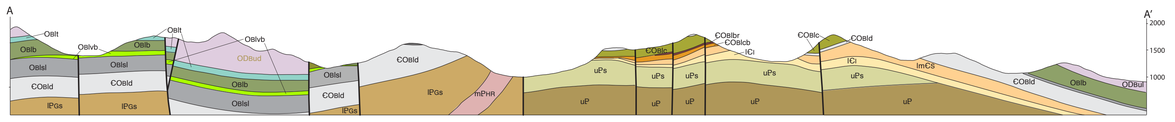
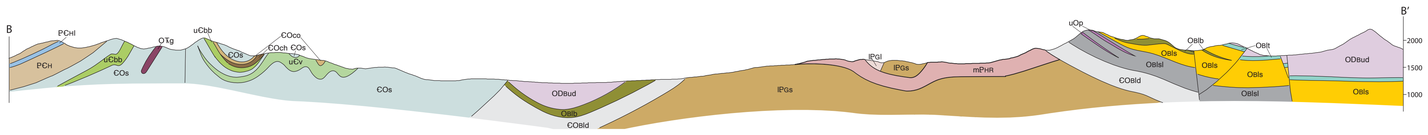
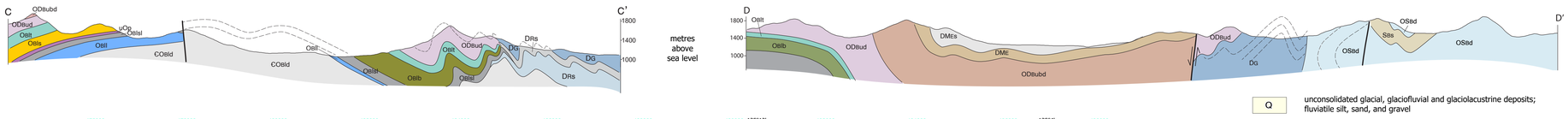






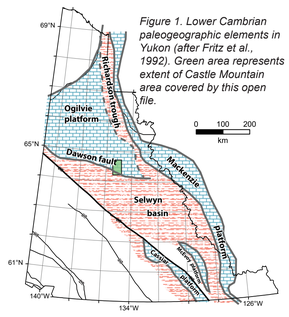


Figure 1. Lower Cambrian paleogeographic elements in Yukon (after Fritz et al., 1992). Green area represents extent of Castle Mountain area covered by this open file.

