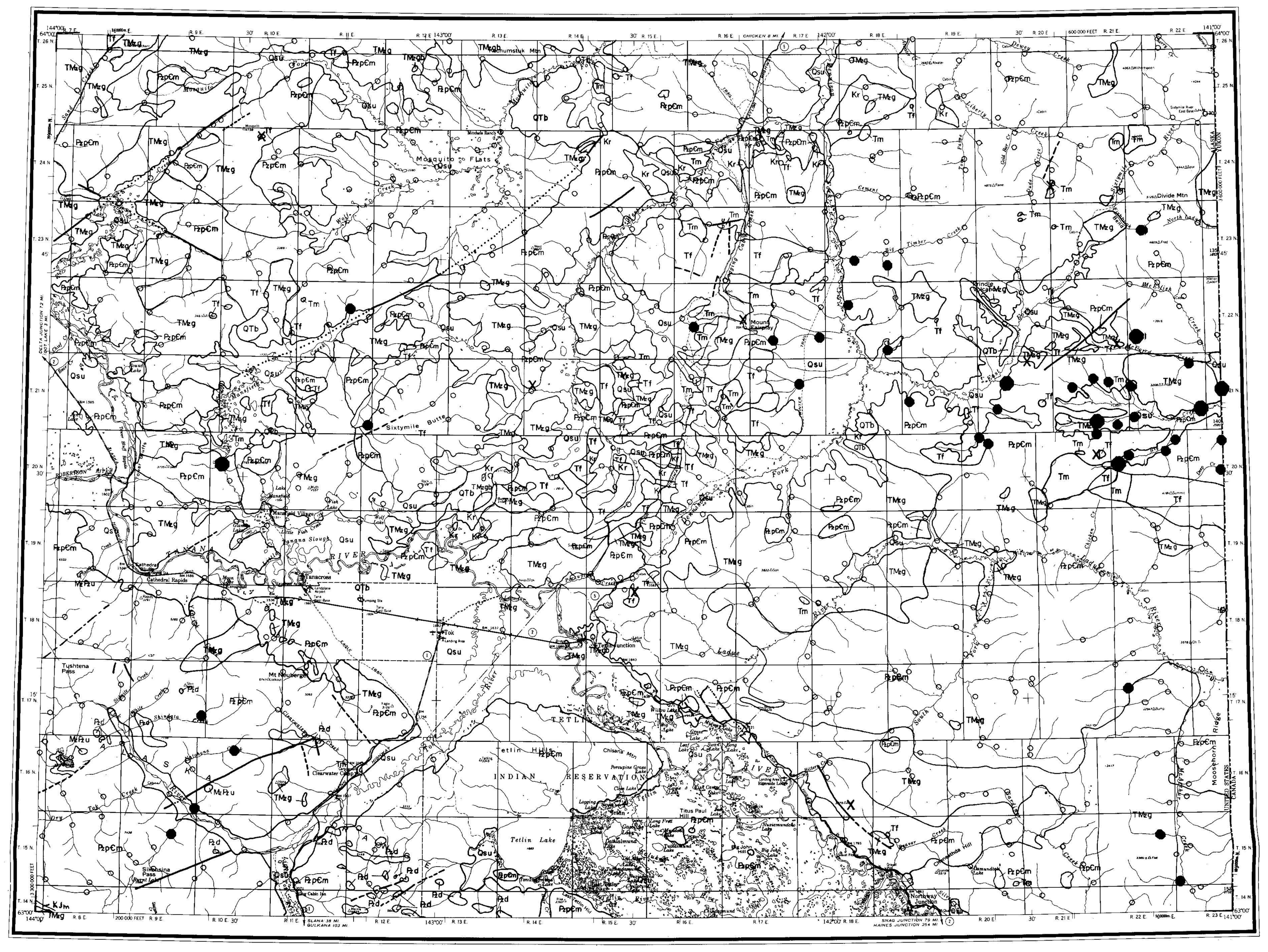
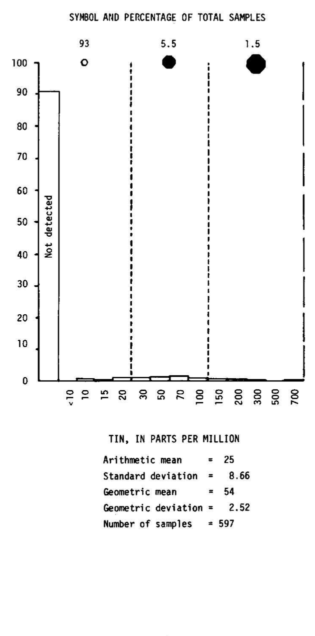
