à l'événement d'impact à Sudbury. Ces fluides représenteraient des saumures chauffées du Bouclier Canadien mélangées aux fluides desquels ont cristallisé les veines de quartz. Leur salinité et les températures de leur homogénéisation sont comparables à celles des fluides qui ont mobilisé les sulfures de métaux de base et les éléments du groupe du platine dans les gisements du flanc sud, et les métaux de base du flanc nord, du complexe de Sudbury. La proximité de Cobalt Hill à ce complexe, la présence ubiquiste de petites inclusions de sulfures de type Sudbury dans la pyrite des veines de quartz à Cobalt Hill, la salinité et les températures d'homogénéisation comparables des inclusions fluides à celles du complexe de Sudbury, et la présence de muscovite chromifère supposent une relation spatiale des veines aux accumulations de métaux de base de type Sudbury et à des roches mafiques ou ultramafiques chromifères à profondeur.
(Traduit par la Rédaction)

Mots-clés: métaux de base, or, fluides à salinité élevée, inclusions fluides, indice de Cobalt Hill, Lac Wanapitei, Ontario.

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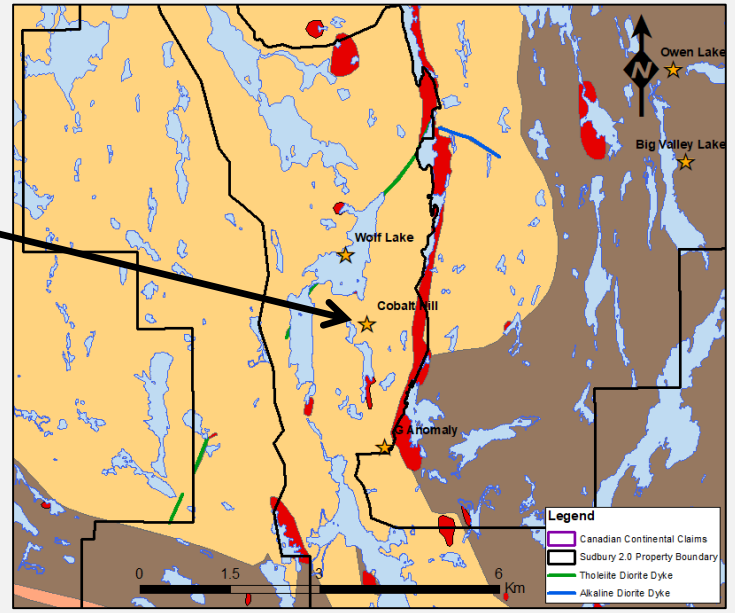
Scientific paper by Eva Schandl in 2004 suggested a possible SIC origin for the mineralization around Cobalt Hill

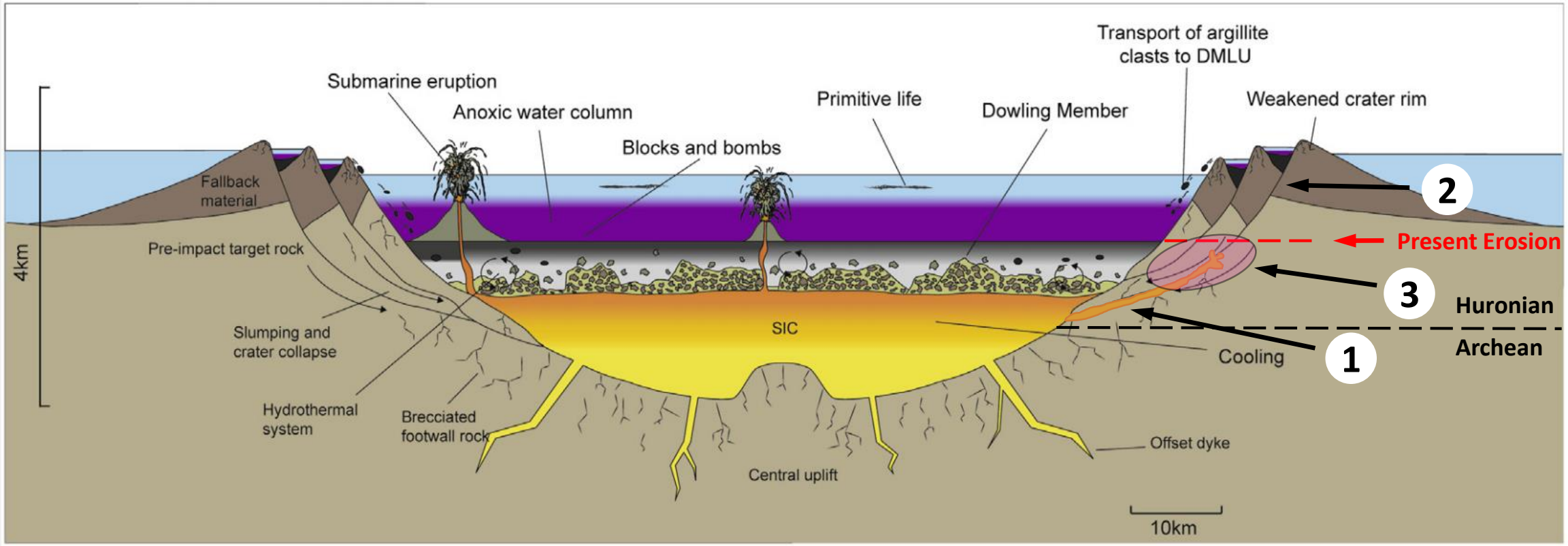
"The relative proximity of Cobalt Hill to the SIC, the ubiquitous presence of small Sudbury-type sulfide inclusions in pyrite in the Cobalt Hill quartz veins, the comparable salinity and homogenization temperature of fluid inclusions in these veins to those of metal-rich fluids of the SIC, and the presence of chromium muscovite (fuchsite), imply a spatial relationship of the veins to Sudbury-type base metals and to a Cr-rich mafic or ultramafic intrusion at depth."

Cobalt Hill Au-Co Showing



Possible Mineralization Model - Cobalt Hill & Wolf Lake

1. Melt injects along slumping crater rim
2. Seawater above crater rim percolates downwards and interacts with SIC melt
3. Sodic hydrothermal fluids cause albitization and brecciation depositing Cu-Au-Co-Ni mineralization in the surrounding rocks

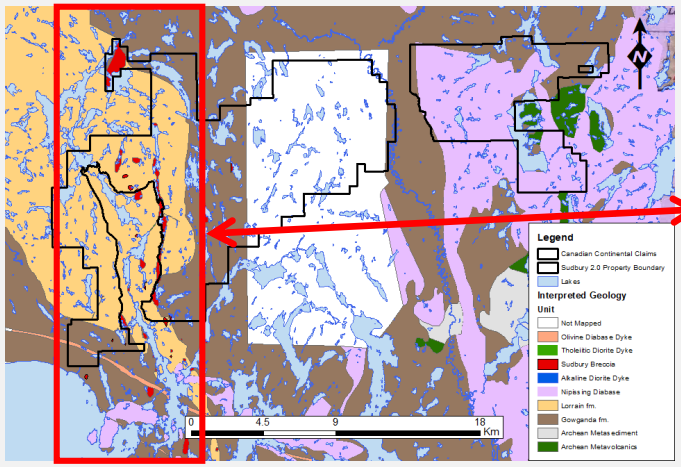


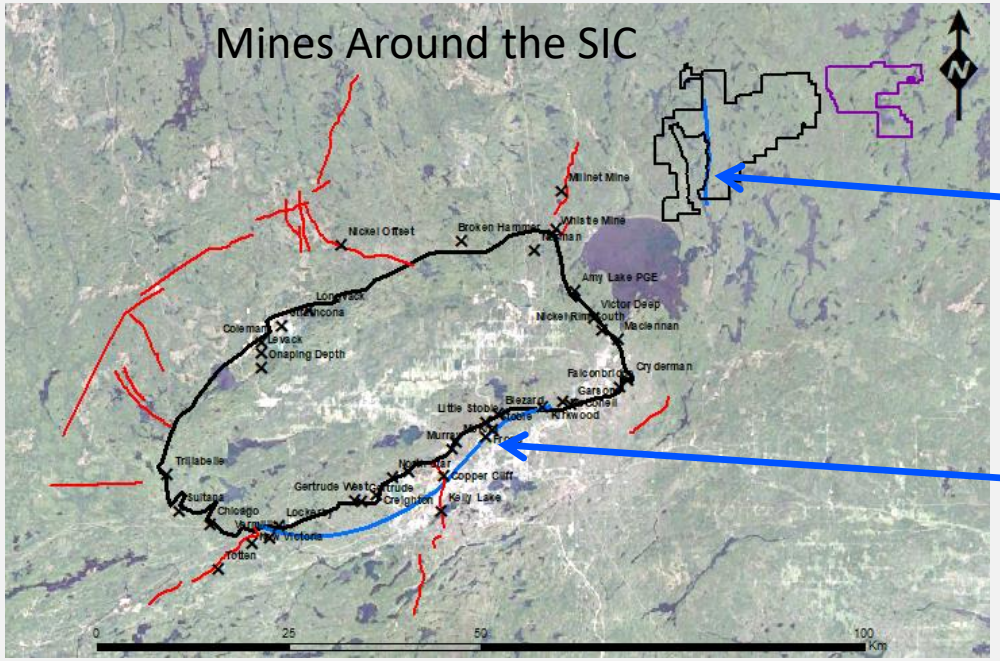
Modified from O'Sullivan et al. (2016)