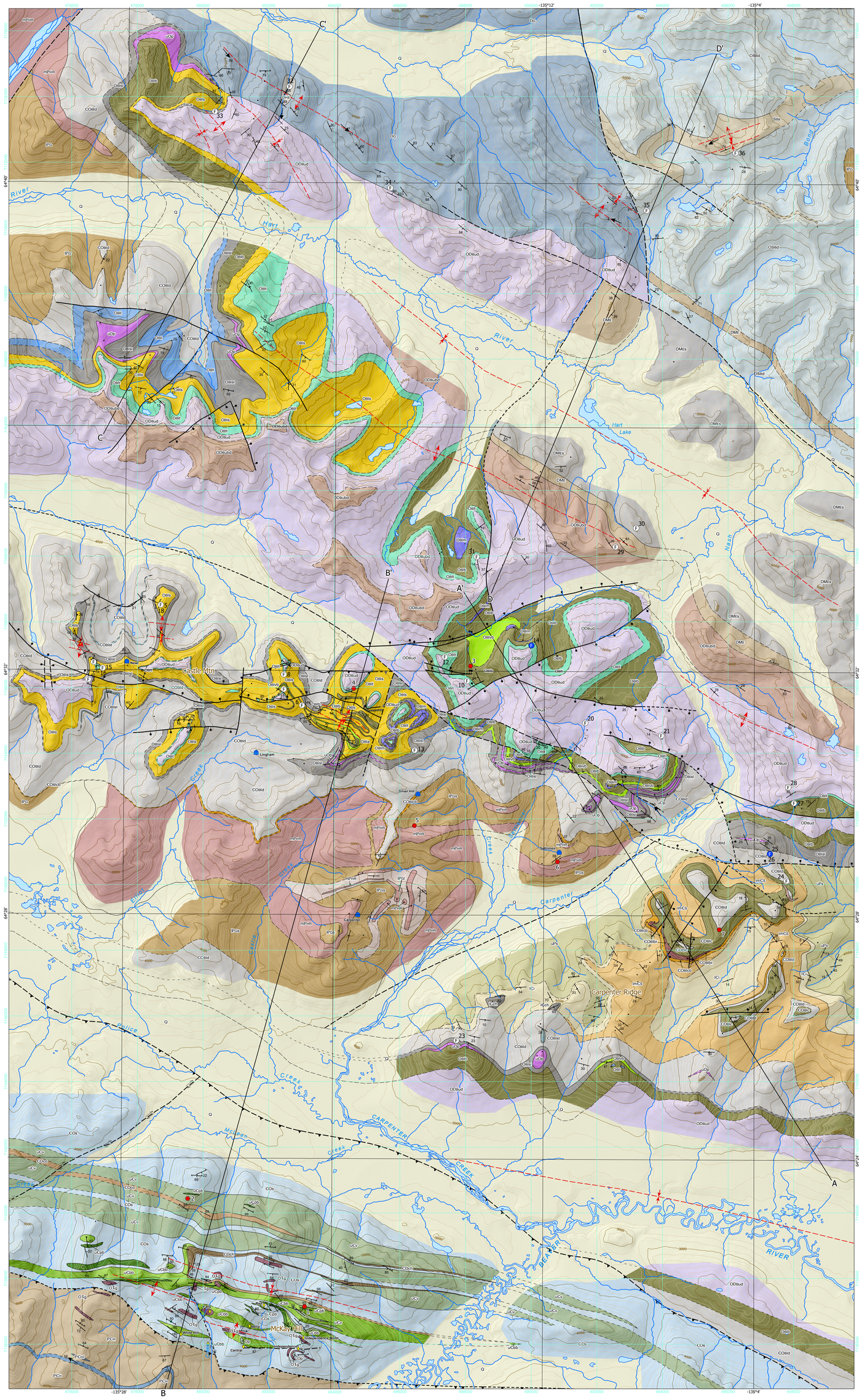
GEOLOGICAL NOTES

The Castle Mountain area of north central Yukon exposes strata of the Ogilvie platform and the northern Selwyn basin. Lower Carpenter Creek coincides with an inferred fault that separates the basinal facies of the Selwyn basin from shallow-water facies of the Ogilvie platform

In the southwestern corner of the map, Selwyn basin stratigraphy includes limestone and quartz-rich grits of the Neopropterozoic to Lower Cambrian Hyland Group. In fault contact with the Hyland Group, Upper Cambrian to Ordovician volcanic and volcaniclastic rocks are interlayered with shale, and siliclastic rocks that are intruded by Ordovician to Triassic gabbro. These rocks host high sulphidation epithermal Au-Ag-Cu vein deposits centred around McKay Hill.

North of lower Carpenter Creek, Cambrian to Devonian carbonate and volcanic rocks sit unconformably on Proterozoic sedimentary rocks and Mesoproterozoic diorite/gabbro. Orange and brown weathering iron carbonate and calcareous siltstone, and well-bedded limestone assigned to the Gillespie Lake Group are intruded by the Mesoproterozoic Hart River gabbro sills. Undivided upper Proterozoic rocks comprise dark weathering siltstone. Undivided lower Cambrian rocks comprise dark weathering chert and siltstone and orange weathering carbonate and sandstone. Arkosic and lithic sandstone are assigned to the lower to middle Cambrian Slats Creek Formation. The Bouvette Formation occurs unconformably above the Slats Creek Formation and has been subdivided into upper and lower members. The lower member comprises Cambrian to Late Ordovician strata that includes, from oldest to youngest, breccia spatially associated with volcanogenic conglomerate and basalt, massive and thick-bedded dolostone, graptolitic silty limestone, and volcanic and volcaniclastic rocks. The upper member comprises Silurian to Devonian, medium-bedded, dolostone and variably fossiliferous limestone.

In the northwestern corner of the map, a lateral facies transition occurs where blocky, light grey weathering upper Bouvette dolostone and limestone becomes dark grey, recessive, thin-bedded, silty limestone interbedded with rudstone that contains abundant shelly fossils and corals. This transition occurs northwards across the northeast-trending contact between the upper Bouvette Formation and the Gossage Formation. The southeastern corner comprises undivided Silurian to Devonian, variably fossiliferous dolostone with local horizons of dark weathering, graptolitic, calcareous siltstone.



