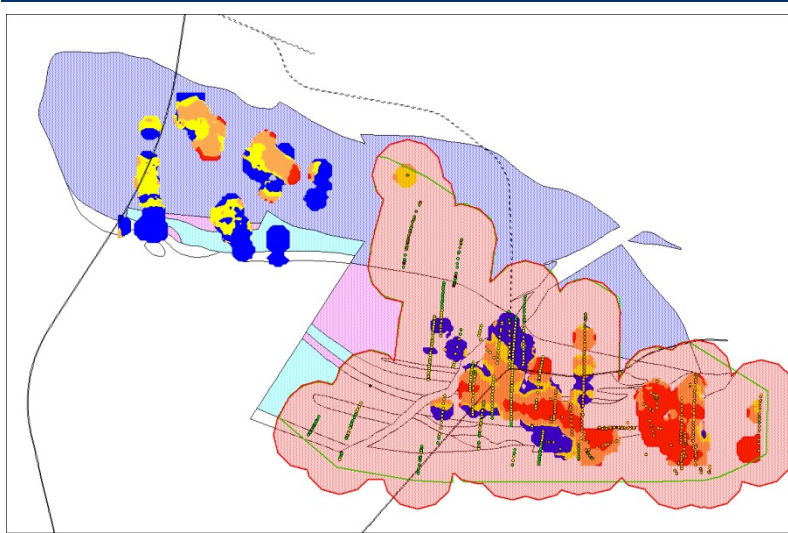


## Project 2002-1B: Parameterisation of hydrothermal alteration: performance comparison of several indicators – Mooshla Pluton

The Mooshla Pluton geochemical database was used as a test case to assess the performance of the various hydrothermal alteration indicators. This database is of interest for the exercise because it is known that the hydrothermal alterations are difficult to characterise in this pluton, yet it hosts significant gold mineralisation.

Two methods were used, namely the mass balance ratio (MBR), a technique developed at CONSOREM, and PER analysis. The performance of various alteration indicators were assessed using criteria established in previous studies (see Projects 2000-2A and 2001-10 for reference).

Beyond the performance assessment of the indicators, the challenge lies in the link between the mineralisation and the alteration. In fact, the representation of the spatial distribution and the quantification of the mineralisation pose a major challenge because of the erratic gold distribution throughout the pluton. A method was developed to overcome these shortcomings. The method enables the linking of alteration and mineralisation, and consists of representing gold-bearing areas using a mesh of the density of points weighted relative to the total density. This approach: 1) allows a clear delineation of areas rich in gold values; 2) highlights isolated and potential areas where information is lacking; and 3) restricts the extrapolation of the mesh to areas where information is available.



*Relationship between alteration and gold mineralisation in the Mooshla Pluton.*

Performance of the various alteration indicators is compared using methods established in Projects 2000-2A and 2001-10. To improve the procedure for comparing the performance of alteration indicators, alteration simulations (mass gain and loss) were carried out on samples from selected protoliths to examine the statistical behaviour of altered sample populations.

The best indicators for Mooshla are: Mafic Index from PER-analysis, Si and Fe+Mg indices from mass balance ratio. Results indicate that the mineralised area of the Doyon mine is characterised by an increase in silica and a loss of ferromagnesian minerals. This is consistent with the type of rocks hosting the mineralisation; it is described as an alaskite, specifically a plagiogranite with little or no ferromagnesian minerals.

### Summary: Project 2002-1B

<b>Objectives</b>	<ul style="list-style-type: none"><li>• To test the performance of various hydrothermal alteration indicators to characterise the hydrothermal alteration of the Mooshla Pluton.</li></ul>
<b>Results</b>	<ul style="list-style-type: none"><li>• The most effective indicators are, in order of effectiveness:<ul style="list-style-type: none"><li>- PER: mafic index</li><li>- MBR: Si</li><li>- MBR: Fe+Mg</li></ul></li></ul>
<b>Tools and Innovations</b>	<ul style="list-style-type: none"><li>• The Mooshla case study helped develop an approach for defining gold-bearing zones linked with alteration zones.</li><li>• An approach was developed to evaluate more objectively the performance of hydrothermal alteration indicators.</li></ul>