References

Bird, J.B. and Bird, M.B., 1961. Bathurst Inlet, Northwest Territories; Geographical Branch, Canada Department of Mines and Technical Surveys, Geographical Memoir 7, 66 p. https://doi.org/10.4095/290069

Deblonde, C., Cocking, R.B., Kerr, D.E., Campbell, J.E., Eagles, S., Everett, D., Huntley, D.H., Inglis, E., Parent, M., Plouffe, A., Robertson, L., Smith, I.R., and Weatherston, A., 2019. Surficial Data Model: the science language of the integrated Geological Survey of Canada data model for surficial geology maps; Geological Survey of Canada, Open File 8236, ver. 2.4.0, 1 .zip file. https://doi.org/10.4095/315021

Kerr, D.E., 1994. Late Quaternary stratigraphy and depositional history of the Parry Peninsula-Perry River area, District of Mackenzie, Northwest Territories; Geological Survey of Canada, Bulletin 465, 39 p. https://doi.org/10.4095/194069

Suggested Readings

Blake, W., Jr., 1963. Notes on glacial geology, northeastern District of Mackenzie; Geological Survey of Canada, Paper 63-28, 12 p. https://doi.org/10.4095/101060

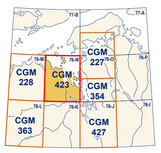
Craig, B.G. and Fyles, J.G., 1960. Pleistocene geology of Arctic Canada; Geological Survey of Canada, Paper 60-10, 21 p. https://doi.org/10.4095/101191

Abstract

The Arctic Sound map area consists primarily of glacially scoured bedrock, minor till in the southwest, and postglacial marine sediments in coastal lowlands and inland along river valleys. The till deposits are cut to bedrock by subglacial meltwater corridors defined by eskers and other glaciofluvial sediments. Glacial lakes occupied the James River valley where retreating or stagnant ice blocked drainage to the east. Glacio-lacustrine deltas record falling lake levels, from 310 m to 290 m and 260 m elevation. Striations and streamlined landforms indicate ice flow to the north-northwest, and later crosscutting relationships recording minor variations locally. Orientation of minor moraines, eskers, and outwash plains suggest ice recession was primarily southeastward. A series of small glaciomarine deltas following a northwest-southeast trend, and postglacial marine deltas and fine-grained sediments, reach elevations of 210 m in the northwest and 200 m in the southeast. Isostatic rebound caused marine regression, forming raised beaches from 210 m elevation to current sea level.

Résumé

La région cartographique d'Arctic Sound se compose principalement d'un substratum rocheux affouillé par les glaciers, d'un peu de till dans le sud-ouest, ainsi que de sédiments marins postglaciaires dans les basses terres côtières et le long des vallées fluviales, à l'intérieur des terres. Les dépôts de till sont incisés jusqu'au substratum rocheux par des corridors d'eau de fonte sous-glaciaires définis par des eskers et d'autres sédiments fluvioglaciaires. Des lacs glaciaires occupaient la vallée de la rivière James où un glacier en retrait ou de la glace stagnante bloquait l'écoulement des eaux vers l'est. Des deltas glaciolacustres enregistrent une chute du niveau des lacs, de 310 m à 290 m, puis à 260 m d'altitude. Des stries et des formes fuselées témoignent d'un écoulement glaciaire vers le nord-nord-ouest, et des relations de recoupement ultérieures indiquent de légères variations locales de l'écoulement. L'orientation des moraines mineures, des eskers et des plaines d'épandage fluvioglaciaires suggère que le retrait glaciaire s'est surtout effectué vers le sud-est. Une série de petits deltas glaciomarins suivant un axe nord-ouest–sud-est, ainsi que des deltas marins postglaciaires et des sédiments à grain fin, atteignent des altitudes de 210 m dans le nord-ouest et de 200 m dans le sud-est. Le relèvement isostatique postglaciaire a entraîné une régression marine, laissant des plages soulevées depuis une altitude de 210 m jusqu'au niveau de la mer actuel.