Q — unconsolidated glacial, glaciofluvial and glaciolacustrine deposits; fluviatile silt, sand, and gravel

North of the Dawson fault

MESOPROTEROZOIC

Hart River sills

- mPHR — dark green, coarse-grained gabbro

ORDOVICIAN

- uOp — porphyritic, augite-phyric gabbro
- lOp — porphyritic, feldspar-phyric diorite

DEVONIAN TO MISSISSIPPIAN

Earn Group

- DMEs — brown weathering, grey, fresh, calcareous siltstone that locally contains fossils; minor bright orange weathering, medium beds of carbonate
- DME — dark grey weathering, thick-bedded, fine-grained, quartz arenite interbedded with dark grey siltstone; thick-bedded, cross-bedded silty limestone; minor black chert; minor tuffaceous sandstone

DEVONIAN

Gossage Formation

- DG — recessive, dark grey weathering, thin and medium-bedded, limestone, rudstone, grainstone; light brown weathering, thin-bedded to laminated, silty limestone; rare, laminated, calcareous siltstone

Road River Group

- DRs — grey silty limestone interbedded with silty chert and brown weathering calcareous siltstone with tentaculites; minor grainstone

ORDOVICIAN TO SILURIAN

Upper Bouvette Formation

- SBus — dark grey weathering, recessive, thin and medium-bedded, calcareous siltstone with bivalves and trilobites
- SBs — dark grey, thin and medium-bedded, graptolitic, silty limestone and black chert; packestone; rudstone
- OSBd — light grey weathering, massive dolostone
- ODBubd — dark grey and light grey weathering alternating beds of medium to thick-bedded dolostone; minor limestone
- ODBud — grey and beige weathering, thick to thin-bedded, fossiliferous dolostone and limestone

ORDOVICIAN

Lower Bouvette Formation

- OBlt — biotite-phyric, crystal-lithic tuff; siltstone, sandstone and chert pebble conglomerate; volcanogenic conglomerate; fossiliferous limestone
- OBlb — pyroxene-phyric basalt, variably amygdaloidal, rarely pillowed
- OBlm — light grey limestone containing rare crinoid fossils
- OBla — green agglomerate comprising rounded, indurated clasts of porphyritic basalt in a green, weathered-out clay matrix
- OBls — brown weathering, green-grey and green fresh, variably calcareous, thin-bedded siltstone and sandstone; volcaniclasic sandstone; orange-brown weathering silty limestone containing fossils
- OBlvb — basalt breccia
- OBlsl — dark grey weathering, recessive, thin to medium-bedded, graptolitic silty limestone with minor black chert beds
- OBll — light grey weathering, dark grey fresh, medium-bedded limestone
- COBld — light grey and buff weathering, massive to thick-bedded dolostone

CAMBRIAN TO ORDOVICIAN

- COBlc — dark weathering, thick-bedded, polymict conglomerate and basalt breccia; minor basalt, volcaniclastic sandstone; volcanogenic conglomerate
- COBlbr — maroon weathering and fresh siltstone interbedded with sandstone and matrix-supported sandy breccia.
- COBlcb — bright orange weathering, biege fresh, matrix supported breccia comprising angular clasts of dolostone, sandstone and siltstone in a sandy matrix.

LOWER TO MIDDLE CAMBRIAN

Slats Creek Formation

- lmCs — brown, beige and reddish weathering, mildly calcareous, fine-grained arkosic to lithic sandstone with rare basal sections of bedding-parallel shale chips and upper sections that are cross-bedded; beige weathering, clast supported conglomerate

Undivided

- lCch — dark grey to black weathering siltstone and chert
- lCi — orange-weathering iron carbonate and matrix-supported carbonate conglomerate interbedded with brown-weathering sandstone

UPPER PROTEROZOIC

- uPs — thin-bedded siltstone with minor orange-weathering, fine-grained, sandstone interbeds
- uP — undifferentiated upper Proterozoic rocks

PALEOPROTEROZOIC

Gillespie Lake Formation

- lPGl — light grey weathering, medium-bedded, silty limestone, calcareous siltstone and grainstone
- lPGs — thin and medium-bedded, orange and brown weathering iron carbonate, calcareous siltstone, silty limestone and limestone, all interbedded; minor dark weathering, thin-bedded to laminated, purple, dark green and grey siltstone with mudstone interbeds

