

# Portage River Property Geological Assessment

LAURENTIA



EXPLORATION

Laurentia Exploration Inc.

March 2021

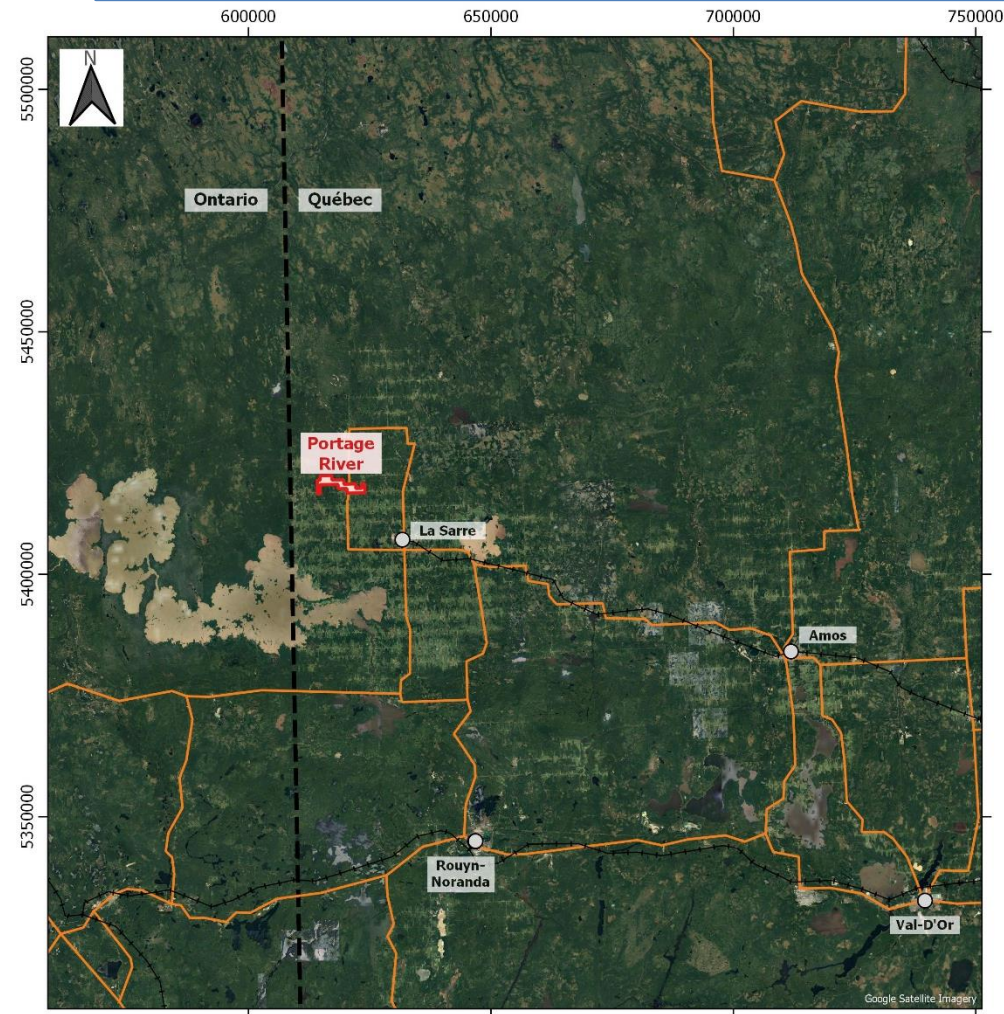


# Summary

1. Property Location & Claims
2. Regional Geology
3. Property geology
4. Structural Geology
5. Geophysical data
6. Mineral occurrences
7. History of Exploration
8. Exploration Targets
9. Conclusions / Recommendations



# 1. Property Location & Claims



The “Portage River” property is located in the northwestern part of the Abitibi region, Québec.

The property is road accessible, close to railway network and within short distance from several major towns.

- Portage River Property
- Main road
- Town
- Provincial border
- Railway

**Location of the Portage River property in Western Quebec, Abitibi region.**

0 50 100 km



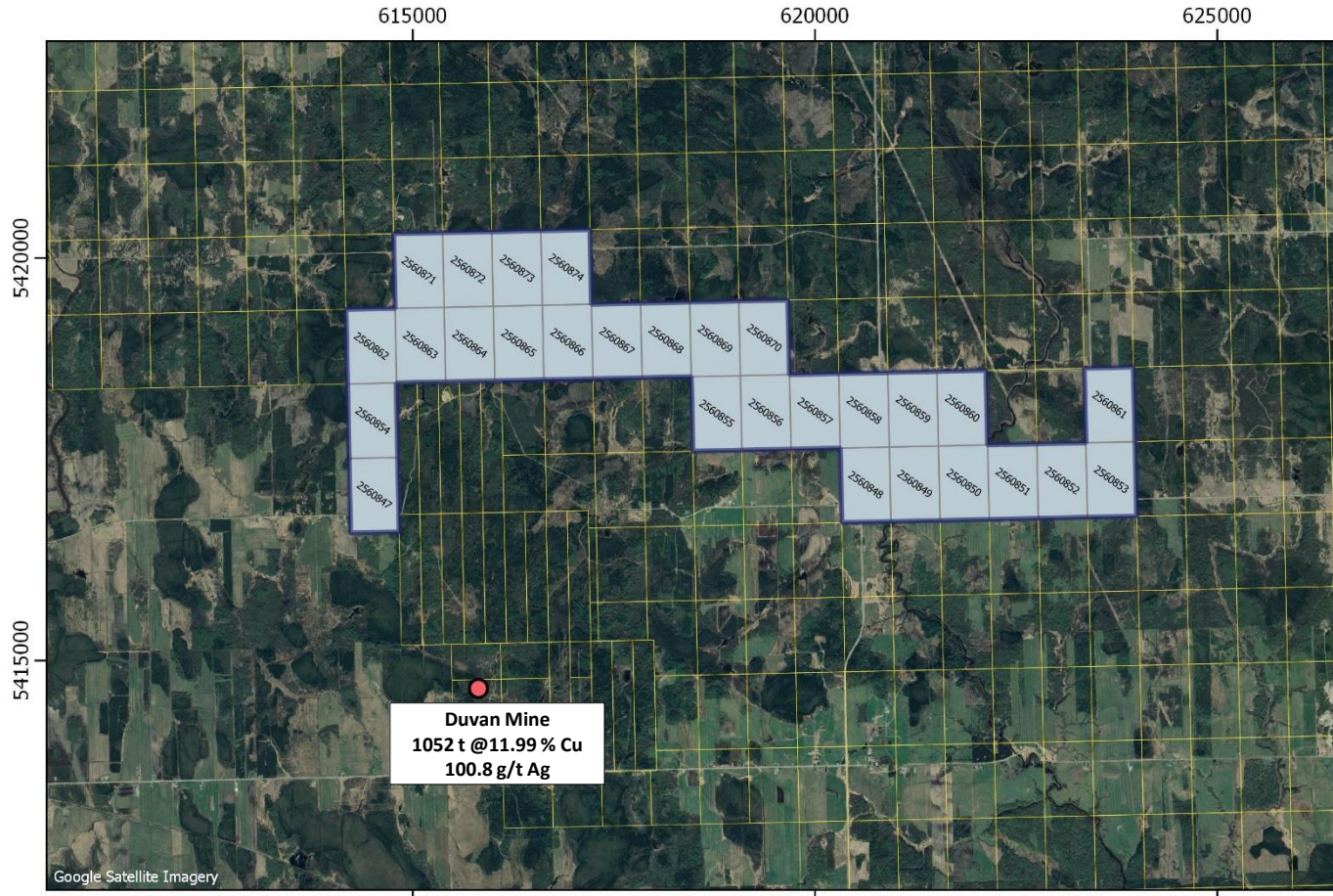
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# 1. Property Location & Claims



The “Portage River” property is comprised of 28 adjacent claims covering an area of 1527.31 hectares.

All claims are in good standing.

**Claims and outline of Portage River property, Abitibi region, Québec.**

0 2.5 5 km



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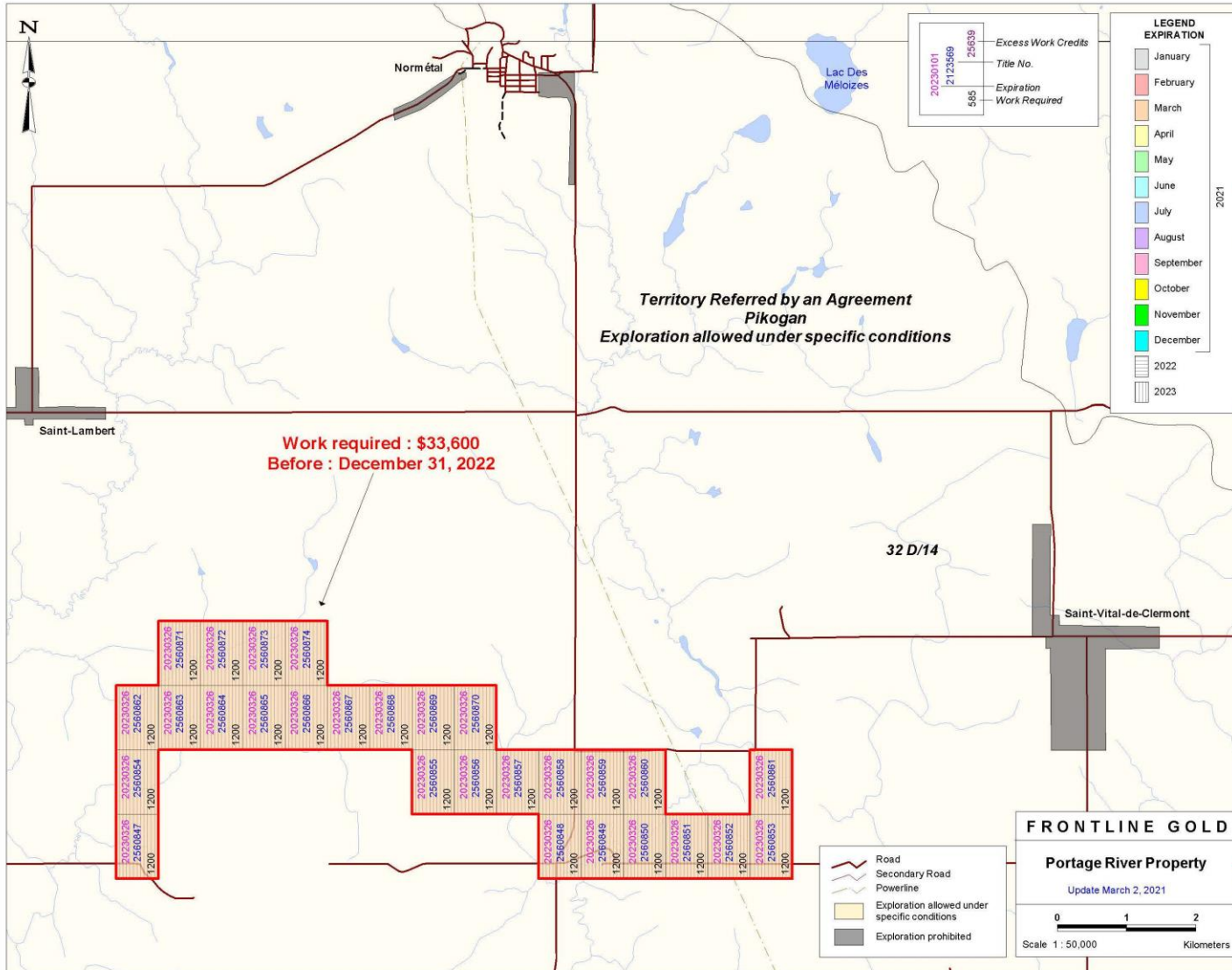
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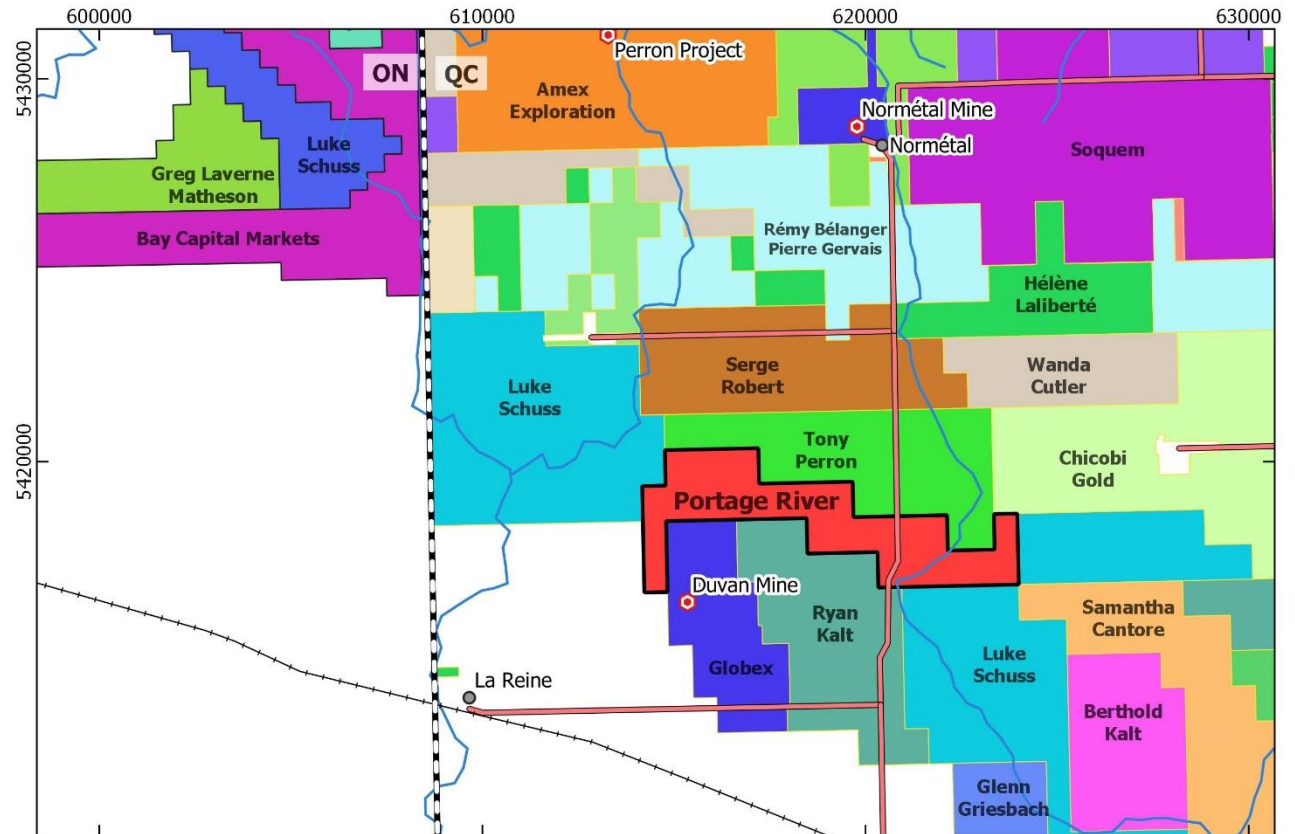
# 1. Property Location & Claims

All claims expire in March 2023.

A total of 33 600\$ in exploration expenditures is required by December 31, 2022.

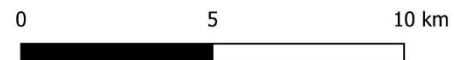


# 1. Property Location & Claims



- |                                |                           |                                |
|--------------------------------|---------------------------|--------------------------------|
| Frontline Gold Property        | Anna Rosa Giglio          | Rémy Bélanger / Pierre Gervais |
| Advanced project / closed mine | Berthold Kalt             | Renetta Braatz                 |
| Town                           | Century Metals            | Ryan Kalt                      |
| River                          | Chicobi Gold              | Samantha Cantore               |
| Railway                        | Anna Rosa Giglio / Globex | Serge Robert                   |
| Roads                          | Globex                    | SOQUEM / Niobay                |
| Provincial border              | Glenn Griesbach           | Spearmint Resources            |
| <b>Claims - Québec</b>         | Hélène Laliberté          | Tony Perron                    |
| 9219-8845 Québec               | Luke Schuss               | Victor Cantore                 |
| Amex Exploration               | Perron Gold               | Wanda Cutler                   |
|                                | Perry English             |                                |

