

NTS

13B/2, 11

13F/14

13G/9-10, 3-16

13H/15

13J/6, 11, 13,

13K/2-4, 8-9, 16

GEOCHEMICAL FOLLOW-UP STUDIES IN LABRADOR

by J.W. McConnell

In recent years, in both Canada generally and the Province of Newfoundland in particular, a large volume of regional geochemical data has become available. The more extensive of these reconnaissance surveys have employed profundal lake sediment as a sample medium. The 73,000 km² survey carried out in southeastern Labrador in 1977 (see Figure) under the Canada-Newfoundland Uranium Reconnaissance Program is typical of these recent surveys, and in this instance the average sample site density was about one sample per 18 square km. The purpose of these surveys is to define areas of increased mineral potential, in particular uranium potential, within the region covered - they are not designed nor are they likely to pinpoint individual mineral deposits. For practical purposes an area of relatively high values of one or more ore metals, often showing relatively greater geochemical relief, is taken to indicate an area of increased mineral potential. With the low sampling density, the area of the anomaly will certainly be tens and often hundreds of square km in extent. These large areas, although small in comparison with the total survey area which is thousands of square km in extent, are generally incompatible with common methods of acquisition of mineral rights, such as claim staking. Furthermore, the relationship between regional geochemical anomalies and economic mineral potential is conceptual and qualitative at best. There is, therefore, a need to investigate the relationship between regional geochemical patterns and mineral potential by studying specific regional anomalies, and following them up to discover their causes. Further, by so doing it becomes possible to devise and document follow-up procedures which will allow the resolution of an extensive regional anomaly into smaller target areas of suitable size for conventional claim staking.

The follow-up geochemical studies carried out in

1978 aimed at meeting the general objectives outlined above. In addition, particular emphasis was placed on further studying anomalies in the Grenville Province. Briefly stated from the results of the regional survey carried out in 1977 (Open Files Labrador 396, 13B/18, 13H/29, 13F/30, and 13G/30), it is readily apparent that the uranium anomalies in lake sediment in the Grenville Province are of lower absolute magnitude than those in the Aillik Group and other rocks of the Makkovik subprovince and, indeed, lower than comparable results from many areas of uranium mineralization elsewhere in Canada. A specific objective of the follow-up studies in Labrador was therefore, to try to determine whether these lower magnitude uranium anomalies in the Grenville Province were related to uranium mineralization, or whether they were merely caused by variations in the background content of uranium in the rocks which are unrelated to mineralization, implying that the Grenville rocks of southeastern Labrador might be of low potential for uranium mineralization.

Within this general frame of reference, therefore, geochemical studies were carried out in ten areas of southeastern Labrador (see the Figure). These ten areas were shown to contain lake sediment anomalous in uranium, together in some cases with anomalous values of Mo, F, Pb, Zn and Cu, in the 1977 regional geochemical survey. There were two main phases of the follow-up program; namely, preliminary follow-up and, secondly, more detailed ground follow-up.

During the preliminary follow-up phase profundal sediment and near-surface water samples were collected from all lakes in ten selected anomalous areas. In one area, stream sediment and water samples were collected to augment the rather thin distribution of lake sample sites. The sediment samples were analysed for U (by neutron activation/delayed neutron counting), Cu, Pb,