2018 Discoveries

New Sudbury Breccia Belt – Laundry Lake Breccia Belt

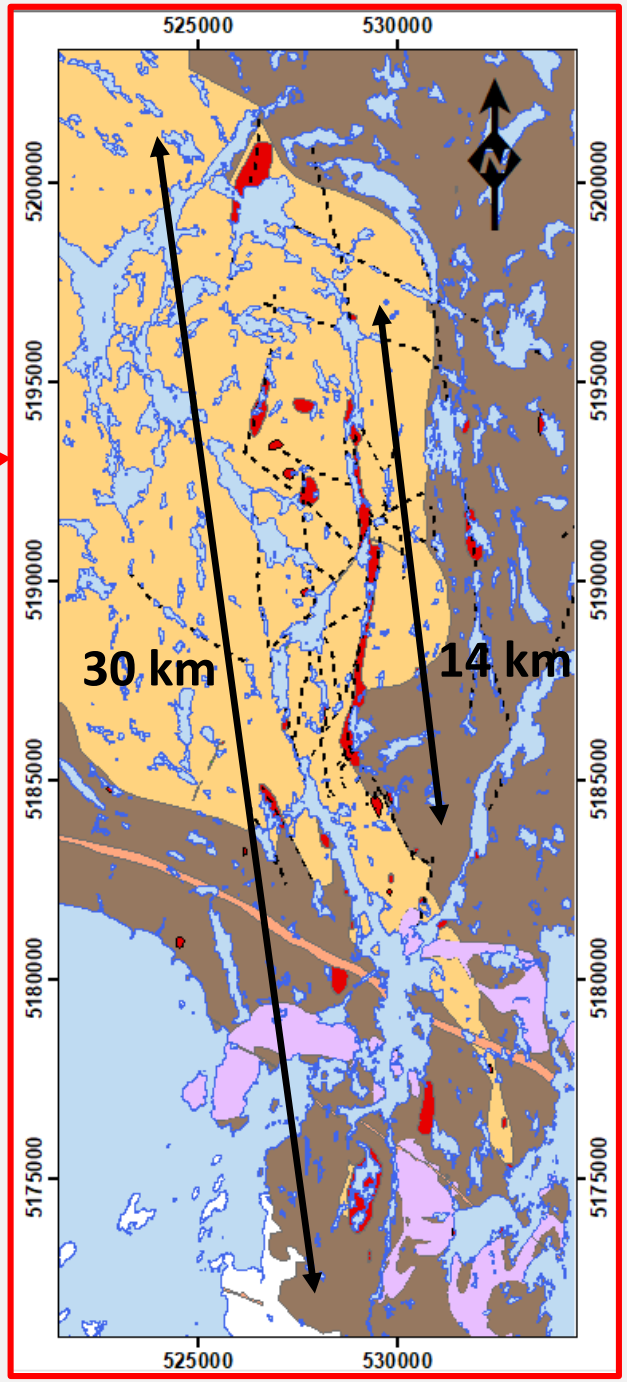
- The Laundry Lake breccia belt (LLBB) was mapped contiguously over **14 km** and may extend over **30 km**
- The Frood-Stobie deposit one of the largest deposits in the world is hosted in a belt of Sudbury Breccia around the SIC





Laundry Lake Breccia Belt

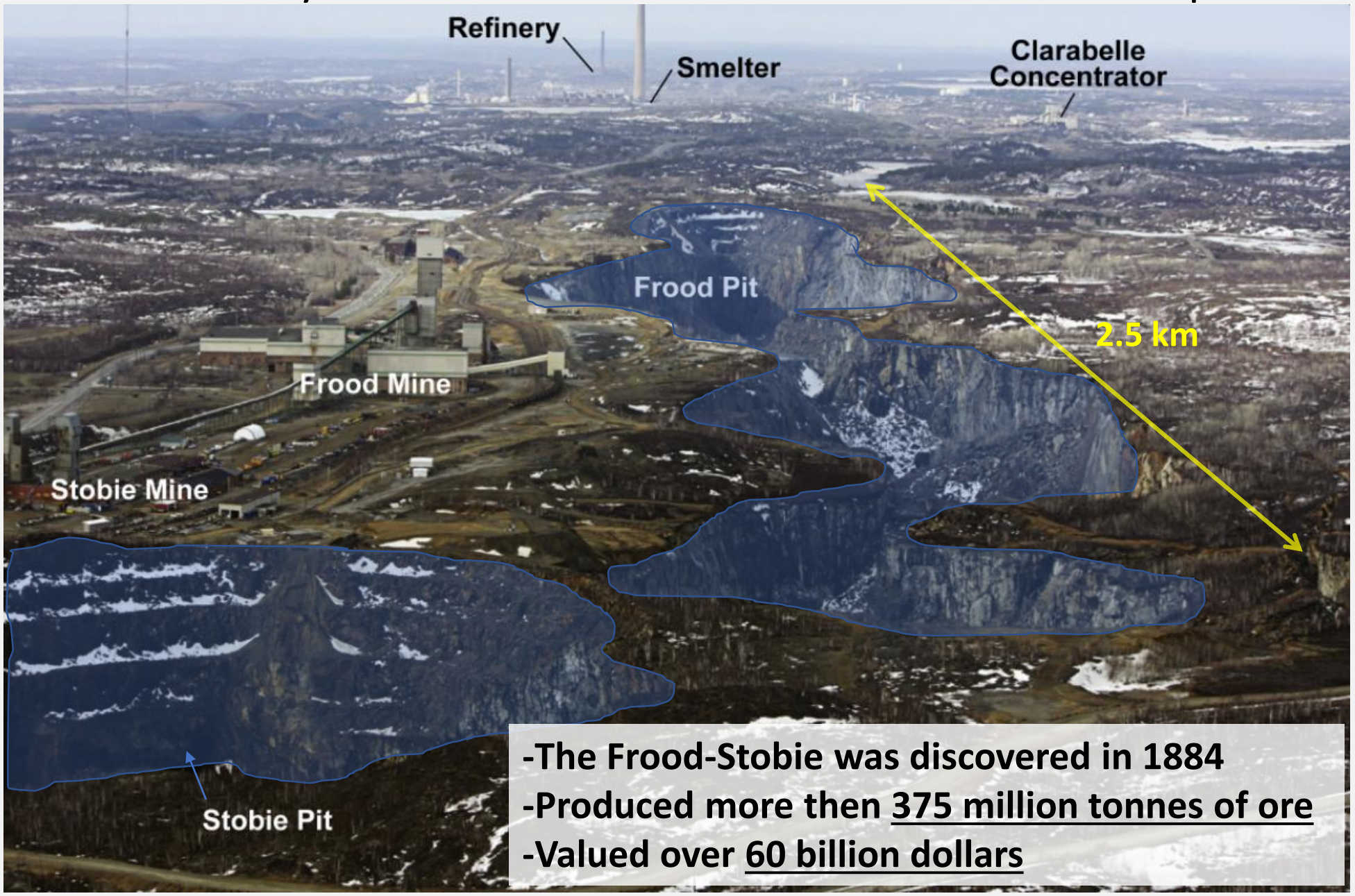
South Range Breccia Belt
Frood-Stobie Mine



2018 Discoveries
New Sudbury Breccia Belt – Laundry Lake Breccia Belt

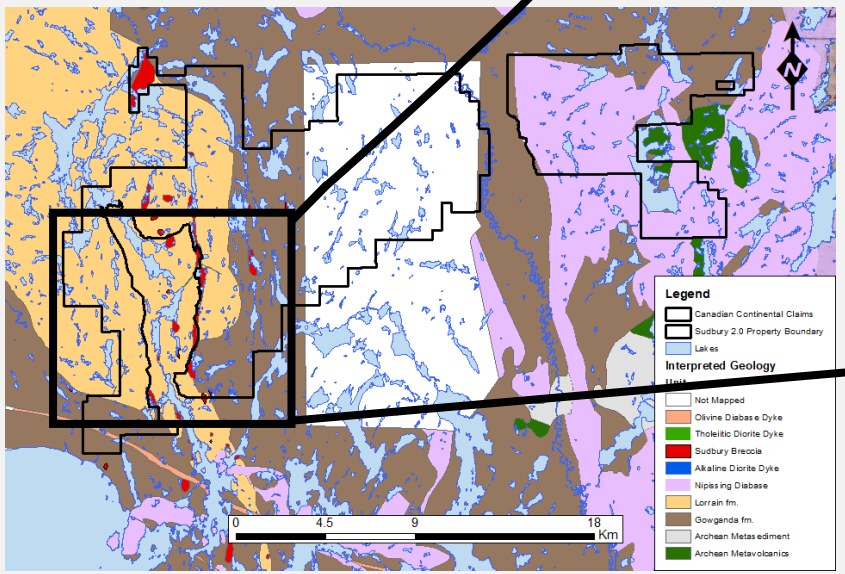
- The breccia matrix is flow banded with a variety of clasts including exotic mafics
- Clasts are rounded and up to 20 metres in diameter
- Varies from 10’s to 100’s of metres wide

