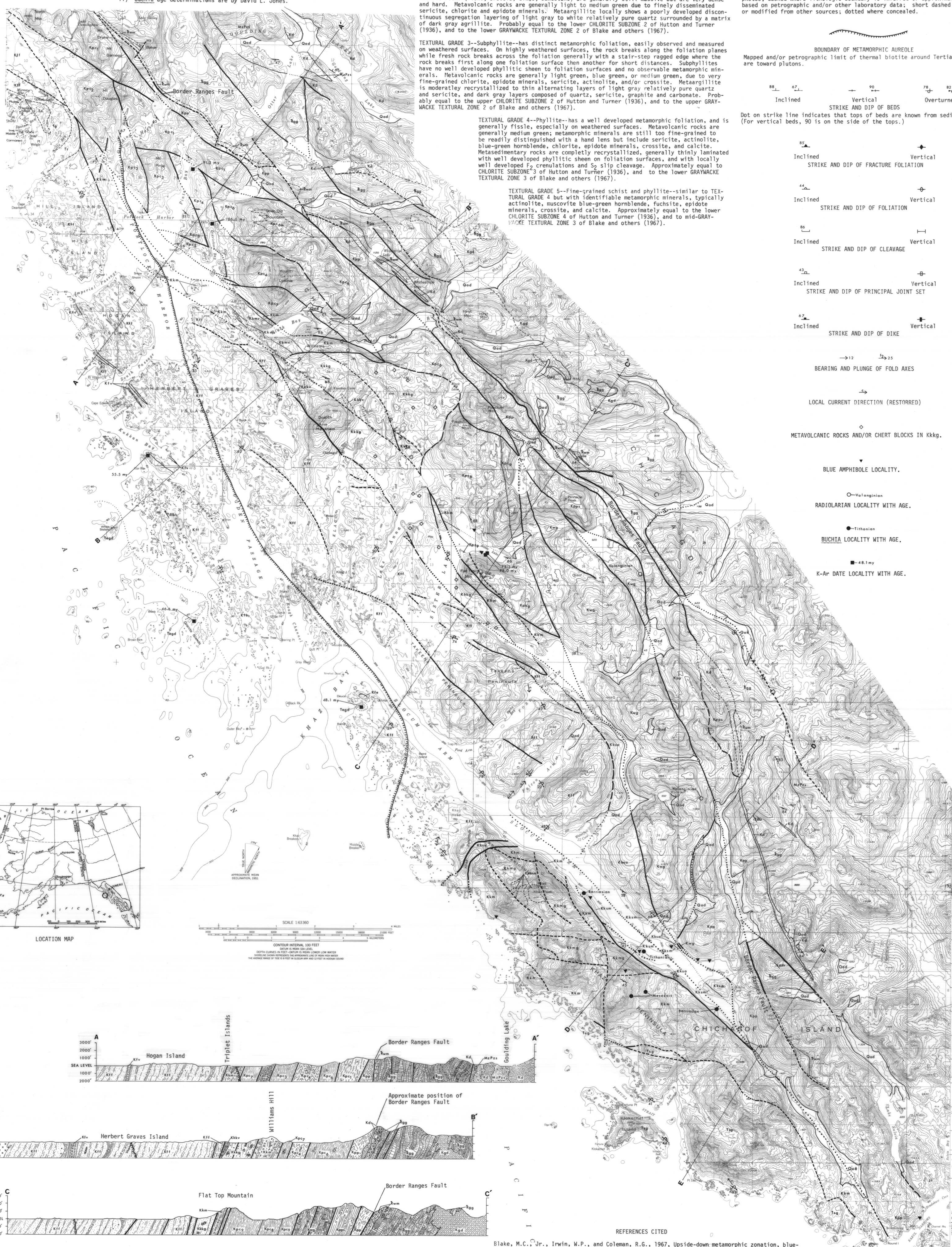
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

OPEN-FILE REPORT
80-150
SHEET 1 OF 2

This map has been compiled from the following sources:

1) John Decker and Susan Karl - field mapping, July, Aug., and Sept., 1977.
2) John Decker, Neil Lundberg, and Susan Karl - field mapping, May, June, July, Aug., and Sept., 1978.
3) Bruce R. Johnson, Susan Karl and others - unpublished field mapping, 1978 and 1979.
4) Robert A. Loney, Henry C. Berg, David A. Brew, and John S. Pomeroy - unpublished field mapping, 1961.
5) Loney and others, 1975.
6) Reed and Coats, 1941.
7) Rossman, 1959.
8) Photogeologic compilations by John Decker, 1977 and 1978; and by J.N. Platt.
9) K-Ar age determinations are by Fredric H. Wilson and Donald L. Turner (Decker and others, 1980).
10) Radiolarian age determinations are by Susan Karl and David L. Jones.
11) Buchia age determinations are by David L. Jones.



LOCATION MAP

NOTE:

The textural grades used in this report are based on field observations mainly of argillite and tuff with minor sandstone, conglomerate, and volcanic flow rocks and breccia, that have been subjected to low grade regional metamorphism of zeolite, prehnite-pumpellyite, greenschist, and blueschist facies. The 5 textural grades are in order if increasing metamorphic intensity (=grade(?)) and are defined as follows:

TEXTURAL GRADE 1--Weakly to unrecrystallized--generally massive with no metamorphic foliation or observable minerals developed, and no metamorphic segregations or layering. Original textures, structures and minerals are locally preserved. Metamorphic effects include cataclastic fracture foliation, slaty cleavage, and a light greenish color in the metavolcanic rocks, probably caused by incipient sericite, chlorite, and epidote minerals. Approximately equal to CHLORITE SUBZONE 1 of Hutton and Turner (1936); and to GRAYWACKE TEXTURAL ZONE 1 of Blake and others (1967).

