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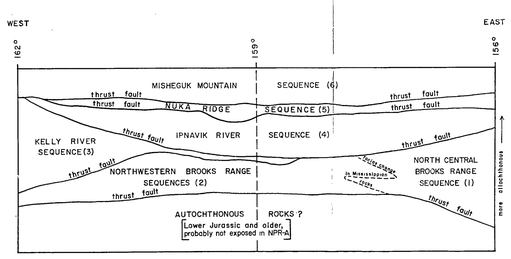

DESCRIPTION OF ROCK UNITS

(FROM MAYFIELD AND OTHERS, 1978)

SURFICIAL DEPOSITS

Q — Unconsolidated surficial deposits, stream alluvium, glacial deposits, tundra soils, and lacustrine deposits — Quaternary

Unconformity

AUTOCHTHONOUS ROCKS

Kc — Colville Group, Turonian to Maastrichtian sandstone, shale, and conglomerate — Upper Cretaceous

Disconformity

Kn — Nanushuk Group, Albian to Cenomanian sandstone, conglomerate, and shale

Kf — Fortress Mountain Formation, Flyschoid wacke, conglomerate, and mudstone; has Albian pelecypods and ammonites

Km — Mudstone with local coquinoid bed consisting of Valanginian pelecypod, Buchia; mapped only on the lower Kiligwa River

Kt — Torok Formation, Gray shale — Upper and Lower Cretaceous

Lower Cretaceous

ALLOCHTHONOUS ROCKS

NORTH CENTRAL BROOKS RANGE THRUST SEQUENCE 1

Disconformity ?

K1 — Flyschoid mudstone and subordinate wacke; has Neocomian pelecypod, Buchia; includes Okpikruak Formation and informally named Ipewik Formation — Lower Cretaceous

Disconformity ?

db1 — Diabase and basalt, occurs mainly as dikes and sills — Jurassic

JP1 — Gray red, and green chert and shale with few fine-grained gray limestone beds in upper third of unit. Has Triassic pelecypod, Monotis, in upper part; includes informally named Blankenship Formation and Shublik and Sikikpuk Formations — Jurassic to Permian

KP1 — Lower Cretaceous to Permian rocks undifferentiated; includes mudstone and wacke (K1) and chert and shale (Ph) in structurally complex terranes — Lower Cretaceous to Permian

KM1 — Lower Cretaceous to Mississippian rocks undifferentiated; includes mudstone (K1), chert and shale (Ph), and limestone (Ml1) in structurally complex terranes — Lower Cretaceous to Mississippian

Ml1 — Lisburne Group, Limestone and dolomite with local black chert nodules in irregular layers; abundant crinoids, corals, brachiopods, and foraminifera; lateral equivalent to Wachsmuth and Alapah Formations

Mks — **Mk** — Kayak Shale, Mks-siltstone, shale, and sandstone; Mk-black shale with few intercalated beds of orange or brown weathering limestone and siltstone — Mississippian

Dk — Kanayut Conglomerate, Includes quartz and chert pebble conglomerate and clean white sandstone

Dss — Sandstone, siltstone, and shale — Lower Mississippian to Upper Devonian

NORTHWESTERN BROOKS RANGE THRUST SEQUENCES 2

Disconformity ?

K2 — Flyschoid wacke, mudstone, and conglomerate with local quartzitic sandstone. Has Lower Cretaceous and Upper Jurassic pelecypod, Buchia; includes Okpikruak Formation and informally named Ipewik formation — Lower Cretaceous to Upper Jurassic

Disconformity ?

ŦRP2 — Gray, red, and green chert and shale with few fine-grained gray limestone beds and Triassic pelecypod, Monotis, in upper part. Includes Shublik and Sikikpuk Formations; locally may include Lower Jurassic oil shale and chert — Triassic to Permian

ŦRM2 — Triassic to Mississippian rocks undifferentiated, includes gray chert and shale (ŦRP2), and black chert and shale (Ml3) in structurally complex terranes — Triassic to Mississippian

KP2 — Lower Cretaceous to Permian rocks undifferentiated; includes wacke and mudstone (K2), and chert and shale (ŦRP2) in structurally complex terranes — Lower Cretaceous to Permian

KM2 — Lower Cretaceous to Mississippian rocks undifferentiated; includes wacke and mudstone (K2), chert and shale (ŦRP2), and black chert and shale (Ml3) in structurally complex terranes — Lower Cretaceous to Mississippian

Ml2 — **Mv** — Lisburne Group, Ml2 - carbonaceous black chert and shale with few dark limestone beds; Mv - rhyolitic tuffs and flows at Drenchwater Creek — Mississippian

FACIES CHANGE, ESPECIALLY IN MISSISSIPPIAN ROCKS

KELLY RIVER THRUST SEQUENCE 3

K3 — Flyschoid wacke and lesser mudstone; has Neocomian pelecypod, Buchia; includes Okpikruak Formation — Lower Cretaceous

Disconformity ?

