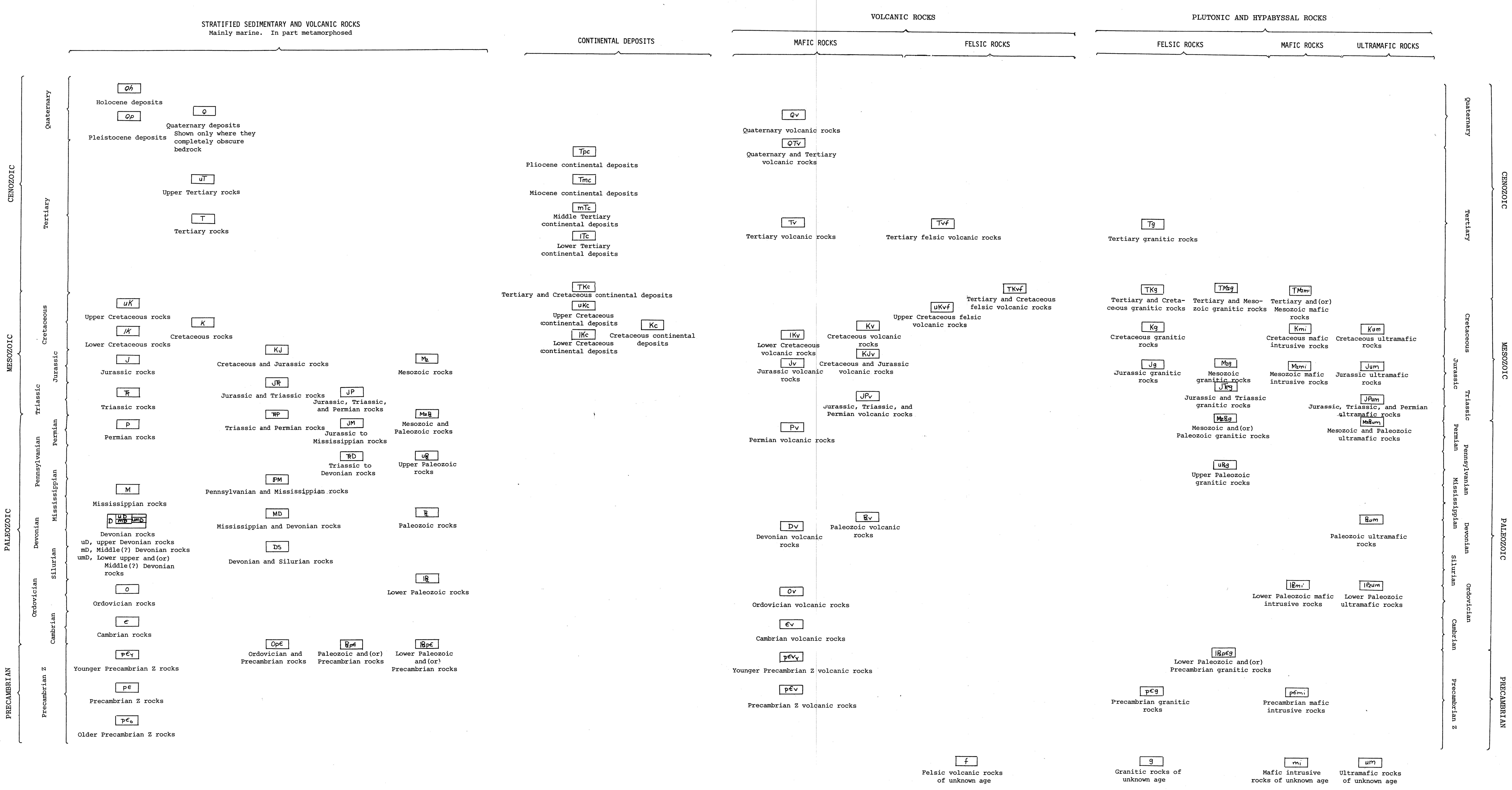
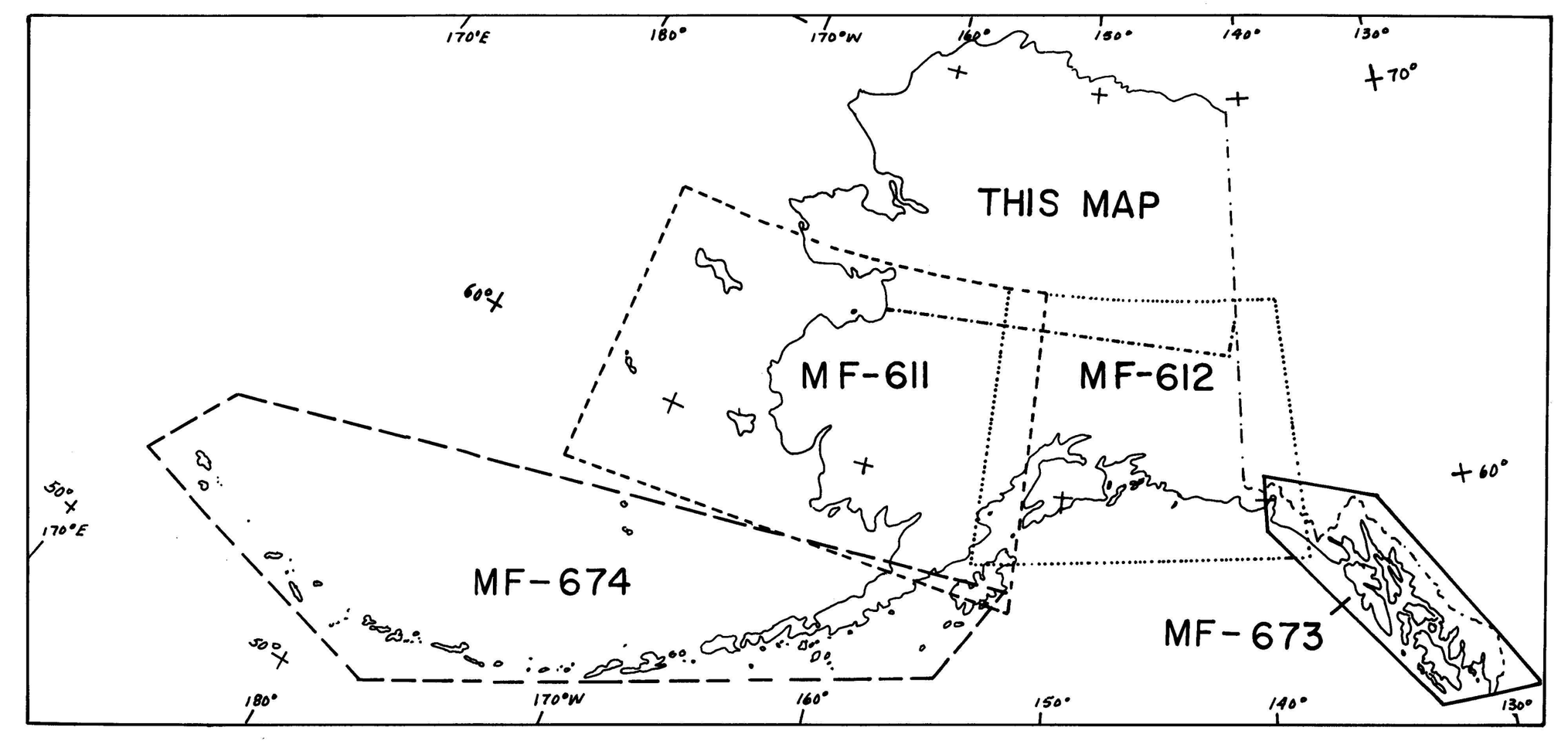
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

