DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

MISCELLANEOUS FIELD STUDIES
MAP MF–846

BREW AND FORD – – GEOLOGIC, METAMORPHIC – ISOGRAD MAP, JUNEAU B–1 QUAD., ALASKA

CORRELATION OF MAP UNITS

Qs Qa Qt Qc Ql Qm		QUATERNARY
SCHIST BELT AND(OR) GNEISS BELT		
GNEISS BELT ONLY	Ta	TERTIARY
	Tgd	
	TKgd	TERTIARY OR CRETACEOUS
gng s sb sa sc sq sm gns gnsb gnsa gnsc gnmc gnm gnh gnhg		UPPER MESOZOIC — MESOZOIC
SCHIST BELT ONLY	a	
	Rp Rpp Rps Rpa Rpq Rpm	UPPER TRIASSIC — TRIASSIC
	RPg RPgs RPgc RPgp RPgsl RPgc RPgm	UPPER TRIASSIC AND PERMIAN(?) — TRIASSIC AND PERMIAN(?)

DESCRIPTION OF MAP UNITS

SURFICIAL DEPOSITS (Quaternary)

- Qs — Undivided surficial deposits
- Qa — Alluvium
- Qt — Talus deposits
- Qc — Colluvium--Locally includes talus deposits
- Ql — Probable lake deposits
- Qm — Morainal deposits--Includes other types of glacial deposits

Units in gneiss belt only

(Equivalent to northeastern gneiss belt of Ford and Brew, 1973)

- Ta — ANDESITE(?) DIKES (Tertiary)
- Tgd — GRANODIORITE OF TURNER LAKE PLUTON (Tertiary)--Medium- to coarse-grained sphene-bearing biotite-hornblende and hornblende-biotite granodiorite varying locally to quartz monzonite; unfoliated or poorly foliated; minor areas of breccia-like migmatite and biotite alaskite; potassium-argon ages reported by Forbes and Engels (1970) suggest that this body is between 46.9 and 52.8 m.y. old
- TKgd — HORNBLENDE-BIOTITE GRANODIORITE AND TONALITE (Tertiary or Cretaceous)--May actually be a phase of the above unit (Tgd)

SCHISTOSE GNEISS UNIT (upper Mesozoic)

- gnsc — Schistose layered calc-silicate gneiss and marble
- gnmc — Migmatitic calc-silicate gneiss and marble

Units in schist belt and(or) gneiss belt

- gng — GARNET GNEISS (upper Mesozoic)--Medium- to coarse-grained garnet-bearing hornblende-biotite-granodioritic gneiss; probably derived from large sills and dikes; possibly equivalent to garnet-bearing homogeneous gneiss (gnhg) unit of this map

SCHIST UNIT (upper Mesozoic)

- s — Undivided schist unit
- sb — Biotite and garnet-biotite schist
- sa — Hornblende and garnet-hornblende schist
- sc — Calc-silicate schist and marble--Includes biotite schist and hornblende schist
- sq — Micaceous and nonmicaceous quartzite
- sm — White mica-quartz schist and gneiss--Distinctive light-colored unit

SCHISTOSE GNEISS UNIT (upper Mesozoic)

- gns — Undivided schistose layered gneiss
- gnsb — Schistose layered biotite and hornblende-biotite gneiss
- gnsa — Schistose layered hornblende and biotite-hornblende gneiss
- gnm — MIGMATITIC HORNBLENDE TONALITE GNEISS -- Heterogeneous mixture of different types of schist and granitic gneiss
- gnh — HOMOGENEOUS GNEISS -- Homogeneous biotite hornblende and hornblende-biotite tonalite and granodiorite gneiss
- gnhg — GARNET-BEARING HOMOGENEOUS GNEISS -- Homogeneous garnet-bearing biotite-hornblende and hornblende-biotite tonalite and granodiorite gneiss

Units in schist belt only

(Equivalent to central schist belt of Ford and Brew, 1973)

- a — AMPHIBOLITE (upper Mesozoic)--Fine- to coarse-grained massive-appearing amphibolite; probably derived from gabbroic sills and dikes; possibly equivalent in part to the hornblende and garnet-hornblende schist (sa) and schistose layered hornblende and biotite-hornblende gneiss (gnsa) units of this map

PHYLLITE UNIT (Upper Triassic)

- Rp — Undivided phyllite unit
- Rpp — Phyllite--Includes minor amounts of slate and semischist
- Rps — Slate--Dark locally carbonaceous slate, contains Late Triassic pelecypods near southern boundary of map area
- Rpa — Amphibole schist--Includes some chlorite schist
- Rpq — Quartzite
- Rpm — White mica-quartz schist and gneiss--Distinctive light-colored unit; probably equivalent to white mica-quartz schist (RPgm) and white mica-quartz schist and gneiss (sm) units

GREENSCHIST UNIT (Permian? and Upper Triassic)

- RPg — Undivided greenschist unit
- RPgs — Greenschist--Unit to south of this map area contains rare large crinoid columnals inferred to be Permian
- RPgc — Greenstone--Includes some greenschist
- RPgp — Phyllite
- RPgsl — Slate--Carbonaceous in part; contains Late Triassic ammonites and pelecypods near southern boundary of map area
- RPgc — Calcareous slate, phyllite, and marble
- RPgm — White mica-quartz schist

