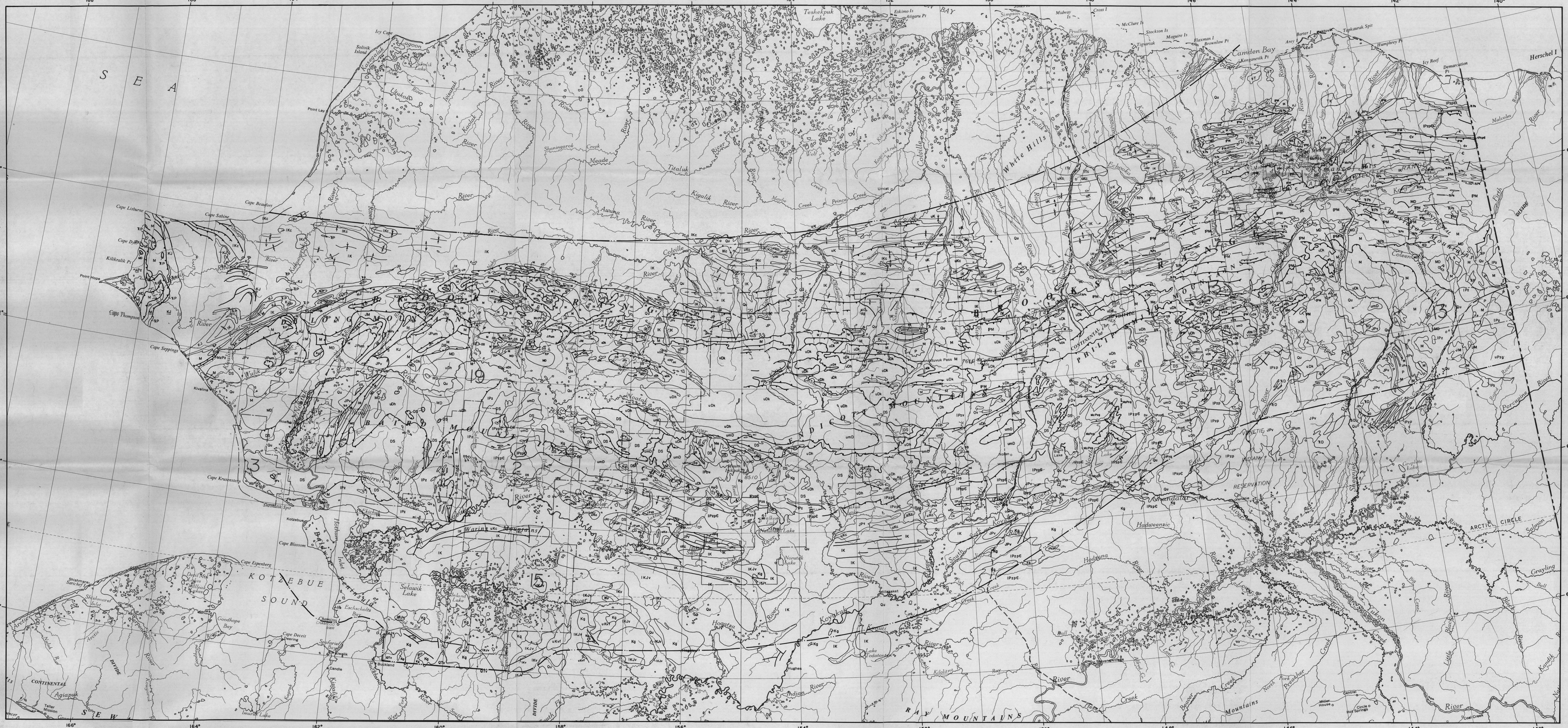
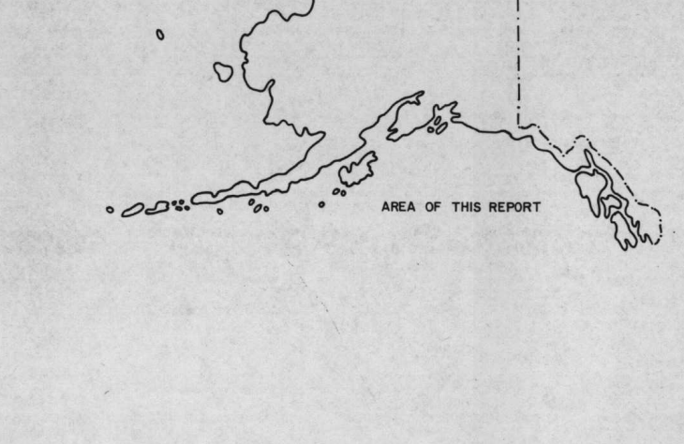
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

