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BEDROCK GEOLOGY OF THE MT. MICHELSON C-1 QUADRANGLE, ARCTIC NATIONAL WILDLIFE REFUGE NORTHEASTERN ALASKA

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GEOLOGIC MAP SYMBOLS


Strike and dip of bedding

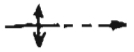

Strike and dip of bedding where stratigraphic top is known

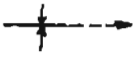

Strike and dip of overturned bedding


Apparent strike and dip of bedding


Horizontal bedding


Strike and dip of cleavage


Strike of the axial trace and plunge of the axis of a large anticline, dashed where approximately located


Strike of the axial trace and plunge of the axis of a large syncline, dashed where approximately located


Axial trend of a small anticline


Axial trend of a small syncline

Contact, solid where known, dashed where approximately located, dotted where inferred, queried where questionable


Fault, solid where known, dashed where approximately located, dotted where inferred, queried where questionable


Thrust fault, teeth on upper plate, solid where known, dashed where approximately located, dotted where inferred, queried where questionable

Form lines, trace of bedding

Breccia zones

DESCRIPTION OF MAP UNITS

TKc **Upper Cretaceous Turbidites (correlative with the Canning Formation of Molenaar, Bird, and Kirk, in press)** Gray to brown and black, very fine- to medium- grained, thin- to thick-bedded, interbedded lithic sandstone, siltstone, shale, and minor tuff and bentonite. Bouma intervals are variable, shows evidence of shallowing-upward depositional environments. Sandstone are petrographically similar to those in the Arctic Creek facies (Molenaar and others in press) of Albian(?) age. The lower contact with the Hue Shale (Molenaar and others in press) is located whenever possible at the first up-section occurrence of sandstone or siltstone turbidites.

Kh **Hue Shale (Molenaar et al in press) (formerly the Shale Wall member of the Sea Bee Formation of the Colville Group)** Multi colored organic-rich shale, siltstone, tuff and bentonite. Distinguished from underlying Pebble Shale by brightly colored (generally shades of red, orange, and, maroon) low relief exposures, and the first upsection occurrence of bentonite.

ARCTIC CREEK UNIT

The Arctic Creek unit consists of deformed Cretaceous (Albian) turbidites and shale which occur in poorly exposed low relief hills east of Ignek Valley between the Shublik Mountains and the Aichilik River. Preliminary studies of the Arctic Creek unit indicates that the section includes, from bottom to top, black shale (Jurassic to Early Cretaceous), manganiferous shale, interbedded black shale and siltstone turbidites, and sandstone turbidites (Albian). Bentonite occurs locally but its volume and stratigraphic significance could not be determined due to the poor exposures. Beds are generally south-dipping and the section has been repeated along north-vergent faults. The Arctic Creek unit is dissimilar to the typical Cretaceous section exposed in Ignek Valley. The more typical Ignek Valley sequence consists of Kingak Shale (Jurassic to Neocomian), Kemik Sandstone (Hauterivian), Pebble Shale (Hauterivian-Barremian), Hue Shale (Aptian? to Santonian), and turbidites of the Canning Formation (Campanian to Paleocene). The two main differences which distinguish the Arctic Creek unit from the typical Ignek Valley section are: 1) the lack the regionally persistent Kemik Sandstone in the Arctic Creek section, and 2) the lack of Albian turbidites in the typical Ignek Valley section.

The Arctic Creek unit is more similar to the Cretaceous section exposed at Bathtub Ridge about 180 km to the southeast. The Bathtub Ridge section consists of black shale with local siltstone beds (Jurassic to Lower Cretaceous), manganiferous shale, interbedded shale and siltstone turbidites (Albian), and sandstone turbidites (Albian?).

The Arctic Creek and Bathtub Ridge sequences probably were once part of a continuous depositional basin, and the Arctic Creek unit has been thrust northward into juxtaposition with the typical Ignek Valley strata.

Kas **Sandstone turbidites**: Sandstone turbidites of the Arctic Creek unit (Molenaar and others, 1987) consists of gray to brown, very fine- to medium- grained, thin to very thick bedded quartzose lithic sandstone and siltstone, interbedded with black shale. Bouma intervals are variable but generally contain well developed Tc intervals in turbidites thinner than 30 cm while thicker beds are dominated by Ta and Tab intervals. Amalgamated Tbcbc turbidites are common along the Hulahula River section. Although poorly exposed, sandstone beds at the base of the turbidite section are up to 3 meters thick and can be traced for several kilometers on arial photographs. These beds coarsen and thicken upward from the underlying siltstone turbidites and probably were deposited in a non-channelized outer-fan environment.

