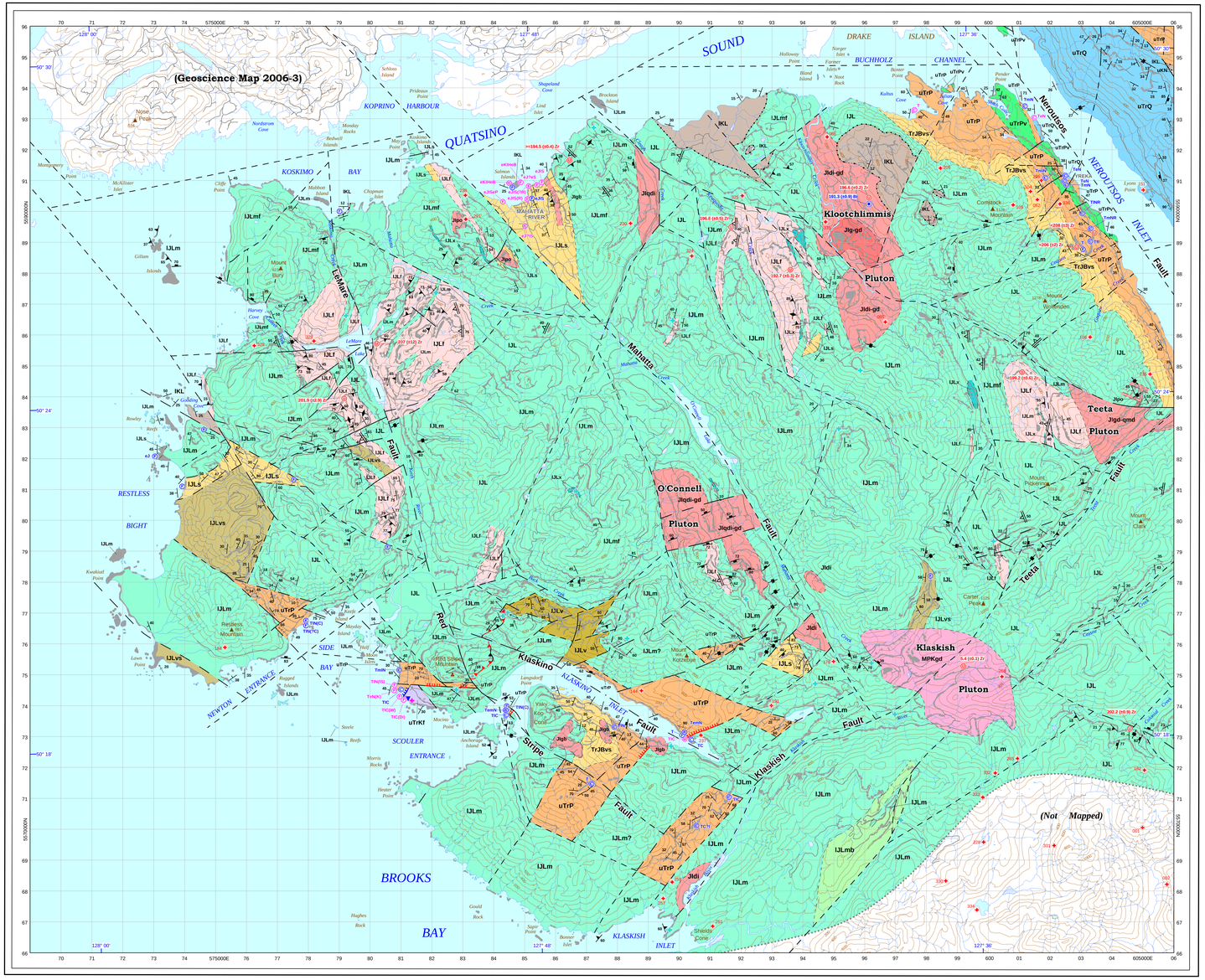

BC Geological Survey

GEOSCIENCE MAP 2006-4

Geology of the Mahatta Creek Area, Northern Vancouver Island

NTS 92L/5

G.T. Nixon, J.L. Hammack, J.V. Hamilton, H. Jennings, J. P. Larocque, R.M. Friedman, D.A. Archibald, M.J. Orchard, J.W. Haggart, H.W. Tipper, T. Tozer and F. Cordey