**Location of the Portage River Property (Frontline Gold) and surrounding claim blocks, Abitibi region, Québec.**

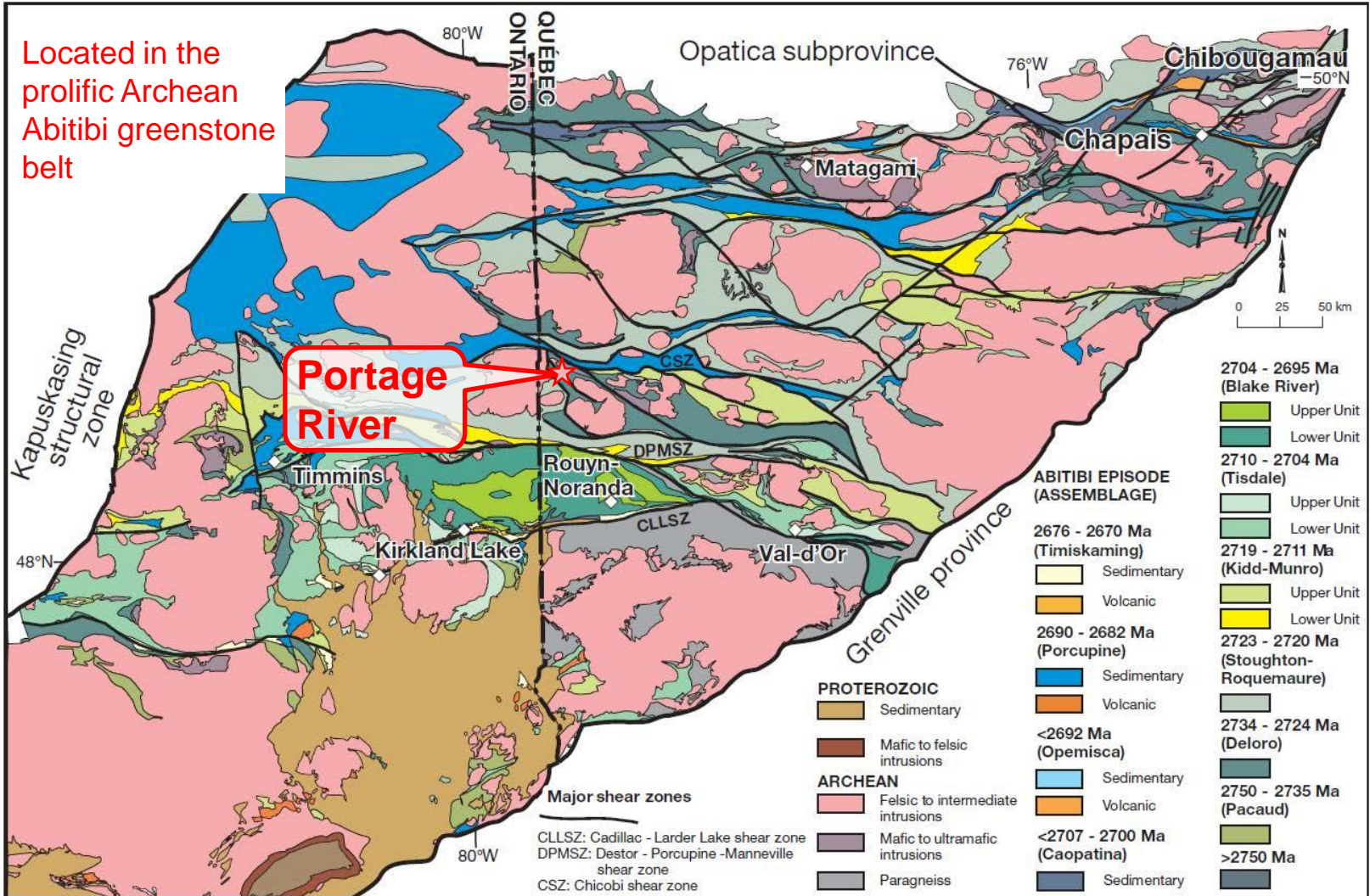






# 2. Regional Geology

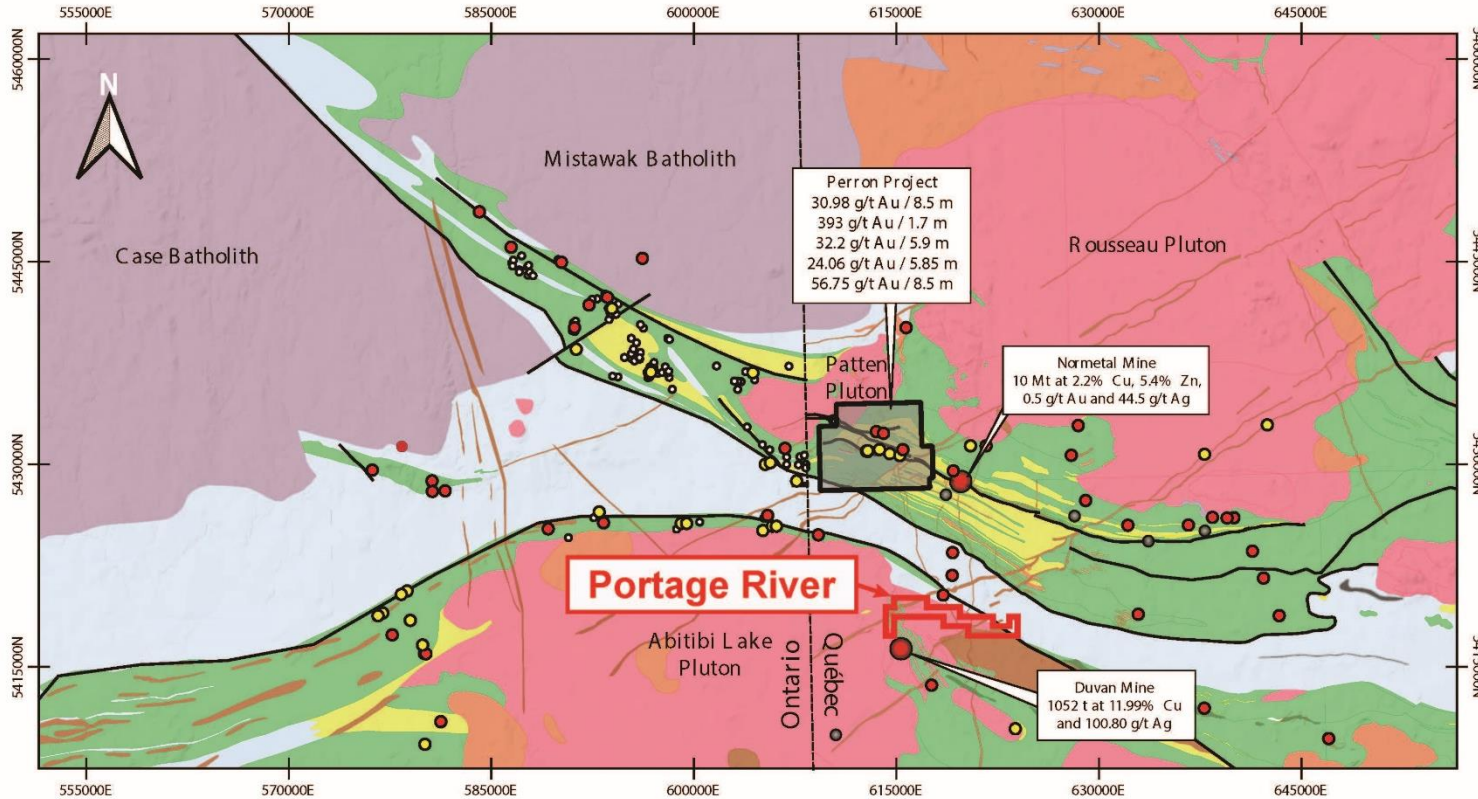
Located in the prolific Archean Abitibi greenstone belt



Modified from Thurston et al., 2008



# 2. Regional Geology



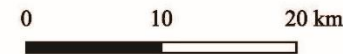
The property is almost entirely within a greenstone belt sequence, close to a fault-bounded contact with sediments.

Proximity to an advanced gold exploration project and two former base metal mines

**LEGEND**

- |                                 |                      |                             |
|---------------------------------|----------------------|-----------------------------|
| Felsic Metavolcanic             | Tonalitic Suite      | Silver Occurrence           |
| Mafic-Intermediate Metavolcanic | Iron Formation       | Gold Occurrence             |
| Metasediments                   | Mafic Intrusive      | Copper-Zinc-Lead Occurrence |
| Felsic Intrusive                | Ultramafic Intrusive | Copper-Zinc Closed Mine     |
| Gneiss and Migmatite            | Fault/Shear zones    |                             |

Regional Geology of the Portage River Property area

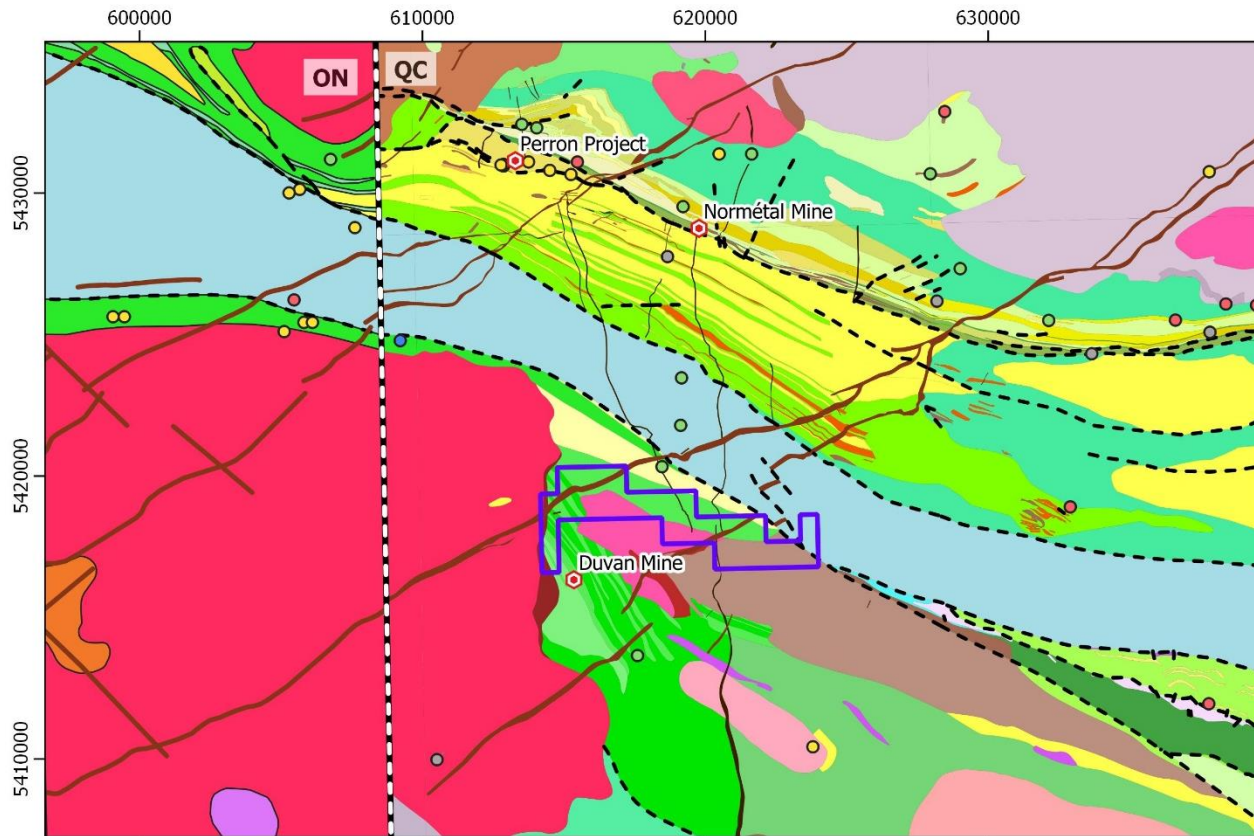


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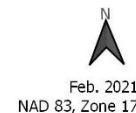
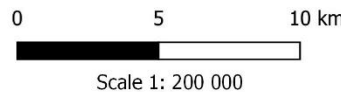
# 2. Regional Geology



- Mapping by Gilman in 1951-52 at a scale of 1000 ft per inch scale revealed the general geological framework of the area (RG 186).
- The geology of the area was last revised in 1991-1994 by S. Lacroix (MRNQ; MB 95-39) and its interpretation was significantly updated.
- A structural study of the Duvan Mine area and gold occurrences ~14 km to the south by Tremblay et al. (1996; MB 96-36).
- Ph.D. thesis by B. Lafrance along the Normétal area (2003; UQAC)

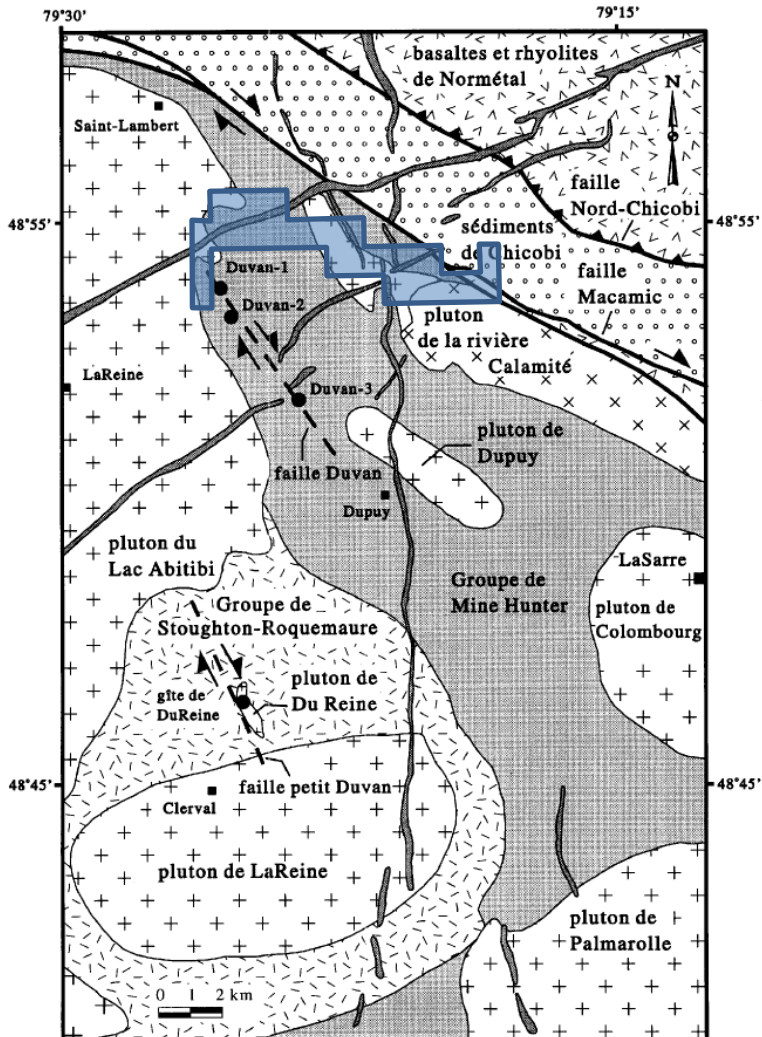


**Regional geology, major faults, mineral occurrences, and outline of Portage River property, Abitibi region, Québec.**





## 2. Regional Geology



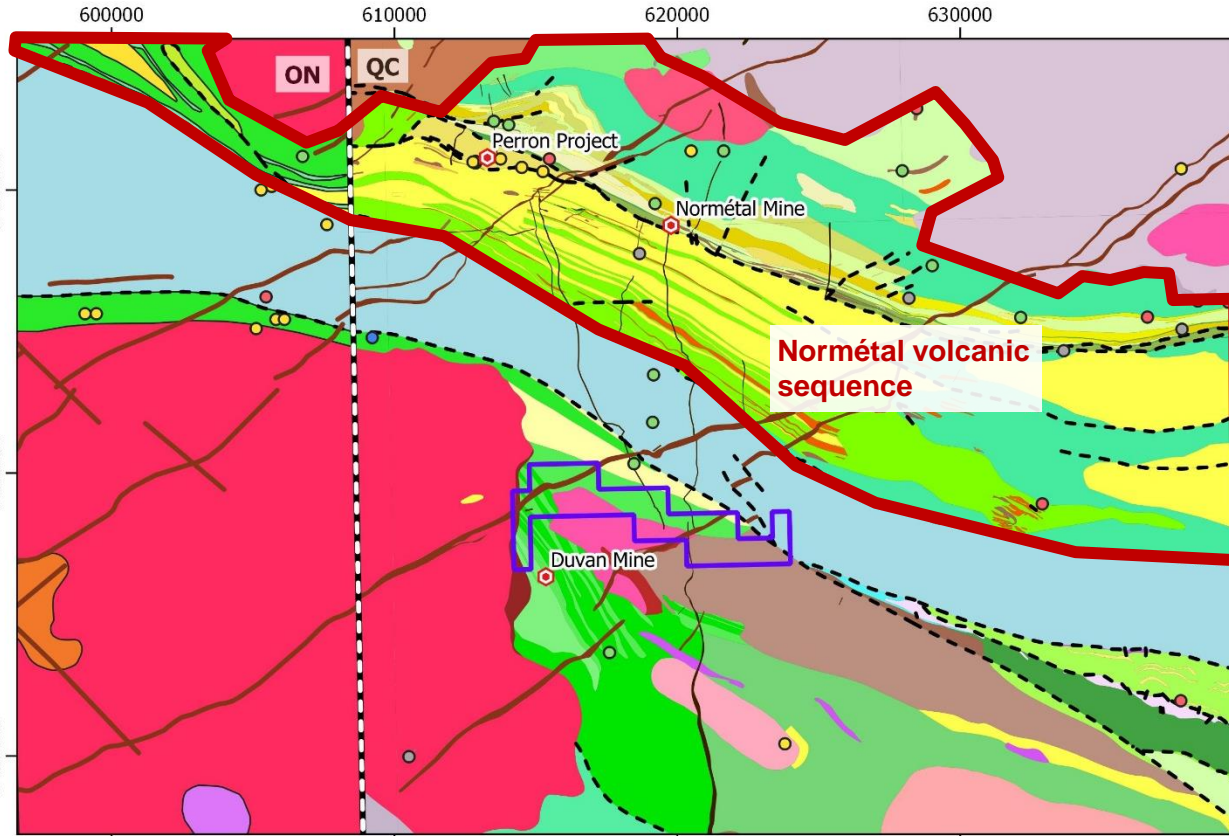
**Simplified map of the main lithotectonic elements of the Portage River area (Tremblay et al., 1996):**

- Proterozoic diabase dikes (N and NE trending)
- Hunter Mine Group volcanic sequence
- Normetal volcanic sequence
- Chicobi sediments
- Syn-volcanic (Rivière Calamité) and syn-tectonic plutons (Lac Abitibi, LaReine, Du Reine, Dupuy, Palmarolle, Colombourg)

*Note: Extent and location of Portage River property are approximative.*



# 2. Regional Geology

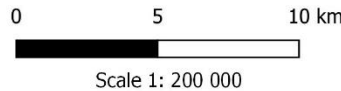


## Normétal volcanic sequence (2728 Ma; Mortensen, 1993):

- Host to the former “Normetal” VMS mine and the “Perron” advanced gold exploration project (AMEX)
- Bimodal sequence of transitional to slightly tholeiitic geochemical affinity
- Comprises several ductile high strain zones
- In structural contact with Chicobi sediments to the south
- Part of Cycle I volcanism of the Abitibi subprovince