The outer-fan deposits are overlain by thin to medium bedded turbidites arranged in weakly developed thinning and fining upward cycles well exposed along the Hulahula River and less well exposed along the Kekiktuk River. Turbidite facies C, D, and E are most common, and channelization occurs locally. These beds are laterally discontinuous and probably were deposited in a channelized middle-fan environment.

Petrographically, sandstones clasts consist of varying porportions of quartz (including chert), mica (prodominantly white mica), and carbonate, with relatively few rock fragments. Carbonate grains typically are composed of individual or composite hexagonal plates most likely from the disaggregation of echinoid shells. Carbonate grains comprise from 5% to 95% of the rock but are commonly disolved in the deeply weathered surface outcrops. Carbonate-rich beds are up to tens of centimeters thick and have excellent dissolution porosity potential in the subsurface.

The stratigraphic thickness of the sandstone turbidite unit is uncertain due to several thrust faults and folds which repeat section. A composite section generalized from the several thrust sheets is 1800 m thick.

KJas **Shale** Black shale underlies the sandstone turbidites and includes the type locality of the Kingak Shale (Leffingwell, 1919). However, a thrust fault is suspected to occur between the sandstone turbidites and the type Kingak exposures. Shale beds with demonstrable stratigraphic continuity immediately below the sandstone turbidites are unfossilliferous and may be in part correlative with the Pebble Shale in Ignek Valley or the manganiferous shale at Bathtub Ridge. Low in the shale section, black clay shale with red-weathering ironstone beds and nodules predominates. Higher in the section, blue-black chatoyant shale occurs. The characteristic color probably is due to manganese oxide on weathered surfaces. The chatoyant shale also contains red weathering ironstone beds and is more resistant than the underlying black shale. The stratigraphic thickness of the shale units beneath the turbidites is uncertain, but it occurs over an outcrop distance of 5 km south of Kikiktat Mountain.

Kongakut Formation

The Kongakut Formation (Detterman et al, 1975) is a lower and upper Cretaceous sequence of shale, siltstone and sandstone. The Formation is divided into four members, they are in descending order; the Siltstone member, the Pebble shale member, the Kemik Sandstone member, and the Clay shale member. Only the Pebble Shale and Kemik Sandstone members have been mapped in the Sadlerochit Mountains. The Pebble Shale member is the most distinctive unit in the formation, is at least 160 meters thick and contains a manganese-rich zone near the middle of the section. Flattened, highly polished chert pebbles up to 2.5 cm in diameter as well as minor well rounded quartz grains are present throughout the section. Clay ironstone nodules are also common. The pebble shale member has little fauna to offer as an indicator of depositional environment is interpreted by Detterman et al (1975) as indicating a deepwater, inhospital environment. The Kemik Sandstone member is mainly a fine-grained, medium- to thick-bedded subfeldspathic quartz arenite near the top of the member and is a feldspathic wacke in the lower part. White tripolitic chert grains and pebbles are characteristic throughout the Kemik section. The Kemik contains sparse megafossil fauna consisting of ammonites, pelecypods, belemnites, gastropods, and annelid worms (Knock, 1987). A distinctive ammonite assemblage including Simberskites sp. indicates a Hauterivian (Early Cretaceous) age (Mull, 1986). The Kemik Sandstone and Pebble Shale units occur above a regionally extensive lower Cretaceous age unconformity (LCU) (Craig et al, 1985 and Mull, 1986) which cuts up section to the east across the Sadlerochit Mountains. This results in the deposition of the Kemik Sandstone on successively younger rocks to the east. For example, along the north flank of the Sadlerochit Mountains west of the Nularvik River, Kemik Sandstone was deposited on Kingak Shale of early Jurassic age; and at Marsh Creek, 6 kilometers to the east, Kemik was deposited on the Ledge Sandstone member of the Ivishak Formation of lower Triassic age. East of the Itkilyariak River, Kemik was deposited on Fire Creek Sandstone, the lower to middle Triassic age member of the Ivishak Formation; and at Last Creek, still farther to the east in the Sadlerochit Mountains, Kemik was deposited on sediments of the Shublik Formation of upper Triassic age.

