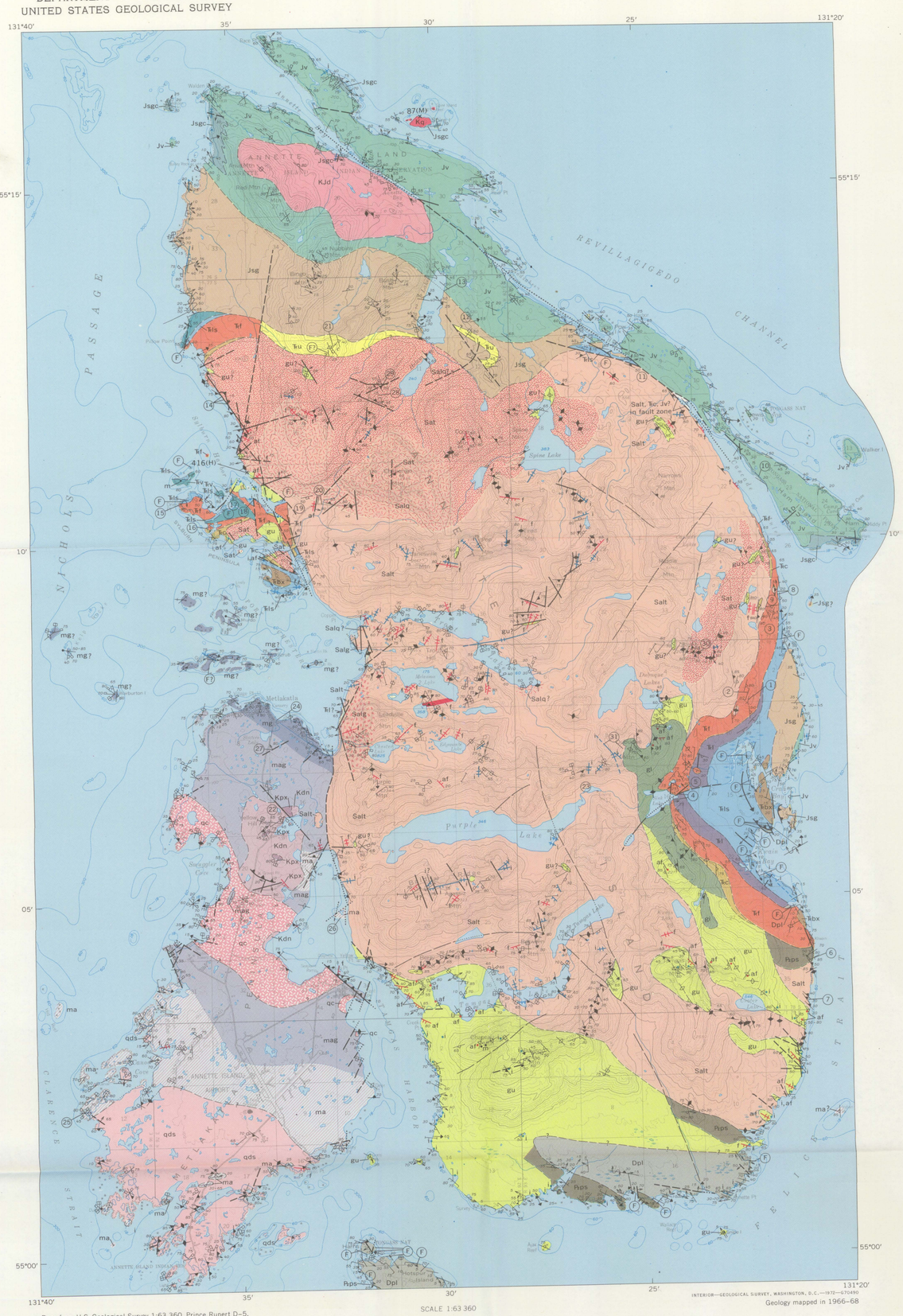
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

MISCELLANEOUS GEOLOGIC INVESTIGATIONS
MAP I-684



Base from U.S. Geological Survey 1:63,360, Prince Rupert D–5, 1955; Ketchikan A–4, A–5, 1955; and Ketchikan B–5, 1954

Geology mapped in 1966–68

GEOLOGIC MAP OF ANNETTE ISLAND, ALASKA

By
Henry C. Berg
1972

EXPLANATION

Mapped area of each unit described may contain minor areas of other units too small to represent at scale of map

METLAKATLA PENINSULA

Ultramafic rocks
Kdn, *partly serpentinized dunite*
Kpx, *clinopyroxenite. Occurs as dikes and as bodies of indefinite but probably layered structure*

Middle or Upper Jurassic

Intermediate metavolcanic rocks and metasedimentary rocks
Jv, *massive to phyllitic dacitic and andesitic volcanic and volcaniclastic rocks*
Jsgc, *slate and phyllitic graywacke and conglomerate*

Slate and phyllitic graywacke

Upper Triassic

Breccia, conglomerate, and intermediate to basic metavolcanic rocks
Tkbx, *phyllitic breccia and conglomerate*
Tkv, *altered andesitic to basaltic pillow flows and tuff*

LOCAL UNCONFORMITY(?)