PREPARED IN COOPERATION WITH STATE OF ALASKA
DEPARTMENT OF NATURAL RESOURCES DIVISION OF GEOLOGICAL AND GEOPHYSICAL SURVEYS

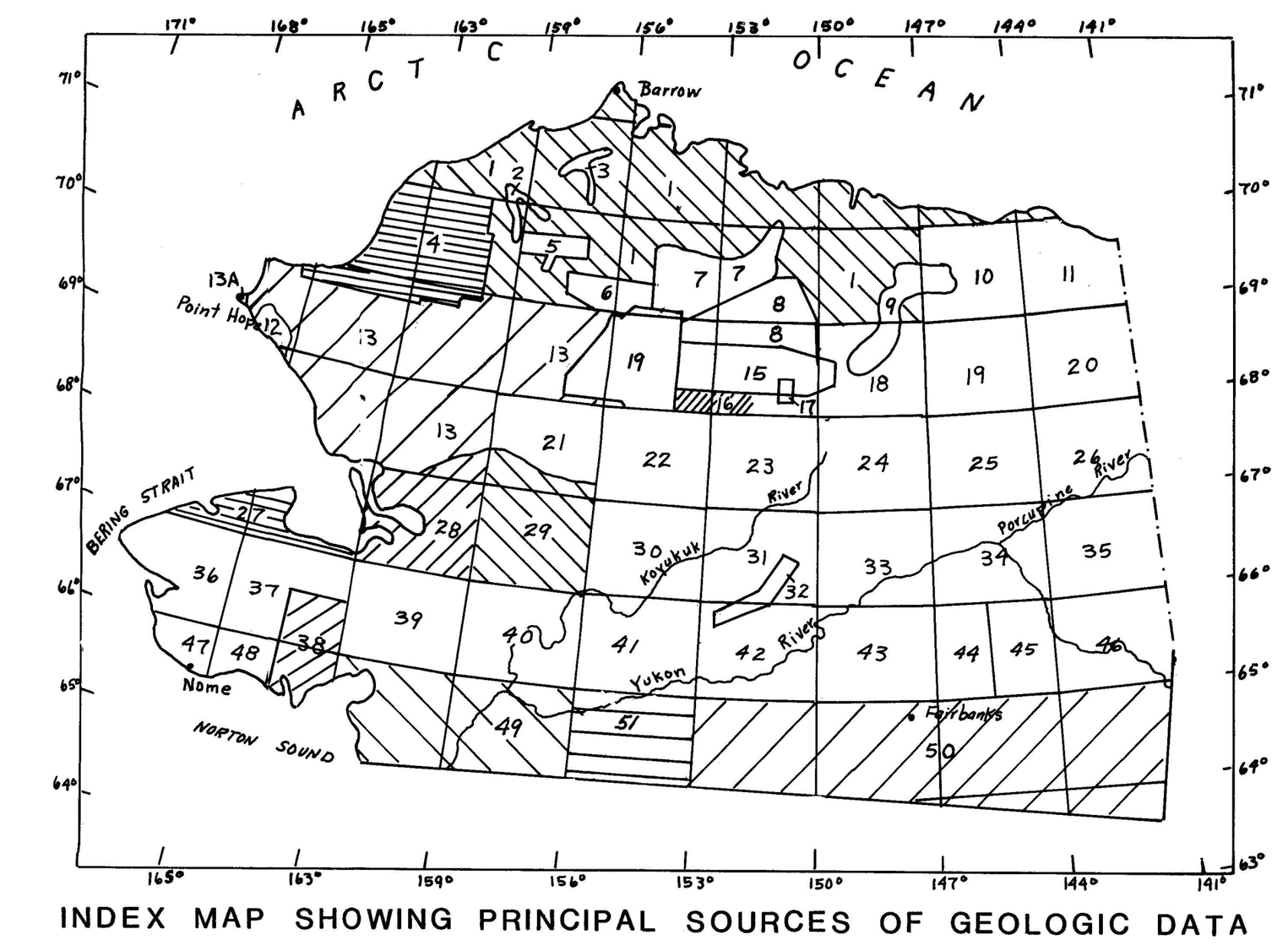
MISCELLANEOUS FIELD STUDIES
MAP MF–789
BEIKMAN–GEOLOGY NORTHERN ALASKA
SHEET 2 OF 2

CORRELATION OF MAP UNITS





INDEX MAP OF ALASKA SHOWING OTHER PRELIMINARY GEOLOGIC MAPS IN THIS SERIES (SCALE 1:1,000,000)



INDEX MAP SHOWING PRINCIPAL SOURCES OF GEOLOGIC DATA

DESCRIPTION OF MAP UNITS

STRATIFIED SEDIMENTARY AND VOLCANIC ROCKS

MAINLY MARINE. IN PART METAMORPHOSED

Qh HOLOCENE DEPOSITS.--Alluvial, flood plain, beach, low terrace, swamp, and landslide deposits

Q QUATERNARY DEPOSITS.--Loess, eolian sand, terrace, flood plain, alluvial, morainal, and outwash deposits

Qp PLEISTOCENE DEPOSITS.--Morainal, outwash, terrace, alluvial fan, and beach deposits

uT UPPER TERTIARY ROCKS.--Nearshore marine deposits of shale, sandstone, conglomerate, mudstone, siltstone, and unconsolidated sand of the upper part of the Sagavanirktok Formation

T TERTIARY ROCKS.--Sedimentary rocks concealed beneath Quaternary cover on Point Hope

uK UPPER CRETACEOUS ROCKS.--Shale, sandstone, conglomerate, bentonite, clay, and coal. Includes the Ninuluk Formation of the Nanushuk Group and the Seabee and Schrader Bluff Formations of the Colville Group

