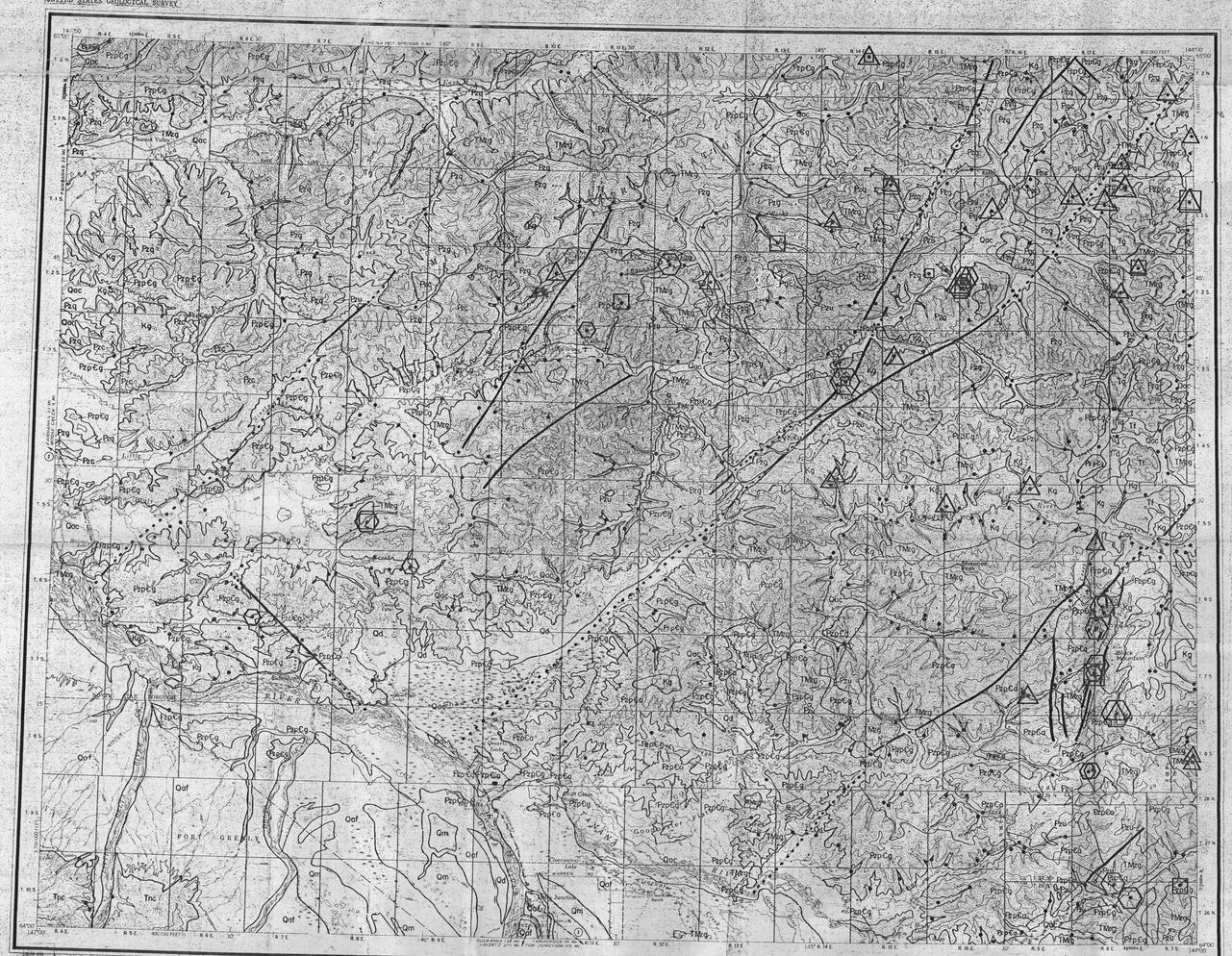
DEPARTMENT OF INTERIOR
UNITED STATES GEOLOGICAL SURVEY



MADE FROM U.S. GEOLOGICAL SURVEY, 1963

SCALE 1:250000

CONTOUR INTERVAL 100 FEET
DATUM IS MEAN SEA LEVEL

LOCATION INDEX

GEOCHEMICAL MAP SHOWING THE DISTRIBUTION AND ABUNDANCE OF BISMUTH, ANTIMONY, AND SILVER IN THE NONMAGNETIC HEAVY-MINERAL CONCENTRATE SAMPLES IN THE BIG DELTA QUADRANGLE, ALASKA

BY T. D. HESSIN, E. F. COOLEY, AND CYNTHIA DUSEL-BACON

1978

OPEN-FILE REPORT 78-529 F
FOLIO OF THE BIG DELTA QUADRANGLE, ALASKA

HESSIN AND OTHERS--GEOCHEMICAL MAP, BISMUTH, ANTIMONY, SILVER

PROPERTY OF BRANCH OF
ALASKAN GEOLOGY
U.S. GEOLOGICAL SURVEY

EXPLANATION

GEOLOGY GENERALIZED FROM WEBER AND OTHERS (1978).

CORRELATION OF MAP UNITS

UNCONSOLIDATED DEPOSITS

- Qac, Qaf, Qd, Qm — QUATERNARY

SEDIMENTARY ROCKS

- Tnc, Td — TERTIARY

IGNEOUS ROCKS

- Ts — TERTIARY
- Tf — TERTIARY(?)
- TMzg — TERTIARY OR MESOZOIC
- Kg — CRETACEOUS

METAMORPHIC ROCKS

