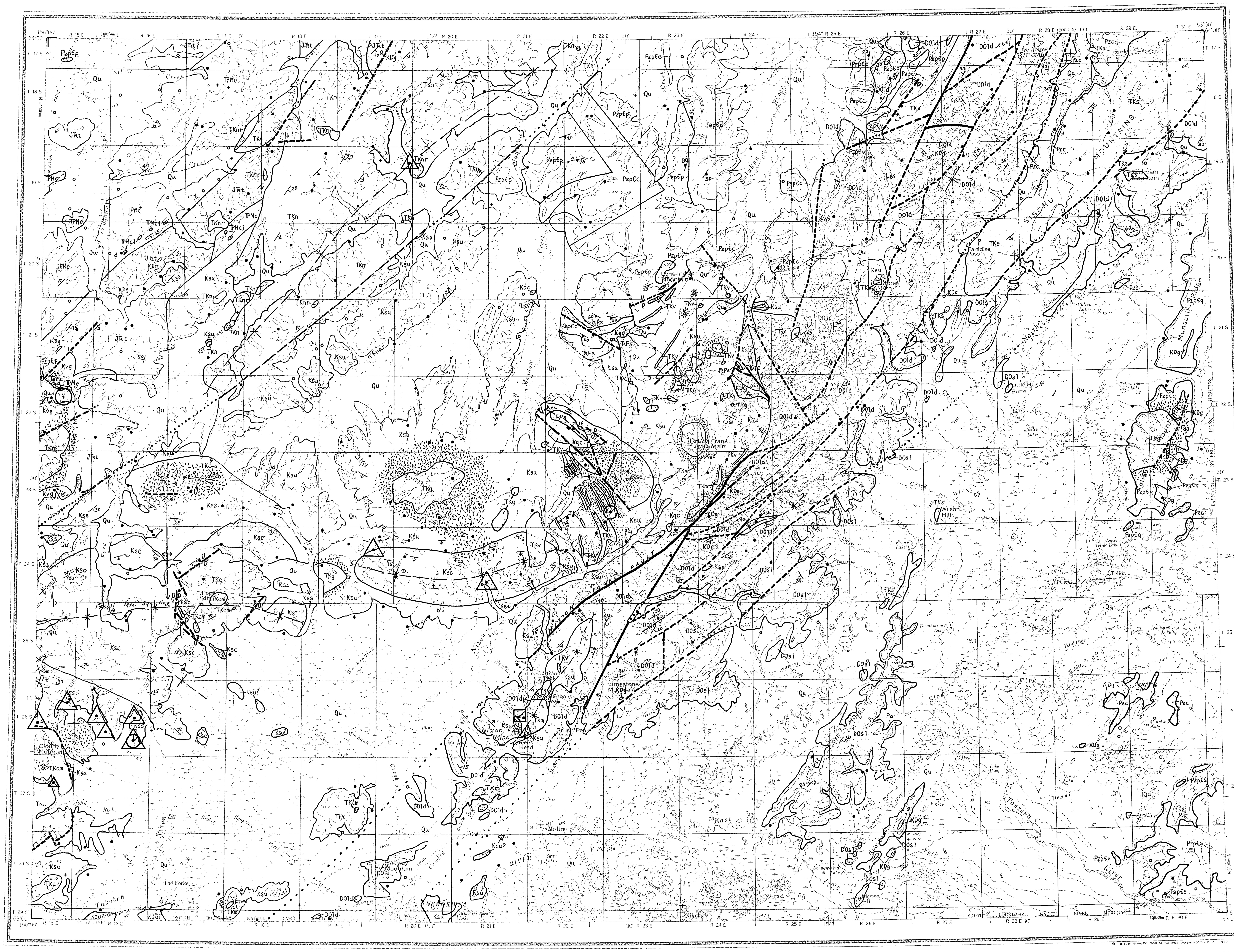


Base from U.S. Geological Survey, 1959

Geology generalized from Patton and others, 1980

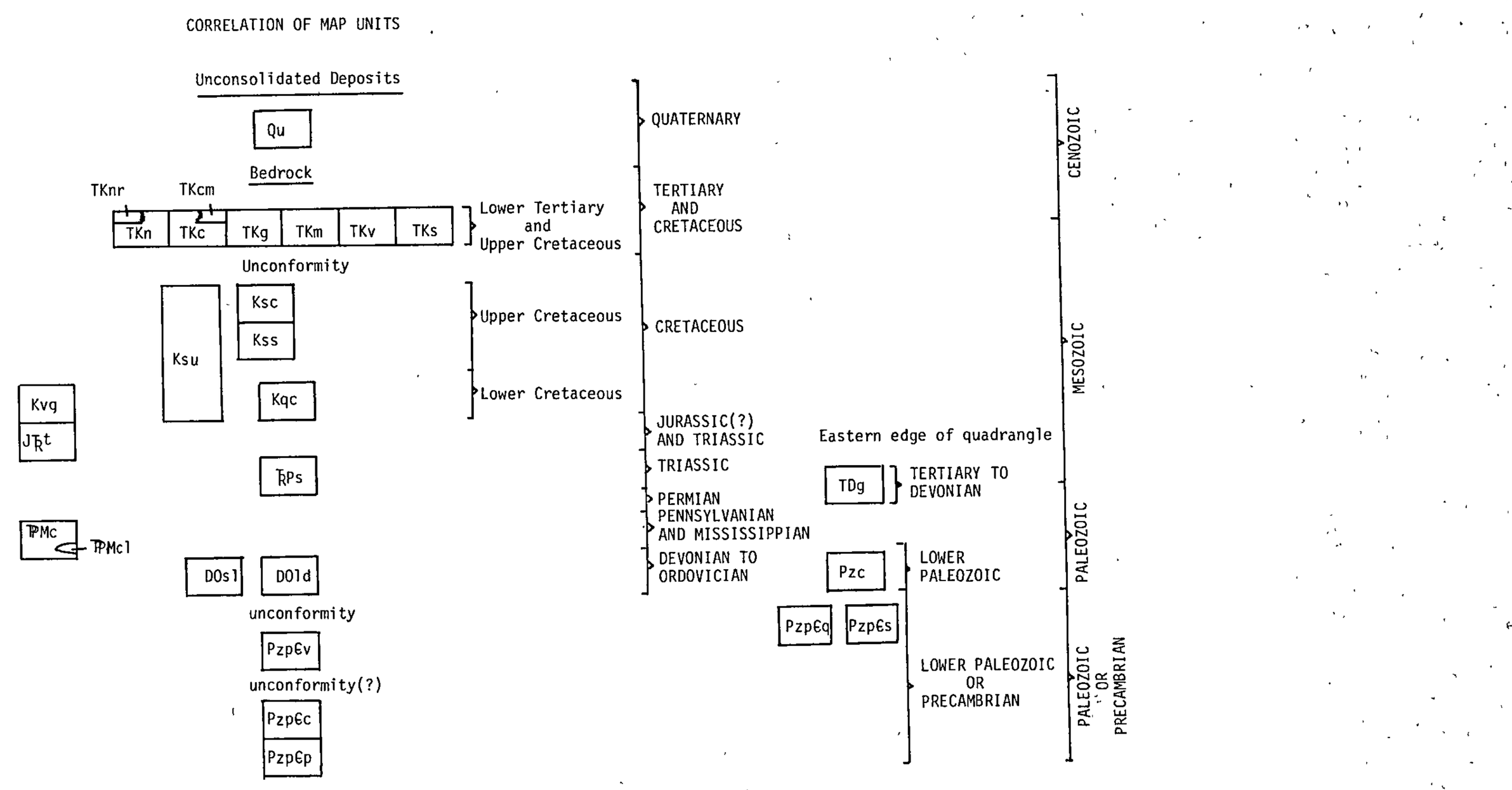
SCALE 1:250000

25 MILES

25 KILOMETERS

CONTOUR INTERVAL 200 FEET
DOTTED LINES REPRESENT 100 FOOT CONTOURS
DATUM IS MEAN SEA LEVEL
MAGNETIC DECLINATION AT SOUTH EDGE OF SHEET VARIES FROM 23°00' TO 24°30' EAST

