DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

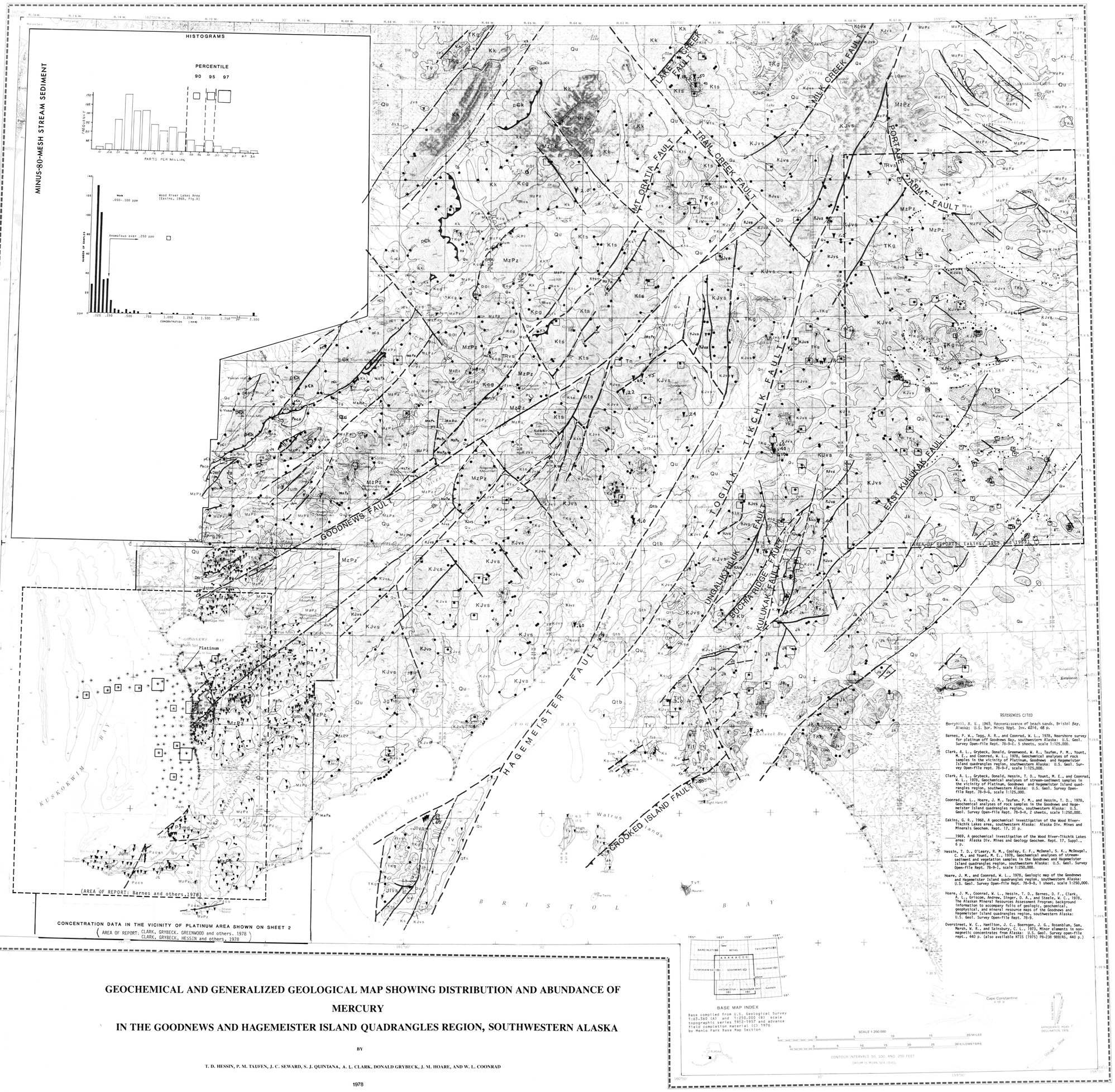
FOLIO OF THE
GOODNEWS AND HAGEMEISTER ISLAND QUADRANGLES REGION

OPEN FILE REPORT 78-9-P

HESSIN AND OTHERS—GEOCHEMICAL DISTRIBUTION OF MERCURY
SHEET 1 OF 2

HISTOGRAMS

MINUS-80-MESH STREAM SEDIMENT



GEOCHEMICAL AND GENERALIZED GEOLOGICAL MAP SHOWING DISTRIBUTION AND ABUNDANCE OF MERCURY IN THE GOODNEWS AND HAGEMEISTER ISLAND QUADRANGLES REGION, SOUTHWESTERN ALASKA

