#### Midland Exploration

TSX -V:MD

# Laflamme Project, Copernick Ni-Cu prospect

December 2024

# Laflamme Project



- Located in the Abitibi greenstone belt, about 20 kilometers NW of the town of Lebel-sur-Quévillon
- Easy road access to the Copernick prospect



# Historical Work on Copernick



- Discovery in 2011 of a maficultramafic mineralized intrusion in Ni-Cu, after drilling a VTEM anomaly
- Additionnal drilling in 2012, 2016, 2017 and 2023 intersect Ni-Cu mineralization, over an apparent width of more than 40 meters



#### Mineralization LAF-16-038B



Interstitial mineraliation in a mafic-ultramafic intrusion, typical of magmatic Ni-Cu systems



# Geochemical Study 2024



- Additionnal ICP-MS 4 acides assays done in 2024 on some key drillholes done previously
- Geochemical study of lithogeochem, geochem and magnetic susceptibility to answer key questions about the mineralization
  - Classification of the various mafic - ultramafic intrusions intercepted in DDH
  - 2. Correlation between mineralized units and magnetic response



# Whole Rocks Analysis Interpretation



 73 whole rock samples of various MAF-UM intrusions analyzed in detail. 6 distinct types of intrusions recognized

**1. Calc-alkaline UM intrusion: 21.5 - 29% MgO**, steep REE profile, low total REE - <u>±Mineralized</u> in Ni-Cu (UM part of Copernick intrusion)

**2. Tholeiitic MAF intrusion:** 3.5 - 7% MgO, flat REE profile - Non-mineralized

**3. Transitional MAF intrusion:** 7.5 - 9% MgO, steep REE profile - <u>Non-mineralized</u>

**5. Alcaline UM intrusion**: 17 - 23% MgO. High in Na-K for low Si. Normative Nepheline+Leucite. Very steep REE profile and very high LREE - <u>Non-mineralized</u>

**4+6 Transitional MAF intrusions:** defined on magnetic susceptibility and metals





# Mag Susceptibility + Density vs Whole Rocks Midland

 Calc-alkaline UM intrusion: <u>Strongly magnetic</u>, <u>dense</u>. <u>±Mineralized in Ni-Cu</u> UM Copernick intrusion

- **2. Tholeiitic MAF intrusion:** <u>non-magnetic</u>, mod. dense <u>Non-mineralized</u>
- **3. Transitional MAF intrusion :** <u>Strongly magnetic</u>, moy. dense. <u>Non-mineralized</u>
- 4. Transitional mafic intrusion: <u>Non-magnetic</u>, not dense 6.4 9% MgO. <u>Non-mineralized</u>
- **5. Alcaline UM intrusion** : Very strongly magnetic, very dense. Non-mineralized
- 6. Transitional Mg-MAF intrusion: Weakly magnetic, dense - 12.2 - 21.6% MgO. Strongly Mineralized in Ni-Cu MAF Copernick intrusion



# Ni-S-Cu by Lithologies



 Reclassed all intervals according to mag susceptibility, lithogeochemistry and 4 acids ICP-ES / MS geochem

1. UM Copernick Intrusion : Mineralized in Ni-Cu. Ni/Cu ratio <u>higher</u> than MAF Copernick Intrusion

6. MAF Copernick intrusion. Mineralized in Ni-Cu. Ni/Cu ratio lower than UM Copernick Intrusion

5. **Alcaline UM intrusion** : High Ni-Cu values but constants. <u>Non-</u> mineralized

2-3-4. MAF intrusions. Ni-Cu values constant = <u>Non-mineralized</u>



## Ni-S-Cu Copernick Intrusion

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- The UM Copernick is much less mineralized than the MAF Copernick
- UM: MAJORITY OF SAMPLES NON-MINERALIZED < 0.2% S
- MAF: MAJORITY OF SAMPLES MINERALIZED > 0.2% S

Copernick UM

**Copernick MAF** 



Colors: point density

# Lithologies on Map

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- "Best-fit" of lithologies based on mag susceptibility, geochem
- The large magnetic anomaly to the north in LAF-16-041 - 42 is the Nonmineralized Alkaline intrusion = NOT related to the Ni-Cu Copernick Intrusion
- Looking carefully at the magnetic data, the associated mag high appears distinct from the one over the Ni-Cu mineralization
- <u>This high mag to the north has no</u> <u>evident Ni-Cu potential</u>



# Lithologies and Mag: Implications

- 1. The strongly magnetic alkaline intrusion to the north is unmineralized
- Lithology 3. Transitional intrusion is as magnetic as the 1. UM of Copernick.
  - It is closer to the surface and larger than the UM Copernick
  - Probable that the mag anomaly seen on the mag survey over the Copernick prospect is caused by that rock type
- 3. It is the <u>weakly magnetic</u> MAF phase of the Copernick intrusion that is Ni-Cu rich. The strongly magnetic UM Copernick intrusion is only weakly mineralized
- In fact, all 3 strongly magnetic lithologies are only weakly or nonmineralized in Ni-Cu...
- High mag anomalies are likely NOT targets for Ni-Cu on this project... Target more weak mag highs - Major change in previous exploration targets







