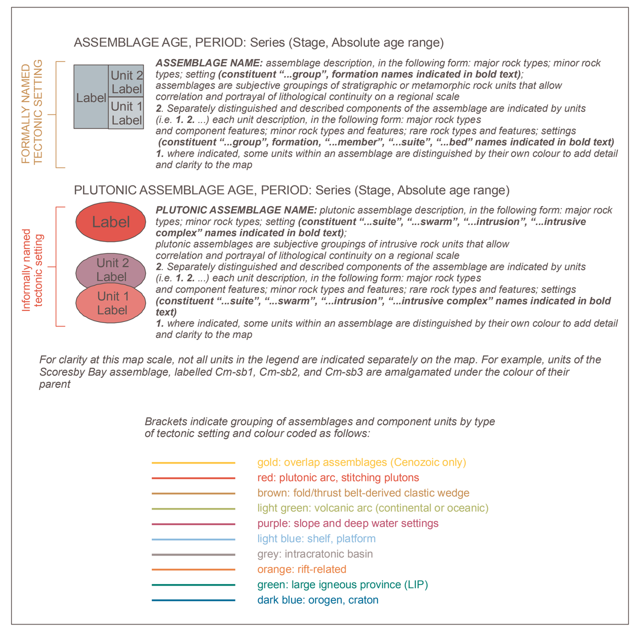
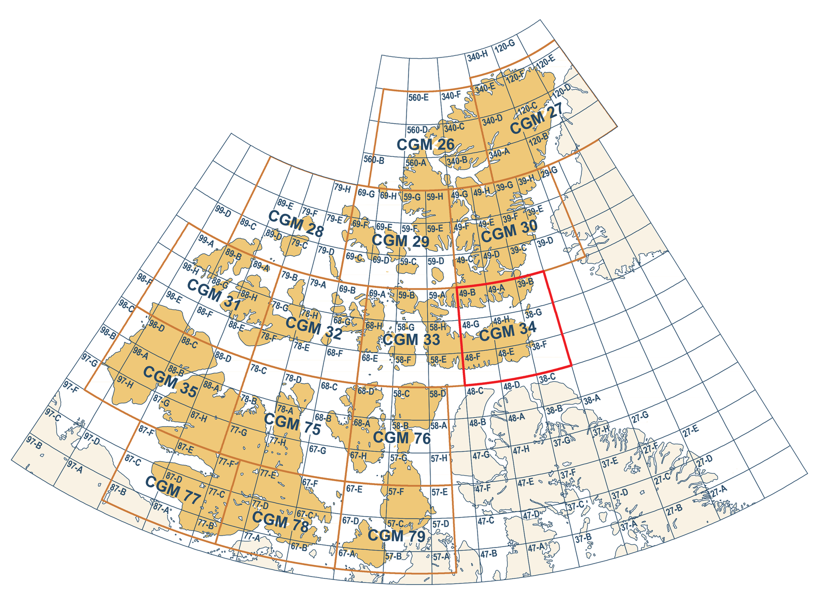


Figure 1. Explanation of map unit features.



National Topographic System reference and index to adjoining published Geological Survey of Canada maps

Abstract

This map and the related geodatabase illustrate the bedrock geology of eastern Devon Island, Coburg Island, and southern Ellesmere Island. Major features of the area include: high-grade Neoarchean and Paleoproterozoic metasedimentary and granitoid rocks of the (?)Rae craton and Inglefield Orogen, unconformable and mostly flat-lying Cambrian to Lower Devonian platformal strata, and (on Ellesmere Island) the Middle and Upper Devonian foreland clastic wedge associated with the Ellesmerian Orogen.