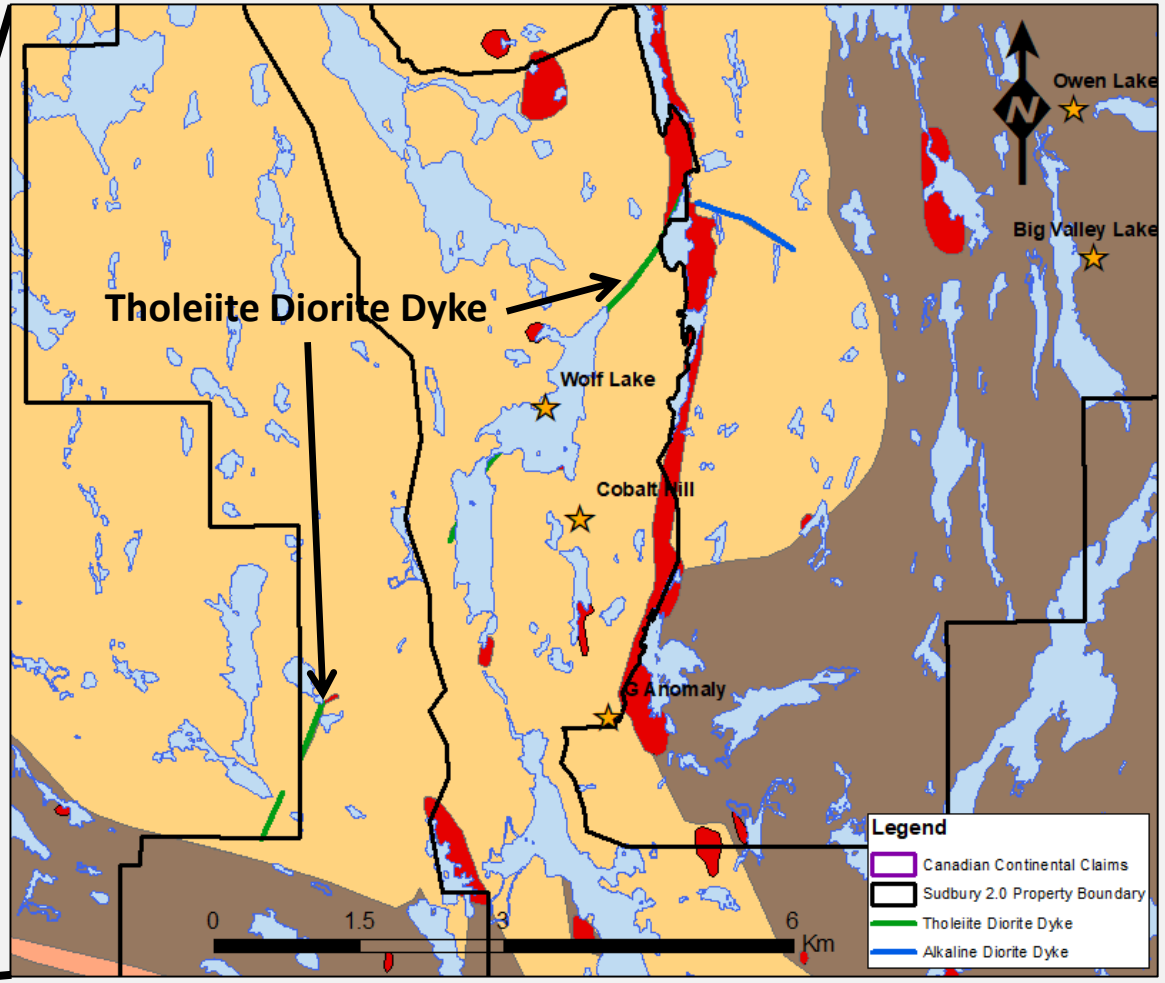
The Sudbury Breccia Hosted Frood-Stobie Deposit



2018 Discoveries
Tholeiite Diorite Dyke

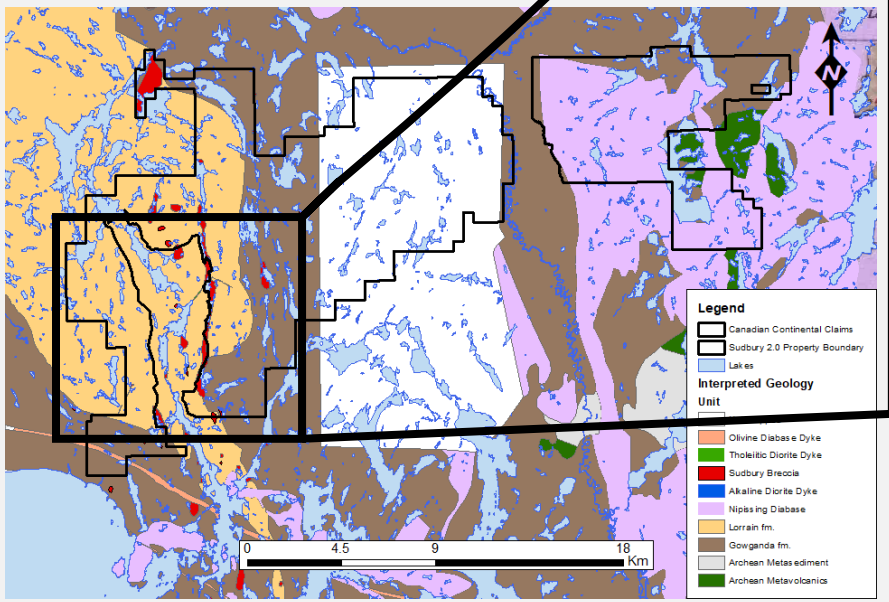
- The dyke occurs on the west side of the breccia belt and intrudes the Huronian Sediments with a near vertical dip
- It has been mapped over 8 km along strike
- The dyke is associated with Cu-Au-Ni-Co mineralization at Wolf Lake and Cobalt Hill