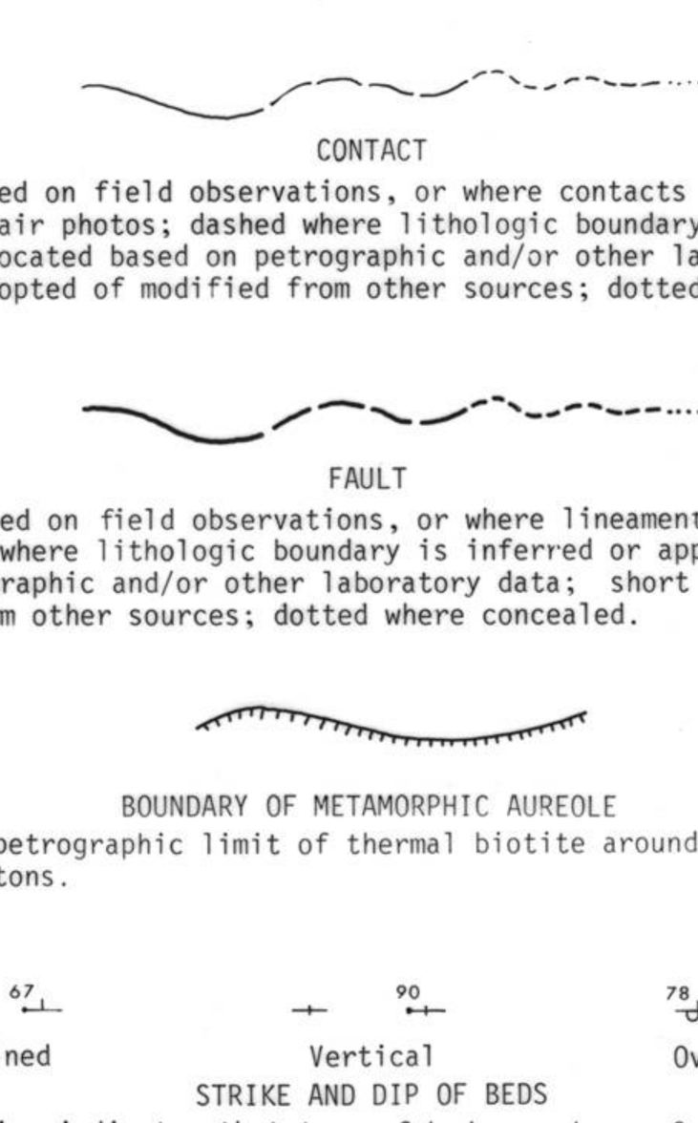
TEXTURAL GRADE 2--Very weakly foliated to massive--has incipient metamorphic foliation developed only in originally layered rocks and only well displayed on weathered surfaces. The foliation is generally difficult to measure and the rock usually breaks across the foliation. Originally massive rocks (flows, breccia, dikes, sandstone) are generally still massive but are very dense and hard. Metavolcanic rocks are generally light to medium green due to finely disseminated sericite, chlorite and epidote minerals. Metaargillite locally shows a poorly developed discontinuous segregation layering of light gray to white relatively pure quartz surrounded by a matrix of dark gray agrillite. Probably equal to the lower CHLORITE SUBZONE 2 of Hutton and Turner (1936), and to the lower GRAYWACKE TEXTURAL ZONE 2 of Blake and others (1967).

TEXTURAL GRADE 3--Subphyllite--has distinct metamorphic foliation, easily observed and measured on weathered surfaces. On highly weathered surfaces, the rock breaks along the foliation planes while fresh rock breaks across the foliation generally with a stair-step ragged edge where the rock breaks first along one foliation surface then another for short distances. Subphyllites have no well developed phyllitic sheen to foliation surfaces and no observable metamorphic minerals. Metavolcanic rocks are generally light green, blue green, or medium green, due to very fine-grained chlorite, epidote minerals, sericite, actinolite, and/or crossite. Metaargillite is moderatley recrystallized to thin alternating layers of light gray relatively pure quartz and sericite, and dark gray layers composed of quartz, sericite, graphite and carbonate. Probably equal to the upper CHLORITE SUBZONE 2 of Hutton and Turner (1936), and to the upper GRAYWACKE TEXTURAL ZONE 2 of Blake and others (1967).

TEXTURAL GRADE 4--Phyllite--has a well developed metamorphic foliation, and is generally fissle, especially on weathered surfaces. Metavolcanic rocks are generally medium green; metamorphic minerals are still too fine-grained to be readily distinguished with a hand lens but include sericite, actinolite, blue-green hornblende, chlorite, epidote minerals, crossite, and calcite. Metasedimentary rocks are completly recrystallized, generally thinly laminated with well developed phyllitic sheen on foliation surfaces, and with locally well developed F_2 crenulations and S_2 slip cleavage. Approximately equal to CHLORITE SUBZONE 3 of Hutton and Turner (1936), and to the lower GRAYWACKE TEXTURAL ZONE 3 of Blake and others (1967).