U.S. GEOLOGICAL SURVEY
OPEN FILE MAP
OF 77-166B

Sheet 1 of 2


168°
166°
164°
162°
160°
158°
156°
154°
152°
150°
148°
146°
144°
142°
140°
69°
68°
67°
66°
S E A
Icy Cape
Solivik Island
Kasegaluk Lagoon
Sikolik Lake
Point Lay
Utukok River
Kokolik River
Kaolak River
Ivisaruk
Avalik River
Ketik River
Meade River
Shaningarok Creek
Titaluk River
Kigalik River
Awuna River
Teshekpuk Lake
Eskimo Is
Atigaru Pt
BAY
Ikpikpuk River
Maybe Creek
Prince Creek
Umiat
Colville River
Kogosukruk
White Hills
Jones Is
Simpson Lagoon
Midway Is
Cross I
Prudhoe Bay
McClure Is
Stockton Is
Maguire Is
Tigvariak
Flaxman I
Brownlow Pt
Camden Bay
Konganevik Pt
Arey I
Barter I
Kaktovik
Tapkaurak Spit
Humphrey Pt
Icy Reef
Demarcation Pt
Herschel I
Malcolm River
Firth River
Cape Beaufort
Cape Lisburne
Cape Sabine
Cape Dyer
Kilikralik Pt
Point Hope
Cape Thompson
Cape Seppings
Kivalina
Wulik River
Kukpowruk River
Pitmegea River
D E L O N G   M O U N T A I N S
B R O O K S   R A N G E
B A I R D   M O U N T A I N S
E N D I C O T T   M O U N T A I N S
P H I L I P   S M I T H   M O U N T A I N S
Romanzof Mts
Davidson Mountains
CONTINENTAL DIVIDE
Noatak River
Noatak
Cape Krusenstern
Sheshalik Spit
Kotzebue
Cape Blossom
Hotham Inlet
Baldwin Peninsula
K O T Z E B U E   S O U N D
Cape Espenberg
Shishmaref Inlet
Devil Mtn Lakes
Killeak Lakes
Goodhope Bay
Cape Deceit
Deering
Eschscholtz Bay
Chamisso I
Spafarief Bay
Kiwalik
Candle
Buckland
Selawik Lake
Inland Lake
Selawik River
Waring Mountains
Kobuk River
Ambler
Kiana
Squirrel River
Anaktuvuk Pass
Chandler Lake
Mount Igikpak
8510
Walker Lake
Nutuvukti Lake
Norutak Lake
Bettles
Alatna
Allakaket
Koyukuk River
Hughes
Kanuti River
Lake Todatonten
Hogatza
Indian River
Nolan
Wiseman
Chandalar Lake
Chandalar River
Big Lake
Arctic Village
Old John Lake
Sheenjek River
Coleen River
Christian River
VENETIE INDIAN RESERVATION
Venetie
Graphite Lake
Shuman House
Porcupine River
Fort Yukon
Black River
ARCTIC CIRCLE
Chalkyitsik
Salmon
Grayling
Yukon River
Birch Creek
Beaver
Stevens Village
Hadweenzic
Hodzana River
Dall River
Ray Mountains
Circle
Circle Hot Springs
Central
Miller House
Preacher Creek
Coal Creek
Kandik
Teller Mission
Agiapuk
CONTINENTAL DIVIDE
S E W A R D
Imuruk Lake
Kugruk
Kiwalik
Serpentine River
Arctic
Nuluk R
1
2
3
13
15
19

Base map from the National Atlas of the United States of America, U. S. Geological Survey, 1970


AREA OF THIS REPORT

This map is preliminary and has not been reviewed for conformity with U.S. Geological Survey standards and nomenclature.