CORRELATION OF MAP UNITS



DESCRIPTION OF MAP UNITS

- Qu — UNDIFFERENTIATED SURFICIAL DEPOSITS
- TKnr, TKn — VOLCANIC ROCKS OF THE NOWITNA RIVER AREA--Chiefly trachyandesite, basaltic andesite, and basalt flows. TKnr--Rhyolite domes, tuffs, and breccia
- TKcm, TKc — MAFIC TO INTERMEDIATE VOLCANO-PLUTONIC COMPLEXES--Altered basalt, andesite, and trachyandesite flows and hypabyssal intrusive bodies. TKcm--Small bodies of monzonite, quartz monzonite, and granodiorite
- TKg — GRANITE
- TKm — MONZONITE
- TKv — VOLCANIC ROCKS OF NIXON FORK-UPPER SULUKNA RIVER AREA--Rhyolite, dacite, and trachyandesite sills, dikes, flows, and plugs
- TKs — VOLCANIC ROCKS OF THE SISCHU MOUNTAINS--Rhyolite and dacite flows and domes
- TDg — GABBRO
- Ksu — UNDIFFERENTIATED SHALE, SILTSTONE, AND SANDSTONE
- Ksc — NONMARINE SANDSTONE AND QUARTZ-CHERT CONGLOMERATE
- Kss — MARINE SANDSTONE, SILTSTONE, AND SHALE
- Kqc — QUARTZ-CARBONATE SANDSTONE AND PEBBLY MUDSTONE
- Kvg — VOLCANIC GRAYWACKE AND CONGLOMERATE
- JTRt — CHERTY TUFF, CRYSTAL AND LITHIC TUFFS, AND VOLCANIC BRECCIA
- TRPs — SANDSTONE, SANDY LIMESTONE, SPICULITE, AND CONGLOMERATE
- PMc, PMcl — CHERT AND LIMESTONE--Chiefly radiolarian chert. PMcl--Limestone.
- DOsl — SHALY LIMESTONE
- DOld — LIMESTONE AND DOLOMITE
- Pzc — CHERT AND PHYLLITE
- PzpЄq — QUARTZITE, GRIT, AND ARGILLITE
- PzpЄs — SHEARED GRIT, QUARTZITE, AND QUARTZ-MICA SCHIST
- PzpЄv — METAVOLCANIC ROCKS--Metarhyolite and dacite
- PzpЄc — CALC-SCHIST
- PzpЄp — PELITIC SCHIST

GEOLOGIC SYMBOLS

- Contact - Includes approximately located, inferred, and indefinite
- Fault - Dashed where approximately located, short dashed where inferred, dotted where concealed. U, upthrown side; D, downthrown side
- Anticline - Showing direction of plunge
- Syncline - Showing direction of plunge
- Strike and dip of beds. May include overturned beds
- Strike of vertical beds
- Horizontal beds
- Strike and dip of beds based on photointerpretation or distant observation
- Strike and dip of foliation
- Zone of hornfels