South of the Dawson fault

ORDOVICIAN TO TRIASSIC

- OTg — medium and coarse-grained gabbro; minor pyroxenite

CAMBRIAN TO ORDOVICIAN

- Op — pyroxene-phyric andesite
- uCpb — pillow basalt
- uCbb — green weathering and fresh basalt breccia comprising angular clasts of basalt in a basaltic matrix; hyaloclastite breccia
- COco — brown weathering conglomerate with a sandy, lithic matrix. Clasts are dominated by sandstone, siltstone, and quartzite
- COch — dark weathering, banded chert
- uCv — green weathering and fresh, volcanic breccia comprising rounded to angular clasts of porphyritic and aphanitic basalt in a variably calcareous, volcaniclastic matrix. Matrix comprises broken pyroxene crystals, altered basalt grains and calcite
- COs — light grey and brown shale; minor siltstone and calcareous sandstone

CAMBRIAN TO ORDOVICIAN

Hyland Group

- PCHl — grey weathering, medium-bedded, fetid limestone
- PCH — green, maroon and brown shale with minor thick beds of brown, coarse-grained, quartz-rich sandstone

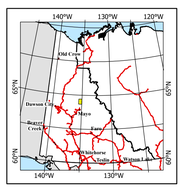
foliation
bedding
cleavage
fault
fold
fossils (macro, conodont)
radiometric date
field station
fault; movement not known (defined, approximate, inferred)
thrust fault (defined, approximate, inferred)
normal fault (defined, approximate, inferred)
strike slip fault, approximate
geologic contact (defined, approximate, inferred)
fold axis (anticline, syncline)
minfile occurrence (epithermal, sediment hosted)

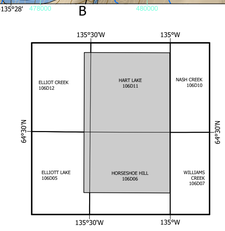
Radiometric Dates

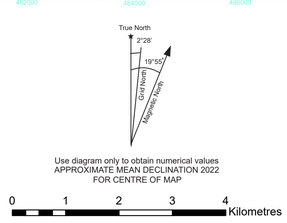
Map label	Sample Number	Map Unit	Rock Type	Method	Mineral	Analytical Technique	Date (Ma)	Latitude	Longitude	Reference	Notes	Interpretation
1	20RC092	uCv	sandstone	U/Pb	Zircon	CA-TIMS	497.57 ± 0.7	64.35974	-135.3502	preliminary		maximum depositional age
2	20RC142-1	uCv	volcanic breccia	U/Pb	Zircon	CA-TIMS	498.54 ± 0.15	64.38906	-135.4244	preliminary		crystallization age
3	20RC043-2	OBlb	volcaniclastic sandstone	U/Pb	Zircon	CA-TIMS	453.33 ± 0.14	64.53496	-135.2470	preliminary		crystallization age
4	19RC170-1	OBlt	crystal-lithic tuff	U/Pb	Zircon	CA-TIMS	445.73 ± 0.13	64.52872	-135.3211	preliminary		crystallization age
5	TOA-91-9-4	mPg	gabbro	U/Pb	Zircon	ID-TIMS	1385.8 ± 1.9	64.49131	-135.2822	Abbott, G. 1997		crystallization age
6	TOA-91-14-4_c	mPg	gabbro	U/Pb	Zircon	ID-TIMS	1383 ± 5.9/5.2	64.48158	-135.1914	Abbott, G. 1997		crystallization age
7	20RC173	COBld	sandstone	U/Pb	Zircon	CA-TIMS	486.90 ± 0.25 - 507.05 ± 0.34	64.46310	-135.0888	preliminary	range of 7 TIMS dates	maximum depositional age