#### 100% Sulfides Values at Copernick



- Calculated for samples with S > 1.5%
  only; background values for nonmineralized lithologies at Copernick used for 100% sulfides calculation (Kerr, 2003, method #1)
  - **UM**: Ni 1600 ppm, Cu 100 ppm
  - **MAF**: Ni 800 ppm Cu, 200 ppm
- Copernick: Very good 100% sulfide values, about 5 - 10 % Ni, 2 - 14 % Cu (likely high R-factor (500+)
- Any massive sulfide lens found at Copernick will be of very high value
- Note: Ni-Cu ratios observed at Copernick are typical of mafic intrusive systems, not ultramafic intrusives



Tiré de Barnes et al., 2017

# **Copernick UM and MAF Relationship**



Geochemical sections and 3D ٠ representation to better understand the relationship between the MAF and UM Copernick phases and to better understand the architecture of the magmatic system



## **Copernick Section LAF-16-040**



- Geochemical section of LAF-16-040: Major elements, ICP-MS 4 acids extraction
- UM in sharp contact with MAF phase. Suggest these are 2 distincts phases and not just the result of gradual fractionation
- Many sharp changes of composition inside the MAF phase. The MAF phase appears to be a series of distinct injection and not just a sill that crystallized gradually



# **Copernick Section LAF-16-040**



- Geochemical section of LAF-16-040: Metals, ICP-MS 4 acids extraction
- Mineralized zones shown in YELLOW
- The UM phase is non / weakly mineralized
- In detail, there are numerous sulfide mineralized zones in the various mafic phases, divided by non-mineralized zones in sharp contacts.
- <u>Again, suggests that mineralization</u> <u>is not simply differentiation at the</u> <u>base of a sill</u>



# Copernick Section LAF-16-038B



- Geochemical section of LAF-16-038B: Major elements, ICP-MS 4 acids extraction
- About 75m under LAF-16-040
- UM in sharp contact with MAF.
- Note that UM here is at the end of the intrusion instead than in the middle like in LAF-16-040.
- Different MAF subphases are evident again



# Copernick Section LAF-16-038B



- Geochemical section of LAF-16-038B: Metals, ICP-MS 4 acids extraction
- Various mineralized zones associated with different injection in MAF
- Not simple accumulation of sulfides at the base of a sill
- UM not mineralized



#### Relationships Between Copernick UM and MAF



- In 3D view, there is not coherent distribution between MAF and UM
- MAF is also a series of different subphases, variably mineralized.
- Meaning???



#### Architecture of Magmatic Ni-Cu Systems

- The spatial complexity of the Copernick intrusion (lithos and mineralization) suggest it is a magmatic conduit zone of some sort, and not a simple sill - Zone of repeated magmas injection, variably mineralized, along a structure or horizon (can be a dyke or horizontal flow)
- These very dynamic systems are now recognized are crucial and very favorable for magmatic Ni-Cu mineralization, in particular associated with mafic intrusions (less Ni-rich initially)
- Ex: Reid Brook at Voisey's Bay; chonoliths and bladded dykes in other areas;
- Consequences: sulfide zones can develop at different places in these conduit zones, difficult to predict geologically. Systematic drilling and borehole geophysics become very important
- By following the conduit zone, it is possible the emerge in a sill with very significant mineralization (ex: Ovoid or Eastern Deeps at Voisey's Bay)







#### **Ni-Cu Copernick Potential**



- The Copernick prospect is a complex magmatic conduit setting, mineralized in Ni-Cu. **Dynamic system, very favorable setting for mafic rocks.** 
  - Consequence 1: Has to be explored differently from a simple sill... Bore-hole geophysics is tool #1 over geology. <u>Several</u> <u>borehole EM anomalies at Copernick are still untested.</u>
- **100% sulfides are very good**, comparable to many Ni-Cu deposits and suggest a **dynamic (high R-factor) system that is fertile**
- The MAF phase hosts most of the mineralization. It is only slightly magnetic vs other strongly magnetic lithologies that are only weakly or non-mineralized
  - Consequence 2: Strong magnetic anomalies should not be the targeted here, but weaker mag highs. Many other weak mag highs in the area, some with corresponding weak VTEM anomalies, are still untested.
  - **Consequence 3**: the MAF phase could be spatially distinct from the UM phase in 3D. Could try to follow the MAF phase in drilling independently from the UM phase.



#### Conclusions



- Promising Ni-Cu mineralization setting with lots of further targets and upside
- The Laflamme project and Copernick prospects are available for option