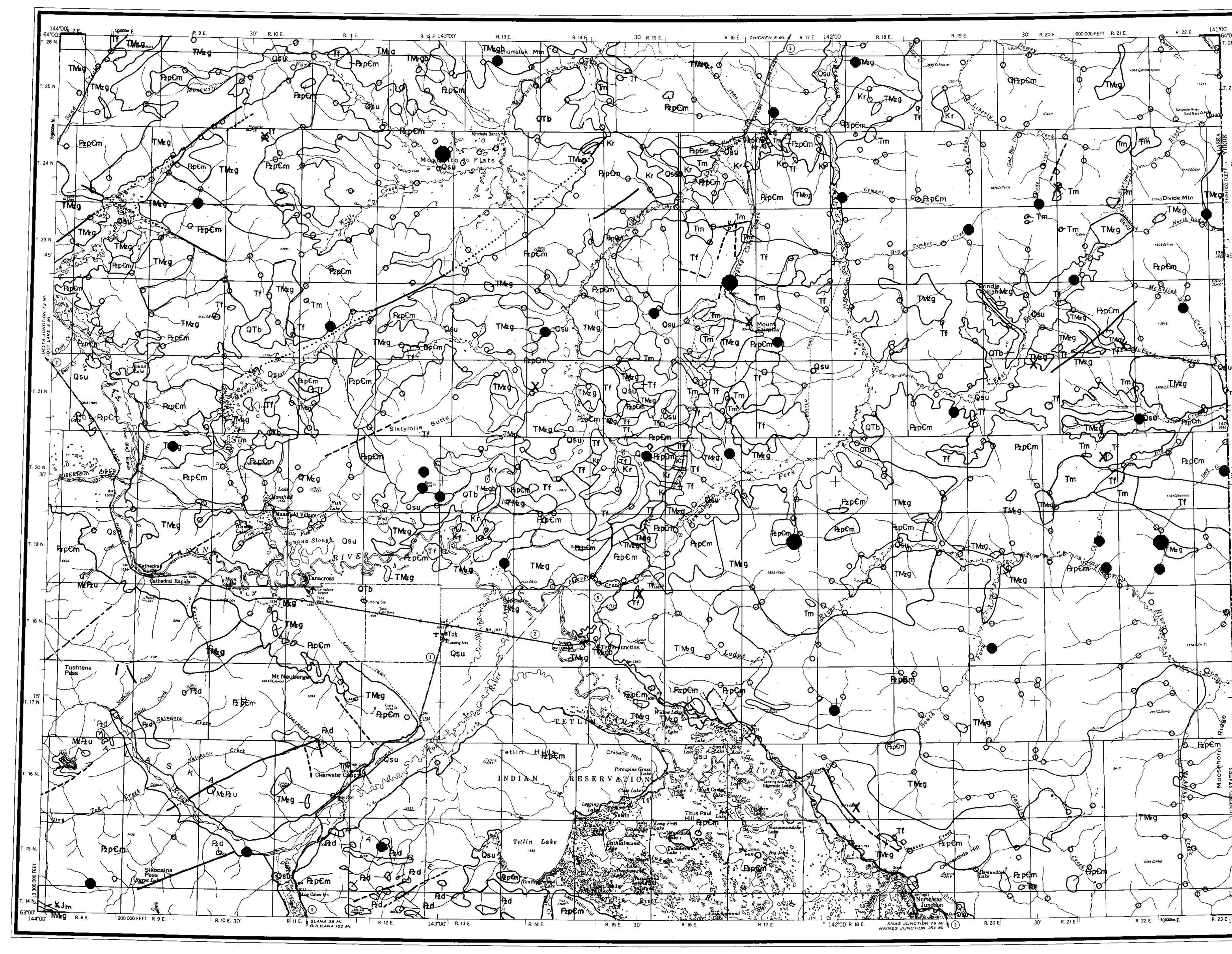
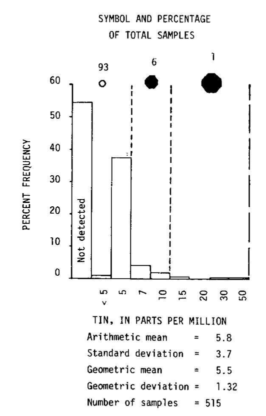


