DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

RECONNAISSANCE BEDROCK GEOLOGIC MAP OF THE GINNY CREEK Zn-Pb-Ag DEPOSIT

Geology by S.M. Curtis, I.F. Ellersieck, C.F. Mayfield, and I.L. Tailleur

Base by U.S. Geological Survey 1956

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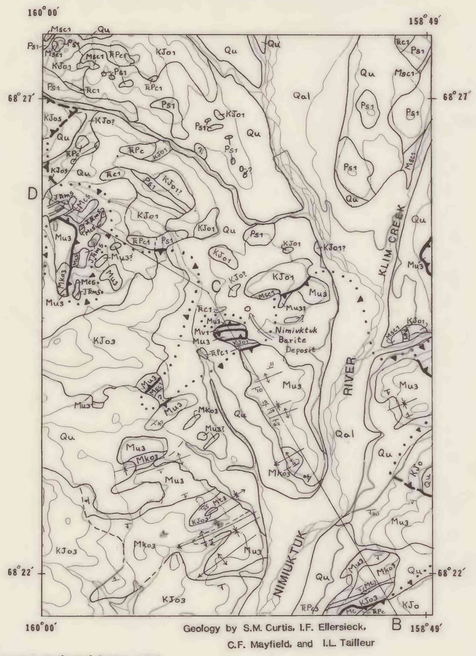

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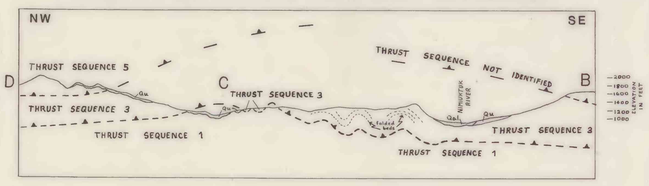
GEOLOGIC SECTION SHOWING THRUST SEQUENCES



SCALE 1:63 360

CONTOUR INTERVAL 200 FEET
CONTOUR INTERVAL 50 FEET IN SOUTH HALF OF GINNY CREEK DEPOSIT MAP

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

GEOLOGIC MAPS

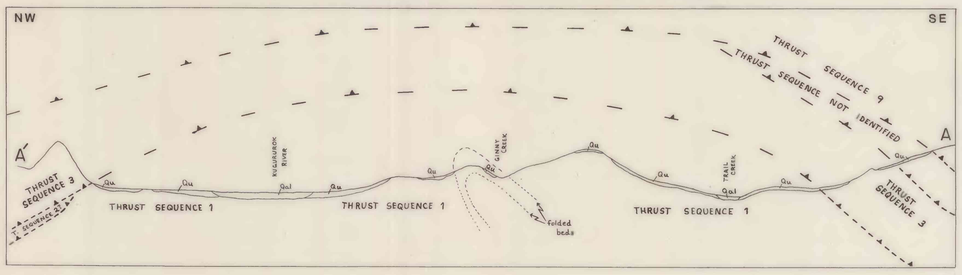
INTRODUCTION

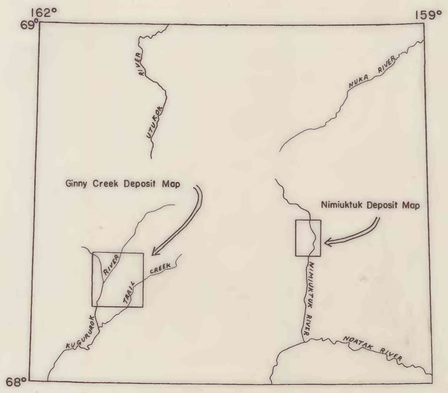
The geologic maps of the Nimiuktuk barite deposit and the Ginny Creek Zn-Pb-Ag deposit occur in an area which is affected by flat thrust faults with tens of kilometers movement. Total displacement has been great enough to superimpose different sedimentary facies in coeval rock units. This is especially true of Mississippian rocks which were deposited as a variety of different sedimentary rock types. Each thrust sheet can be grouped into one of various named thrust sequences consisting of rock units that range in age from Upper Devonian or Mississippian to Lower Cretaceous (with the exception the Misheguk Mountain thrust sequence which is postulated by Patton and others (1977) to be an ophiolite). Most thrust sequences are distinguished from the others by differences in lithology of Mississippian rock units, but there are also subtle differences in Mesozoic rocks. Rock unit symbols are numbered on each map for easy identification of the thrust sequence. There are 9 thrust sequences which can be mapped in the Misheguk Mountain quadrangle, but only portions of 5 thrust sequences appear on these geologic maps. The numbering system for thrust sequences is intended to be consistent with the geologic map of the Misheguk Mountain quadrangle currently being compiled by the authors. Thrust sequences 1, 2, 3, 5, and 9 appear on the maps of this report. If individual map units are colored by the numbers, a thrust sequence map will result; if they are colored by letter symbols, a rock unit (geologic) map will result.

