FOLLOW-UP GEOCHEMISTRY: A DISCUSSION OF FIELD WORK OVER METALLIFEROUS AND MINERALIZED GRANITOID TERRANE IN NEWFOUNDLAND

by

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INTRODUCTION

Field work in 1984 was devoted primarily to concluding a three year study of surficial exploration methods and of the mineral potential of granitoids in south-central Newfoundland. In addition, two small projects unrelated to the granites in Newfoundland were conducted: 1) a pilot study over three areas of gold mineralization to test the effectiveness of lake sediment sampling in gold exploration; 2) an additional 130 lake water samples were collected by M. Batterson in the area of the Strange Lake Zr-Nb-Be-REE deposit in Labrador to further assess the effectiveness of lake water chemistry as an exploration tool. Only work related to the granite project will be discussed here.

Work in 1982 and 1983 had concentrated on anomalous and/or mineralized areas within the North Bay batholith (Silurian) and the Francois and Ackley granites. Areas within the North Bay complex include the Granite Lake area (W-Mo mineralization), the Dolland Brook anomaly (W in lake sediment), the Bottom Brook anomaly (W in lake sediment) and the East Bay anomaly (W-Pb-Mo-Cu-Ag in lake sediment). Areas outside the batholith include the Francois Granite (a Pb-U-Mo-F lake sediment anomaly and a Th-U airborne radiometric anomaly) and the southern margin of the Ackley Granite (Sn-Mo mineralization). The last two granites are Devonian. Results of work in the Ackley, Granite Lake and Francois areas have been released (McConnell, 1984b). In 1984, additional work was done in the Ackley (NTS 1M/10, 11, 14, 15), Francois (11P/10) and Dolland Brook (11P/15) areas, including an additional area described as the Dolland Brook North anomaly (see figure 1). These are discussed below.

Ackley Granite

The highly fractionated southern margin of the Ackley granite is host to stanniferous quartz-topaz-fluorite greisens (± molybdenite) and molybdenite bearing quartz veins (Dickson, 1983 and Tuach, 1984). Most recent exploration attention has focused on the cassiterite mineralization along the Gisborne Lake - Sage Pond granite/volcanic contact. Lithogeochemical data have suggested the potential for additional Sn mineralization along this contact to the west (Davenport et al., 1984). Since conventional soil sampling for Sn has proven effective here (McConnell, 1984), soil and rock sampling was extended in 1984 from Long Harbour west to Rally Pond. As well, 74 reconnaissance stream sediment samples were collected. The granite/volcanic contact is difficult to trace because of considerable overburden and is further complicated by what appears to be roof pendants of volcanics; the latter, however, might prove to be effective structural traps for Sn greisens (Tuach, 1984). No direct evidence of greisens was found to the west of Long Harbour, although quartz veins are common where the contact is exposed.

To the east of Long Harbour, three areas identified as having anomalous Sn values in the previous reconnaissance soil and rock survey were sampled in detail. New occurrences of fluorite and pyrite mineralization in quartz veins were found about 0.5 km north of one of these soil anomalies and several narrow (2-10 cm) greisens and quartz veins were discovered in the vicinity of the rock anomaly.

Francois Granite

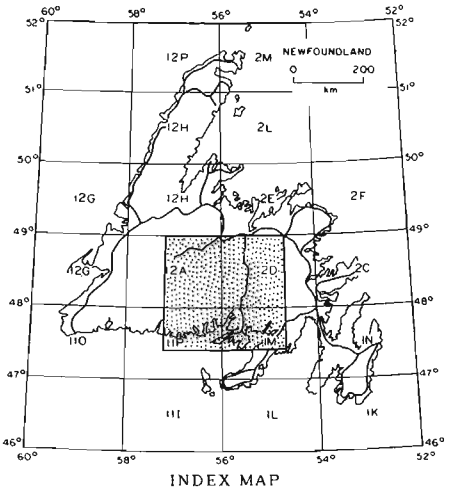
Follow-up work was done at three locations. A major multisample U-Pb-Zn-F anomaly in the reconnaissance stream sediment data was resampled in detail and the surrounding area prospected. Besides the presence of an unusual pitted texture on the weathered surface of the local granite, apparently resulting from preferential weathering of (altered?) feldspars, no field evidence was found to explain the anomaly. Analytical data will become available in 1985.

