DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

MISCELLANEOUS FIELD STUDIES
MAP MF-847
FORD AND BREW - JUNEAU A-1 AND A-2, ALASKA

Base from U.S. Geological Survey 1:63,360
Juneau A-1, 1954; Juneau A-2, 1951

APPROXIMATE MEAN DECLINATION, 1976

SCALE 1:31,680
2 MILES
2 KILOMETERS
CONTOUR INTERVAL 100 FEET
DATUM IS MEAN SEA LEVEL

QUADRANGLE LOCATION

Geology by A. B. Ford and D. A. Brew, 1964-65, 1968-69, 1976; assisted by C. D. Miller, 1964-65; W. A. Stopford, 1964; S. W. Nelson, 1965; F.R. Carlson, 1968; P. J. Egan, 1968; J. F. Childs, 1969; J.G. Smith, 1969; A. P. Brew, 1976; B. R. Johnson, 1976; and C. J. Nutt, 1976. Authors' data supplemented by unpublished field data of D. J. Miller and J. S. Pomeroy, 1958, in vicinity of Mount Bradley and McDonough Peak; W. H. Condon, 1958, on ridge east of Rhine Creek; and L. J. P. Muffler, 1962, locally on north shore of Taku Inlet.

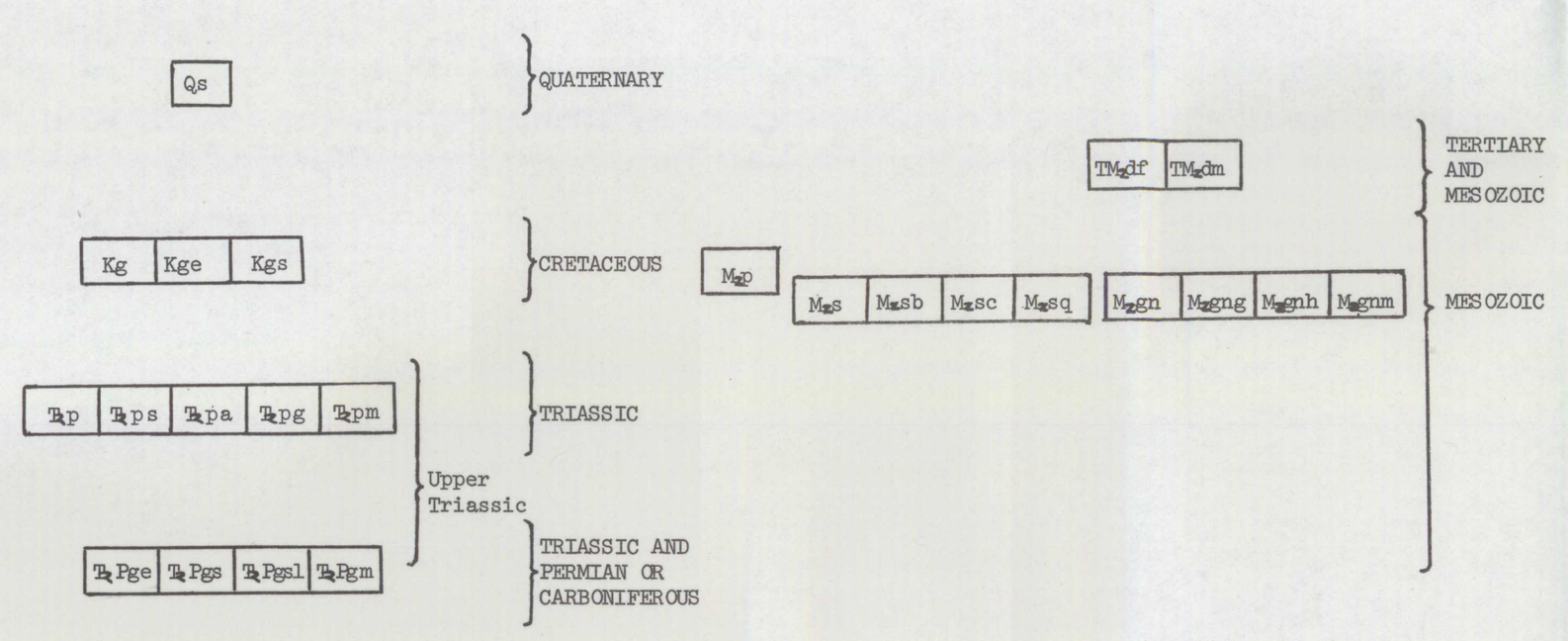
PRELIMINARY GEOLOGIC AND METAMORPHIC-ISOGRAD MAP OF NORTHERN PARTS OF THE JUNEAU A-1 AND A-2 QUADRANGLES, ALASKA