lKps **Pebble Shale Member** Dark-gray to black shale and silty shale with locally abundant quartz and black chert pebbles. Zones containing clay ironstone concretions commonly occur in weakly recrystallized beds and lenses which display atleast some original sedimentary structures.

lKk **Kemik Sandstone Member** Medium- to dark-gray siltstone and very fine grained sandstone with common pebbles. Unit is extensively burrowed. Consists in general of a lower thin- to medium-bedded, hummocky, cross stratified sandstone alternating with highly bioturbated muddy sandstone, overlain by a unit composed of clean, cross bedded, conchoidally fracturing sandstone, and muddy sandstone with vertical, U-shaped burrows. A basal conglomerate commonly occurs overlying the unconformity (LCU) surface (Knock, 1987).

Kingak Shale

The Kingak Shale (Leffingwell, 1919) consists primarily of dark, noncalcareous shale, siltstone, claystone and clay ironstone that ranges in age from Early Jurassic to Early Cretaceous (Valanginian) and conformably to disconformably overlies rocks of the Shublik Formation, Karen Creek Sandstone and Kemik Sandstone. The lowest part of the Kingak consists of up to 180 meters of fissile black shale that contains abundant clay ironstone concretions locally. Overlying the basal shale unit is a unit composed of at least 100 meters and possibly as much as 300 meters of dark gray, clay shale and claystone. The upper part of this unit contains beds and nodules of clay ironstone that weather to a characteristic brick red (Detterman et al, 1975). The concretions in the Kingak commonly contain distinctive quartz veining within the core of the concretions; a characteristic that may aid in the identification of the Kingak Shale where it is not fossiliferous.

JKk **Kingak Shale** Black fissile shale, and claystone that is rarely silty, and contains some chert and quartz pebbles locally. Common clay ironstone concretions and ironstone layers, that are typically recrystallized. Ironstone rich layers weather to a brick red color. Unit contains a distinctive assemblage of ammonites locally. Ironstone is more common than in the Pebble Shale.

Shublik Formation

The Shublik Formation forms a distinctive and readily recognizable unit in northern Alaska. In northeastern Alaska, the unit occurs in a narrow belt along the north flank of the Brooks Range and along the Sadlerochit and Shublik Mountains. In structurally complex areas, the Shublik may be missing, or duplicated. In most of northeastern Alaska, the Shublik Formation is divided informally into three members: the lowest member is the siltstone member, an overlying limestone and dolomite member, which is in turn overlain by a clay shale member. The siltstone member is composed predominantly of dark siltstone and calcareous siltstone with a high organic content. The contact with the underlying Fire Creek Siltstone Member of the Ivishak Formation is an unconformity and is marked by a thin but widely distributed chert pebble conglomerate horizon that overlies silty shale of the Fire Creek. Calcite may constitutes between 20 and 40 percent of the siltstone locally and is of secondary origin (Detterman et al, 1975). Conformably overlying the basal siltstone member is the limestone and dolomite member that contains many coquinite layers, most of which contain significant amounts of phosphate. Calcite is the dominant component of rocks in this member and constitutes as much as 90 percent of the rock. Secondary dolomite is present and may constitute up to 20 percent of the rock locally. The clay shale member at the top of the formation is predominantly a very fine-grained, silty, calcareous sandstone. The Shublik Formation forms a widespread sequence of rocks that ranges from 100 to 150 meters thick. Locally, structural duplication may account for much thicker sections.

Porosities in the Shublik Formation range from 5 to 30 percent (Jones and Speers, 1976) and total organic carbon contents range from 0.5% to 2%. The formation has fairly good source rock potential and reservoir potential. It has produced gas at the Kemik field and it is part of the main reservoir at Prudhoe Bay.

Trs **Shublik Formation** Thin- to medium-bedded, fine- to medium-grained, calcareous and siliceous, phosphatic, sandstone interbedded with dark, sooty limestones and calcareous siltstone. The unit is very fossiliferous locally and forms subdued outcrops due to its incompetent nature. Horizons that contain abundant phosphate nodules weather a light blue color.

SADLEROCHIT GROUP (Detterman et al, 1975)

Ivishak Formation

The Ivishak Formation (Keller and others, 1961) is the upper-most formation of the Sadlerochit Group in northern Alaska. The contact between the Ivishak and the overlying Shublik Formation is probably a minor unconformity. Fossils from the upper-most Ivishak and the lowest Shublik indicate that there was apparently some local pre-Shublik erosion of the Ivishak section (Detterman et al, 1975).