EXPLANATION FOR GEOLOGIC MAP AND SECTIONS

Anticline

Syncline

Overturned anticline

High-angle fault or fault whose altitude is unknown--Dashed where inferred

Thrust fault--Dashed where inferred. Sawteeth on upthrown block

Contact--dashed where inferred

Boundary of Brooks Range Regional Mineral Resource Assessment Program (RAMRAP) as used in this study

Outline of area selected under sec. 17(d)(2) of the Alaska Native Claims Settlement Act. Numbers refer to the Four National Systems proposal of the Department of the Interior, Dec. 18, 1973. Compiled from maps prepared by the U.S. Bureau of Land Management, December 1973 and March 1974.

1. Gates of the Arctic National Park
2. Kobuk Valley National Monument
3. Cape Krusenstern National Monument
13. Arctic National Wildlife Refuge Additions
15. Selawik National Wildlife Refuge
19. Noatak National Arctic Range

Approximate location of Alyeska pipeline

On Sections

▲ Stratigraphic position of K-Ar age date

+ Stratigraphic position of Pb-alpha age date

Albers Equal Area Projection

SCALE 1:1,000,000

10 0 20 40 60 80 100 MILES

10 0 50 100 150 KILOMETERS

GEOLOGIC MAP OF THE BROOKS RANGE, ALASKA

Compiled by Donald Grybeck, Helen M. Beikman, William P. Brosgé, Irving L. Tailleur and Charles G. Mull