TEXTURAL GRADE 5--Fine-grained schist and phyllite--similar to TEXTURAL GRADE 4 but with identifiable metamorphic minerals, typically actinolite, muscovite blue-green hornblende, fuchsite, epidote minerals, crossite, and calcite. Approximately equal to the lower CHLORITE SUBZONE 4 of Hutton and Turner (1936), and to mid-GRAYWACKE TEXTURAL ZONE 3 of Blake and others (1967).

EXPLANATION



CONTACT

Solid where based on field observations, or where contacts of Quaternary units are taken from air photos; dashed where lithologic boundary is inferred or approximately located based on petrographic and/or other laboratory data; short dashed where adopted of modified from other sources; dotted where concealed.

FAULT

Solid where based on field observations, or where lineaments are mapped from air photos; dashed where lithologic boundary is inferred or approximately located based on petrographic and/or other laboratory data; short dashed where adopted or modified from other sources; dotted where concealed.

BOUNDARY OF METAMORPHIC AUREOLE

Mapped and/or petrographic limit of thermal biotite around Tertiary plutons; teeth are toward plutons.

Inclined — Vertical — Overturned

STRIKE AND DIP OF BEDS

Dot on strike line indicates that tops of beds are known from sedimentary structures. (For vertical beds, 90 is on the side of the tops.)

Inclined — Vertical

STRIKE AND DIP OF FRACTURE FOLIATION

Inclined — Vertical

STRIKE AND DIP OF FOLIATION

Inclined — Vertical

STRIKE AND DIP OF CLEAVAGE

Inclined — Vertical

STRIKE AND DIP OF PRINCIPAL JOINT SET

Inclined — Vertical

STRIKE AND DIP OF DIKE

BEARING AND PLUNGE OF FOLD AXES

LOCAL CURRENT DIRECTION (RESTORRED)

METAVOLCANIC ROCKS AND/OR CHERT BLOCKS IN Kkkg.

BLUE AMPHIBOLE LOCALITY.

Valanginian

RADIOLARIAN LOCALITY WITH AGE.

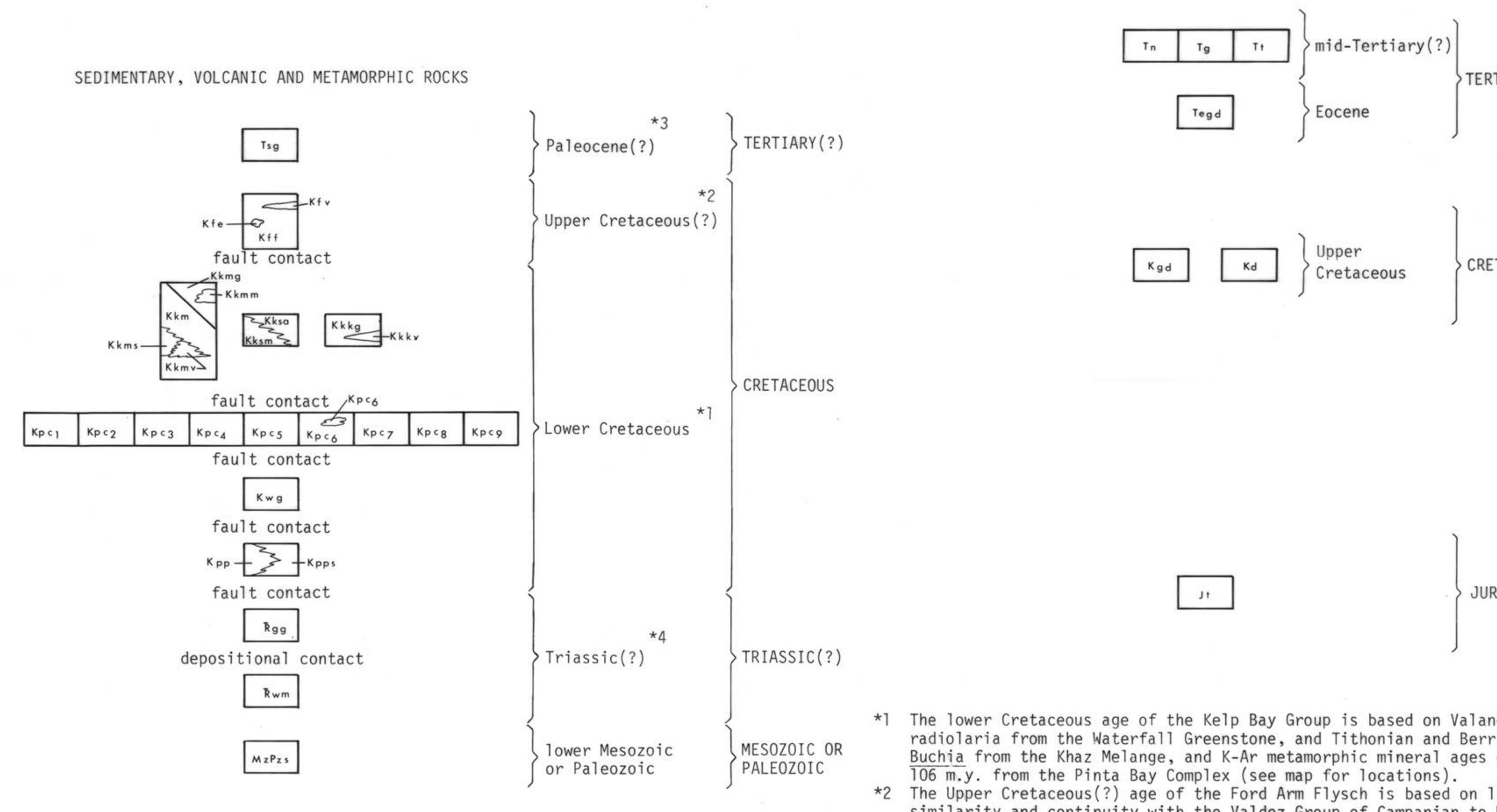
Tithonian

BUCHIA LOCALITY WITH AGE.

