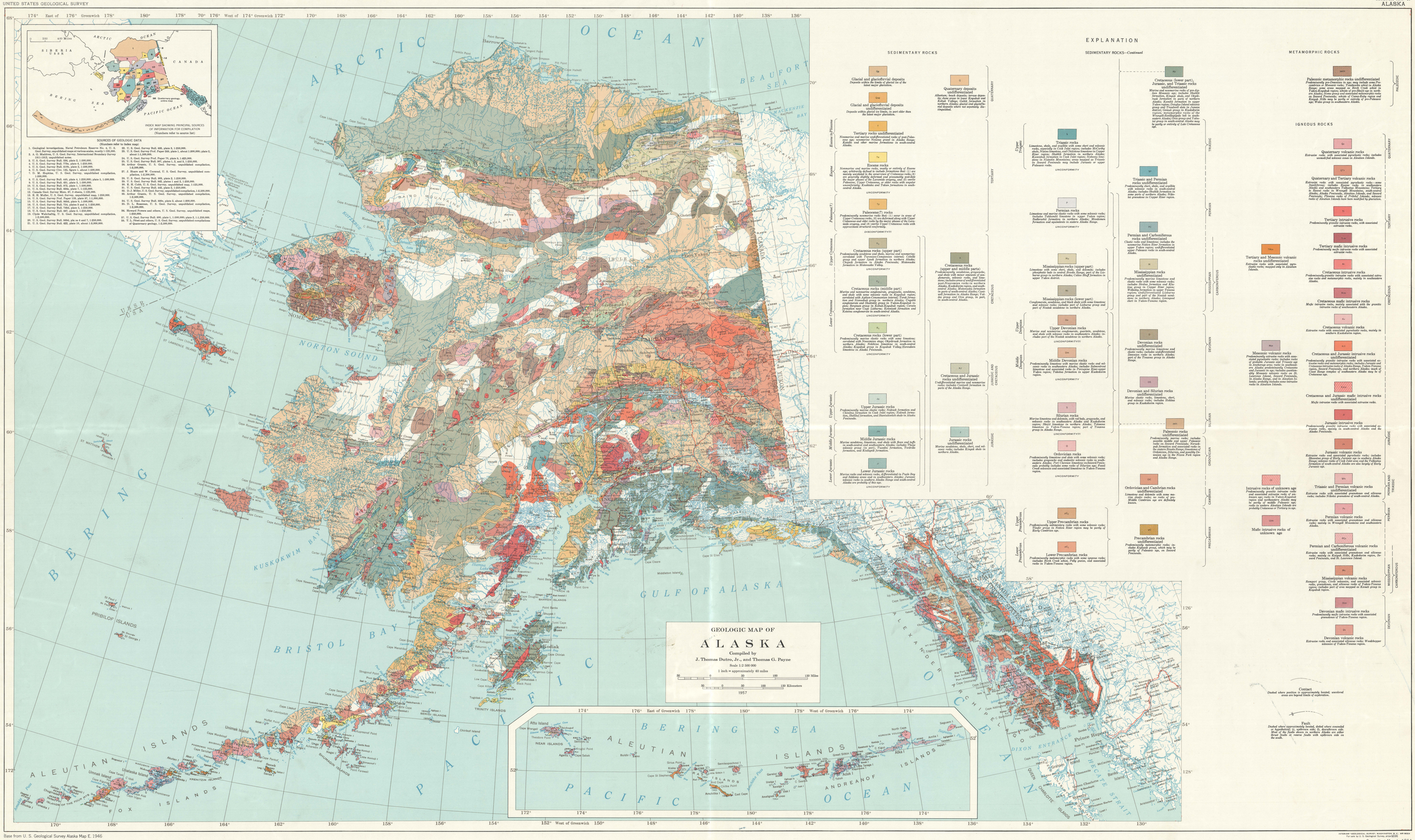

EXPLANATION

SEDIMENTARY ROCKS

Qal — Glacial and glaciofluvial deposits
Deposits within the limits of glacial ice of the latest major glaciation.

