



Ministry of Energy, Mines and Petroleum Resources
Oil & Gas Division
Resource Development and Geoscience Branch

Petroleum Geology Map 2006-1
Sheet 2 of 3 - Geology Legend

GEOLOGY OF THE SOUTHERN NECHAKO BASIN
NTS 92N, 92O, 93B, 93C, 93F, 93G
Compiled by J.M. Riddell, 2006

Digital geology by N.W.D. Massey, D.G. MacIntyre, P.J. Desjardins and R.T. Cooney
B.C. Ministry of Energy and Mines, Geological Survey Branch Open File 2005-2

B.C. Albers Projection
North American Datum 1983 (NAD 83)
Digital base maps by B.C. Ministry of Sustainable Resource Management

References

- Bevier, Mary Lou (1983): Regional stratigraphy and age of Chilcotin Group basalts, south-Central British Columbia; *Canadian Journal of Earth Sciences*, Volume 20, p. 515-524.
- Diakow, L.J., Webster, I.C.L., Richards, T.A. and Tipper, H.W. (1987): Geology of the Fawnie and Nechako ranges, southern Nechako Plateau, Central British Columbia (92F, 3, 6, 7); in: Interior Plateau Geoscience Project: Summary of geological, geochemical and geophysical studies, Larry Diakow and John Newell, eds., *British Columbia Ministry of Employment and Investment*, Paper 1987-2, p. 7-30.
- Dostal, Robichaud, D.A., Chiaro, B.N. and Reynolds, P.H. (1998): Eocene Challis-Kamloops volcanism in central British Columbia: an example from the Buck Creek basin; *Canadian Journal of Earth Sciences*, Volume 35, p. 951-963.
- Duffell, S. and McTeague, K.C. (1982): Ashcroft map area, British Columbia; *Geological Survey of Canada*, Memoir 262, 122 pages.
- Friedman, R. M. and Armstrong, Richard Lee (1988): Tatla Lake metamorphic complex: an Eocene metamorphic core complex on the southwestern edge of the Intermontane belt of British Columbia; *Tectonics*, Volume 7, Number 6, p. 1141-1166.
- Garver, J.J. (1992): Provenance of Albian-Cenomanian rocks of the Methow and Tyahughton basins, southern British Columbia: a mid-Cretaceous link between North America and the Insular terrane; *Canadian Journal of Earth Sciences*, Volume 29, Number 6, p. 1274-1295.
- Grainger, Nancy C., Villeneuve, Michael E., Heaman, Larry M., and Anderson, Robert (2001): New U-Pb and Ar/Ar isotopic age constraints on the timing of Eocene magmatism, Fort Fraser and Nechako River map areas, central British Columbia; *Canadian Journal of Earth Sciences*, Volume 38, p. 679-696.
- Hunt, J.A. and Bustin, R.M. (1997): Thermal maturation and source rock potential of Cretaceous strata in the Chilcotin-Nechako region, south-central British Columbia; *Geological Survey of Canada*, Paper 1997-1A, p. 173-182.
- Mathews, W.H. and Rouse, G.E. (1984): The Gang Ranch Big Bar area, south-central British Columbia: stratigraphy, geochronology, and palynology of the Tertiary beds and their relationship to the Fraser Fault; *Canadian Journal of Earth Sciences*, Volume 21, p. 1132-1144.
- Mathews, W.H. (1989): Neogene Chilcotin basalts in south-central British Columbia: geology, ages, and geomorphic history; *Canadian Journal of Earth Sciences*, Volume 26, p. 969-982.
- Mathews, W.H. and Rouse, G.E. (1984): The Gang Ranch Big Bar area, south-central British Columbia: stratigraphy, geochronology, and palynology of the Tertiary beds and their relationship to the Fraser Fault; *Canadian Journal of Earth Sciences*, Volume 21, p. 1132-1144.
- Mustard, Peter S. and van der Heyden, Peter (1997): Geology of the Tatla Lake (92/15) and the east half of the Busel Lake (92/14) map areas; in: *Interior Plateau Geoscience Project: Summary of geological, geochemical and geophysical studies*, Larry Diakow and John Newell, eds., *British Columbia Ministry of Employment and Investment*, Paper 1997-2, p. 31-61.
- Schiarizza, P., Gabi, R.G., Glover, J.K., Garver, J.J. and Umhoefer, P.J. (1997): Geology and mineral occurrences of the Taseko-Bridge River area; *British Columbia Ministry of Employment and Investment*, Bulletin 100, 292 pages.
- Schiarizza, Paul and Ridell, Janet (1997): Geology of the Tally Lake, Beece Creek area (92N/8, 92O/5, 6, 12); in: *Interior Plateau Geoscience Project: Summary of geological, geochemical and geophysical studies*, Larry Diakow and John Newell, eds., *British Columbia Ministry of Employment and Investment*, Paper 1997-2, p. 63-101.
- Thorkelson, D.J. and Rouse, Glenn E. (1989): Revised stratigraphic nomenclature and age determinations for mid-Cretaceous volcanic rocks in southwestern British Columbia; *Canadian Journal of Earth Sciences*, Volume 26, p. 2016-2031.
- Tipper, H.W. and Richards, T.A. (1976): Jurassic stratigraphy and history of north-central British Columbia; *Geological Survey of Canada*, Bulletin 270, 73 pages.
- Umhoefer, Paul J. (1990): Stratigraphy and tectonic setting of the upper part of the Cadwallader terrane, southwestern British Columbia; *Canadian Journal of Earth Sciences*, Volume 27, p. 702-711.
- Umhoefer, P.J. and Tipper, H.W. (1998): Stratigraphy, depositional environment, and tectonic setting of the upper Triassic and middle Jurassic rocks of the Chilcotin Ranges, southwestern British Columbia; *Geological Survey of Canada Bulletin* 519, 58 pages.