Portage River Property	Granodiorite	Amphibolite, granodiorite (injections)
Provincial border	Diabase (dike)	Rhyolite (quartz-porphyrific)
Advanced project / closed mine	Mafic-ultramafic sill	Peridotite
Major fault	Rhyolite	Diorite
<b>Mineral deposit / occurrence</b>	Gabbro, diorite	Migmatite
Zn > Cu, +/- Pb, Ag, Au	Schist (biotite-, sericite-)	Granodiorite (hornblende-, biotite-)
Ni, Cu	Amphibolite	Diabase (dike)
Cu > Zn, +/- Pb, Ag, Au	Andesite	Dacite, rhyolite
Au +/- Ag, Cu	Andesite, undifferentiated tuff	Migmatite
Ag > Au +/- Zn, Pb, Cu	Trondhjemite, tonalite	Wacke & mudrock
<b>Geology</b>	Granodiorite, trondhjemite	Rhyodacite & rhyolite (porphyritic)
Gabbro	Schist (hornblende-)	Felsic-intermediate volcanoclastic
Wacke	Granodiorite	Tholeiitic basalt
Andesite, int. / fels. tuffs	Monzonite, syenite	Andesite, dacite
Rhyodacite, rhyolite	Basalt, andesite, minor sediments	Rhyolite (quartz-feldspar porphyritic)
	Basalt, basaltic andesite	Intermediate-mafic volcanics
	Granite, granodiorite	

## Regional geology, major faults, minera occurrences, and outline of Portage River property, Abitibi region, Québec.



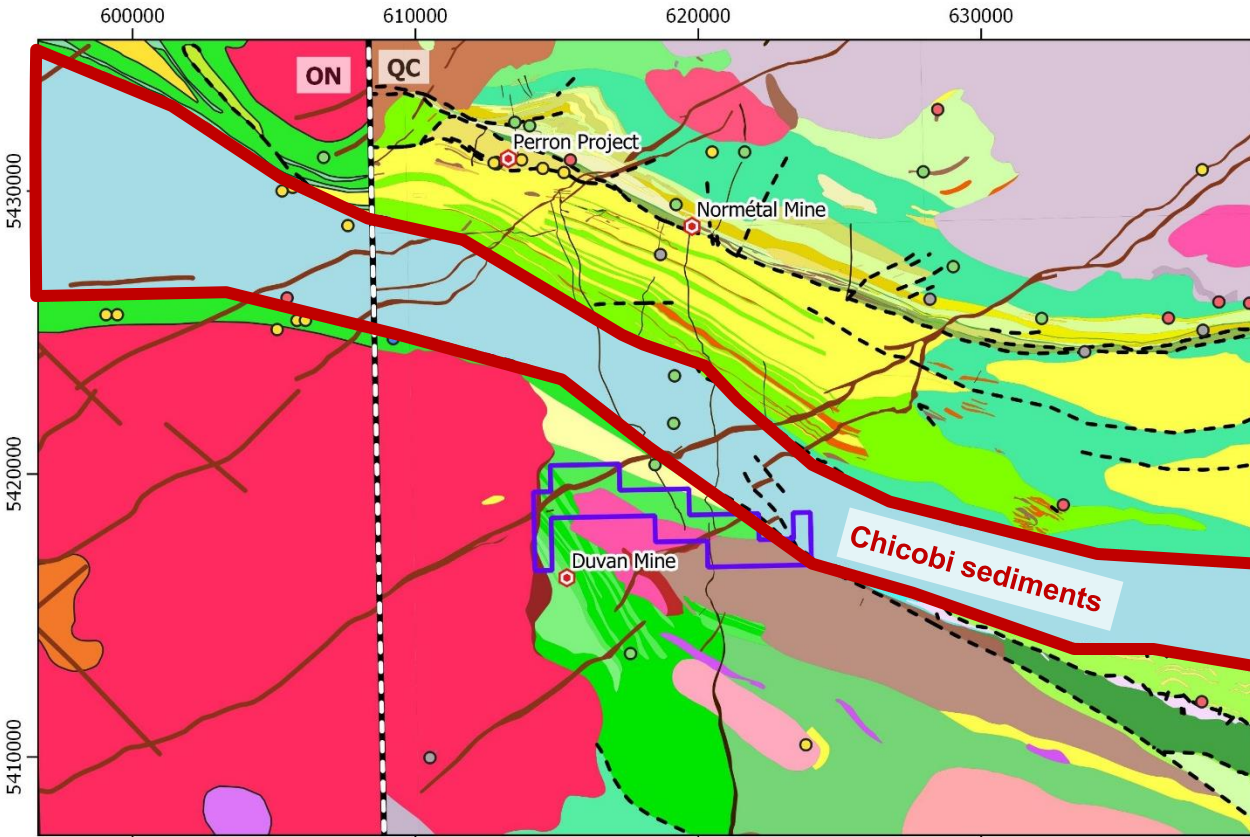




# 2. Regional Geology

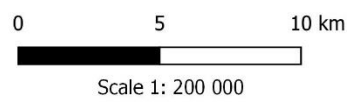
## Chicobi sediments:

- Thinly bedded (cm-thick) sequence of alternating sandstone-siltstone-mudstone.
- In structural contact with volcanic rocks to the north and to the south



Portage River Property	Granodiorite	Amphibolite, granodiorite (injections)
Provincial border	Diabase (dike)	Rhyolite (quartz-porphyrific)
Advanced project / closed mine	Mafic-ultramafic sill	Peridotite
Major fault	Rhyolite	Diorite
<b>Mineral deposit / occurrence</b>	Gabbro, diorite	Migmatite
Zn > Cu, +/- Pb, Ag, Au	Schist (biotite-, sericite-)	Granodiorite (hornblende-, biotite-)
Ni, Cu	Amphibolite	Diabase (dike)
Cu > Zn, +/- Pb, Ag, Au	Andesite	Dacite, rhyolite
Au +/- Ag, Cu	Andesite, undifferentiated tuff	Migmatite
Ag > Au +/- Zn, Pb, Cu	Trondhjemite, tonalite	Wacke & mudrock
<b>Geology</b>	Granodiorite, trondhjemite	Rhyodacite & rhyolite (porphyritic)
Gabbro	Schist (hornblende-)	Felsic-intermediate volcanoclastic
Wacke	Granodiorite	Tholeiitic basalt
Andesite, int. / fels. tuffs	Monzonite, syenite	Andesite, dacite
Rhyodacite, rhyolite	Basalt, andesite, minor sediments	Rhyolite (quartz-feldspar porphyritic)
	Basalt, basaltic andesite	Intermediate-mafic volcanics
	Granite, granodiorite	

**Regional geology, major faults, mineral occurrences, and outline of Portage River property, Abitibi region, Québec.**



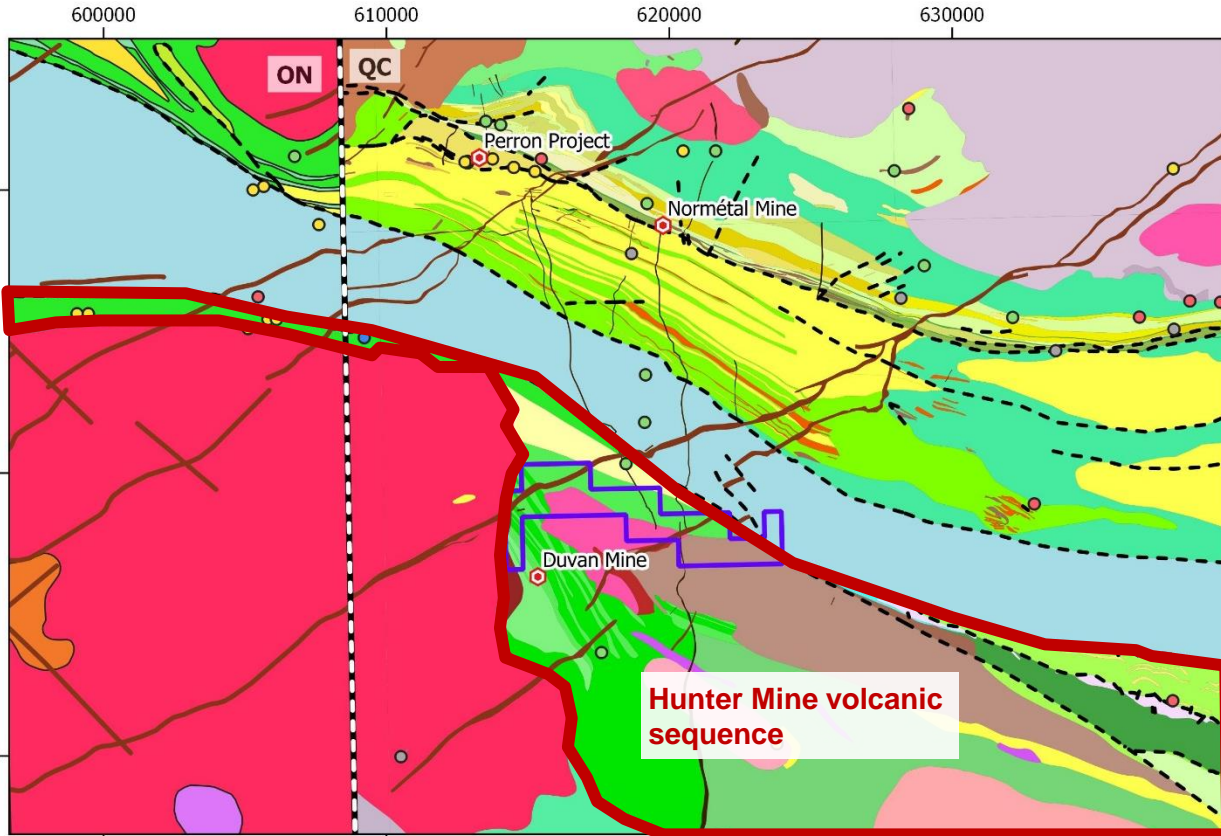
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# 2. Regional Geology

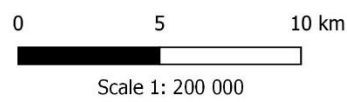
## Hunter Mine volcanic sequence (2730 Ma; Mortensen, 1993):

- Host to former VMS mines (Hunter, Lyndhurst, and Duvan)
- Bimodal sequence of transitional to subalkaline geochemical affinity
- Comprises several ductile high strain zones
- In structural contact with Chicobi sediments to the north and other volcanic rocks to the West
- Intruded by several syntectonic plutons



Portage River Property	Granodiorite	Amphibolite, granodiorite (injections)
Provincial border	Diabase (dike)	Rhyolite (quartz-porphyrific)
Advanced project / closed mine	Mafic-ultramafic sill	Peridotite
Major fault	Rhyolite	Diorite
<b>Mineral deposit / occurrence</b>	Gabbro, diorite	Migmatite
Zn > Cu, +/- Pb, Ag, Au	Schist (biotite-, sericite-)	Granodiorite (hornblende-, biotite-)
Ni, Cu	Amphibolite	Diabase (dike)
Cu > Zn, +/- Pb, Ag, Au	Andesite	Dacite, rhyolite
Au +/- Ag, Cu	Andesite, undifferentiated tuff	Migmatite
Ag > Au +/- Zn, Pb, Cu	Trondhjemite, tonalite	Wacke & mudrock
<b>Geology</b>	Granodiorite, trondhjemite	Rhyodacite & rhyolite (porphyritic)
Gabbro	Schist (hornblende-)	Felsic-intermediate volcanoclastic
Wacke	Granodiorite	Tholeiitic basalt
Andesite, int. / fels. tuffs	Monzonite, syenite	Andesite, dacite
Rhyodacite, rhyolite	Basalt, andesite, minor sediments	Rhyolite (quartz-feldspar porphyritic)
	Basalt, basaltic andesite	Intermediate-mafic volcanics
	Granite, granodiorite	

**Regional geology, major faults, minera occurrences, and outline of Portage River property, Abitibi region, Québec.**



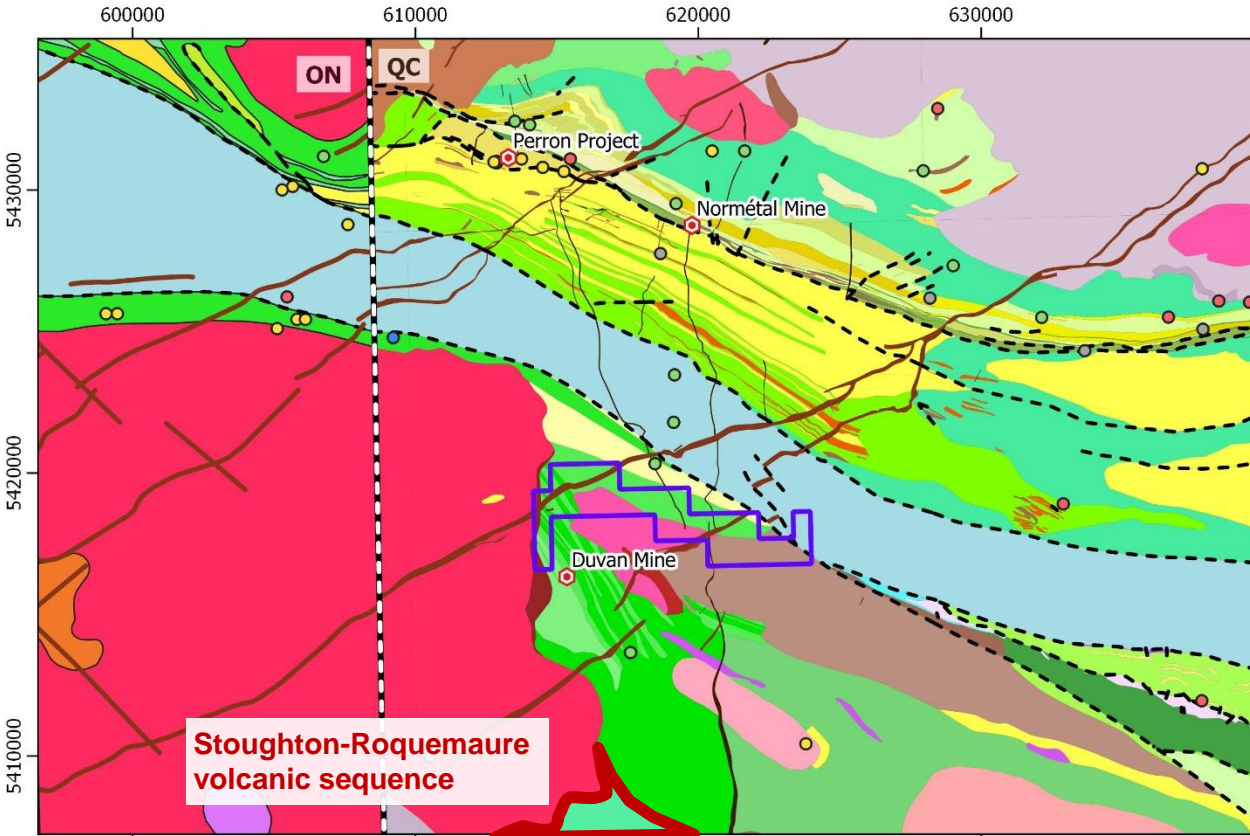




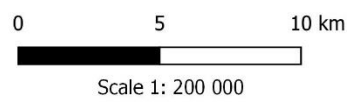
# 2. Regional Geology

**Stoughton-Roquemaure volcanic sequence (2723-2720 Ma; Ayer et al. 2002):**

- Host to former Estrades VMS mine
- Mostly mafic to ultramafic comprised of tholeiitic basalt and komatiites.
- Likely in structural contact with the Hunter Mine volcanics to the south of the Portage property



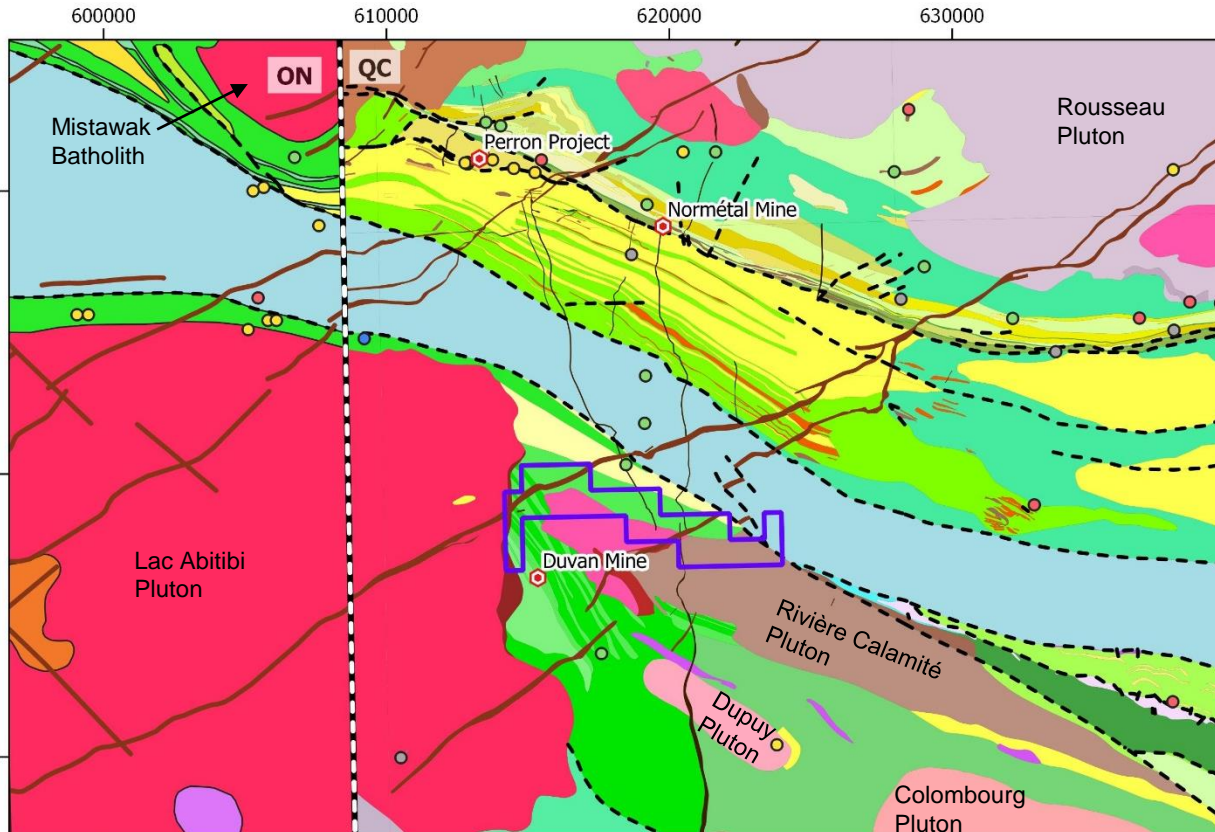
**Regional geology, major faults, mineral occurrences, and outline of Portage River property, Abitibi region, Québec.**



