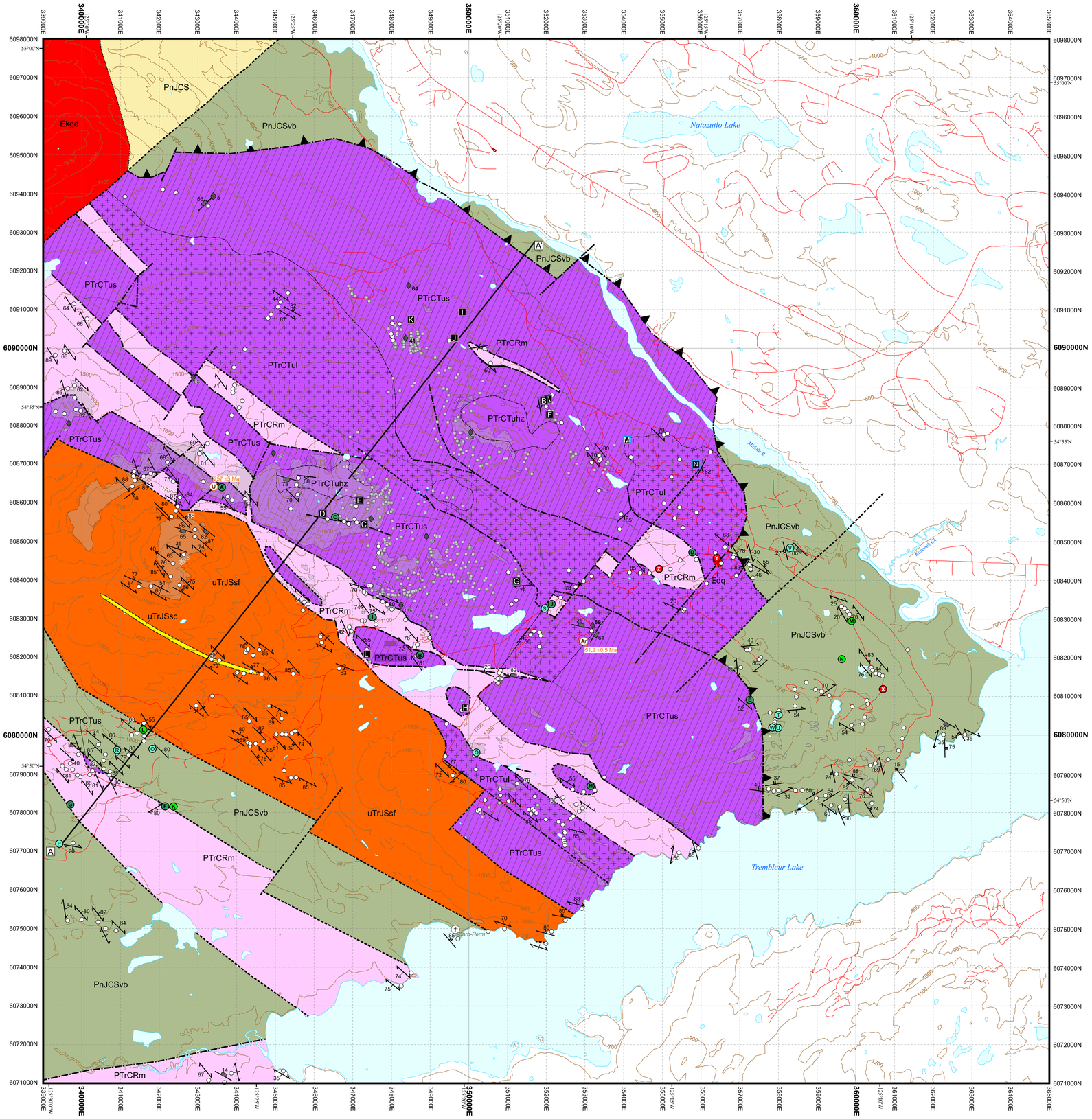


British Columbia Geological Survey Open File 2019-06

Ministry of Energy, Mines and Petroleum Resources

Geology of the Cache Creek terrane north of Trembleur Lake

part of NTS 93K/14

Dejan Milidragovic

0 1 2 3 4 5 10
kilometres
scale 1:50,000

Legend

Post-accretion (< ca. 172 Ma)

Eocene (?)

