

EXPLANATION

GEOLOGY GENERALIZED FROM FOSTER (1970)

CORRELATION OF MAP UNITS

UNCONSOLIDATED DEPOSITS

- Qsu QUATERNARY

SEDIMENTARY ROCKS

- Qtb QUATERNARY AND TERTIARY
- Tm TERTIARY(?)
- Tt TERTIARY OR MESOZOIC
- Kr CRETACEOUS(?)
- Kjn CRETACEOUS OR JURASSIC
- Flsu MESOZOIC OR PALEOZOIC
- Bd PALEOZOIC(?)
- gpcn PALEOZOIC AND CENOZOIC PRECAMBRIAN

IGNEOUS AND METAMORPHIC ROCKS

DESCRIPTION OF MAP UNITS

- Qsu UNCONSOLIDATED SEDIMENTARY DEPOSITS
- Kr DETRITAL ROCKS (CRETACEOUS?)
- Kjn MENTASTA ARGILLITE OF BIGHTER (1967) (JURASSIC OR CRETACEOUS)
- Qtb BASALT
- Tm MAFIC VOLCANIC ROCKS
- Tt FELSIC TUFF, WELDED TUFF, LAVA, AND HYPABYSSAL INTRUSIVE ROCKS
- Ttmg GRANITIC ROCKS, UNDIVIDED
- Ttmg GABBRO
- Flsu ULTRAMAFIC ROCKS
- Bd DIORITE
- gpcn METAMORPHIC ROCKS, UNDIVIDED

GEOLOGIC SYMBOLS

- CONTACT, APPROXIMATELY LOCATED
- FAULT, DASHES WHERE APPROXIMATELY LOCATED, DOTTED WHERE CONCEALED
- UPPERMOUNT SIDE ON DOWNMOUNT SIDE
- FAULT OR LINEAMENT FROM AERIAL PHOTOGRAPHS
- X BASE METAL PROSPECTS NORTH OF THE TANACROSS RIVER

GEOCHEMICAL SYMBOLS

WEAK METAL ANOMALY

WEAKLY ANOMALOUS VALUES IN ONE SAMPLE MEDIUM, NO DISTINCTION IS MADE BETWEEN ANOMALOUS AMOUNTS OF PB, ZN OR BOTH PB AND ZN.

MODERATE METAL ANOMALY

WEAKLY ANOMALOUS VALUES IN TWO SAMPLE MEDIA OR STRONGLY ANOMALOUS VALUES IN ONE SAMPLE MEDIUM.

STRONG METAL ANOMALY

A COMBINATION OF VALUES RANGING FROM WEAKLY ANOMALOUS AND STRONGLY ANOMALOUS VALUES IN TWO SAMPLE MEDIA TO STRONGLY ANOMALOUS VALUES IN ALL FOUR SAMPLE MEDIA.

DISCUSSION

This geochemical map delineates drainage basins in which either anomalous copper, molybdenum, or both copper and molybdenum were detected in at least one of four sample media: (A) the oxide residue (oxalic-acid-leachable fraction) of stream sediment, (B) the minus-80-mesh stream sediment, (C) the ash of aquatic bryophytes (mosses). The anomaly patterns were derived from the point-plots of copper and molybdenum distribution in the individual sample media (Curtin, Day, O'Leary, Marsh, and Tripp, 1976; Curtin, Day, Carten, Marsh, and Tripp, 1976). Background data were disregarded for each of the two metals. Weakly anomalous data for all media (small black symbols) were assigned the number 2; strongly anomalous data for all media (large black symbols) were assigned the number 3. These new data were then summed or "stacked" for each metal so that all sites showing anomalous values in one or more of the sample media had a numerical rating that ranged from 2 (weakly anomalous value in one sample medium) to a possible 12 (strongly anomalous values in rating for all four sample media). The summed data were ranked into the three groups shown in the explanation. The drainage all four sample media) were outlined according to these groups. As a final step the composite copper anomaly map was superimposed on that of molybdenum to give this composite copper-molybdenum map.

In the Tanacross quadrangle, the naturally dissected terrain north of the Tanana River shows promise for porphyry copper potential. In the east-central part of the quadrangle (T. 22 N., R. 21 E.) the strong copper-molybdenum pattern delineates a drainage that includes a porphyry copper prospect. The strong copper pattern immediately to the west reflects another porphyry copper prospect. To the south, the moderate copper pattern reflects the presence of a third prospect in T. 20 N., R. 20 E.

In the vicinity of Mount Fairplay (T. 22 N., R. 16 E.), a moderately strong copper-molybdenum anomaly is associated with Tertiary felsic rocks and Mesozoic-Tertiary granitic rocks. This anomaly reflects the presence of altered and mineralized rock which has been prospected in this area.