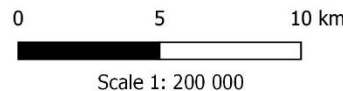




# 2. Regional Geology



**Regional geology, major faults, mineral occurrences, and outline of Portage River property, Abitibi region, Québec.**



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## Major plutons:

### Syn-volcanic to early tectonic:

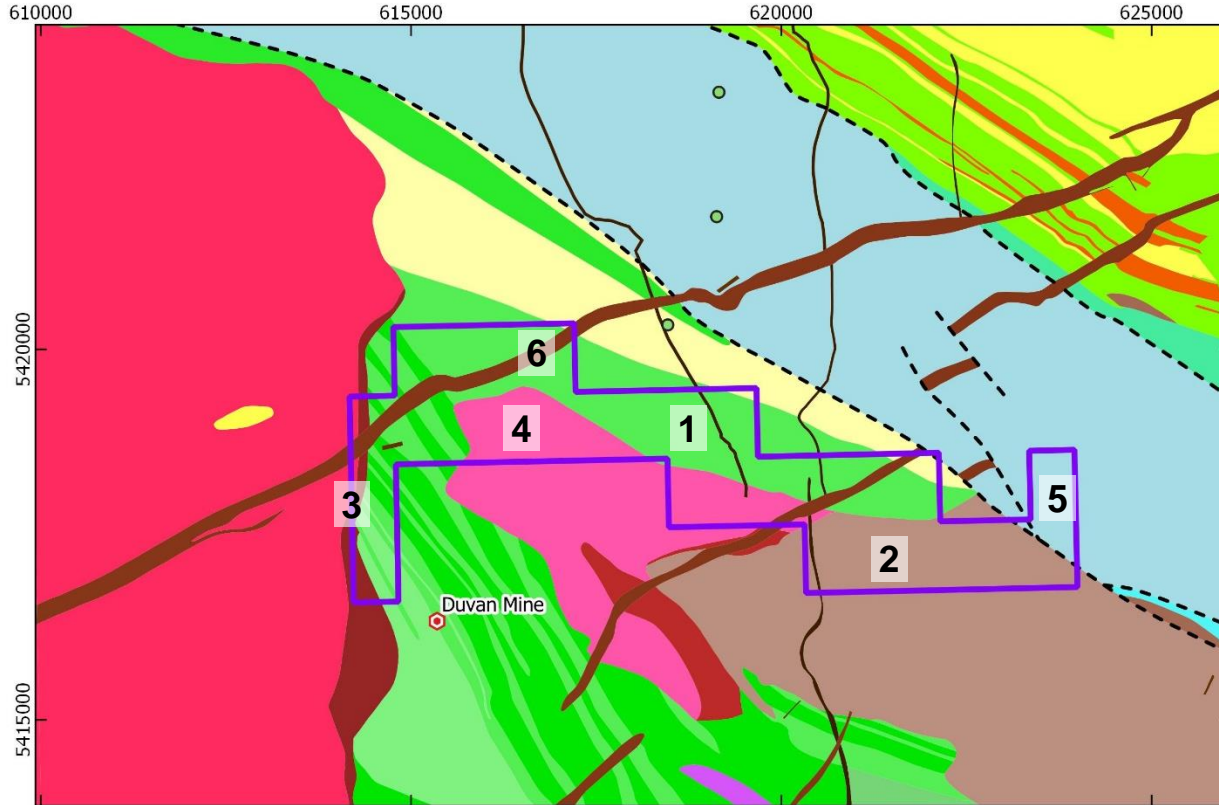
- The Rivière Calamité Pluton was re-interpreted by Lacroix (1995) as a series of sills intruded within the Hunter Mine volcanic sequence; their age is constrained to > 2718 Ma and < 2730 Ma .

### Syntectonic :

- Lac Abitibi Pluton (tonalite; 2690 Ma)
- Mistawak Batholith (monzonite-granodiorite; 2702 Ma)
- Rousseau Pluton (granite-granodiorite)
- Dupuy Pluton (granodiorite)
- Colombourg Pluton (quartz monzodiorite; 2697 Ma)



# 3. Property Geology



## Six main lithological components:

- 1- Hunter Mine volcanic sequence
- 2- NW margin of the syn-volcanic diorite sill complex of the Rivière Calamité Pluton
- 3- East margin of the Lac Abitibi pluton (tonalite and migmatite)
- 4- NE margin of an unnamed granodioritic pluton interpreted to be of syn-orogenic nature
- 5- Chicobi sediments
- 6- Proterozoic diabase dikes

The Hunter Mine volcanics, the Riv. Calamité diorite sill complex and the unnamed pluton cover the bulk the property.

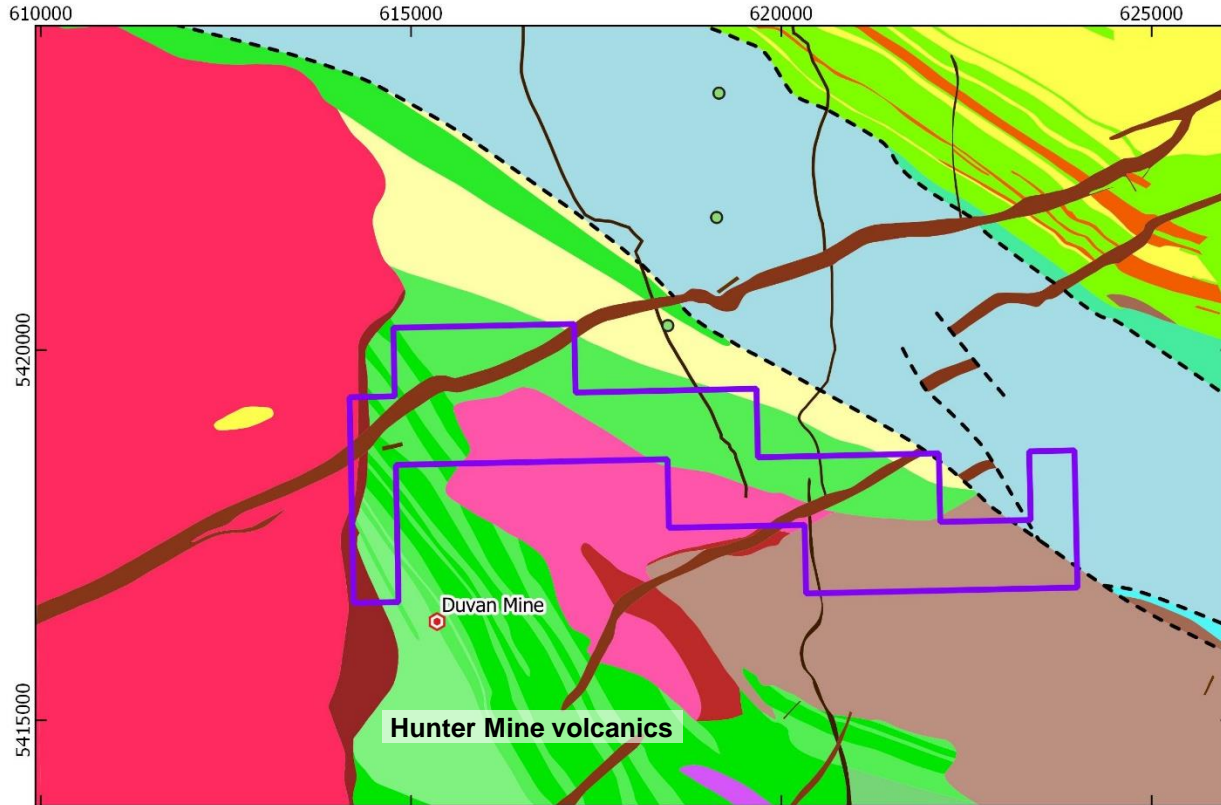


**Geology, main faults, mineral occurrences, and outline of Portage River property, Abitibi region.**



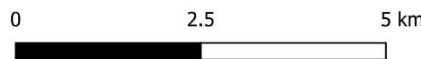


# 3. Property Geology



- Portage River Property
- Former Mine
- Portage River - Mineral occurrences**
- Zn > Cu, +/- Pb, Ag, Au
- Cu > Zn, +/- Pb, Ag, Au
- Major fault
- Geology**
- Gabbro
- Wacke
- Diabase (dike)
- Gabbro, diorite
- Schist (biotite-, sericite-)
- Andesite, undifferentiated tuff
- Schist (hornblende-)
- Granodiorite
- Basalt, andesite, minor sediments
- Basalt, basaltic andesite
- Amphibolite, granodiorite (injections)
- Peridotite
- Diorite
- Migmatite
- Granodiorite (hornblende-, biotite-)
- Diabase (dike)
- Dacite, rhyolite
- Migmatite
- Wacke & mudrock
- Felsic-intermediate volcanoclastic
- Intermediate-mafic volcanics

**Geology, main faults, mineral occurrences, and outline of Portage River property, Abitibi region.**

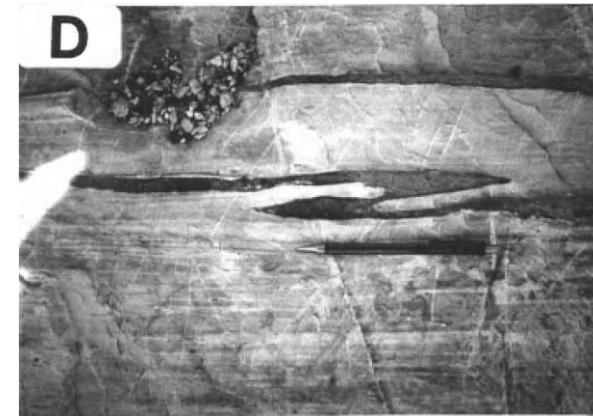


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**Hunter Mine volcanic sequence:** sequence of strongly deformed bimodal volcanic rocks dominated by basaltic flows and pillows, and felsic to intermediate volcanoclastics horizons.

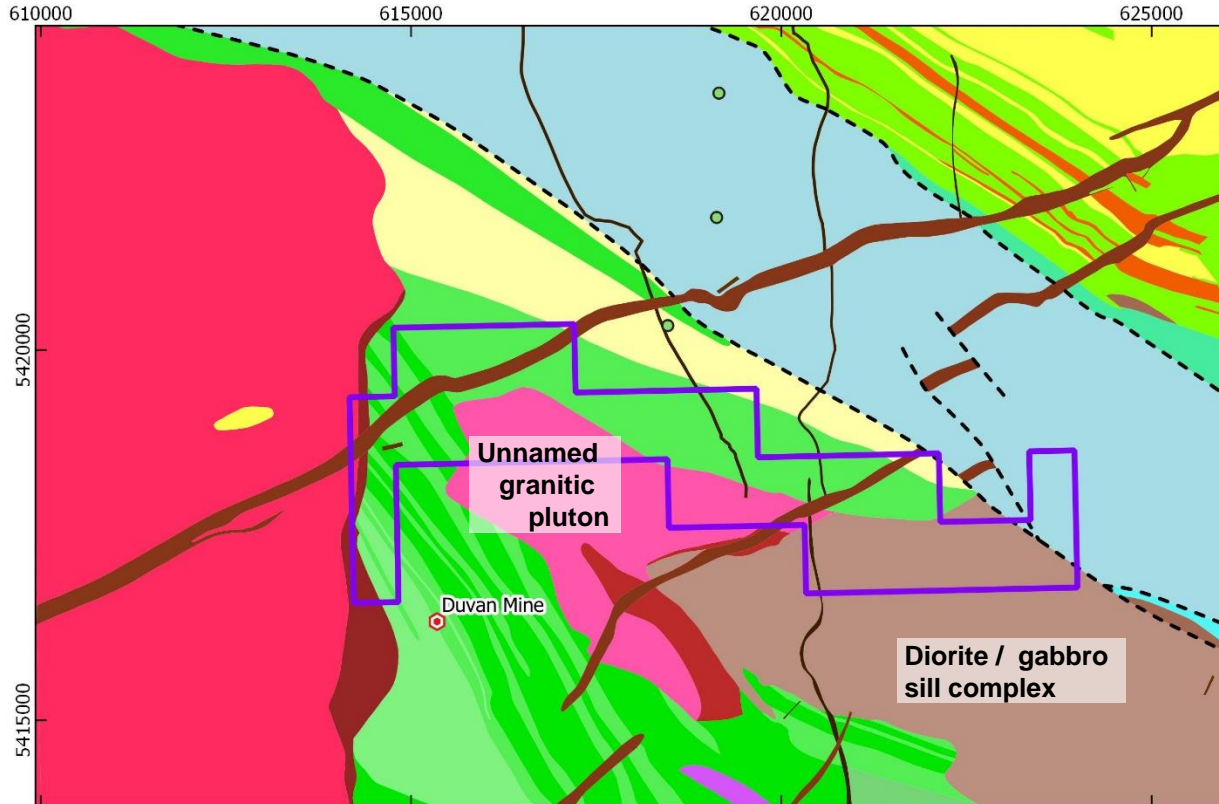


Example of a tight drag-fold in laminated felsic tuff of the Hunter Mine volcanics, near Duvan, indicating a dextral sense of shear (from Lacroix, 1995).





# 3. Property Geology



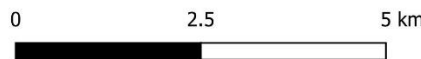
Very few details are available to describe the granodiorite and diorite sill complex within or near the property.

Lacroix interpreted the diorite/ gabbro sill complex as a series of NW-SE synvolcanic concordant to sub-concordant injections within the Hunter mine volcanics.

The unnamed granitic pluton was interpreted by Lacroix to be syn-orogenic.

- Portage River Property
- Former Mine
- Portage River - Mineral occurrences**
- Zn > Cu, +/- Pb, Ag, Au
- Cu > Zn, +/- Pb, Ag, Au
- Major fault
- Geology**
- Gabbro
- Wacke
- Diabase (dike)
- Gabbro, diorite
- Schist (biotite-, sericite-)
- Andesite, undifferentiated tuff
- Schist (hornblende-)
- Granodiorite
- Basalt, andesite, minor sediments
- Basalt, basaltic andesite
- Amphibolite, granodiorite (injections)
- Peridotite
- Diorite
- Migmatite
- Granodiorite (hornblende-, biotite-)
- Diabase (dike)
- Dacite, rhyolite
- Migmatite
- Wacke & mudrock
- Felsic-intermediate volcanoclastic
- Intermediate-mafic volcanics

**Geology, main faults, mineral occurrences, and outline of Portage River property, Abitibi region.**



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## 4. Structural Geology

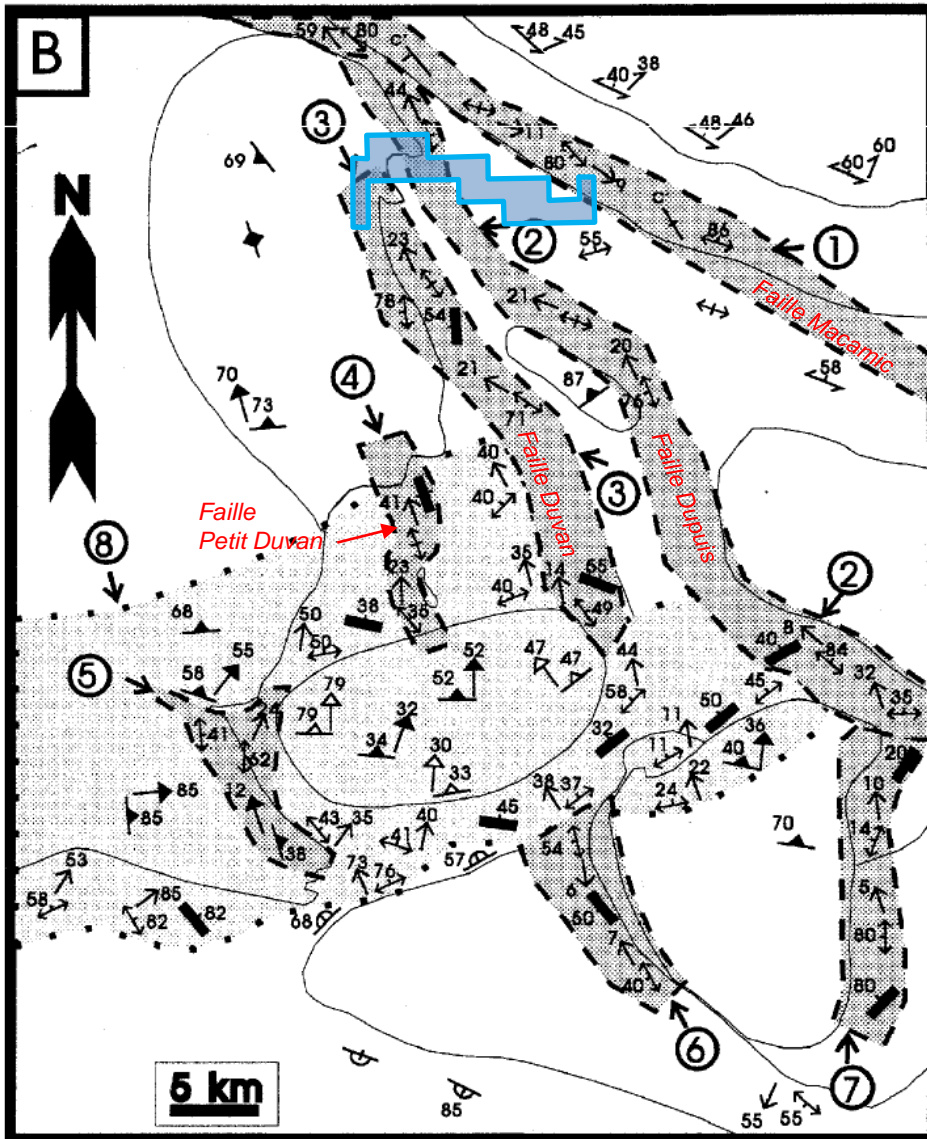
**Two main deformation phases** (Lacroix & Sawyer, 1995):

**D1-** Period of south verging thrust development (incl. North Chicobi fault), regional moderately dipping W- to NW-striking foliation with down-dip stretching lineation. D1 fabric is best preserved north of the Macamic fault. D1 faults are shallow to moderately dipping.