GEOLOGIC MAP SYMBOLS

- Contact, dashed where approximately located
- Fault, dotted where concealed
- Major thrust fault between thrust sequences, dashed where approximately located, dotted where concealed, sawteeth on upper plate
- Minor thrust fault which occurs within a thrust sequence, dashed where approximately located, dotted where concealed, sawteeth on upper plate
- Anticline, showing trace of axial plane and plunge of axis, dashed where approximately located
- Overturned anticline, showing trace of axial plane and plunge of axis
- Syncline, showing trace of axial plane and plunge of axis, dashed where approximately located
- Strike and dip of inclined beds
- Apparent strike and dip of inclined beds
- Areas of observed zinc and lead sulfides at Ginny Creek deposit
- Queried outcrops are plotted mostly from aerial photographs and have not been investigated in the field

GEOLOGIC SECTION SHOWING THRUST SEQUENCES





LOCATION OF GEOLOGIC MAPS IN THE MISHEGUK MOUNTAIN QUADRANGLE

DESCRIPTION OF ROCK UNITS

SURFICIAL DEPOSITS

Qal
Alluvial deposits

Qu
Undifferentiated surficial deposits, includes tundra, soil, lacustrine, talus, and glacial deposits.

} Quaternary

1 — BROOKS RANGE THRUST SEQUENCE

KJo1
Okpikruak Formation
Gray mudstone with minor amounts of thin-bedded wacke.

Unconformity

Rc1 / Ps1

Rc1-Light gray to dark gray chert, has thin siliceous shale partings. Upper part of section contains Triassic pelecypod, Monotis, weathers to cream-colored bed surfaces, and commonly has a few carbonate beds; lower part of section has 5 m interval of black chert which resembles Mississippian chert. Beds have variable concentrations of radiolaria; unit probably about 20-40 m thick.

Siksikpuk Formation
Ps1-Gray chert and gray, olive, and maroon siliceous shale. Middle part of section is mostly shale which grades both up and down into well-bedded gray chert with thin siliceous shale partings; beds have variable concentrations of radiolaria; unit is probably 30-40 m thick.

RPc1-Undifferentiated Permo-Triassic gray chert with minor amounts of shale; may include portions of Siksikpuk Formation.

Mv / Msc1

Msc1-Black carbonaceous shale with lesser interbedded black chert, has few beds of gray to dark gray, medium- to fine-grained limestone. Chert predominates over shale in top 10 m of unit; contains radiolaria. Upper contact with Siksikpuk Formation is prominent orange and yellow weathering clay rich horizon (bentonite?) that has regional extent. Unit is probably more than 40 m thick.

Mv-Felsic volcanic rock. Biotite latite or andesite in Nimiuktuk River map area; porphyritic biotite latite or tuffaceous sediments in Ginny Creek map area. Volcanics are in uncertain position but probably in upper part or top of black shale and chert unit (Msc1); sparse map distribution suggests volcanics were produced by localized eruptions. K-Ar date from biotite in volcanics west of Nimiuktuk River is 333 ± 17 m.y.

Ml1
Lisburne Group
Gray medium-grained limestone with black chert nodules and lenses, resembles Alapah, Wachsmuth, and Kogruk Formations. Recognized only from one group of outcrops in the south central part of Ginny Creek map area; may have not been deposited in section at Ginny Creek deposit; thickness uncertain but probably less than 20 m.

Mk1
Kayak Shale
Black shale with interbedded rusty weathering fossiliferous limestone and pyritic ironstone concretions, locally contains few thin siltstone and sandstone beds; common fossils include crinoids, brachiopods, and bryozoa. Thickness of unit is probably controlled by faults and ranges from 10 m to greater than 40 m.

Mu1
Utukok Formation
Gray coarse-grained limestone with local interbeds of sandstone; locally contains numerous crinoid and brachiopod fragments. Gradational at base into Noatak Sandstone; unit is approximately 20 m thick at Ginny Creek deposit.

MDn1
Noatak Sandstone
Interbedded sandstone, siltstone, and shale, local sandy calcareous beds have fragments of crinoids and brachiopods. Sandstone and siltstone beds commonly rusty weathering; unit is probably greater than 200 m thick.

2 — KURUK CREEK THRUST SEQUENCE

Mc2
Black chert, well-bedded, few siliceous black shale partings; beds have variable amounts of radiolaria, local white-weathering rind on bed surfaces; unit is about 40-60 m thick.

Ml2
Black fine-grained limestone, weathers light gray; well developed platy beds .3-5 cm thick; unit is about 5 m thick.

Ms2
Black shale, few thin fine-grained limestone and black chert beds, thin-bedded; unit is less than 10 m thick and bounded at base by thrust fault at only exposure west of Kugururok River.

3 — KELLY RIVER THRUST SEQUENCE

KJo3
Okpikruak Formation
Interbedded wacke and mudstone; local conglomerate contains clasts of chert, mafic rocks, granite, and limestone; has Neocomian pelecypod, Buchia; unit has variable thickness.

