GEOLOGICAL SURVEY OF CANADA COMMISSION GÉOLOGIQUE DU CANADA

DEPARTMENT OF ENERGY, MINES AND RESOURCES
MINISTÈRE DE L'ÉNERGIE, DES MINES ET DES RESSOURCES

TERRANE MAP OF THE CANADIAN CORDILLERA (O.F. 1894)

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Terranes of the Canadian Cordillera, including the North American miogeocline are regions characterized by an assemblage or assemblages of rocks whose paleogeographic relationships with those in bordering terranes are unknown. Paleontological and paleomagnetic data suggest that some currently juxtaposed terranes were originally separated by distances of up to thousands of kilometres. Terranes are bounded by faults although, in places, these may be concealed by cover rocks or intrusions.

Terranes are categorized according to their relationship to ancestral North America which includes the North American craton and flanking miogeoclinal strata present during early Paleozoic time. The Monashee Terrane is considered, tentatively, to be part of the basement to ancestral North America. Displaced continental margin terranes have a stratigraphic record similar to that of adjacent ancestral North America. Amounts of transcurrent displacement, particularly for the Arctic Alaska Terrane are conjectural. Pericratonic terranes are less obviously related to ancestral North America than the displaced terranes but may, in part, represent rocks originally contiguous with, but distal to, the continental margin. Accreted terranes represent oceanic or island arc lithologies, generally of unknown paleogeographic origin, which are clearly allochthonous with respect to miogeoclinal strata. The accreted terranes are grouped into two superterranes, the Intermontane and Insular, on the basis of their time of assembly and collision with North America. Between the two superterranes lie the terranes of the Coast Belt. The outer terranes represent Mesozoic and Tertiary accretionary prisms.

Pre-accretionary plutonic assemblages are included in the terranes whereas post-accretionary plutons are shown separately. Metamorphic rocks of unknown protolith have no terrane assignment.

Overlap assemblages, as well as intrusive rocks provide a minimum age on the assembly and accretion of terranes. Those on the craton are related to the collision of the Intermontane Superterrane with ancestral North America, and with subsequent intraplate deformation. Overlap assemblages on terranes indicate latest times of assembly of various components of the superterranes and the time of collision between the Insular and Intermontane superterranes.

Tectonic assemblages and plutonic suites which make up each terrane are listed using symbols and names from Tectonic Assemblage Map of the Canadian Cordillera and adjacent parts of the United States of America, compiled by J.O. Wheeler and P. McFeely, Geological Survey of Canada, Open File 1565, 1987.

COLOURS:
700 Series Verithin
900 Series Prismacolor

LEGEND

MIOGEOCLINE

CRATON

NA — Ancestral North America

904 lt

Middle Proterozic to Carboniferous passive and offshelf continental margin sediments, Devonian to Carboniferous clastic wedges, Pennsylvanian to Jurassic passive continental margin prism, and Permian clastics

mP_{CM} Cap Mountain, mP_{M} Mackenzie, mP_{Mu} Muskwa, mP_{PW} Purcell-Wernecke, uP_{W} Windermere, uP_{WR} Rapitan, uP_{PI} Pinguicula, $P\epsilon_{G}$ Gog, $P\epsilon_{H}$ Hyland, $m\epsilon_{r}$ rift assemblage, ϵD_{R} Rocky Mountains, DM_{B} Besa River, DM_{E} Earn, DM_{I} Imperial, DC_{R} Rundle, C_{M} Mattson, C_{L} Lisburne, CP_{O} Outer, PP_{I} Ishbel, P_{J} Jungle Creek, TRJ_{S} Spray River, JK_{P} Parsons
plutonic rocks: $_{M}P\gamma_{H}$ Hellroaring Creek, $_{M}Pd_{M}$ Moyie, $_{L}Pq_{D}$ Deserters, $_{L}Pd_{M}$ Macdonald, $_{L}Pd_{R}$ Rackla, $_{L}Pd_{T}$ Thundercloud, Sy Bearpaw Ridge

TERRANES: geological record except for displaced continental margin differs from that of Ancestral North America

NORTH AMERICAN BASEMENT?

