

Application of Airborne Gamma Spectrometer Surveys to Mineral Exploration in Northern New Brunswick

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The successful application of airborne radiometric surveys to the search for uranium deposits over the past two decades has, ironically, created barriers to the perception and acceptance of the method as an exploration tool for other metals. New applications of high sensitivity, gamma-ray spectrometric data include regional and detailed characterization (mapping) of bedrock lithologies and mineral deposit studies.

Much of northern New Brunswick has been flown by the Geological Survey of Canada with 1 km line spacing and the data published as a series of line contour maps showing total count, K, eU, and eTh concentrations and eU/eTh, eU/K and eTh/K ratios at a scale of 1:50,000. Visual presentation of data has been enhanced by recent advances in compilation procedures such as ternary radioelement techniques. Four examples illustrate applications of these maps to precious metal exploration in northern New Brunswick by identification of favourable geological envi-

ronments:

- (1) Potassic alteration zones within felsic pyroclastic horizons associated with epithermal deposits. Local thorium- depletion and chalcophile metal-enrichment are characteristic of potassium specialization zones.
- (2) Uranium-thorium haloes associated with auriferous intrusions in iron carbonate alteration zones.
- (3) Radiometric anomalies associated with buried or unmapped feldspar porphyry intrusions.
- (4) Potassic alteration zones in sedimentary basins.

The first three examples have direct application to exploration in the Chaleur-Tobique Zone (Siluro-Devonian). The significance of the last feature has not been tested but it may be important for precious metal exploration in the Matapedia Zone (Ordovician-Silurian).