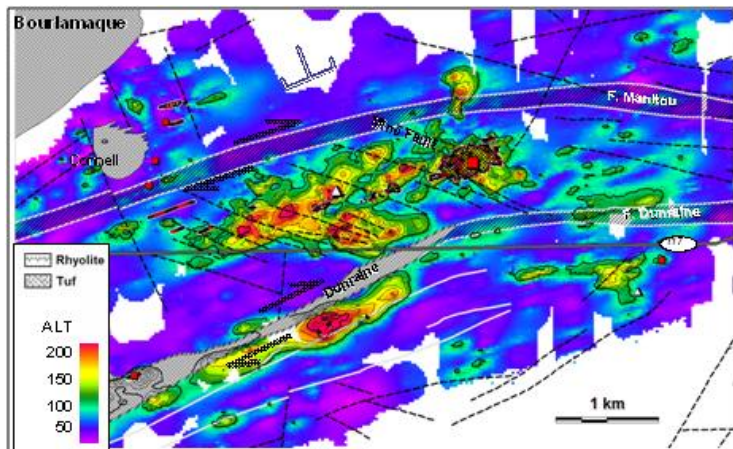


## 2008-04: Recognition of synvolcanic faults fertile for VMS in deformed greenstone belts: application in the Val-d'Or area

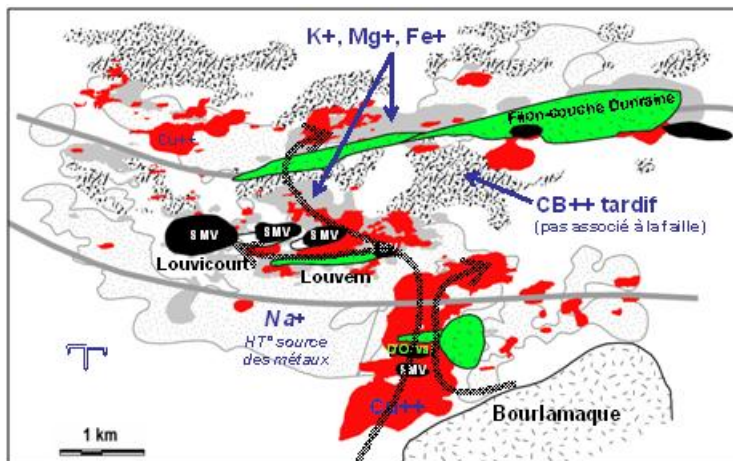
This project aimed to apply the synvolcanic fault identification methodology developed for Blake River (2007-03) in more deformed terrains. The Val-d'Or region, more precisely the old Louvem and Louvicourt mines, and the Dunraine Fault served as the study area.

Volcanic architecture was recreated to show hydrothermal permeability. From lithogeochemical databases, data arrays were constructed using 10 geochemical alteration indices (normative, elemental and molar) and correlated with different spatial criteria, including the geology of the Val-d'Or Formation, deformation and fault zones, and the known mineralisation in these two areas of interest (figure A). The geochemical approach helped in establishing the geometry and the stratigraphic polarity of fossil hydrothermal reservoirs associated with Cu-Zn mineralisation and in proposing a series of new faults as exploration targets.

Using geochemical criteria, two superimposed hydrothermal reservoirs are distinguished in the Louvem - Louvicourt area (figure B). The basal part of the first reservoir is consistent with the stratigraphic sequence, extends 6 km laterally and 1.5 km in stratigraphic thickness. This hydrothermal recharge zone is enriched in Na and metals. It is located between the Bourlamaque Batholith and the VMS mineralised lenses of Louvem - Louvicourt. The uppermost part of this reservoir is also conformable and located below and level with the old mineralized lenses. This alteration zone is directly related to the mineralization and extends 3.5 km laterally and 600 m in stratigraphic thickness. It is characterized by  $K_2O$ ,  $MgO$ ,  $Fe$  and  $S$  enrichment, and significant  $Na$  leaching. Intense and discordant alterations are stratigraphically above (to the SE) the Louvem and Louvicourt deposits, intersecting the stratigraphic sequence and the uppermost part of the first reservoir.



**A - Contours of the combined index ICHLO + ISER + IPYRO + SPITZ + ISHIKAWA : reflection of the hydrothermal system associated with VMS. The black broken lines correspond to new synvolcanic faults interpreted from clear breaks in the distribution of alteration.**



**B - Reconstitution section of the volcanic edifice and the hydrothermal system for the Val-d'Or area.**

These areas form two separate 200 to 600 m wide alteration corridors parallel to the only family of synvolcanic faults in the area, oriented N290°. These faults feed a second large reservoir that is just as altered, but thinner than the first. It is located above the synvolcanic Dunraine Sill layer and the two could be genetically associated. Each reservoir is topped by a few hundred meters thick carbonate saturated layer.

The plan and cross-sections views of the synvolcanic faults in the Louvem - Louvicourt area are characterized either by clear breaks in the distribution of the alteration, forming alteration corridors or areas secant to the stratigraphic sequence, or by periodic anomalies along the faults. Based on this observation, 95 new structures have been identified in the two study areas. Many of these structures coincide with alignments or terminations of electromagnetic conductors, and are regarded as potential exploration targets.

<b>Project 2008-04: Summary</b>	
<b>Objectives</b>	<ul style="list-style-type: none"> <li>• To test the identification and potential of synvolcanic faults in deformed terrains.</li> <li>• To propose new exploration models for VMS in the Val-d'Or region.</li> </ul>
<b>Results</b>	<ul style="list-style-type: none"> <li>• Identification of new synvolcanic faults in the Val-d'Or region.</li> <li>• Reconstitution of the Louvem – Louvicourt hydrothermal system.</li> </ul>
<b>Innovations</b>	<ul style="list-style-type: none"> <li>• New model for the Louvem – Louvicourt area with implications for VMS exploration in the area.</li> <li>• Method for identifying synvolcanic structures in deformed terrain.</li> </ul>
<b>Special Collaboration</b>	<ul style="list-style-type: none"> <li>• Pierre Pilote, MRNF</li> <li>• Denys Vermette, Alexis Minerals Corporation</li> </ul>