BY

T. D. HESSIN, P. M. TAUFEN, J. C. SEWARD, S. J. QUINTANA, A. L. CLARK, DONALD GRYBECK, J. M. HOARE, AND W. L. COONRAD

1978

BASE MAP INDEX

Base compiled from U.S. Geological Survey 1:63,360 (A) and 1:250,000 (B) scale topographic series 1952-1957 and advance field completion material (c) 1976 by Menlo Park Base Map Section

SCALE 1:250 000

CONTOUR INTERVALS 50, 100, AND 200 FEET
DATUM IS MEAN SEA LEVEL

EXPLANATION

GEOLOGY GENERALIZED FROM HOARE AND COONRAD (1978)

CORRELATION OF MAP UNITS

SURFICIAL DEPOSITS

Qs	QUATERNARY

VOLCANIC, SEDIMENTARY, AND METAMORPHIC ROCKS		INTRUSIVE ROCKS	
Qtb	Pleistocene	QUATERNARY	
QTs	Plio-Pleistocene	QUATERNARY or TERTIARY	
Tv	Early Tertiary	TERTIARY	Tir, Tim, Tn: TERTIARY
Kk	Late Cretaceous (Maastrichian ?)		Tkg: TERTIARY AND CRETACEOUS
Kk	Upper and Lower Cretaceous	CRETACEOUS	
Kk, Kkg, Kkg, Kcg	Lower Cretaceous		
KJvs	Lower Cretaceous to Middle Jurassic	CRETACEOUS AND JURASSIC	
Jk, Jvs	Middle to Lower Upper Jurassic	JURASSIC	Jg, Jum, Jt: JURASSIC AND JURASSIC ?
Jtvs	Lower Jurassic		
MzPz	Lower Cretaceous to Lower Ordovician ?	MESOZOIC AND PALEOZOIC	
Pzvs		PALEOZOIC	Pzmg: PALEOZOIC ?
pEk		PRE-CAMBRIAN	

DESCRIPTION OF MAP UNITS

SURFICIAL DEPOSITS

Qu — UNCONSOLIDATED SEDIMENTARY DEPOSITS

SEDIMENTARY, VOLCANIC, AND METAMORPHIC ROCKS

Qtb — TOGIAK BASALT

QTs — SEMICONSOLIDATED MARINE BEACH SEDIMENTS

Tv — VOLCANIC ROCKS AND VOLCANOGENIC SEDIMENTS - Chiefly andesitic flows and tuffs

Kk — SUMMIT ISLAND FORMATION - Nonmarine conglomerate, sandstone, shale, and carbonaceous mudstone

Kk — KUSKOKWIM GROUP - Conglomerate overlain by interbedded graywacke, siltstone, and shale; commonly micaceous; mostly marine

Kk — BUCHIA RIDGE GRAYWACKE - Chiefly interbedded calcareous graywacke, siltstone, and conglomerate with local couplets of mudrock shells

Kkg — LIMY GRIT AND LIMESTONE - Chiefly angular grit cemented by bioclastic limestone

Kcg — TUFFS AND SEDIMENTARY ROCKS - Varied assemblage of andesitic tuffs, graywacke, siltstone, impure limestone, and tuffaceous chert; tuff and tuffaceous sediments commonly laumontitized

Kcg — GRAYWACKE AND CONGLOMERATE - Marine graywacke, siltstone, and conglomerate; commonly calcareous

KJvs — VOLCANIC AND SEDIMENTARY ROCKS - Interbedded intermediate to mafic flows, tuffs, tuffaceous sedimentary rocks, and argillites; intermediate composition tuffaceous rocks commonly laumontitized

Jk — KOLMAK GRAYWACKE - Chiefly very hard lithic graywacke and siltstone with local conglomerate

Jtvs — VOLCANIC AND SEDIMENTARY ROCKS - Andesitic, trachytic, and basaltic flows and breccias interbedded with volcanogenic sedimentary rocks

Jtvs — VOLCANIC AND SEDIMENTARY ROCKS - Mafic flows and breccias interbedded with volcanogenic sedimentary rocks; fractures commonly coated with laumontite