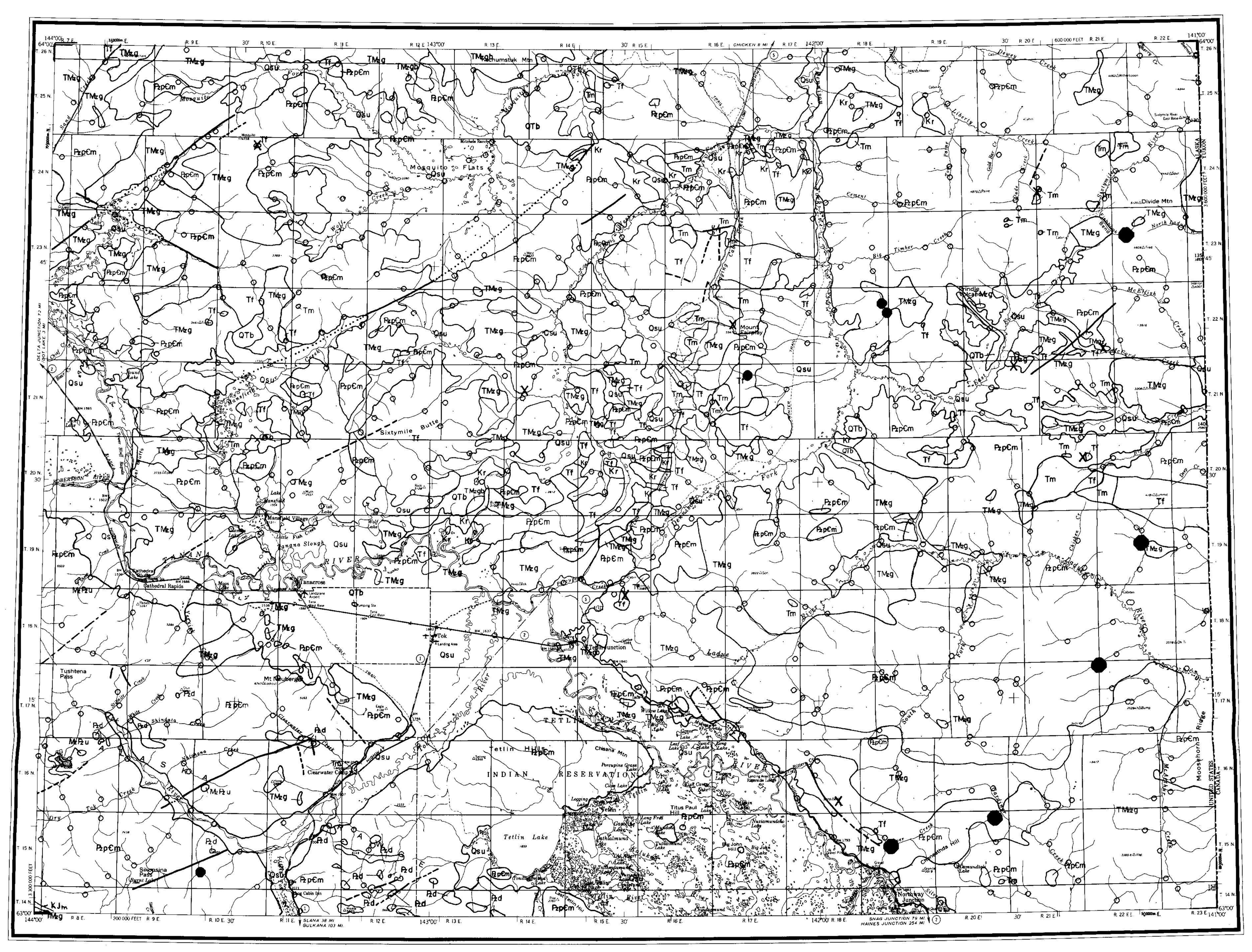


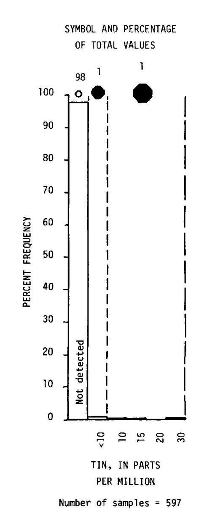
A. Tin in the oxide residue of stream sediment





C. Tin in the ash of aquatic bryophytes (mosses)





B. Tin in the minus-80-mesh stream sediment

DISCUSSION

This series of geochemical maps shows the distribution of tin in three sample media: (A) the oxide residue (oxalic-acid-leachable fraction) of stream sediment, (B) the minus-80-mesh stream sediment, and (C) the ash of aquatic bryophytes (mosses). The geochemical data are plotted on a base map that shows generalized geology and the drainage pattern. The map symbols show sample site patterns and ranges of values in the following manner: (1) open symbols denote background, (2) small black symbols represent weakly anomalous values, (3) large black symbols denote strongly anomalous values. Because the small black symbols represent weakly anomalous values, they are considered to be significant only where they correlate with strongly anomalous metal values either in the same or in other sample media. The ranges of values were determined from the histograms and other statistical data shown for each of the sample media. An explanation of sampling, preparation, and analytical procedures is given in Circular 734, which accompanies this folio. Complete analytical data for geochemical samples collected by the U.S. Geological Survey in the Tanacross quadrangle are available in a U.S. Geological Survey open-file report (O'Leary and others, 1976).

Of the three sample media, the oxide residue of stream sediment and the aquatic bryophytes act as scavenging agents of ions in solution in the stream waters. The tin content of these media, therefore, is indicative of the amounts of tin migrating in solution. The tin content of the minus-80-mesh stream sediment, on the other hand, mainly represents the amount of tin within the detrital material of the stream sediment.