**D2** – Development of NW- to WNW-trending dextral faults (incl. Macamic, Dupuy, Duvan, Petit Duvan faults) accompanied by ductile deformation and peak amphibolite metamorphism. D2 faults / shear zones are characterized by subvertical foliation, shallow plunging stretching lineation and numerous dextral shear-sense indicators.



## 4. Structural Geology



Map on the left shows corridors of D2 ductile deformation as defined by Lacroix (1995).

The D2 corridors are defined by zones of ductile deformation where foliation were transposed parallel the SZ boundaries, stretching lineation became shallow to sub-horizontal, and abundant kinematic indicators of dextral strike-slip movement are observed.

Syntectonic plutons were emplaced during and deformed by D2. Along plutons margins, mutually crosscutting relationships were observed, and D2 characteristic mineral fabric were observed within the plutons.

Observations suggest incremental deformation during D2 with brittle conditions developed during waning stages of the episode.

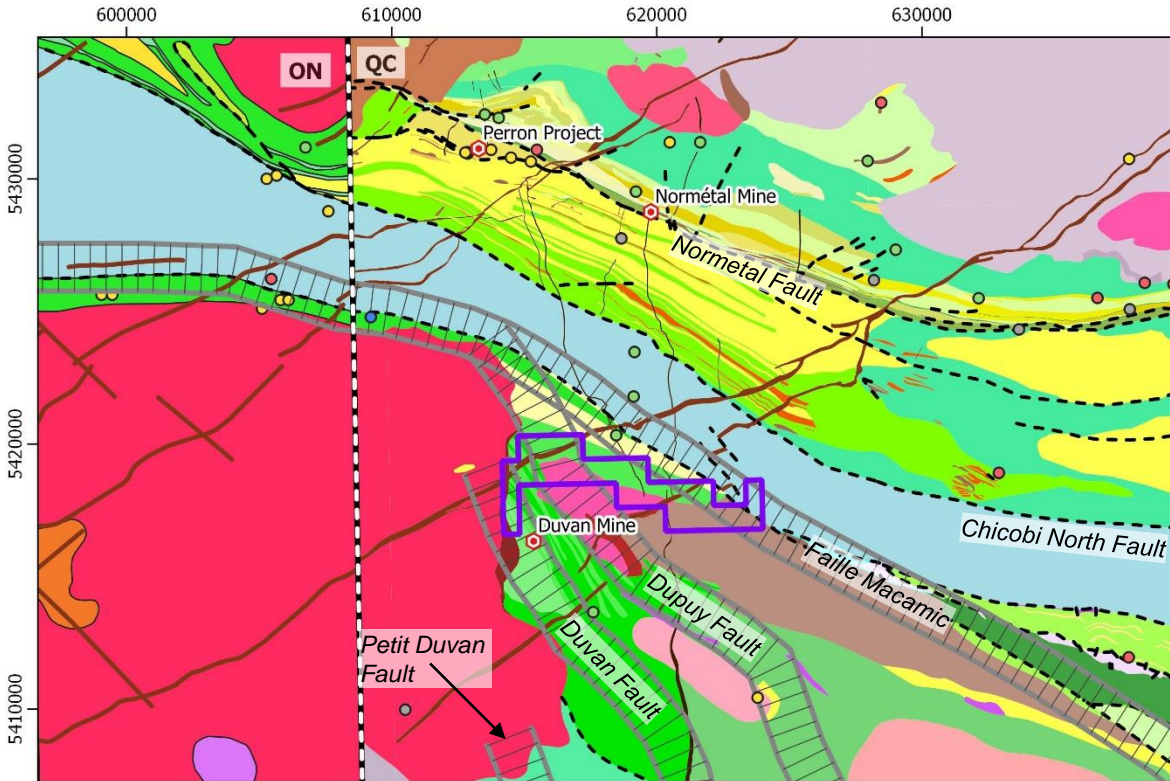




# 4. Structural Geology

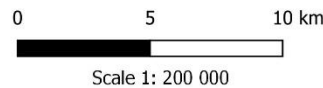
Corridors of D2 ductile deformation from Lacroix's geological report (1995) have been located and traced on a geological map of the area surrounding the Portage River property.

Note that the Portage River property is transected by three significant corridors of D2 deformation.



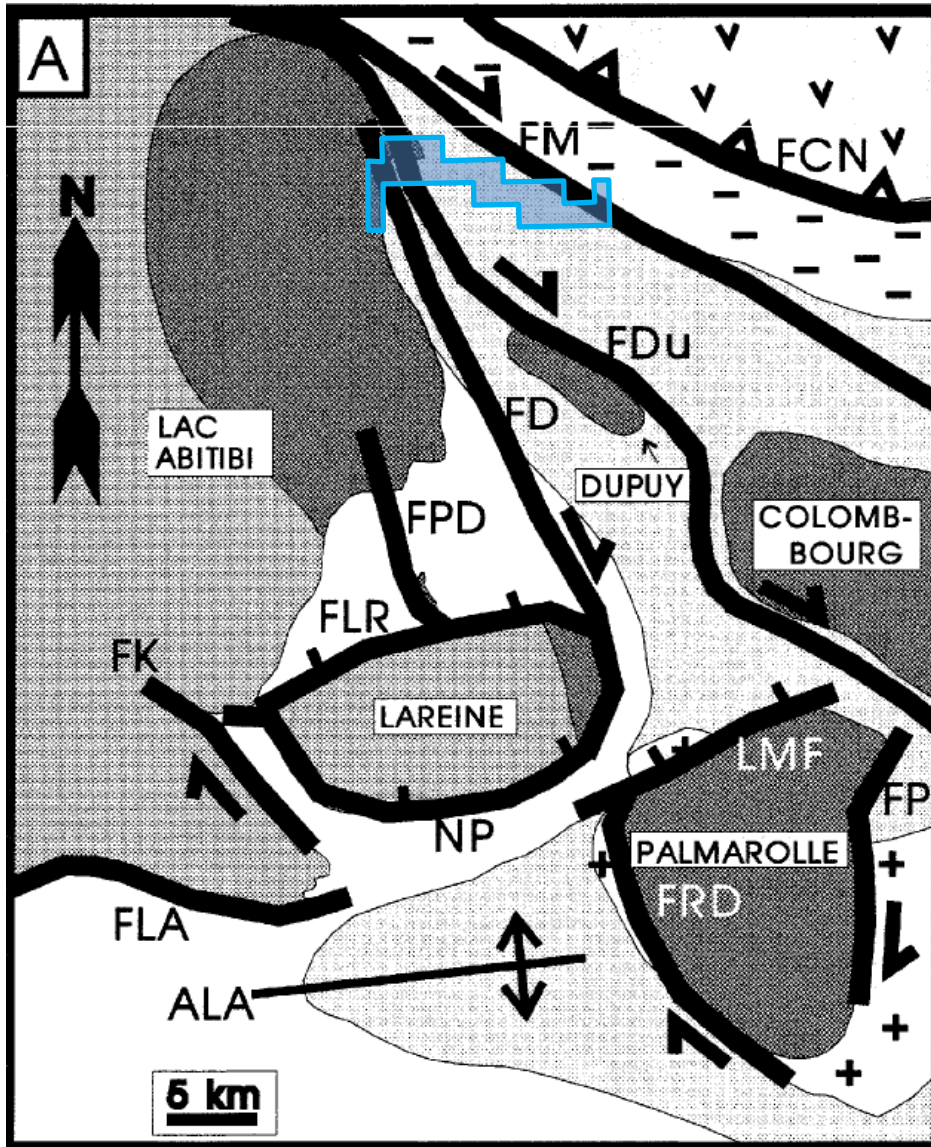
- |                                     |                                   |  |
|-------------------------------------|-----------------------------------|--|
| Portage River Property              | Granodiorite                      | Amphibolite, granodiorite (injections) |
| Provincial border                   | Diabase (dike)                    | Rhyolite (quartz-porphyritic)          |
| Advanced project / closed mine      | Mafic-ultramafic sill             | Peridotite                             |
| Major fault                         | Rhyolite                          | Diorite                                |
| <b>Mineral deposit / occurrence</b> | Gabbro, diorite                   | Migmatite                              |
| Zn > Cu, +/- Pb, Ag, Au             | Schist (biotite-, sericite-)      | Granodiorite (hornblende-, biotite-)   |
| Ni, Cu                              | Amphibolite                       | Diabase (dike)                         |
| Cu > Zn, +/- Pb, Ag, Au             | Andesite                          | Dacite, rhyolite                       |
| Au +/- Ag, Cu                       | Andesite, undifferentiated tuff   | Migmatite                              |
| Ag > Au +/- Zn, Pb, Cu              | Trondhjemite, tonalite            | Wacke & mudrock                        |
| <b>Geology</b>                      | Granodiorite, trondhjemite        | Rhyodacite & rhyolite (porphyritic)    |
| Gabbro                              | Schist (hornblende-)              | Felsic-intermediate volcanoclastic     |
| Wacke                               | Granodiorite                      | Tholeiitic basalt                      |
| Andesite, int. / fels. tuffs        | Monzonite, syenite                | Andesite, dacite                       |
| Rhyodacite, rhyolite                | Basalt, andesite, minor sediments | Rhyolite (quartz-feldspar porphyritic) |
|                                     | Basalt, basaltic andesite         | Intermediate-mafic volcanics           |
|                                     | Granite, granodiorite             |  |

**Regional geology, D2 deformation corridors, major faults, mineral occurrences, and outline of Portage River property, Abitibi region, Québec.**





## 4. Structural Geology



Smaller scale geological map from Lacroix showing the main structural components in the vicinity of the property and to the south.

Note the predominance of D2 NW-SE faults and the often sheared margins of the plutons.

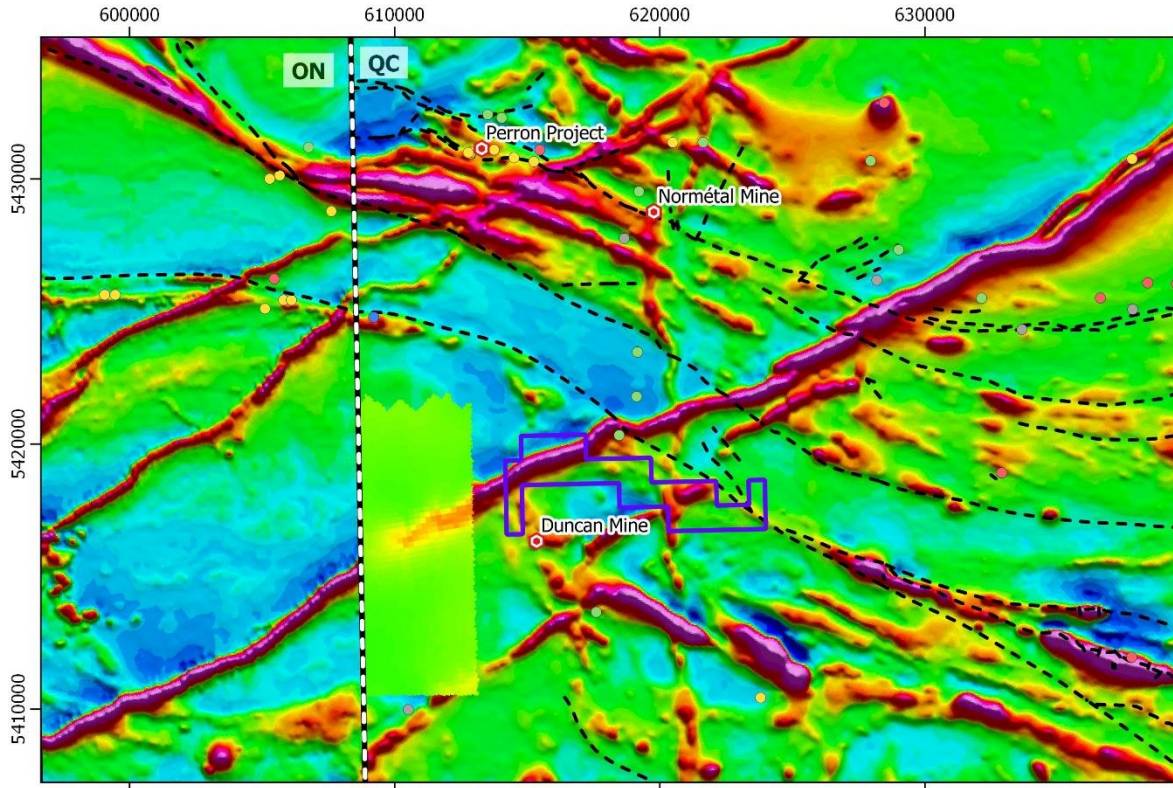
The Dupuy fault (FDu) connects with the Malartic fault (FM) at its northern termination.

The Petit Duvan fault (FPD) and the Duvan fault (FD) are subparallel to the Dupuy fault (DPu) and are also interpreted to be D2 structures.





# 5. Geophysical Data



Map showing the Residual total magnetic field gradient for the area surrounding the Portage River property.

No high-resolution survey were found to cover the property.

The Proterozoic dikes and more magnetic volcanic horizons make the bulk of the magnetic fabric on this map.

The main Chicobi North and Macamic fault can be identified.

Portage River Property

Provincial border

Advanced project / closed mine

Major fault

Mineral deposit / occurrence

Zn > Cu, +/- Pb, Ag, Au

Ni, Cu

Cu > Zn, +/- Pb, Ag, Au

Au +/- Ag, Cu,

Ag > Au +/- Zn, Pb, Cu

**Residual total magnetic field, major faults, mineral occurrences, and outline of Portage River property, Abitibi, Québec.**

0 5 10 km



Scale 1: 200 000

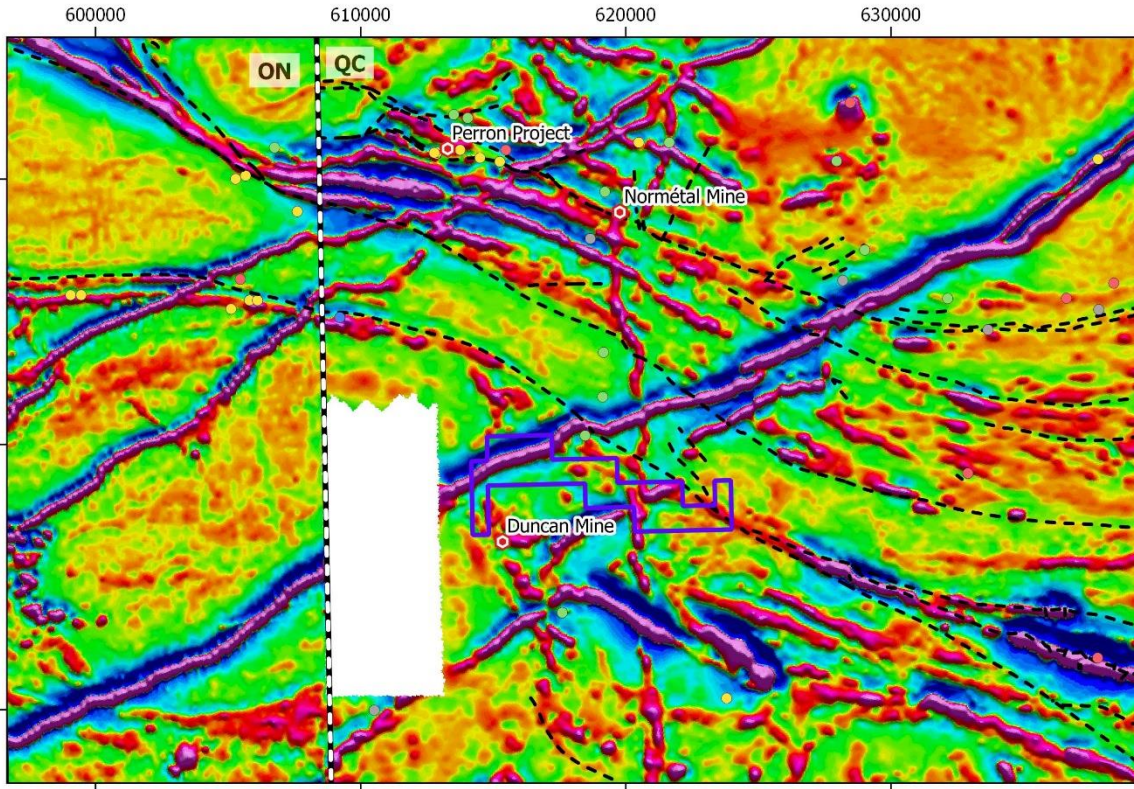


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# 5. Geophysical Data



Map of the first vertical derivative of the magnetic field.

The low-resolution of the map does not allow to distinguish much of the geology within the map area.

Again, The Proterozoic dikes and more magnetic volcanic horizons make the bulk of the magnetic fabric on this map.