Qgd — Glacial and glaciofluvial deposits undifferentiated
Deposits within glacial ice limits, in part older than the latest major glaciation.

Tu — Tertiary rocks undifferentiated
Nonmarine and marine undifferentiated rocks of post-Paleocene age; nonmarine Neogene gravel in Alaska Range; Kenai and other marine formations in south-central Alaska.

Te — Eocene rocks
Nonmarine and marine rocks, mostly or entirely of Eocene age; arbitrarily defined to include formations that: (1) are mainly unrelated to the occurrence of Cretaceous rocks; (2) are unlike Paleocene rocks; (3) are unconformable with the major phases of the Laramide orogeny, and (4) overlie Paleocene, Upper Cretaceous, or older rocks with angular unconformity. Kushtaka and Tukisa formations in south-central Alaska.

UNCONFORMITY

Tp — Paleocene(?) rocks
Predominantly nonmarine rocks that: (1) occur in areas of Upper Cretaceous rocks; (2) are unlike Upper Cretaceous and older rocks by the major phases of the Laramide orogeny, and (3) overlie Upper Cretaceous rocks with approximate structural conformity.

DISCONFORMITY(?)

Kcu — Cretaceous rocks (upper part)
Predominantly sandstone and shale, marine and nonmarine; correlated with Turonian-Campanian interval. Chinitna group and upper Tyonek formation in northern Alaska; Chignik formation in Alaska Peninsula; Matanuska formation in Alaska Range.

UNCONFORMITY

Kcm — Cretaceous rocks (middle part)
Marine and nonmarine conglomerate, graywacke, sandstone, and shale with some volcanic rocks in Kuskokwim region; correlated with Albian-Cenomanian interval. Herendeen Bay and Nowakaski group in northern Alaska; Unalaska conglomerate and Shumagik group in Yukon-Koyukuk region; Kaguyak formation in Alaska Peninsula; Matanuska formation near Cape Lisburne; Kaguyak formation and Katina conglomerate in south-central Alaska.

UNCONFORMITY

Kcl — Cretaceous rocks (lower part)
Predominantly marine shale, with some limestone; correlated with Neocomian-Aptian interval. Chejdinak formation in northern Alaska; Nakolon limestone in south-central Alaska; Kogoluktuk and Kogoluktuk Valley formations limestone in Alaska Range.

UNCONFORMITY

Ju — Upper Jurassic rocks
Predominantly marine shale; Naknek formation and Chinitna formation in Cook Inlet region; Naknek formation, Shelikof formation, and Staniukovich shale in Alaska Peninsula.

Jm — Middle Jurassic rocks
Marine sandstone, limestone, and shale with fossil and tuffaceous volcanic rocks; Tuxedni group in Cook Inlet region; Kaguyak formation (in part), Tuxedni formation, Tordrillo formation, and Kialagvik formation.

Jl — Lower Jurassic rocks
Marine rocks and volcanic rocks, differentiated in Puale Bay region; Talkeetna formation in Cook Inlet region; volcanic rocks in southern Alaska Range and south-central Alaska are probably of this age.

UNCONFORMITY

Q — Quaternary deposits undifferentiated
Alluvium; beach deposits; terrace deposits; glacial deposits; Bootlegger Cove clay, Kobuk Valley, Gubik formation in northern Alaska; glacial and glaciofluvial deposits where not separately distinguished.

QUATERNARY

Ku — Cretaceous rocks (upper and middle parts)
Predominantly sandstone, graywacke, shale, and conglomerate, with some volcanic rocks, and limestone; includes strata of undifferentiated Upper and Middle Cretaceous age in south-central Alaska; Kuskokwim region; and southeastern Alaska; Matanuska formation in parts of south-central Alaska; Chignik formation in Alaska Range; Valdez group in Prince William Sound region, in part, in south-central Alaska.