Résumé

Cette carte et la géodatabase qui s'y rapporte documentent la géologie du substratum rocheux dans l'est de l'île Devon, l'île Coburg et le sud de l'île d'Ellesmere. Les principales entités géologiques de la région comprennent : des roches métasédimentaires et granitoïdes néoarchéennes et paléoprotérozoïques à degré élevé de métamorphisme du craton de Rae(?) et de l'orogène d'Inglefield; des strates de plate-forme discordantes et généralement horizontales (Cambrien au Dévonien inférieur); et, sur l'île d'Ellesmere, le prisme de roches clastiques d'avant-pays du Dévonien moyen et supérieur associé à l'orogène ellesmérien.

Cover illustration
Paleoproterozoic basement gneisses, Makinson Inlet, southeastern Ellesmere Island, Nunavut. Photograph by J.C. Harrison. 2013-066

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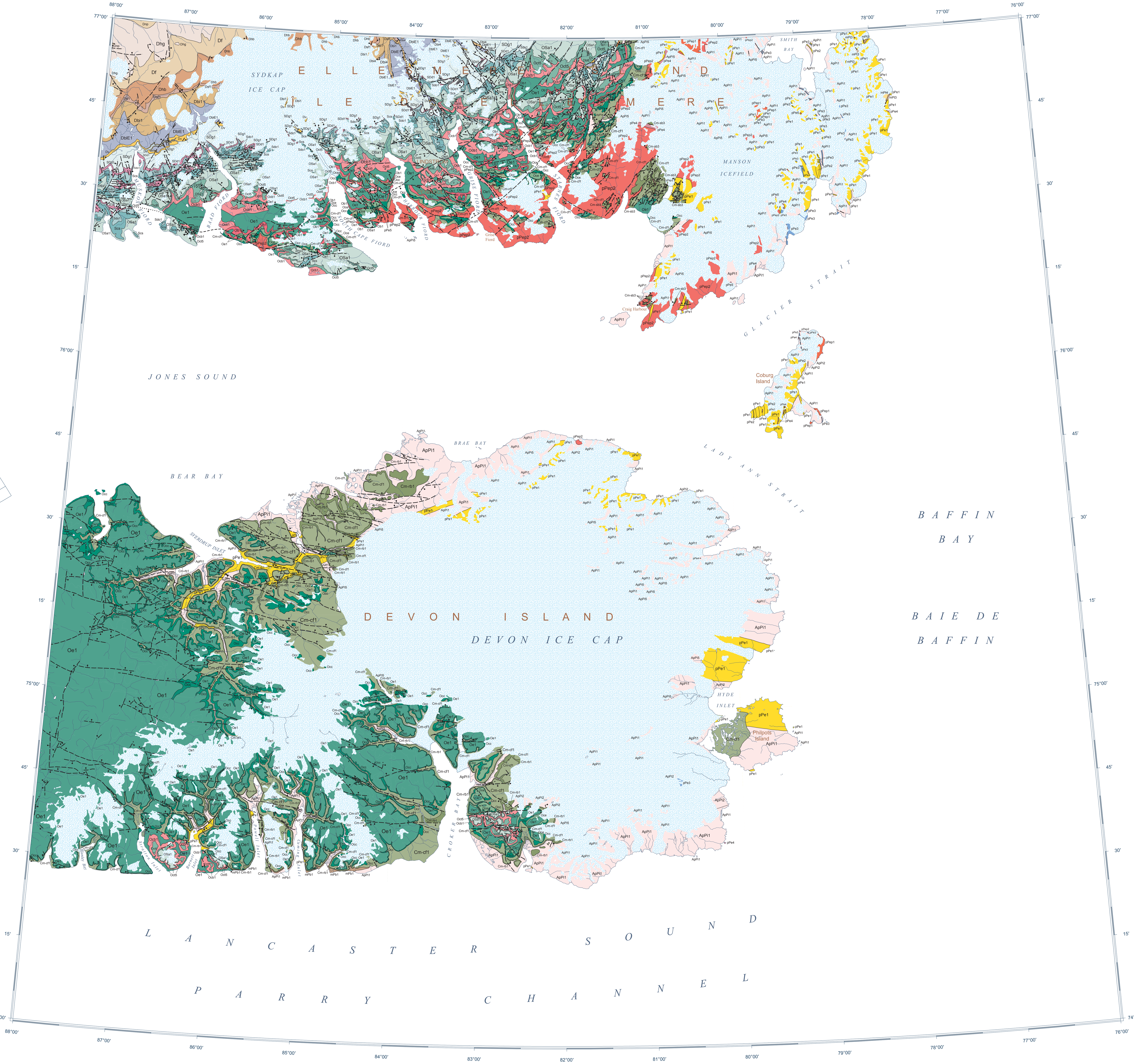
CANADIAN GEOSCIENCE MAP 34