- Pzu — PERMIAN
- Pzu, Pzc, Pzg, Pzg — PALEOZOIC
- PzpCm, PzpCg — PALEOZOIC AND (OR) PRECAMBRIAN

DESCRIPTION OF MAP UNITS

UNCONSOLIDATED DEPOSITS

- Qac — ALLUVIUM, COLLUVIUM, AND MINOR GLACIAL AND EOLIAN DEPOSITS
- Qaf — ALLUVIAL FAN AND GLACIAL OUTWASH DEPOSITS
- Qd — DUNE SAND
- Qm — MORAINAL DEPOSITS

SEDIMENTARY ROCKS

- Tnc — NENANA GRAVEL AND COAL-BEARING FORMATION
- Td — DETRITAL ROCKS

IGNEOUS ROCKS

- Ts — FELSIC TUFF AND LAVA
- Tf — GRANITE AND QUARTZ MONZONITE
- TMzg — UNDIVIDED GRANITIC AND DIORITIC ROCKS
- Kg — UNDIVIDED GRANITIC AND MINOR DIORITIC ROCKS

METAMORPHIC ROCKS

- Pzc — GREENSTONE AND CHERT
- Pzu — ULTRAMAFIC ROCKS
- PzC — CATACLASTIC SCHIST AND GNEISS
- Pzg — GREENSCHIST, QUARTZITE, MARBLE, COARSE META-ARENITE
- Pzg — GREENSTONE, AND META-TUFF
- PzQ — QUARTZITE, SLATE, CALC-PHYLLITE, AND MARBLE
- PzpCm — AUGEN GNEISS AND MINOR AMOUNTS OF OTHER GNEISSIC ROCKS
- PzpCg — GNEISS, SCHIST, AUGEN GNEISS, AMPHIBOLITE, AND MARBLE