The most distinctive tin pattern is that of high tin values in the oxide residue of stream sediment (fig. A). In this medium, the zone of high tin values in the east half of the quadrangle roughly correlates with anomalous tungsten values in heavy-mineral concentrates (Tripp and others, 1976). The anomalous tin values also correlate, in part, with high copper values in oxide residue (Curtin and others, 1976a) and with high beryllium values in heavy-mineral concentrates (Tripp and others, 1976) in the east-central part of the quadrangle. At the west end of the anomalous tin zone, near the center of the quadrangle, high tin values are associated with anomalous copper, lead, and zinc values (Curtin and others, 1976a, b, c). On the other hand, the anomalous tin zone does not correlate with high tin values in heavy-mineral concentrates or with sites where cassiterite was observed in heavy-mineral concentrates (Tripp and others, 1976). The source of the tin in the oxide residue is apparently not cassiterite, an insoluble and highly resistate mineral; rather the tin is in a form that is soluble in oxalic acid--the reagent used to separate the secondary iron-manganese oxides from the detrital material of the stream sediment.

Additional geochemical studies were made in the east-central part of the quadrangle to determine the source of the tin. The results indicated that the high tin values most likely reflect minor amounts of tin incorporated in the minerals associated with several porphyry copper prospects and related mineral occurrences in the east-central part of the quadrangle. The high tin values to the west probably represent similar associations.