CRETACEOUS

Ju — Cretaceous and Jurassic rocks undifferentiated
Undifferentiated marine and nonmarine rocks; includes Cantwell formation in parts of the Alaska Range.

JURASSIC AND CRETACEOUS

J — Jurassic rocks undifferentiated
Marine sandstone, shale, chert, and volcanic rocks; includes Kingak shale in northern Alaska.

JURASSIC

Tr — Triassic rocks
Limestone, shale, and volcanic rocks, some chert and volcanic rocks, especially in Cook Inlet region; includes McCarthy shale, Nikina limestone, and Chitistone limestone in Copper River region; Chitistone limestone in Alaska Range; Kamishak formation in Cook Inlet region; Nizhoni limestone in Nizhoni Mountains; areas mapped as Triassic in Seward Peninsula may include Jurassic or upper Paleozoic rocks.

UNCONFORMITY

Tp — Triassic and Permian rocks undifferentiated
Predominantly marine limestone and graywacke with minor volcanic rocks in south-central Alaska; includes Skolai formation in some parts of northern Alaska Range; Nikolai greenstone in Copper River region.

P — Permian rocks
Limestone and marine clastic rocks with some volcanic rocks; includes Tahkandit limestone in upper Yukon region; Nadaleenah formation in northern Alaska; Mankomen formation and equivalents in eastern Alaska Range.

UNCONFORMITY

Pc — Permian and Carboniferous rocks undifferentiated
Chert and limestone; includes the nonmarine Nikolai Esser formation in upper Yukon region; undifferentiated upper Paleozoic rocks in south-central Alaska.

M — Mississippian rocks undifferentiated
Predominantly marine limestone and shale; includes undifferentiated rocks in Copper River region; includes Sinclair formation and Kletina group in Copper River region; Kogrukluk formation in Kuskokwim region; undifferentiated Lisburne group and part of the Nutzotin sandstone in northern Alaska; Mississippian chert in Yukon-Tanana region.

Mu — Mississippian rocks (upper part)
Limestone with some chert, shale, and dolomite; includes phosphatic beds in central Brooks Range; part of the Lisburne group in northern Alaska; Calico Bluff formation in upper Yukon district.

Ml — Mississippian rocks (lower part)
Conglomerate, sandstone, and black shale with some limestone and volcanic rocks; includes part of Lisburne group and part of Nutzotin sandstone in northern Alaska.

Du — Devonian rocks undifferentiated
Predominantly marine limestone and shale rocks; includes undifferentiated Upper and Middle Devonian rocks in south-central Alaska; includes part of the Nutzotin sandstone in northern Alaska.

Dm — Middle Devonian rocks
Predominantly limestone with Devonian fossils; chert and volcanic rocks in southern Alaska; includes Sadlerochit limestone and associated rocks in Porcupine River-upper Yukon region; Tahtsun formation in upper Kuskokwin region.

UNCONFORMITY

S — Silurian rocks
Marine limestone and dolomite, with red beds, graptolite, and volcanic rocks in southeastern Alaska and Kuskokwim region; Skolai limestone in northern Alaska; Tolsona group in Copper River region; part of Tonsina group in Alaska Range.

UNCONFORMITY(?)

O — Ordovician rocks
Predominantly limestone and slate with some volcanic rocks; includes graptolite and trilobite fossils; rocks in southeastern Alaska; Port Clarence limestone on Seward Peninsula probably includes some rocks of Silurian age; Fossil Creek volcanics and associated limestone in Yukon-Tanana region.

UNCONFORMITY

OC — Ordovician and Cambrian rocks undifferentiated
Limestone and dolomite with some marine clastic rocks; no rocks of pre-Middle Cambrian age are definitely known.