Metasedimentary and felsic metavolcanic rocks
Tkls, *recrystallized carbonaceous limestone and siltstone*
* Tkl, *recrystallized massive limestone; locally dolomitic*
* Tkf, *felsic metavolcanic rocks*
* Tkc, *recrystallized conglomerate and breccia*

UNCONFORMITY

South Metlakatla pluton
Foliated quartz diorite and diorite

Central Metlakatla pluton
Foliated leucocratic quartz diorite

Metamorphosed bedded rocks
Contacts between facies are gradational and inferred
ma, *amphibolite-facies metamorphic rocks*
mag, *metamorphic rocks transitional between amphibolite and greenschist facies*
mg, *greenschist-facies metamorphic rocks*

MAINLAND ANNETTE ISLAND

Quartz metadiorite
Potassium-argon age (muscovite): 87 m.y.

Metadiorite

Intermediate metavolcanic rocks and metasedimentary rocks
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Slate and phyllitic graywacke

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UNCONFORMITY

Phyllite and schist
Minor recrystallized limestone and dolomite

Phyllite and recrystallized limestone and dolomite

UNCONFORMITY

Annette pluton
Contacts between phases are gradational or inferred
Salt, *leucocrondhjemite*
Sat, *trondhjemite*
Salq, *leucocratic quartz diorite and minor hornblende diorite. Potassium-argon age (hornblende): 416 m.y.*
Salg, *leucocratic granite, quartz monzonite, and granodiorite*

Greenstone
gu, *undivided greenschist-facies metamorphosed bedded rocks, including greenstone, greenschist, phyllite, phyllitic limestone, and minor quartzite. Metamorphic grade locally reaches amphibolite facies, especially near contacts with intermediate and mafic intrusive rocks in Tamgas Lake-Davison Mountain area*
gi, *foliated dioritic intrusive (?) rock*

MISCELLANEOUS INTRUSIVE ROCKS

Inclined — Dike — Vertical

Showing attitude of laminae (felsic dikes only) or of contact with enclosing rocks
af, *dikelike (dike symbol) and irregular (dot symbol) apophyses of Annette pluton. Includes porphyrite, intergranular, and aplitic leucotrondhjemite and leucocratic quartz monzonite and granodiorite. On Hemlock Island, consists of fault slivers of Annette pluton*
f, *felsic dike. Includes quartz-albite-sericite (-K-feldspar) aphanite and porphyrophanite; locally spherulitic; commonly laminated parallel to contact with enclosing rocks*
i, *intermediate dike. Includes altered andesite, microdiorite, and fine-grained hornblende and hornblende-plagioclase porphyry*

* af i m

Complexly mixed intrusive and metamorphosed bedded rocks. Letter symbol indicates intrusive rock type

af, *see under "dike"*
i, *undivided intermediate and felsic intrusive rocks. Intermediate varieties include quartz diorite and diorite; relatively felsic varieties include leucocratic quartz diorite and aplite. In Sylburn Harbor, 1.1 miles east of Driest Point, consists of trachyandesite dike and small flow*
m, *mafic intrusive rocks, chiefly hornblende and pyroxene gabbro*

*Field studies in 1970 on nearby Gravina Island indicate that most of these 4 units are of Middle and Late(?) Paleozoic age

CRETACEOUS

Undivided Triassic(?) rocks
Chiefly recrystallized massive limestone (l) and recrystallized conglomerate and breccia (c)

PLANAR AND LINEAR FEATURES

SYMBOLS

Planar and linear symbols may be combined

Inclined — Overturned

Contact, showing dip
Dashed where approximately located; dotted where concealed; queried where doubtful or indefinite

Topographic lineament interpreted from aerial photographs
Dotted where inferred to cross bodies of water

Fault, showing dip, rake of slickensides, and relative movement
Faults without attitudes are presumed to be high angle. Dashed where approximately located; dotted where concealed; queried where doubtful or indefinite. U, *relatively upthrown side;* D, *relatively downthrown side*