K CRETACEOUS ROCKS.--Calcareous graywacke, graywacke, mudstone, volcanic graywacke, and volcanic conglomerate

lK LOWER CRETACEOUS ROCKS.--Graywacke sandstone, shale, siltstone, and conglomerate. Includes part of the Tiglukpuk Formation of former usage, Okpikruak, Fortress Mountain, and Torok Formations, the Kukpowruk Formation in the western Arctic foothills, and the Kongakut Formation, Bathtub Graywacke, Tuktu and Grandstand Formations in the eastern Brooks Range and Arctic foothills

KJ CRETACEOUS AND JURASSIC ROCKS.--Graywacke, sandstone, quartzitic sandstone, quartzite, conglomerate, siltstone, shale, and argillite

J JURASSIC ROCKS.--Shale, siltstone, and claystone of the Kingak Shale along the northern front of the Brooks Range and carbonaceous shale with minor siltstone and quartzite of the Glenn Shale in the southeast part of the map area

JTR JURASSIC AND TRIASSIC ROCKS.--Chert and argillite

TR TRIASSIC ROCKS.--Shale, chert, and limestone of the Shublik Formation and quartzitic sandstone of the Karen Creek Sandstone

TRP TRIASSIC AND PERMIAN ROCKS.--Sandstone, siltstone, and shale of the Sadlerochit Group

JP JURASSIC, TRIASSIC, AND PERMIAN ROCKS.--Shale, siltstone, and chert in upper part of the Nuka Formation, Siksikpuk Formation (Permian), Shublik Formation (Triassic), and two unnamed sequences of Permian age--a chert, shale, and graywacke sequence and a shale sequence

MzPz MESOZOIC AND PALEOZOIC ROCKS.--Arkosic and glauconitic sandstone, interbedded with shale and chert in the lower part and dolomite, arkosic sandstone and conglomerate in the upper part. Comprises a discordant rock sequence of unknown provenance that includes rocks of Mississippian, Triassic, Jurassic, and Cretaceous age. Includes Nuka Formation

P PERMIAN ROCKS.--Chert, shale, and siltstone of the Siksikpuk Formation and of the Echooka Formation in the eastern Arctic

PM PENNSYLVANIAN AND MISSISSIPPIAN ROCKS.--Limestone, conglomerate, shale, dolomite, and chert. Includes Kekiktuk Conglomerate and Kayak Shale, both of Mississippian age and both in the Endicott Group, and the Alapah and Wahoo Limestones of the Lisburne Group, of Mississippian and Pennsylvanian age

M MISSISSIPPIAN ROCKS.--Conglomerate, shale, and limestone with subordinate shale, chert, and dolomite. Includes the Kekiktuk Conglomerate and Kayak Shale of the Endicott Group, the Utukok Formation and Wachsmuth and Alapah Limestones of the Lisburne Group, and an unnamed limestone on Cape Prince of Wales

JM JURASSIC TO MISSISSIPPIAN ROCKS.--Slate and fossiliferous quartzite of Jurassic and Mississippian(?) age in the east-central part of the map area. Includes the Lisburne Group, Sadlerochit Group, and Kingak Shale along the northeast front of the Brooks Range

TRD TRIASSIC TO DEVONIAN ROCKS.--Radiolarian chert, slate, and argillite of undetermined age and thickness

uPz UPPER PALEOZOIC ROCKS.--Argillite, chert, shale, limestone, and siltstone

Pz PALEOZOIC ROCKS.--Limestone and schists north of Norton Bay; limestone and marble on Seward Peninsula; and gneiss, schist, and phyllite on Yukon-Tanana Upland. May include some Precambrian rocks

MD MISSISSIPPIAN AND(OR) DEVONIAN ROCKS.--Sandstone, quartzite, graywacke, and quartz-chert conglomerate. Includes the Noatak Sandstone in western Brooks Range and undifferentiated Kekiktuk or Kanayut Conglomerate in eastern Brooks Range