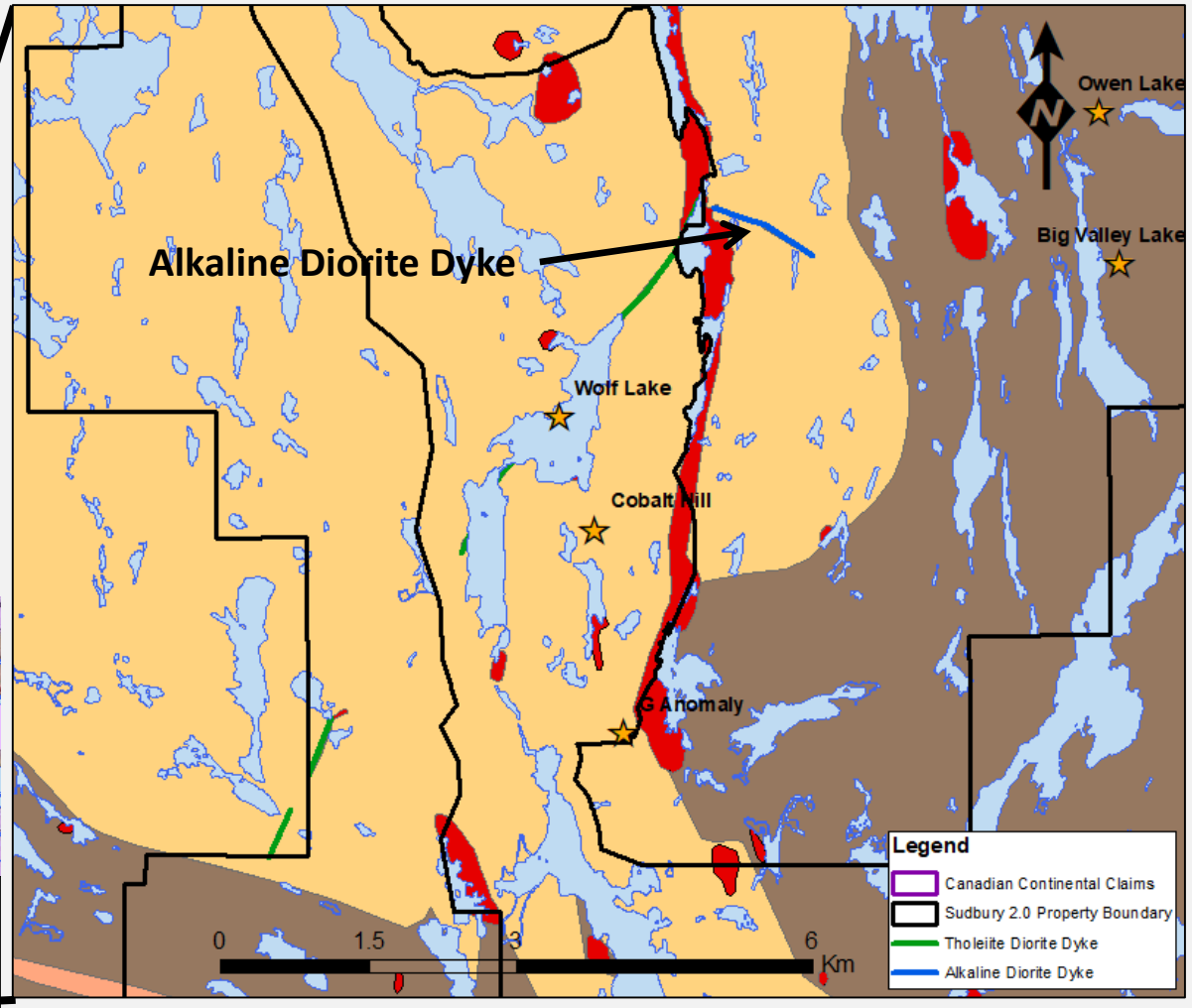




2018 Discoveries
Alkaline Diorite Dyke

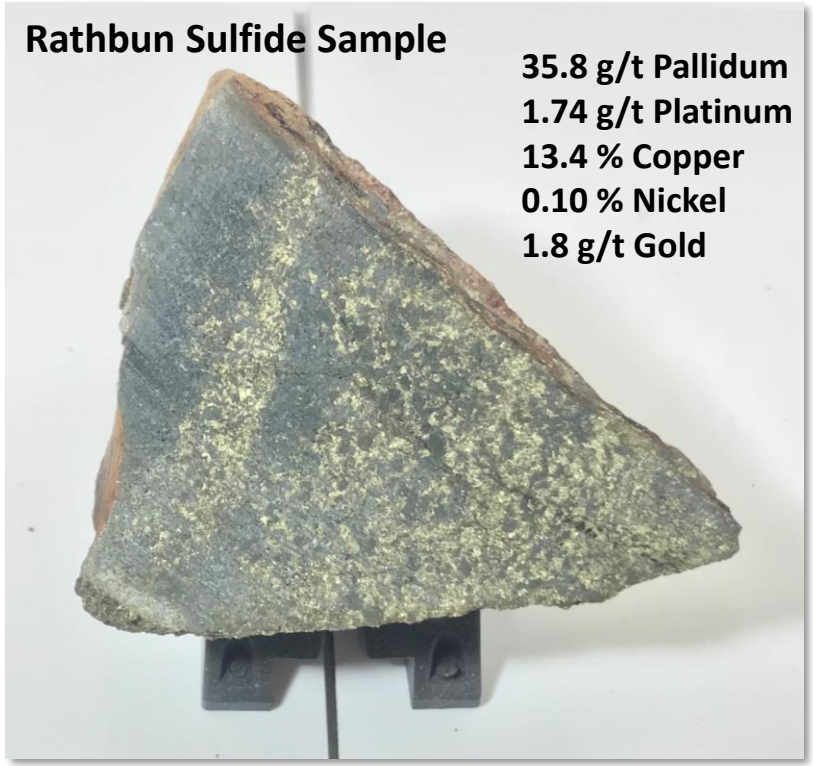
- The dyke occurs on the east side of the breccia belt and intrudes the Huronian Sediments with a near vertical dip
- The dyke is magnetic and enriched in rare earth elements
- Has been mapped over 1 km along strike
- Clasts of the dyke occur in the Laundry Lake Breccia Belt