The Ivishak Formation is broken into three formal members in northeastern Alaska. The Fire Creek Siltstone Member consists of thin-bedded to massive, siliceous siltstone and minor silty shale and argillaceous sandstone. Most of the rocks are cemented by silica, and secondary authigenic calcite has replaced the silica locally (Detterman et al, 1975). Detterman et al (1975) believe that the silica content decreases to the north in the Fire Creek Member. Mud lumps, worm trails and clay ironstone concretions as well as flute and load casts are common in rocks of the Fire Creek Member.

Conformably underlying the the Fire Creek Member is the Ledge Sandstone Member of the Ivishak. The Ledge Sandstone is dominated by a resistant, massive sandstone unit that forms prominent hogbacks ridges and questas along the north flank of the Brooks Range and in the Sadlerochit and Shublik Mountains. The Ledge Sandstone Member in outcrop averages from 15 meters thick near Wahoo Lake to as much as 120 meters thick near the Alaska-Canada boundary. Thicker sections are known in the Sadlerochit Mountains (Harun, 1987). The Ledge Sandstone is primarily a clean, massive, quartz arenite, that occurs in beds that range from .5 to 3 meters thick. Locally the sandstone is conglomeratic, generally in zones in the upper part of the member. A few thin siltstone and silty shale intervals also occur . Compositionally, the siltstones are fine-grained versions of the sandstone with a sericitic clay matrix (Detterman et al, 1975). Chert forms between 30 and 40 percent of the rock. Some of the chert is highly weathered (tripolitic). Tripolitic chert grains are characteristic of this member. The sedmentary stuctures indicate a northerly source area and the Ledge Sandstone unit becomes thinner and finer grained to the south. Regional isopachs of the thickness of the Ledge suggest that it may have been deposited in several depositional centers; one at Prudhoe Bay, one north and east of the Sadlerochit Mountains and a third near and to the east of the Alaska-Canada boundary. Thick accumulations of the Ledge Sandstone Member correspond to these depocenters.

Conformably underlying the Ledge Sandstone Member is the Kavik Member of the Ivishak Formation. The Kavik Member is a recessive-weathering unit of silty shale and siltstone, that varies between 15 meters and 75 meters thick in undisturbed section to structurally repeated sections of over 250 meters thick. Lithologically, the Kavik Member consists of thin-bedded, laminated, silty shale, siltstone and minor argillaceous sandstone. Quartz forms about 30 to 40 percent of the rock, generally in well-rounded grains. Most of the sandstone layers are very fine-grained quartz arenites with a clay-rich matrix.

Porosities in the Ivishak range between 2 and 10 percent for surface samples in the ANWR compared to porosities as high as 30 percent for similar units at Prudhoe Bay. Jones and Speers (1976) suggest that the average porosities in the Ivishak may improve northward away from the mountain front. Therefore, there is a high probably that good reservoir quality sandstones occur in the Ivishak Formation.

The Ivishak Formation contains "dead" oil near the Nularvik River in the Sadlerochit Mountains (Gar Pessel, personnel communication, 1985), it has produced gas at the Kavik field, and it contains the main reservoir. at Prudhoe Bay.

Ivishak Formation

lTrfc **Fire Creek Sandstone** Fine- to medium-grained, medium light brown to brown and gray, dark-brown weathering, thin- to massive-bedded, convolute-bedded, quartz-lithic sandstone interbedded with dark-gray to brown very fine-grained siliceous siltstone and minor shale. The sandstone intervals contain large crossbeds and may represent storm deposits. Shale and siltstone intervals contain abundant mudlumps and show signs of extensive bioturbation. Unit forms a distinctive hump on top of the Ledge Sandstone. The contact between the Fire Creek and the underlying Ledge Sandstone appears to be conformable and gradational.

lTrl **Ledge Sandstone** Fine- to medium-grained, light gray to brown, bone to brownish weathering, thin- to massive-bedded, well sorted, mature quartz sandstone. The sandstone contains abundant pyrite locally. The pyrite occurs as blobs to ten mm in diameter and as disseminated concentrations. Layers of poorly sorted, coarse-grained conglomerate occur near the top of the unit. Clasts in the conglomeratic layers range up to 15mm in diameter and are composed of gray and black chert and black shale in a clean quartz sandstone matrix. Unit is thin to massive-bedded and occurs in beds that range from 2 to 30cm thick that are graded locally. Bottoms of some massive beds contain lobate bed forms. Some good porosity is present in the northern exposures in the Sadlerochit Mountains, where the unit contains dead oil. Contact between the Ledge Sandstone and the underlying Kavik Shale is conformable and is marked by a change in overall bedding character and decrease in grainsize of the sandstone. Thickness of the Ledge Sandstone ranges up to 150 meters.