D DEVONIAN ROCKS.--Phyllite, hornfels, graywacke, and sandstone and shale on the Seward Peninsula

uD UPPER DEVONIAN ROCKS.--Consists of a clastic sequence of shale, sandstone, chert, quartz-pebble conglomerate, quartzite in the eastern and central Brooks Range, and a carbonate sequence of limestone and dolomite in the western Brooks Range. Includes the Hunt Fork Shale and Kanayut Conglomerate, both in the Endicott Group, in the Philip Smith and Endicott Mountains; Hunt Fork Shale in the southern De Long Mountains; the Kugururok Formation in the central and western De Long Mountains; and the Eli Limestone in the Baird Mountains

umD LOWER UPPER AND(OR) UPPER MIDDLE(?) DEVONIAN ROCKS.--Conglomerate, graywacke, chloritic phyllite, calcareous shale and sandstone, siltstone, and minor limestone

mD MIDDLE(?) DEVONIAN ROCKS.--Limestone and dolomite of the Nanook Limestone in the Shublik Mountains

DS DEVONIAN AND SILURIAN ROCKS.--Includes the Katakturuk Dolomite in the Sadlerochit Mountains, limestone, dolomite, marble, and interbedded shale of the Skajit Limestone in the Brooks Range

lPz LOWER PALEOZOIC ROCKS.--Phyllite, slate, schist, graywacke, quartzite along north edge of Yukon-Koyukuk basin; limestone, chert, shale, sandstone, and mudstone northeast of Manley Hot Spring and along Yukon River at east edge of map area where some rocks of Mississippian age are included; and chert and phyllite in northeast part of map area

O ORDOVICIAN ROCKS.--Limestone, dolomitic limestone, argillaceous limestone, and subordinate shale on the Seward Peninsula

Op€ ORDOVICIAN, CAMBRIAN, AND PRECAMBRIAN ROCKS.--Phyllite, sandstone, siltstone, limestone, chert, and quartzite in the White Mountains area in the southeast part of the map and limestone, argillaceous limestone, and dolomitic argillaceous limestone of Ordovician and Precambrian age on the Seward Peninsula

Pzp€ PALEOZOIC AND(OR) PRECAMBRIAN ROCKS.--Metasedimentary and metaigneous rocks, including schist and gneiss primarily of the greenschist and amphibolite facies in the Yukon-Tanana Upland. Formerly included in the Birch Creek Schist

€ CAMBRIAN ROCKS.--Calcareous siltstone and sandstone, phyllite, and sandstone in the northeast Brooks Range

lPzp€ LOWER PALEOZOIC AND(OR) PRECAMBRIAN ROCKS.--Sandstone, limestone, shale, chert, phyllite, argillite, and quartzite of the Neruokpuk Formation in the northeast Brooks Range; quartz-mica schist, mafic greenschist, calcareous schist, chloritic quartz schist, phyllite, and quartzite in central part of map area; and schist and quartzite of the Birch Creek Schist of former usage in Yukon-Tanana Upland

p€y YOUNGER PRECAMBRIAN Z ROCKS.--Schistose, argillaceous, dolomitic limestone with local tactite

p€ PRECAMBRIAN Z ROCKS.--Siltite, phyllite, graywacke, quartz schist, and graphitic schist of slate of the York region on the Seward Peninsula; quartz wacke, semi-schist, phyllite, and argillite of the Neruokpuk Formation in the northeast Brooks Range; phyllite, slate, and siltstone near Salmon in the east-central part of the area; and limestone, dolomite, sandstone, shale, and basalt of the Tindir Group north of the Tintina fault

p€o OLDER PRECAMBRIAN Z ROCKS.--Schist, gneiss, and migmatic and metamorphic rocks on the Seward Peninsula. Includes some rocks equivalent to slate of the York region in the Kigluaik and Bendeleben Mountains

CONTINENTAL DEPOSITS

Tpc PLIOCENE CONTINENTAL DEPOSITS.--Pebble to boulder conglomerate and coarse sandstone, with interbedded mudflow deposits, claystone, and local thin lignite beds. Includes Nenana Gravel

Tmc MIOCENE CONTINENTAL DEPOSITS.--Sandstone, siltstone, conglomerate, claystone, and coal beds

mTc MIDDLE TERTIARY CONTINENTAL DEPOSITS.--Sandstone, siltstone, claystone, and coal beds. Includes Healy Creek Formation (Oligocene and Miocene) in the northern part of the central Alaska Range

lTc LOWER TERTIARY CONTINENTAL DEPOSITS.--Coal-bearing sequence and cyclic bedded clay and silt. Includes lower (Paleocene through Oligocene) part of the Sagavanirktok Formation. In the Yukon Valley, includes interbedded conglomerate, grit, and sandstone with siltstone, shale, and lignite