Ministry of Energy, Mines and Petroleum Resources
Mining and Minerals Division

PALEONTOLOGY
by
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F. CORDEY (University of Lyon, France)

GEOLOGY
by
G.T. NIXON, J.L. HAMMACK, J.V. HAMILTON, H. JENNINGS and J.P. LAROCQUE (BC Geological Survey)

GEOCHRONOLOGY
by
R.M. FRIEDMAN (The University of British Columbia)
D.A. ARCHIBALD (Queen's University)

0 2 4
kilometres
Scale 1:50 000

LAYERED ROCKS

UPPER CRETACEOUS

NANAIMO GROUP EQUIVALENTS (IN PART)

Campanian to ?Maastrichtian

uKN — Medium to coarse-grained arkosic to lithic wacke, pebble to cobble conglomerate, siltstone and minor coal; locally fossiliferous

LOWER CRETACEOUS

Late Valanginian to Barremian

LONGARM FORMATION EQUIVALENTS

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

UPPER TRIASSIC (CARNIAN) TO MIDDLE JURASSIC (MID-BAJOCIAN)

BONANZA GROUP

Hettangian (or late Rhaetian) to Pliensbachian

LEMARE LAKE VOLCANIC SUCCESSION (subdivided by lithotype)

lJL — Undifferentiated basaltic to rhyolitic, mainly subaerial lava flows and pyroclastic rocks, including ash-flow and rare airfall tuff and reworked equivalents, minor pillow lava, pillow breccia, hyaloclastite and rare pyroclastic surge deposits, locally intercalated with marine to non-marine, volcanic conglomerate, sandstone, siltstone, mudstone, impure limestone and debris-flow deposits

lJLf — Mainly rhyolitic or dacitic to rhyolitic lava flows and/or pyroclastic rocks, including flow and pyroclastic breccias, welded to non-welded crystal-lithic lapilli tuff and rare airfall tuff; may include thin interbedded sedimentary deposits and minor basaltic to andesitic lava flows

lJLm — Mainly basaltic to andesitic lava flows with minor intercalated volcaniclastic and sedimentary lithotypes similar to unit Lvs; locally includes minor pillow lava/breccia

lJLmf — Mainly bimodal basaltic and rhyolitic lava flows and pyroclastic deposits with subordinate intercalated volcaniclastic and sedimentary lithotypes

lJLx — Plagioclase-megacrystic basaltic to andesitic lava flows; locally intercalated with aphanitic and plagioclase-phyric flows

lJLmb — Mainly basaltic to andesitic pillow breccias and hyaloclastite with minor intercalated epiclastic deposits; locally includes minor pillow lava

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

lJLs — Mainly sedimentary strata including impure limestone, calcareous to non-calcareous mudstone, shale, siltstone, sandstone and tuffaceous equivalents; may include minor intercalated volcaniclastic breccia

lJLvs — Interbedded volcaniclastic and sedimentary strata; includes lithic and crystal-lithic lapilli tuff and reworked equivalents, pyroclastic and epiclastic volcanic breccia, sandstone, siltstone, mudstone, impure limestone, and minor debris-flow and phreatomagmatic deposits; may include minor lava flows

Rhaetian to Hettangian

VOLCANICLASTIC-SEDIMENTARY UNIT

TrJBvs — 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 limestone, locally coralline; lithic-crystal tuff, lapilli tuff and reworked equivalents; and minor vitric tuff, pebbly sandstone, siltstone, and volcaniclastic debris-flow deposits; organic-rich facies include carbonaceous shale, mudstone, siltstone and limestone, locally coralline

Carnian to Rhaetian or possibly earliest Hettangian

PARSON BAY FORMATION

uTrP — 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; shale locally contains abundant bivalves

uTrPv — Volcanic lithotypes within the Parson Bay Formation: mainly aphanitic to clinopyroxene-plagioclase-phyric, basaltic waterlain breccia and tuff; includes lithic tuff and tuff-breccia of phreatomagmatic origin; minor pillow lava and hyaloclastite; and rare subaerial flows; locally interbedded with lithic wacke and typical Parson Bay sedimentary rock types

