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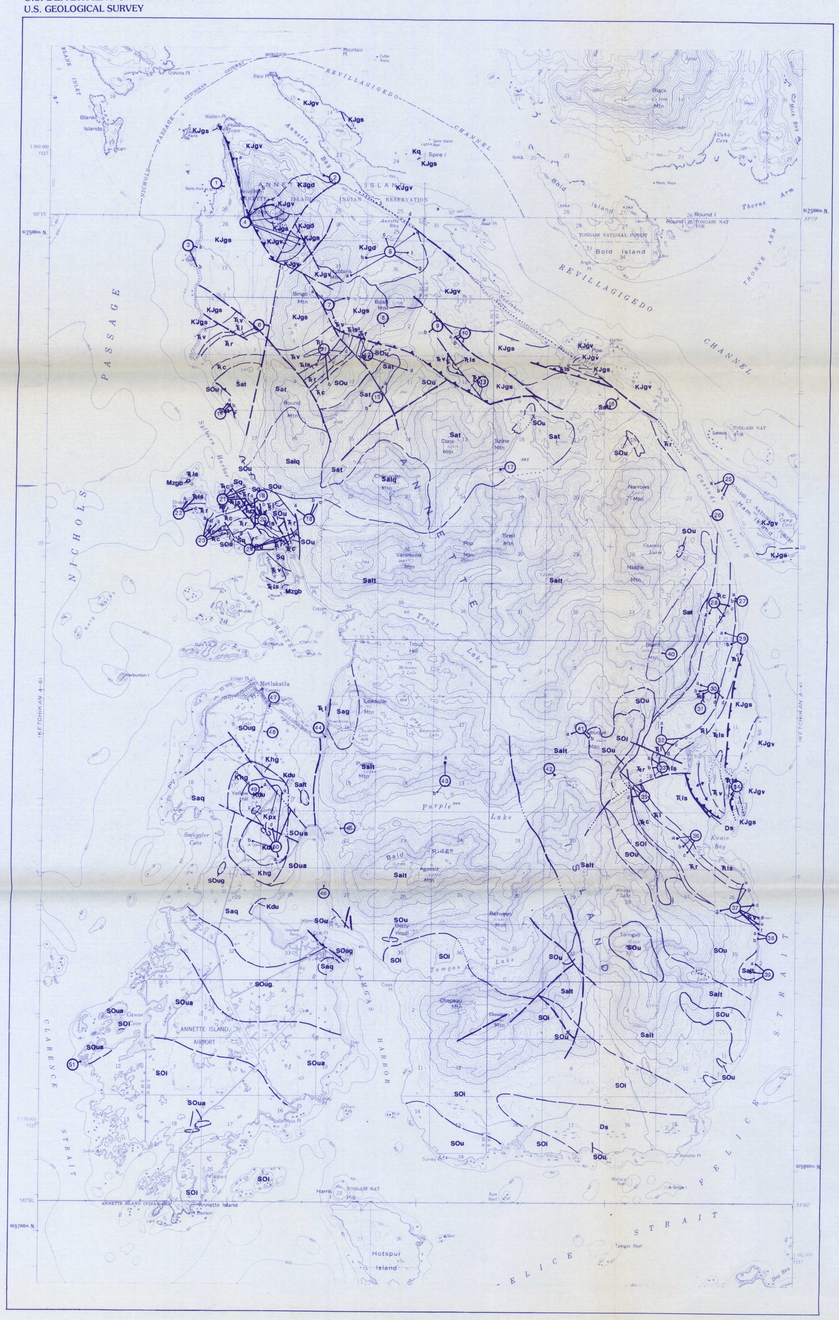