1977

DESCRIPTION OF ROCK UNITS

STRATIFIED SEDIMENTARY AND VOLCANIC ROCKS, IN PART METAMORPHOSED

Qu	QUATERNARY DEPOSITS, UNDIFFERENTIATED.-- Includes flood plain, alluvial, morainal, outwash, eolian sand, loess, terrace, beach, and landslide 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 north of the Romanzof Mountains
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 northeastern portion of the area
TK	TERTIARY AND CRETACEOUS.-- Shale, sandstone, and conglomerate. Marine and nonmarine unit that occurs only on Jago River
uK	UPPER CRETACEOUS ROCKS.-- Shale, sandstone, conglomerate, bentonite clay and thin coal. Includes the Ninuluk Formation of the Nanushuk Group and the Seabee and Schrader Bluff Formations of the Colville Group
uKc	UPPER CRETACEOUS CONTINENTAL DEPOSITS.-- Sandstone and conglomerate and interbedded shale, clay, silt, and bentonite on the Arctic Coastal Plain; includes the 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
lK	LOWER CRETACEOUS ROCKS.--Graywacke sandstone, shale, siltstone, and conglomerate. Includes part of the Tiglukpuk Formation of former usage, Okpikruak, Fortress Mountain and Torok, Tuktu, and Grandstand Formations; the Kukpowruk Formation in the western Arctic foothills and the Kongakut Formation and Bathtub Graywacke in the eastern Brooks Range and Arctic foothills
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
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
ŦR	TRIASSIC ROCKS.-- Shale, chert, and limestone of the Shublik Formation and quartzitic sandstone of the Karen Creek Sandstone
ŦRPs	TRIASSIC AND PERMIAN SADLEROCHIT GROUP ROCKS.--Sandstone, siltstone, and shale of the Sadlerochit Group in the northeastern Brooks Range. Includes ŦR east of the Canning River and locally elsewhere in northeastern Alaska
ŦRP	TRIASSIC AND PERMIAN ROCKS.-- Undifferentiated Shublik and Echooka Formations in the Coleen River area and undifferentiated Shublik Formation and Permian rocks in western Brooks Range
JP	JURASSIC, TRIASSIC, AND PERMIAN ROCKS.-- Shale, siltstone, and chert in upper part of the Nuka Formation, Siksikpuk Formation (Permian), and Shublik Formation (Triassic). Includes Kingnak Shale in western Brooks Range
MzPz	MESOZOIC AND PALEOZOIC ROCKS.-- Arkosic and glauconitic sandstone, interbedded with shale and chert in the lower part and dolomites, arkosic sandstone and conglomerate in the upper part. Comprises a grossly allochthonous rock sequence in the northwestern Brooks Range that includes rocks of Mississippian, Triassic, Jurassic and Cretaceous age. Includes Nuka Formation and parts of Siksikpuk Formation
P	PERMIAN ROCKS.-- Mostly chert, shale, and siltstone of the Siksikpuk Formation, but includes shale, siltstone and limestone of the Echooka Formation in the southeastern Brooks Range
ℙM	PENNSYLVANIAN AND MISSISSIPPIAN CARBONATE AND CLASTIC ROCKS.-- Limestone, dolomite, chert, shale, and conglomerate. Includes Kekiktuk Conglomerate and Kayak Shale, both of Mississippian Endicott Group, and the Alapah, Wachsmuth, and Wahoo Limestones of the Lisburne Group (Mississippian and Pennsylvanian). Unit differentiated only in eastern Brooks Range. Locally includes ŦRPs in Phillip Smith Mountains and Arctic quadrangles.
M	MISSISSIPPIAN CARBONATE AND CLASTIC ROCKS.-- Mostly limestone with subordinate shale, chert and dolomite. Includes the Utukok and Kogruk Formations of the western Brooks Range; includes all of the Lisburne Group, and the Kayak Shale of the central Brooks Range
Me	MISSISSIPPIAN CLASTIC ROCKS.-- Includes the Kekiktuk Conglomerate and Kayak Shale of the Endicott Group in the northeast portion of the area and correlative shale and conglomerate near upper Noatak River. Includes minor amounts of unnamed brown sandstone of Middle(?) Devonian age northeast Brooks Range
JM	JURASSIC TO MISSISSIPPIAN ROCKS.-- Slate and fossiliferous quartzite of Jurassic and Mississippian age in the southeast corner of the area. Chiefly chert and subordinate fine-grained clastic rocks in western Brooks Range
ŦRD	TRIASSIC TO DEVONIAN ROCKS.-- Radiolarian chert, slate, and argillite of undeterminated thickness in southeast portion of area
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. Includes unnamed Devonian(?) brown sandstone on upper East Fork, Chandalar River. Consists mainly of a conglomerate unit in the DeLong Mountains
uDk	UPPER DEVONIAN CONGLOMERATE.-- Consists of a clastic sequence of conglomerate and quartzite of the Kanayut Conglomerate in the Endicott Group
uDh	UPPER DEVONIAN SHALE.-- Consists of a clastic sequence of shale and sandstone of the Hunt Fork Shale in the Endicott Group
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 Shublik and Sadlerochit Mountains; limestone, dolomite, marble, and interbedded shale of the Skajit Limestone in the Brooks Range; and the Kugururok Formation in the Delong Mountains and the Eli Limestone in the Baird Mountains; all are parts of the Baird Group as commonly used in the western Brooks Range
lPz	LOWER PALEOZOIC, UNDIFFERENTIATED.-- Graywacke and mudstone unit near Point Hope and semischist and phyllite unit at the southeast corner of map
lPzp	LOWER PALEOZOIC PHYLLITE.-- Phyllite, slate, schist, graywacke, and quartzite along north edge of the Yukon-Koyukuk basin and along East Fork Chandalar River
lPzc	LOWER PALEOZOIC CHERT.-- Chert-phyllite member of the Neruokpuk Formation in the Romanzof Mountains. May be Cambrian or Ordovician
lPzv	LOWER PALEOZOIC PHYLLITE AND VOLCANIC ROCKS.-- Volcanic wackes, agglomerates, quartz semischist, phyllite, and siltstone in the Doonerak anticline; may be Cambrian or Ordovician. Purple and green phyllite and metavolcanic rocks in western Survey Pass quadrangle
lPzs	LOWER PALEOZOIC SCHIST AND MARBLE.-- Schist, marble, and quartzite unit in western Survey Pass quadrangle
€	CAMBRIAN ROCKS.-- Calcareous siltstone and sandstone, phyllite, and sandstone in the Romanzof Mountains
lPzp€	LOWER PALEOZOIC AND (OR) PRECAMBRIAN SCHIST.-- Quartz-mica schist, greenschist, calcareous schist, chlorite-quartz schist, phyllite and quartzite along the southern foothills of the Brooks Range. All or part may be as young Devonian
lPzp€l	LOWER PALEOZOIC AND (OR) PRECAMBRIAN ROCKS.-- Sandstone, limestone, shale, chert, phyllite, argillite and quartzite of the Neruokpuk Formation in the Romanzof Mountains. Includes Ordovician graptolite-bearing shale
p€	PRECAMBRIAN Z ROCKS.-- Semischist, phyllite, and argillite of the Neruokpuk Formation in the Romanzof Mountains