GEOLOGY

TECTONIC ASSEMBLAGE MAP OF GRISE FIORD

eastern Devon and southern Ellesmere islands, Nunavut

1:500 000



QUATERNARY

HOLOCENE

Glacier ice: Ice cap.

PLEISTOCENE

Eurekan orogen cover

Q — **Surficial:** Sand, silt, clay, gravel; unconsolidated; marine bivalves; glacio-fluvial, nearshore marine deposits.

PALEOGENE

PALEOCENE AND EOCENE (Selandian to middle Eocene)

EUREKAN OROGEN, Eurekan foreland

Te1 — **EUREKA SOUND:** Sandstone, siltstone, shale; local conglomerate; minor coal, volcanogenic sandstone; mostly fluvial and deltaic; local syntectonic alluvial fan deposits.
1. Sandstone, fine- to coarse-grained; siltstone, shale; local conglomerate, coal, volcanogenic sandstone; common plant fossils; mostly fluvial and deltaic; local syntectonic alluvial fan deposits **(Eureka Sound)**.

DEVONIAN

Ellesmerian foreland, ELLESMERIAN OROGEN

LATE DEVONIAN (Frasnian)

Dnp — **NORDSTRAND:** Sandstone, quartzose and cherty, fine-grained, thin- to medium-bedded, red brown and green weathering; siltstone; ripples, trough cross-stratified, fining upward cycles, burrows, root casts, plant fragments; rare thin coal; meandering fluvial and overbank settings **(Nordstrand Point)**.

Dhg — **HELL GATE:** Sandstone, quartzose and cherty, yellow to orange weathering, very fine- to medium-grained, medium- to thick-bedded, trough and planar cross-stratified, fining upward cycles, minor pebbly sandstone, shale chip conglomerate; siltstone, green and red weathering; thin-bedded, recessive; fluvial channel and overbank deposits **(Hell Gate)**.

Df — **FRAM:** Sandstone, quartzose and cherty, dusky red, green and grey weathering, very fine- to fine-grained, thin- to thick-bedded, trough cross-stratification; fining and coarsening upward cycles; siltstone, thin-bedded, rip-up clasts, plant and fish fragments; meandering fluvial channel and overbank deposits **(Fram)**.

MIDDLE DEVONIAN (Eifelian and Givetian)

Dhb — **HECLA BAY:** Sandstone, quartzose, fine- to medium-grained, locally pebbly, friable grading to cemented and resistant in the western Arctic, off-white, yellowish grey, and light green weathering, mud rip-up clasts, trough cross-stratified; minor very fine sandstone, siltstone, shale; coarsening upward cycles; local chert pebble conglomerate; humid tropical setting, fluvial braidplain and deltaic, grading to marginal marine in the western Arctic **(Hecla Bay)**.

EARLY AND MIDDLE DEVONIAN (Emsian and Eifelian)

Dbi4, Dbi1 — **BIRD FIORD:** Sandstone, limestone, dolostone; minor siltstone, shale; local anhydrite; deltaic and shallow marine shelf, mostly unrestricted.
4. Sandstone, micaceous, red, fine-grained, thin-bedded, calcareous; siltstone, shale; common coarsening-upward cycles; deltaic **(Bird Fiord, Redbed facies)**.
1. Sandstone, micaceous, grey-green, fine-grained, thin-bedded, calcareous, fossiliferous; limestone, light grey to yellow grey, thin-bedded and thick-bedded, fossiliferous, in part argillaceous; brachiopods, trilobites, corals; dolostone, fine-grained, laminated; minor siltstone, shale; common coarsening-upward cycles; local gypsum, anhydrite; deltaic and shallow marine shelf, mostly unrestricted **(Bird Fiord)**.