48.1my

K-Ar DATE LOCALITY WITH AGE.

CORRELATION OF MAP UNITS



*1 The lower Cretaceous age of the Kelp Bay Group is based on Valanginian radiolaria from the Waterfall Greenstone, and Tithonian and Berriasian Buchia from the Khaz Melange, and K-Ar metamorphic mineral ages of 91-106 m.y. from the Pinta Bay Complex (see map for locations).

*2 The Upper Cretaceous(?) age of the Ford Arm Flysch is based on lithologic similarity and continuity with the Valdez Group of Campanian to Maestrichtian age (Jones and Clark, 1973), in the Prince William Sound area (Plafker and Campbell, 1979).

*3 The Paleocene(?) age of the Sitka Graywacke is based on a lithologic correlation and similar structural position to the Paleocene Orca Group in the Prince William Sound area (Winkler, 1976).

*4 The Triassic age for the Goon Dip Greenstone and Whitestripe marble is inferred by Loney and others (1975).

DESCRIPTION OF MAP UNITS

SURFICIAL DEPOSITS

Qad — ALLUVIUM AND DRIFT, undivided - Contacts taken from aerial photographs with only minor field checking.

SEDIMENTARY, VOLCANIC AND METAMORPHIC ROCKS

Tsg — SITKA GRAYWACKE - The Sitka Graywacke consists of light to medium gray, thick-bedded to massive, medium- to coarse-grained sandstone, with minor conglomerate, siltstone and mudstone. The sandstone is composed chiefly of quartz, volcanic rock fragments, plagioclase, potassium feldspar, and detrital biotite; conglomerate clasts are mainly pebbles and cobbles of felsic volcanic and plutonic rock, clastic sedimentary rock, chert, greenstone and carbonate. The Sitka Graywacke on Chichagof and Klokachef Islands is a broken formation consisting of highly disrupted and chaotically juxtaposed strata. Dominant Mutti and Ricci Lucchi turbidite facies are A and B, with minor E, F amd G. These rocks are interpreted as an inner-fan facies association derived from a volcano-plutonic source terrane (Decker and others, 1979).

FORD ARM FLYSCH - The Ford Arm Flysch consists dominantly of sandstone and siltstone turbidites interbedded with mudstone and shaly mudstone (Kff), minor interbedded metabasalt (Kfv), and rare exotic blocks (Kfe). The sedimentary rocks are distinguished from the Sitka Graywacke on the basis of turbidite sedimentology (Sitka Graywacke is dominantly facies A and B, Ford Arm Flysch is mainly facies D and E), and sandstone petrology (detrital biotite and potassium feldspar are common in the Sitka Graywacke and rare to absent in the Ford Arm Flysch). Rocks are locally hornfelsed around Tertiary intrusives.

Kff — Sedimentary and hornfelsed sedimentary rocks, undivided - The rocks of this unit are medium to dark gray, thin- to medium-bedded, fine- to medium-grained sandstone turbidites, with minor interbedded siltstone turbidites and mudstone, and minor thick-bedded to massive sandstone and conglomerate. The sandstone is composed chiefly of quartz, volcanic rock fragments, and plagioclase; conglomerate clasts are chiefly pebbles and granules of reworked sedimentary rock, volcanic rock and carbonate. The Ford Arm Flysch is characterized by pervasive ductile deformation, rotated strata and angular tectonic blocks. Mutti and Ricci Lucchi turbidite facies are dominantly D and E with minor facies A, B, F and G. This unit is interpreted as a mid-fan facies association derived from a first-cycle volcanic source terrane (Decker and others, 1979).

Kfv — Metabasalt - Rocks are dominantly medium green massive to schistose metabasalt, which occurs as tuff, flow breccia and massive flows, interbedded with thin-bedded turbidites (Kff). The metabasalt locally contains limestone clasts, calcareous zones, and blocks and streaky lenses of red chert. The schistose metabasalt has a prominent S_1 foliation with locally well developed medium-grained actinolite.

Kfe — Exotic blocks near Khaz Bay - Rocks of this unit consist of a large block of silicified pillow lava and of tightly folded, highly deformed banded metachert.

KELP BAY GROUP - The Kelp Bay Group is a complex assemblage of low-grade metavolcanic and metasedimentary rocks consisting of four formations: 1) the Khaz Melange, a melange characterized by metaargillite and metatuff matrix and enclosed exotic blocks; 2) the Pinta Bay Complex, which consists of a group of mainly fault-bounded terranes; 3) the Waterfall Greenstone, dominantly reddish weathering metavolcanic rocks and graywacke with minor red chert; and 4) the Pinnacle Peak Phyllite, which is, in part, phyllitic metasedimentary and metavolcanic rocks.