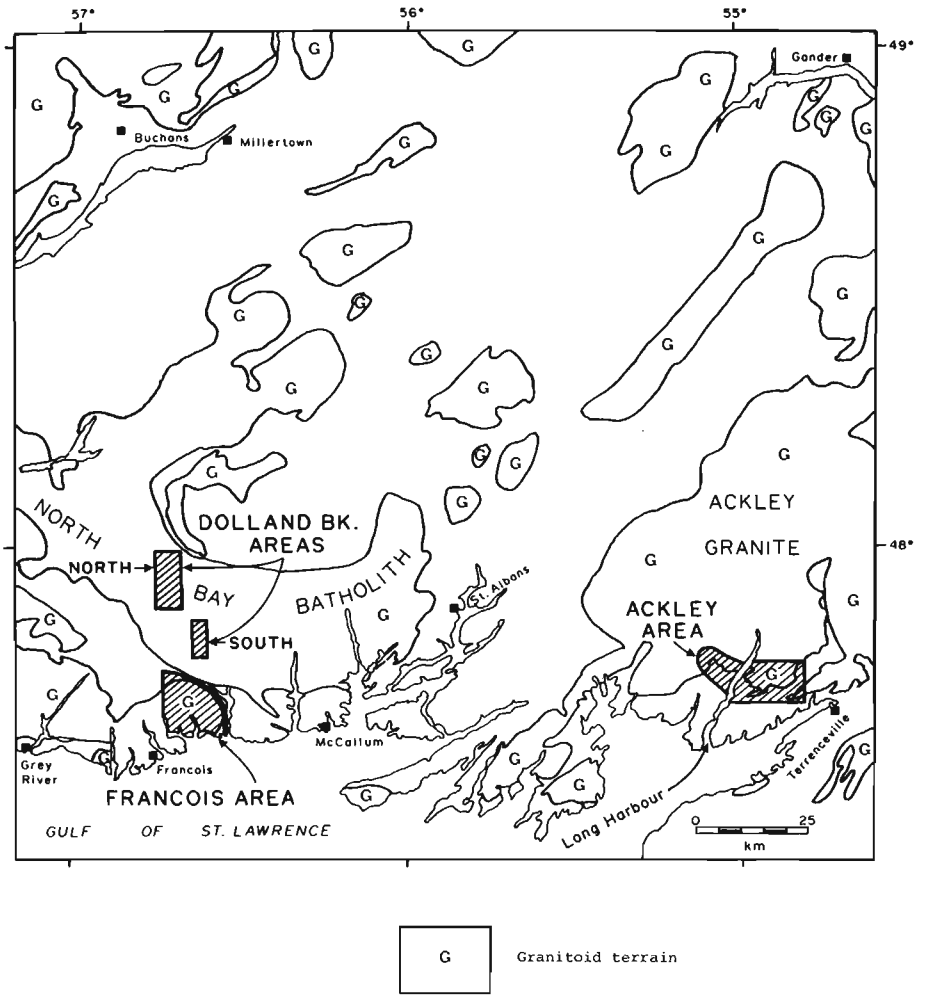
Work in the second area consisted of detailed stream sediment sampling of two streams in which the previous survey had identified a number of sediments with anomalous Sn values (100 g/t). Again, no mineralization was visible.

Finally, an unsuccessful attempt was made to locate the source of several large crystals of topaz found in a talus slope during the previous survey.

Dolland Brook South Anomaly

Work in this poorly exposed area was continued because of encouraging W values in stream sediments collected during 1983 and the discovery of several scheelite-bearing veins (McConnell, 1984a). Various approaches were made to gain an under-





Locations of 1984 study areas.

standing of the dispersion processes affecting the trace element distribution patterns present in the area. One problem is the presence of high levels of W in many of the stream and lake sediment samples but very low levels in the soils.

Areas within the anomaly were selected for detailed follow-up on the basis of having high W values in stream sediment and/or high residual W values after regression against Fe and Mn. Conventional silt sampling was done in several streams and Fe/Mn nodules and crusts were sampled from some of them. Tungsten concentration has been found to correlate highly with Fe and Mn concentrations in the 1983 stream sediment data.

Overburden drilling was done in two areas in an attempt to penetrate the surface till and to sample either a lower till unit or the till immediately above bedrock. In bogs, the lowermost level of peat was also sampled. Because of the bouldery nature of the till, most holes were unable to penetrate more than 2-3 m with occasional holes reaching 4.5 m. None of the holes was believed to have reached bedrock although it did not appear possible to distinguish bedrock from large boulders. Samples of B horizon soils were also taken to compare with till samples. Despite a mantle of granitic boulders, pebbles of volcanic and metamorphic rocks predominate in the soil and till, suggesting that a major portion of the till itself may be of distant provenance. Thus, the W anomalies in sediments appear to be hydromorphic in origin, with the W being derived either from a deeper concealed till unit of more local origin or from bedrock itself.

The scheelite occurrence discovered in 1983 was examined. Several thin tourmaline-quartz-scheelite veins were found (0.5 to 1 cm wide) and traced with ultraviolet light. It is estimated that the veins carry about 1-3% scheelite in a tourmaline-quartz matrix with accessory pyrite. Exposure is limited to the bottom and sides of the brook.

Dolland Brook North Anomaly

The Dolland Brook North area, located about 10 km north-northwest of the Dolland Brook South anomaly, was selected for preliminary follow-up because of the presence of high W values in the regional lake sediment data (Davenport and Butler, 1982) and because of its proximity to W mineralization to the south-southeast. The area has very little outcrop and considerable till cover. The outcrop seen was mostly feldspar porphyritic leucogranite, generally massive but weakly foliated in places. The till is similar to that in the southern anomaly with a mantle of locally derived boulders over a till of more distant derivation. Stream sediments, nodules and crusts of Mn-Fe oxides, and bedrock were sampled. Evidence of mineralization was found in the form of a small occurrence of pyrite and several nearby quartz veins.

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