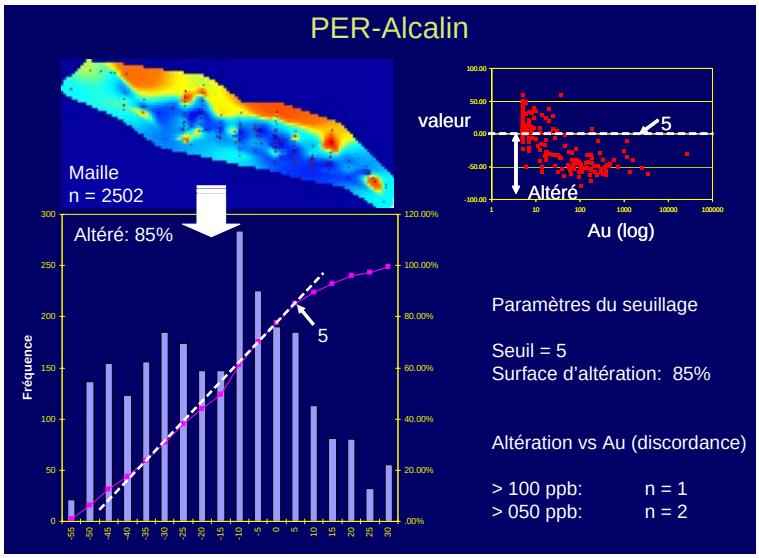
Project 2001-10: Parameters of hydrothermal alteration: performance comparison of several indicators, phase 2 *(Comtois property)*

In this project, the study of hydrothermal alteration settings associated with gold or base metal mineralisation continues with the case of the Comtois property in the Abitibi. The Comtois gold deposit is located in a tabular zone of mineralisation which occurs as sulphide veinlets and disseminated sulphides (pyrite, pyrrhotite and chalcopyrite). The host sequence consists of mafic to felsic volcanics with facies ranging from clastic to massive. Metamorphism is lower amphibolite. Hydrothermal alteration is an assemblage of cordierite, biotite, quartz, amphibole and epidote. The mineralisation is probably related to submarine hydrothermal activity associated with volcanism.

The lithogeochemical database of the Comtois project was used to test the performance of some hydrothermal alteration indicators. The database contains 226 georeferenced samples. A large number of the samples are located in the mineralised zone. The indicators considered in this study were the Ishikawa alteration index, ISER, ICHLO and IPAF indices from Normat (greenschist version), alkaline and mafic indices from PER analysis and the indicators Si, Fe, Mg, Na, K, Ca calculated using the mass balance ratio (MBR).



Performance evaluation of alteration indicators using quantitative metrics: sample application for the PER-Alkali index.

A simple method is proposed to evaluate the performance of alteration indicators qualitatively and quantitatively. The method consist of: 1) checking the individualisation of the mineralised zone with respect to the regional signature using visualisation of the data grid, 2) checking homogeneity of the alteration signature generated by an indicator in the mineralised zone, 3) establishing the alteration threshold using a population analysis of the mesh in the altered zone, and 4) verifying the covariance between the metal of interest (Au) and the alteration index values compared to the defined threshold.

The results of this performance analysis of the indicators show that the PER-Alkali indicator is the best for the Comtois property. It allowed the clear definition of the mineralised zone, the expansion of the area of interest and the definition of a 2000 m x 200 m alteration zone. In addition, it does not generate any artefacts and the indicator values are consistent with gold values.

Summary: Project 2001-10	
Objectives	• To establish hydrothermal alteration signatures and to compare the performance of various types of alteration indicators.
Results	• Determination of the effectiveness of PER-Alkali and Ishikawa indicators on the Comtois property.
Tools and Innovations	• A simple and effective method to determine the performance of alteration indicators.