Dsf1 — **STRATHCONA FIORD:** Siltstone, sandstone; minor conglomerate, limestone; meandering fluvial settings, locally brackish shallow marine.
1. Siltstone, micaceous, grey, red and green weathering; sandstone, yellow to grey weathering, thin- to thick-bedded, cross-stratified, fine-grained; fining upward cycles; minor chert pebble conglomerate, limestone containing crinoids, ostracodes and fish fragments; mostly meandering fluvial settings, locally brackish shallow marine **(Strathcona Fiord)**.

EARLY DEVONIAN (Emsian)

Bache uplift cover

DblE3, DblE2, DblE1 — **BLUE FIORD-EAST:** Limestone, dolostone, wackestone, sandstone; minor shale; nearshore and restricted, grading to shallow subtidal, unrestricted.
3. Dolostone and limestone, yellow and yellowish brown weathering; thick-bedded, fenestral; vuggy porosity; shallow marine shelf, restricted and unrestricted; locally on central Ellesmere Island; dolostone, limestone, silty, red and yellowish green-weathering; thin-bedded; recessive; siltstone, laminated, ripple marks; minor gypsum-anhydrite, nodular and laminated; mostly shallow, restricted to peritidal, hypersaline **(Blue Fiord, Upper part)**.
2. Limestone, yellowish grey; medium- to thick-bedded, bioturbated; fossiliferous, fenestral, biostromal, biohermal; minor dolostone, shale; minor sandstone, calcareous; pale yellowish brown and dusky yellow weathering; thin-bedded; shallow subtidal unrestricted to nearshore **(Blue Fiord, Lower part)**.
1. Limestone, grey, medium- to thick-bedded, bioturbated; wackestone, dark grey, argillaceous; fossiliferous rudstone and packstone including stromatoporoids, crinoids, brachiopods, corals, tentaculitids; dolostone and limestone, light grey to yellow, fenestral, fine- to medium-grained; local sandstone; minor shale; mostly shallow subtidal, periodically peritidal, restricted and unrestricted **(Blue Fiord)**.

EARLY DEVONIAN (Pragian and Emsian)

BACHE UPLIFT

Dv — **VENDOM:** Dolostone, variably arenaceous, red, yellowish green, and yellowish brown weathering; thin- to thick-bedded; variably laminated with bird's eye and local biomoldic porosity, locally fossiliferous; conglomerate, granule to cobble, rarely boulder grade; minor sandstone, siltstone, gypsum; arid climate alluvial fans grading to restricted nearshore **(Vendom Fiord)**.

SILURIAN AND DEVONIAN

LUDLOW TO EARLY DEVONIAN (Pragian)

Cape Phillips embayment

SDd1 — **DEVON ISLAND:** Shale, limestone; local olistostromes, bioherms; deep water and sediment starved, locally grading to shelf ramp.
1. Calcareous shale and silty shale, dark grey to black; argillaceous limestone, thin-bedded, local stromatoporoid-coral bioherms often dolomitized, carbonate conglomerate, breccia, concretions, common graptolites in the lower part; mostly deep water and sediment starved, locally grading to shallow shelf ramp on southern Ellesmere **(Devon Island)**.

Franklinian shelf, ARCTIC PLATFORM

SDg1 — **GOOSE FIORD:** Dolostone, limestone, mudstone; minor wackestone, siltstone, sandstone; nearshore, shelf and shelf edge including reefs and foreslope, mostly unrestricted.
1. Dolostone, limestone; light grey to pale yellowish brown weathering; thin- to massive-bedded, resistant; locally common brachiopods, bryozoa, corals, silicified trilobites; chert nodules; local stromatoporoid-coral bioherms, olistoliths; minor siltstone, sandstone (upper part); feldspathic, fine-grained; medium- to thick-bedded, cross-stratified; overall shallowing upward from subtidal to pertidal, mostly unrestricted **(Goose Fiord)**.