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MAP AND TABLE OF MINERAL DEPOSITS ON ANNETTE ISLAND, ALASKA

By

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SUMMARY OF MINERAL OCCURRENCES ON ANNETTE ISLAND

MAP LOCATION	CLASS	MINERALS	COMMENTS
1	Occurrence	Au	Quartz veins in pyritic argillite
2	Occurrence	Cu	Disseminated chalcopyrite in metavolcanic schist
3	Occurrence	Au	Quartz-calcite-pyrite veins
4	Occurrence	Pb, Cu	Disseminated pyrite, pyrrhotite, galena, chalcopyrite
5	Occurrence	Au, Cu, Pb	Disseminated pyrite in diorite
6	Occurrence	Ag	Quartz-calcite-pyrite veins
7	Occurrence	Au, Cu	Quartz-calcite-pyrite veins
8	Occurrence	Au, Ag, Cu	Disseminated pyrite and quartz-pyrite veins
9	Occurrence	Au	Vuggy quartz veins
10	Prospect	Au	Abundant quartz and quartz-pyrite veins
11	Occurrence	Pb, Cu	Malachite, disseminated pyrite, quartz-calcite-pyrite veins
12	Occurrence	Au, Ag, Cu, Pb, Mo, Cr, Ni	Pyritic greenstone and microgabbro with quartz and calcite veins
13	Occurrence	Ag, Cu	Disseminated pyrite and chalcopyrite, common quartz veins
14	Occurrence	Au, Ag	Galena in quartz-calcite fissure veins
15	Occurrence	Pb	Galena in calcite veinlets
16	Occurrence	Cu	Disseminated chalcopyrite
17	Occurrence	Cu, Pb	Base-metal sulfides in quartz veins
18	Occurrence	Cu	Chalcopyrite in quartz-carbonate veins
19	Prospect	barite, Ag, Pb, Zn	Barite veins in brecciated rhyolite, disseminated sulfides
20	Occurrence	Ag, Pb, Zn, barite	Sheared phyllite, greenstone,rhyolite and limestone with quartz-baste veins
21	Occurrence	Ag, Pb, Zn, barite	Barite pods and barite-calcite veins in dolostone and in sheared rhyolite
22	Occurrence	Ag, Pb, Zn, barite	Quartz-calcite-barite-sulfide veins in sheared rhyolite conglomerate
23	Occurrence	Ag, Pb, Zn, barite	Quartz-calcite-barite veins with galena and sphalerite
24	Occurrence	Ag, Cu, Pb, Zn, barite	Quartz-barite-sulfide veins in greenstone, carbonate rocks,rhyolite and trondjhemite
25	Occurrence	Au	Gold in quartz veins, traces of gold in beach placer
26	Occurrence	Au, Ag, Cu, Pb	Quartz veins in sheared trondjhemite
27	Occurrence	Au	Quartz veins with clots of pyrite, galena, and chalcopyrite
28	Occurrence	Au, Cu, Pb, Zn	Disseminated sulfides in sheared metarhyolite
29	Occurrence	Au, Ag, Cu, Pb, Zn	Gold and sulfide bearing-quartz veins in rhyolite
30	Prospect	Au, Ag, Cu, Pb, Zn	Quartz veins in rhyolite
31	Prospect	Au, Ag, Cu, Pb, Zn	Quartz veins in brecciated rhyolite
32	Occurrence	Ag, Pb, Zn, barite	Quartz veins in dolostone and at dolostone-rhyolite contact
33	Prospect	Ag, Pb, Zn, barite	Quartz pods and veins and quartz-calcite-barite veins in carbonate and rhyolitic rock
34	Occurrence	Ag, Pb	Pyrite and galena in quartz veins in thrust fault
35	Occurrence	Au, Ag, Cu, Pb, Zn	Ladder and stringer quartz veins in limestone and dolostone near rhyolite contact
36	Occurrence	Au, Ag, Pb, Zn	Sulfides in dolostone and limestone at rhyolite contact
37	Occurrence	Au, Cu	Pyrite and chalcopyrite in quartz veins, disseminated pyrite and chalcopyrite in volcaniclastic rocks
38	Occurrence	Fe, Co, Mo	Mineralized shear zones in granite rocks
39	Occurrence	Au, Ag, Cu	Quartz-calcite veins with sulfides in granitic rock
40	Occurrence	Pb	Quartz veins with galena in foliated trondjhemite
41	Occurrence	Fe, Mo	Quartz veins and gossan in foliated trondjhemite
42	Occurrence	Cu	Disseminated chalcopyrite in trondjhemite
43	Occurrence	Au, Mo	Disseminated sulfides and pyrite-magnetite veins in sheared granitic rock
44	Occurrence	Au, Ag, Mo	Disseminated pyrite and hematite and seams of massive sulfides in sheared granitic rock
45	Occurrence	Au, Ag, Cu, Mo	Disseminated sulfides in aplite dike
46	Occurrence	Cu	Disseminated pyrite and chalcopyrite in schist and hornfels
47	Occurrence	Cu	Disseminated pyrite and chalcopyrite in schist
48	Occurrence	Cu	Pyrite, chalcopyrite, and arsenopyrite in sheared fine-grained schist with calcite veinlets
49	Occurrence	Cr, Pt	Disseminated magnetite and chromite in massive, serpentinized dunite
50	Occurrence	Cr	Disseminated magnetite and chromite and chromite stringers in serpentinized dunite
51	Occurrence	Cu	Pyrite and chalcopyrite stringers in schist and gneiss