BY

ARTHUR B. FORD AND DAVID A. BREW

1977

CORRELATION OF MAP UNITS



DESCRIPTION OF MAP UNITS

Qs — SURFICIAL DEPOSITS (Quaternary)--Undivided glacial, alluvial, colluvial, marine, and glaciomarine materials

DIKE AND SILL-LIKE BODIES (Tertiary and Mesozoic)--Hypabyssal igneous bodies with varied lithology. Older ones sheared and altered, probably by Late Cretaceous or early Tertiary regional metamorphism. Some dikes are postmetamorphic. Many bodies too small to show at map scale

TMzdf — FELSITE AND METAFELSITE--Generally aphanitic and locally porphyritic. Includes rock as mafic as andesite

TMzdm — MAFIC ROCK--Basalt, diabase, gabbro, and metamorphosed equivalents

GREENSTONE UNIT (Cretaceous)--Mostly metavolcanic rock of subgreenschist and greenschist facies derived from breccia, tuff, and minor flow rock. Basaltic in composition (Ford and Brew, 1977a). Characterized by abundance of relict megacrysts of primary augite in recrystallized groundmass. Common metamorphic phases are albite, white mica, chlorite, pumpellyite, epidote and actinolite, locally with prehnite, clinozoisite, stilpnomelane, and green or brown biotite. In places contains beds or layers of metasedimentary rock. Thickness probably exceeds 1,000 m. Age assignment based on fossil occurrences in the Juneau B-2 quadrangle (Ford and Brew, 1973; D. L. Jones, written comm.,1971). Similar rock in nearby areas termed "augite melaphyre" by Knopf (1912) Designated Douglas Island Volcanics by Lathram, Pomeroy, Berg, and Loney (1965)

Kg — UNDIVIDED GREENSTONE UNIT

Kge — GREENSTONE--Generally massive and weakly foliated greenstone. Grades locally into greenschist. Relict clastic or pyroclastic textures common. Includes minor green semischist and green phyllitic rock

Kgs — METASEDIMENTARY ROCK--Slate, phyllite, argillite, metagraywacke, metasiltstone, and minor metaconglomerate. In places includes layers of metatuff. Locally well bedded. In area of Nevada Creek, cut by numerous dikes and contains highly altered green phyllitic rock that may in part be derived from greenstone of unit Kge. Minor-element content given in Brew and Ford (1969)

Mzp — PHYLLITE, SLATE, AND SEMISCHIST (Mesozoic)--Contains minor greenstone and greenschist on Marmion Island and nearby parts of Douglas Island. Locally very strongly folded. No fossils found. Designated Treadwell Slate by Martin (1926). Perhaps equivalent in part to metasedimentary rock of unit Kgs

SCHIST UNIT (Upper Mesozoic)--Regionally metamorphosed schistose and minor nonschistose rock of the amphibolite facies. Metamorphic grade increases from southwest to northeast (Ford and Brew, 1977b). Highly varied mineralogy. No fossils found. Age given is that of metamorphism, which may actually extend into the early Tertiary (Forbes and Engels, 1970). An extension of the schist belt in the Juneau B-1 quadrangle (Brew and Ford, 1977) and probably in part correlative with the Clark Peak Schist of Martin (1926)

Mzs — UNDIVIDED SCHIST UNIT

Mzsb — BIOTITE AND GARNET-BIOTITE SCHIST--Biotitic schist in places mixed with minor hornblende-bearing schist and calc-silicate rock. Kyanite and sillimanite not found, although present in correlative rocks in the Juneau B-1 quadrangle. Staurolite much rarer than in area to north, and not found south of Taku Inlet

Mzsc — CALC-SILICATE ROCK AND MARBLE--Calcareous metamorphic rock locally mixed with minor biotite- and hornblende-bearing schist

Mzsq — MICACEOUS AND NONMICACEOUS QUARTZITE--Quartzite and quartzitic schist commonly containing white micas and locally conspicuous pyrite. Includes possible metachert. In places mixed with minor biotite schist and calc-silicate rock

