W.J. Crawford was a very able senior field assistant. Field party support was provided by Baffinland Iron Mines Corporation from June to September, 1965. Helicopter service and groceries were provided in the field through an agreement with Baffinland Iron Mines, who also made reports and other information available to us. The author gratefully acknowledges the following GSC staff for their contributions to this publication. K. Love for careful work (2005) to complete the challenging conversion of legacy paper field maps to digital data. More recently, R. Buenviaje provided extensive support for transformation of the data and GIS compilation work. M. Szadurski located and scanned legacy field photographs. Thanks also to A. Morin for providing a thorough review of the geodatabase and N. Côté for the final cartography.

Brouillette, P., Girard, É., and Huot-Vézina, G., 2019. Geological Survey of Canada Bedrock Data Model and tools: design and user guide documentation including ArcGIS(TM) add-ins; Geological Survey of Canada, Open File 8247, 129 p, 1 .zip file. https://doi.org/10.4095/314673 Jackson, G.D., 1978. Basement gneisses and the Mary River Group, No. 4 deposit area, northwest Baffin Island, District

of Franklin; in Rubidium-Strontium Isotopic Age Studies, Report 2 (Canadian Shield), (ed.) R.K, Wanless and W.D. Loveridge; Geological Survey of Canada, Paper 77-14, p. 18-24. https://doi.org/10.4095/314651 Jackson, G.D., 2000. Geology of the Clyde-Cockburn land map area, north-central Baffin Island, Nunavut; Geological Survey of Canada, Memoir 440, 316 p. https://doi.org/10.4095/211268 Jackson, G.D., Hunt, P.A., Loveridge, W.D., and Parrish, R.R., 1990. Reconnaissance geochronology of Baffin Island,

N.W.T.; in Radiogenic Age and Isotopic Studies, Report 3; Geological Survey of Canada, Paper 89-2, p. 123–148. Saumur, B.M., Skipton, D.R., St-Onge, M.R., Bros, E.R., Acosta-Gongora, P., Kelly, C.J., Morin, A., O'Brien, M.E., Johnston, S.T., Weller, O.M., 2018. Precambrian geology of the surroundings of Steensby Inlet and western Barnes Ice Cap (parts of NTS 37E, 37F, 37G), Baffin Island, Nunavut; Canada-Nunavut Geoscience Office, Summary of

Activities 2018, 2018 p. 29–45.

https://doi.org/10.4095/103973

Saumur, B.M., Skipton, D.R., St-Onge, M.R., Jackson, G.D., Wodicka, N., Bros, E.R., Weller, O.M., and Johnston, S.T., 2020. Bedrock geology, Angijurjuk -Mary River, Baffin Island, Nunavut, NTS 37-G west; Geological Survey of Canada, Canadian Geoscience Map 403, scale 1:100 000. https://doi.org/10.4095/321794 Trettin, H.P., 1975. Investigations of Lower Paleozoic geology, Foxe Basin, northeastern Melville Peninsula, and parts

Suggested Readings

of northwestern and Central Baffin Island; Geological Survey of Canada, Bulletin 251, 177 p.

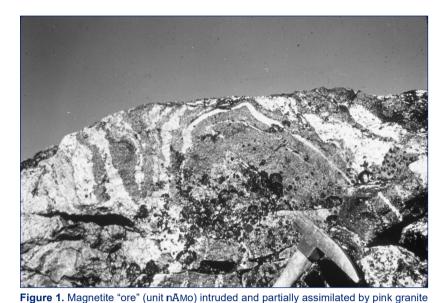
Crawford, W.J.P., 1973. Metamorphic iron formation of EQE Bay and adjacent parts of northern Baffin Island; Ph.D. thesis, University of Washington, Seattle, Washington, 101 p. Fahrig, W.F., Irving, E., and Jackson, G.D., 1971. Paleomagnetism of the Franklin diabases; Canadian Journal of Earth Sciences, v. 8, no. 4, p. 455–467. https://doi.org/10.1139/e71-047 Fryer, B.J., 1971. Canadian Precambrian iron formations; ages and trace element compositions; Ph.D. thesis,