EXPLANATION

- Bedding attitude
- Foliation
- Fold axis -- antiformal or anticlinal fold
- Contact, dashed where inferred
- Fault, dashed where inferred
- Thrust fault, dashed where inferred, sawteeth on upper plate
- (63) Mineral occurrence, numbers correspond to Map Number in table
- Data point -- location of sample for which data is provided in table

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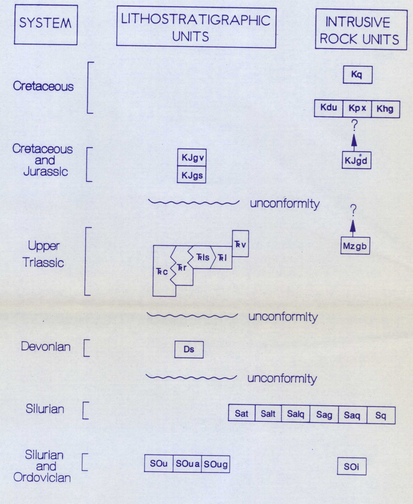
Correlation Chart for Geologic Map of Annette Island



Map Units

Kq Quartz diorite (Cretaceous) -- Brownish-gray, medium-grained, sheared and hydrothermally altered quartz diorite consisting of albite, chlorite, muscovite, epidote-clinozoisite, calcite, quartz, apatite, sphene, and pyrite. K/Ar age of 89 Ma is from muscovite (Berg and others, 1988).

Kdu Dunite (Cretaceous) -- Yellow- to orange-weathering, dark greenish-black, medium- to coarse-grained, serpentinized olivine dunite, with minor amounts of magnetite and chromite as disseminations and veinlets. Near margins up to 5 per cent clinopyroxene in dunite. Age of 106 to 134 Ma inferred from regional correlations (Berg and others, 1988).

Kpx Pyroxenite (Cretaceous) -- Yellow- to orange-weathering, dark greenish- to brownish-black, serpentinized diopsidic clinopyroxenite with minor disseminated magnetite and chromite; forms dikes, lenses and irregular masses in dunite (Kdu). Age of 106 to 134 Ma inferred from regional correlations (Berg and others, 1988).

Khg Hornblende gabbro (Cretaceous) -- Dark grayish-green weakly foliated, fine-grained hornblende gabbro consisting of 70 per cent hornblende, 25 per cent plagioclase, and accessory magnetite, clinozoisite, and sphene. Age inferred from association with dunite (Kdu).

KJgd Diorite and quartz diorite (Cretaceous or Jurassic) -- Greenish-gray and white, medium-grained, locally porphyritic diorite and quartz diorite. Pluton is pervasively hydrothermally altered. Mafic minerals altered to actinolite-chlorite-epidote; plagioclase replaced by epidote-albite-sericite-quartz. Accessory minerals include apatite, sphene, and pyrite. Considered to be cogenetic with volcanic rocks of unit KJgv.

KJgv Intermediate to mafic volcanic rocks (Cretaceous and Jurassic) -- Foliated and massive green sub-alkaline to tholeiitic intermediate to mafic metavolcanic rocks, consisting of flows, breccia, and tuff. Unit includes subordinate gray, green, and black phyllite and graywacke semischist. Regionally metamorphosed to greenschist grade. Correlative with Gravina Island Formation (Berg and others, 1988).

KJgs Sedimentary and volcaniclastic rocks (Cretaceous and Jurassic) -- Basal dark gray argillite matrix conglomerate and calcareous phyllite grade up to graywacke turbidites with intercalated tuff and debris flows. Regionally metamorphosed to greenschist grade. Correlative with Gravina Island Formation (Berg and others, 1988).