Notes

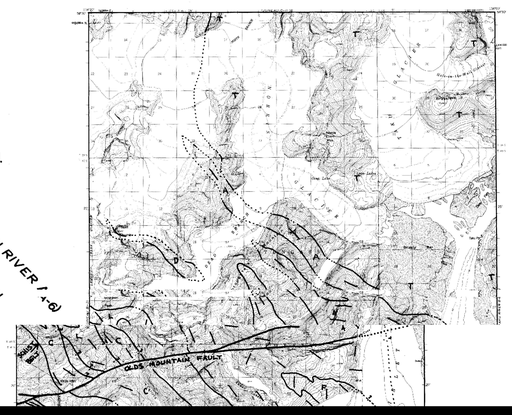
1. Distribution of map units is based on outcrop information from heavily snow- and ice-covered terrain and therefore is subject to a high degree of uncertainty.
2. Ages given above for the phyllite unit, greenschist unit, surficial deposits, andesite(?) dikes (Ta), and granodiorite (Tgd and TKgd) units are ages of deposition or emplacement of those units, as appropriate; all other ages are those of later metamorphism.
3. Generalized correlation of these map units with those in the adjacent Juneau B-2 quadrangle (Ford and Brew, 1973) is given in the following table:

Juneau B-1		Juneau B-2
Garnet gneiss (gng)	–	Homogeneous granitic gneiss (of Mt. Juneau pluton) (cgh)
Amphibolite (a)	–	Hornblende schist, amphibolite and metagabbro (ch)
Phyllite unit	–	Chlorite schist and greenschist (cc) and phyllite and slate (cp)
Quartzite (Rpq)	–	Quartzite and quartzitic white-mica schist (cq)
Greenschist unit	–	Chlorite schist and greenschist (cc); hornblende schist, amphibolite and metagabbro (ch); chlorite schist, greenschist, and hornblende schist (cch); and phyllite, slate and semischist (cps)
Schist unit	–	Biotite schist (cb); migmatite (cgm); hornblende schist and biotite schist (chb); and marble and calc-silicate rocks (cm)
Schistose layered gneiss; migmatitic hornblende tonalite gneiss (gnm); homogeneous gneiss (gnh); and garnet-bearing homogeneous gneiss (gnhg)	–	Homogeneous granitic gneiss (of Mt. Juneau pluton) (cgh); heterogeneous gneiss (migmatite) (ng); homogeneous granitic gneiss (nh); marble and calc-silicate rock (nsm); migmatite related to Lemon Creek Glacier pluton (nlm); and granitic gneiss (orthogneiss) of Lemon Creek Glacier pluton (nlh)
Schistose layered calc-silicate gneiss and marble (gnsc); migmatitic calc-silicate gneiss and marble (gnmc)	–	Marble and calc-silicate rock (nsm); and heterogeneous gneiss (migmatite) (ng)

- Horizontal joint
- Strike and dip of dike
- Strike of vertical dike
- Metamorphic isograd--First appearance of index mineral in pressure northeastward across metamorphic belt. Dotted where inferred; queried where indefinite. See note 2 below
- Fossil locality, approximately located--Number is locality number, Branch of Paleontology and Stratigraphy, U.S. Geological Survey
- Key layer
- Contact, showing dip--Dotted where concealed; queried where indefinite or inferred
- Fault--Dotted where concealed; queried where inferred
- Lineament--Determined by field observation or interpretation of aerial photographs; most are probably small faults or shear zones; some may be well-developed joints
- Minor overturned syncline, showing direction of plunge
- Small fold (marked FA on map), lineation (marked LIN on map), or boudin (marked BOUD on map); showing bearing and plunge
- Horizontal small fold, lineation, or boudin, showing bearing
- Strike and dip of foliation
- Strike of vertical foliation
- Strike and dip of joint
- Strike of vertical joint

NOTES

1. Above foliation, cleavage, and lineation symbols are shown in a variety of combinations where appropriate.
2. Metamorphic isograd pattern based on available control; unusual situations, such as crossing isograds, due in part to lack of control, but the general displacement of the "staurolite" and "staurolite out" isograds to the southeast is probably due to some other cause.
3. Attitude symbols shown within large glacier-covered areas indicate that there was outcrop exposed at the time of mapping.



Base from U. S. Geological Survey 1:63,360, 1967

Geology by D. A. Brew and A. B. Ford, 1964–65, 1968, assisted by C. D. Miller, 1964–65; W. A. Stopford, 1964; S. W. Nelson, 1965; and F. R. Carlson, 1968; and by A. B. Ford and W. C. Hauck, 1970. Unpublished field data of W. H. Condon, J. S. Pomeroy, and H. C. Berg, 1958, and G. Plafker, 1962, used in vicinity of Hawthorne Peak and Sheep Fork of Carlson Creek to supplement authors' data. Petrographic studies in part by M. L. Throckmorton, 1975–76.

Forbes, R. B., and Engels, J. C., 1970, K^{40}/Ar^{40} age relations of the

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 Misc. Field Studies Map MF-527, scale 1:31,680.

Plafker, George, 1962, Geologic investigations of proposed power sites at Sheep Creek, Carlson Creek, and Turner Lake, Alaska: U.S. Geol.

APPROXIMATE MEAN DECLINATION 1977

SCALE 1:31 680

1 ½ 0 1 MILE

1 .5 0 1 KILOMETER

CONTOUR INTERVAL 100 FEET