TKc TERTIARY AND CRETACEOUS CONTINENTAL DEPOSITS.--Sandstone, mudstone, conglomerate, and thin lignitic coal beds

uKc UPPER CRETACEOUS CONTINENTAL DEPOSITS.--Sandstone and conglomerate and interbedded shale, clay, silt, and bentonite on the Arctic Coastal Plain (Niakogon Tongue of the Chandler Formation of the Nanushuk Group and the Prince Creek Formation of the Colville Group); shale and siltstone within the Yukon-Koyukuk basin; and pebble conglomerate around margins of the basin

Kc CRETACEOUS CONTINENTAL DEPOSITS.--Limestone conglomerate with minor interbeds of limestone, graywacke, and thin coal seams

lKc LOWER CRETACEOUS CONTINENTAL DEPOSITS.--Shale and claystone, siltstone, sandstone, conglomerate, coaly shale and coal, ironstone, and bentonite. Includes Corwin Formation of Nanushuk Group in western part of Arctic Coastal Plain and Killik Tongue of Chandler Formation of Nanushuk Group in central part

VOLCANIC ROCKS

MAFIC ROCKS

Qv QUATERNARY VOLCANIC ROCKS.--Tholeiitic and alkali olivine basalt on the Seward Peninsula

QTv QUATERNARY AND TERTIARY VOLCANIC ROCKS.--Basalt and andesite and pyroclastics with some intercalated gravel and conglomerate on Seward Peninsula and olivine basalt in area to the east of the peninsula

Tv TERTIARY VOLCANIC ROCKS.--Andesitic and basaltic lava, breccia, and tuff

Kv CRETACEOUS VOLCANIC ROCKS.--Volcaniclastic rocks and porphyritic pyroxene andesite flows and hypabyssal rocks

lKv LOWER CRETACEOUS VOLCANIC ROCKS.--Porphyritic andesite and basalt

KJv CRETACEOUS AND JURASSIC VOLCANIC ROCKS.--Porphyritic pyroxene andesite and trachyandesite flows, andesitic crystal and lithic tuffs, tuffaceous volcanic graywacke, andesite breccia, agglomerate, and conglomerate

Jv JURASSIC VOLCANIC ROCKS.--Basalt, andesite, and gabbro in flows, breccia and intrusive rocks. Includes some chert of Permian or Jurassic age

JPv JURASSIC, TRIASSIC, AND PERMIAN VOLCANIC ROCKS.--Igneous complex of mafic volcanic and intrusive rocks. Complex is composed of basalt, diabase, diorite, gabbro, radiolarian chert, peridotite, and dunite. In places includes flows, tuffs, breccias, and interbedded sediments. Includes Rampart Group and Circle Volcanics

Pv PERMIAN VOLCANIC ROCKS.--Mafic volcanic and hypabyssal rocks on the Seward Peninsula

Pzv PALEOZOIC VOLCANIC ROCKS.--Greenstone and minor quartzite, chert, and phyllite in the southeast part of the map area

Dv DEVONIAN VOLCANIC ROCKS.--Northwest of Chandalar, includes hornblende diorite, pyroxenite sills, and andesitic flows. In the southeast part of the map area, includes spilitic basalt and lapilli tuff with interbedded dolomite, limestone, and shale of the Woodchopper Volcanics

Ov ORDOVICIAN VOLCANIC ROCKS.--Andesitic and basaltic volcanic conglomerate interlayered with phyllite and intruded by gabbro and diorite

€v CAMBRIAN VOLCANIC ROCKS.--Mafic vesicular flows, basaltic tuff, agglomerate, and volcanic conglomerate, and limestone interbeds

p€vy YOUNGER PRECAMBRIAN Z VOLCANIC ROCKS.--Feldspathic chloritic schist

p€v PRECAMBRIAN Z VOLCANIC ROCKS.--Chloritic schists, locally blueschists or retrograded blueschists, with subordinate limestone

FELSIC ROCKS

Tvf TERTIARY FELSIC VOLCANIC ROCKS.--Light-colored lava, tuff, breccia, volcanic conglomerate, and tuffaceous deposits

TKvf TERTIARY AND CRETACEOUS FELSIC VOLCANIC ROCKS.--Rhyolite, light-colored porphyritic flows, breccia, conglomerate, and tuff of acidic and intermediate composition

uKvf UPPER CRETACEOUS FELSIC VOLCANIC ROCKS.--Porphyritic latite, quartz latite and trachyte flows, quartz latite porphyry flows and hypabyssal intrusive rocks, and crystal lithic tuffs

f FELSIC VOLCANIC ROCKS OF UNKNOWN AGE.--Rhyolite

PLUTONIC AND HYPABYSSAL ROCKS

FELSIC ROCKS

Tg TERTIARY GRANITIC ROCKS.--Granitic rocks of acidic and intermediate composition