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

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CANADIAN GEOSCIENCE MAP 423

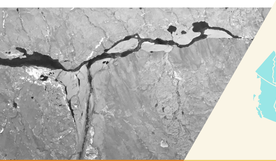
RECONNAISSANCE SURFICIAL GEOLOGY

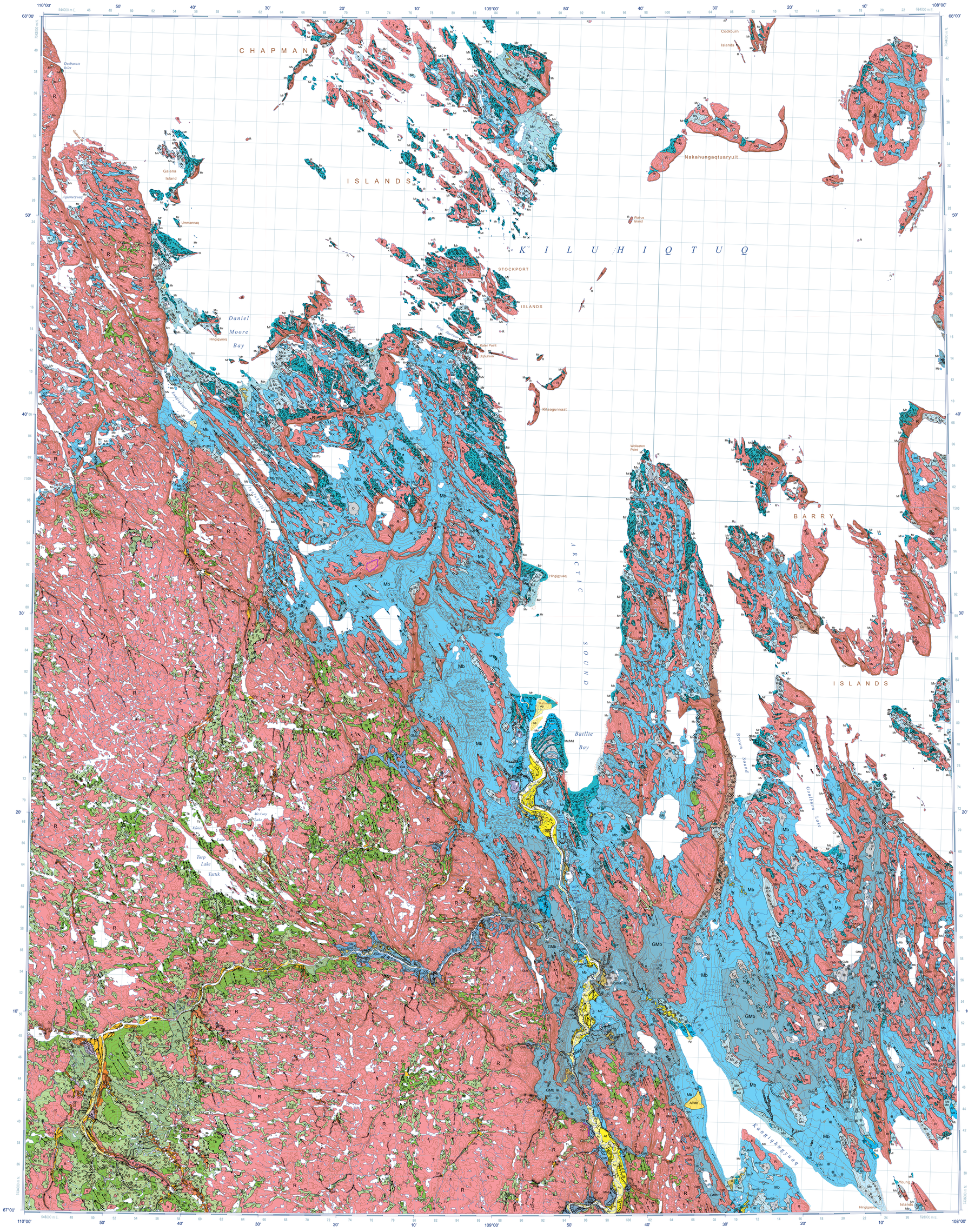
ARCTIC SOUND

Nunavut

NTS 76-N

1:125 000





QUATERNARY

HOLOCENE

POSTGLACIAL ENVIRONMENT

Isn — **Snowpack, icing:** ice accumulations along creeks and small rivers; varied thickness; observed on airphotos taken in August 1955 and July 1957.

