

2009-07: Metamorphic signatures for SEDEX and VMS-types of mineralisation in the Grenville Province

In Proterozoic rocks there are several world-class metal deposits and some of these deposits are located in high-grade metamorphic terrains. In Quebec, these characteristics correspond to the context of the Grenville Province. Incidentally, the Grenville contains large SEDEX-type deposits (zinc) in the American sector (Balmat-Edward and Sterling Hill) and some smaller VMS-type of deposits in Quebec (Montauban and Calumet). Therefore, the existence of large SEDEX and VMS deposits on the Quebec side of the Grenville may be proposed; but exploration criteria for recognising these mineralisation types are difficult to establish, given that metamorphic and structural transformations may have significantly changed their environments.

The original objective of the project was to define exploration criteria for the exploration of SEDEX and VMS deposits in the Grenville. As the density and the type of data available for the Grenville territory are heterogeneous and because of the low number of mineral occurrences, direct processing of Grenville data can be difficult. Instead, the proposed methodology consisted of establishing the characteristics of SEDEX and VMS-type deposits from around the world, but located in contexts similar to the Grenville. This approach allows a capture of the features considered important for these mineralisations and to extract criteria applicable in Quebec. VMS-type deposits are associated with alteration zones whose mineralogy is well defined for low-grade metamorphic rocks, but the changes caused by an increase in metamorphism are less well known.

Thus, a decision making tool in the shape of a searchable database was built. The database contains the characteristics of all metamorphosed SEDEX and VMS deposits known in the world. The various components contained in the database will aid in comparing the characteristics of occurrences or a given region in the Grenville with characteristics of known deposits. In addition, the consolidated information in the database will help define exploration strategies either in new areas or in the vicinity of known mineralisations. Furthermore, models were created showing the mineralogical characteristics of alteration zones at various metamorphic grades to guide the participants during an exploration campaign.

Project 2009-07: Summary	
Objectives	<ul style="list-style-type: none"> To characterise the metallogenic environments of SEDEX and VMS-type mineralisations in the Grenville. To define exploration criteria applicable in the Grenville and develop exploration tools.
Innovation	<ul style="list-style-type: none"> Decision making tool using the characteristics of world-class deposits. Model for the alteration assemblage for high metamorphic grades.
Results	<ul style="list-style-type: none"> Integration of key characteristics for every SEDEX and VMS-type deposit in the world, located in high-grade metamorphic environments.
Special Collaboration	<ul style="list-style-type: none"> Stéphanie Lavaure