PC — Precambrian rocks
Predominantly metamorphic rocks; includes Kigluaik group, which may be partly of Paleozoic age, on Seward Peninsula.

pCu — Upper Precambrian rocks
Predominantly metamorphic and volcanic rocks; Tindir group in Nation River region may be partly of Early Cambrian age.

pCl — Lower Precambrian rocks
Predominantly metamorphic rocks with some igneous rocks; includes Birch Creek schist, Fossil gneiss, and associated rocks in Yukon-Tanana region.

Kc — Cretaceous (lower part), Jurassic, and Triassic rocks undifferentiated
Marine sandstone, shale, and volcanic rocks of pre-Albian Mesozoic age; includes Shuklik formation, Kingak shale, and Okpikruak formation in parts of northern Alaska; Kandik formation in upper Yukon region; Nutzotin sandstone, Chisana group and Tanacross group in Tanana district; Gemuk group in Kuskokwim region; Tuxedni group in Cook Inlet and Wrangell-Kenilgingah belt in southeastern Alaska; Orca group and Valdez group in Prince William Sound region, in part, in south-central Alaska.

Sv — Silurian and Devonian rocks undifferentiated
Marine clastic rocks, limestone, chert, and volcanic rocks; includes Itkilinna group in Kuskokwin region.

Sd — Paleozoic rocks undifferentiated
Predominantly marine rocks; includes possible middle and upper Paleozoic rocks on Seward Peninsula, Nyrnak on eastern Brooks Range, Innoko group in Ophir region, and Nikolai greenstone in the Nizina Park region and Alaska Range.

pMzu — Upper Paleozoic and Mesozoic rocks undifferentiated
Predominantly marine rocks; includes Permian rocks on Seward Peninsula, Nerukpuk formation and associated rocks in the eastern Brooks Range, Innoko group in Ophir region, and Nikolai greenstone in the Nizina Park region and Alaska Range.

pMzl — Lower Paleozoic and Mesozoic rocks undifferentiated
Predominantly marine rocks; includes Ordovician rocks on Seward Peninsula, Nerukpuk formation and associated rocks in the eastern Brooks Range, Innoko group in Ophir region, and Nikolai greenstone in the Nizina Park region and Alaska Range.

TRIASSIC; PERMIAN; CARBONIFEROUS; MISSISSIPPIAN; DEVONIAN; SILURIAN; ORDOVICIAN; CAMBRIAN; PRECAMBRIAN

METAMORPHIC ROCKS

pzpm — Paleozoic metamorphic rocks undifferentiated
Predominantly schist and marble; includes Ordovician Kanoyak group, Paleozoic schist in Alaska Range; some areas mapped as Birch Creek schist in Yukon-Koyukuk region; schists of pre-Devonian age in southeastern Alaska; Nome group and associated metamorphic rocks in Seward Peninsula; Paleozoic schist in Ophir region; Kuiyuk Hills may be partly or entirely of pre-Paleozoic age; Wales group in southeastern Alaska.

PALEOZOIC

IGNEOUS ROCKS

Qv — Quaternary volcanic rocks
Extrusive rocks with associated pyroclastic rocks; includes unmodified volcanic cones in Aleutian Islands.

QUATERNARY

QTv — Quaternary and Tertiary volcanic rocks
Extrusive rocks with associated pyroclastic rocks—some Quaternary rocks may be included in south-central Alaska and southeastern Yukon-Tanana Mountains; Tertiary in Seward rocks in Wrangell Mountains, south-central Alaska, southeastern Alaska, Kenai Peninsula, Alaska Peninsula; Pliocene rocks of Pribilof Islands; Miocene rocks of Aleutian Islands have been modified by glaciation.

Tv — Tertiary intrusive rocks
Predominantly granitic intrusive rocks, with associated extrusive rocks.

TERTIARY

Tmiv — Tertiary and Miocene volcanic rocks undifferentiated
Extrusive rocks with associated pyroclastic rocks; mapped only in Aleutian Islands.