MzPz — MESOZOIC AND PALEOZOIC ROCKS UNDIVIDED - Widespread marine unit including mafic to intermediate volcanic rocks, tuffaceous sedimentary rocks, chert, argillite, siltstone, graywacke, conglomerate, and limestone

Mzk — VOLCANIC AND SEDIMENTARY ROCKS (Upper Triassic) - Locally differentiated marine unit of chert, tuffaceous cherty rocks, argillite, siltstone, basic conglomerate, limestone, and mafic flows and breccia

Pv — VOLCANIC ROCKS (Permian) - Locally differentiated marine unit of pillow basalts, massive mafic flows, breccia, and tuff

Pl — LIMESTONE (Permian) - Locally differentiated thin unit of marine limestone; generally tuffaceous, commonly has strong fetid odor

DOl — LIMESTONE - Thin-bedded to massive limestone with minor interbedded tuff and mafic flows; locally recrystallized to marble with interbedded quartzite and quartz-chlorite schist

Pzcs — CALCAREOUS SCHIST (Permian or older?)

pEk — KANEKTOK METAMORPHIC COMPLEX - Gneiss, schist, amphibolite, and marble; upper greenschist to lower amphibolite facies

mDl — MARBLEIZED LIMESTONE - Locally differmentiated

INTRUSIVE ROCKS

Tir — FELSIC INTRUSIVE ROCKS - Chiefly rhyolitic to dacitic dikes and sills; locally mapped

Tim — MAFIC INTRUSIVE ROCKS - Diabase, basalt, dioritic, and gabbroic dikes and sills locally mapped

Tn — NANOGAMUK COMPLEX - Quartz-rich porphyritic felsite intrusive-extrusive complex of dikes, stills, tuff, and breccias

TKg — GRANITIC ROCKS - Chiefly quartz monzonite, granodiorite, and quartz diorite stocks

Jg — GABBROIC ROCKS - Commonly shows compositional layering and generally associated with ultramafic rocks

Jum — ULTRAMAFIC ROCKS - Serpentinite, dunite, and websterite

Jt — TRONDHJEMITE - Associated with serpentinite and gabbro

Pzmg — METAGABBRO AND GREENSTONE - Probable dismembered ophiolite complex of mafic flows, dikes, volcaniclastic rocks, and gabbro altered by greenschist facies metamorphism and calcium metasomatism

GEOLOGIC SYMBOLS

Contact. Known, approximately located, gradational, and inferred. Most contacts between bedded rock units are probably faults

Fault or fault zone. Dashed where approximately located, inferred, or concealed

Thrust fault. Dashed where approximately located, inferred, or concealed. Sawteeth on upper plate

Hornfels

GEOCHEMICAL SYMBOLS

RM — RED MOUNTAIN ULTRAMAFIC BODY

RMC — RED MOUNTAIN CONTACT ZONE

GEOCHEMICAL SAMPLE SITES

▼ — ROCK (CLARK, GRYBECK, GREENWOOD, AND OTHERS, 1978; COONRAD, AND OTHERS, 1978)

★ — CONCENTRATE (OVERSTREET, AND OTHERS, 1973)

◈ — OFFSHORE AND ONSHORE SEDIMENTS (BARNES, AND OTHERS, 1978)

⊙ — BEACH AND STREAM SEDIMENTS (BERRYHILL, 1963)

● — STREAM DRAINAGE SEDIMENT (HESSIN, AND OTHERS, 1978)

• — STREAM DRAINAGE SEDIMENT (CLARK, GRYBECK, HESSIN, AND OTHERS, 1978)

· — STREAM DRAINAGE SEDIMENT (EAKINS, 1968, 1969)

ABUNDANCE

▼.50 — NUMBER WITH SOLID ROCK SAMPLE-SITE SYMBOL REPRESENTS GEOCHEMICAL CONCENTRATION IN PARTS PER MILLION (PPM)

□ — ABUNDANCE SYMBOLS REPRESENTING 90TH PERCENTILE OR GREATER CONCENTRATIONS DETERMINED IN STREAM-DRAINAGE SITE SAMPLES ARE SHOWN WITH HISTOGRAMS (SHEET 1)