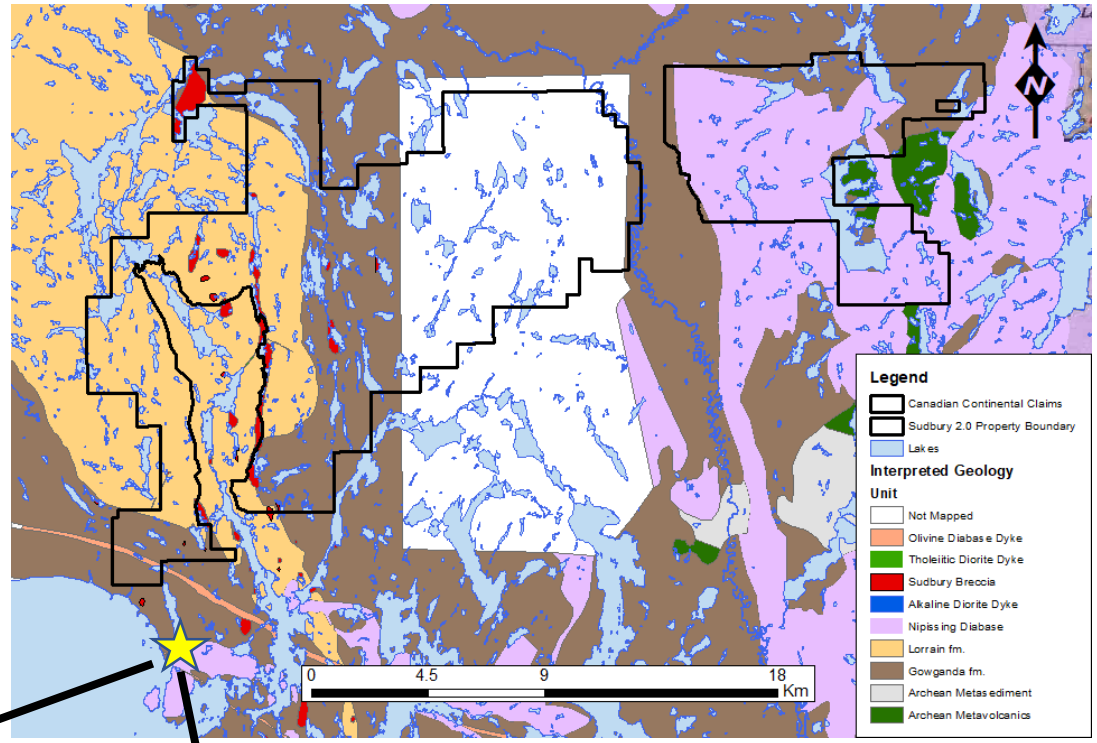




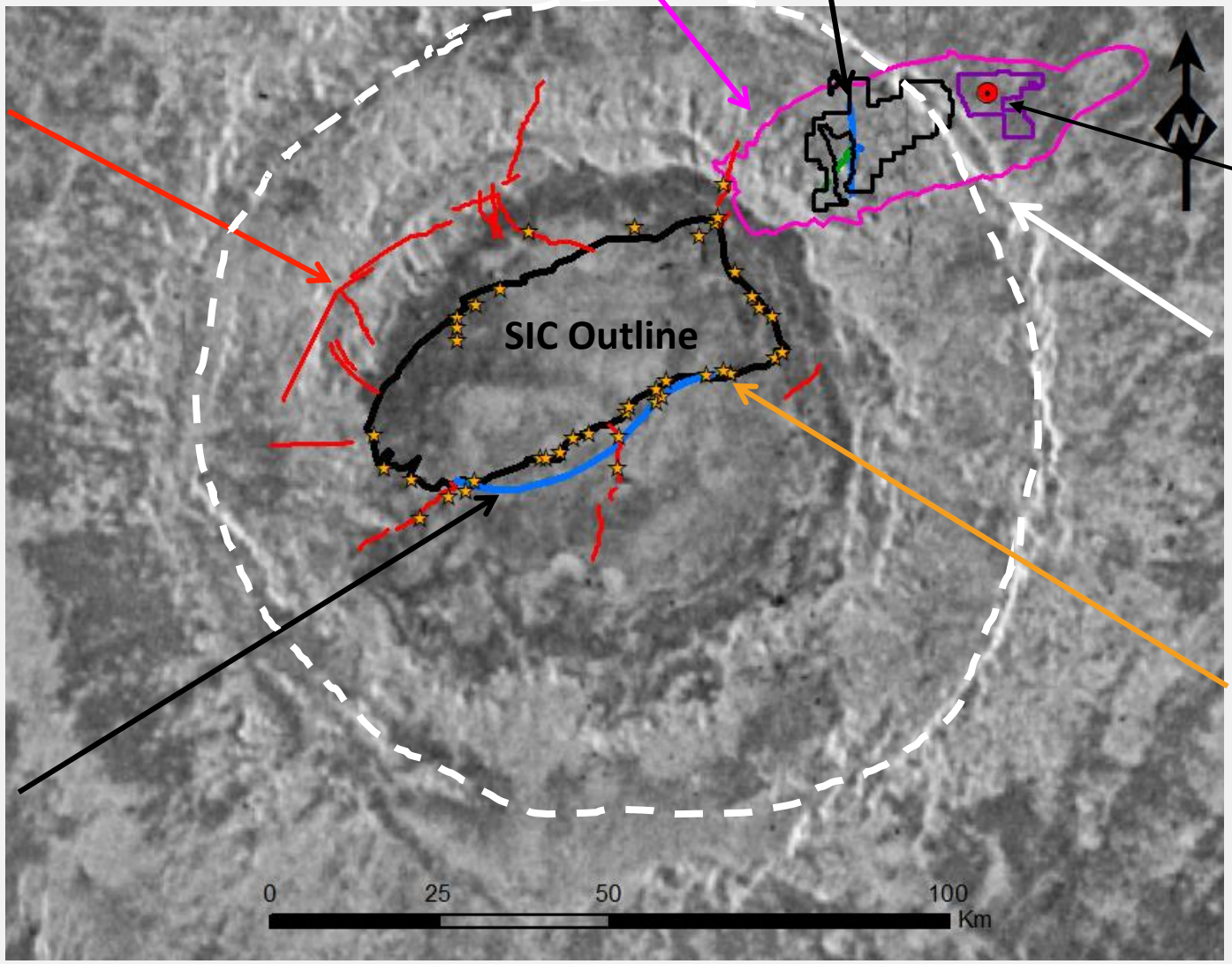
2018 Discoveries
Quartz Diorite at Rathbun Lake

- Inclusion bearing quartz diorite discovered at Rathbun Lake in 2018
- Showing is 15km east of the SIC
- Bulk geochemistry of the quartz diorite strongly supports a correlation with the SIC





Proposed Impact Crater of the Sudbury Igneous Complex



Modified from Lightfoot, 2017

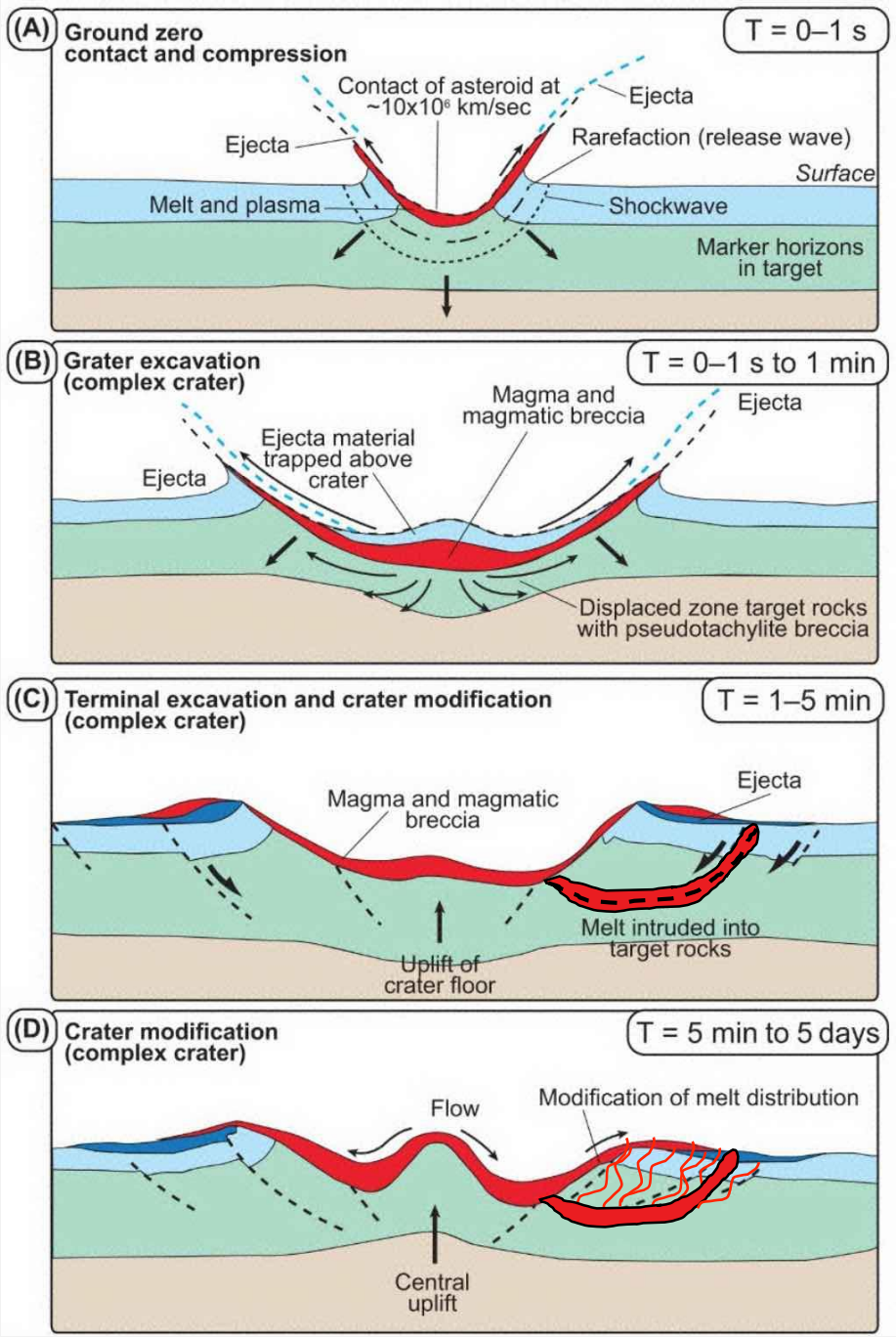
The Sudbury Impact and possible theory for the Temagami Anomaly

A) Impact and compression

B) Crater excavation and shockwave into country rock

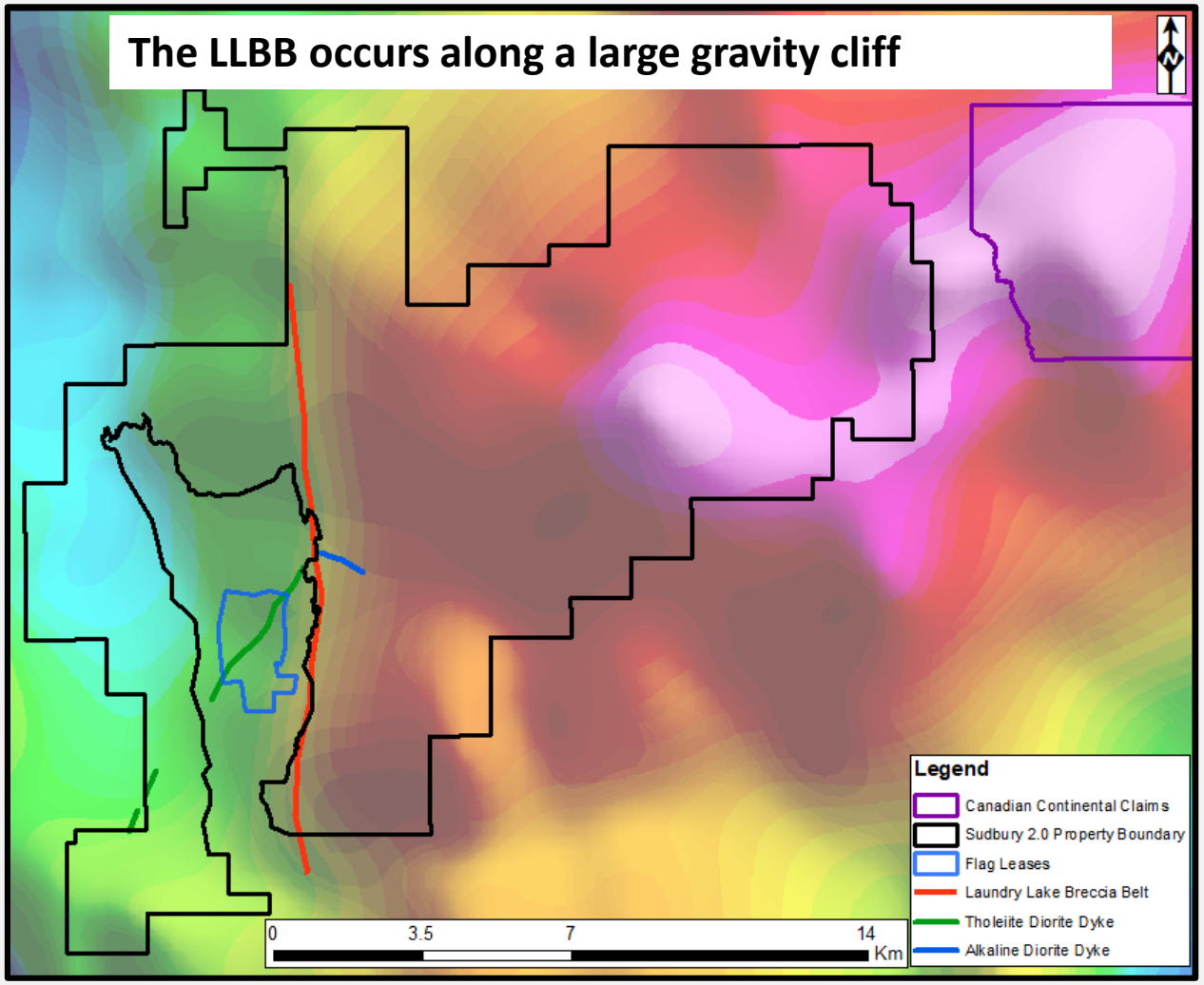
C) Impact melt and breccia inject into a listric fault during crater modification