SILURIAN

LUDLOW

Sdo1 — **DOURO:** Limestone; minor dolostone, shale; local bioherms; shallow to deep subtidal shelf ramp.
1. Argillaceous limestone, limestone, dolomitic limestone; nodular, burrow-mottled, minor dolostone, calcareous shale, calcisiltite; local sponge-coral-stromatoporoid mud mounds on Somerset Island, and favositid-microbial biostromes in basal beds on Grinnell Peninsula; shallow to deep subtidal outer shelf ramp **(Douro)**.

Scs — **CAPE STORM:** Dolostone; grey, buff and brown weathering, very fine- to fine-grained, thin- to thick-bedded, laminated, mud-cracked, molar-tooth structures, stromatolitic, microbial; lesser dolomitic limestone, oolitic and peloidal; minor silty dolostone, siltstone, shale; mostly restricted intertidal and supratidal **(Cape Storm)**.

ORDOVICIAN TO SILURIAN

RICHMONDIAN TO LUDLOW

Osa — **ALLEN BAY:** Dolostone, limestone; local bioherms, anhydrite; arid subtidal to supratidal settings.
1. Dolostone, medium- to thick-bedded, light grey to yellowish brown, medium-grained, in part fossiliferous; bitumen stained; lesser dolomitic limestone, burrow mottled; minor flat pebble conglomerate; local stromatoporoid bioherms; local gypsum and anhydrite (Somerset Island); common shallowing upward cycles; semi-arid to arid subtidal to supratidal settings **(Allen Bay)**.

ORDOVICIAN

MIDDLE AND LATE ORDOVICIAN (Blackriveran to Richmondian)

Oct5 — **THUMB MOUNTAIN:** Limestone, mudstone, grainstone, wackestone, dolostone; subtidal and intertidal, restricted and unrestricted.
5. Thumb Mountain, Irene Bay, undivided.

MIDDLE ORDOVICIAN (Whiterockian)

Ocb1 — **BAY FIORD:** Dolostone, limestone; minor anhydrite, rock salt, breccia; initially hypersaline grading to mostly restricted peritidal.
1. Dolostone, dolomitic limestone; very fine- to fine-grained, thin- to medium-bedded, grey to grey-green weathering; limestone, pale to dark brown, massive-bedded, burrow mottled, locally bioclastic; basal discontinuous member of gypsum, anhydrite, solution breccia and, in the Parry Islands, subsurface rock salt; initially hypersaline grading up into mostly restricted peritidal **(Bay Fiord)**.

EARLY ORDOVICIAN (Arenig)

Oe1 — **ELEANOR RIVER:** Limestone, dolostone, grainstone, packstone, wackestone, mudstone; unrestricted, peritidal to subtidal shelf.
1. Limestone, lesser dolostone; light brown to dark brown, thick- to massive-bedded, burrow mottled, grainstone, packstone, wackestone, stromatolitic and thrombolitic members alternating with recessive light yellowish grey, very thin- and thin-bedded lime mudstone and grainstone members; unrestricted subtidal to peritidal **(Eleanor River)**.

EARLY ORDOVICIAN (Tremadoc and Arenig)

Ob1 — **BAUMANN FIORD:** Anhydrite; minor dolosiltite, limestone; arid climate, hypersaline subtidal to peritidal shelf.
1. Gypsum, anhydrite; white and light grey weathering; planar parallel lamination; intensely tectonized; recessive; minor dolosiltite, limestone including mudstone, grainstone, packstone, stromatolitic boundstone, flat pebble conglomerate; arid climate, hypersaline subtidal to peritidal shelf **(Baumann Fiord)**.