Edq **quartz diorite:** rusty weathering; grey; medium grained; accessory interstitial ankerite and euhedral pyrite.

Early Cretaceous

EKgd **granodiorite:** biotite ± hornblende granodiorite to quartz diorite; adapted from Macintyre and Schiarizza (1999) and Struik et al. (2007).

Cache Creek terrane

Sitlika clastic unit (Upper Triassic to Lower Jurassic)

uTrJSsf **fine-grained siliciclastic unit:** moderately to strongly schistose argillite, slate, phyllite, and lesser wacke; locally rust-weathering; medium to dark grey-brown; low aeromagnetic expression.

uTrJSsc **coarse-grained siliciclastic unit**: conglomerate and medium grey grit; tan to grey; conglomerate has rounded, oblate, locally fossiliferous cobbles of limestone and a few mafic-intermediate volcanic clasts in a medium- to corse-grained lithic-rich sandstone matrix.

Cache Creek complex

Sowchea succession (Upper Pennsylvanian to Lower Jurassic)

PnJCS **mainly sedimentary rocks**: thin- to medium-bedded chert, limestone, quartz phyllite, graphitic phyllite, chlorite schist and metabasalt; intruded by dikes and sills of greenschist-facies metamorphosed gabbro, diorite, and diabase; moderate, but variable aeromagnetic expression; adapted from MacIntyre and Schiarizza (1999) and Struik et al. (2001, 2007).

PnJCSvb **mainly volcanic rocks**: massive to fragmental aphanitic mafic metavolcanic (basalt) and subordinate shallow intrusive rocks; locally rust-weathering (pyritiferous); grey-green; moderately to strongly schistose; greenschist-facies metamorphosed; unit includes significant massive chert, ribbon chert, and cherty argillite; moderate to low aeromagnetic expression; geochemistry of volcanic rocks ranges from strongly alkaline to tholeiitic (Milidragovic and Grundy, 2019).

Ophiolitic complex

Rubyrock igneous complex (Lower Permian to Upper Triassic)

PTrCRm **volcanic and shallow intrusive complex:** greenschist to amphibolite-facies; weakly to strongly foliated; gabbro, diorite, clinopyroxenite interlayered with rafts/enclaves of basalt, phyllite, chert, and siltstone; moderate, but variable aeromagnetic expression; high field strength element (HFSE)-depleted tholeiitic trace element profiles suggest origin in supra-subduction tectonic setting (Milidragovic and Grundy, 2019).

Trembleur ultramafite (Lower Permian to Upper Triassic)

PTrCTuhz **weakly serpentinized harzburgite:** light brown weathering, warty; minor Cr-spinel and clinopyroxene (<5%); relatively high SiO_2 concentration suggests supra-subduction zone origin; moderate to strong aeromagnetic expression.

Altered ultramafic rocks

PTrCTus **serpentinized ultramafic rocks:** dark green to black; massive to strongly schistose; pervasively serpentinized; bastite pseudomorphs after orthopyroxene locally preserve primary texture; locally high-temperature metamophic olivine overprints serpentine; trace awaruite, heazlewoodite, millerite, (Co-) pentlandite, polydymite, siegenite; strong to very strong aeromagnetic expression.