Fossil Compilation

Sample	Type	Age	Broad Age	Confidence	Map Label
19RC006-2	Pandorinellina aff. P. insita	late Givetian-early Frasnian	late Middle to early Late Devonian		1
19RC085-1	orthid brachiopods	Ordovician to Silurian	Ordovician to Silurian	low	2
19RC089-1	solitary rugose coral, disarticulated brachiopod	Silurian or Devonian	Silurian or Devonian	low	3
19RC106-1	*Didymograptus* s.l., *Phyllograptus* sp., *Isograptus* cf. *victoriae lunatus*	uppermost Floian to basal Dapingian (Isograptus victoriae (upper Floian more likely)	late Early Ordovician	high	4
19RC113-1	parvicostellate brachiopod (possibly *Eoplectodonta*), smooth trilobite pygidium, encrinurid trilobite	Ordovician to Silurian (Ludlow)	Ordovician to Silurian		5
19RC140-1	nov. aff. *Oculoceras* n. sp. ammonoid, *Phacops and Lacunoporaspis* trilobite	late early Emsian	late Early Devonian	high	6
19RC149-1	coral, orthid brachiopods, undetermined stropheodont brachiopod, Psuedophorid gastropod, articulated crinoid	Silurian or Devonian	Silurian or Devonian		7
19RC150-1	ramniform elements	Paleozoic	Paleozoic		8
19RC158-1	*Stimulograptus* sp., likely *S. sedgwickii* i or *S. halli* , *gryptograptus* sp., *Parapetalolithus* cf. *giganteus*	latest Aeronian or early Telychian (Stimulograptus sedgwickii -Spirograptus guerichi zones)	early Silurian	high	9
20RC003-1	*Ptychopleurella* sp.	Lower Ordovician (Llanvirnian) to Lower Devonian (Emsian)	Lower Ordovician to Lower Devonian		10
20RC008-1	Catenipora sp. , undetermined solitary rugose corals, *Palaeophyllum* , *P. rugosum* (a fasciculate rugose coral), and *Maclurites* sp. (gastropod)	Katian	Late Ordovician		11
20RC018-1	*Byssonychia* (fine-ribbed bivalve), *Laphospira* gastropod	Late Ordovician	Late Ordovician		12
20RC032-1	*Orthograptus calcaratus* (subspecies indet.), *Climacograptus bicornis* , *Cryptograptus marcidus* , *Archiclimacograptus antiquus* , *Dicranograptus* sp. (possibly D. brevicaulis), *Dicranograptus nicholsoni*	upper Sandbian Climacograptus bicornis Zone (=Orthograptus calcaratus Zone)	Late Ordovician		13
20RC041-2	*Aphelognathus* sp., *Panderodus unicostatus* (Branson & Mehl) or *Panderodus gracilis* (Branson & Mehl), *Pseudobeloding quadrata* Sweet 1979, *Pseudobeloding* sp., indeterminate ostracodes	Edenian - Richmondian	Late Ordovician	high	14
20RC044	undetermined solitary rugose corals, *Amblyosiphonell* a or *Amblyosiphonelloides* sp. 1 (sphinctozoan sponge), Illaenid and asaphid trilobites, fenestellid bryozoan, brachiopod	Late Ordovician	Late Ordovician		15
20RC045	Trilobites: illaenid trilobite (possibly Stenopareia), Failleana, asaphid trilobite, harped trilobite; Brachiopods: Strophomena sp. 1 (same species present in 20RC047-1); and fenestellid bryozoans.	Late Ordovician	Late Ordovician		16
20RC046-1	undetermined strophomenid brachiopod, undetermined stropheodontid brachiopod, unidentified rhynchonellid brachiopod, possibly Hypsiptycha, *Amblyosiphonella* or *Amblyosiphonelloides* sp. 2 (sphinctozoan sponge), illaenid trilobite belonging to the genus Stenopareia Holm, 1886, *Maclurites* sp. (gastropod), *Loxonema* sp. (gastropod), the cyrtoconid nautiloid genus *Winnipegoceras* .	Late Ordovician	Late Ordovician		17
20RC047-1	Either a small Plaesiomys, or a dalmanelloid brachiopod, *Strophomena* sp. 1 (brachiopod) (probably same species in 20RC045-1), *Strophomena* sp. 2.	Late Ordovician	Late Ordovician		18
20RC050-2	*Orthograptus expansus* , *Orthograptus calcaratus* (subspecies indet.), *Pronormalograptus euglyphus* , *Archiclimacograptus meridionalis* , *Archiclimacograptus modestus* , *Jianxigraptus gurleyi* , *Jiangxigraptus sextans* ?, *Glossograptus* sp., *Thamnograptus capillaris* , *Reteograptus* sp.	upper Sandbian Climacograptus bicornis Zone (=Orthograptus calcaratus Zone)	Late Ordovician		19
20RC069-1	*Panderodus unicostatus* (Branson & Mehl) or *Panderodus gracilis* (Branson & Mehl) - 1 specimen		Ordovician - Devonian		20
20RC074-1	indeterminate smooth brachiopod	Silurian or Devonian	Silurian or Devonian		21