Mzgb Gabbro (Mesozoic) -- Dark, dull green, locally rusty weathering medium- to coarse-grained hornblende gabbro. Interstitial plagioclase pervasively altered to clinozoisite. Dikes and plugs in the vicinity of Sylburn Peninsula; possibly feeders to Trv. Contains copper and iron sulfides and no magnetite.

Trv Volcanic and volcaniclastic rocks (Triassic) -- Dark green, mafic to intermediate volcanic rocks, consisting of a sequence of alternating pillow basalt, agglomerate, breccia, aquagene tuff, marine volcaniclastic rocks, and minor lenses of limestone and interpillow limestone. Calcareous, matrix-supported conglomerate with mainly volcanic clasts overlies pillow basalt near top of unit. Correlated with Chapin Peak Formation on Gravina Island (Berg and others, 1988); assigned to Hyd Group by Gehrels and others (1987).

Trls Limestone and siltstone (Triassic) -- Dark gray, carbonaceous and locally pyritic bedded limestone and calcareous siltstone. Unit contains minor pebbly limestone andcalcareous grit to cobble conglomerate with clasts of felsic volcanic rock. Fossils from the Sylburn Peninsula yield early, middle and late Norian ages (Berg and Cruz, 1982; Savage and Gehrels, 1987). Unit correlates in part with Nehenta Formation on Gravina Island (Berg and others, 1988); assigned to Hyd Group by Gehrels and others (1987).

Trl Limestone (Triassic) -- Light gray-weathering, medium to dark gray thick-bedded to massive limestone. Gradationally underlies limestone and siltstone unit (Trls). Conodonts from Sink Lake and Kwain Bay provide a Late Triassic age (Berg, 1980). Locally hydrothermally dolomitized. Assigned to Hyd Group by Gehrels and others, 1987).

Trr Rhyolite (Triassic) -- Light gray to light green, locally rusty-weathering, banded rhyolite, rhyolite breccia, and tuff, with dominantly subaerial, subordinately submarine,volcaniclastic rocks. Relict flow lamination, spherulitic, vitroclastic, fragmental, and porphyro-aphanitic textures are locally well -preserved. Local disseminated pyrite or limonite; local sericitic alteration. Correlated with Puppets Formation on Gravina Island (Berg and others, 1988); assigned to Hyd Group (Gehrels and others, 1987).

Trc Conglomerate and breccia (Triassic) -- Light green, brown, gray, and orange, massive to bedded polymictic fragmental rocks. Lensis of fragmental rocks to 20 meters thick contain clasts up to 1/2 meter diameter of trondjhemite, quartz diorite, greenstone, and minor limestone near the base of the unit, and grade upward to felsic tuff breccia. Unit depositionally overlies Annette pluton and Paleozoic metamorphic rocks. Unit correlates in part with Nehenta Formation on Gravina Island (Berg and others, 1988); assigned to Hyd Group by Gehrels and others (1987).

Ds Sedimentary rocks (Devonian) -- Dull olive gray, brown- or reddish-weathering, pyritic phyllite,calcareous siltstone,graywacke, feldspathic to arkosic siltstone and sandstone, grit, and conglomerate, and dolomitic, arenaceous or phyllitic limestone. Contains Devonian and middle Devonian megafossils (Berg and Cruz, 1982). Regionally metamorphosed to greenschist grade. Correlated with Karheen Formation of Prince of Wales Island (Gehrels and others, 1987).

Sag Granite of the Annette pluton (Silurian) -- White to buff, medium-grained, hypidiomorphic granite with less than 5 percent interstitial chlorite after biotite. Minor phase of Annette pluton which yielded U-Pb ages ranging from 409 to 424 Ma (Gehrels and others, 1987).

Sat Trondjhemite of the Annette pluton (Silurian) -- Light gray, medium-grained, equigranular trondjhemite, gradational to leuco-trondjhemite (Salt) and leuco -quartz diorite (Salq) phases of the Annette pluton. Composed of sodic plagioclase, quartz, perthite, microcline, and less than 10 percent mafics (biotite and hornblende). Locally hydrothermally altered: plagioclase to sericite and mafic minerals to chlorite. K-Ar and U-Pb ages range from 409 to 424 Ma (Berg, 1972; Smith and Diggles, 1981; Gehrels and others, 1987).