EARLY ORDOVICIAN (Tremadoc)

Oce — **CHRISTIAN ELV:** Limestone, including lime mudstone, calcisiltite; medium to dark grey weathering; medium- to thick-bedded; ripples, mud cracks; intraclast flat pebble conglomerate; minor thrombolitic boundstone; dolosiltite, quartz sandstone, calcareous; medium-grained; medium- to thick-bedded; cross-stratified; restricted shelf, shallow subtidal to peritidal **(Christian Elv)**.

Occ — **CAPE CLAY:** Dolostone, limestone including lime mudstone, packstone, grainstone, thrombolitic microbialite; thick- to massive-bedded, grey to grey-brown weathering, burrow-mottled; rare dolosiltite, flat pebble conglomerate, nodular chert; mostly subtidal unrestricted shallow marine shelf **(Cape Clay)**.

CAMBRIAN AND ORDOVICIAN

MIDDLE CAMBRIAN TO EARLY ORDOVICIAN (Tremadoc)

Franklinian shelf, ARCTIC PLATFORM

Cm-cf1 — **CASS FJORD:** Dolostone, limestone, intraclast conglomerate; minor shale, sandstone, gypsum; local bioherms; peritidal grading to subtidal shelf.
1. Dolostone, limestone; light grey and grey-brown, thin-bedded; intraclast flat-pebble conglomerate; calcisiltite, dolosiltite, stromatolitic boundstone; minor shale, sandstone, gypsum, local carbonate mud mounds and algal reefs; mostly peritidal grading northwest to subtidal settings **(Cass Fjord)**.

CAMBRIAN

EARLY AND MIDDLE CAMBRIAN (Series 2, 3)

Cm-sb3 — **SCORESBY BAY:** Dolostone, limestone; minor basal sandstone, intraclast conglomerate, sedimentary breccia; nearshore grading to shallow marine shelf.
3. Limestone, dolostone, variably argillaceous and arenaceous, medium- to thick-bedded, medium- and coarse-grained, yellow-orange and brown, minor flat-pebble conglomerate, sandstone; nearshore and shallow marine, restricted and unrestricted **(Cape Leiper, Cape Ingersoll, Police Post, Cape Kent, Cape Wood)**; sandstone, coarse-grained to pebbly, medium- to thick-bedded; crossbedded; yellow-orange; shoreface and nearshore shallow marine **(Dallas Bugt)**.

ARCTIC PLATFORM

Cm-rb1 — **RABBIT POINT:** Limestone, dolostone; sandstone; fluvial and nearshore grading to shallow subtidal.
1. Sandstone, thick-bedded, planar and trough cross-stratified, medium- to coarse-grained, grey, yellow, red weathering; sandstone, very fine- to fine-grained, thin-bedded, ripples, desiccation cracks, trace fossils; fluvial and nearshore settings **(Rabbit Point)**; limestone, nodular, burrowed, trilobite fragments; dolostone. medium- to coarse-grained, in part silty or arenaceous, burrow mottled; subtidal shelf ramp **(Bear Point)**.

MESOPROTEROZOIC

ECTASIAN AND STENIAN (1270 to 1000 Ma)

BORDEN BASIN

mPb1 — **BORDEN:** Siltstone, shale, sandstone, dolostone; syntectonic alluvial fans grading to fluvial and shallow marine.
1. Siltstone and shale, laminated to thin-bedded; sandstone to very thick-bedded; stromatolitic dolostone; dolostone intraclast and polymictic conglomerate; syntectonic alluvial fans grading to fluvial and shallow marine settings **(Strathcona Sound)**.

THULE BASIN

mPt4, mPt3 — **THULE:** Quartzite, conglomerate, siltstone, shale, dolostone; minor basalt.
4. Orthoquartzite, quartz-pebble conglomerate, red siltstone, shale, dolostone, microbialite, minor limestone; intruded by sills of Franklin-Thule swarm; rift-related settings; fluvial, peritidal, shallow marine **(Baffin Bay group)**.
3. Orthoquartzite, quartz-pebble conglomerate, red siltstone, shale, dolostone, microbialite, minor limestone, basalt flows; intruded by sills of Franklin-Thule swarm **(Nares Strait group, Smith Sound group)**.