Ultramafic Rocks

?? to Triassic

- Pzus:** Permian to Mesozoic; serpentinite, listwanite, serpentized ultramafite, **Pzum:** Permian to Triassic; peridotite, serpentinite, pyroxenite, harzburgite, ilherzolite, dunite, talc, gabbro, silica-carbonate altered ultramafite, minor greenstone, gabbro, conglomerate and greywacke, **CTrus:** Carboniferous to Triassic; serpentinite, serpentinite-carbonate-talc schist, serpentized harzburgite, melange containing knockers of greenstone, diabase, amphibolite, chert, limestone; minor listwanite, dunite, rodingite, and nephrite, **Pus:** Permian; serpentinite, harzburgite, with lesser amounts of dunite and orthopyroxenite, **Pus:** Permian; serpentinite, harzburgite, dunite, wehrleite, **Cpus:** Carboniferous to Permian; serpentinite, harzburgite, peridotite, **?us:** serpentinite of unknown age

Intrusive and

High-grade Metamorphic Rocks

Paleogene to Pliocene

- Ltgd:** granodiorite
- ETfp:** hornblende and quartz-plagioclase porphyry plugs and dikes; **ETg:** undivided felsic intrusive rocks; **ETgb:** gabbro, diabase; **ETgd:** equigranular, coarse-grained, hornblende-biotite-feldspar porphyritic granodiorite; **ETgr:** biotite+/-hornblende-plagioclase porphyritic granite; **ETm:** biotite granodiorite, granite and minor diorite; **ETqd:** quartz diorite; **ETqm:** biotite-quartz monzonite; **ETqp:** aphanitic felsic intrusions, rusty, rhythmic feldspar-quartz porphyry dikes; **ETto:** foliated to mylonitic biotite tonalite

Cretaceous to Paleocene

- KTdr:** diorite, minor gabbro; **KTfp:** andesitic and dacitic hornblende-plagioclase porphyry, biotite-feldspar porphyry, feldspar porphyry and felsite; **KTg:** undivided plugs, sill and dikes, equigranular (biotite-) hornblende diorite, granodiorite and granite; **KTgd:** granodiorite, tonalite, quartz diorite; **KTmi:** migmatitic gneiss; **KTqd:** quartz diorite, granodiorite, tonalite; **KTqp:** quartz-eye felsite, quartz-feldspar to quartz-hornblende-feldspar porphyry; **KTto:** tonalite, "One Eye Tonalite"- weakly foliated

Cretaceous

- Late Cretaceous:** **LKdr:** diorite, biotite-hornblende diorite; **LKfp:** andesitic hornblende-plagioclase porphyry; **LKg:** granite and quartz monzonite; **LKgd:** granodiorite, aplite; **LKog:** tonalitic orthogneiss; **LKqd:** quartz diorite, minor granodiorite, diorite and greenstone; **LKqm:** homogeneous to inclusion-bearing biotite monzonite; **LKto:** tonalite