A strong molybdenum pattern in the northwest part of the quadrangle (T. 24 N., R. 10 E.) reflects molybdenum mineralization in an altered and mineralized Tertiary felsic hypabyssal intrusive body. Molybdenum values of 30 ppm were measured in the leached surface capping of this intrusive body, and surrounding rocks contain anomalous amounts of copper, lead, tin, and silver.

Other copper and molybdenum anomalies in that area of the quadrangle north of the Tanana River are similar to those that are associated with the known mineralized zones. The anomalous areas that show the most promise for additional exploration are those associated with sharp magnetic highs (Grison, 1976), which correlate with the Mesozoic-Tertiary granitic rocks and the Tertiary hypabyssal felsic rocks. Several areas in the eastern part of the quadrangle show this association and warrant further investigation. The anomalies around and within Kosquo Flats and those in the west-central part of the quadrangle also warrant additional study.

Four base metal prospects in that part of the quadrangle north of the Tanana River are not defined by the anomalous patterns on the copper-molybdenum map. These prospects are located in T. 21 N., R. 14 E.; T. 18 N., R. 15 E.; T. 16 N., R. 18 E.; and in T. 24 N., R. 21 E. The absence of anomalous copper and molybdenum values around the prospects indicates either that the copper-molybdenum content of the altered and mineralized rock is low or that the amount of mineralized rock is too small to produce copper- and molybdenum-bearing dispersion trains that could be detected at the sampling density used in this study.

The anomalies in the Alaska Range in the southwest corner of the quadrangle are most likely associated with small mineralized veins and shear zones which are known to occur in this area.

REFERENCES CITED

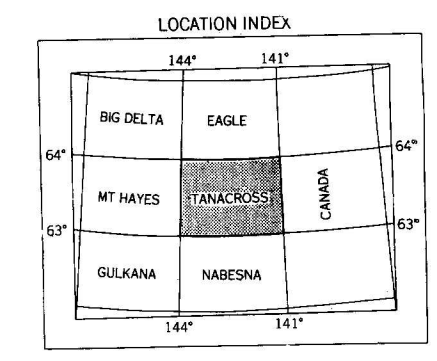
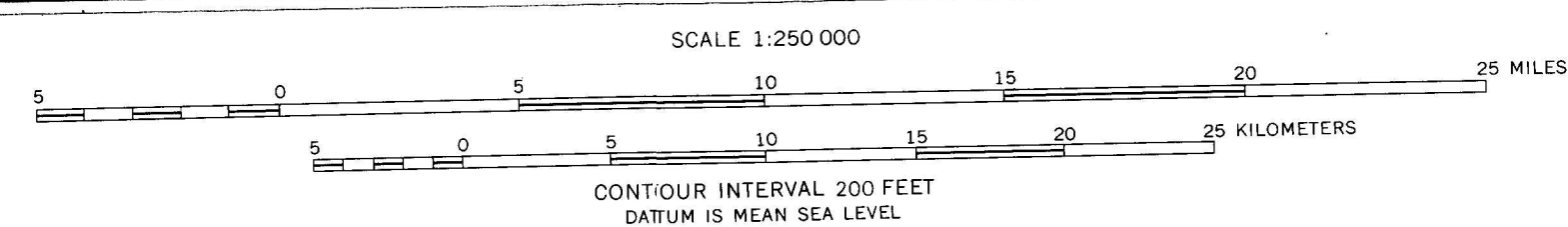
Curtin, G. C., Day, G. W., Carten, R. B., Marsh, S. P., and Tripp, R. B., 1976, Geochemical maps showing the distribution and abundance of molybdenum in the Tanacross quadrangle, Alaska: U.S. Geol. Survey Misc. Field Studies Map MF-767M, 1 sheet, scale 1:500,000.

Curtin, G. C., Day, G. W., O'Leary, R. M., Marsh, S. P., and Tripp, R. B., 1976, Geochemical maps showing the distribution and abundance of copper in the Tanacross quadrangle, Alaska: U.S. Geol. Survey Misc. Field Studies Map MF-767F, 1 sheet, scale 1:500,000.

Foster, H. L., 1970, Reconnaissance geologic map of the Tanacross quadrangle, Alaska: U.S. Geol. Survey Misc. Geol. Inv. Map 1-593, scale 1:250,000.

Grison, Andrew, 1976, Aeromagnetic map and interpretation of the Tanacross quadrangle, Alaska: U.S. Geol. Survey Misc. Field Studies Map MF-767A, 2 sheets, scale 1:250,000.

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



COMPOSITE GEOCHEMICAL MAP OF ANOMALOUS COPPER AND MOLYBDENUM DISTRIBUTION IN THE TANACROSS QUADRANGLE, ALASKA

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