Massachusetts Institute of Technology, Cambridge, Massachusetts, 174 p. Fryer, B.J., 1971. Age and trace element compositions of Algoma-type iron formations of the Canadian Shield; in Variations in Isotopic Abundances of Strontium, Calcium and Argon and Related Topics –Nineteenth Annual Progress Report for 1971; Department of Earth and Planetary Sciences, Massachusetts Institute of Technology, Cambridge,

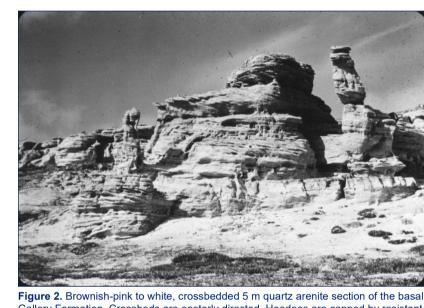
Geological Survey of Canada, 1972. District of Franklin (Sheet 37g/5) Northwest Territories; Geophysical Series Map 4695G, scale 1:63 360. https://doi.org/10.4095/117258 Hegner, E., Jackson, G.D., Whalen, J.B., and Wodicka, N. 2007. Some Nd-Sm data for Archean and Paleoproterozoic rocks of Baffin Island; in Digital geoscience atlas of Baffin Island (south of 70°N and east of 80°W), Nunavut, (ed.) M.R. St-Onge, A. Ford, and I. Henderson; Geological Survey of Canada, Open File 5116, 1. zip file.

Jackson, G.D. and Berman, R.G., 2000. Precambrian metamorphic and tectonic evolution of northern Baffin Island,

Nunavut, Canada; The Canadian Mineralogist, v. 38, no. 2, p.399–421. https://doi.org/10.2113/gscanmin.38.2.399



(unit nA5). The two rock types were then folded together at the east end of the major syncline. Photograph by G.D. Jackson. NRCan photo 1997-054H



Gallery Formation. Crossbeds are easterly directed. Hoodoos are capped by resistant quartz arenite here and also by gneiss boulders elsewhere. Location: 'Muriel lake' (unofficial name) area. Photograph by W. J. Crawford. NRCan photo 1997-054S

The map area lies about 40 km northwest of Baffinland's iron mine. Dvkes of unit mAnA3 within unit mAnA2 suggest that unit mAnA2 predates unit mAnA3. Unit nAMgf, basal Mary River Group unit, includes regolith material from units mAnA2 and mAnA3. Unit mAnAm may include some dykes of unit nAmb. The Mary River Group was deposited in a volcanic-arc environment, yielding zircon U-Pb ages mostly in the range of 2.88 to 2.72 Ga. Iron-formation (unit nAMi) is approximately 276 m thick locally, with oxide facies (unit nAMio) being most abundant. The quartzite triangle west of 'Iron lake' (unofficial name) may be a small horst. The main east-west-trending synclinal fold, including the area around 'Iron lake' and the no. 4 ore deposit, is upright, nearly isoclinal, and plunges mostly easterly at both ends with small scale anticlines and synclines in the middle. Magnetite constitutes about 75% of high-grade iron deposits in the north limb,

whereas hematite predominates in south-limb deposits. K-Ar and Rb-Sr ages indicate middle Paleoproterozoic overprinting. Central Borden Fault Zone was active at ca. 1.27 Ga and during or after Ordovician time. Note: please be aware that the information contained in CGM 408 is based on legacy data from the 1960-1990s and that it has been superseded by

regional-scale information contained in CGM 403.