GNEISS UNIT (Upper Mesozoic)--Generally light-colored coarsely foliated rock of varied heterogeneity. Includes orthogneiss and gneiss of mixed sedimentary and plutonic origin. Forms part of west margin of Coast Range plutonic complex that on a regional scale truncates isograd pattern of schist belt to west (Ford and Brew, 1977b). Age of parent rock unknown. Age given is that of regional metamorphism, which may actually extend into the early Tertiary (Forbes and Engels, 1970)

Mzgn — UNDIVIDED GNEISS UNIT

Mzgng — GARNET-BEARING GRANITIC GNEISS--Distinctly foliated, generally homogeneous biotite- and hornblende-bearing granitic rock, commonly with epidote and sphene and characteristically with coarse, anhedral to sieve-textured garnet. Quartz dioritic to granodioritic in composition (Ford and Brew, unpublished analytical data). Correlative with orthogneiss of Mount Juneau pluton in Juneau B-1 and Juneau B-2 quadrangles (see sketch map) and probably with orthogneiss southeast of mapped area (Brew and others, 1976)

Mzgnh — HOMOGENEOUS GRANITIC GNEISS--Biotite- and hornblende-bearing foliated granitic rock. Unit east of Taku Inlet equivalent to orthogneiss of Carlson Creek pluton in Juneau B-1 quadrangle (see sketch map)

Mzgnm — MIGMATITIC GNEISS--Heterogeneous mixture of various types of schist and granitic gneiss. Commonly garnet bearing

METAPELITE UNIT (Upper Triassic)--Metamorphic rock of mostly pelitic composition and locally mixed with minor amounts of metavolcanic rock. Commonly with biotite and graphite and locally with garnet in higher grade part of unit. Pyrite locally conspicuous. Quartz veins in places abundant. Outcrop-scale isoclinal folds common. Thickness unknown. Age assignment based on fossil occurrences in slate and phyllite (unit ₮ps) near Bishop Point and in southwest part of Juneau B-1 quadrangle (Brew and Ford, 1977). Probably correlative with part of Gastineau Volcanic Group of Martin (1926) and possibly with metapelitic part of metavolcanic units in vicinity of Grindstone Creek

₮p — UNDIVIDED METAPELITE UNIT

₮ps — SLATE, PHYLLITE, AND ARGILLITE--Contains minor metasiltstone, fine-grained black marble and limestone, quartzite, semischist, and greenstone

₮pa — AMPHIBOLE SCHIST--Green amphibole schist with minor chlorite schist, in small lenticular bodies

₮pg — GREENSTONE--Contains some greenschist and green semischist

₮pm — WHITE MICA-QUARTZ SCHIST AND PARAGNEISS--Distinctive light-colored foliated rock. In part lithologically similar to units Mzsq and ₮Pgm

METAVOLCANIC UNIT (Upper Triassic and Carboniferous or Permian)--Greenstone and greenschist with lesser amounts of metasedimentary rock of varied lithology. Outcrop-scale isoclinal folds common. Thickness unknown. Age assignment based on upper Paleozoic fossils occurring south of Little Sheep Creek and east of Point Salisbury, and Upper Triassic fossils in southwest part of the Juneau B-1 quadrangle (Brew and Ford, 1977). Probably partly correlative with the Gastineau Volcanic Group of Martin (1926)

₮Pge — GREENSTONE--Greenstone with local relict pillow structure and in places mixed with greenschist and minor slate, metagraywacke, and fine-grained black marble and limestone

₮Pgs — GREENSCHIST--Greenschist with local relict pillow structure. In places mixed with minor greenstone and green semischist

₮Pgsl — SLATE AND PHYLLITE--Contains minor metagraywacke, metasiltstone, fine-grained black marble or limestone, quartz-sericite schist, and possible metachert

₮Pgm — WHITE MICA-QUARTZ SCHIST

Contact--Dotted where concealed; queried where indefinite or inferred

Fault--Dotted where concealed; queried where indefinite or inferred; zig-zag lines indicate boundaries of sheared zone

Lineament--Identified in field or from aerial photographs. May be small faults, shear zones, or well-developed joints

Axis of minor fold (labelled F on map), boudin (B), rod structure (R), kink (K), and lineation (unlabelled)