KHAZ MELANGE - The Khaz Melange is a chaotic terrane characterized by exotic blocks of greenstone, greenschist, blueschist, marble, chert, fossiliferous limestone, sandstone and pillow lava, in a matrix of argillite (metaargillite) and/or tuff (metatuff). The Khaz Melange is subdivided locally into two members, the Slocum Arm Argillite Member and the Kimshan Cove Graywacke Member. Elswhere, the formation is subdivided locally in the basis of sedimentary to volcanic ratio (Kkms and Kkmv). On Khaz Peninsula, a greenstone block (Kkmg) and associated marble (Kkmm) were mapped separately.

Kkm — Melange, undivided - This unit consists mainly of rocks similar to units Kkms, Kkmv, Kksa, and Kksm that are either too intimately intermixed to be mapped separately, are in areas that were not studied in sufficient detail to subdivide units, or are in unstudied areas mapped as Khaz Formation by Loney and others (1975).

Kkms — Dominantly metasedimentary rocks - These rocks are mainly highly deformed very dark gray to black argillite and weakly foliated metaargillite chaotically intermixed with medium green massive to subphyllitic metatuff. The sedimentary to volcanic ratio is approximately 9:1, with minor chert. Tuff and metatuff are evenly distributed throughout the unit and occur as thin interbeds, streaky lenses, angular pebble- to boulder-size clasts, and large tectonic blocks. Where present, the weak metamorphic fabric was developed subsequent to melange mixing. Textural grades 1 and 2 (minor 3, but possibly in blocks).

Kkmv — Dominantly metavolcanic rocks - These rocks are mainly highly deformed, light to medium green, massive to subphyllitic metatuff chaotically intermixed with dark gray to black argillite, and black and white, thinly laminated, tightly folded subphyllitic metasedimentary rocks. The sedimentary to volcanic ratio is approximately 1:8. The volcanic and metavolcanic rocks are mainly tuff and tuff breccia; minor rock types include agglomerate and pillow breccia. Metasedimentary rocks generally occur in discrete zones that are similar to Kkms but are too small to map separately. Textural grades 1, 2 and 3.

Kkmg — Greenstone block(?) on Khaz Peninsula - This unit consists of green, gray, and rust weathering greenstone and foliated metavolcanic rocks, red chert, and marble, that was mapped by Loney and others (1975).

Kkmm — Marble in greenstone block(?), Kkmg - The rocks are massive, locally layered, light gray weathering, fine-grained to "sugary" marble. The marble is tightly folded and locally includes green volcanic lenses. Mapped by Loney and others (1975).

Kksa — SLOCUM ARM ARGILLITE MEMBER--turbidite facies - This unit consists of dark gray to black, siltstone and mudstone turbidites interbedded with hemipelagic mudstone, with minor sandstone lenses and boudins, and no volcanic rocks. Sandstone to shale ratios are low, generally less than 1:10, but the ratio of graded to ungraded mudstone is about 1:1. The rocks are generally highly disrupted by an anastomosing fracture foliation. The turbidites are mainly Mutti and Ricci Lucchi facies D, F and G, and are interpreted to have been deposited in a submarine slope environment (Decker and others, 1979).

Kksm — SLOCUM ARM ARGILLITE MEMBER--melange facies - These rocks are similar to the highly deformed zones in Kksa, but in this unit, the rocks characteristically contain minor but ubiquitous lenses and blocks of streaky green tuff, and exotic blocks of higher grade metamorphic rocks, marble, fossiliferous calcareous sandstone and chert. The sedimentary to volcanic ratio is variable but averages approximately 8:1. The textural grade of the matrix is 1. The contact between the turbidite and melange facies of the Slocum Arm Argillite Member is placed at the first occurrence of volcanic rocks and/or exotic blocks.

Kkkg — KIMSHAN COVE GRAYWACKE MEMBER--graywacke facies - This facies is dominantly medium gray, massive, medium- to very coarse-grained sandstone and granule conglomerate, and dark gray, highly disrupted shaly argillite and pebbly mudstone. The graywacke is locally associated with exotic blocks of chert, carbonate and volcanic rocks (Kkkv). The sedimentary to volcanic ratio is very high, approximately 90:1. The graywacke appears massive in outcrop but on rare smoothly-weathered or polished surfaces, the rock can be seen to be a highly chaotic assemblage of juxtaposed fragments and vague zones of clastic sedimentary rock that vary slightly in color, grain size, sorting, bedding features and carbonate content. Limited evidence suggests that the mixing took place both during syn- and postdepositional gravity-induced deformation and as ductile tectonic deformation of unlithified strata. Turbidite facies nomenclature can rarely be applied but the textures suggest deposition in a relatively proximal--either lower slope or inner fan--environment.

Kkkv — KIMSHAN COVE GRAYWACKE MEMBER--volcanic rocks and/or exotic blocks - These rocks occur as mappable bodies or as isolated zones of interbedded streaky green tuff, tightly folded, yellow weathering, gray bedded chert, red radiolarian chert, volcanic breccia, pillow lava, calcareous sandstone or marble. The most typical association is volcanic breccia, tuff, yellow weathering chert, and locally, red radiolarian chert.

PINTA BAY COMPLEX - The Pinta Bay Complex is composed of an assemblage of mainly fault-bounded lithotectonic terranes, each with a characteristic lithologic association, deformational style and/or metamorphic grade. The metavolcanic rocks are chemically andesite and basalt; the metasedimentary rocks were originally fine-grained clastic rocks, dominantly siltstone and mudstone.

