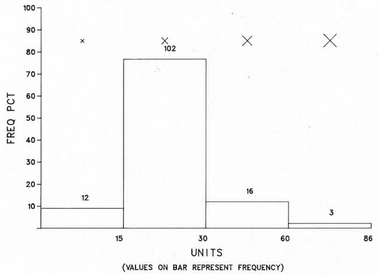
N POINTS	133	MEAN	23
MEDIAN	21	STD DEV	10
MINIMUM	10	MAXIMUM	86



NIOBIUM (PPM)

TILL GEOCHEMISTRY
CENTRAL MINERAL BELT, LABRADOR

KASHESHIBAW LAKE NTS 13L

F.J. THOMPSON, R.A. KLASSEN, R.K. BURNS

The normal range of values for Nb is 10-20 ppm. Tills derived from the Red Wine Alkaline Intrusive Suite and Letitia Lake volcanics are characterized by high background and anomalous levels of Pb (40-500 ppm) Zn (150-1500 ppm), Mo (6-20 ppm), U (5-25 ppm), Be (3-6 ppm), Zr (700-2000 ppm), Nb (20-40 ppm), Y (60-100 ppm) and Ce (100-300 ppm). The higher values in this zone may reflect economically interesting mineralization. High background values for these elements east of the bedrock sources are considered to reflect glacial transport. The highest levels of Zn (1000-1600 ppm), U (15-25 ppm), Be (10-20 ppm), Y (700-750 ppm), Ce (500-600 ppm) Nb (60-75 ppm) are associated with the quartz undersaturated series of the Red Wine Alkaline Intrusive suite (unit 10) south of Letitia Lake and may reflect economically interesting mineralization.

Introduction

Geochemical analysis of till in the Kasheshibaw Lake area of central Labrador are presented on the accompanying maps at a scale of 1:250,000. The till samples were collected during the 1984 and 1985 field seasons by the Terrain Sciences Division, Geological Survey of Canada, to establish drift composition and patterns of glacial dispersal in the area and to develop techniques of drift prospecting. The work has been funded by the Canada – Newfoundland Mineral Development agreement.

Sample densities varied from 1-3 per 100 km^2 in areas with limited mineral potential, and from 8-15 per 100 km^2 within the Central Mineral Belt. Sampling to date is limited to the eastern part of the map sheet. Pits were dug, by shovel, to depths of 30-70 cm depending on depth to bedrock and on difficulties in penetrating stony till. Samples were collected from the least oxidized and most organic-free section of the modern soil profile near the base of the pit. In areas of tundra vegetation, pits were dug in mudboils where soil zonation was absent or poorly developed due to periglacial churning.

The clay-sized (<0.002 mm) fraction of the till samples was analyzed for Cu, Pb, Zn, Ni, Cr, Mo, Mn, and Fe by atomic absorption methods and for U by delayed neutron activation. The silt plus clay-sized (<0.063 mm) fraction of selected samples was analyzed for Be, Ce, Nb, Sn, Y and Zr by X-ray fluorescence. All geochemical analyses were done by Bondar-Clegg and Co. Ltd., Ottawa. About 180 clay-sized samples and 134 silt plus clay-sized samples were analyzed.

Physiography and bedrock geology

The study area is rugged, with hills commonly rising 200 m above valley floors. Sample sites were preferentially located on hilltops because valley bottoms are heavily forested, providing few landing sites, and because major valleys are commonly infilled with glaciofluvial deposits. The bedrock comprises Paleohelikian anorthosite to the northeast and Grenville granites and gneisses to the southeast. Aphebian gneisses and Paleohelikian granites underlie the west half of the map sheet. The east central part of the map area is underlain by supracrustal volcanics and sediments of the Neohelikian Seal Lake Group which are considered to have potential for economic mineralization in copper. The Paleohelikian Red Wine Alkaline Intrusive Suite and Letitia Lake Group volcanics occupy a broad curvilinear zone between the Seal Lake group and the Grenville gneisses. The rocks of the Red Wine Alkaline Intrusive Suite are known to contain anomalously high levels of Zr, Be, Nb, Th, U and rare earth elements and is considered to have potential for economic concentrations of these minerals. The Letitia Lake volcanics are known to contain elevated levels of Zr, La, Yb, Be, Y, Pb, Zn and Sn.

