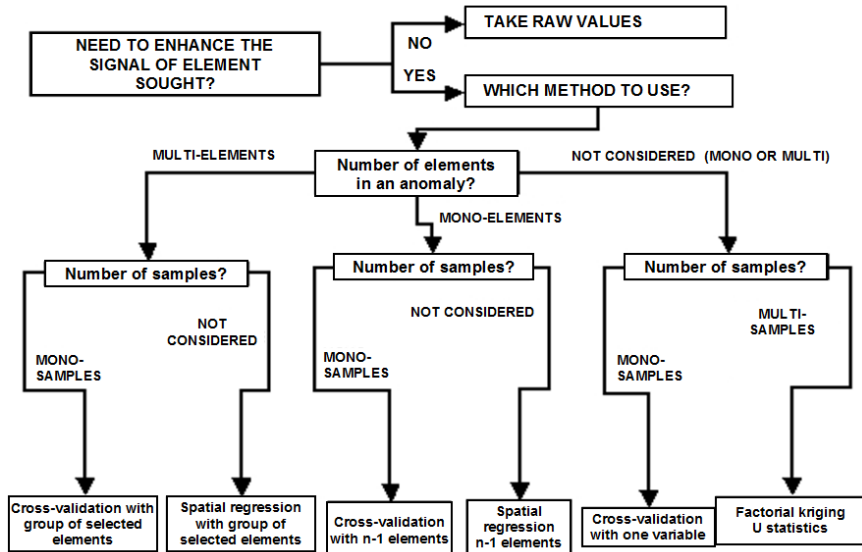


Project 2005-3: Identification of geochemical domains and generation of exploration targets - Phase 2

The project 2004-09 allows to divide the territory into geochemical domains based on factorial statistical analysis. These geochemical domains could then be used to calculate base-level statistics to determine the most realistic anomaly thresholds. However, even if these domains are an interesting first tool for dividing the territory, it is shown that their use has several drawbacks.

This project showed new methods of data processing, taking into account regional variations in sediment composition, by using innovative approaches based on multivariate and/or spatial statistics. These methods can enhance the signal from the geochemical anomalies with respect to signals coming from regional lithological and/or environmental sources. Choosing one method over another makes the exploration geologist question the very nature of the anomaly being looked for depending on the context. The main parameters influencing the choice of treatment method are: the nature of mineralisation sought, the secondary environment and the sampling grid.



Decision flowchart illustrating the process of choosing a method of treatment.

All the methods were used on the complete lake sediment database of Quebec. Several concrete examples of the usefulness of the different signal enhancement methods are presented on already known mineralisations. The methods clearly show their usefulness in revealing mineralisations that otherwise have no clearly visible signatures in the raw analytical values. Different "recipes" to target these different types of mineralisations are also presented. As part of this project, the use of these methods has generated several exploration targets for different contexts of mineralisation.

Summary: Project 2005-3	
Objectives	<ul style="list-style-type: none"> To develop a method to eliminate the effect of variations in metal concentrations caused by the secondary environment. To propose innovative techniques for delineating exploration targets for different types of deposits (IOCG, Ni, VMS, Au).
Results	<ul style="list-style-type: none"> Database analysed using statistical methods for six anomalous elements (Cu, Zn, U, La, Ni, As). The database contains more than 130 000 analysed samples. Decision tree (see figure) used to determine the best enhancement method based on the desired anomalies. Enhanced anomaly maps created for combined elements (for example: Au-As and Cu-U-REE) using improved enhancement methods.

Summary: Project 2005-3

Tools and Innovations

- Construction and adaptation of 5 anomaly enhancement methods applicable to lake-bottom sediment data: 1) spatial regression, 2) U statistics, 3) cross-validation with one variable, 4) cross-validation with multiple variables, 5) factorial kriging.
- Development of a new approach for selecting the best enhancement method for a specific type of anomaly.