- Cretaceous:** **Kg:** quartz monzonite, granodiorite, granite, quartz diorite; minor aplite, pegmatite, monzonite, syenite; may include Jurassic and/or Tertiary plutons; **Kgr:** granite, muscovite granite; **Kmi:** migmatitic gneiss; **Kog:** hornblende-biotite granoblastic gneiss, fine-grained granoblastic gneiss

- Middle Cretaceous:** **mKgb:** gabbro and diorite; **mKgd:** granodiorite, minor quartz diorite; **mKgr:** biotite granite, potassium-feldspar megacrystic biotite granite, aplite, pegmatite; **mKqd:** quartz diorite; **mKto:** tonalite

- Early Cretaceous:** **EKdr:** chloritized (hornblende-)biotite-quartz diorite, granodiorite and diorite; **EKgd:** biotite +/- hornblende +/- feldspar granodiorite, **EKim:** tectonically interleaved slices of Cretaceous and Triassic rocks and orthogneiss; **EKto:** hornblende leucotonalite, granodiorite; **EKog:** granitoid gneiss

Jurassic to Cretaceous

- Jkdr:** chloritized hornblende diorite and quartz diorite, **JKg:** granodiorite, diorite and quartz diorite, quartz monzonite and tonalite; **JKgd:** granodiorite; **JKml:** felsic to mafic metavolcanic schist and gneiss; **JKog:** granodiorite augen gneiss; **JKqd:** quartz diorite, lesser granodiorite, **JKqm:** quartz monzonite; **JKqp:** quartz porphyry, quartz porphyry microgranite; **JKto:** tonalite

Jurassic

- Late Jurassic:** **LJgd:** equigranular (hornblende-)biotite granodiorite to granite; **LJgr:** porphyritic granodiorite; **LJqd:** quartz diorite; **LJto:** tonalite to quartz diorite

- Middle Jurassic:** **MJdr:** (biotite-)hornblende diorite to quartz diorite; **MJfp:** plagioclase-augite porphyry plugs; **MJg:** quartz monzonite, granodiorite and granite; **MJqd:** biotite-hornblende quartz diorite to granodiorite; **MJqm:** potassium-feldspar megacrystic hornblende quartz monzonite

- Early Middle Jurassic:** **EMJdr:** hornblende +/- biotite diorite, tonalite

- Jurassic:** **Jgd:** granodiorite, diorite; **Jgs:** pelitic schist, quartzofeldspathic schist; **Jml:** hornblende-quartz-oligocase schist; **Jmy:** mylonitic sedimentary rocks; **Jqd:** quartz diorite

- Middle Lower Jurassic:** **MLJdr:** quartz diorite, leucocratic quartz diorite; **MLjb:** quartz diorite; **MLjd:** granite to granodiorite; **MLjqd:** quartz diorite and diorite, minor granodiorite

- Early Jurassic:** **EJdr:** diorite; **EJqd:** quartz diorite, leucocratic quartz diorite; **Ejsy:** syenite

Triassic to Jurassic

- TrJdr:** diorite, hornblende diorite, monzodiorite, monzonite, amphibolite, lesser monzonite and syenite; **Trqd:** quartz diorite to tonalite with mafic dikes; **Trto:** hornblende tonalite

Permian to Jurassic

- PJml:** biotite quartzofeldspathic gneiss and schist; **PJog:** granodioritic orthogneiss

Paleozoic to Mesozoic

- PzMzm:** undivided metamorphosed sedimentary rocks and volcanics; **PzMzog:** felsic to mafic orthogneiss; **PzMpg:** paragneiss, amphibolite, schist

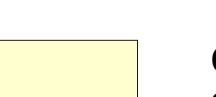
Permian

- Pdr:** chloritized quartz metadiorite; **Pgb:** gabbro, diorite, quartz diorite, minor greenstone and serpentinite; **Pqm:** quartz monzonite

Age Unknown

- ?dr:** diorite and quartz diorite; **?g:** granite; **?gr:** granodiorite; **?hs:** hornfelsed sandstone and siltstone; **?m:** monzonite; **?ml:** felsic to mafic metavolcanic schist and gneiss; **?og:** orthogneiss; **?pg:** paragneiss; **?qd:** quartz diorite; **?qm:** quartz monzonite, **?to:** tonalite

Neogene



Qal: Quaternary cover; unconsolidated till, glaciofluvial deposits, glaciolacustrine deposits, colluvium, alluvium



Qv: Quaternary volcanics; basalt and basalt breccia, basalt cinder cones and related flows