MO — Monashee

904 med

Craton-related metasedimentary rocks overlying basement paragneiss and orthogneiss of Early Proterozoic age

lP_{M} Monashee Complex
plutonic rocks: $_{E}Pn_{Mo}$ Monashee, $_{L}P\gamma_{C}$ Mt. Copeland

MO? — Monashee - inferred

904 med

lPn_{V} Vaseaux Gneiss

DISPLACED CONTINENTAL MARGIN

AA — Arctic Alaska

906

Upper Proterozoic and lower Paleozoic miogeoclinal sedimentary, volcanic and granitic rocks unconformably overlain by Lower Carboniferous to Triassic continental margin deposits and displaced along the Kaltag Fault

uP_{N} Neruokpuk, $P\epsilon_{HA}$ Hyland, ϵD_{RA} Rocky Mountains, DM_{IA} Imperial, C_{MA} Mattson, C_{LA} Lisburne, PTR_{S} Sadlerochit, JK_{PA} Parsons
plutonic rocks: DMq_{A} Ammerman, DMq_{F} Fitton, DMq_{OC} Old Crow, DMq_{Sh} Schaeffer, DMq_{Se} Sedgwick

CA — Cassiar

919

Upper Proterozoic to Upper Triassic passive continental margin sediments displaced along the Tintina and Northern Rocky Mountain Trench transcurrent faults

uP_{WC} Windermere, $P\epsilon_{GC}$ Gog, ϵD_{RC} Rocky Mountains, DC_{RC} Rundle, DM_{EC} Earn, TRJ_{SC} Spray River
plutonic rocks: $_{E}Pn_{T}$ Tochieka

SUBTERRANE

CA_C Cariboo

919

Upper Proterozoic to Upper Triassic displaced offshelf passive continental margin sediments without characteristic platformal Upper Silurian (?) to Upper Devonian carbonate and sandstone

$u\underset{\sim}{P}_{WCA}$ Windermere, $\underset{\sim}{P}\epsilon_{GCA}$ Gog, ϵD_{RCA} Rocky Mountains, DM_{ECA} Earn, $\mathbb{P}P_{ICA}$ Ishbel, TRJ_{SCA} Spray River

NS Nisling

950

Metamorphosed Proterozoic to lower Paleozoic (?) passive continental margin assemblage and partly metamorphosed carbonaceous and siliceous offshelf sediments

$\underset{\sim}{P}\epsilon_N$ Nisling, ϵD_N Nasina

PC Porcupine

903

Continental margin sediments comprising upper Proterozoic clastics overlain by Paleozoic carbonates and clastics intruded by Devonian syenodiorite, and bounded by the Yukon and Kaltag faults

$\underset{\sim}{P}\epsilon_{HP}$ Hyland, ϵD_{RP} Rocky Mountains, C_{LP} Lisburne, CP_{OP} Outer, P_{JP} Jungle Creek, TRJ_{SP} Spray River, JK_{PP} Parsons
plutonic rocks: DMy_{DL} Dave Lord

PERICRATONIC: no record of significant displacement but rocks differ in stratigraphic or structural characteristics from the ancient continental margin

KO Kootenay

920 dk

Intensely deformed, variably metamorphosed and poorly dated Proterozoic to Triassic, siliceous clastic sediments, subordinate volcanics, and limestone, locally intruded by Ordovician, Devonian and Mississippian granitoid plutons. Some of the deformed lowest Paleozoic rocks appear to be stratigraphically related to ancestral North America whereas the younger, less deformed rocks do not

$\underset{\sim}{P}Pz_{EK}$ Eagle Bay, C_{MK} Milford
plutonic rocks: OSn_L Little Shuswap Lake, DMq_F Mt. Fowler, DMq_C Clachnacudainn

SUBTERRANES

KO? Kootenay -inferred

920 med

Proterozoic continental margin sediments and basement gneiss separated from North American strata by the Purcell and Esplanade thrust faults