lTrk **Kavik Shale** Dark reddish-brown to black and brown, bone weathering, fine- to very-fine grained, thin-laminated, to thin-bedded, and cross stratified, sandy siltstone and shale. Contains spheroidal-weathering sandstone clots locally. Some thin laminated, flaky, black shale occurs near the top of the unit. Contains ripup clasts and pyrite concentrations as blobs and disseminations along bedding surfaces. Often contains brachiopods and crinoid debris and the trace fossil zoophycus(?). Up to 15 meters thick locally.

Echooka Formation

Conformably to disconformably underlying the Kavik Member of the Ivishak Formation is the Echooka Formation (Keller and others, 1961). The Echooka has been subdivided into two members, the upper member is the Ikiakpaurak Member and the lower member is the Joe Creek Member. The Ikiakpaurak Member consists of a sequence of orthoquartzite, quartzitic sandstone and siltstone that form the main part of the Echooka Formation (Detterman et al, 1975). The sandstones are generally dark, fine-grained quartz arenites. Quartz grains are generally subround to subangular and are cemented by silica that has formed overgrowths. Calcite is a dominant cementing agent locally, and where calcite is the dominant cement, the rocks commonly contain abundant glauconite. Siltstones and shales are essentially fine-grained versions of the quartz arenite with a siliceous clay-rich matrix. The Ikiakpaurak Member ranges from less than 10 meters thick to as much as 110 meters thick in the central part of the Sadlerochit Mountains and it thins rapidly to the north.

Underlying the Ikiakpaurak Member conformably is the Joe Creek Member, a unit dominated by calcareous siltstone, limy mudstone, chert, and limestone. The calcareous siltstone and limy mudstone are composed of 15 to 30 percent detrital quartz and 15 to 30 percent rounded detrital calcite. Euhedral dolomite grains are present and suggest dolomitization of the unit. The limestones in the upper part of the member are quartz calcarenites and contain 10 to 30 percent detrital quartz. Some of the limestone beds are bioclastic limestone or microcoquinite (Detterman et al, 1975) composed of rounded fragments of brachiopods, bryozoans, corals, gastropods and foraminifera. Glauconite is a common constituent of this unit. The Joe Creek Member ranges from 10 meters to 120 meters thick.

Pe **Echooka Formation Undifferentiated** Unit mapped where the Ikiakpaurak Member and the Joe Creek Member are to thin to be represented separately at this map scale.

LISBURNE GROUP

Schrader (1902) described and named a thick sequence of light gray limestone in the Anaktuvak River area, of the central Brooks Range, the Lisburne Formation. Later, Leffingwell (1919) referred to similar rocks in northeastern Alaska as the Lisburne Limestone. Detailed work by Bowsher and Dutro (1957) in the Shainin Lake area, subsequently raised the Lisburne Formation (Limestone) to the Group status and subdivided the rocks into two formations. The lower formation, the Wachsmuth Limestone is of Lower and Upper Mississippian age and consists of banded dolomitic, bioclastic, crinoidal and shaly limestones and minor chert (Sable, 1977). The upper formation, the Alapah Limestone is of Upper Mississippian age and consists of clastic limestone, silicified limestone, shale, chert, and oolitic limestone. The Wachsmuth Limestone apparently thins to the east and northeast and is absent near Lake Peters in the Arctic National Wildlife Refuge. The Alapah Limestone thickens to the northeast of the Shainin Lake area. In the northeastern Brooks Range, the Alapah Limestone is overlain by the Wahoo Limestone (Brosge and others, 1962). The Wahoo Limestone is of Late Mississippian to Early Pennsylvanian age (Armstrong and others, 1970).

Pw **Wahoo Limestone** Light-gray to buff and tan, fine- to medium-grained, thin to massive-bedded, interbedded lime mud and bioclastic grainstone. Bedding ranges from a few centimeters to as much as 10 meters thick. Irregular blobs and layers of gray and black chert are common. Unit is abundantly fossiliferous, and contains a rich fauna of crinoids, brachiopods and bryozoans. Some tan, thin-laminated dolomitic beds occur locally. Top of the unit is marked by a slight unconformity, on which the orange-weathering unit of the Echooka Formation was deposited. Some channeling on the unconformity surface is present. Where the channels are well exposed, large rip up clasts of limestone are present in the channels.