O — **Organic deposits, undifferentiated:** peat and muck; up to 2 m thick but commonly less than 1 m thick; formed predominantly by the accumulation of vegetative material in bogs; occur in depressions, along valley bottoms, and on marine silt and clay, and till; may contain ice-wedge polygons; small unmapped organic deposits occur in most terrain units.

E — **Eolian sediments, undifferentiated:** fine to medium sand; varied thickness; deposited by wind; active and stabilized areas; may contain northwest-southeast-trending linear and arcuate bi-directional dunes, and blowouts; derivedly from glaciofluvial and marine sediments.

COLLUVIAL DEPOSITS: variable composition from silty clay with fine sand to poorly sorted cobble diamicton; deposited by various downslope movement processes.

Cf — **Fan sediments:** silt, sand, and gravel; varied thickness; fans deposited by intermittent streams and gravity-induced movement; derived from colluviated marine sediments.

Cv — **Colluvial veneer:** silt, sand, and gravel to angular cobbles; generally less than 2 m thick; deposited by gravity-induced movement; forming scree and talus slope deposits along bedrock escarpments; may include marine sediments below limit of inundation; locally includes weathered bedrock.

Cb — **Colluvial blanket:** silt, sand, and gravel to angular cobbles; greater than 2 m thick; deposited by gravity-induced movement; forming scree and talus slope deposits along bedrock escarpments; may include marine sediments below limit of inundation; locally includes weathered bedrock.

ALLUVIAL SEDIMENTS: silt, sand, and gravel deposited by modern streams and rivers.

Ap — **Floodplain sediments:** silt, sand, and gravel; varied thickness; include inactive and seasonally flooded terrain along modern meandering streams and rivers; may be overlain by organics.

Af — **Fan sediments:** silt, sand, and gravel; varied thickness; forming a fan deposited by past and present intermittent streams; overlie marine sediments.

At — **Terraced sediments:** silt, sand, and gravel; 3 to 5 m or more thick; forming raised terraces above modern rivers; confined to valleys; surfaces may exhibit paleochannels and patterned ground; locally vegetated in coastal lowlands.

A — **Alluvial sediments, undifferentiated:** silt, sand, and gravel; deposits are generally stratified and moderately sorted; 1 to 5 m thick; may occur as floodplains and terraces.

L — **Lacustrine sediments, undifferentiated:** silt and sand; varied thickness; associated with small drained lakes in areas of marine blanket; may be vegetated.

MARINE SEDIMENTS: clay, silt, sand, and gravel; 1 to 15 m or more thick; deposited during marine regression, resulting in a coarsening-upward sequence; may include fine-grained glaciomarine sediments; may contain ground ice.

Mr — **Beach sediments:** sand to gravel, may contain cobbles; varied thickness; derived mainly from reworked glaciofluvial sediments; forming raised beach ridges and swales associated with falling sea levels, beginning with glaciomarine environments; may also include ice-wedge polygons and shingle beaches derived from exposed bedrock outcrops or colluvium.

Md — **Deltaic sediments:** silt, sand, and gravel; varied thickness; deposited by modern and late Holocene rivers draining into the sea; generally occur below 90 m elevation.

Mn — **Littoral sediments:** silt to sand with pebbles, may also consist of small cobbles and shingles; 1 to 3 m thick; nearshore sediments with undulating surfaces; in places, overlie fine-grained sediments; may contain ice-wedge polygons.

Mv — **Marine veneer:** undifferentiated sediment, consisting of a clay to sand matrix containing pebbles, cobbles, and boulders but predominantly silt and sand; less than 2 m thick; occurs as sediments infilling depressions between bedrock outcrops and as a lag on washed bedrock and till surfaces below marine limit.

Mb — **Marine blanket:** clay and silt with minor sand; 2 to 15 m or more thick; deposited in deep-water environments; generally heavily vegetated in coastal lowlands, and exhibiting solifluction stripes on moderate slopes; may contain segregated ice; may be gullied and exhibit retrogressive thaw flow slides and ice-wedge polygons in river valleys or on steep slopes; transitional to unit GMb at higher elevations (less than 200 m).