15 — Inclined, showing bearing and plunge

Vertical

Horizontal

Strike and dip of beds--Ball indicates top known

75 — Inclined

Vertical

85 — Overturned

Strike and dip of foliation

85 — Inclined

Vertical

Strike and dip of joints

23 — Inclined

Vertical

Strike and dip of dikes

78 d — Inclined

d — Vertical

staurolite — Metamorphic isograd, based on first appearance of an index mineral--Mineral name on higher grade side of line. Queried where indefinite; dotted where bedrock concealed

pumpellyite out — Metamorphic isograd, based on disappearance of an index mineral--Mineral name on higher grade side of line. Queried where indefinite: dotted where bedrock concealed

F 64AFd5 — Fossil locality, showing field station number.

NOTE: Planar and linear symbols may be combined, where appropriate

REFERENCES

Brew, D. A., and Ford, A. B., 1969, Minor element content of stream-sediment and bedrock samples from southeastern Douglas Island, southeastern Alaska: U.S. Geol. Survey open-file report no. 1239.

——— 1977, Preliminary geologic and metamorphic-isograd map of the Juneau B-1 quadrangle, Alaska: U. S. Geol. Survey Map MF-846, scale 1:31,680.

Brew, D. A., Ford, A. B., Grybeck, Donald, Johnson, B. R., and Nutt, C. J., 1976, Key foliated quartz diorite sill along southwest side of Coast Range complex, northern southeast Alaska, in Cobb, E. H., ed., The United States Geological Survey in Alaska---accomplishments during 1975: U.S. Geol. Survey Circ. 733, p. 60.

Forbes, R. B., and Engels, J. C., 1970, K^{40}/Ar^{40} age relations of the Coast Range batholith and related rocks of the Juneau icefield area, Alaska: Geol. Soc. America Bull., v. 81, p. 579-584.

Ford, A. B., and Brew, D. A., 1973, Preliminary geologic and metamorphic-isograd map of the Juneau B-2 quadrangle, Alaska: U.S. Geol. Survey Map MF-527, scale 1:31,680.

——— 1977a, Chemical nature of Cretaceous greenstone near Juneau, Alaska, in Blean, K. M., ed. The United States Geological Survey in Alaska---accomplishments during 1976: U.S. Geol. Survey Circ. 751B (in press).

——— 1977b, Truncation of regional metamorphic zonation pattern of the Juneau area, Alaska by the Coast Range batholith, in Blean, K. M., ed., The United States Geological Survey in Alaska ---accomplishments during 1976: U.S. Geol. Survey Circ. 751B (in press).

Knopf, Alfred, 1912, The Eagle River region, southeastern Alaska: U.S. Geol. Survey Bull. 502, 61 p.