VOLCANIC ROCKS

QTv	QUATERNARY AND TERTIARY VOLCANIC ROCKS.-- Basalt, olivine basalt, and andesite and pyroclastics with some intercalated gravel and conglomerate in the Selawik Hills
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
lKv	LOWER CRETACEOUS VOLCANIC ROCKS.-- Porphyritic andesite and basalt
lKJv	LOWER CRETACEOUS AND JURASSIC VOLCANIC ROCKS.-- Porphyritic pyroxene andesite and trachyandesite flows, andesitic crystal and lithic tuffs, tuffaceous volcanic graywacke, andesite breccia, agglomerate, and conglomerate
JPv	JURASSIC, TRIASSIC, AND PERMIAN VOLCANIC ROCKS.-- Ophiolite 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
Dv	DEVONIAN VOLCANIC ROCKS.-- Includes hornblende diorite, pyroxenite sills and andesitic sills, and some pillow lavas northwest of Chandalar Lake
Ov	ORDOVICIAN VOLCANIC ROCKS.-- Andesitic and basaltic volcanic conglomerate interlayered with phyllite and intruded by gabbro and diorite in Doonerak anticline
€v	CAMBRIAN VOLCANIC ROCKS.-- Mafic vesicular flows, basaltic tuff, agglomerate, and volcanic conglomerate, with limestone interbeds in Romanzof Mountains
f	RHYOLITIC VOLCANIC ROCKS OF UNKNOWN AGE.-- Occur south of the Romanzof Mountains where they may be Paleozoic in age. Also in the lower Paleozoic-Precambrian rocks and lower Paleozoic rocks north of the Kobuk River interbedded in the schists

PLUTONIC AND HYPABYSSAL ROCKS

Kg	CRETACEOUS GRANITIC ROCKS.-- Chiefly quartz monzonite and monzonite with granite, granodiorite, and syenite
JPum	JURASSIC, TRIASSIC, AND PERMIAN ULTRAMAFIC ROCKS.-- Serpentinized peridotite and dunite. In the western Brooks Range and the Christian area occur with bodies of leucogabbro and basalt as part of an ophiolite complex
MzPzg	MESOZOIC AND (OR) PALEOZOIC GRANITIC ROCKS.-- Quartz monzonite and granite in northeast Brooks Range and in western Chandalar quadrangle. Discordant K-Ar and Pb-alpha ages
uPzg	UPPER PALEOZOIC GRANITIC ROCKS.-- Biotite granite and quartz monzonite of Carboniferous age in the southeast corner of the area
g	GRANITIC ROCKS OF UNKNOWN AGE.-- Predominantly quartz monzonite at the eastern end of the area
mi	MAFIC INTRUSIVE ROCKS OF UNKNOWN AGE.-- Altered mafic intrusive and extrusive rocks