DISCUSSION OF GEOCHEMISTRY

THE TWO SHEETS COMPRISING THIS REPORT SHOW THE DISTRIBUTION AND ABUNDANCE OF MERCURY AS GEOCHEMICALLY DETERMINED IN VARIOUS SAMPLE MEDIA COLLECTED FROM LOCATIONS THROUGHOUT THE GOODNEWS AND HAGEMEISTER ISLAND QUADRANGLES REGION. SHEET 1 COVERS THE ENTIRE REGION AND SHEET 2 COVERS THE AREA OF ABUNDANT SAMPLE DATA IN THE VICINITY OF PLATINUM. LOCATION AND ROCK SAMPLE MERCURY ABUNDANCE SYMBOLS ARE SIMILAR ON BOTH SHEETS. DATA PRESENTED HAVE BEEN COMPILED FROM ANALYSES AND LOCATIONS REPORTED BY BARNES AND OTHERS (1978); CLARK, GRYBECK, GREENWOOD, AND OTHERS (1978); CLARK, GRYBECK, HESSIN, AND OTHERS (1978); COONRAD AND OTHERS (1978); EAKINS (1968, 1969); HESSIN AND OTHERS (1978); AND OVERSTREET AND OTHERS (1973).

THE FIRST HISTOGRAM ON SHEET 1, BASED ON INSTRUMENTAL MERCURY-VAPOR DETECTOR ANALYSES FROM ALMOST 900 MINUS-80-MESH STREAM-SEDIMENT SAMPLES (HESSIN AND OTHERS, 1978, TABLE 2) HAS BEEN USED TO IDENTIFY AND PORTRAY ON SHEET 1 THE CONCENTRATIONS OF MERCURY THAT MIGHT BE ANOMALOUS. THE SECOND HISTOGRAM ON SHEET 1, BASED ON EAKINS' (1968, TABLE II, FIG. 8) ANALYSES OF 372 SAMPLES FROM THE WOOD RIVER LAKES AREA, INCLUDING SAMPLES TAKEN IN THE VICINITY OF THE MARSH MOUNTAIN-RED TOP MINE MERCURY DEPOSIT, INDICATES ANOMALOUS VALUES SIMILAR TO THOSE IN THE FIRST HISTOGRAM.

THE DISTRIBUTION AND ABUNDANCE OF MERCURY IN THE VICINITY OF PLATINUM, AS SHOWN ON SHEET 2, HAS ABUNDANCE SYMBOLS BASED ON STREAM-SEDIMENT SAMPLE DATA FROM THAT IMMEDIATE AREA (CLARK, GRYBECK, HESSIN, AND OTHERS, 1978). THE FIRST HISTOGRAM ON SHEET 2 SHOWS UPPER PERCENTILE MERCURY VALUES IN STREAM SEDIMENTS THAT ARE TWO OR THREE TIMES THE VALUES DETERMINED THROUGHOUT THE REST OF THE GOODNEWS-HAGEMEISTER ISLAND QUADRANGLES REGION (SEE HISTOGRAM ON SHEET 1). THE SECOND HISTOGRAM ON SHEET 2 SHOWS THE FREQUENCY AND ABUNDANCE OF MERCURY DETERMINED IN ROCKS COMPRISING THE RED MOUNTAIN ULTRAMAFIC BODY (RM) AND ADJACENT CONTACT ZONE (RMC). THE MEAN AND UPPER PERCENTILE VALUES INDICATED ARE SOMEWHAT LESS THAN THE STREAM-SEDIMENT MERCURY VALUES DETERMINED IN THE SURROUNDING AREA.

THE GENERALIZED GEOLOGIC MAP DATA INCLUDED IN SHEET 1 AND THE MORE DETAILED GEOLOGIC MAP OF THE REGION (HOARE AND COONRAD, 1978) SHOULD BE UTILIZED IN CONSIDERING SIGNIFICANT STRUCTURE, SOURCE, AND POSSIBLE HOST ROCKS FOR THE MERCURY THAT HAS BEEN DETECTED IN VARIOUS GEOCHEMICAL SAMPLES IN THE VICINITY OF PLATINUM, AS WELL AS THROUGHOUT THE REGION.

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BACKGROUND INFORMATION RELATING TO THIS REPORT IS PUBLISHED AS U.S. GEOLOGICAL SURVEY OPEN-FILE REPORT 78-9
(AVAILABLE FROM THE SAME SOURCE AS THIS MAP)

This report is preliminary and has not been edited or reviewed for conformity with Geological Survey standards and nomenclature.