$l\underset{\sim}{P}_M$ Malton, $u\underset{\sim}{P}_W$ Windermere
plutonic rocks: $E\underset{\sim}{P}n_M$ Malton, $L\underset{\sim}{P}g_H$ Hugh Allan, Dy_I Ice River

KO_B Barkerville

920 dk

Proterozoic and Paleozoic strata which are thrust bounded with and may be a facies equivalent of the Cariboo Subterrane

$\underline{P}Pz_{EK}$ Eagle Bay
plutonic rocks: DMq_Q Quesnel Lake

KO_N Nisutlin

920 dk

Metamorphosed and intensely cataclastized sedimentary, volcanic and intrusive rocks of Late Proterozoic, Paleozoic and possibly early Mesozoic ages

$\underline{P}TR_{NK}$ Nisutlin
plutonic rocks: DMg_S Simpson Range Suite, $_EPq_{SC}$ Sulphur Creek

PG Pelly Gneiss

934

Muscovite-biotite granite and leucogranite augen gneiss and biotite quartz monzonite orthogneiss of S-type affinity; in part fault bounded. Pelly Gneiss is in fault contact with Nisutlin Subterrane and in an unknown relationship with the Nisling Terrane. It may be included with the Nisutlin Subterrane if correlated by age with the Simpson Range Suite although Pelly Gneiss is compositionally different.

DMg_M Mink Creek Suite

ACCRETED TERRANES:

INTERMONTANE SUPERTERRANE: terranes amalgamated by latest Triassic time and accreted to Ancestral North America in the Jurassic

SM Slide Mountain

936

Oceanic marginal basin volcanics and sediments of Devonian to Late Triassic age which are basement to Quesnellia in southern B.C.. Included are chert, argillite, sandstone, conglomerate, mafic intrusions, basalt, alpine-type ultramafic rocks, carbonate rocks and local occurences of blueschist and eclogite. In northern B.C. Permian fusulinids are not found in coeval, co-latitudinal cratonal rocks suggesting terrane movement from the south

DTR_S Slide Mountain
plutonic rocks: DTRuo oceanic ultramafics, DTRd, $_EPt_F$ and $_EMt_F$ Four Mile

DY Dorsey

968

Carboniferous marginal basin chert and clastics with similar lithology to Slide Mountain Terrane but lacking ultramafics, containing less volcanics and including important conglomeratic units. The terrane may represent a facies of either Quesnellia or Slide Mountain Terrane

C_D Dorsey

QN Quesnellia

909 med

Upper Triassic and Lower Jurassic arc volcanics, volcaniclastics and comagmatic intrusive rocks overlain by Jurassic arc-derived clastics. Triassic and Jurassic faunas differ from those in coeval, co-latitudinal cratonal rocks

TRJ_N Nicola, J_{HA} Hall
plutonic rocks: $_LTRu_P$ Polaris Suite, $_EJg_G$ Guichon Suite, $_EJy_{CM}$ Copper Mountain Suite

SUBTERRANES: basement to Quesnellia

QN_H Harper Ranch

908 dk

Upper Devonian to Triassic arc clastics, volcanics and carbonate

DTR_H Harper Ranch

QN_O Okanagan

909 + 911

Ordovician to Triassic oceanic volcanics and sediments

OTR_S Shoemaker, CP_A Anarchist

CC Cache Creek

962

Mississippian to Upper Triassic oceanic volcanics and sediments, Upper Triassic island arc volcanics and local accretionary prism melange. Included are radiolarian chert, argillite and basalt, shallow water carbonate and alpine-type ultramafics. The terrane is bounded on the east by the Teslin and Pinchi faults. Permian fusulinid and coral faunas of Tethyan affinity are not found in coeval, co-latitudinal cratonal rocks suggesting an exotic origin