au nord-ouest de la mine de fer Baffinland. Des dykes de l'unité mAnA3 situés à l'intérieur de l'unité mAnA2 nous portent à croire que l'unité mAnA2 est antérieure à l'unité mAnA3. L'unité nAMgf, qui forme la base du Groupe de Mary River, comprend des matériaux régolitiques provenant des unités mAnA2 et mAnA3. L'unité mAnAm peut renfermer des dykes de l'unité nAmb. Le Groupe de Mary River s'est mis en place dans un milieu d'arc volcanique et a livré des âges U-Pb sur zircon dans l'intervalle 2,88-2,72 Ga. La formation de fer (unité nAMi) est épaisse d'environ 276 m par endroits et le faciès à oxydes (unité nAMio) est le plus abondant. Le triangle de quartzite situé à l'ouest du 'lac Iron' (nom non officiel) pourrait être un petit horst. Le principal pli synclinal d'orientation estouest, qui touche entre autres le secteur autour du 'lac Iron' et du gîte n° 4, est un pli droit, presque isoclinal, qui plonge principalement vers l'est aux deux extrémités et renferme de petits anticlinaux et synclinaux dans sa partie centrale. La magnétite constitue environ 75 % des gîtes de fer à haute teneur du flanc nord, tandis que l'hématite prédomine dans les gîtes de fer du flanc sud. Les âges K-Ar et Rb-Sr indiquent une surimpression au Paléoprotérozoïque moyen. La zone de failles de Central Borden était active à environ 1,27 Ga, ainsi que pendant ou après

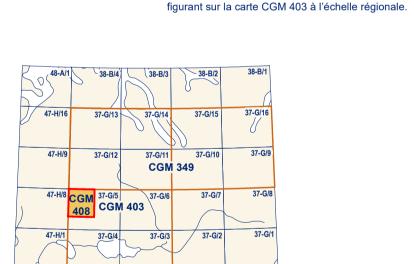
Cette région cartographique se situe à environ 40 km

25'00"

22'30"

80°00'00"

Note : L'information présentée sur la carte CGM 408 est fondée sur d'anciennes données recueillies au cours des années 1960-1990 et est supplantée par celle



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

Catalogue No. M183-1/408-2021E-PDI ISBN 978-0-660-30181-5 https://doi.org/10.4095/314670

© Her Majesty the Queen in Right of Canada, as represented by the Minister of Natural Resources, 2021

Natural Resources Ressources naturelles Canada Canada

CANADIAN GEOSCIENCE MAP 408 BEDROCK GEOLOGY NORTHWEST PART OF

NULUUJAAK MOUNTAIN Baffin Island, Nunavut part of NTS 37-G/5 1:25 000



Author: G.D. Jackson Geology by G.D. Jackson and W.J. Crawford, 1965 Geological compilation by G.D. Jackson, 2019 Geology has been spatially adjusted to fit the updated base. traversing, helicopter traversing of areas with few or no outcrops, and aeromagnetic interpretation.

Photographs, chemical analyses and diagrams, descriptions, and Paleozoic stratigraphic sections are available for the area in GSC Memoir 440 (Jackson, 2000). Faults and folds are available in Jackson (1978). Geomatics by K. Love, R. Buenviaje, and A. Morin Cartography by N. Côté Scientific editing by A. Weatherston Initiative of the Geological Survey of Canada, conducted under the auspices of the GEM North Baffin as part of Natural Resources Canada's Geo-mapping for Energy and Minerals (GEM) program

52'30"

BEDROCK GEOLOGY NORTHWEST PART OF NULUUJAAK MOUNTAIN Baffin Island, Nunavut part of NTS 37-G/5 1:25 000

45'00"

CANADIAN GEOSCIENCE MAP 408

47'30"

COTSdl

42'30"

COTSdl

Map projection Universal Transverse Mercator, zone 17 North American Datum 1983 Base map at the scale of 1:50 000 from Natural Resources Canada, with Elevations in metres above mean sea level Proximity to the North Magnetic Pole causes the magnetic compass to be erratic in this area. Magnetic declination 2021, 30°11'W, decreasing 49.0' annually This map is not to be used for navigational purposes.

[∕] €OTSd

COTSdl-i.

37'30"

Title photograph: Very thin-bedded, deformed, oxide-facies (magnetite) ironformation, alternate layers of magnetite and quartz (meta-chert), with local cummingtonite and actinolite. Location: 'Muriel lake'-'David lake' (unofficial names) belt. Photograph by G.D. Jackson. NRCan photo 2018-390 The Geological Survey of Canada welcomes corrections or additional information from users at (nrcan.gscinfo-infocgc.rncan@canada.ca).