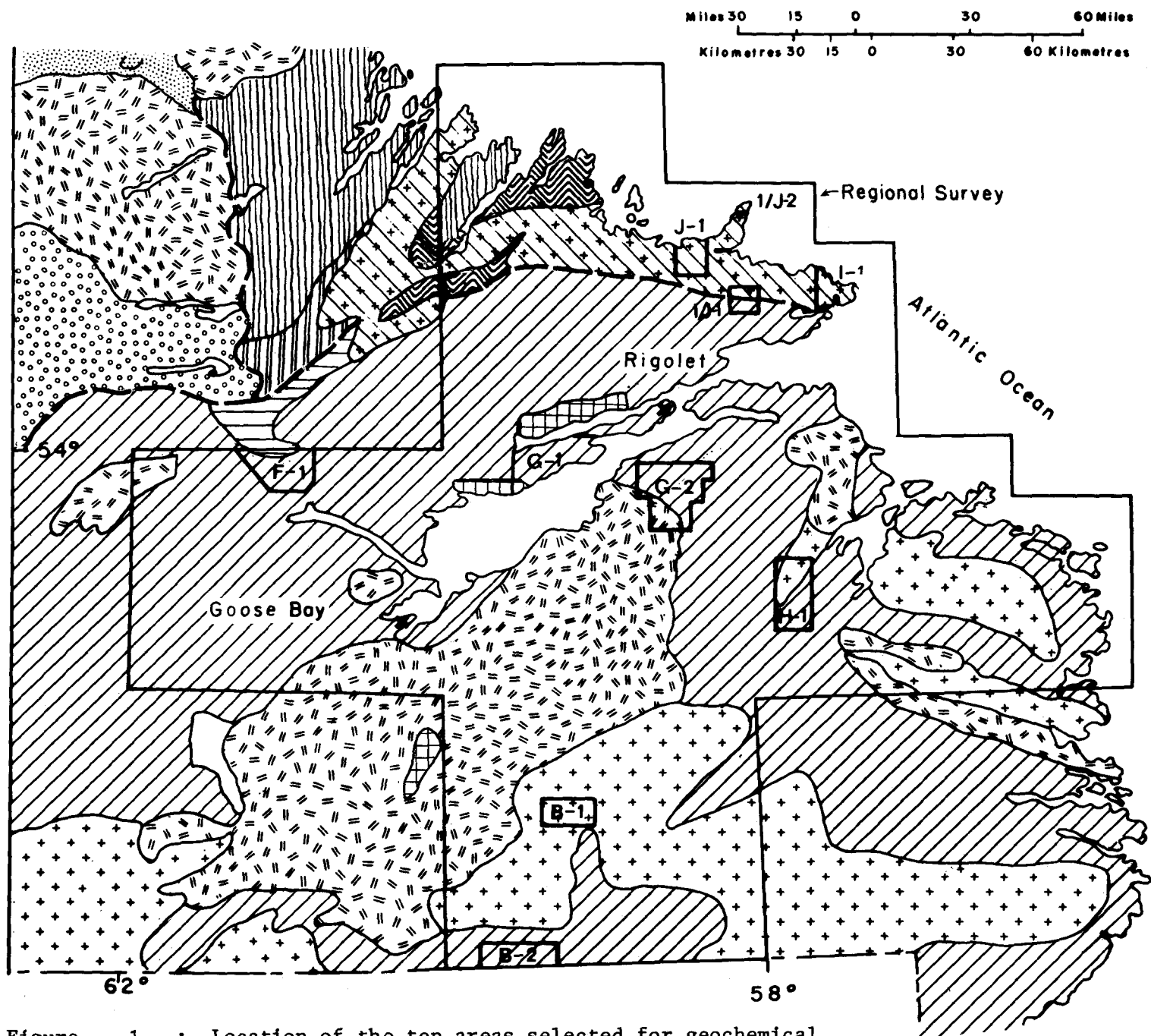


Figure 1 : Location of the ten areas selected for geochemical follow-up studies in 1978 in relation to the 1977 regional survey area.

LEGEND

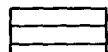
GRENVILLE PROVINCE

HADRYNIAN



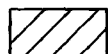
Supracrustal arkosic sedimentary rocks of the Double Mer Formation.

HELIKIAN AND APHEBIAN



Metamorphosed equivalents of the Seal and Croteau Groups.

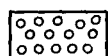
HELIKIAN AND APHEBIAN



Metamorphic rocks, mainly quartzofeldspathic gneisses.

CHURCHILL PROVINCE

HELIKIAN



Supracrustal sedimentary and volcanic rocks of the Seal Group.

NAIN PROVINCE

HELIKIAN AND APHEBIAN



Supracrustal sedimentary and volcanic rocks of the Croteau Group.

APHEBIAN



Metamorphosed sedimentary and volcanic rocks of the Aillik Group.

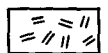
ARCHEAN



Basement gneisses.

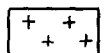
INTRUSIVE ROCKS

HELIKIAN



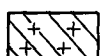
Anorthosites, gabbros, and associated acidic intrusives.

HELIKIAN AND EARLIER



Massive to poorly foliated acidic intrusives.

APHEBIAN



Acidic intrusives and associated metamorphic rocks.

Zn, Co, Ni, Ag, Mo, Mn and Fe (by atomic absorption spectrophotometry); and loss-on-ignition as a measure of organic carbon content. The pH of the water samples was determined in the field, and the acidified samples were subsequently analysed for U (by fission track) and F (by ion-selective electrode). In addition, three anomalies were selected for coverage by airborne gamma-ray spectrometry. This was done by mounting a gamma-ray spectrometer, recorder and a radar altimeter in a helicopter.² The anomalies were flown using a line spacing of about 1 km, with flight lines being oriented approximately perpendicular to the bedrock strike where practical. Total count, K, U, Th and ground clearance were simultaneously recorded.

From the results of, firstly, the airborne gamma-ray data and, subsequently, the lake water data, two of the ten anomalies were selected for further follow-up on the ground. The ground follow-up phase included the surveying of a 1 km² grid, and the taking of scintillometer readings (using a discriminating scintillometer) and soil and peat samples over the grid.

Uranium mineralization was encountered in outcrop and float of anomaly G-1 in areas underlain by quartzofeldspathic gneisses. Grab samples of mineralized rock have assayed up to 2900 ppm uranium. Molybdenite, garnet, biotite and, in one instance,

tourmaline were observed in the field to be associated with the mineralization. Limited thin section work and auto-radiographs also indicate the presence of chlorite, fluorite and euhedral uraninite crystals (John Kerswell, Geological Survey of Canada).

The preliminary results of these follow-up studies have been released on Open File, Labrador 408. In summary, it has been shown that at least one of the anomalies in the regional survey is related to previously unrecorded uranium mineralization in the Grenville Province. Thus, although the economic significance of the new area of showings has not yet been assessed, the results to date indicate that some areas of the Grenville Province of Labrador have uranium potential, and that these areas are reflected by geochemical anomalies in lake sediment and water in the regional surveys.

Footnotes

¹ Subproject 1.27 of the Canada-Newfoundland Mineral Development Subsidiary Agreement.

² The spectrometer and radar altimeter were lent by the Resource Geophysics and Geochemistry Section of the Geological Survey of Canada, and were operated by Mr. Jacques Parker of that organization, whose help and cooperation are gratefully acknowledged.

Figure Caption: Location of the ten areas selected for geochemical follow-up studies in 1978 in relation to the 1977 regional survey area.