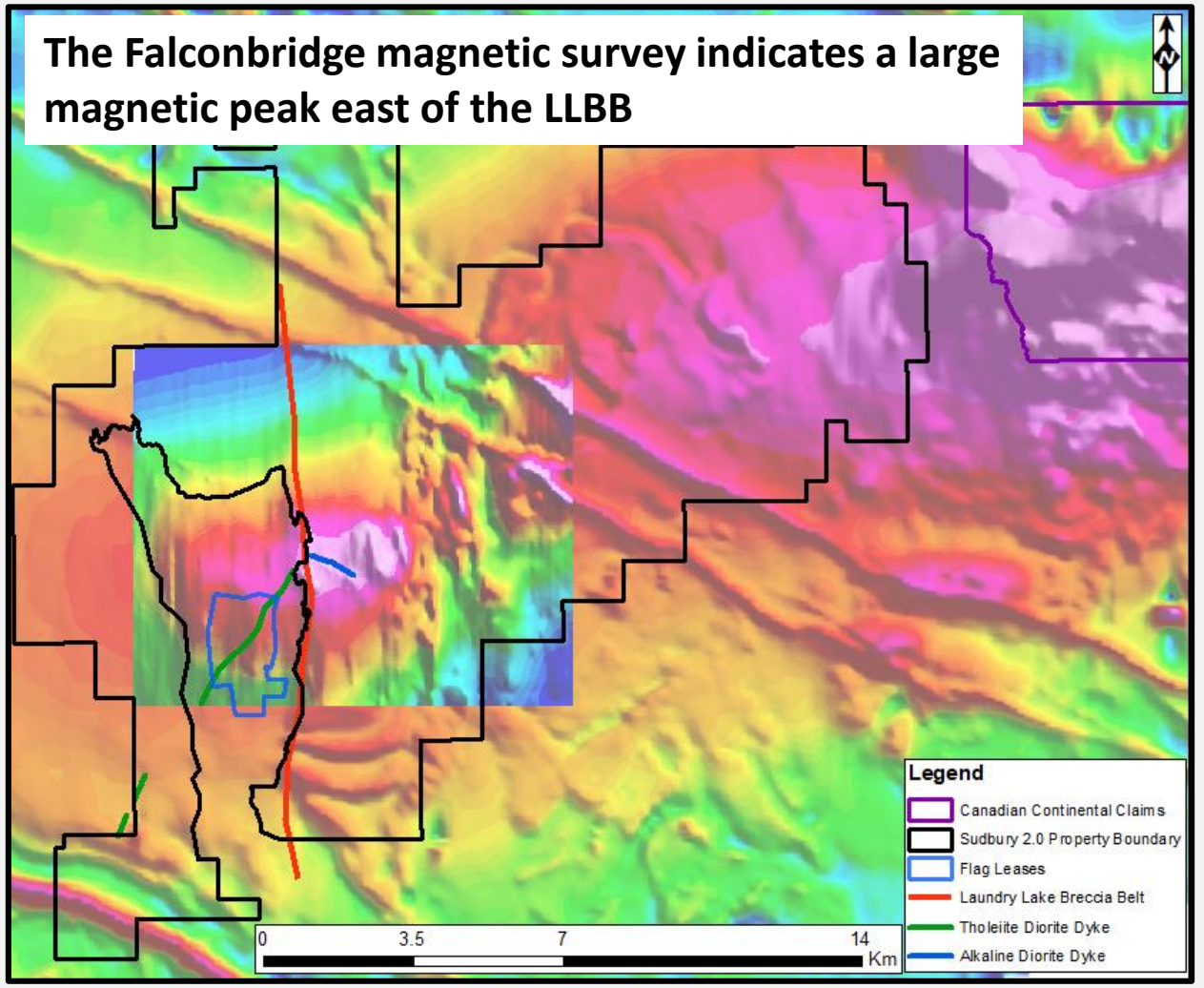
D) Hydrothermal fluid brecciates the country rock above the intrusion and deposits Cu, Au, Co, Ni mineralization