LTQAn: Anahim volcanics (7.9-9.9 Ma); vesicular basalt, basalt breccia and ash beds, basalt cinder cones, trachyte and rhyolite; **LTQGb:** Garibaldi volcanics (0.1 - 10 Ma); dacite, rhyolite porphyry, vesicular basalt, and andesite flows



LTQCh: Chilcotin Group volcanics, (2-10 Ma); vesicular to amygdaloidal, columnar olivine basalt with clinopyroxene, olivine, and plagioclase phenocrysts and megacrysts and ultramafic xenoliths of dunite and leucogniss and crust nodules; massive to scoriasitic, aphanitic, clinopyroxene-, plagioclase- magnetite- and rarely olivine-phric, subalkaline basalt flow; minor andesite, rhyolite ash, tuff, breccia, conglomerate, sandstone, shale and diatomaceous earth, rare hyaloclastite basalt; **OIPfr:** Fraser Bend/Australian Creek Formation; poorly consolidated to unconsolidated conglomerate, sandstone and mudstone, minor diatomite, lignite and basalt; **Miv:** Miocene volcanics

Paleogene



ETKm: Kamloops Group (50 Ma); andesite, trachyanandesite, trachyte and latite flows, breccia and tuff; **ETPr:** Princeton Group (35-56 Ma); volcanic pebble to cobble conglomerate, minor sandstone



ETEn: Endako Group (51-45 Ma); vesicular and amygdaloidal basaltic to andesitic flows and related tuff, breccia, hyaloclastic breccia, and lahar, minor dacite, conglomerate, sandstone, shale and minor lignite; **ETOo:** Ootsa Lake Group (52-49 Ma); intermediate to felsic volcanic flows, tuffs and breccias; conglomerate, sandstone, siltstone, tuffaceous shale and mudstone, rare coal

Cretaceous



UKTa: Taseko River strata (informal) (87.3 to 83 Ma); Non-marine conglomerate and cross-bedded sandstone, clast composition is dominantly plagioclase and hornblende-phric andesite, and less than 2% chert; probably forms the top of the Powell Creek Group in this locality



UKKs: Kasalka Group (105 to 83 Ma); plagioclase and hornblende-phric andesite, dacite and basalt flows, and related lapilli tuff and tuff breccia, minor ryholite, sandstone, and conglomerate; **UKPo:** Powell Creek volcanics (92-79 Ma); feldspar and hornblende-phric andesitic volcanic flows, breccia, lapilli tuff, ash tuff, and lahar; mafic to intermediate volcanic flows, tuffs and breccias; volcanic sandstone, siltstone, shale and conglomerate; rare occurrences of welded tuff



KSq: Silverquick Fm (upper Albian to Cenomanian); pebble to cobble conglomerate containing clasts of chert, volcanic rock and sandstone; lesser amounts of sandstone, siltstone and shale; upper part of formation includes intercalations of volcanic breccia and volcanic conglomerate



KJa: Jackass Mountain Group: (Hauterivian to Cenomanian); arkosic sandstone, lithic sandstone, conglomeratic sandstone, granule to pebble conglomerate, polymict pebble to boulder conglomerate; lesser amounts of siltstone, shale and fossiliferous black shale; andesite, minor ryholite, minor argillite; very minor laminated silty limestone



KTc: Taylor Creek Group: (Albian); sandstone, quartzose sandstone, arkose, micaceous quartzofeldspathic sandstone, lithic sandstone, greywacke, argillite, conglomerate, volcanic conglomerate, chert-pebble conglomerate, polymict conglomerate, pebble to cobble conglomerate, conglomeratic sandstone, shale, siltstone; intermediate to felsic volcanic flows and tuffs; volcanic breccia and conglomerate +/- intercalations of sandstone, siltstone and shale; **IKSk:** Skeena Group: (upper Cretaceous, mainly Albian); fossiliferous sandstone and mudstone; pebble conglomerate; lesser andesite-ryholite-ryholite flows, tuff, flow breccia, submarine flows, and subvolcanic domes



IKSb: Spences Bridge Group: (lower Albian to Santonian); andesite and dacite flows, breccia, and lapilli tuff; volcanic sandstone, siltstone and conglomerate; minor basalt and ryholite



IKGa: Gambier Group: (Hauterivian to Albian); ryholite, dacite, andesite, and basalt flows and related (intercalated) tuff, argillaceous tuff, breccia, and lahar; minor shale, siltstone, greywacke and conglomerate, greenstone, pillowved basalt

Jurassic to Cretaceous