MTR_C Cache Creek, TR_{KU} Kutcho
plutonic rocks: DTRuo oceanic ultramafics

ST Stikinia

912 med

Devonian to Permian arc volcanics and platform carbonates form the basement to Stikinia. They are overlain by Triassic and Lower Jurassic arc volcanics, volcaniclastics, chert and arc-derived clastics which are intruded by comagmatic plutonic rocks. Permian, Triassic and Jurassic faunas differ from co-latitudinal cratonal rocks indicating northward terrane displacement

DP_A Asitka, TR_S Stuhini, TR_L Lewes River, J_H Hazelton, J_T Takwahoni
plutonic rocks: $_LTRu_P$ Polaris Suite, $_LTRd_S$ Stikine Suite, $TRJg_K$ Klotassin Suite, $_EJq_B$ Black Lake, $_EJq_{CM}$ Copper Mountain Suite, $_EJg$ unnamed plutons in Coast Mountains, $_EJq_L$ Long Lake Suite, $_EJq_T$ Topley Suite, $_MJdg_T$ Three Sisters Suite

WM — Windy McKinley

905 + 968

Devonian oceanic sediments and volcanics; Cretaceous blocks

DK_{WR} White River

TERRANES OF THE COAST BELT

TU — Taku

751 dk

Variably metamorphosed upper Paleozoic and Triassic basalt, local acid volcanics, carbonate, pelite and Permian crinoidal limestone. Jurassic to Cretaceous metamorphosed sediments and volcanics are similar to the Gambier (Gravina-Nutzotin) Assemblage. The stratigraphic base of the terrane is unknown and relationships with other terranes are obscured by intrusions and metamorphism.

PK_T Taku

CD — Cadwallader

911 dk

Upper Triassic island arc clastics and volcanics (regarded in part by some workers as Stikinia) overlain by Jurassic arc clastics and volcanics, and Jura-Cretaceous easterly derived continental margin clastic wedge of shale and siltstone in Tyaughton Trough

TR_C Cadwallader, J_L Ladner, JK_R Relay Mountain

MT — Methow

913 dk

Upper Triassic basalt overlain by Lower Jurassic arc clastics and volcanics, and Jurassic and Cretaceous easterly derived clastic wedges shed from Quesnellia

J_L Ladner, JK_R Relay Mountain, K_S Skeena

BR — Bridge River

967 dk

Accretionary prism and oceanic crust of Permian to Middle Jurassic age disrupted and variably metamorphosed radiolarian chert, argillite, basalt, alpine-type ultramafics and minor carbonate and diorite

PJ_B Bridge River

HA — Harrison

912 dk

Jurassic island arc volcanics and clastics. Carbonate clasts in Toarcian conglomerate contain Permian fossils similar to those in the Chilliwack Terrane

J_{HL} Harrison Lake

CK — Chilliwack

908med

Devonian to Permian arc volcanics and clastics overlain by Upper Triassic to Lower Jurassic arc clastics. Permian fusilinid faunas resemble those in Quesnellia and Stikinia. The Yellow Aster may in part be basement to the Chilliwack Terrane.

DP_{CH} Chilliwack, TRJ_C Cultus
plutonic rocks: $\mathcal{P}Pn_V$ Vedder, $\mathcal{E}On_Y$ Yellow Aster

SH — Shuksan

737½ dK

Upper Triassic and Lower Jurassic oceanic crust and sediments metamorphosed to greenschist and blueschist and Jurassic near arc oceanic marginal basin crust and sediments

TRJ_{SE} Settler, J_S Shuksan

INSULAR SUPERTERRANE: terranes amalgamated by Late Jurassic to earliest Cretaceous time and accreted to the continental margin in the Cretaceous

AX — Alexander

941

Upper Proterozoic to Triassic volcanic and sedimentary rocks in a variety of depositional settings (ocean arc, back arc, platform, rift, trough, offshelf) and comagmatic intrusions

$P\mathcal{E}_W$ Wales, OS_D Descon, OD_D Donjek, OD_K Kaskawulsh, OTR_A Alexander, D_C Cedar Cove, D_K Karheen, DP_C Cannery, C_I Iyoukeen, P_H Halleck, P_P Pybus, PTR_A Alexander, TR_H Hyd
plutonic rocks: $\mathcal{E}Od$ in St. Elias, OSg, OSd, Sy, Sg and Sum in S.E. Alaska, $\mathcal{P}Pg_I$ Icefield Ranges Suite