Kpc1 — Unit 1 - Unit 1 consists of fine-grained shaly mudstone with minor siltstone and tuff. The sedimentary to volcanic ratio is approximately 9:1, with no marble. The volcanic rock is evenly distributed throughout the unit and generally occurs as intermixed fragments with irregular wispy to streaky contacts with the sedimentary rock. Locally, the sedimentary and volcanic rocks are thinly interlayered. Unit 1 is highly disrupted by a pervasive anastomosing fracture foliation but shows no evidence of metamorphic segregation of quartz or development of a regional metamorphic fabric. Textural grade 1.

Kpc2 — Unit 2 - These rocks are fine-grained shaly mudstone and tuff, with minor siltstone and marble. The sedimentary rocks of unit 2 are very similar to unit 1 but unit 2 has a sedimentary to volcanic ratio of approximately 1:1. Textural grade 1. Units 1 and 2 are similar to rocks of the Khaz Melange, particularly units Kkm, Kkms, and Kksm. Units 1 and 2, however, contain much less sandstone, have a more systematic structure and lack exotic blocks (other than tuff and rare pillow basalt).

Kpc3 — Unit 3 - Unit 3 consists dominantly of light to medium green subphyllitic to phyllitic metavolcanic rocks with discrete zones of dark gray to black and white thinly layered, highly contorted phyllitic metasedimentary rocks, and minor marble and calcareous pods. Sedimentary to volcanic ratio is 1:9. A metamorphic foliation is well developed with locally visible chlorite and actinolite. Textural grade 4.

Kpc4 — Unit 4 - This unit consists of dark gray to black and white thinly layered phyllitic metasedimentary rocks and medium green phyllitic to schistose metavolcanic rocks. The sedimentary to volcanic ratio is approximately 3:2, with about 10 percent foliated marble, and ubiquitous vuggy-weathering calcareous pods. Rocks are completely recrystallized with well developed phyllitic sheen on S_1 foliation surfaces and with locally present F_2 crenulations and S_2 slip cleavage. Metasedimentary rocks are composed chiefly of quartz, sericite and graphite; the metavolcanic rocks are composed mainly of chlorite, actinolite, epidote, blue-green hornblende, calcite, quartz and fuchsite. Textural grade 5.

Kpc5 — Unit 5 - Unit 5 consists of greenish gray, massive, internally chaotic crystal-lithic tuff and tuff breccia. No clastic sedimentary rocks were seen. The majority of the unit is fine-grained massive tuff (70 percent), with lesser amounts of red radiolarian chert-rich tuff and tuff breccia (10 percent), crystal-lithic tuff breccia with a cherty and/or calcareous matrix (10 percent), and exotic blocks of banded marble with a recrystallized cataclastic foliation (10 percent). Breccia clasts generally weather yellow green to light greenish yellow and contain phenocrysts of altered pyroxene and plagioclase. Rare red radiolarian chert is smeared throughout clasts and matrix. Tuff is locally vuggy due to intermixed carbonate. The rocks are generally massive and very dense with no metamorphic foliation. The rocks locally contain abundant pyrite and minor chalcopyrite. Textural grade 1.

Kpc6 — Unit 6 - North of Goon Dip Mountain, unit 6 consists of light to medium green, massive to very weakly foliated metavolcanic rocks, and intermixed and interlayered, incompletely recrystallized, weakly foliated, dark gray metasedimentary rocks. The sedimentary to volcanic ratio is approximately 7:3, with 10 to 15 percent marble slabs, generally less than 4 meters thick and 10 meters long. Massive metavolcanic rocks are generally hard and very dense. Textural grade 2. The area mapped as unit 6 south of Goon Dip Mountain was lumped together based on only a few scattered observations.

Kpc6m — Unit 6m - Marble at Goon Dip Mountain mapped by Reed and Coats (1941). The marble is fine-grained, impure and buff colored, and weathers gray with rough surfaces; contains considerable volcanic material.

Kpc7 — Unit 7 - Unit 7 consists of dominantly light to medium green, massive to subphyllitic metavolcanic rocks, and dark gray to black and white, thinly layered metasedimentary rocks. The sedimentary to volcanic ratio is approximately 1:4, with rare calcareous zones. In general, the metavolcanic rocks are relatively homogeneous, occurring in discrete zones separated from other dominantly metavolcanic zones by chaotically intermixed metatuff and relatively homogeneous tightly folded metasedimentary rock. North of Black Bay, both metavolcanic and metasedimentary rocks have a well developed subphyllitic foliation, easily seen on weathered surfaces, while at Black Bay, the rocks are massive to very weakly foliated. Textural grades 2 and 3. Unit 7 is similar to unit 6, but is differentiated on the basis of structural position (they are separated by unit 4), and unit 7 is of higher textural grade. Unit 7 is very similar to unit 9, and the two could be the same unit. They are mapped separately on the basis of relative geographic separation and a lower and locally less variable textural grade for unit 7.