- Portage River Property
- Provincial border
- Advanced project / closed mine
- Major fault

- Mineral deposit / occurrence
- Zn > Cu, +/- Pb, Ag, Au
  - Ni, Cu
  - Cu > Zn, +/- Pb, Ag, Au
  - Au +/- Ag, Cu
  - Ag > Au +/- Zn, Pb, Cu

**First vertical derivative of the magnetic field, major faults, mineral occurrences, and outline of Portage River property, Abitibi, Québec.**

0 5 10 km



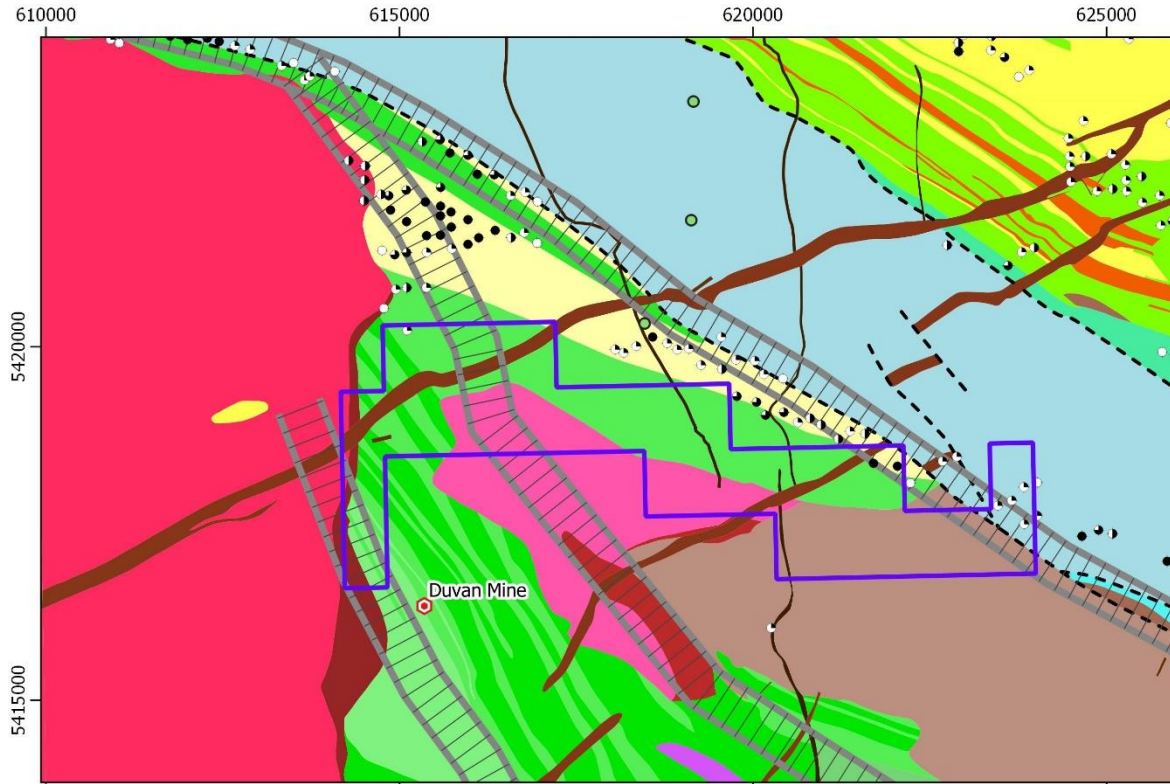
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Feb. 2021  
NAD 83, Zone 17



# 5. Geophysical Data



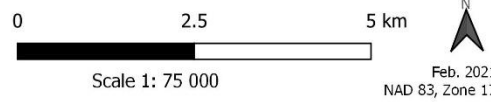
Very few EM input anomalies are present within the property.

Shown on the map are input anomalies from an airborne 1972 MK V survey, compiled by MRNQ.

Several larger-scale ground EM and Mag surveys have been conducted around the Duncan mine, but were not compiled for this report.

**EM input anomalies, mineral occurrences, deformation corridors, geology, and outline of Portage River property, Abitibi region.**

- ▭ Portage River Property
- ⊙ Advanced project
- - - Major fault
- Portage River - Mineral occurrences**
- Zn > Cu, +/- Pb, Ag, Au
- Cu > Zn, +/- Pb, Ag, Au
- Geology**
- ▭ Gabbro
- ▭ Wacke
- ▭ Diabase (dike)
- ▭ Gabbro, diorite
- ▭ Schist (biotite-, sericite-)
- ▭ Andesite, undifferentiated tuff
- ▭ Schist (hornblende-)
- ▭ Granodiorite
- ▭ Basalt, andesite, minor sediments
- ▭ Basalt, basaltic andesite
- ▭ Amphibolite, granodiorite (injections)
- ▭ Peridotite
- ▭ Diorite
- ▭ Migmatite
- ▭ Granodiorite (hornblende-, biotite-)
- ▭ Diabase (dike)
- ▭ Dacite, rhyolite
- ▭ Migmatite
- ▭ Wacke & mudrock
- ▭ Felsic-intermediate volcanoclastic
- ▭ Intermediate-mafic volcanics



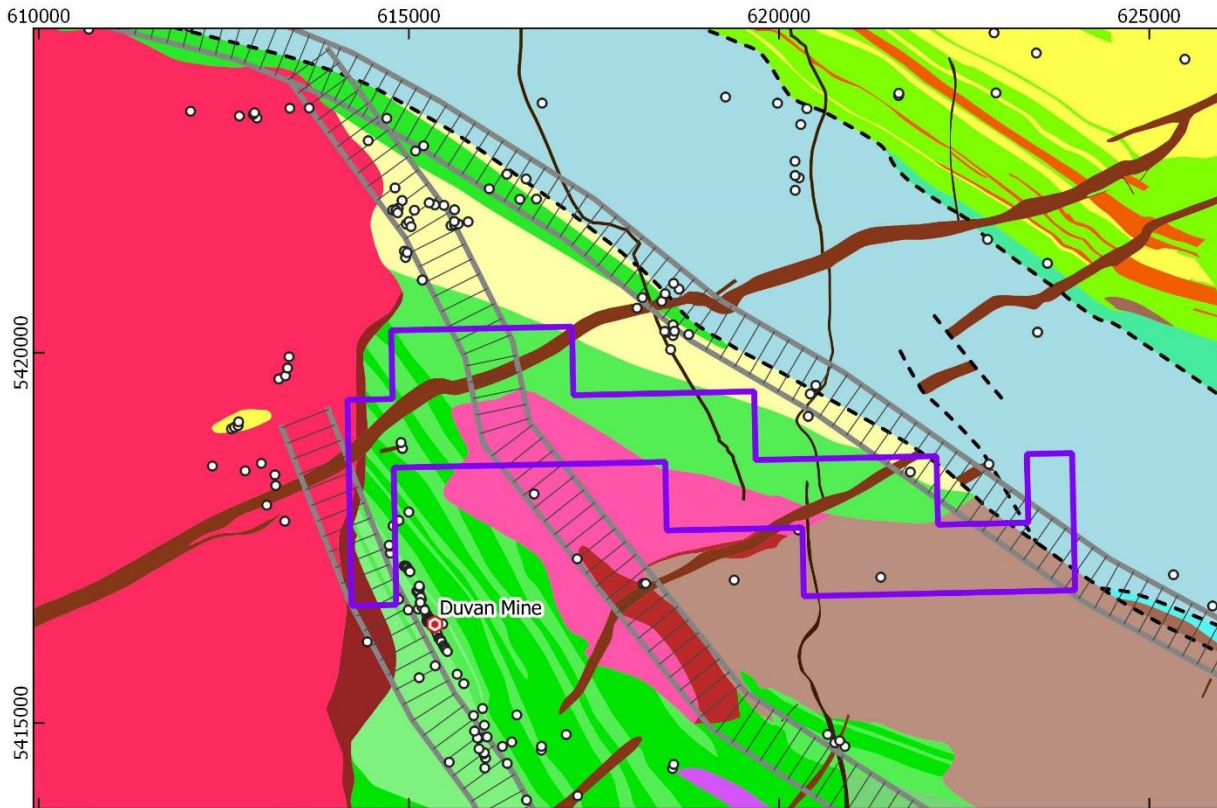




# 6. History of Exploration

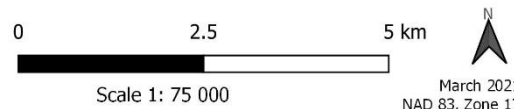
Location of historical drill holes in the vicinity of the Portage River property.

Only eight (8) drill holes have tested the geology of the property.



- Portage River Property
  - Advanced project
  - Drillholes
  - D2 deformation corridor
  - Major fault
- Geology**
- Gabbro
  - Wacke
  - Diabase (dike)
  - Gabbro, diorite
  - Schist (biotite-, sericite-)
  - Andesite, undifferentiated tuff
  - Schist (hornblende-)
  - Granodiorite
  - Basalt, andesite, minor sediments
  - Basalt, basaltic andesite
  - Amphibolite, granodiorite (injections)
  - Peridotite
  - Diorite
  - Migmatite
  - Granodiorite (hornblende-, biotite-)
  - Diabase (dike)
  - Dacite, rhyolite
  - Migmatite
  - Wacke & mudrock
  - Felsic-intermediate volcanoclastic
  - Intermediate- mafic volcanics

**Geology, deformation corridors from Lacroix (1995), main faults, historical drillholes, and outline of Portage River property, Abitibi region.**







## 6. History of Exploration

Early reports of exploration in the vicinity of the property started with the discovery of the Duvan showing just south of the property in 1925. The property itself has not been the focus of exploration. However, various parts have been included in regional and property-scale program focusing on the Duvan and Normétal mines as well as on sediments-hosted base metals mineralization within the Chicobi sediments.

Below is a summary of the main highlights of exploration in the vicinity of the property:

1925 : Rex Mining Ltd ; prospection and discovery of the Duvan orebody.

1928 : Laval Québec Mines ; stripping and diamond drilling

1949-1950 : Dominion Gulf ; prospecting in the vicinity of the Bornite Copper showing.

1952 -1955 : Various companies (Dominion Gulf, Quebec Diversified , Duvan Copper Co. Ltd., Normetal Mining Corp.) collectively drilled 82 diamond drillholes ( ~ 9500 m) on the Duvan orebody and the Bornite prospects.

1955-1956 : Duvan Copper Co. Ltd. ; sinking of a 300 m shaft with 8 levels at the Duvan mine.

1955: Three DDH were drilled within property limits (GM 03349E), altered volcanics and trace sulfides were encountered, no significant assay.

1956: Voodoo Copper Mining Corp. drilled three DDH within the Hunter group volcanics inside the property (GM03740C); altered volcanics and disseminated pyrite, no assay reported.



## 6. History of Exploration

- 1960 : Duvan Copper Co. Ltd. ; 1415 tons sample is shipped to the Horne smelter (10.45 % Cu + 100 gpt Ag). Mine is shutdown and equipment is sold.
- 1961: one DDH drilled along NE edge of property (GM10828B) through sediments, no mineralization.
- 1965: one DDH drilled through diorite within property limits (GM16299), no mineralization.
- 1975-1977: New Isco Mines Ltd. ; surface prospecting and geophysical work.
- 1978 : Great Plains Res. Ltd. ; 1 DDH, IP and ground magnetic survey (GM 33685)
- 1985-1987 : Aunore Res. Inc. ; Magnetic survey (GM 42036, GM 44769)
- 1987 : Exploration Minière LaSarre ; overburden drilling program (59 reverse circulation holes), 1 hole within property limits and 5 holes within 300 m (GM 46195), several holes containing gold grains.
- 1991 : Ressources Temisca Inc.; Ground magnetic survey just north of the Duvan mine (GM 50351)
- 1992 : Explorations Noranda Ltée.; line cutting, IP and mag survey, stripping, 2 drill holes, one of which within property limits, altered volcanics and disseminated pyrite were encountered, no significant assay results(GM 52199, GM 51666) .
- 1997 : Ressources Cristal Inc. ; prospecting near Bornite Copper, sampling at the Duvan Mine (GM54971).



## 6. History of Exploration

- 1998 : Ressources Cristal Inc. ; stripping and sampling at the prospect Bornite Copper.
- 1999 -2003 : Gosselin & Turcotte prospectors ; prospecting, stripping, sampling, and IP survey on base metals showing just N of property (GM 59173, GM 60040, GM 60041, GM 60196, GM 60197, GM 60199, GM 60200).
- 2007 : DIAGNOS Inc. ; computer-assisted target generation with CARDS (« Computer Aided Resource Detection System ») around Bornite Copper (GM 63729).

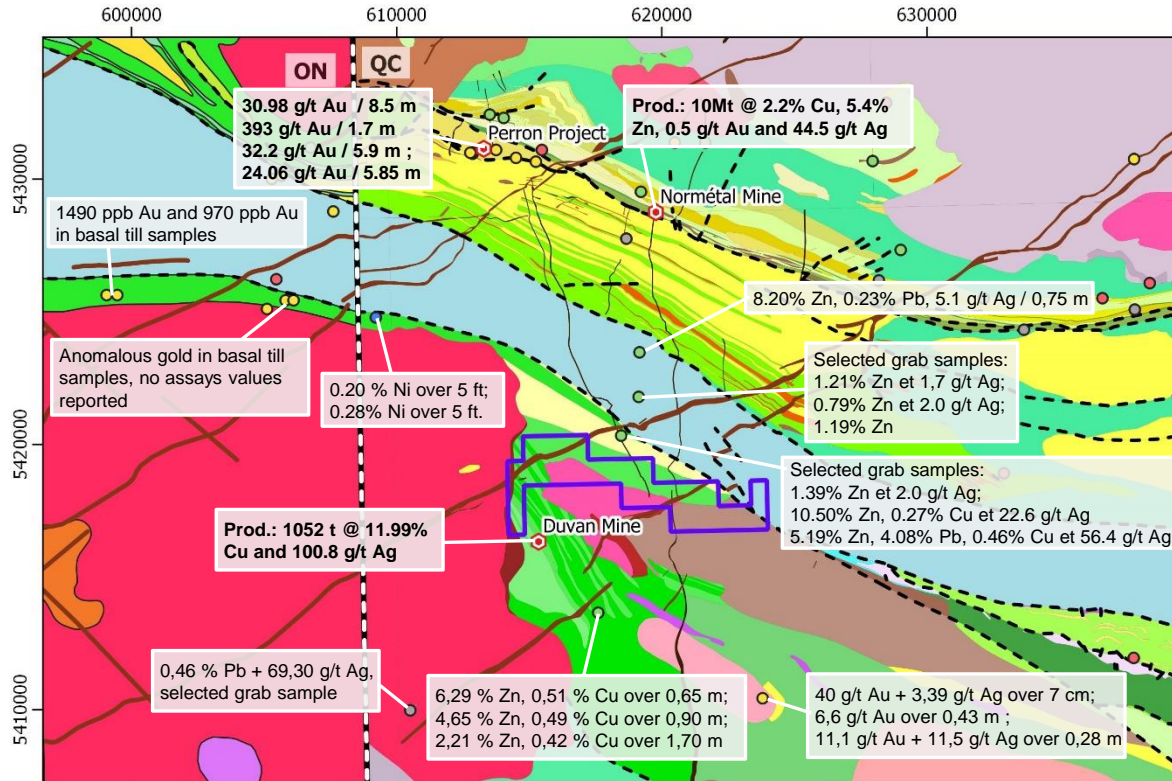
### **Recent Globex Mining Enterprises Inc. work on Duvan property**

- 2011 : linecutting and mag survey in the Duvan mine area (GM 65455).
- 2013 : linecutting, magnetic and electromagnetic survey (HLEM) Duvan area (GM 67421).
- 2014 : Reconnaissance field mapping and sampling (GM 68961).
- 2015: Reconnaissance field visit, 7.2 linear km of IP survey, two DDH (GM 69312, GM 69420).





# 7. Mineral occurrences



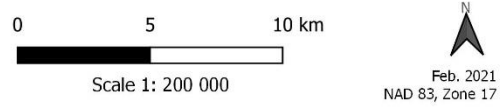
Two former base metal mines and one significant advanced gold exploration project occur within the Portage River area.

There are no recorded mineral occurrence within the property limits.

The former Duvan mine is within 600 metres from the property limits.

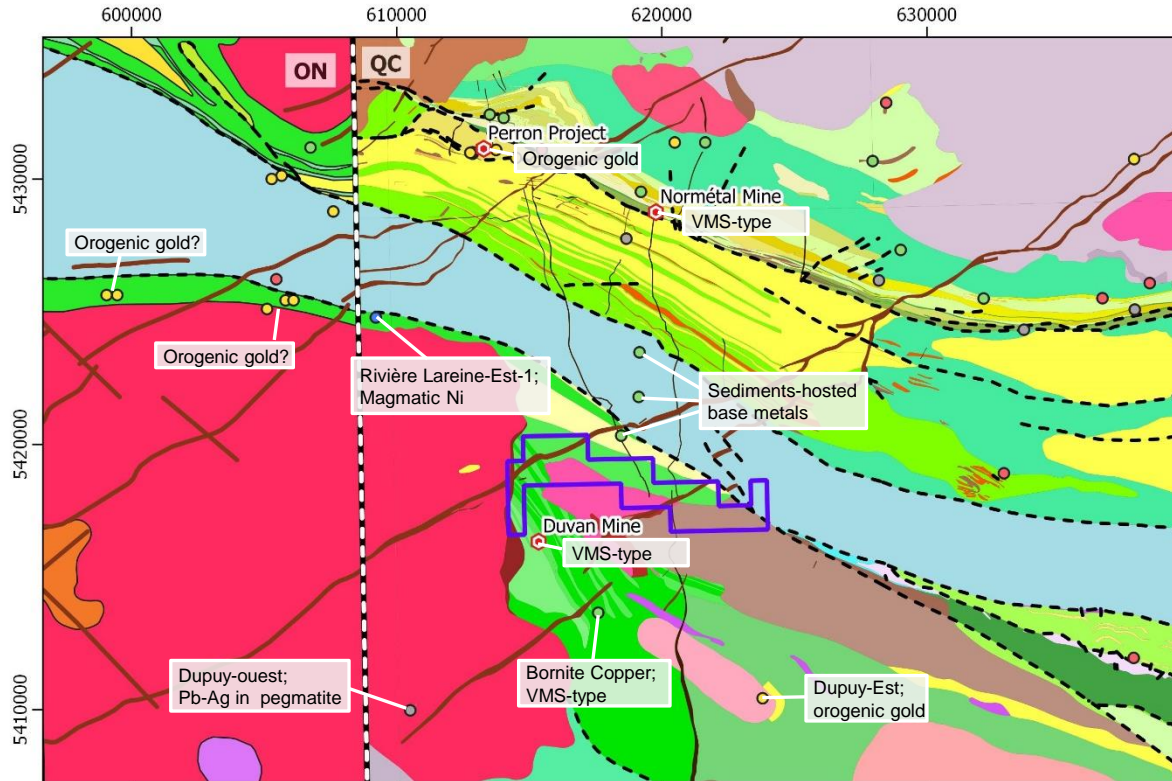
- ▬ Portage River Property
  - ▬ Provincial border
  - Advanced project / closed mine
  - - - Major fault
- Mineral deposit / occurrence**
- Zn > Cu, +/- Pb, Ag, Au
  - Ni, Cu
  - Cu > Zn, +/- Pb, Ag, Au
  - Au +/- Ag, Cu
  - Ag > Au +/- Zn, Pb, Cu
- Geology**
- Gabbro
  - Wacke
  - Andesite, int. / fels. tuffs
  - Rhyodacite, rhyolite
  - Granodiorite
  - Diabase (dike)
  - Mafic-ultramafic sill
  - Rhyolite
  - Gabbro, diorite
  - Schist (biotite, sericite-)
  - Amphibolite
  - Andesite
  - Andesite, undifferentiated tuff
  - Trondhjemite, tonalite
  - Granodiorite, trondhjemite
  - Schist (hornblende-)
  - Granodiorite
  - Monzonite, syenite
  - Basalt, andesite, minor sediments
  - Basalt, basaltic andesite
  - Granite, granodiorite
  - Amphibolite, granodiorite (injections)
  - Rhyolite (quartz-porphyritic)
  - Peridotite
  - Diorite
  - Migmatite
  - Granodiorite (hornblende-, biotite-)
  - Diabase (dike)
  - Dacite, rhyolite
  - Migmatite
  - Wacke & mudrock
  - Rhyodacite & rhyolite (porphyritic)
  - Felsic-intermediate volcanoclastic
  - Tholeiitic basalt
  - Andesite, dacite
  - Rhyolite (quartz-feldspar porphyritic)
  - Intermediate-mafic volcanics

**Regional geology, major faults, mineral occurrences, and outline of Portage River property, Abitibi region, Québec.**





# 7. Mineral occurrences



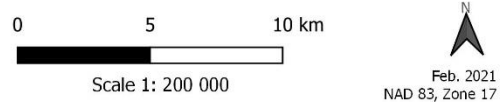
Three main types of mineralization are found in the property area:

- 1- Base metals mineralization hosted in volcanic rocks (Normétal, Duvan).
- 2- Base metals mineralization hosted in Chicobi sedimentary rocks.
- 3- Orogenic gold mineralization (Perron project, Dupuy-Est)

Single minor occurrences of magmatic Ni and Pb-Ag in pegmatite are also found along the margin and within the Lac Abitibi pluton, respectively.