Thrust fault, showing dip, rake of slickensides
Dashed where approximately located; dotted where concealed

Arch — Open warps — Anticline — Syncline — Overturned anticline — Overturned syncline — Generalized attitude of overturned isoclinal folds

Folds
Showing, where appropriate, crestline, troughline, direction of dip of limbs, plunge, and dip of axial plane

Inclined — Horizontal
Small fold axes
Beds too tightly folded to show individual folds

Inclined — Overturned — Vertical — Horizontal
Strike and dip of beds
Dot indicates top of beds known from sedimentary structures

Inclined — Vertical — Horizontal — Parallel bedding and foliation
Strike and dip of foliation in metamorphosed bedded rocks

Inclined — Vertical — Horizontal
Strike and dip of foliation in intrusive rocks

Inclined — Vertical
Strike and dip of cleavage

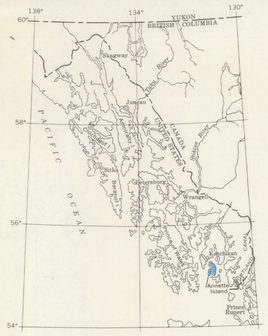
Inclined — Horizontal
Bearing and plunge of lineation
Includes crenulations, striations (except slickensides), mineral alinement, boudinage, mullions, bedding-cleavage-foliation intersections, and kink folds

Inclined — Vertical — Horizontal
Strike and dip of joint or joint set

× 416 (H)
Potassium-argon age, in millions of years
Letter in parentheses indicates dated mineral: H, *hornblende;* M, *muscovite*

