
An overview of geochemical exploration for rare earths and rare metals, with particular reference to Newfoundland and Labrador

STEPHEN AMOR

*Geological Survey of Newfoundland and Labrador,
Department of Natural Resources, PO Box 8700, St. John's,
Newfoundland A1B 4J6, Canada*

This paper describes the application of surficial geochemistry in the search for rare-earth elements and rare metals (REE/RM). Examples of the responses to known occurrences, as well as some untested anomalies, are described, as well as some of the issues in analysis, and interpretation of the results thereof.

The regional-scale provincial lake-sediment and water database comprises multielement analyses for samples from 16,657 sites in the island of Newfoundland and 18,648 sites in Labrador. In addition, samples of lake sediment and water have been collected at 6,600 sites in more than 20 focused, detailed studies in Labrador, and this database continues to be expanded. Till coverage in Labrador has also been selective, with 2,610 samples collected from five detailed surveys, although the coverage of the island has been more systematic, with 7% currently covered, at a density of about 1.6 per km².

There are numerous REE/RM anomalies in both Newfoundland and Labrador. Of the eight known occurrences or districts in Labrador, six have an expression in either lake sediments or tills, or both. The Misery Lake occurrence in Quebec, located close to the border with Labrador, also has a strong geochemical and geophysical expression. In Newfoundland, only one of three known occurrences or districts is spatially associated with such a feature. Some anomalies are present on a regional scale: for example, the Flowers River Complex and Letitia Lake regions, and the glacial dispersion train from the Strange Lake deposit. Others are more restricted in extent, indicating that detailed examination of the regional geochemical databases is necessary; in some cases information in the assessment files may also prove useful, since it may have been acquired in the search for other metals with the REE/RM potential overlooked.

The behaviour of certain rare metals is strongly controlled by the relative amounts of clastic and chemically-precipitated material in lake sediment, and by high background content of certain rock types. These environmental factors may give rise to false anomalies or in some cases the masking of the response to mineralization. The apparent extent of anomalies in till may also be interrupted by variations in the type of glacial sediment that is available for sampling. The track record of various Canadian geochemical labs in performing REE/RM analyses is variable, but some are capable of delivering high-quality analyses for all of the rare earths and rare metals, at all concentration levels. It may not be advisable to apply a blanket single method for all of these elements and the potential for inter-element interferences, in particular, should not be underestimated. It is also highly recommended that detailed examination be made

of QAQC data, both external and internal, before making any recommendations based on the results.