ŦRP3 — Gray and red chert and shale, has few limestone beds and Triassic pelecypod, Monotis, in upper part; includes Shublik and Sikikpuk Formations — Triassic to Permian

Ml3 — Lisburne Group, Crinoidal limestone with local black chert nodules and beds, and sandy limestone with local sandstone and shale. Includes Tupik, Kogruk, and Utukok Formations — Mississippian

THRUST FAULT

IPNAVIK RIVER THRUST SEQUENCE 4

K4 — Flyschoid wacke and mudstone with local conglomerates; has Neocomian pelecypod, Buchia. Includes Okpikruak Formation — Lower Cretaceous

Unconformity ?

db4 — Diabase and basalt, occurs mainly as sills and dikes — Jurassic

ŦRP4 — Gray, red, and green chert, commonly has diabase sills; subordinate shale — Triassic to Permian

KP4 — Lower Cretaceous to Permian rocks undifferentiated; includes wacke and mudstone (K4), diabase (db4) and chert (ŦRP4) in structurally complex terranes — Lower Cretaceous to Permian

KM4 — Lower Cretaceous to Mississippian rocks undifferentiated; includes gray, red, and green chert (ŦRP4), diabase (db4), and black chert and limestone (Ml4) in structurally complex terranes — Lower Cretaceous to Mississippian

Ml4 — Lisburne Group, Well-bedded black chert and gray limestone with black chert nodules; commonly has diabase sills

Ms — Siltstone, sandstone, and shale — Mississippian

Dl — Light-gray weathering, medium- to fine-grained, thick-bedded limestone and dolomite; has brachiopods and stromatoporoid, Amphipora — Upper and/or Middle Devonian

THRUST FAULT

NUKA RIDGE THRUST SEQUENCE 5

K5 — Flyschoid wacke and mudstone with cannonball concretions; includes Okpikruak Formation — Lower Cretaceous

Disconformity ?

ŦRP5 — Well-bedded gray and red chert with minor shale; has Triassic pelecypod, Monotis, in upper part — Triassic to Permian

KP5 — Lower Cretaceous to Permian rocks undifferentiated; includes wacke and mudstone (K5), and gray chert (ŦRP5) in structurally complex terranes — Lower Cretaceous to Permian

KM5 — Lower Cretaceous to Mississippian rocks undifferentiated; includes wacke and mudstone (K5), chert (ŦRP5), and Nuka Formation (PMn) in structurally complex terranes — Lower Cretaceous to Mississippian

PMn — Nuka Formation, Arkose, arkosic limestone, and glauconitic limestone; has Permian brachiopods and Mississippian cephalopods and foraminifera — Permian to Mississippian

THRUST FAULT

MISHEGUK MOUNTAIN THRUST SEQUENCE 6

db6 — Pillow basalt and diabase, local chert and shale — Jurassic or Older

gb — Layered gabbro consisting of augite and plagioclase with variable amounts of hornblende, orthopyroxene, and olivine — Jurassic or Older

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

MAP SHOWING RELATION BETWEEN AEROMAGNETIC DATA AND GEOLOGY, SOUTHERN NATIONAL PETROLEUM RESERVE IN ALASKA

COMPILED BY
H.A. GIBSON AND I.L. TAILLEUR
1980

INTRODUCTION

The accompanying geologic map and description of rock units represents an interpretation of the geology in the southern part of NPR-A based upon the publications of Tailleur and others, 1966, Snelson and others, 1968, and Martin, 1970.

The south edge of NPR-A (Delong and Endicott Mountains) consists of generally coeval rock assemblages of slightly different facies which are believed to have been superimposed by large-scale horizontal thrust faults. Stratigraphic and structural data indicate that movement on these faults has been from south to north, and it is probable that a distance of more than 160 km would be required to unstack the thrust plates to their original positions. Major foreshortening occurred in the latest Jurassic to middle Cretaceous. Numerous open folds and high angle faults affected the rocks after the thrusting ended.

Rock units have been grouped into discrete thrust sequences. Five of the sequences, the north central Brooks Range, northwestern Brooks Range, Kelly River, Ipnavik River, and Nuka Ridge thrust sequences, have root zones south of the Brooks Range and are allochthonous. The sequence of the Misheguk Mountain thrust sequence have less certain age, but must be Jurassic or older. The relationship between the north central Brooks Range sequence and the northwestern Brooks Range sequences is uncertain; however, apparent transitional facies change in Mississippian rocks and similar structural styles suggest that the northwestern Brooks Range sequences are older thrust faults. The northwestern Brooks Range thrust sequences are not well enough understood to be separated on the map, but discrete sequences may be mappable using shaley versus cherty Mississippian rocks. The diagram below is a schematic cross-section in southern NPR-A showing the relative stacking positions and the east-west distribution of the 6 major thrust plates represented on the map.

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