20RC167-1	Indeterminate fasciculate rugose coral	Middle Ordovician or younger	Middle Ordovician or younger		22
21RC101-1	*Pronormalograptus euglyphus* , *Archiclimacograptus* cf. *meridionalis* , *Jiangxgraptus bispiralis* , *Apoglossograptus uniformis* (= Isograptus lyra of Lenz and Chen, 1985), *Jianxigraptus gurleyi*, *Pseudoazygograptus incurvus*, *Glossgpraptus* sp.	lower Sandbian Nemagraptus	Late Ordovician		23
21RC144-1	small brachiopods *Glyptorthi*, small crinoid columns		probably Late Ordovician		24
21RC145-1	*Periodon flabellum* (Lindström 1955) (Sb, Sc, Sa, M and P elements), *Protopanderodus parvibasi* s Löfgren 1978, *Protopanderodus varicostatu* s (Sweet and Bergström 1962), *Pariostodus originalis* (Sergeeva 1963),	Darriwilian	Middle Ordovician	high	25
21RC146-2	*Periodon flabellum* (Lindström 1955) (Sb, Sc, Sa, M and P elements), *Protopanderodus parvibasi* s Löfgren 1978, *Protopanderodus varicostatus* (Sweet and Bergström 1962), *Pariostodus originalis* (Sergeeva 1963),	Darriwilian	Middle Ordovician	high	26
22RC003-2-1	*Maclurites* sp., solitary rugose corals, *Paleofavosites* sp. (favositid coral), orthoconic cephalopods	Lockhovian to Pragian	early to middle Devonian	med	27
22RC004-1	weakly pilcate spiriferid brachiopod belonging to the genus *Howellella*	Lochkovian to Pragian	early to middle Devonian		28
22RC014-1	gastropods, indeterminate brachiopods, crinoid ossicles	Ordovician to Devonian	early to middle Paleozoic		29
22RC016-1A	primitive plants, dechenellid trilobite pygidium, indeterminate invertibrate shelly fossil fragments		Early to Middle Devonian		30
22RC024-1	*Maclurites* sp., *Trochonema* sp., indeterminate orthid brachiopod, undetermined orthoconic cephalopods, large solitary, rugose coral, crinoid ossicles, indeterminate tubes		Late Ordovician		31
22RC071-1	*Tentaculites* sp. (tentaculitids)	Pragian and Emsian	Ordovician to Devonian	low	32
22RC087-1	*Cromus* sp. (encrinurid trilobites), atrypid brachiopods, undetermined brachiopod external mold, fenestillid bryozoans	Llandovery, Telychian	Early Silurian		33
22RC092-1	*Iqitoania* brachiopod, *Ivedilinia* sp., *Spinatrypa* sp., *Spinatrypina* sp., generically indeterminate highly descorticated atrypid brachiopods, large solitary rugose coral (probably an acanthophyllid), crinoids stem fragments	Emsian to Eifelian	late Early to early Middle Devonian	high	34
22RC104-1	Undetermined rhynchonellid, *Ivdelinia* sp. (brachiopod), *Spinatrypa* sp., small atrypid brachiopod, *Cystiphylloides* sp. (large solitary rugose coral)	Emsian to Eifelian	late Early to early Middle Devonian	high	35
22RC123-2	Spirograptus guerichi, Oktavites contortus, Torquigraptus linterni, Parapetalolithus globosus, Monograptus marri?, Torquigraptus cf. obtusus, Stimulograptus sedgwickii or S. halli, Glyptograptus cf. auritus, Pristiograptus sp., Streptograptus sp.	lower Telychian Spirograptus guerichi Biozone	Llandovery	high	36







Yukon Geological Survey
Energy, Mines and Resources
Government of Yukon

Open File 2022-9
Preliminary geological Map of the Castle Mountain area, central Yukon (parts of NTS 106D/5, 6, 11, 12)
(scale 1:50,000)
by
Rosie Cobbett

REFERENCE

ABBOTT, G. 1997. Geology of the Upper Hart River Area, Eastern Ogilvie Mountains, Yukon Territory (116A/10, 116A/11), Exploration and Geological Services Division, Yukon, Indian and Northern Affairs Canada, Bulletin 9, 92 p.

FRITZ, W.H., CECILE, M.P., NORFORD, B.S., MORROW, D., and GELDSETZER, H.H.J., 1992. Cambrian to Middle Devonian assemblages, Chapter 7. In: Geology of the Cordilleran Orogen in Canada, H. Gabrielse and C.J. Yorath (eds.), Geological Survey of Canada, Geology of Canada, no. 4, p. 151-218. (also Geological Society of America, The Geology of North America, v. G-2).

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Digital cartography and drafting by Rosie Cobbett, Yukon Geological Survey.

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