Tmi — Tertiary mafic intrusive rocks
Predominantly mafic intrusive rocks with associated extrusive rocks.

Ki — Cretaceous intrusive rocks
Predominantly granitic intrusive rocks with associated extrusive rocks and metamorphic rocks, mainly in southeastern Alaska.

Km — Cretaceous mafic intrusive rocks
Mafic intrusive rocks, mainly associated with the granitic intrusive rocks of southeastern Alaska.

Kv — Cretaceous volcanic rocks
Extrusive rocks with associated pyroclastic rocks, mainly in southern Kuskokwim region.

CRETACEOUS

Mzv — Mesozoic volcanic rocks
Predominantly extrusive rocks with associated pyroclastic rocks; includes rocks mapped as Triassic in Copper River region, Cretaceous-intrusive rocks of Alaska Range, Yukon-Tanana region, Seward Peninsula, and northern Alaska; much of Coast Range complex of southeastern Alaska may be of Cretaceous age.

KJi — Cretaceous and Jurassic intrusive rocks undifferentiated
Predominantly granitic intrusive rocks with associated extrusive rocks; includes Jurassic-intrusive rocks and Cretaceous-intrusive rocks of Alaska Range, Yukon-Tanana region, Seward Peninsula, and northern Alaska; much of Coast Range complex of southeastern Alaska may be of Cretaceous age.

KJm — Cretaceous and Jurassic mafic intrusive rocks undifferentiated
Mafic intrusive rocks with associated extrusive rocks.

Ji — Jurassic intrusive rocks
Predominantly granitic intrusive rocks with associated extrusive rocks, mainly in south-central Alaska and the Alaska Peninsula.

Jv — Jurassic volcanic rocks
Extrusive rocks and associated pyroclastic rocks; includes Sitkalidak group of Early Jurassic age in southern Alaska Peninsula; Talkeetna formation in Alaska Range; Chinitna formation of south-central Alaska are also largely of Early Jurassic age.

JURASSIC

Ui — Intrusive rocks of unknown age
Predominantly granitic intrusive rocks with associated extrusive rocks; ages of most known only rocks in Yukon-Kuskokwin region and northwestern Alaska may be partly of middle Paleozoic age; rocks in eastern Aleutian Islands are probably Cretaceous or Tertiary in age.

Um — Mafic intrusive rocks of unknown age

TRv — Triassic and Permian volcanic rocks undifferentiated
Extrusive rocks with associated pyroclastic and volcanic rocks; includes Nikolai greenstone of south-central Alaska.

TRIASSIC AND PERMIAN

Pv — Permian volcanic rocks
Extrusive rocks with associated pyroclastic and volcanic rocks; mainly in Wrangell Mountains and southeastern Alaska.

PERMIAN

PCv — Permian and Carboniferous volcanic rocks undifferentiated
Extrusive rocks with associated pyroclastic and volcanic rocks; mainly in Kuiyuk Hills, Kuskokwim region, Seward Peninsula, and St. Lawrence Island.

Mv — Mississippian volcanic rocks
Rampart and Tonsina groups; Mississippian associated volcanic rocks, pyroclastic, and siliceous rocks of Yukon-Tanana region; includes part of area mapped as Kemik group in Kuyukuk region.

MISSISSIPPIAN; CARBONIFEROUS

Dm — Devonian mafic intrusive rocks
Predominantly mafic intrusive rocks with associated granodiorites of Yukon-Tanana region.

Dv — Devonian volcanic rocks
Extrusive rocks and associated siliceous rocks; Wandeknegger volcanics of Yukon-Tanana region.

DEVONIAN

Contact
Dashed where position is approximately located; unnoticed areas are beyond limits of exploration.

Fault
Dashed where approximately located, dotted where concealed or hypothetical; U, upthrown side; D, downthrown side. Most of the faults shown in northern Alaska are either thrust faults or reverse faults with upthrown side on the south.

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