TKg TERTIARY AND CRETACEOUS GRANITIC ROCKS.--Granite and quartz diorite

TMzg TERTIARY AND MESOZOIC GRANITIC ROCKS.--Primarily quartz monzonite and granodiorite, but includes granite to diorite with local aplite, alaskite, and pegmatite. Some smaller bodies of diorite, quartz diorite, and diorite porphyry

Kg CRETACEOUS GRANITIC ROCKS.--Chiefly quartz monzonite and monzonite with granite, granodiorite, and syenite. Granite, monzonite, and quartz monzonite with minor hypabyssal rocks on Seward Peninsula

Jg JURASSIC GRANITIC ROCKS.--Syenite porphyry and granodiorite

Mzg MESOZOIC GRANITIC ROCKS.--Dominantly granodiorite but ranging in composition from granite to diorite

JTRg JURASSIC AND TRIASSIC GRANITIC ROCKS.--Granodiorite, locally quartz monzonite, quartz diorite or diorite of Late Triassic or Early Jurassic age

MzPzg MESOZOIC AND(OR) PALEOZOIC GRANITIC ROCKS.--Quartz monzonite and granite in northeast Brooks Range

uPzg UPPER PALEOZOIC GRANITIC ROCKS.--Biotite granite and quartz monzonite of Carboniferous age

lPzp€g LOWER PALEOZOIC AND(OR) PRECAMBRIAN GRANITIC ROCKS.--Granitic intrusive rocks metamorphosed to amphibolite facies biotite augen gneiss and gneiss

p€g PRECAMBRIAN GRANITIC ROCKS.--Granitic orthogneiss on Seward Peninsula

g GRANITIC ROCKS OF UNKNOWN AGE.--Predominantly quartz monzonite

MAFIC ROCKS

TMzmi TERTIARY AND(OR) MESOZOIC MAFIC ROCKS.--Gabbro, basalt, and some andesite, probably Tertiary

Kmi CRETACEOUS MAFIC INTRUSIVE ROCKS.--Gabbro and diorite

Mzmi MESOZOIC MAFIC INTRUSIVE ROCKS.--Primarily gabbro and basalt

lPzmi LOWER PALEOZOIC MAFIC INTRUSIVE ROCKS.--Mafic and ultramafic rocks of pre-Late Devonian age

p€mi PRECAMBRIAN MAFIC INTRUSIVE ROCKS.--Gabbro, diabase, and altered equivalents on the Seward Peninsula

mi MAFIC INTRUSIVE ROCKS OF UNKNOWN AGE.--Primarily gabbro and basalt on the Seward Peninsula and includes altered mafic intrusive and extrusive rocks on the south flank of the Brooks Range

ULTRAMAFIC ROCKS

Kum CRETACEOUS ULTRAMAFIC ROCKS.--Serpentinite

Jum JURASSIC ULTRAMAFIC ROCKS.--Serpentinite

JPum JURASSIC, TRIASSIC, AND PERMIAN ULTRAMAFIC ROCKS.--Serpentinized peridotite and dunite. In the western Brooks Range consists of locally serpentinized complex of gabbroic and ultramafic rocks

MzPzum MESOZOIC AND PALEOZOIC ULTRAMAFIC ROCKS.--Serpentinized peridotite

Pzum PALEOZOIC ULTRAMAFIC ROCKS.--Serpentinite, peridotite, dunite, and pyroxenite

lPzum LOWER PALEOZOIC ULTRAMAFIC ROCKS.--Serpentinite with some rodingite

um ULTRAMAFIC ROCKS OF UNKNOWN AGE.--Serpentinite on Seward Peninsula

MAP SYMBOLS

Contact

Indefinite contact
Data insufficient to establish contact with certainty. Used only on the Arctic Coastal Plain and on Point Hope where Quaternary deposits mantle the bedrock

Scratch boundary

Fault
Dotted where concealed or inferred

Volcano or volcanic vent

SOURCES OF GEOLOGIC DATA

(Unless otherwise indicated, all publications are those of the U.S. Geological Survey)