Portage River Property	Granodiorite	Amphibolite, granodiorite (injections)
Provincial border	Diabase (dike)	Rhyolite (quartz-porphyrific)
Advanced project / closed mine	Mafic-ultramafic sill	Peridotite
Major fault	Rhyolite	Diorite
<b>Mineral deposit / occurrence</b>	Gabbro, diorite	Migmatite
Zn > Cu, +/- Pb, Ag, Au	Schist (biotite, sericite-)	Granodiorite (hornblende-, biotite-)
Ni, Cu	Amphibolite	Diabase (dike)
Cu > Zn, +/- Pb, Ag, Au	Andesite	Dacite, rhyolite
Au +/- Ag, Cu	Andesite, undifferentiated tuff	Migmatite
Ag > Au +/- Zn, Pb, Cu	Trondhjemite, tonalite	Wacke & mudrock
<b>Geology</b>	Granodiorite, trondhjemite	Rhyodacite & rhyolite (porphyritic)
Gabbro	Schist (hornblende-)	Felsic-intermediate volcanoclastic
Wacke	Granodiorite	Tholeiitic basalt
Andesite, int. / fels. tuffs	Monzonite, syenite	Andesite, dacite
Rhyodacite, rhyolite	Basalt, andesite, minor sediments	Rhyolite (quartz-feldspar porphyritic)
	Basalt, basaltic andesite	Intermediate-mafic volcanics
	Granite, granodiorite	

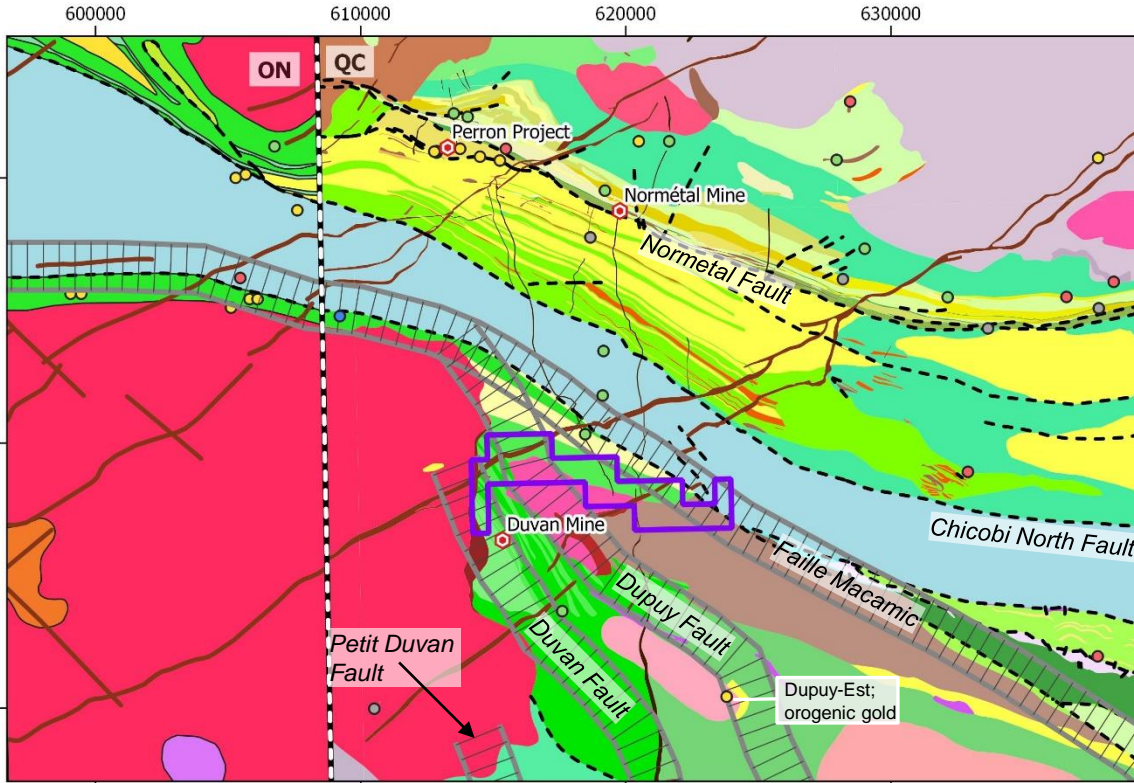
**Regional geology, major faults, mineral occurrences, and outline of Portage River property, Abitibi region, Québec.**





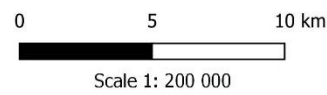


# 7. Mineral occurrences



Portage River Property	Granodiorite	Amphibolite, granodiorite (injections)
Provincial border	Diabase (dike)	Rhyolite (quartz-porphyrific)
Advanced project / closed mine	Mafic-ultramafic sill	Peridotite
Major fault	Rhyolite	Diorite
<b>Mineral deposit / occurrence</b>	Gabbro, diorite	Migmatite
Zn > Cu, +/- Pb, Ag, Au	Schist (biotite-, sericite-)	Granodiorite (hornblende-, biotite-)
Ni, Cu	Amphibolite	Diabase (dike)
Cu > Zn, +/- Pb, Ag, Au	Andesite	Dacite, rhyolite
Au +/- Ag, Cu	Andesite, undifferentiated tuff	Migmatite
Ag > Au +/- Zn, Pb, Cu	Trondhjemite, tonalite	Wacke & mudrock
<b>Geology</b>	Granodiorite, trondhjemite	Rhyodacite & rhyolite (porphyritic)
Gabbro	Schist (hornblende-)	Felsic-intermediate volcanoclastic
Wacke	Monzonite	Tholeiitic basalt
Andesite, int. / fels. tuffs	Monzonite, syenite	Andesite, dacite
Rhyodacite, rhyolite	Basalt, andesite, minor sediments	Rhyolite (quartz-feldspar porphyritic)
	Basalt, basaltic andesite	Intermediate-mafic volcanics
	Granite, granodiorite	

**Regional geology, D2 deformation corridors, major faults, mineral occurrences, and outline of Portage River property, Abitibi region, Québec.**



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## Orogenic gold mineralization

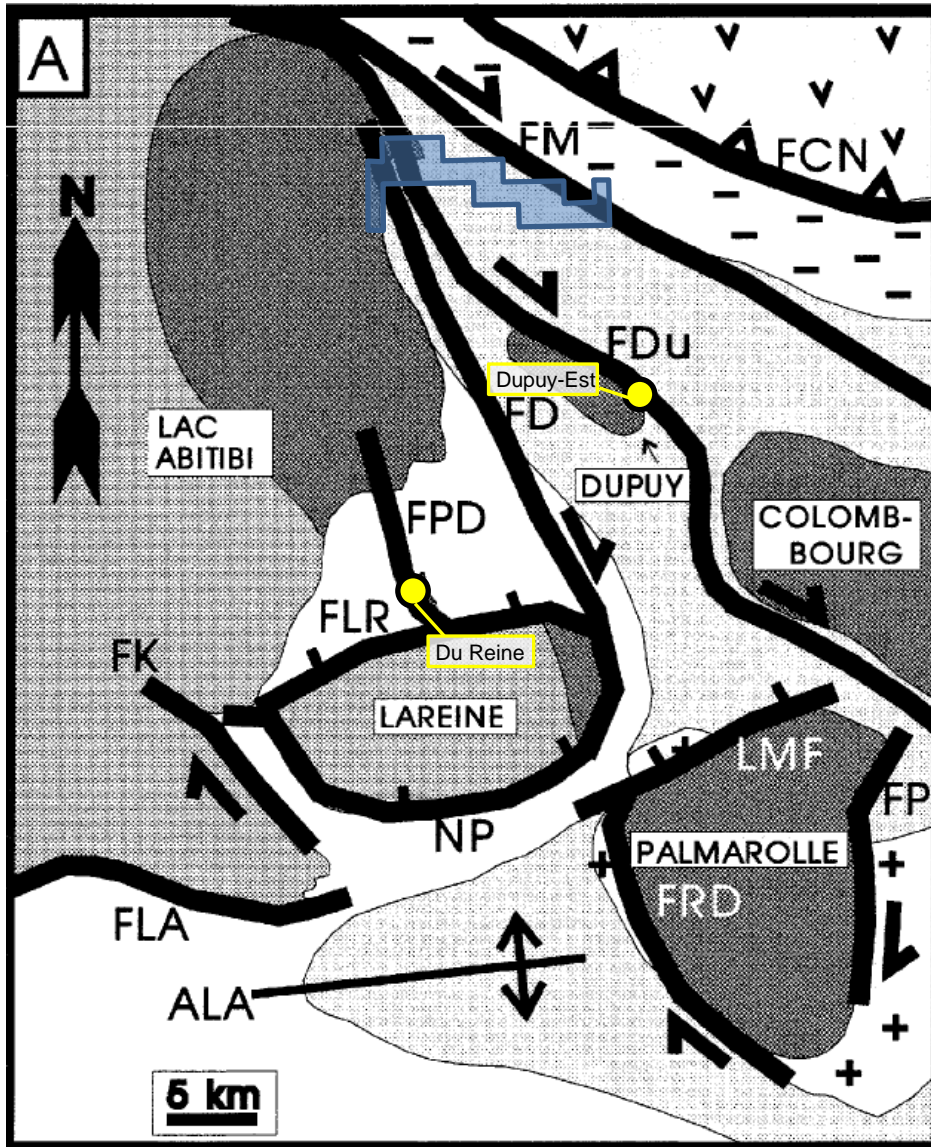
- Dupuy-Est:
- 10 km SE of property.
  - Underexplored target
  - Mineralized narrow quartz veins with visible gold (up to 5 mm) hosted in altered granite discovered by drilling.
  - DDH HR-88-1 drilled near margin of Dupuy pluton which is affected by the D2 Dupuy Fault.
  - This suggest that the D2 shearing may be responsible for the Dupuy mineralization and that mineralized fluids were circulating, at least locally, along the D2 structure.
  - The Dupuy fault extends through the Portage River property.

**Dupuy-Est: HR-88-1 significant intercepts**  
 40 g/t Au + 3,39 g/t Ag over 7 cm;  
 6,6 g/t Au over 0,43 m ;  
 11,1 g/t Au + 11,5 g/t Ag over 0,28 m





# 7. Mineral occurrences



## Orogenic gold mineralization

### Du Reine:

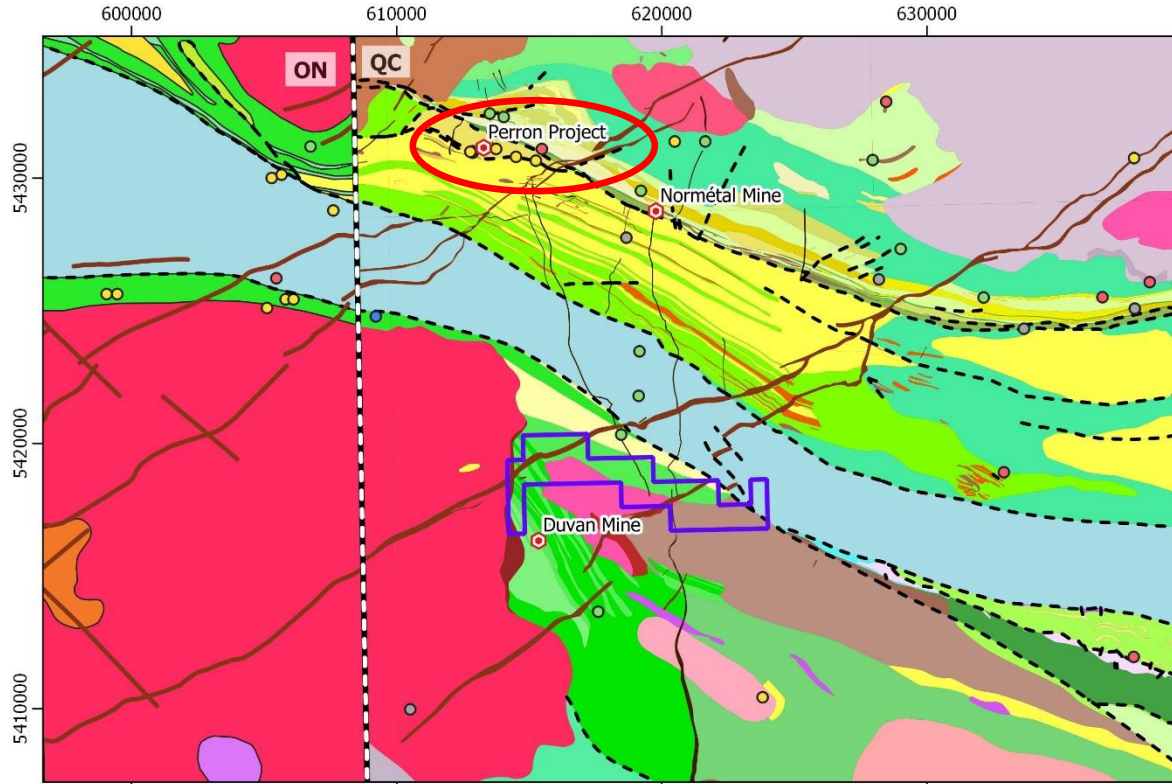
- 15 km S of property.
- System of shear and extension quartz veins hosted in a syn-tectonic granitic intrusion affected by the Petit Duvan fault (FPD), a D2 structure subparallel to the Duvan (FD), Dupuy (FDu), and Macamic (FM) faults.
- Work by Tremblay et al. (1996) showed that the mineralization was emplaced during D2 dextral shearing.

### ***Du Reine***

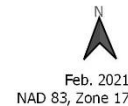
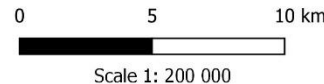
*Historical resources (non NI 43-101) of 356 271 tons @ 2.42 g/t Au (27 764 oz).*



# 7. Mineral occurrences



**Regional geology, major faults, mineral occurrences, and outline of Portage River property, Abitibi region, Québec.**



## Orogenic gold mineralization

### Perron Project:

- 10 km NNW of property.
- Several mineralized zones being explored.
- Mineralized intercept with high-grade gold over significant widths.

### ***Perron Project: significant intercepts***

*30.98 g/t Au / 8.5 m;  
393 g/t Au / 1.7 m;  
32.2 g/t Au / 5.9 m;  
24.06 g/t Au / 5.85 m*



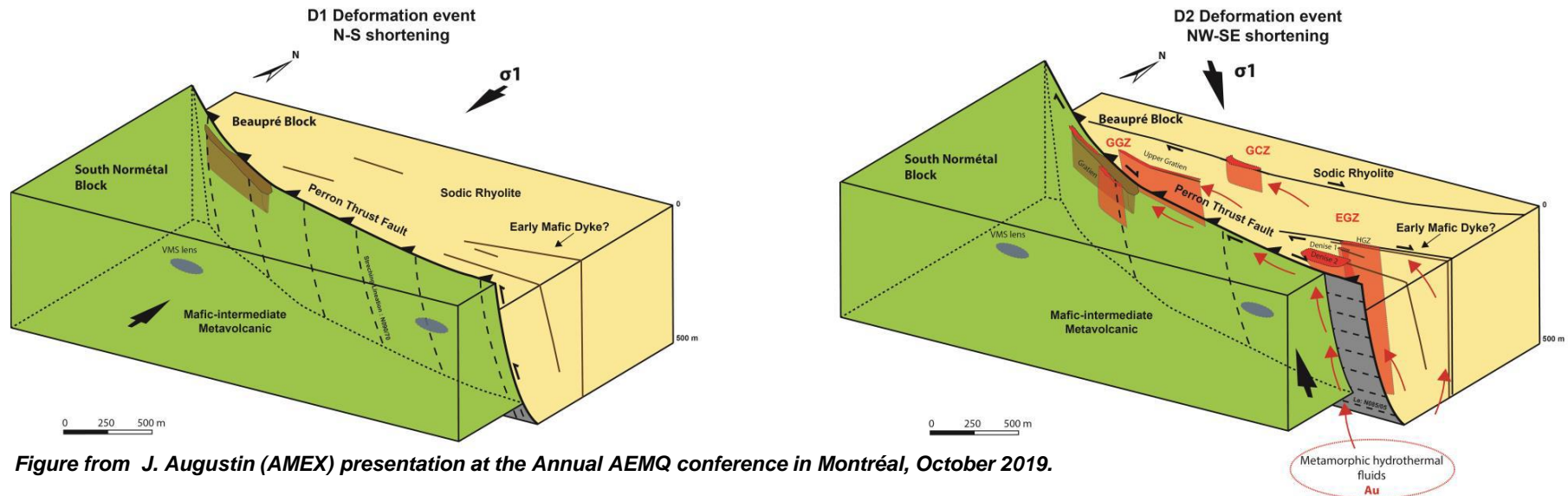
# 7. Mineral occurrences

## Orogenic gold mineralization

### Perron Project:

The image below shows the simplified structural evolution model for the Perron property and the interpreted timing of gold mineralization emplacement.