Kpc8 — Unit 8 - Unit 8 is dominantly light to medium green subphyllitic to phyllitic metavolcanic rocks with lesser amounts of massive light green greenstone, and minor highly deformed phyllitic metasedimentary rocks. The sedimentary to volcanic ratio is approximately 1:9. About 30 percent of the metavolcanic rocks are massive to weakly foliated, and are interbedded and intermixed with subphyllitic and phyllitic rocks in a non-systematic pattern. The low textural grade of the greenstone is probably related to original compositional and textrual differences. The protolith for the more phyllitic rocks is probably fine-grained tuff, whereas the protoliths of the greenstones are lapilli tuff, tuff breccia, flow breccia and diabase dikes. Textural grades 2, 3 and 4. Unit 8 is similar to unit 3; they are differentiated on the basis of relative geographic separation, abundant massive to weakly foliated rocks in unit 8 that are rare to absent in unit 3, and the absence of marble in unit 8. The lower textural grade rocks of unit 8 are similar to unit 6, but unit 6 contains abundant marble and is dominantly textural grade 2 with rare textural grade 3 and no textural grade 4.

Kpc9 — Unit 9 - Unit 9 consists mainly of highly contorted, dark gray to black and white, thinly layered subphyllitic and phyllitic metasedimentary rocks (50 percent), intermixed and interbedded metatuff and metasedimentary rocks (40 percent), and massive light greenstone (10 percent). The sedimentary to volcanic ratio is approximately 3:2, with no marble. Where metasedimentary rocks predominate, structure is generally complex, but not chaotic. These rocks are very tightly folded and intenseley faulted, they generally have a well developed S_1 foliation with locally well developed F_2 crenulations and rare S_2 slip cleavage. The rocks are locally rich in white chalky weathering laumontite. Textural grades 2, 3 and 4. Unit 9 is compositionally similar to Kkmv of the Khaz Melange but unit 9 is a higher textural grade and less chaotic.

Kwg — WATERFALL GREENSTONE - The Waterfall Greenstone is generally massive, highly altered, reddish weathering greenstone with varying amounts of orange weathering graywacke and tuff, and minor chalky weathering red and gray radiolarian chert. The chert occurs both as tightly folded blocks of bedded chert and as streaky zones and pieces chaotically intermixed with the greenstone. Mixing of the second type of chert probably occurred during a volcanic event while the chert was still soft radiolarian ooze. Two of these chert samples were analyzed by Susan Karl and David L. Jones of the U.S. Geological Survey and have yielded age-diagnostic radiolaria of Valanginian (Early Cretaceous) age. The greenstone locally retains textures and structures that indicate that they were originally massive flows, pillow lavas, flow breccia and tuff. Textural grade 1.

PINNACLE PEAK PHYLLITE - The Pinnacle Peak Phyllite consists of subphyllitic to phyllitic metavolcanic and metasedimentary rocks (Kpp), with lesser amounts of slightly recrystallized to subphyllitic metaturbidites (Kpps).

Kpp — Subphyllitic to phyllitic metavolcanic and metasedimentary rocks - The sedimentary to volcanic ratio is locally highly variable but overall is approximately 2:1. Metasedimentary rocks are generally dark gray with thin white quartz-sericite segregation layers; the metavolcanic rocks are light to medium green, locally with thin white quartz layers. Both rock types have well developed S_1 axial plane foliation, generally with a strong phyllitic sheen, F_1 fold axes are present but rare; F_2 crenulations and minor folds, and S_2 slip cleavage are common. Locally, the rocks have a superimposed D_3 deformation characterized by complex apparently unsystematic F_3 folds and brittle fracture. Textural grade 4.

Kpps — Slightly recrystallized to subphyllitic metasedimentary rocks - The sedimentary to volcanic ratio is very high, approximately 20:1. The rocks locally retain original sedimentary features that indicate that they were originally thin- to medium-bedded (2 to 10 cm thick) turbidites with a sandstone to shale ratio of approximately 1:1. The coarsest grain size observed was fine sand (up to 0.25 mm), grading is common and indicates that these rocks have been isoclinally folded. These rocks grade into dark gray to black and white thinly layered subphyllitic rocks of Kpp. Textural grades 2 and 3.

Rgg — GOON DIP GREENSTONE - The Goon Dip Greenstone is generally massive, medium gray weathering, medium to dark gray and greenish gray, very fine-grained, plagioclase-(or rarely pyroxene-) porphyritic basalt and metabasalt. The rocks are dominantly massive, holocrystalline, commonly amygdaloidal, and locally pillowed. Pillow breccia, flow breccia, and crystal-lithic lapilli tuff are less common, and diabase dikes are rare. Locally, the rocks have a very weakly developed metamorphic foliation. Textural grade 1.

Rwm — WHITESTRIPE MARBLE - The Whitestripe marble is generally massive to weakly foliated, white to medium gray, fine-grained marble, locally; it includes greenstone interbeds, lenses and pieces, and diorite dikes; only the larger bodies of each are mapped separately.

MzPzs — SILICEOUS METASEDIMENTARY ROCKS - These rocks are dominantly thin- to medium-bedded various shades of gray quartzite and impure quartzite, including recrystalized chert, argillite, siltstone and sandstone. The age is uncertain but the rocks are closely associated with the Goon Dip Greenstone and are intruded by diorite plutons.

INTRUSIVE ROCKS

DAVISON BAY COMPLEX - A complex stock of norite (Tn), gabbro (Tg), and tonalite (Tt); minor rock types include amphibolite, amphibolitic marble, diorite, monzonite, granite, pegmatite, quartz veins and schist inclusions (Pecora, 1942; Rossman, 1959). A mid-Tertiary age is inferred by Rossman (1959).

Tn — Norite - This unit consists of norite and associated rocks, and includes copper-nickel deposits of pyrrhotite, chalcopyrite and pentlandite. Mapped by Pecora (1942), and Rossman (1959).