Glacial Geology

Regional ice flow trends are indicated by the orientation of striae and glacial landforms. Sense of movement has been determined by the shape of streamlined landforms and by small scale features on outcrop surfaces. The prominent ice flow trends, east to east-northeast, cross linear valleys and overtop highland areas and are consequently considered to reflect a major phase of flow that was not significantly affected by topographic influences. Striations from two earlier phases of ice advance, east-southeast and northeast, are recorded on several sites near Letitia Lake. The northeast trending striations, the oldest recorded in the study area, are consistent in orientation and relative age with striation noted in the Churchill Falls area, Snegamook Lake area and in the Labrador Trough and are considered to have been formed during a major phase of flow. The east-southeast striations are intermediate in age between the north east and east-north east in flow trends.

The dispersal of erratics of Red Wine Alkaline Intrusive Suite (not shown) in the study area and in the map area to the east demonstrates a broad eastward opening fan consistent with the multiple phases of flow recorded by striations (Thompson and Klassen, 1986). The volume of Red Wine Alkaline Intrusive Suite in the till indicates that the main vector of transport was east to east southeast. The data suggest that glacial debris may have been subjected to a complex history of transport; for example, debris from the Red Wine Complex appears to have been carried in three phases of ice flow. Furthermore, as yet unrecognized, topographically controlled local variations in ice flow direction, particularly in low areas or on hillsides, may have played an important role in the transport of glacial debris during the late stages of glaciation.

Geochemistry

The geochemistry of the till generally reflects the geochemistry of underlying and immediately up ice bedrock. Isolated anomalous values may reflect economically interesting mineralization in the bedrock up ice.

Contribution to the
CANADA-NEWFOUNDLAND MINERAL DEVELOPMENT AGREEMENT 1984-1989

DEPARTMENT OF MINES AND ENERGY
GOVERNMENT OF NEWFOUNDLAND AND LABRADOR

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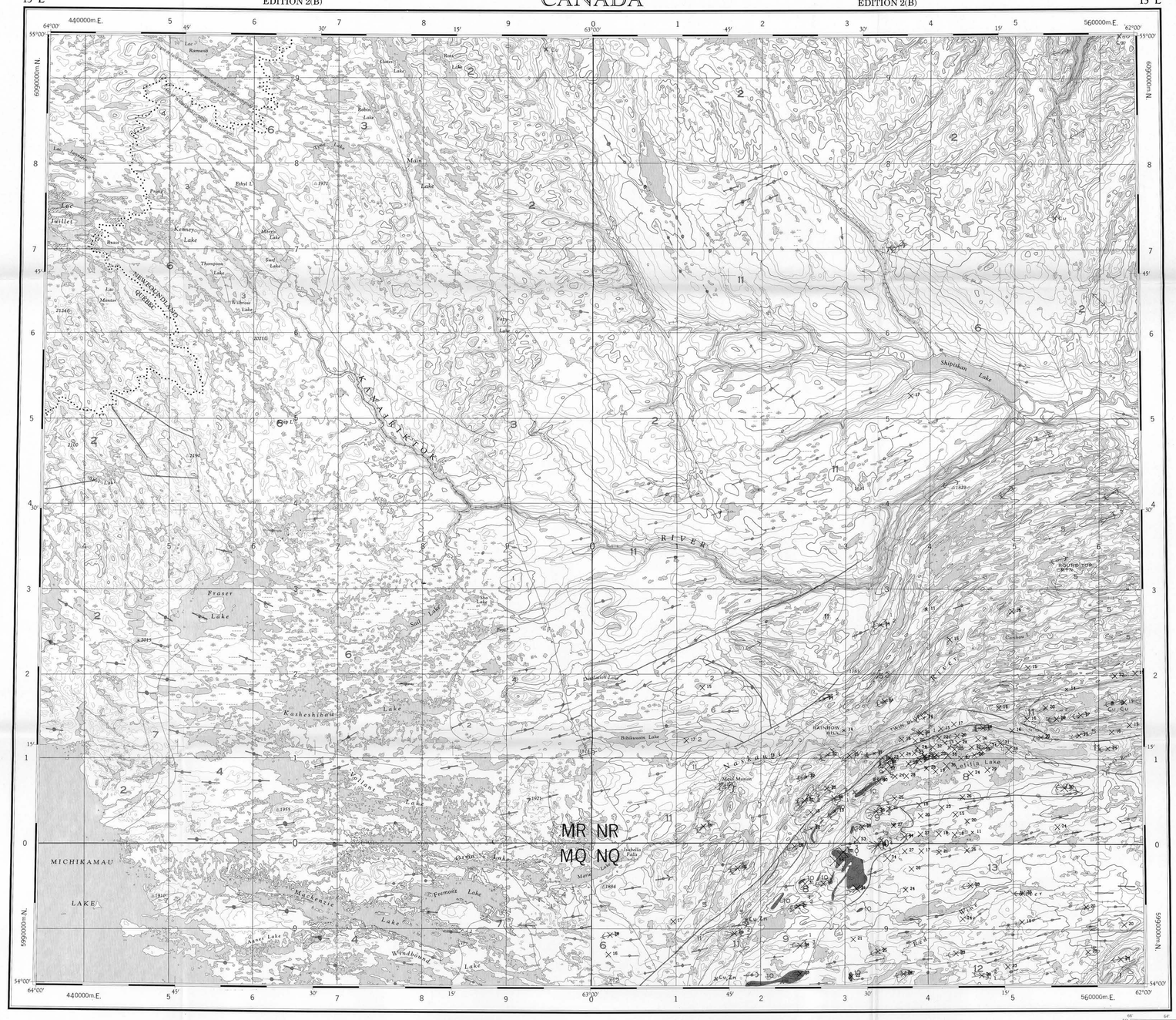