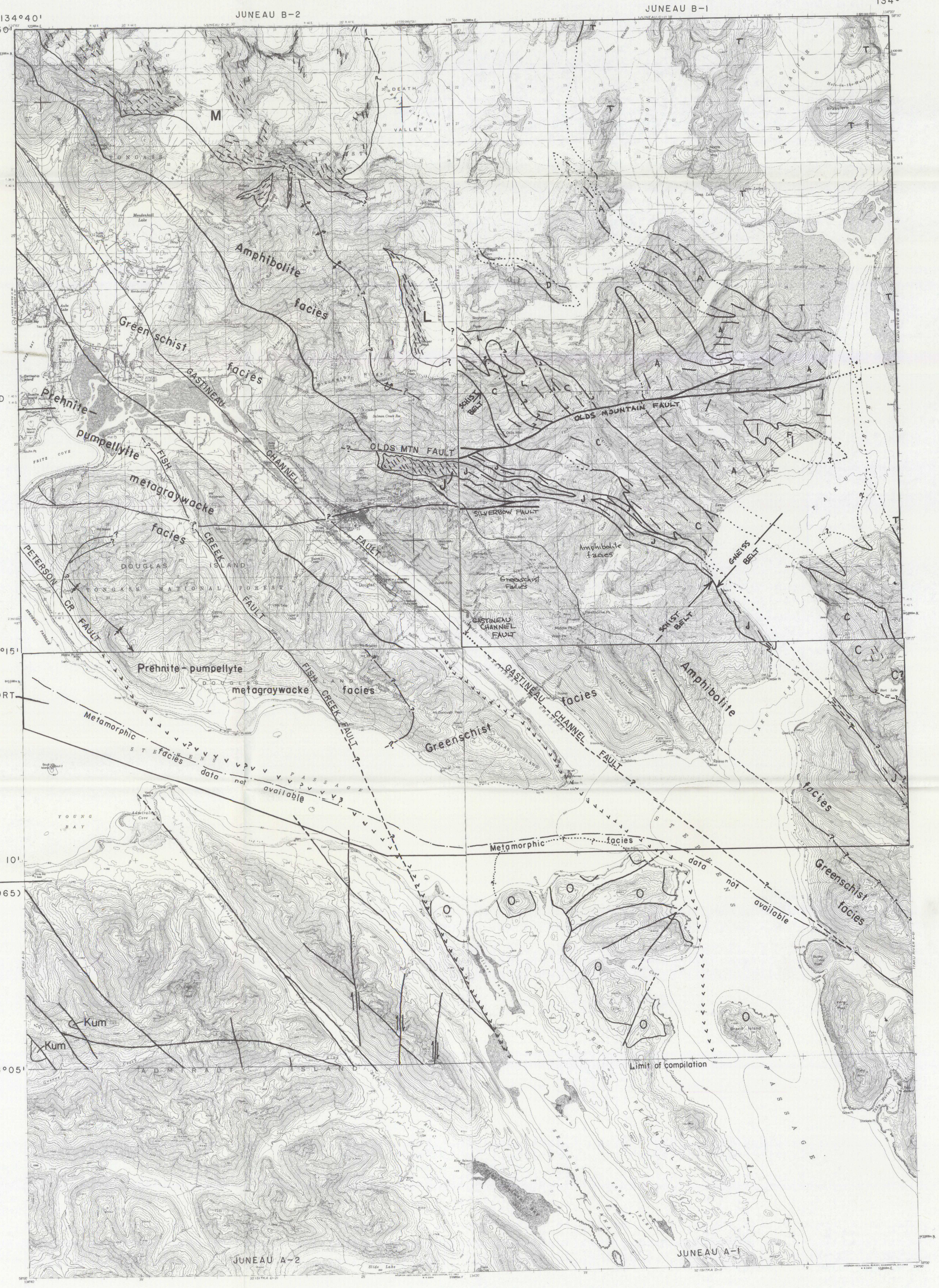
Lathram, E. H., Pomeroy, J. S., Berg, H. C., and Loney, R. A., 1965, Reconnaissance geology of Admiralty Island, Alaska: U. S. Geol. Survey Bull. 1181-R, 48 p.

Martin, G. C., 1926, The Mesozoic stratigraphy of Alaska: U. S. Geol. Survey Bull. 776, 493 p.

JUNEAU B-1 FROM BREW AND FORD (1977); AND JUNEAU B-2 FROM FORD AND BREW (1973)

AREA OF THIS REPORT

COMPILED FROM LATHRAM, POMEROY, BERG AND LONEY (1965)



SCALE 1:125,000

Sketch map of northern parts of the Juneau A-1 and A-2 quadrangles showing relation of major faults, plutons, and distribution of metamorphic facies to those mapped in adjoining areas. Major bodies of quartz dioritic to granodioritic orthogneiss include the Mount Juneau pluton (J); Mendenhall Glacier pluton (M); Lemon Creek Glacier pluton (L); Carlson Creek pluton (C), which may actually be an extension of the Lemon Creek Glacier pluton; Dead Branch pluton (D); and the Annex Lakes pluton (A). The bodies were variably recrystallized and deformed, apparently during a late stage of the synkinematic regional metamorphism of the schist belt dated by Forbes and Engels (1970) as Late Cretaceous or early Tertiary. Younger intrusive bodies include the granodioritic Turner Lake (T) and Flat Point (F) plutons and the largely dioritic Oliver Inlet pluton (O) on northeast Admiralty Island and Grand Island. Lined patterns in plutons show generallized foliation trends. The distribution of metavolcanic rocks of the Douglas Island Volcanics of Lathram, Pomeroy, Berg, and Loney (1965) in the Juneau A-1 and A-2 quadrangles is delimited by lines of "v"s. Kum, on Admiralty Island (from Lathram and others, 1965), indicates mafic and ultramafic bodies.

Interior--Geological Survey, Reston, Va.--1977
For sale by Branch of Distribution, U. S. Geological Survey
Box 25286, Federal Center, Denver, CO 80225