WR — Wrangellia

907

Silurian to Permian arc volcanics, clastics and platform carbonates form the basement to Wrangellia; they are overlain by Triassic oceanic rift tholeiitic basalt, carbonate and Jurassic arc volcanics, and intruded by comagmatic plutons. Paleomagnetic data suggest displacement from low latitudes

DP_S Sicker, $\mathcal{P}P_S$ Skolai, TR_K Karmutsen, J_B Bonanza
plutonic rocks: Dg_S Saltspring, $_EJd_W$, $_EJn_W$ Westcoast Complex, $_MJg_V$ Vancouver Island Suite, $_MJg$ Chichagof Island

OUTER TERRANES: Mesozoic and Tertiary accretionary prisms

CG — Chugach

751 lt

Cretaceous greywacke, argillite, and melange of Triassic to Lower Cretaceous blocks in a Lower Cretaceous matrix

K_V Valdez

YA — Yakutat

910 lt

Upper Cretaceous turbidite and melange of Upper Triassic to Lower Cretaceous blocks in a Cretaceous matrix

uK_Y Yakutat, pT_M Metchosin, pT_C Carmanah, nT_Y Yakataga

PR — Pacific Rim

913 lt

Melange and chert-volcanics assemblage on Upper Triassic calc-alkaline arc volcanics

JK_{PR} Pacific Rim

CR — Crescent

912 lt — Pull-apart basin ridge-island Eocene volcanics cut by gabbro and diabase intrusions

pT_M Metchosin
plutonic rocks: $_ETg_C$ Catface Suite

OC — Olympic Core

909 lt — Eocene to Miocene flyschoid marine sediments and oceanic basalt

pT_O Olympic

OZ — Ozette

907 lt — Lower and Middle eocene melange and broken formation

pT_{Om} Olympic melange

HO — Hoh

910 med — Middle Miocene to Upper Oligocene melange forming the upper continental slope

nT_Y Yakataga

ROCKS EXCLUDED FROM TERRANE CLASSIFICATION:

METAMORPHIC ASSEMBLAGES

m 956 — undivided metamorphic assemblages

PLUTONIC ROCKS

All post-terrane accretion intrusions

POST-TERRANE ACCRETION OVERLAP ASSEMBLAGES HIGHLIGHTED ON MAP:

927 — TR_L Lewes River (on Cache Creek Terrane)

942 — J_{BL} Bowser Lake (on Stikinia)

914 — J_I Inklin (on Cache Creek Terrane)

914 — J_T Takwahoni (on Cache Creek Terrane)

916 — JK_G Gambier (in Coast Belt)

POST-TERRANE ACCRETION OVERLAP ASSEMBLAGES UNDIFFERENTIATED ON MAP:

JKTQ

Cratonal overlap:

918

JK_K Kootenay, $\underline{m}K_B$ Blairmore, $\underline{m}K_S$ South Fork, uK_S Smoky, uK_T Trevor, KT_B Brazeau, pT_{MC} Moose Channel, pT_R Reindeer, nT_B Beaufort, nT_F Fraser, Q Quaternary

Terrane overlap:

918

JK_R Relay Mountain, lK_L Longarm, K_S Skeena, $\underline{m}K_S$ South Fork, uK_H Honna, uK_M Midnight Peak, uK_V Virginian Ridge, $\underline{u}K_C$ Carmacks, KT_N Nanaimo, pT_A Amphitheatre, pT_C Carmanah, pT_K Kamloops, pT_S Sifton, nT_A Alert Bay, nT_C Chilcotin, nT_F Fraser, nT_P Pemberton, nT_S Skonun, TQ_A Anahim, TQ_E Edziza, TQ_G Garibaldi, TQ_W Wrangell, Q_C Clearwater, Q Quaternary