Unconformity

Rc3 / RPc3

Rc3-Gray and well-bedded chert, has few siliceous shale partings, weathers to gray, brown, or cream-colored surfaces; contains Triassic pelecypod Monotis near top. Beds have variable concentrations of radiolaria; unit is about 30-40 m thick at exposure east of Trail Creek.

RPc3-Undifferentiated Permo-Triassic gray chert with siliceous shale partings; contains radiolaria.

Mt3
Tupik Formation
Interbedded light gray limestone and black chert; unit may be as much as 20-40 m thick in the Nimiuktuk area.

Mk3
Kogruk Formation
Light gray-weathering limestone with black chert nodules and lenses. Common fossils are corals, crinoids, brachiopods, and foraminifera; unit is greater than 300 m thick west of Kugururok River and thins eastward to about 30 m near the Nimiuktuk River.

Mk3 / Mu3
Kayak Shale
Mk3-Black to dark gray shale with few thin orange-weathering limestone beds and ironstone concretions. Unit is less than 20 m thick with fault at base.

Utukok Formation
Mu3-Buff-weathering limestone, sandy limestone, and sandstone, few thin gray shale beds. Contains numerous brachiopods, gastropods, pelecypods, and crinoids; exposed thickness more than 150 m, fault contact at base.

Db3
Baird Group
Light gray limestone and dark gray dolomite, few zones of buff-weathering medium to thin-bedded limestone and minor shale in upper part; dolomite predominates in lower part of unit. Common fossils from upper part of unit are crinoids and brachiopods; from lower part of unit are stromatoporoids, brachiopods, and corals; unit is more than 700 m thick west of Kugururok River.

5 — IPNAVIK RIVER THRUST SEQUENCE

KJo5
Okpikruak Formation
Interbedded wacke, conglomerate, and mudstone; conglomerate contains clasts of chert, mafic rocks, granite, and limestone; unit has variable thickness.

Unconformity

JRms
Diabase sills and dikes; mostly consist of plagioclase and augite.

Mc5
Black well-bedded chert, commonly bleached white near contracts with diabase sills, has few small limestone beds; thickness uncertain because of structural complexities.

9 — MISHEGUK MOUNTAIN THRUST SEQUENCE

Jum
Ultramafic rock, mostly peridotite, may include minor amounts of pyroxenite, dunite, and gabbro.

ALLOCHTHONOUS ROCKS NOT ASSIGNED A SPECIFIC THRUST SEQUENCE

KJo
Wacke and mudstone.

Unconformity

JRm
Mafic volcanic agglomerate, crops out on lower Trail Creek.

} Lower Cretaceous and Upper Jurassic

} Jurassic and Upper Triassic?

RPc / Ps

RPc-Gray chert, few siliceous shale partings; contains radiolaria.

Siksikpuk Formation
Ps-Maroon and gray shale; few gray chert beds contain variable amounts of radiolaria.

} Triassic and Permian

Mc
Black well-bedded chert.

} Mississippian

} Devonian

meta
Metamorphic rock, consists of quartz-muscovite-chlorite-garnet schist, marble, and actinolite-albite-chlorite schist probably derived from pelitic sediments, limestone, and mafic igneous rock.

} Mesozoic? or Paleozoic?

Comparison of thrust sequences in this report with those of other authors

This report	Tailleur and others, 1966	Snelson and Tailleur, 1968; Tailleur and Brosgé, 1970	Martin, 1970	Mayfield and others, 1978	Churkin and others, 1978	Null, 1979 (in press)
Misheguk Mountain thrust sequence (9)	Not distinguished	Misheguk sequence	Ultrabasic pluton sequence	Misheguk Mountain thrust sequence	Not distinguished	Misheguk sequence
Ipnavik River thrust sequence (5)	Ipnavik sequence	Ipnavik sequence	Ipnavik sequence	Ipnavik River thrust sequence	Not distinguished	Ipnavik sequence
Kelly River thrust sequence (3)	Not distinguished	Kelly sequence	DeLong sequence	Kelly River thrust sequence	Not distinguished	Kelly sequence
Kuruk Creek thrust sequence (2)	Sequence at Killigwa River (eastern facies)	Wulik sequence?	Not distinguished	Northwestern Brooks Range thrust sequences	Not distinguished	Not distinguished
Brooks Range thrust sequence (1)	Foothills sequence Assemblage on Drenchwater Creek Sequences at Mount Bupto (eastern facies)	Foothills sequence	Brooks Range sequence Ivotuk Hills sequence (eastern facies)	Northwestern Brooks Range thrust sequences North central Brooks Range thrust sequence (eastern facies)	Lower structural sequence	Endicott sequence (eastern facies)

RECONNAISSANCE GEOLOGY OF THE GINNY CREEK ZINC-LEAD-SILVER AND NIMIUKTUK BARITE DEPOSITS, NORTHWESTERN BROOKS RANGE, ALASKA

BY C.F. MAYFIELD, S.M. CURTIS, I.F. ELLERSIECK, AND I.L. TAILLEUR

1979