1. Geology interpreted by the compilers from test well and core hole data from Prof. Paper 305; stratigraphic sections described in Prof. Paper 886; field observations by L. D. Carter; and paleontologic age determinations by Kristin McDougall and J. E. Hazel (written commun., 1976).
2. Geol. Inv. Naval Petroleum Reserve Alaska Rept. 28, unnumbered illustrations, 1:190,000, open-file rept., 1949.
3. Geol. Inv. Naval Petroleum Reserve Alaska Rept. 6, open-file rept., 1947.
4. Prof. Paper 303C, pl. 9, 1:500,000, 1960.
5. Geol. Inv. Naval Petroleum Reserve Alaska Rept. 36, figs. 1 and 2, 1:96,000 and fig. 3, 1:48,000, open-file rept., 1950.
6. Geol. Inv. Naval Petroleum Reserve Alaska Rept. 17, fig. 1, 1:96,000, open-file rept., 1948.
7. Prof. Paper 303H, pl. 52, 1:125,000, 1966.
8. Prof. Paper 303E, pl. 27, 1:125,000, 1963.
9. Prof. Paper 303D, pl. 21, 1:125,000, 1961.
10. Open-file map 490, 1:200,000, 1971.
11. Misc. Field Studies Map MF-610, 1:200,000, 1974.
12. Prof. Paper 395, pl. 1, 1:63,360, 1967.
13. I. L. Tailleur, unpub. compilation, 1:1,000,000.
13A Arthur Grantz (written commun., 1976).
14. Prof. Paper 303F, pl. 43, 1:125,000, 1964.
15. Prof. Paper 303G, pl. 50, 1:125,000, 1964.
16. Open-file map, 1:96,000, 1960.
17. Prof. Paper 303A, pl. 2, 1:63,360, 1957.
18. H. N. Reiser, W. P. Brosgé, J. T. Dutro, Jr., and R. L. Detterman, unpublished map, 1:200,000.
19. Open-file map 256, 1:250,000, 1965.
20. W. P. Brosgé and H. N. Reiser, unpublished map, 1:250,000.
21. G. H. Pessel, I. L. Tailleur, W. P. Brosgé, and H. N. Reiser, unpublished map, 1:250,000.
22. W. P. Brosgé and H. N. Reiser, unpublished map, 1:250,000.
23. Open-file map 479, 1:250,000, 1971.
24. Misc. Geol. Inv. Map I-375, 1:250,000, 1964.
25. Open-file map 229, 1:250,000, 1962.
26. Open-file map 370, 1:250,000, 1969.
27. D. M. Hopkins, unpublished map.
28. Misc. Geol. Inv. Map I-530, 1:250,000, 1968.
29. Misc. Geol. Inv. Map I-554, 1:250,000, 1968.
30. Misc. Geol. Inv. Map I-459, 1:250,000, 1966.
31. Misc. Field Studies Map MF-492, 1:250,000, 1973.
32. Bull. 1312J, fig. 2, 1:792,000, 1970.
33. Misc. Field Studies Map MF-525, 1:250,000, 1973.
34. Bull. 1111-H, pl. 42, 1:500,000, 1962.
35. Misc. Geol. Inv. Map I-601, 1:250,000, 1970.
36. Misc. Geol. Inv. Map I-685, 1:250,000, 1972.
37. Sainsbury, C. L., 1974, Geologic map of the Bendeleben quadrangle, Seward Peninsula, Alaska. A report prepared in cooperation with the U.S. Bur. of Mines, the U.S. Geol. Survey, and The Mapmakers, 1:250,000.
38. Open-file map 537, 1:250,000, 1972.
39. Misc. Geol. Inv. Map I-492, 1:250,000, 1967.
40. Misc. Geol. Inv. Map I-437, 1:250,000, 1966.
41. Patton, W. W., Jr., Miller, T. P., Chapman, R. M., and Yeend, Warren, unpublished compilation, 1976.
42. Open-file map 75-337, 1:250,000, 1975.
43. Open-file map 483, 1:250,000, 1971.
44. Bull. 872, pl. 1, 1:500,000, 1937.
45. W. E. Davies, unpublished map, 1:1,000,000.
46. Misc. Geol. Inv. Map I-573, 1:250,000, 1969.
47. Open-file map 543, 1:250,000, 1972.
48. Open-file map 544, 1:250,000, 1972.
49. Misc. Field Studies Map MF-611, 1:1,000,000, 1974.
50. Misc. Field Studies Map MF-612, 1:1,000,000, 1974.
51. Chapman, R. M., and Patton, W. W., Jr., unpublished compilation, 1976.

PRELIMINARY GEOLOGIC MAP OF NORTHERN ALASKA

COMPILED BY

HELEN M. BEIKMAN AND ERNEST H. LATHRAM