Survey of Canada, Canadian Geoscience Map 408, scale 1:25 000. https://doi.org/10.4095/314670 79°30'00"

supplement field observations and samples. Normal fault, defined The Paleozoic rocks in the map area are compatible with the stratigraphy determined by others for part of this area and for adjacent areas (e.g. Trettin, 1975). Some unit names (e.g. Baillarge Fault, motion undefined, defined Formation) may be superseded by more recent mapping (Saumur et al., 2018, 2020). . Conglomerate Till/Drift Unconsolidated clay to coarse gravel and boulder till; partly reworked by water; chiefly ground moraine, local small moraines, eskers, bog deposits, eolian sand; rare small bedrock outcrops.

Geological contact:

Inferred

Fold hinge:

Minor S

Minor Z

Glacial striae:

Mineral lineation

Fieldwork station, 1965

Fossil collection site

Cre deposit no. 4

Direction known

Direction unknown

Metamorphic foliation and layering

Bedding form line

Defined-Approximate

MEMBER B: Mostly rough-weathering, light to medium brown, minor buff to grey; very thin- to thin-bedded, microcrystalline dolostone and partially dolomitized limestone; shaly, silty, and sandy upper strata; local nodular strata, chert, and worm burrows; abundant fossils, catalogued at the

MEMBER A: Mostly silty to partially dolomitized limestone and minor burrows, and local nodular structures; thickness 15 m.

CAMBRIAN-ORDOVICIAN UPPER ADMIRALTY GROUP (COGCS-COTSdl) silty or sandy; very fine- to coarse-grained quartzose, dolomitic, and massive; minor dolomite conglomerate and flat-clast breccia; abundant crosslaminations, ripple marks, mudcracks, and fossils that have been catalogued, along with minor glauconite, cordierite, sericite, and alusite, and sulphide streaks; sandstones, abundant in the lower part, in general, decrease in abundance upward and are very minor in the upper dolostones: each formation contains two members and the total thickness may range

:mAnA3-i

nA5-i

GALLERY FORMATION: The lower part of unit is mostly red, brown, and buff, quartz-clast conglomerate, and arkosic and quartz-arenitic sandstone beds and lenses; hematite clasts occur in the 'Muriel and David lakes' areas (unofficial names), and east of the map area, north of 'Sheardown lake' (unofficial name); upper strata are mostly grey with some buff and brown; a few red ferruginous lenses occur throughout the formation; very fine- to very coarse-grained, thin- to very thick-bedded, crossbeds, local ripple marks, sole marks, and worm burrows are present; crossbed paleocurrent data indicate southeast-directed current movements; measured thicknesses are 10 to 70 m.

dyke, along Central Borden Fault, has a few small offshoots and a tourmalinerich altered zone in its bend northwest of 'Fish lake' (unofficial name); a few small Franklin dykes and plugs occur elsewhere within the map area. NEOARCHEAN Syenite to granodiorite, mostly monzogranite; fine-grained to commonly pegmatitic, pink to red, massive to locally weakly foliated, rodded and mineral-lineated; local areas contain apparently gradational, white to pale grey and mottled white and red, fine- to medium-grained granite; this unit occurs in bodies up to batholithic size, intrudes and locally contains ingested Mary River Group strata, including iron-formation and ultramafic rocks; the rock commonly has a small amount of magnetite in small pockets or veinlets; biotite is the most common mafic mineral; an irregular linear body in the northwest corner of the map area may have been emplaced along a fissure.

