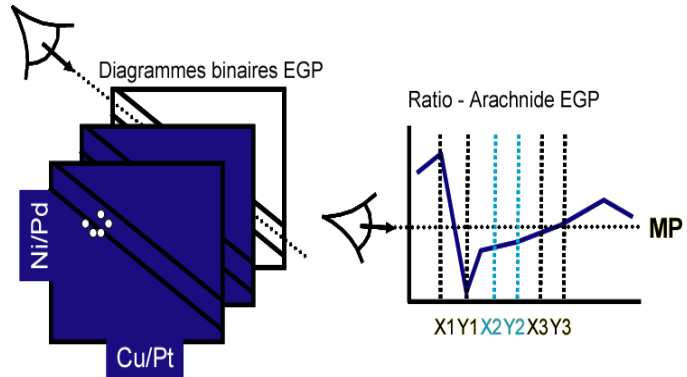


Project 2002-2: Development of new tools for PGE exploration

The platinum group elements are some substance increasingly coveted and for which exploration tools are few and difficult to use.

The first phase of the project developed a graphic representation method to display different trace element ratios at once that allow us to first evaluate the magmatic processes (depletion or enrichment) that affected the magma and ultimately to judge the fertility for platinum group developments.

This new assessment tool, called PGE-Spidergram Ratio (RA-PGE) diagram, takes advantage of conventional representations such as binary PGE diagrams and spidergrams. Binary PGE diagrams were developed from experimental findings and corroborated by case studies. The graphs show inter-element ratios with a precise meaning in terms of partial melting, fractionation and sulphur saturation. The use of these ratios is a technique proven in the field.



The PGE-Spidergram diagram was created by taking into account the ratios already proposed by binary PGE diagrams (Barnes et al. 1988).

The RA-PGE method is innovative; it shows inter-element ratios along a horizontal axis as do spidergrams. The signature of the inter-element ratios normalised to the estimated primitive mantle is represented by a profile. Five different profiles were characterised 1) unenriched fertile magma, 2) enriched fertile magma, 3) depleted fertile magmas, 4) sterile refractory residues and finally 5) fertile magmas affected by high temperature hydrothermal mobilisation.

In the second phase, ten sites were visited, of which five were selected to document the litho-geochemistry (major elements, trace elements, rare earth elements, PGE). This phase examined the relevance of using RA-PGE in a mineral exploration context. The results obtained suggest that the PGE potential in an igneous sequence is effectively assessed using a small group of 6 elements (Cu, Ni, Pt, Pd, Ir, S). The method optimises the interpretation of host rock fertility.

Summary: Project 2002-2	
Objectives	<ul style="list-style-type: none"> To define geological and geochemical criteria that facilitate the development of a PGE exploration model in Quebec in conventional (reef-type) and unconventional (breccia-type, shear and others environments). To develop new concepts and tools for PGE exploration.
Results	<ul style="list-style-type: none"> The development of the PGE-Spidergram Ratio diagram to optimise data interpretation, and to recognise the associated petrogenetic and hydrothermal mobilisation signatures.
Tools and Innovations	<ul style="list-style-type: none"> RA-PGE diagram is innovative and readily applicable to exploration.