KASHESHIBAW LAKE
NEWFOUNDLAND - QUÉBEC

Scale 1:250 000

Kilometres 5 0 5 10 15 20 Kilometres

Universal Transverse Mercator Projection

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DEPARTMENT OF ENERGY, MINES AND RESOURCES
MINISTÈRE DE L'ÉNERGIE, DES MINES ET DES RESSOURCES

LEGEND

SEDIMENTARY, VOLCANIC AND METAMORPHIC ROCKS

GRENVILLE PROVINCE

HELIKIAN AND EARLIER(?)

13 Paragneisses, granitoid gneisses of probable sedimentary origin, minor quartzite and marble ...

12 Intermediate to basic gneiss, amphibolite

CHURCHILL PROVINCE

HELIKIAN
NEOHELIKIAN

11 Quartzite, conglomerate, arkose, shale ...: BESSIE LAKE ... FORMATION; SHIPISKAN FORMATION (possibly younger)

PALEOHELIKIAN

10 Quartz undersaturated series ... RED WINE ALKALINE INTRUSIVE SUITE

9 Quartz saturated to oversaturated series ... RED WINE ALKALINE INTRUSIVE SUITE

8 Quartzite, grit conglomerate, acidic volcanics ... LETITIA GROUP

7 Greywacke, quartzite, arkose, slate, ...: PETSCAPISKAN GROUP

APHEBIAN AND EARLIER(?)

6 Granulite, pyroxene gneiss, charnockite; minor granitic gneiss ...

INTRUSIVE ROCKS

HELIKIAN
NEOHELIKIAN

5 Diabasic olivine gabbro, intermediate and ultramafic intrusive rocks ...

PALEOHELIKIAN

4 Granite, quartz monzonite, granodiorite, quartz diorite, syenite ...

3 Adamillite suite: adamellite, monzonite, syenite, granodiorite, granite ...

2 Anorthosite suite: anorthosite, anorthositic gabbro, leucotroctolite ...

1 Gabbro, norite, anorthositic gabbro, troctalite, diorite ...

Geological boundary .....

Fault .....

Mineral showing.....×

Mineral prospect.....●

Geology Modified after:
Regional geochemical reconnaissance map 63-1983; Geological Survey of Canada, open file 998

Curtis, L.W. and Currie, K.L.
1981: Geology and petrology of the Red Wine Alkaline Complex, Central Labrador; Geological Survey of Canada, Bulletin 294, figure 39

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1983: Geology, Letitia Lake-Wapustan Lake area, Mineral Developement Division, Department of Mines and Energy, Government of Newfoundland and Labrador, Map 83-31

STRIAE, WELL DEFINED (FLOW DIRECTION KNOWN,UNKNOWN) NUMBERS INDICATE RELATIVE AGE)

STRIAE, POORLY DEFINED (FLOW DIRECTION KNOWN,UNKNOWN)

STREAMLINED LANDFORMS (FLOW DIRECTION KNOWN,UNKNOWN)

From:
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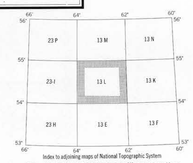
1976: Mineral Occurrence Map, Kasheshibaw Lake, Map 7644, 13 L; compiled by C. Douglas and E. Hsu, Department of Mines and Energy, Newfoundland.



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