Mau **upper Alapah Limestone** Light- to medium-gray, thin- to medium-bedded limestone that weathers to a buff and very light gray color. Limestones of the upper Alapah weather into small irregular pieces and form distinctive talus aprons below the Wahoo Limestone. The contact between the upper Alapah and the Wahoo Limestone is marked by a massive bed of yellow-brown weathering limestone.

Mal **lower Alapah Limestone** Medium light gray to gray and tan, thin- to massive-bedded limestone that forms a distinctive cliff-forming unit below the upper Alapah Limestone. The contact between the upper Alapah and the lower Alapah unit appears to be conformable. Bedding in the lower unit ranges from less than 1 meter to over 10 meters thick. Near the base of the unit a distinctive clastic sequence composed of sandy and silty lime muds contains large, sand-dominated forset crossbeds. Some dark gray to green and red shale are also present locally.

ENDICOTT GROUP

Brosge and others (1962) described the Kekiktuk Conglomerate as a thin quartzitic chert-pebble conglomerate that occurs beneath the Kayak Shale (Bowsher and Dutro, 1957) and unconformably above rocks of the Neruokpuk Formation (Leffingwell, 1919) throughout much of northeastern Alaska. The formation is almost entirely conglomerate and coarse-grained quartzitic sandstone. Clasts in the conglomerate consist of sub angular to rounded granules, pebbles and cobbles of black, gray, and white chert, quartz, quartzite and sandstone and siltstone (Dutro and others, 1962). Thickness of the Kekiktuk Conglomerate ranges from 0 to more than 100 meters thick, and the unit grades upward from a conglomeratic base into finer grained paralic sediments near the top of the unit (Armstrong and Mamet, 1975). Locally the Kekiktuk Conglomerate contains thin discontinuous coal beds in a sequence of interbedded coarse-grained conglomerate and coarse-grained, calcareous sandstone. A coal sample from a bed in the Kekiktuk Conglomerate collected during the 1985 field season on Leffingwell Ridge just east of the Jago River had a vitrinite reflectance value of 4.0 and an average air dried BTU content of 13,516 (Roy Merrit, DGGS unpublished data). A conglomerate sequence in the

Kekiktuk Conglomerate just east of the Jago River on Leffingwell Ridge is at least 75 meters thick and contains dead oil (DGGS, unpublished data).

Conformably overlying the Kekiktuk Conglomerate and disconformably underlying rocks of the Lisburne Group in the northeastern Brooks Range is the Kayak Shale (Bowsher and Dutro, 1957), a formation dominated by dark gray to black noncalcareous shale and minor siltstone and thin-bedded ferruginous sandstone .

The Endicott Group in the Sadlerochit Mountains is highly variable in nature and ranges from 0 to 25 meters thick. The Kayak Shale thickens to the south in the Shublik Mountains where it ranges up to 100 meters thick.

IMe **Kayak Shale and Kekiktuk Conglomerate** (undifferentiated) Dark gray to black shale and siltstone of the Kayak Shale and sandstone and conglomerate of the Kekiktuk Conglomerate. These rocks occur only sporadically in the Sadlerochit Mountains.

NERUOKPUK QUARTZITE

Leffingwell (1919) named interlayered quartzite, siliceous phyllite, argillite, limestone, and shale that crop out in the Romanzof Mountains the Neruokpuk Schist. Reiser and others (1971, 1978) suggested a Proterozoic age for the Neruokpuk schist and noted that it is generally less metamorphosed to the north. The Neruokpuk Schist is interlayered Proterozoic(?) limestone, calcareous and dolomitic sandstone, shale, phyllite, mafic volcanic rocks, and quartzite that form several mappable units units. In the Demarcation Point Quadrangle, these Proterozoic(?) rocks rocks are overlain unconformably(?) by latest Proterozoic-Lower PaleozPaleozoic Franklinian rocks.

pCn **Neruokpuk Quartzite (undifferentiated)** Crops out in the central and eastern Sadlerochit Mountains. Unit is in thrust fault contact with overlying Katakturuk Dolomite. It is polyformed and contains isoclinal folds and well defined axial plane cleavage as the dominant fabric. Lithologies include: quartzite, fine-grained metasedimentary rocks (locally phyllitic and schistose) and argillaceous dolomite.

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