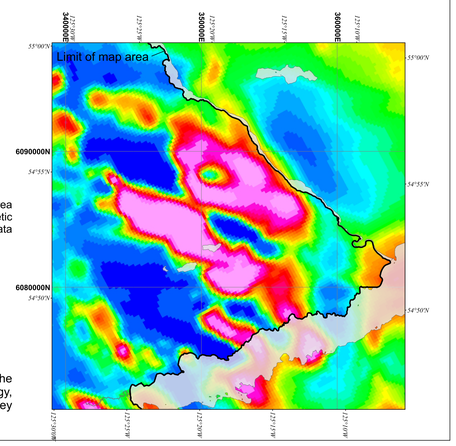
PTrCTul **carbonate-altered ultramafic rocks** (listwanite; Hansen et al., 2005): green to orange; variably carbonate altered; non-schistose to strongly schistose; serpentine-magnesite, talc-magnesite, and quartz magnesite listwanite end-members; minor magnetite ± fuchsite ± pyrite ± hematite; weak to strong aeromagnetic expression reflects the extent of carbonation.

Symbols

BCGS station
BCGS geochemical sample (see Table 1 for details)
bedding (tops known, tops unknown, vertical, overturned)
foliation/schistosity S1 (inclined, vertical)
foliation/schistosity S2 (inclined)
igneous layering (inclined, vertical)
dike (inclined)
vein (inclined, vertical)
fold axis
geochronology sample site (U-Pb zircon) (see Table 2 for details)
geochronology sample site (Ar-Ar) (see Table 2 for details)
fossil sample site (see Table 3 for details)
MINFILE occurrence (see Table 4 for details)
FPX Nickel drillhole (Voordouw and Simpson, 2018)
FPX Nickel surface sample (Voormeij and Bradshaw, 2008; Britten, 2009, 2010)
line of vertical cross-section
logging road
area of continuous outcrop

contact: defined, approximate, geophysically inferred, inferred
fault: defined, approximate, geophysically inferred, inferred
thrust fault: geophysically inferred trace
geophysically defined lineament

Approximate declination for center of map on Dec. 20, 2018 changing at 13.6'/y west



Residual total field aeromagnetic map (grid spacing: 200 m) of the study area acquired as part of the Geological Survey of Canada's national aeromagnetic dataset. Downloaded from the Natural Resources Canada geoscience data repository for geophysical data (http://gdr.agg.nrcan.gc.ca) on Jan. 9, 2019.

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North American Datum 1983
Universal Transverse Mercator Projection (Zone 10 North)
TRIM DEM, 25 m resolution
Contour interval 100 m

Table 1: Geochemical samples

Ultramafic rocks

Harzburgite
- A DMI17-5-9
- B DMI17-5-10
- C DMI17-9-3
- D DMI17-9-7A
- E DMI17-9-11*
- F DMI17-16-3C
- G RGR17-16-6

Serpentinite
- H DMI17-4-5
- I DMI17-10-1
- J DMI17-10-2
- K DMI17-10-4
- L DMI17-14-1A

Listwanite
- M DMI17-5-5
- N DMI17-15-6

*dunite

Volcanic and shallow intrusive rocks

HFSE-depleted suite
- A 98PSC-33-9-1
- B DMI17-3-8
- C DMI17-9-8
- D DMI17-7-8
- E DMI17-7-11
- F DMI17-3-3
- G DMI17-3-5
- H DMI17-4-16
- I DMI17-14-9
- J DMI17-5-2

High-Ti alkaline suite
- K DMI17-3-4
- L DMI17-2-12
- M DMI17-8-4
- N DMI17-8-5

Tholeiitic Suite
- *Enriched*
  - O DMI17-2-9
  - P DMI17-2-15
  - Q DMI17-4-10
  - R DMI17-18-5
  - S DMI17-5-1A
  - T DMI17-1-2
  - U DMI17-1-7
- *Depleted*
  - V DMI17-15-7
  - W DMI17-1-5

Calc-alkaline suite
- X DMI17-8-11
- Y DMI17-15-3
- Z DMI17-7-6

For complete geochemical data see Milidragovic and Grundy (2019)