moderately foliated, some bodies have shear zones and mylonite zones but seems a little more deformed than unit nA5 and is a little more mafic: north of the area similar to nA4 (Jackson et al., 1990) Granite to tonalite, with minor associated quartzofeldspathic gneisses, whitegrey, mostly fine- to medium-grained, some with quartz eyes and some rhyodacite to dacite may be included in the unit; local grey granodioritetonalite dykes occur in the unit east of the circular ultramafic body northeast

rock types, pink granite pegmatite dykes, meta-ultramafic rocks and ironformation are also present; the latter two are rare north of the Mary River Group where only three occurrences of iron-formation were noted. MARY RIVER GROUP (2.75-2.72 Ga?) (nAMq-nAMg) Metagabbro, minor metadiorite, mostly dykes and sills; mostly

some may predate the Mary River Group. ultramafic rocks occur mostly within the iron-formation or just above it; aphanitic to very coarse-grained, medium to dark green and blotchy greenish-grey; some cumulate zones and deformed spinifex texture; some ultramafic bodies are gradational with basalt and may be volcanic.

Mostly serpentinite and ultramafic rocks with minor amounts of the lithologies noted in unit nAmp; upper part of the unit is mostly silicate- and silicate-oxidefacies iron-formation with lesser aluminous-, carbonate-, and iron-oxide-Metagreywacke to metapelite, some meta-arkose and tuff, minor thin quartzite; quartz+biotite+feldspar (plagioclase?) schist and gneiss is abundant, quartz+muscovite, and quartz+biotite+cordierite are common;

High-grade iron ore occurs in the no. 4 deposit on the north limb of the easterly plunging area of the major syncline; about 65% of the surface material may be magnetite and the rest hematite; several very small pockets of high-grade iron were found in the area; virtually all of the high-grade iron occurrences along the south limb of the syncline are hematite and include some spectacular specularite bodies; some younger goethite-hematite-

Iron-formation, undivided, includes unit nAMio, local aluminous-facies ironformation and the following: silicate facies - dark yellow cummingtonitegrunerite, or green actinolite, each alone or interlaminated with, to very thinly interbedded with, quartz±garnet; silicate-oxide facies - cummingtonitegrunerite or actinolite±diopside, each interlaminated with, to very thinly interbedded with, magnetite or magnetite+quartz; carbonate facies - massive to thinly bedded ferruginous dolostone+minor magnetite±tremolite-

Oxide-facies iron-formation, interlaminated to very thinly interbedded quartz and iron oxide, usually magnetite ± some hematite, and minor iron silicates; the iron-formation is highly interfolded with metavolcanic, mafic volcanic, and metasedimentary rocks in the core of the easterly plunging 'Iron lake' (unofficial name) syncline, almost as if these strata were plastic and being squished as the syncline formed.

pink-weathered surface and rare flecks of chrome green mica and a vitreous lustre with a massive to faint mineral foliation, minor to trace minerals include sericite, muscovite, biotite, chlorite, and magnetite; about 100 m thick. The unit top is orthoquartzite as in unit nAMq with a trace of muscovite; the quartzite grades down northward into quartz-muscovite schist, then grey quartz-feldspar±muscovite±biotite schist and gneiss; continuing northward, lenses of pebble-clast conglomerate are present and biotite takes over from muscovite and the rock colour changes to pink; the base of unit nAMgf is arbitrarily taken a little above where the pink rock is considered a granite with

Mafic amphibole dykes, fine- to medium-grained, mostly segmented; those north of the Mary River Group trend south by east, arcing easterly toward the south, as do the nAmb dykes, with mineral lineations and rodding all plunging southeasterly in this area; these features suggest that the Mary River relative to the region to the north.

Mostly quartz monzonite to granodiorite; pale to moderately pink, massive to mostly foliated, with scattered faint layering; thinly scattered phenocrysts and some crushing; some augen may be present, locally associated with mostly pinkish quartzofeldspathic gneisses; fine- to medium-grained remnants of quartz±muscovite±biotite schist and gneiss that probably include paragneiss; cut by small disconnected amphibolite dykes; most trend south by east and arc easterly with similarly oriented mineral lineations and rodding; may be part of the basement to the Mary River Group.

Mostly quartz monzonite to tonalite, grey to locally whitish, fine- to mediumgrained; commonly foliated, lineated, and mineral-rodded; some grey quartz, feldspar, biotite±hornblende schist, and gneiss, probably includes paragneiss.