(F)
Fossil locality

(2)
Mineral occurrence
Number refers to list below



INDEX MAP OF SOUTHEASTERN ALASKA, SHOWING LOCATION OF ANNETTE ISLAND

MINERAL OCCURRENCES

MAP LOC.	FIELD STATION NUMBER	DESCRIPTION
1	*34AC319a	Three-foot-wide quartz stringer lode in metarhyolite breccia: 0.04 oz./ton Au
1	*34AK409a	One-foot-wide streak of chalcopyrite, galena, and pyrite in quartz vein in metarhyolite: 0.04 oz./ton Au; 20.60 oz./ton Ag; 9.75 percent Pb; 4.63 percent Cu; 13.14 percent Zn
1	*34AK409b	Chalcopyrite, galena, and pyrite in 2-foot-wide quartz vein in metarhyolite: 0.05 oz./ton Au; 13.20 oz./ton Ag; 4.00 percent Pb; 1.88 percent Cu; 5.00 percent Zn
1	*34AK411	Relatively barren quartz vein about 4 feet wide and several hundred feet long in metarhyolite: 0.04 oz./ton Au; 0.92 oz./ton Ag; 0.05 percent Cu; 0.21 percent Zn
1	68ABg461	110-foot-long northeast-trending adit in iron-stained rhyolite microbreccia that contains traces of chalcopyrite, pyrite, and hematite
2	67ABg280	Iron-stained north-northeast-trending shear zones up to 10 feet wide and 40 feet long in metarhyolite. Zones contain vuggy quartz and disseminated pyrite
3	*34AK412a	1.5-foot-wide quartz vein in metarhyolite: 0.36 oz./ton Au; 0.91 oz./ton Ag; 2.00 percent Pb; 0.63 percent Cu; 0.23 percent Zn
3	*34AK412b	Three-foot-wide quartz vein in shear zone in metarhyolite: 0.43 oz./ton Au; 0.34 oz./ton Ag; 0.64 percent Pb; 0.85 percent Cu;16.75 percent Zn
4	*34AK414a	Sulfide-bearing quartz lenses and veins in either limestone or metarhyolite. Sulfides, which occur both in the quartz and in the country rock near the quartz, consist of tetrahedrite and galena, plus a little chalcopyrite, covellite, and chalcocite, and a trace of ruby silver: 0.03 oz./ton Au; 9.64 oz./ton Ag; 12.43 percent Pb; 1.28 percent Cu; 0.56 percent Zn
4	68ABg579	Disseminated magnetite and secondary copper minerals (malachite, azurite) in leucocratic quartz diorite adjacent to northeast-trending fault
4	68ABg581	Traces of hematite and secondary copper minerals in inch-wide quartz and calcite veinlets in dolomitic limestone
5	68ABg472	Small stringers and disseminated grains of galena, pyrite, and chalcopyrite in brecciated dolomitic limestone
6	68ABg547	Veinlets and disseminated grains of magnetite in fault breccia in schist
7	68ABg497	Traces of chalcopyrite, malachite, pyrite, and hematite in sheared aplite and leucocratic quartz monzonite. Metalliferous minerals occur in iron-stained zones an inch or so wide and about a foot long
8	67ABg38, 39	Quartz lenses and veins up to 30 feet wide and 100 feet long in phyllite and metarhyolite. Some of the veins contain small amounts of galena, pyrite, and marcasite(?)
9	*34AK145	Small amounts of sphalerite, chalcopyrite, pyrite, and galena in metarhyolite(?)
10	*34AK53(?)	Traces of gold in beach placer material and in quartz float near quartz-bearing slate and graywacke bedrock
11	68ABg653	Sparsely disseminated chalcopyrite in foliated leucotrondhjemite
12	*34AK142, 416a	Quartz lenses and veins up to 10 feet wide and several hundred feet long in phyllite and fine-grained schist. Quartz and country rock near quartz contain small amounts of disseminated pyrite and galena, and a few specks of gold: 0.71 oz./ton Au; 0.91 oz./ton Ag
13	68ABg405	Iron-stained quartz veins in zone up to 8 feet wide in dark-gray phyllite
14	68ABg36, 37, 452	Galena in thin, discontinuous calcite-quartz fissure veins in subhorizontal shear zone up to 20 feet thick and several hundred feet long. Grab sample assayed in July, 1968 by Alaska Division of Mines and Minerals: 1.38 oz./ton Au; 0.42 oz./ton Ag
15	68ABg84	Crushed metarhyolite cut by sparse veinlets containing quartz, calcite, barite, and a few specks of galena
16	68ABg89	East-northeast-trending 10(?)-foot-wide shear zone in metarhyolite. Zone contains calcite and quartz veins carrying barite and hematite, plus small amounts of galena, chalcopyrite, and pyrite
17	66ABg208 and 68ABg69	Barite-calcite veins in iron-stained brecciated metarhyolite. Outcrop of barite-bearing rock is 150 square feet in area
18	66ABg198 and 68ABg76	North-striking 10(?)-foot-wide shear zone in brecciated metarhyolite. Zone contains veins and irregular masses of barite and calcite, plus small amounts of hematite and galena
19	68ABg90	Quartz veinlets containing chalcopyrite, pyrite, hematite, and secondary copper minerals in brecciated sericitized leucotrondhjemite. Veinlets occur in breccia zones up to an inch wide and several feet long
20	67ABg294, 295	Sparse veinlets and disseminated grains of chalcopyrite, pyrite, malachite, azurite, and hematite in brecciated leucotrondhjemite and felsic aphanite. Also present at locality are foot-thick pieces of quartz float containing small amounts of chalcopyrite, pyrite, malachite, and magnetite
21	68ABg196	Trace of malachite in conglomerate
22	66ABg182, 184	Partly serpentinized dunite containing scattered thin seams of chrysotile asbestos and sparse veinlets and disseminated grains of chromite. A random sample of massive dunite contained 0.029 ppm Pt, but less than 0.005 ppm Rh and Pd
23	No field station	Location approximate. Disseminated chalcopyrite in leucotrondhjemite
24	67ABg340	Sparsely disseminated pyrite and chalcopyrite and traces of malachite in schist
25	67ABg456a	Thin stringers and streaks of pyrite and chalcopyrite in schist and gneiss
26	68ABg270	Very sparsely disseminated pyrite and chalcopyrite in schist and hornfels
27	69ABg101	Sparse pyrite, arsenopyrite, and chalcopyrite(?) in iron-stained, sheared, and intricately jointed very fine grained schist. Abundant calcite veinlets
28	69ABg91	Pyrite, magnetite, and galena(?) in sparse calcite veinlets up to a quarter of an inch thick and 2 or 3 inches long in foliated trondhjemite
29	69ABg90	Same as 69ABg91
30	69ABg84a	Sparse galena, hematite(?), and pyrite in iron-stained quartz veins and pods up to 10 feet thick in schistose trondhjemite
31	69ABg34	a) Iron-stained zones (gossan) associated with dark-green intermediate dike about 10 feet thick; b) Scattered irregular quartz veins, iron-stained zones, and inch-long pods of magnetite and hematite in crudely schistose leucotrondhjemite

*Location approximate. Mapped and sampled in 1934 by A. H. Koschmann and H. Coombs, U.S. Geological Survey. Data are from their unpublished field notes. Samples analyzed by chemical and spectrographic methods by E. T. Erickson and G. Steiger, U.S.G.S., 1934.

For sale by U.S. Geological Survey, price $1.00
Explanatory pamphlet accompanies map