PLEISTOCENE (WISCONSIN GLACIATION)

PROGLACIAL AND GLACIAL ENVIRONMENT

GLACIOMARINE SEDIMENTS: silt to gravel and cobbles; deposited at or beyond a retreating ice front by meltwater entering the sea.

GMd — **Deltaic sediments:** sand to cobbles; massive to cross-stratified; up to 10 m or more thick; deposited in a deltaic environment; exhibit flat to gently sloping channelled surfaces; may exhibit kettle lakes, braided paleochannels, ice-wedge polygons, and beach ridges; may contain massive ground ice; elevations range from 180 to 210 m.

GMv — **Glaciomarine veneer:** undifferentiated sediment, consisting of a clay to sand matrix containing pebbles, cobbles, and boulders but predominantly silt and sand; less than 2 m thick; occurs as sediments infilling depressions between bedrock outcrops and as a lag on washed bedrock and till surfaces at and immediately below marine limit of 200 to 210 m elevation.

GMb — **Glaciomarine blanket:** clay to sand with minor gravel; greater than 2 m thick; deposited in deep-water environments; may contain segregated ice; may be gullied and exhibit retrogressive thaw flow slides and ice-wedge polygons in river valleys and on steep slopes; generally occurs between 150 and 200 m elevation.

GM — **Glaciomarine sediments, undifferentiated:** clay to gravel; varied thickness; deposited in various environments at or immediately below marine limit.

GLACIOLACUSTRINE SEDIMENTS: sediments deposited at or beyond a retreating ice front by meltwater entering a temporary glacier-dammed lake; may contain ground ice.

GLd — **Deltaic sediments:** sand, gravel, and cobbles; massive to cross-stratified; up to 20 m thick; flat to inclined surface may exhibit kettle lakes, braided paleochannels, ice-wedge polygons, and beach ridges; occur between 260 and 310 m elevation; may contain massive ground ice.

GL — **Glaciolacustrine sediments, undifferentiated:** silty clay to sand and gravel; stratification ranges from massive or cross-stratified to planar bedded; 1 to 10 m thick veneer to blanket; deposited into temporary glacier-dammed lakes; may exhibit channelled surfaces, ice-wedge polygons, and ground ice.

GLACIOFLUVIAL SEDIMENTS: sand, gravel, and minor silt; 1 to 20 m thick; deposited by meltwater flowing from, or in contact with, glacier ice; may contain ground ice.

GFp — **Outwash plain sediments:** sand and gravel; varied thickness; generally flat-topped; occur as a proglacial outwash plain, may include minor terraces and ice-contact sediments; surfaces may exhibit meltwater paleochannels.

GFc — **Ice-contact sediments:** sand to gravel; massive to cross-stratified; 2 to 20 m thick; deposited at or beyond the ice margin and subglacially; occur as hummocky terrain; may exhibit ice-wedge polygons and kettle lakes.

GFr — **Esker sediments:** silt, sand, and gravel; 1 to 20 m thick; forming ridges with both sharp-crested and flat-topped segments, mounds, and flanking aprons, within and outside of meltwater corridors; formed subglacially or in subaerially exposed ice-walled channels; may exhibit ice-wedge polygons and kettle lakes.

GF — **Glaciofluvial sediments, undifferentiated:** sand, gravel, and minor silt; 1 to 20 m thick; may occur as braided fans, outwash plains, and hummocky terrain; may contain massive ground ice.

GLACIAL ENVIRONMENT

GLACIAL SEDIMENTS (TILL): unsorted glacial debris, diamicton; deposited beneath, or along the margin of glacier as lodgment till, meltout till, and gravity-flow deposits; may be fossiliferous below marine limit; may contain ground ice.

Th — **Hummocky till:** diamicton; silt to sand matrix with pebbles, cobbles, and boulders; consisting of small to large hummocks, and minor rounded to irregular moraine ridges; may contain ground ice.

