

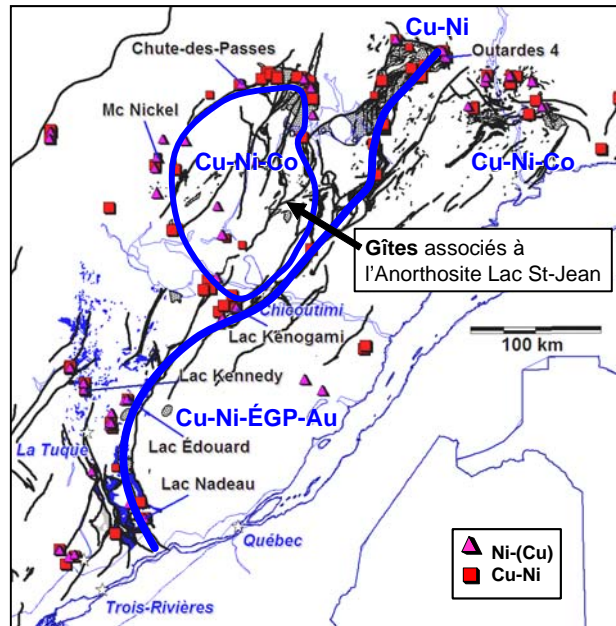
2008-05: Crustal structures and the potential of mafic intrusions in the Grenville Province for magmatic Cu-Ni-PGE mineralisation

The main objective of project 2008-05 was to test the hypothesis of a spatial relationship between major structures in the Grenville and the emplacement of mafic and ultramafic intrusions for Cu-Ni. The approach also aimed to establish a predictive model for areas in the Grenville that are favourable for magmatic Cu-Ni mineralisation.

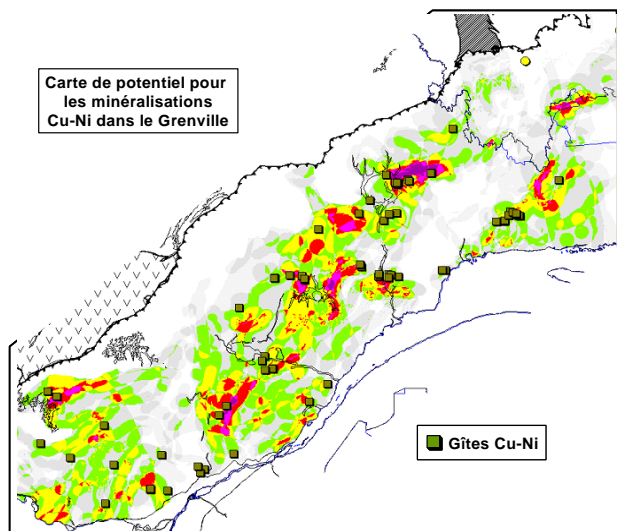
As exploration criteria across the Grenville, massive anorthosites (AMCG) are preferred because they represent a paleo-source for heat in the mantle (mantle plume, crustal delamination). In addition, inspired by the characteristics of the Voisey's Bay deposit, it was proposed to try to identify suture zones between two terrains of contrasting age or metamorphism, that is to say, translithospheric structures connected to the mantle; an aspect not yet addressed in the Grenville. These zones would be favourable for the emplacement of mafic/ultramafic intrusions, because they represent weakness in the mantle and the crust. As a second order criterion, the identification of faults or lineaments at right angles to the AMCG is proposed.

The identification of favourable translithospheric structures in the Grenville is based on seismic tomography, gravimetry, crust thickness, metamorphic fronts and boundaries of metasedimentary basins. These structures were placed in spatial relationships with the Cu-Ni mineralisation and the mafic/ultramafic intrusions (figure A).

A predictive model was developed (figure B), based on the integration of favourable areas identified using geophysical and/or geological means. The information layers are seismic tomography (first derivative at 125 km of depth), crust thickness (depth of the Moho), high regional residual gravity, very high local residual gravity (gabbro-norite bodies), faults along granulite fronts, faults along the edges of metasedimentary basins and favourable lithologies (anorthosites, gabbro-norites-troctolites and undifferentiated gabbros). Several exploration targets were proposed.



A - Spatial relationships between Cu-Ni deposits, interpreted translithospheric structures and mafic/ultramafic intrusions.



B - Predictive map for magmatic Cu-Ni in the Grenville.

Project 2008-05: Summary

<p>Objectives</p>	<ul style="list-style-type: none"> • To validate the hypothesis of an association between crustal and mantle structures, and Grenvillian mafic intrusion. • To establish guidelines for identifying favourable areas for Cu-Ni mineralisation.
<p>Results</p>	<ul style="list-style-type: none"> • Identification of geological and geophysical parameters for regional exploration for magmatic Cu-Ni in metamorphic terrains. • First predictive map for Cu-Ni in the Grenville with several high quality targets. • 122 exploration targets proposed.
<p>Innovations</p>	<ul style="list-style-type: none"> • Identification of discontinuities in the upper mantle and the crust to test their association with mafic intrusions and magmatic mineralisation. • Predictive model for Cu-Ni in the Grenville.