Many of the anomalous tin values in the ash of the aquatic mosses most likely represent very small grains of cassiterite that have weathered from the welded tuffs or granitic rocks and have been trapped on the surfaces of the mosses. This process is substantiated by the observation of trace amounts of fine-grained cassiterite in heavy-mineral concentrates collected from streams draining areas of welded tuff (Tripp and others, 1976). One strongly anomalous tin value in moss ash near the east-central part of the quadrangle (T. 19 N., R. 22 E.) correlates with high tin values in three other sample media. These media are (1) the nonmagnetic fraction of the heavy-mineral concentrates (Tripp and others, 1976), (2) the minus-80-mesh stream sediments (fig. B), and (3) although not shown, the ash of streambank sod. The source of the high tin values is probably cassiterite, which was observed in heavy-mineral concentrate samples collected at this site and at adjacent sites (Tripp and others, 1976).

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EXPLANATION

GEOLOGY GENERALIZED FROM FOSTER (1970)

CORRELATION OF MAP UNITS

UNCONSOLIDATED DEPOSITS

Qsu — QUATERNARY

SEDIMENTARY ROCKS

Kr — CRETACEOUS(?)

KJm — CRETACEOUS OR JURASSIC

IGNEOUS AND METAMORPHIC ROCKS

QTb — QUATERNARY AND TERTIARY

Tm, Tf — TERTIARY(?)

TMzg, TMzgb — TERTIARY OR MESOZOIC

MzPzu — MESOZOIC OR PALEOZOIC

Pzd — PALEOZOIC(?)

Pzp€m — PALEOZOIC AND (OR) PRECAMBRIAN

DESCRIPTION OF MAP UNITS

UNCONSOLIDATED DEPOSITS

Qsu — UNCONSOLIDATED SEDIMENTARY DEPOSITS

SEDIMENTARY ROCKS

Kr — DETRITAL ROCKS (CRETACEOUS?)

KJm — MENTASTA ARGILLITE OF RICHTER (1967) (JURASSIC OR CRETACEOUS)

IGNEOUS AND METAMORPHIC ROCKS

QTb — BASALT

Tm — MAFIC VOLCANIC ROCKS

Tf — FELSIC TUFF, WELDED TUFF, LAVA, AND HYPABYSSAL INTRUSIVE ROCKS

TMzg — GRANITIC ROCKS, UNDIVIDED

TMzgb — GABBRO

MzPzu — ULTRAMAFIC ROCKS

Pzd — DIORITE

Pzp€m — METAMORPHIC ROCKS, UNDIVIDED

GEOLOGIC SYMBOLS

CONTACT, APPROXIMATELY LOCATED

FAULT, DASHED WHERE APPROXIMATELY LOCATED, DOTTED WHERE CONCEALED
U, UPTHROWN SIDE; D, DOWNTHROWN SIDE

FAULT OR LINEAMENT FROM AERIAL PHOTOGRAPHS

X BASE METAL PROSPECTS NORTH OF THE TANANA RIVER

GEOCHEMICAL SYMBOLS

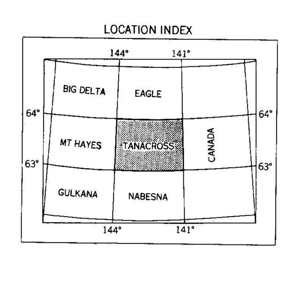
○ BACKGROUND VALUES

● WEAKLY ANOMALOUS VALUES

⬢ STRONGLY ANOMALOUS VALUES

BASE FROM U. S. GEOLOGICAL SURVEY, 1:250,000, TANACROSS QUADRANGLE, 1964

Scale 1:500,000
1 inch equals approximately 8 miles
10 0 10 20 30 40 Miles
10 0 10 20 30 40 50 Kilometers



GEOCHEMICAL MAPS SHOWING THE DISTRIBUTION AND ABUNDANCE OF TIN IN THE TANACROSS QUADRANGLE, ALASKA

BY

G. C. CURTIN, G. W. DAY, S. P. MARSH, R. M. O'LEARY, AND R. B. TRIPP

1976

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