Tv — **Till veneer:** diamicton; silt to sand matrix with pebbles, cobbles, and boulders; less than 2 m thick; occurs as a discontinuous layer where rock structure is generally visible on airphotos, and as a lag on washed bedrock above marine limit; unit may include isolated bedrock outcrops, small pockets of hummocky and till blanket, and glaciofluvial sediments.

Tb — **Till blanket:** diamicton; silt to sand matrix with pebbles, cobbles, and boulders; 2 to 10 m thick; occurs preferentially on north-facing, lee-side slopes; surface commonly fluted by drumlinoids and crag-and-tails; may include pockets of till veneer.

PRE-QUATERNARY

R — **Bedrock, undifferentiated:** various igneous, metamorphic, and sedimentary lithologies; generally represented by extensive outcrop; surface may be glacially scoured or represent zones of washed, scoured bedrock within meltwater corridors or by marine wave action; may include pockets of marine, glaciofluvial, glaciomarine sediments, or till.

Stratigraphic relationship: two map-unit designators separated by a slash (/) are used where a stratigraphic relationship is observed or confidently inferred (e.g. Af/Mb indicates fan sediments overlying marine blanket).

- Thermokarst depression, small
- Patterned ground, ice-wedge polygons
- Dune crest
- Extensive gullied terrain
- Kettle, small
- Geological contact: *Defined*; *Approximate*
- Landslide: *Escarpment, active*; *Scar, small, direction known*
- Terrace scarp, escarpment
- Beach crest, trim line
- Marine limit of submergence
- Meltwater channel: *Minor subglacial or proglacial, paleocurrent direction unknown*; *Minor subglacial or proglacial, paleocurrent direction known*
- Major subglacial meltwater corridor margin
- Moraine ridge, minor
- Esker ridge: *Direction unknown*; *Direction known*; *With beach ridges, direction unknown*; *With beach ridges, direction known*
- Drumlinoid ridge: *Buried, 1 = older, 2 = younger*; *Large*
- Drumlin ridge, buried, 1 = older, 2 = younger
- Crag-and-tail ridge: *Buried, 2 = younger*; *Large, 1 = older, 2 = younger*
- Pre-crag ridge
- Fluted bedrock, roche moutonnée: *Poorly defined*; *Well defined, 1 = older, 2 = younger*
- Solifluction lobe, direction known
- Kame
- Striation: *Ice-flow direction unknown*; *Ice-flow direction known*
- Small outcrop
- 103 Station location, ground observation, stratigraphic section with number (see geodatabase)

Recommended citation

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CANADIAN GEOSCIENCE MAP 423

Geological Survey of Canada
Canadian Geoscience Maps

Canada

Author: D.E. Kerr

Geology by D.E. Kerr, based on airphoto interpretation in 2018 of 1:60 000 scale photos taken in 1955 and 1957, and limited fieldwork in 1986 and 1987; additional striations from Bird and Bird (1961), Kerr (1994), and unpublished field manuscript map by W. Blake Jr., 1962.

Geology conforms to Surficial Data Model v. 2.4.0 (Deblonde et al., 2019).

Geomatics by L. Robertson, S. Eagles, and J. Kingsley

Cartography by N. Côté

Scientific editing by L. Ewert

Initiative of the Geological Survey of Canada, conducted under the auspices of Natural Resources Canada's Climate Change Geoscience program.

Map projection Universal Transverse Mercator, zone 12
North American Datum 1983

RECONNAISSANCE SURFICIAL GEOLOGY
ARCTIC SOUND
Nunavut
NTS 76-N
1:125 000

2 0 2 4 6 8 10 km

Base map at the scale of 1:50 000 from Natural Resources Canada, with modifications
Elevations in metres above mean sea level

Mean magnetic declination 2022, 12°17'E, decreasing 7.4' annually
Readings vary from 13°17'E in the SW corner to 11°10'E in the NE corner of the map.

This map is not to be used for navigational purposes.

Title photograph: Glaciofluvial outwash plain and terraced sediments along the James River. Photo from the National Air Photo Library. NAPL photo A15690-43

The Geological Survey of Canada welcomes corrections or additional information from users. (gscpublications-cgcpublications@nrcan-rncan.gc.ca).

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/).

CANADIAN GEOSCIENCE MAP 423
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