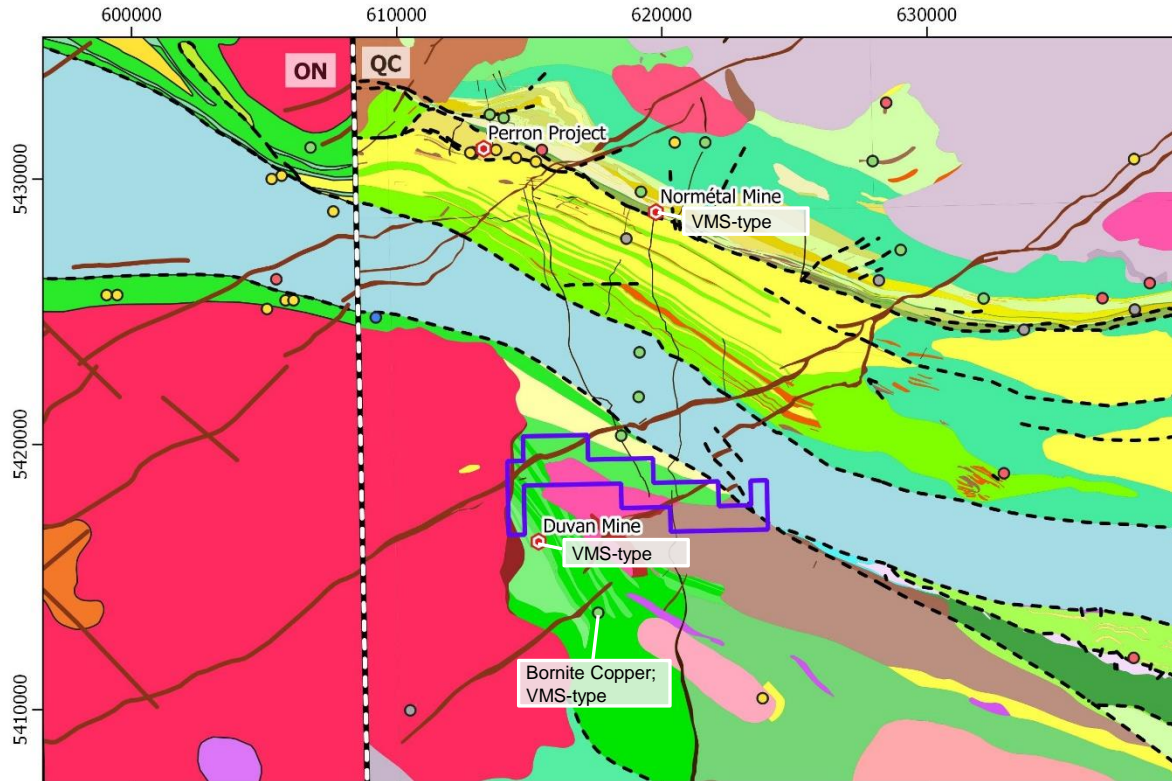
Work by AMEX and its consultants has pinpointed gold deposition within the various zones of the Perron property to have been emplaced during the D2 deformation along either new dextral shear zones or D1 faults that were re-activated during D2 as strike-slip dextral faults.



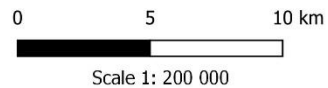




# 7. Mineral occurrences



**Regional geology, major faults, mineral occurrences, and outline of Portage River property, Abitibi region, Québec.**



**VMS-type, base metals mineralization hosted in volcanic rocks**

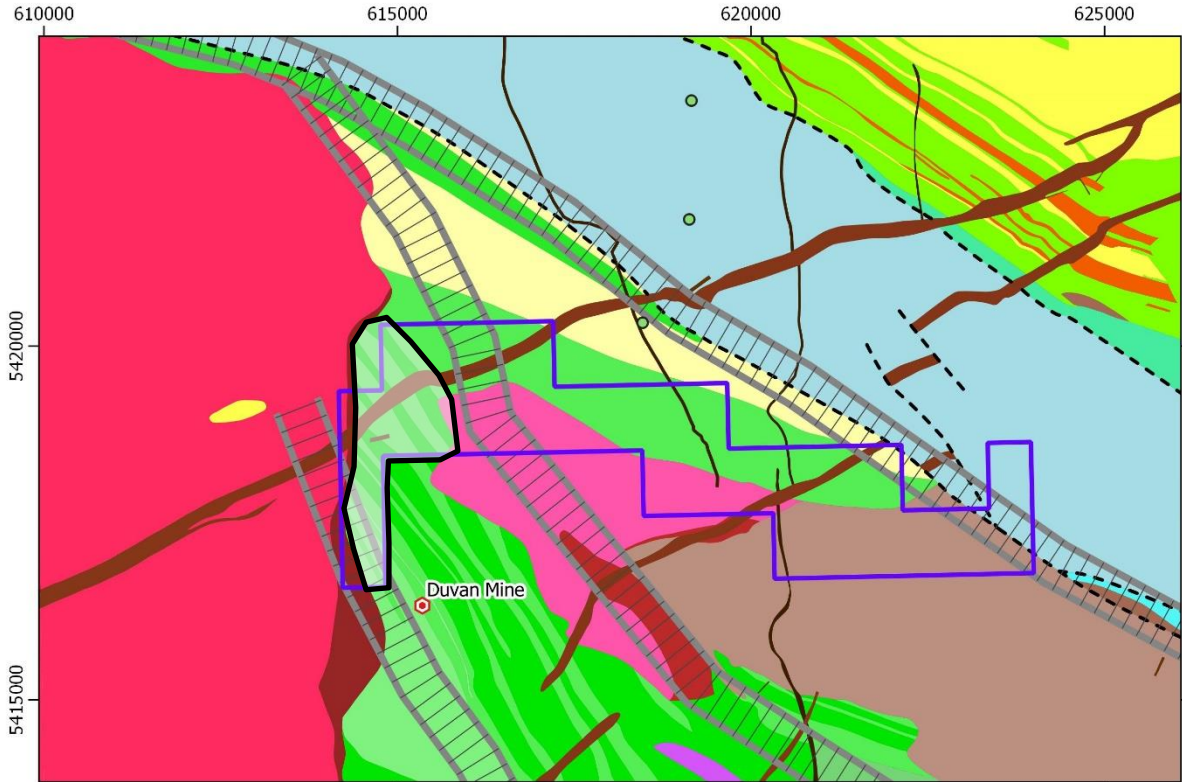
## Duvan Mine

- Cu-Ag rich orebody, concordant to locally discordant mineralization.
- Lack of a clear footwall alteration zone typical of VMS deposits.
- Hosted in D2 high-strain zone (Duvan fault); transposition of units may explain the lack of footwall alteration.
- 600 m SE, along strike, from property.

**Duvan Mine**  
 Production of 1052 t @ 11.99% Cu and 100.8 g/t Ag  
 Historical resources (non NI 43-101) of 101 000 t @ 2.5 % Cu.

**Bornite Copper: historical intercepts**  
 6,29 % Zn, 0,51 % Cu over 0,65 m;  
 4,65 % Zn, 0,49 % Cu over 0,90 m;  
 2,21 % Zn, 0,42 % Cu over 1,70 m

# 8. Prospectivity & Exploration Targets

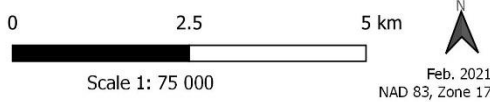


**VMS-type, base metals mineralization hosted in volcanic rocks**

- Hunter Mine volcanic rocks along the western portion of the property should be considered highly prospective for VMS-type mineralization.

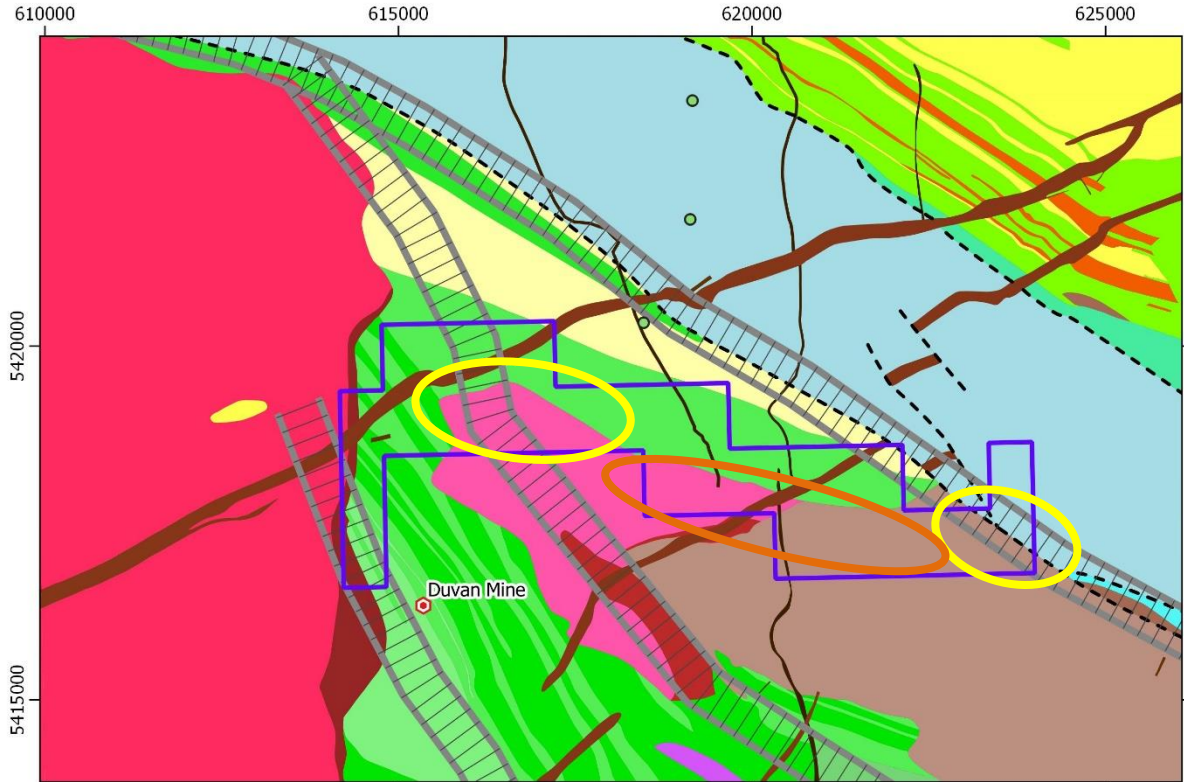
- Portage River Property
- Advanced project
- Major fault
- Portage River - Mineral occurrences**
- Zn > Cu, +/- Pb, Ag, Au
- Cu > Zn, +/- Pb, Ag, Au
- Geology**
- Gabbro
- Wacke
- Diabase (dike)
- Gabbro, diorite
- Schist (biotite-, sericite-)
- Andesite, undifferentiated tuff
- Schist (hornblende-)
- Granodiorite
- Basalt, andesite, minor sediments
- Basalt, basaltic andesite
- Amphibolite, granodiorite (injections)
- Peridotite
- Diorite
- Migmatite
- Granodiorite (hornblende-, biotite-)
- Diabase (dike)
- Dacite, rhyolite
- Migmatite
- Wacke & mudrock
- Felsic-intermediate volcanoclastic
- Intermediate-mafic volcanics

**Deformation corridors from Lacroix (1995), local geology, mineral occurrences, and outline of Portage River property, Abitibi region.**

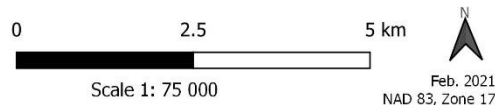




# 8. Prospectivity & Exploration Targets



**Deformation corridors from Lacroix (1995), local geology, mineral occurrences, and outline of Portage River property, Abitibi region.**

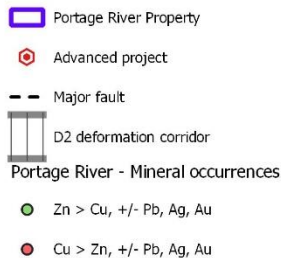
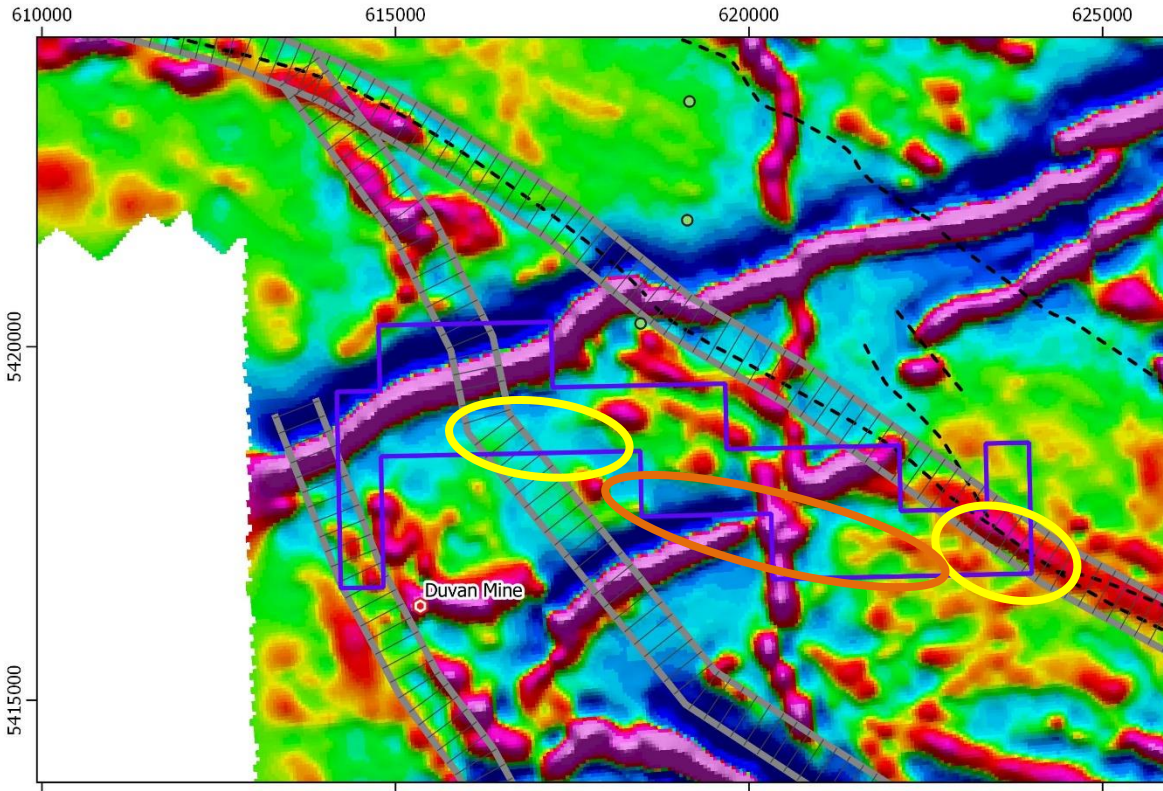


## Orogenic gold

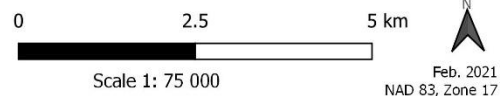
- The trace of the D2 faults and their vicinity within the highly competent plutons should be favorable setting for development of brittle fracture and trapping of mineralized fluids.
- The competency contrast between the pluton and the host volcanic rocks also represent a favorable setting for development of vein system.
- The D2 Macamic fault in the vicinity of the diorite sill complex is another interesting target because it is a competent lithology favorable for development of brittle fracture and its iron-rich nature gives it the ability to react with the sulfur-bearing travelling mineralized fluids. .



# 8. Prospectivity & Exploration Targets



**Deformation corridors from Lacroix (1995), 1st vertical derivative for the magnetic gradient, mineral occurrences, and outline of Portage River property, Abitibi region.**



## Orogenic gold

- The trace of the D2 faults and their vicinity within the highly competent plutons should be favorable setting for development of brittle fracture and trapping of mineralized fluids.
- The competency contrast between the pluton and the host volcanic rocks also represent a favorable setting for development of vein system.
- The D2 Macamic fault in the vicinity of the diorite sill complex is another interesting target because it is a competent lithology favorable for development of brittle fracture and its iron-rich nature gives it the ability to react with the sulfur-bearing travelling mineralized fluids. .



## 9. Conclusions & Recommendations

The following features show high-prospectivity for mineralization:

- ✓ The Portage River property is transected by three D2 shear zones, structures associated to gold mineralization in the area.
- ✓ Intersection of D2 structures and lithological contact with high competency contrast are favorable setting for development of brittle fracture.
- ✓ D2 shear zones cutting through an iron-rich host (diorite sill complex) represent a favorable chemical trap for mineralizing fluids.
- ✓ Volcanic stratigraphy hosting the Duvan Cu-Zn rich orebody extends into the property.



## 9. Conclusions & Recommendations

We recommend:

- ✓ Completion of IP ground survey to detect possible zones of disseminated sulfides and strong alteration commonly associated to shear zones–hosted gold mineralization. Areas of focus should be the intersection of the Macamic fault with the diorite (east of property) and the Dupuy fault with granitic pluton (center part of property).
- ✓ Review of historical geophysical data over the Duvan mine and Bornite zones to determine the most efficient geophysical technique to identify the mineralization.
- ✓ Completion of a deep penetrating high-resolution magnetic and EM survey over the western part of the property to test for possible base metals mineralization.
- ✓ Drill testing of the best geophysical anomalies.
- ✓ The property coverage of the prospective intersection between D2 faults and competent intrusions is fairly small. Therefore, acquisition of additional properties along the strike of the Dupuy and Macamic fault should be evaluated.