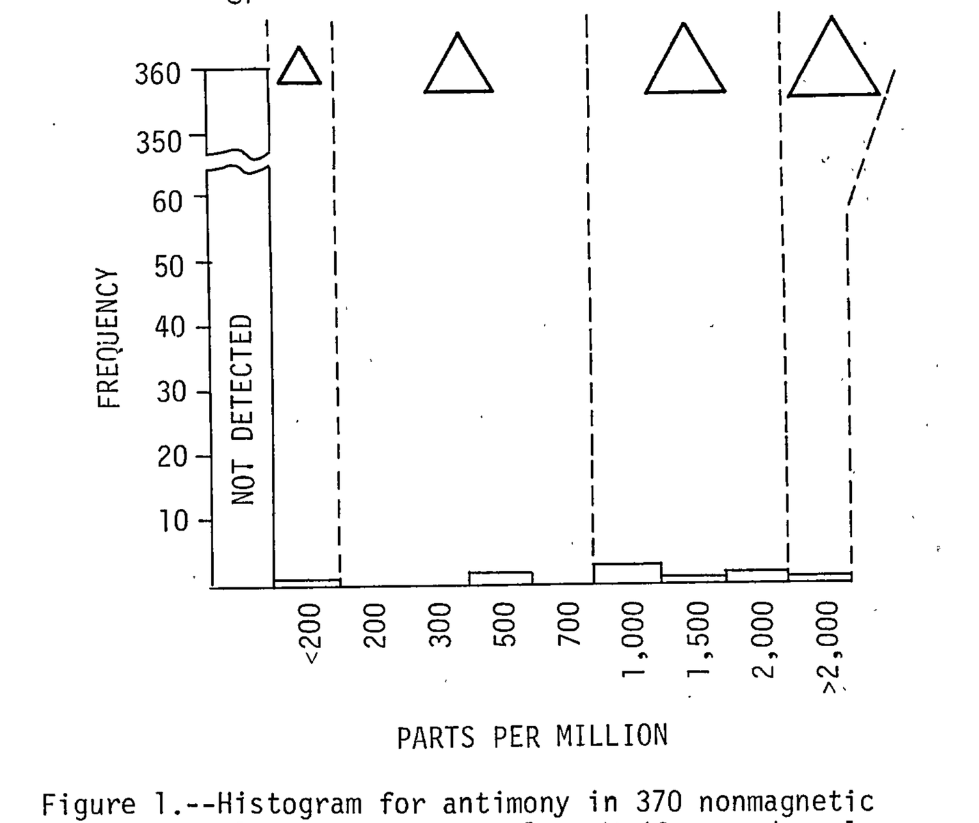


Figure 1.--Histogram for antimony in 370 nonmagnetic heavy-mineral-concentrate samples, Medfra quadrangle, Alaska, showing symbols denoting anomalous concentrations and percentage of total number of samples represented by each range.

EXPLANATION OF SAMPLE MEDIA SYMBOLS

SAMPLE SITES Symbols indicate the types of samples collected at each site

- ● Nonmagnetic and moderately magnetic heavy-mineral-concentrate and minus-80-mesh stream-sediment samples
- o Minus-80-mesh stream-sediment samples
- + Moderately magnetic heavy-mineral-concentrate and minus-80-mesh stream-sediment samples
- -o- Nonmagnetic heavy-mineral-concentrate and minus-80-mesh stream-sediment samples
- ɸ Moderately magnetic heavy-mineral-concentrate samples

ANTIMONY IN NONMAGNETIC AND MODERATELY MAGNETIC HEAVY-MINERAL-CONCENTRATE AND MINUS-80-MESH STREAM-SEDIMENT SAMPLES

DISCUSSION

Introduction

These geochemical maps show some results of a reconnaissance geochemical survey done in the Medfra quadrangle, Alaska in 1978 and 1979 as part of the Alaska Mineral Resource Assessment Program. The maps show the distribution and abundance of antimony and mercury in 370 nonmagnetic (C3 fraction) and 422 moderately magnetic (C2 fraction) heavy-mineral-concentrate samples on a subdued topographic and generalized geologic base. The maps of this report are presented largely to aid users in making their own interpretations. Additional individual element plots for selected elements are in King and others, 1983a,b,c,d.

Various symbols of different sizes are used to represent values and ranges of values as defined in the histograms (figures 1 and 2). Triangles denote antimony in the C3 fraction. Circles denote antimony in the C2 fraction and mercury in sediment samples. Dots are used for the lowest mercury value plotted. A square is used to represent the only antimony value detected in a sediment sample. The value is 300 ppm (parts per million) and no histogram is shown A histogram is not shown for the three antimony values in the C2 fraction; the symbols are defined as follows: large circle, 1,000 ppm; small circles, 200 ppm.

Small dots are used on the map for mercury to identify sites where the sediment samples were collected. On the map for antimony various symbols are used to indicate sample sites and also to denote what types of samples were collected at the sites. An explanation for these symbols is shown.

All detected antimony values in either C3, C2 fractions, or sediment samples are considered anomalous and are shown on the map. Mercury values greater than 0.20 ppm are considered anomalous. Some of the mercury values between 0.15 and 0.20 ppm are possibly anomalous in some areas. A plot of all results for mercury was examined and values less than those plotted on this map were determined to show no evidence of significant geochemical patterns.

SAMPLING PREPARATION, AND ANALYSIS OF SAMPLES

Most of the samples were taken from channels of active streams with upstream catchment areas averaging about nine km^2. Samples were taken from first or second order streams whenever possible. Larger, or third order, streams were sampled when helicopter landing sites along first or second order tributary streams were not available. Minus-2-mm stream sediment was collected for the stream-sediment samples by wet sieving at the sample sites with a stainless-steel screen. Heavy-mineral-concentrate samples were collected by panning the minus-2-mm stream sediment to remove most of the light-mineral fraction.