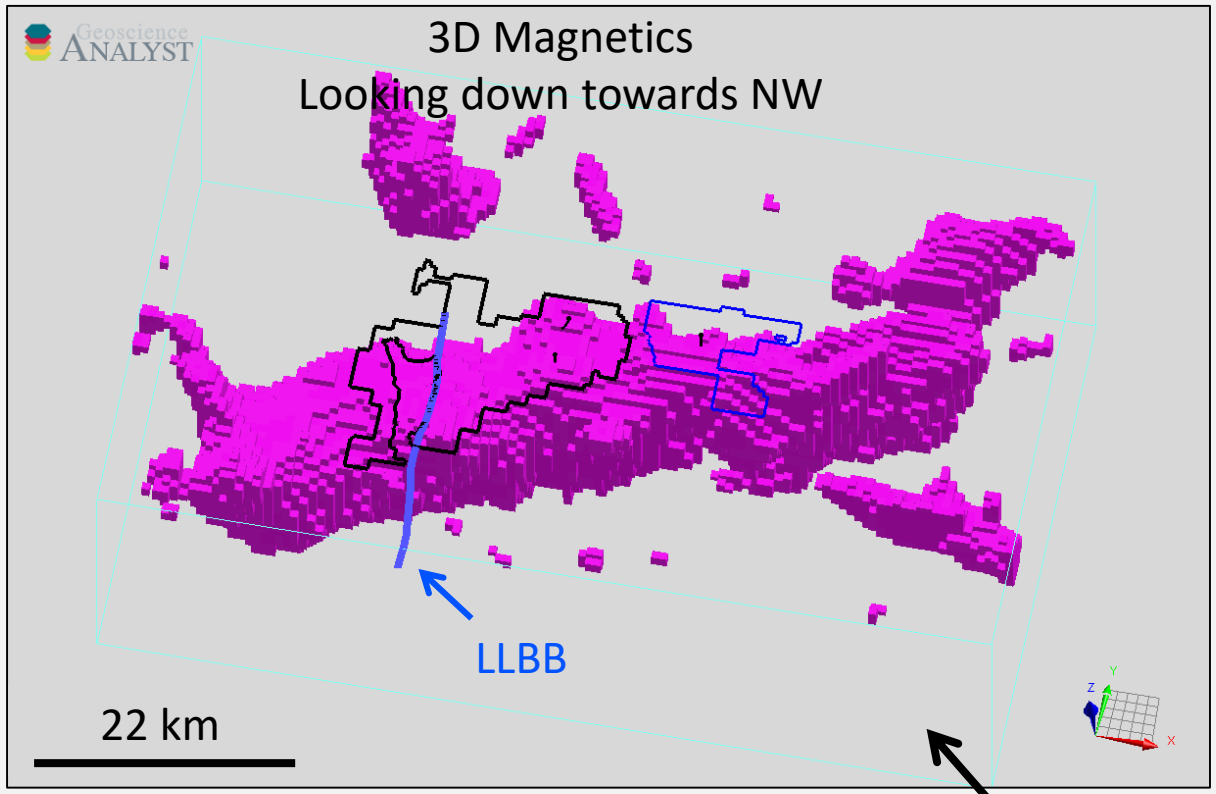
Modified from Lightfoot, 2017

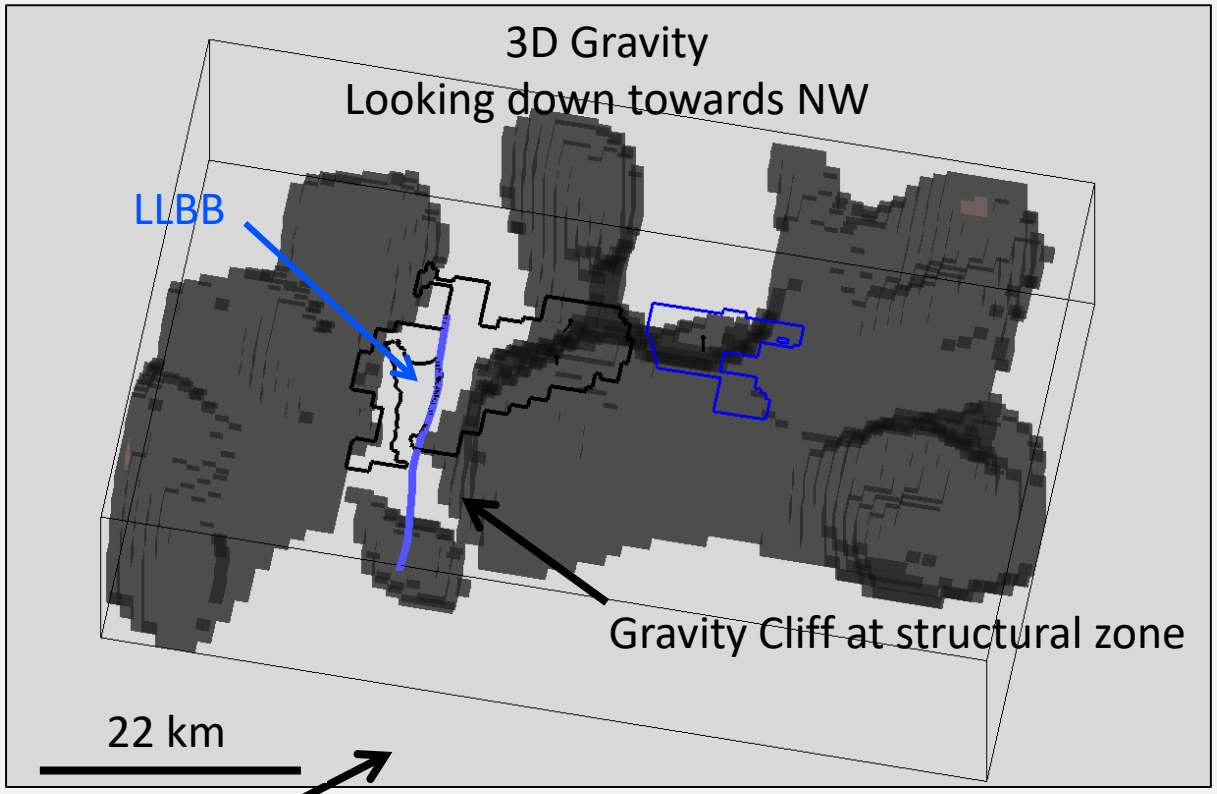
2D Gravity and Magnetic maps over the Temagami Anomaly