UPPER TRIASSIC

VANCOUVER GROUP

Carnian to Early Norian

QUATSINO FORMATION

uTrQ — 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 structures; locally fossiliferous; unit is very thin (<40m) on the West Coast

Carnian (possibly latest Middle Triassic at the base)

KARMUTSEN FORMATION

uTrKf — 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, pillow breccia and hyaloclastite

INTRUSIVE ROCKS

LATE MIOCENE TO EARLY PLIOCENE

KLASKISH PLUTONIC SUITE

MPKgd — Medium-grained, equigranular hornblende granodiorite

EARLY TO MIDDLE JURASSIC

ISLAND PLUTONIC SUITE

JI — Medium to coarse-grained, equigranular granitoid rocks and porphyry; includes hornblende+/-biotite-bearing gabbro (gb), diorite (di), quartz diorite (qdi), plagioclase+/-hornblende porphyry (po), quartz monzodiorite (qmd), granodiorite (gd) and granite (g)

Jig-gd — Medium to coarse-grained, equigranular hornblende-biotite granite-granodiorite interior zone of Klootchlimmis Pluton

MAP SYMBOLS

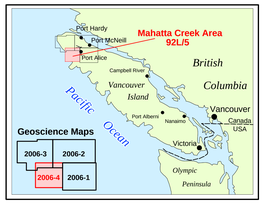
- Geological contact, defined
- Geological contact, approximate
- Geological contact, inferred
- Steeply dipping fault, defined
- Steeply dipping fault, approximate
- Steeply dipping fault, inferred
- Reverse fault, defined (teeth on upper plate)
- Reverse fault, inferred (teeth on upper plate)
- Unconformity, defined
- Unconformity, approximate
- Unconformity, inferred
- Thin (<40m) sliver of Quatsino limestone adjacent to fault
- Thin (<40m) unit of Quatsino limestone at base of Parson Bay Formation
- Limit of mapping
- Bedding, facing known, inclined, vertical
- Volcanic flow lamination, inclined, vertical
- Volcanic lamination/welding, inclined
- Plutonic flow lamination, inclined, vertical
- Dike, inclined, vertical
- Minor fold with plunge
- Minor fold with dip of axial plane
- Lineation, inclined (slickenfibres on fault plane)
- Lineation, horizontal (slickenfibres on fault plane)
- Macrofossil locality (age code as below)
- GSC Macrofossil locality (age code as below)
- Conodont locality (age code as below)
- GSC Conodont locality (age code as below)
- Radiolarian locality (age code as below)

Fossil age designation

T Late Triassic; J Jurassic; K Cretaceous
e early; m middle; l late

Late Triassic: C Carnian; N Norian; R Rhaetian
Jurassic: S Sinemurian; P Pliensbachian
Cretaceous: H Hauterivian; B Barremian
Ammonoid Zones: (Di) Dillieri; (Wi) Welleri; (K) Kerri; (R) Rutherfordi; (C) Cordillerarus; (S) Suessi
l lower
(no label indicates age indeterminate)

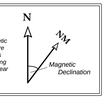
- Plagioclase-megacrystic Karmutsen basalt
- Plagioclase-megacrystic basalt/andesite, LeMare Lake Volcanic Succession
- Thin (<10m) lens of grey intra-Karmutsen limestone intercalated with basalt near the top of the succession
- 160 (±1.4) Bi — $^{40}Ar/^{39}Ar$ date (Ma, 2 sigma error); Bi, biotite
- 167.4 (±1.1) Zr — U-Pb zircon date (Ma, 2 sigma error)
- 042 — MINFILE Locality
- Outcrop Examined
- Outcrop too small to show at map scale
- Road (dirt)



Base Map Information

Base map produced from digital TRIM (Terrain Resource Inventory Management) 1:20 000-scale topographic database, British Columbia Ministry of Environment, Lands and Parks.

North American Datum 1983 (NAD83). Universal Transverse Mercator Projection (Zone 9). Elevation in metres above mean sea level. Contour interval 100m.



Approximate mean magnetic declination 2005 for centre of map area: 19 degrees 40 minutes east, decreasing annually 12 minutes per year

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Data Compilation

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Digital Cartography

G. T. Nixon and R. D. M. Rayner

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