All samples were partially dried in the field and later completely dried in an oven at the laboratory. After drying, the stream-sediment samples were sieved with an 80-mesh (0.177 mm) screen and the <80-mesh fraction was pulverized to minus 150 mesh in a vertical grinder using ceramic grinding plates. Panned samples were sieved with a 20-mesh (0.8 mm) screen. The <20-mesh fraction was passed through bromoform (specific gravity, 2.86) to remove light-mineral grains not removed in the panning process. Each heavy-mineral concentrate sample was then divided into three fractions based on the magnetic susceptibilities of the mineral grains. A fraction consisting chiefly of magnetite was removed with the use of a hand magnet and a Frantz Isodynamic magnetic separator. Two additional fractions were obtained by passing the remaining sample through the Frantz separator at a setting of 0.6 ampere. The fraction composed of mineral grains having no magnetic susceptibility to 0.6 ampere is referred to in this report as the nonmagnetic fraction. The mineralogic composition of the nonmagnetic fraction was determined by visual observation with a binocular microscope. The fraction consisting of mineral grains with magnetic susceptibilities between 0.1 and 0.6 ampere is referred to in this report as the moderately magnetic fraction. Using a microsplitter, a split of each sample of the nonmagnetic and moderately magnetic fractions was obtained. One split was then pulverized to <150 mesh by hand grinding in a mortar and pestle. The ground portion was used for spectrographic analysis.

Minus-80-mesh stream sediment samples and the nonmagnetic and moderately magnetic heavy-mineral-concentrate samples were analyzed semiquantitatively for 31 elements including antimony using a six-step emission spectrographic method outlined by Grimes and Marranzino (1968). The method was modified slightly for the concentrate samples to eliminate spectral interferences. Stream-sediment samples were also analyzed for mercury using the atomic absorption method described by Ward and others (1969, p. 41-42). All of the analytical results are available in U.S. Geological Survey Open-File Report 80-811F (King and others, 1980).

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.

King, H. D., Risoli, D. A., Cooley, E. F., O'Leary, R. M., Speckman, W. A., Spiesman, D. L., Jr., and Galland, D. W., 1980, Final results and statistical summary of analyses of geochemical samples from the Medfra quadrangle, Alaska: U.S. Geological Survey Open-File Report 80-811F, 134 p.

King, H. D., Cooley, E. F., Gruzensky, A. L., and Spiesman, D. L., Jr., 1983a, Distribution and abundance of gold and silver in nonmagnetic and moderately magnetic heavy-mineral-concentrate and minus-80-mesh stream-sediment samples and silver in ash of aquatic bryophyte samples, Medfra quadrangle, Alaska: U.S. Geological Survey Open-File Report 80-811H.

King, H. D., Tripp, R. B., O'Leary, R. M., and Cooley, E. F., 1983b, Distribution and abundance of copper, lead, and zinc in nonmagnetic and moderately magnetic heavy-mineral-concentrate, minus-80-mesh stream-sediment, and ash of aquatic-bryophyte samples, Medfra quadrangle, Alaska: U.S. Geological Survey Open-File Report 80-811I.

King, H. D., Risoli, D. A., and Tripp, R. B., 1983c, Distribution and abundance of molybdenum, tin, and tungsten in nonmagnetic and moderately magnetic heavy-mineral=-concentrate samples and tin in minus-80-mesh stream-sediment and ash of aquatic-bryophyte samples, Medfra quadrangle, Alaska: U.S. Geological Survey Open-File Report 80-811J.

King, H. D., Cooley, E. F., and Spiesman, D. L., Jr., 1983d, distribution and abundance of arsenic and bismuth in nonmagnetic and moderately magnetic heavy-mineral-concentrate samples and arsenic in minus-80-mesh stream-sediment and ash of aquatic-bryophyte samples, Medfra quadrangle, Alaska: U.S. Geological Survey Open-File Report 80-811K.

Patton, W. W., Jr., Moll, E. F., Dutro, J. T., Jr., Silberman, M. L., and Chapman, R. M., 1980, Preliminary geologic map of the Medfra quadrangle, Alaska: U.S. Geological Survey Open-File Report 80-811A, 1 sheet, scale 1:250,000.

Ward, F. N., Nakagawa, H. M., Harms, T. F., and VanSickle, G. H., 1969, Atomic-absorption methods of analysis useful in geochemical exploration: U.S. Geological Survey Bulletin 1289, 45 p.

This report is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards. Any use of trade names is for descriptive purposes only and does not imply endorsement by the USGS.

DISTRIBUTION AND ABUNDANCE OF ANTIMONY AND MERCURY IN MINUS-80-MESH STREAM-SEDIMENT AND ANTIMONY IN NONMAGNETIC AND MODERATELY MAGNETIC HEAVY-MINERAL-CONCENTRATE SAMPLES, MEDFRA QUADRANGLE, ALASKA

By

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1983