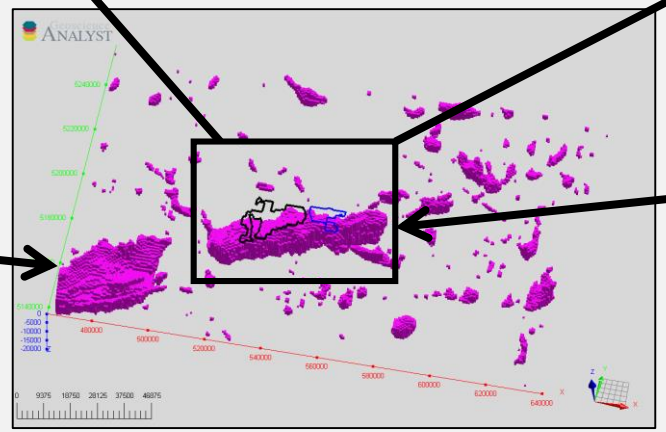




3D Magnetic and Gravity Inversion of the Temagami Anomaly



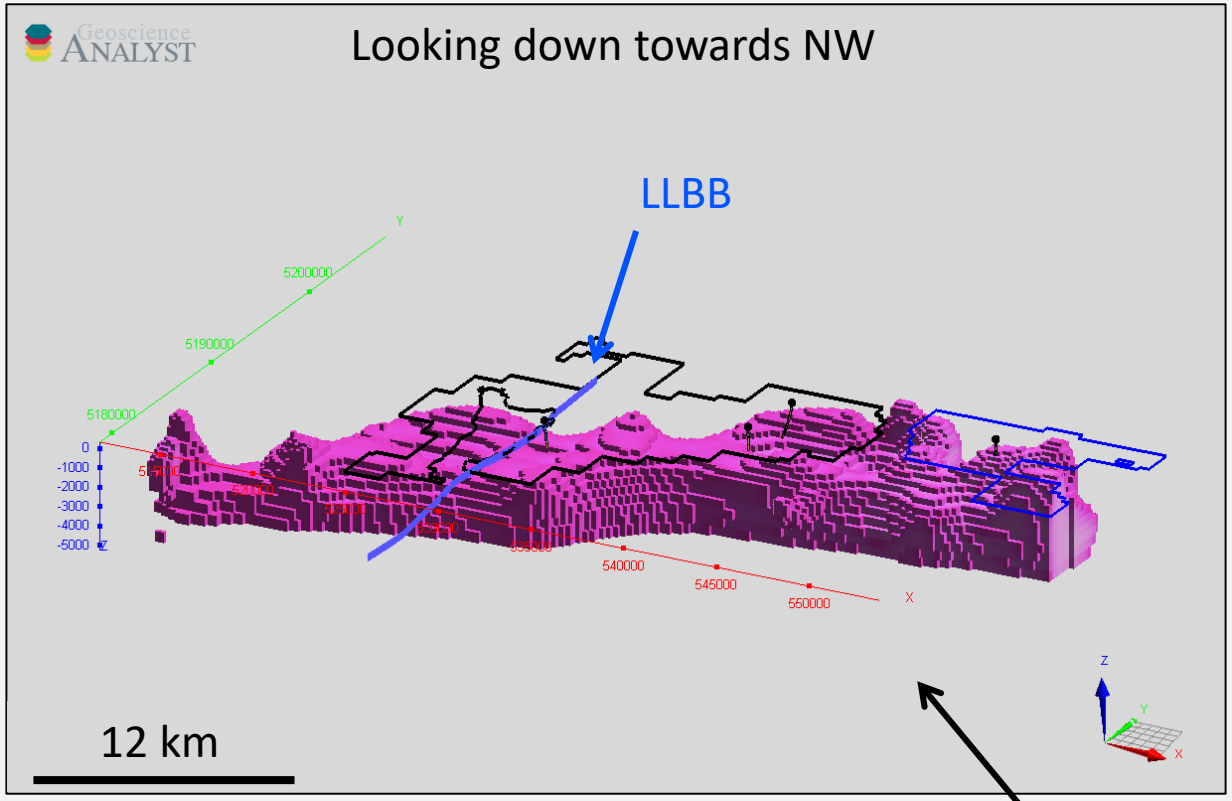


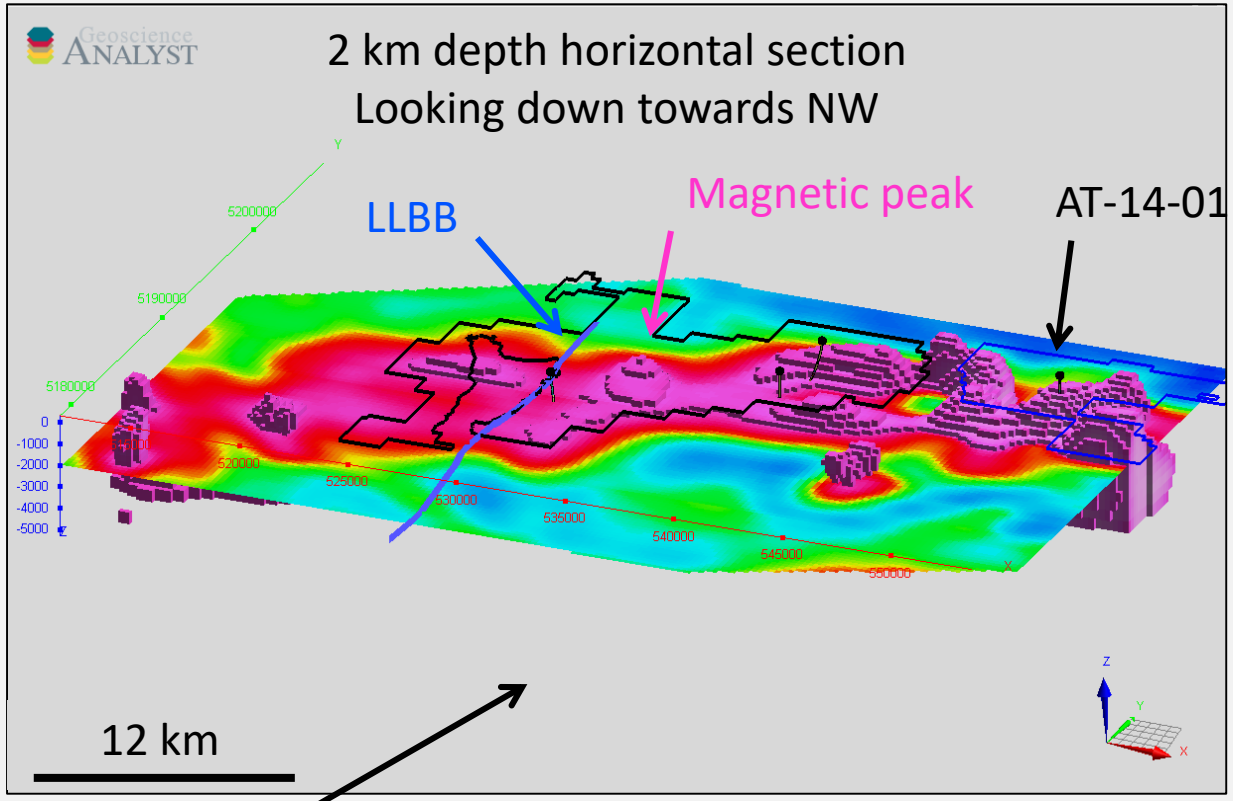


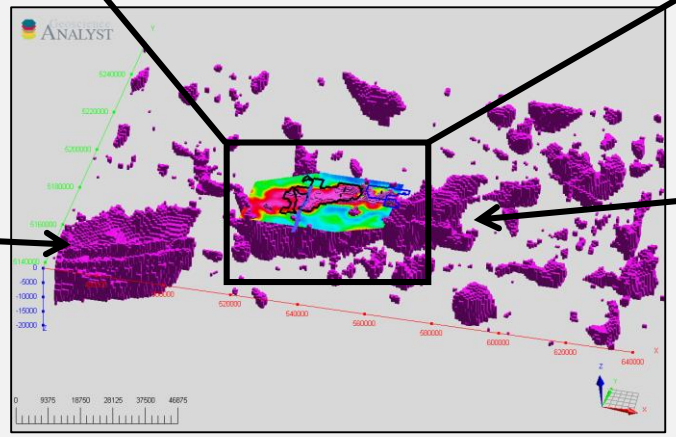
Sudbury Igneous Complex

Temagami Anomaly

3D Inversion of Falconbridge Magnetic data over the Temagami Anomaly



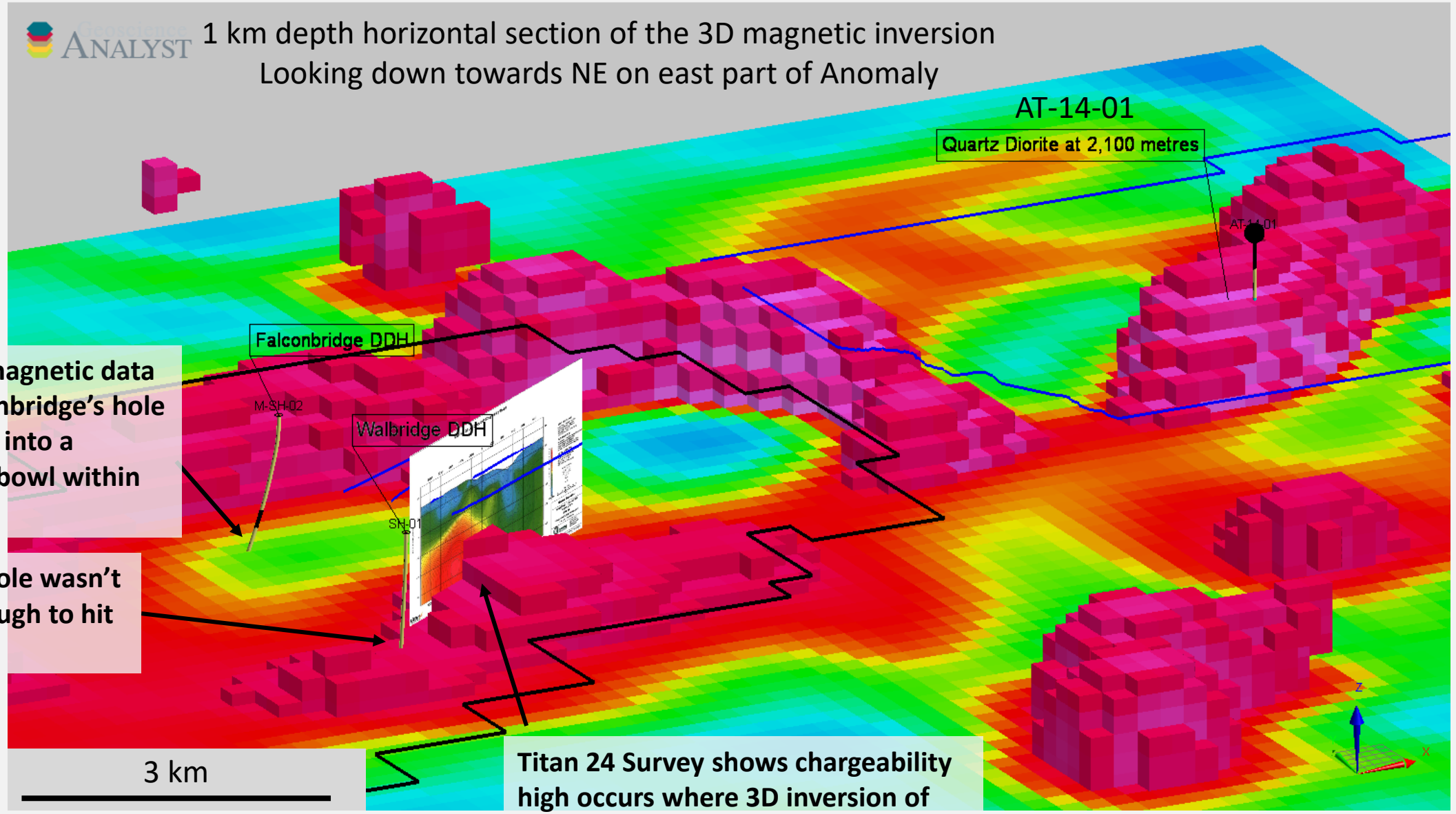




Sudbury Igneous Complex

Temagami Anomaly

Vismand Exploration – Titan 24 Survey “Fishhook Gird”



3D inversion of magnetic data shows that Falconbridge’s hole in ‘97 was drilled into a magnetic low (A bowl within the TMA)

Wallbridge ‘01 hole wasn’t drilled deep enough to hit the anomaly

Titan 24 Survey shows chargeability high occurs where 3D inversion of magnetic data is close to surface

In Summary

The discovery of Sudbury-type geology over the TMA indicates potential for Ni-Cu-PGE mineralization.

- There is physical evidence of SIC equivalent quartz diorite in drill hole AT-14-01 on the east side of the Temagami Anomaly
- There is quartz diorite-hosted high grade Ni-Cu-PGE mineralization at Rathbun Lake on the west side of the Temagami Anomaly
- The Laundry Lake Breccia Belt (LLBB) occurs on surface through the middle of the Temagami Anomaly and along the edge of a gravity anomaly suggesting a major structure
- Abundant hydrothermal Cu-Au +/- Co, Ni mineralization occurs in close proximity to the LLBB
- The LLBB contains exotic mafic inclusions, similar to the South Range Breccia Belt which hosts the Frood-Stobie deposit

2019 Exploration Targets for the Sudbury 2.0 Property

The Laundry Lake Breccia Belt (LLBB)

Explore in greater detail to discover quartz diorite with sulfide mineralization similar to the Frood-Stobie deposit. Continue mapping and extending the LLBB unit along strike.

The Rathbun Property

Mineralized quartz diorite on surface – The quartz diorite was not recognized by previous exploration in the area

The Alkaline Diorite Dyke

An exotic magnetic dyke from an unknown intrusion. This unit needs to be prospected and mapped along strike, particularly where in contact with the LLBB

The Tholeiitic Diorite Dyke

The close association of hydrothermal breccia hosted Au-Cu +/- Co, Ni mineralization with the dyke around the Wolf Lake and Cobalt Hill areas is intriguing. The dyke should be prospected and mapped further along strike.

The Fishhook Grid

Vismand Exploration's Titan 24 survey over the Fishhook grid shows some interesting signatures of a dyke system beneath it. The 3D inversion of the magnetic data shows a strong positive anomaly near surface. The area, which has never been mapped, should be prospected and mapped in detail.