Tg — Gabbro - This unit consists of gabbro and associated rocks mapped by Pecora (1942), and Rossman (1959).

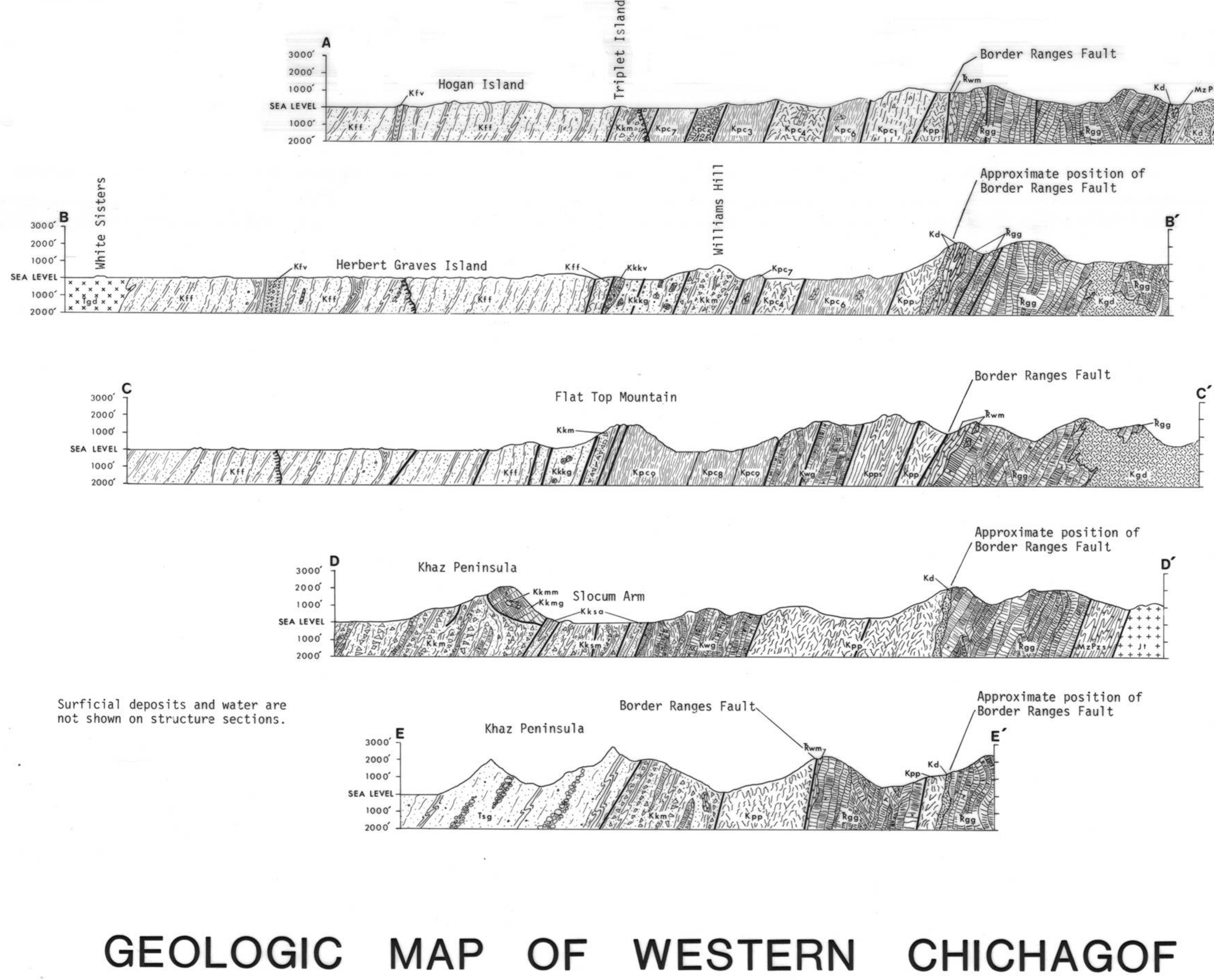
Tt — Tonalite - This unit is dominantly tonalite and quartz diorite, mapped by Rossman (1959).

Tegd — GRANODIORITE - Granodiorite in the Khaz Bay area consists of massive, leucocratic (CI = 5-15), medium-grained biotite granodiorite. The age is based on two K-Ar biotite dates of 46.6 m.y. and 48.2 m.y.

Kgd — GRANODIORITE - Granodiorite in the Hirst Mountain area, consists of massive, light colored (CI = 10-15), medium-grained hornblende-biotite granodiorite. The age is inferred from structural position and regional correlation with isotopically dated similar rocks (Loney and others, 1975). May be Tertiary.

Kd — DIORITE - This unit is highly variable in composition but in general consists of massive to weakly foliated, dark colored (CI = 25-40), fine- to medium-grained biotite-hornblende diorite. Cretaceous age is inferred by Loney and others (1975).

Jt — TONALITE - The tonalite unit consists of foliated, CI = 20-25, medium-grained biotite-hornblende tonalite and quartz diorite. The age is based on a local correlation with isotopically dated similar rocks (Loney and others, 1975).



Surficial deposits and water are not shown on structure sections.

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GEOLOGIC MAP OF WESTERN CHICHAGOF ISLAND, SOUTHEASTERN ALASKA

BY JOHN DECKER

1980

Base maps by U.S. Geological Survey
Sitka (B-6, C-6, C-7, D-7), 1951.