PALEOPROTEROZOIC

OROSIRIAN (1980 to 1915 Ma)

INGLEFIELD OROGEN

pPep2, pPep1 — **ETAH plutonic assemblage:** Tonalite, granite; minor paragneiss, pegmatite; collisional setting plutonic complex.
2. Orthopyroxene granite, perthite porphyroblasts, red and pink, locally containing metasedimentary enclaves, locally retrograded.
1. Orthopyroxene tonalite; minor orthopyroxene granite, granodiorite; plagioclase porphyroblasts; red, brown, grey; common granite and pegmatite veins, layers; locally retrograded.

OROSIRIAN (1980 to 1920 Ma)

INGLEFIELD OROGEN, Rae craton cover

pPe5, pPe4, pPe3, pPe2, pPe1 — **ETAH:** Paragneiss, cordierite sillimanite gneiss, quartzite, marble; minor pyribolite; interleaved granitoids, orthogneiss; granulite grade supracrustal rocks.
5. Ultramafic pyribolite.
4. Pyribolite, amphibolite, metadykes.
3. Marble, calcsilicate.
2. Quartzite with sillimanite, garnet, feldspar.
1. Sillimanite gneiss with garnet, cordierite, biotite; minor pyribolite, marble, quartzite, quartzofeldspathic gneiss with pyroxene.

NEOARCHEAN AND PALEOPROTEROZOIC (to 1915 Ma)

INGLEFIELD OROGEN, RAE CRATON

ApPi — **INGLEFIELD:** orthogneiss, granite, tonalite; minor syenite, pegmatite; high grade collisional plutonic complex.
5. Granulite, granitoid gneiss, granite, tonalite, minor pyribolite, amphibolite, marble, cordierite and sillimanite gneiss and other metasediments.
4. Hornblende-biotite gneiss; grey, pink, red; retrograded.
2. Orthopyroxene tonalite, tonalitic gneiss; minor granitic gneiss, granite veins, pegmatite; grey, greenish grey; locally retrograded.
1. Orthopyroxene granite, granitic gneiss, tonalite, tonalitic gneiss; minor orthopyroxene granodiorite, syenite, granite veins, pegmatite; brown, red, feldspar porphyroblasts, locally retrograded.

Contacts
- Geological boundary: defined or approximate

Faults
- Fault: approximate
- Fault: assumed
- Fault: inferred
- Fault: approximate, showing downthrown side
- Fault: assumed, showing downthrown side
- Fault: inferred, showing downthrown side

Thrust faults
- Thrust fault: approximate, teeth indicate upthrust side
- Thrust fault: inferred, teeth indicate upthrust side

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Canadian Geoscience Maps

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GEOLOGY

TECTONIC ASSEMBLAGE MAP OF GRISE FIORD

eastern Devon and southern Ellesmere islands, Nunavut

1:500 000

10 0 10 20 30 40 km

Map projection Lambert Conformal Conic, standard parallels 74°30′N and 76°30′N. North American Datum 1983

Base map at the scale of 1:250 000 from Natural Resources Canada, with modifications.

Proximity to the North Magnetic Pole causes the magnetic compass to be erratic in this area.
Mean magnetic declination 2014, 45°22′W, decreasing 58.1′ annually.
Readings vary from 35°39′W in the SW corner to 50°22′W in the NE corner of the map.

The Geological Survey of Canada welcomes corrections or additional information from users.

Data may include additional observations not portrayed on this map. *See* documentation accompanying the data.

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This map is not to be used for navigational purposes

Preliminary publications in this series have not been scientifically edited.

CANADIAN GEOSCIENCE MAP 34

GEOLOGY

TECTONIC ASSEMBLAGE MAP OF GRISE FIORD

eastern Devon and southern Ellesmere islands, Nunavut

Canada