GEOLOGIC SYMBOLS

- CONTACT, APPROXIMATELY LOCATED
- FAULT OR PROBABLE FAULT, DOTTED WHERE CONCEALED

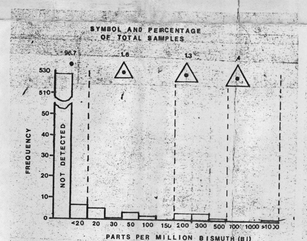
GEOCHEMICAL SYMBOLS

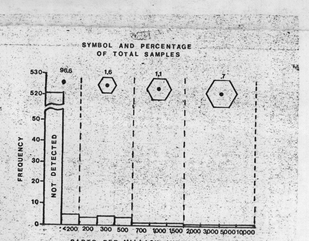
- SAMPLE SITE--Represents background values at sites where there are no anomalous values

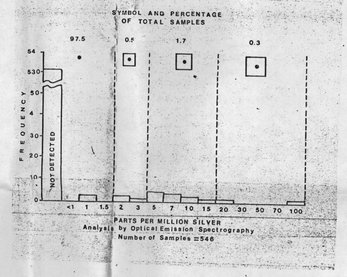
ANOMALOUS VALUES--Explained on histograms

- BISMUTH
- ANTIMONY
- SILVER

BACKGROUND INFORMATION RELATING TO THIS MAP IS PUBLISHED AS U.S. GEOLOGICAL SURVEY CIRCULAR 783 AVAILABLE FREE OF CHARGE FROM THE U.S. GEOLOGICAL SURVEY, RESTON, VA. 22092







DISCUSSION

This map shows the distribution and abundance of bismuth, antimony, and silver in 546 heavy-mineral concentrate samples collected in the Big Delta quadrangle in 1975 and 1977. This sampling was a part of geochemical studies made for the Alaska Mineral Resource Assessment Program. The heavy-mineral concentrates were separated from stream sediments collected in the active channels of streams draining areas ranging from approximately 10 to 25 km^2. The areas within the quadrangle that show a low density of sample sites, particularly along the major northeast-trending fault and in the northwestern part of the quadrangle, were areas where dense brush and trees prevented helicopter landings. Areas in the southwestern and south-central parts of the quadrangle were not sampled because they are covered by thick unconsolidated deposits of Quaternary material, which limits effective geochemical sampling within the scope of the present geochemical studies.

The heavy-mineral concentrates were panned in the field to remove most of the low-density minerals. The panned samples were sieved through a 20-mesh (0.8 mm) screen in the laboratory and the -20 mesh fraction was further separated with bromoform (specific gravity, 2.86) to remove the remaining low-density mineral grains. Magnetite and other strongly magnetic heavy minerals were removed from the heavy-mineral fraction by the use of a hand magnet. The remaining heavy minerals were passed through a Frantz Isodynamic Separator[1] and a nonmagnetic fraction was obtained at a setting of 0.6 amperes. A split of this fraction was pulverized and analyzed by semiquantitative emission spectrography (Grimes and Marranzino, 1968). Map plots and histograms were produced from the analytical results. The range of anomalous values for each element was determined from the histograms and was subdivided into two or more plotting intervals represented by the symbols shown on the map and histograms.

Complete analytical data for all of the sample sites shown on this map are available in a U.S. Geological Survey Open-File Report by R. M. O'Leary and others (1978).

[1]The use of trade names is for descriptive purposes only and does not constitute endorsement of these products by the U.S. Geological Survey.

REFERENCES CITED

Grimes, D. J., and Marranzino, A. P., 1968, Direct-current arc and alternating-current spark emission spectrographic field methods for the semiquantitative analysis of geologic materials: U.S. Geological Survey Circular 591, 6 p.

O'Leary, R. M., Cooley, E. F., Day, G. W., Hessin, T. D., McDougal, C. M., and McDanal, Steven, 1978, Spectrographic and chemical analyses of geochemical samples from the Big Delta quadrangle, Alaska: U.S. Geological Survey Open-File Report 78-571, 127 p.

Weber, F. R., Foster, H. D., Keith, T. E. C., and Dusel-Bacon, Cynthia, 1978, Preliminary geologic map of the Big Delta quadrangle, Alaska: U.S. Geological Survey Open-File Report 78-529A.