

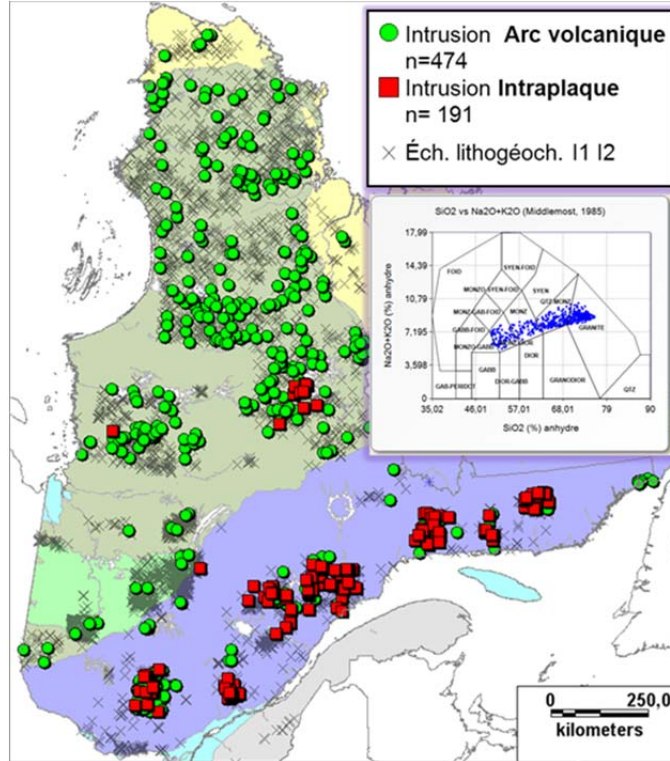
2010-08: Potential for IOCG mineralisation in an intracratonic or continental arc settings in the Archean and Proterozoic terrains of Quebec

Project 2010-08 focuses on finding favourable settings for IOCG (iron oxide copper gold) hydrothermal mineralisation in Quebec in the strictest sense, that is to say economically viable for copper and gold (\pm U, REE, Co) exploitation. This type of mineralisation is concentrated mainly in the Proterozoic, but also at the end of the Archean and in the Phanerozoic. For this reason, the Superior and Grenville Provinces are particularly targeted. It was previously established in project 2009-05 that plutons temporally associated with IOCG are intrusions of monzonite-granite suite, with calc-alkaline to alkaline affinity. They show geochemical signatures typical of volcanic arcs or intraplate intrusions. The recognition of these plutonic suites and their tectonic environment is in itself a regional exploration criterion.

Among the 8065 lithochemical samples from felsic and intermediate intrusions from the entire Province of Quebec (SIGÉOM database), only 8 % of the samples show the indicated favourable geochemical criteria. Next,

using spatial association, these samples helped identify areas favourable for IOCG-type mineralisation on the map of the intrusive suites. The identified continental volcanic arc environments are located mainly along the edges of lithotectonic blocks in the Superior Province, whereas intraplate intrusions are concentrated in several places in the Grenville Province. Regional and local exploration targets are based on spatial relationships between the so called favourable intrusions on the one hand and major structures, magnetic signatures and lake-bottom sediment anomalies on the other.

Three sectors were positively identified in the Superior Province as being favourable to the formation of IOCG mineralisations: 1) south of the Cap Smith Fold Belt, along major N-S shear zones on the edge of the Pinguq and La Chevrotière suites; 2) north of James Bay, in the Tikkerutuk domain where chains of geochemical lake-bottom sediment anomalies run along the ESE deformation corridors, which probably cut a volcanic arc; 3) southwest of the Ashuanipi Subprovince where the only intraplate intrusions of the Superior Province, the Viau Suite, cut the continental arc of the Gamart Suite at right angles. In the latter case, the Viau Suite, whose geochemistry is similar to the Wirrda Suite, Gawler Craton (Olympic Dam), is interpreted, based on an analysis of faults and lineaments, to have been emplaced in a strike-slip fault system in the middle of a Late Archean horst. This horst is particularly targeted in exploration because



Lithochemical samples from intrusions and their tectonic environment favourable for IOCG-type mineralisation

the NE-SW brittle-ductile fault corridors that run along the edges have coincident magnetic and geochemical anomalies and atypical iron mineralisation.

Kwyjibo is the targeted area in the Grenville. It includes a series of deposits considered to be the only mineralised (Cu – RRE) representatives of the IOCG class in the Grenville in Quebec. The project helped identify two major structures oriented NW-SE across the Grenville and that have geological (lithotectonic boundaries), magnetic, tomographic and geochemical (lake-bottom) imprints. The structure located to the north coincides with the Kwyjibo (Clunecurry-type) and Lac Marmont (Kiruna-type) IOCG occurrences and deposits, and a chain of small, late tectonic intraplate intrusions. Targets are proposed along these two structures at the intersection with the NE-SW synorogenic thrust structures based on geological setting, magnetism and geochemistry of the secondary environment.

Project 2010-08: Summary	
Objectives	<ul style="list-style-type: none"> • To identify and locate volcanic arc and intracratonic intrusive suites in the Superior and Grenville Provinces whose geochemical signatures are similar to intrusions temporally associated with world-class IOGC deposits. • To propose local exploration targets by establishing a spatial relationship between favourable intrusive suites and large crustal faults, geophysical signatures of typical IOCG deposits and geochemical anomalies of lake-bottom sediments.
Results	<ul style="list-style-type: none"> • 29 regional and local exploration targets. • Geochemical characterisation of a wide area of intrusive suites usually associated with and favourable for IOCG deposits. • Better understanding of the geology of the Kwyjibo area and the area SW of Ashuanipi.
Innovation	<ul style="list-style-type: none"> • Guidelines for IOCG exploration based on the geochemistry of the plutons and spatial relationships between so-called favourable plutonic suites, and geophysical and geochemical anomalies.