Salt Leuco-trondjhemite of the Annette pluton (Silurian) -- light gray, fine- to medium-grained leuco-trondjhemite. Less than 5 percent mafic minerals. Locally hydrothermally altered. Phase of Annette pluton which has yielded U-Pb ages of 409 to 424 Ma (Gehrels and others, 1987).

Salq Leuco-quartz diorite of the Annette pluton (Silurian) -- Light gray, fine- to medium-grained inequigranular leuco-quartz diorite with subordinate quartz diorite and diorite. Composed of plagioclase, quartz, biotite and hornblende. Mafics less than 5 percent for leucocratic phases; up to 25 percent for dioritic phases. Border phase of Annette pluton which has yielded U-Pb ages of 409 to 424 Ma (Gehrels and others, 1987).

Saq Quartz diorite of the Annette pluton (Silurian) -- Light gray and green medium-grained quartz diorite with 15 to 30 percent mafic minerals. Plagioclase shows sericitic alteration. Green hornblende, subordinate and rare augite are altered to chlorite. U-Pb ages for this phase of the Annette pluton range from 430 to 390 Ma (Gehrels and others, 1987).

Sq Quartz diorite and diorite (Silurian?) -- Medium-gray, medium-grained, inequigranular, hypidiomorphic quartz diorite and diorite. Hornblende is intergrown with plagioclase; quartz is interstitial. Hornblende, commonly altered to epidote and chlorite, ranges from 20 to 40 percent of rock. There are no isotopically determined ages for this unit.

SOi Diorite (Silurian or Ordovician) -- Dark green, medium-grained, inequigranular diorite. Mafic minerals 30 to 40 percent and entirely altered to chlorite and oxides or sulfides. Unit displays pervasive sericitic alteration. Relict accessory minerals include apatite and sphene. Metamorphic assemblage includes quartz, albite, chlorite, epidote-clinozoisite, sericite, calcite, leucoxene, hematite, magnetite, and pyrite. Unit is intruded by the Annette pluton and has yielded U-Pb ages of 415 and 426 Ma (Gehrels and others, 1987).

SOu Volcanic, sedimentary, and intrusive rocks, undivided (Silurian and Ordovician) -- Heterogenous assemblage of metamorphosed and highly deformed mafic to intermediate and minor felsic volcanic rocks, clastic and carbonate rocks, and subordinate mafic to intermediate intrusive rocks. Intrusive rocks are presumably dikes of units SOi, Sq, and Sat. Volcanic rocks are dominant and consist of calc-alkaline pillow basalt flows with minor interpillow red chert, pillow breccia, and mafic to intermediate agglomerate, breccia, and tuff. Interbedded with volcanic rocks are tuffaceous carbonate rocks, massive to bedded marble, calcareous conglomerate, graywacke, and dark gray phyllite. Ubiquitous minor disseminated sulfides. Greenschist facies metamorphic mineral assemblage includes chlorite, epidote-clinozoisite, albite, actinolite, sericite, calcite, dolomite, quartz, hematite, and pyrite.

SOua Amphibolite facies volcanic, sedimentary and intrusive rocks, undivided (Silurian and Ordovician) -- Unit SOu overprinted by amphibolite facies metamorphism on the Metlakatla Peninsula. Hornfels, schist and gneiss textures accompanied by mineral assemblage including plagioclase, blue-green hornblende, brown biotite, epidote-clinozoisite, chlorite, actinolite,sericite, calcite, almandine garnet, staurolite(?), and potassium feldspar. Timing of metamorphism inferred to be related to ultramafic intrusion at Yellow Hill.

SOug Greenschist facies volcanic, sedimentary, and intrusive rocks (Silurian and Ordovician) -- Metamorphic rocks of unit SOua are retrograded to greenschist facies in some places on the Metlakatla Peninsula. The mineral assemblage includes chlorite after biotite, epidote and clinozoisite after metamorphic amphibole and plagioclase. Albite-quartz-prehnite veinlets postdate retrogressive metamorphism. Retrograde minerals and textures are attributed to Late Cretaceous regional metamorphism.