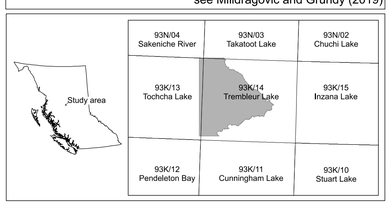

Table 2: Geochronological data

Sample	Easting	Northing	Rock Unit	Age (Ma)	Type	Mineral	Sample description	Source
98PSC-34-5	343407	6086424	PTrCRm	257 ±5	U-Pb	zircon	Tonalite lenses within medium-grained diorite/gabbro	Struik et al., 2007
DMA98-291	352922	6075515	dike	51.2 ±0.5	Ar-Ar	biotite	Bt-Ms-Qtz porphyry dike in serpentinite	Struik et al., 2007

Table 3: Fossil data

Sample	GSC number	Easting	Northing	Unit	Age	Fossil description	Identified by	Source
DMA98-283	C-211641	349718	6074735	PnJCS	Carboniferous-Permian	foraminifers (probably Staffella)	L. Rui	Struik et al., 2007

Table 4: MINFILE occurrences in study area (updated on Dec. 12, 2018)

Label	MINFILE	Name	Alias	Easting	Northing	Commodities	Deposit type	Status
5	093K 005	Genesis	Green	343398	6093913	jade (nephrite)	jade	past producer
39	093K 039	Mt. Sidney Williams Cr.	Mt. Sidney Williams	348904	6085123	Cr	podiform chromite	showing
40	093K 040	Pauline	Middle River ridge	350046	6087808	Cr	podiform chromite	showing
41	093K 041	Van Decar Creek	PG	348364	6090246	Cr	podiform chromite	prospect
43	093K 043	Mt. Sidney Williams	Van	344948	6087269	Asbestos, Au, Ag, Cr	ultramafic-hosted/ podiform chromite	showing
64	093K 064	Van Decar Creek placer		348446	6091605	Au	surficial placer	showing
68	093K 068	Van Decar asbestos		342878	6089229	asbestos	ultramafic-hosted	showing
72	093K 072	Sidney		347475	6085574	Cr	podiform chromite	showing
73	093K 073	O'Ne-eel Creek		339663	6088043	Cr	podiform chromite	showing
89	093K 089	Baptiste	Mt. Sidney Williams	353198	6082816	talc, soapstone	ultramafic-hosted	showing
116	093K 116	Baptiste (Decar)	Decar (Baptiste)	348500	6083500	Ni, Cr	podiform chromite	developed prospect

Mineral occurrences from MINFILE database (MINFILE, 2018; https://minfile.gov.bc.ca).

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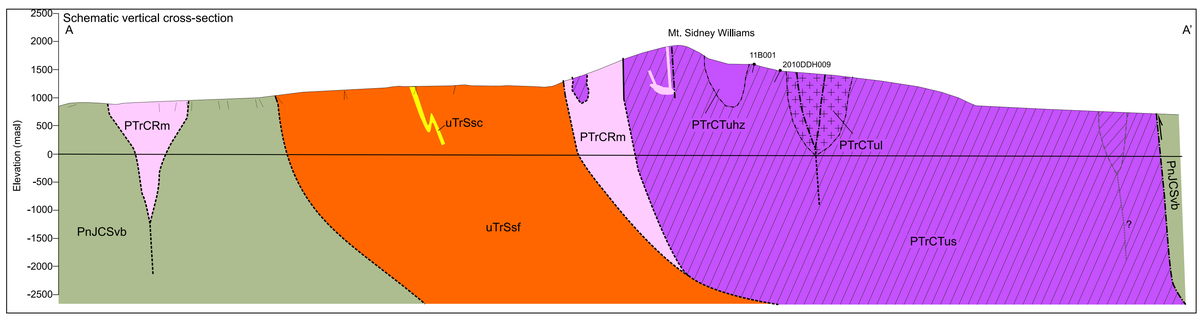

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