

BC Geological Survey GEOSCIENCE MAP 2006-3



Geology of the Holberg - Winter Harbour Area, Northern Vancouver Island

NTS 92L/12W, 102I/8, 9

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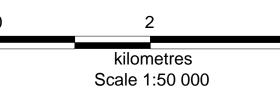
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PALEONTOLOGY

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GEOCHRONOLOGY

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LAYERED ROCKS

UPPER CRETACEOUS QUEEN CHARLOTTE GROUP EQUIVALENTS (IN PART) Cenomanian or Early Turonian to ?Santonian

BLUMBERG FORMATION Massive to thinly bedded lithic to arkosic wacke with minor pebble to

Massive conglomerate with minor lenses of coarse-grained lithic wacke.

Cenomanian to ?Turonian SHALE UNIT

Dark grey, calcareous to non-calcareous siltstone and impure limestone interbedded with subordinate wacke and minor pebble conglomerate.

LOWER CRETACEOUS

Late Valanginian to Barremian LONGARM FORMATION EQUIVALENTS

Thinly bedded to massive sandstone, siltstone, mudstone, pebble conglomerate and minor coal; locally fossiliferous.

UPPER TRIASSIC (CARNIAN) TO MIDDLE JURASSIC (MID-BAJOCIAN) **BONANZA GROUP**

Rhaetian or Hettangian to mid-Bajocian (Holberg - Winter Harbour Area) LEMARE LAKE VOLCANICS (subdivided by lithotype) Age designation: mJ, Middle Jurassic; lmJ, Lower and/or Middle Jurassic;

Undifferentiated basaltic to rhyolitic, predominantly subaerial lavas and pyroclastic rocks including ash-flow and rare airfall tuffs and reworked equivalents, minor pillow lavas, breccia, hyaloclastite

and pyroclastic surge deposits, locally intercalated with marine to non-marine, volcanic conglomerate, sandstone, siltstone, mudstone, impure limestone and localized debris-flow deposits. Mainly rhyolitic or dacitic to rhyolitic lavas and/or pyroclastic rocks, including flow and

pyroclastic breccias, welded to non-welded crystal-lithic lapilli tuffs and rare airfall tuffs;

may include thin interbedded sedimentary deposits. Mainly basaltic to andesitic lava flows with minor intercalated volcaniclastic and sedimentary lithologies similar to Lvs; locally includes minor pillow lava and breccia.

Mainly basaltic to andesitic pillow lava; may include pillow breccia, hyaloclastite and

Mainly basaltic to andesitic volcanic breccia of epiclastic and pyroclastic origin, and variably reworked lithic-crystal tuff; locally fine-grained sedimentary interbeds. Interbedded volcaniclastic and sedimentary strata, includes lithic and crystal-lithic

lapilli tuffs and reworked equivalents, pyroclastic and epiclastic volcanic breccias, sandstone, siltstone, mudstone, impure limestone, and minor debris-flow and phreatomagmatic deposits; may include rare lava flows.

Mainly sedimentary strata including impure limestone, calcareous to non-calcareous mudstone, shale, siltstone, sandstone and tuffaceous equivalents.

Middle Jurassic (mid-Bajocian) Pemberton Hills Rhyolite

Rhyolitic lavas and ash-flow tuffs with minor intercalated epiclastic deposits; subunits mJPf1/2

1 and 2 may represent separate stratigraphic units separated by basalt-andesite lavas (mJL/Pm) or the same unit repeated by intrusion/faulting in the Hushamu Creek valley.

Hettangian (or possibly Rheatian to Sinemurian) (Holberg - Winter Harbour Area)

Victoria Lake Megacrystic Basalt

Plagioclase-megacrystic basaltic to andesitic lavas locally intercalated with, and laterally equivalent to, aphanitic and plagioclase-phyric flows near the base of the LeMare Lake Volcanics; locally forms pillow lavas (LVpx).

HOLBERG SILTSTONE

Dark grey, weakly to non-calcareous siltstone and fine-grained sandstone; locally fossiliferous; only known exposures confined to the south shore of Holberg Inlet.

Rhaetian to Hettangian or ?Sinemurian (Holberg - Winter Harbour Area) VOLCANICLASTIC-SEDIMENTARY UNIT

Interbedded volcaniclastic and lesser sedimentary strata (predominantly submarine): buff to grey-green, thin to very thickly bedded, calcareous to non-calcareous, volcanic breccia, lithic and feldspathic wacke, siltstone and impure limestone; lithic-crystal tuff, lapilli tuff and reworked equivalents; and minor vitric tuff, pebbly sandstone, shale and

(late) Early Norian to Rhaetian or ?Hettangian (Holberg - Winter Harbour Area)

Medium grey to black, laminated to medium bedded impure limestone, calcareous to non-calcareous mudstone, siltstone, and shale, locally intercalated with minor grey-green lithic wacke, feldspathic wacke, lithic, crystal and vitric tuff and reworked equivalents and volcaniclastic breccia, and rare pebbly sandstone, conglomerate and debris-flow deposits; calcareous facies locally contain colonial coral horizons; organicrich facies comprise carbonaceous to graphitic shales, mudstone and limestone;

volcaniclastic debris-flow breccia.

locally abundant fossils.