> Recommended citation Jackson, G.D., 2021. Bedrock geology, northwest part of Nuluujaak Mountain, Baffin Island, Nunavut, part of NTS 37-G/5; Geological

Geological Survey of Canada Canadian Geoscience Maps

Geology conforms to Bedrock Data Model v. 2.9 (Brouillette et al., 2019). The geological interpretation provided on this map is based on ground

€OTSdl-i

50'00"

mAnA3-i

Data may include additional observations not portrayed on this map. See map info document accompanying the downloaded data for more information about this publication. This publication is available for free download through

GEOSCAN (https://geoscan.nrcan.gc.ca/).

present. Many areas of interpreted geology (light coloured areas with unit labels ending in -i) are drift covered, but a few locally derived regoliths are present. The area was mapped by ground traverses, but sparse outcrop areas to the east were covered by low-level helicopter flights. Map interpretations were based on aeromagnetic and structural data and airphotos to

This legend displays map unit designators and relatively intense colours for areas of outcrop

observed in the field (e.g. mAnAm designates mapped mafic amphibolite dykes). Where the

The paler colour for each unit indicates either lack of outcrop seen and/or lack of outcrop

interpretation of the map unit was extrapolated, map unit designators end in '-i' (e.g. mAnAm-i).

BAILLARGE FORMATION

Paleontology Unit of the Geological Survey of Canada; thickness to erosion

dolostone; light grey to grey, buff, and minor brown; laminated to thin-bedded, microcrystalline; abundant various fossils catalogued at the Paleontology Unit of the Geological Survey of Canada; minor sandstone, cherty beds, worm TURNER CLIFFS AND SHIP POINT FORMATIONS (UNDIVIDED): Mostly dolostone and limestone; microcrystalline to very finely crystalline, commonly calcareous sandstones are also present; colours range from light grey to buff, greyish-orange, yellowish-brown, and white; laminated to thick-bedded and

NEOPROTEROZOIC FRANKLIN INTRUSIONS (ca. 723 Ma): Northwest-trending, inferred Franklin massive tholeiitic diabase dykes (U-Pb Baddeleyite 700–723 Ma elsewhere on Baffin); dark greyish-green to black, aphanitic to coarse-grained. The main

> Quartz syenite to quartz monzodiorite, mostly monzogranite; pink to red, fineto coarse-grained; K-feldspar-phyric, rarely pegmatitic, commonly weakly to approximately 1 m thick; this unit intrudes Mary Group strata in a few places relations between the two granite units are uncertain; this unit includes some grey and pink quartzofeldspathic gneisses whose relationships are also uncertain; a U-Pb zircon age of 2709 +4/-3 Ma has been obtained for a body

of 'Muriel lake' (unofficial name). Migmatite, mostly intermixed granites and amphibolite, especially in the northern part of the area where more than one age of both lithologies is probably present; greywacke-metapelite anatectite, additional sedimentary

metamorphosed to amphibolite (hornblende and/or actinolite); green to black; aphanitic to pegmatitic; clast size or grain size of some plagioclaselomeroporphyritic units fines downward and they are probably cumulates; Peridotite-dunite, pyroxenite, komatiite, and local enstatite dykes; abundant serpentine; some of which may have been subsequently remetamorphosed;

Metabasalt, locally pillowed, amphibolite, minor komatiitic basalt, tuff, and amphibolite dykes; some of which are faintly layered; local volcanic breccia and conglomerate; all lithologies range from dark grey to greenish-black.

garnet, hornblende, andalusite, kyanite, sillimanite, and magnetite have been reported; a light grey, massive, granodiorite cobble-clast conglomerate with a schist matrix occurs in this unit north of 'Muriel lake' (unofficial name); the clast compositions closely resemble that of grey foliated granodiorite in

magnetite occurrences are probably related to recent leaching and

actinolite±chlorite±quartz.

Orthoguartzite, fine- to coarse-grained, white to pale grey with a white- to

feldspar phenocrysts 3 cm long. MESOARCHEAN-NEOARCHEAN

Syncline, whose nose plunges easterly about 35°, moved easterly and down