Volcaniclastic and volcanic lithologies: predominantly basaltic to andesitic epiclastic waterlain breccias and tuffs, includes lithic lapilli tuff and tuff-breccia of phreatomagmatic origin; minor pillow lava and hyaloclastite; locally interbedded fine-grained volcaniclastic

UPPER TRIASSIC

VANCOUVER GROUP

Carnian to (late) Early Norian (Holberg - Winter Harbour Area)

QUATSINO FORMATION Medium to pale grey, thinly bedded to massive micritic limestone and locally bioclastic limestone; minor silica replacements and chert nodules; rare laminated interbeds, oolitic layers and algal mats; locally fossiliferous.

Carnian

KARMUTSEN FORMATION Aphanitic to plagioclase-phyric and locally plagioclase-megacrystic basaltic lava flows,

commonly amygdaloidal; predominantly subaerial flows in the upper part of the succession; may include minor pillow lava, breccia and hyaloclastite. Trend/locality of thin grey limestone beds and lenses intercalated with basalt near the top of the succession.

INTRUSIVE ROCKS

TERTIARY (?Neogene)

Rhyolite sill complex possibly equivalent to Alert Bay Volcanics.

EARLY TO MIDDLE JURASSIC

ISLAND PLUTONIC SUITE Medium to coarse-grained, equigranular granitoid rocks and porphyry; includes hornblende +/- biotite-bearing diorite (di), quartz diorite (qdi), plagioclase +/- hornblende porphyry (po) and minor quartz

Minor Intrusions Subvolcanic basaltic to andesitic, aphanitic to porphyritic intrusions:

monzonite/monzodiorite (qm) and granodiorite (gd).

d: diabase; dp: plagioclase-phyric diabase.

Subvolcanic rhyolite dikes, sills and intrusive complexes.

MAP SYMBOLS

———— Geological contact, defined — — Geological contact, approximate - - - - - Geological contact, inferred ----- Unconformity, approximate Unconformity, inferred

High-angle fault, defined (block on downthrown side if known) — — – High-angle fault, approximate ─ ─ ─ ─ ─ High-angle fault, inferred

Reverse fault, approximate (teeth on upper plate) A Reverse fault, inferred Axial trace of anticline

Axial trace of syncline

Limit of mapping

Primary flow lamination in volcanic rocks, inclined, vertical

Welding, inclined Cleavage, fault-related, inclined

Lineation (slickenfibres on fault plane)

Plunge of minor fold axis

Plunge of primary flow fold axis Minor fold with dip of axial plane

Primary flow fold with dip of axial plane — Dike, inclined, vertical

Macrofossil locality (with indicated age) Late Cretaceous

Early Cretaceous (Hauterivian) 3 Early Cretaceous (Valanginian)

4 Early Cretaceous 5 Late Jurassic - Early Cretaceous Early or Early - Middle Jurassic

Early Jurassic (Late Pliensbachian - Toarcian) 8 Early Jurassic (Sinemurian - Pliensbachian) 9 Early Jurassic (Late Sinemurian) 10 Early Jurassic (Early Sinemurian) 11 Early Jurassic (Middle Hettangian)

12 Late Triassic (Late Norian) 13 Late Triassic (Late Carnian) 14 Late Triassic GSC macrofossil locality (ages as above)

Conodont locality (with indicated age)

1 Late Triassic (Rhaetian) Late Triassic (Late Norian) 3 Late Triassic (Middle Norian)

4 Late Triassic (Early Norian) 5 Late Triassic (Carnian - Late Carnian) 6 Late Triassic GSC conodont locality (ages as above)

Radiolaria locality (with indicated age) 1 Early Jurassic (Hettangian - Sinemurian) 2 Early Jurassic

4 Late Triassic (Late Carnian - Middle Norian) Ar40/Ar39 hornblende (Hb) date (Ma, 2 sigma error)

Ar40/Ar39 mineral date (Ma, 2 sigma error); Panteleyev et al. (1995); Al, alunite; Sc, sericite

U-Pb zircon date (Ma, 2 sigma error) ⊕ 010/10 MINFILE locality (102I 010/92L 10) Outcrop examined

Outcrop too small to show at map scale Roads, paved ———— Roads, dirt

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