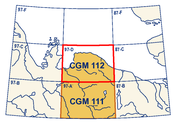
Abstract

The highest central regions of the Brock River map area were covered by active ice moving from the southeast, although exact ages of advance(s) are unknown. Deglaciation of parts of the high interior may have started in early Wisconsinan, and may have been free of active ice in middle Wisconsinan time or earlier. Evidence of ice-free conditions is limited. Fluctuating cover of thin ice, probably cold based, may have survived for extensive periods during the Wisconsinan. It disappeared in Late Wisconsinan, leaving widespread kames and ice-contact deposits overlying surficial sediments and bedrock. Till is widespread at all elevations. In the high interior, it is locally mixed with felsenmeer and isolated kames. Glaciofluvial deposits are concentrated along major river valleys. Postglacial fluvial erosion along the Brock River carved bedrock canyons up to 150 m deep. The upper Roscoe River is broad with sweeping meanders and terraces deeply incised into thick morainal deposits. Coastal regions have marine sediments associated with the postglacial sea.

Résumé

Les régions centrales les plus élevées de la région de la carte Brock River ont été recouvertes de glace active provenant du sud-est, mais on ne connaît pas l'âge exact des avancées. La déglaciation de certains secteurs des hautes régions intérieures et de la région sud-ouest pourrait avoir commencé au début du Wisconsinien, et il se peut que ces secteurs aient été dépourvus de glace active au milieu du Wisconsinien ou avant. Les preuves d'absence de glace sont limitées. Les fluctuations de glace mince, probablement à base froide, peuvent avoir persisté longtemps pendant le Wisconsinien. La glace est disparue pendant le Wisconsinien tardif, laissant des kames et des sédiments juxtaglaciaires sous lesquels se trouvent des sédiments de surface et le substratum rocheux. Le till est présent à toutes altitudes. Dans les hautes régions intérieures, le till est mélangé avec des blocs et des kames. Les dépôts fluvioglaciaires sont concentrés dans les grandes vallées fluviales. L'érosion fluviale postglaciaire le long de la rivière Brock a façonné des canyons de substratum rocheux dont la profondeur atteint 150 m par endroits. La partie amont de la rivière Roscoe compte de grands méandres et des terrasses encaissées dans d'épais dépôts morainiques. Dans les régions côtières, on trouve des sédiments marins associés à la mer postglaciaire.



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

Cover illustration
Diabase–gabbro sill showing a columnar structure and a flat, tabular, upper surface. Note the white horizontal bands of carbonate rocks near the base of the sill. This resistant rock controls the course of Brock River over long distances.
Photograph by J.J. Veillette. 2012-178

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CANADIAN GEOSCIENCE MAP 112

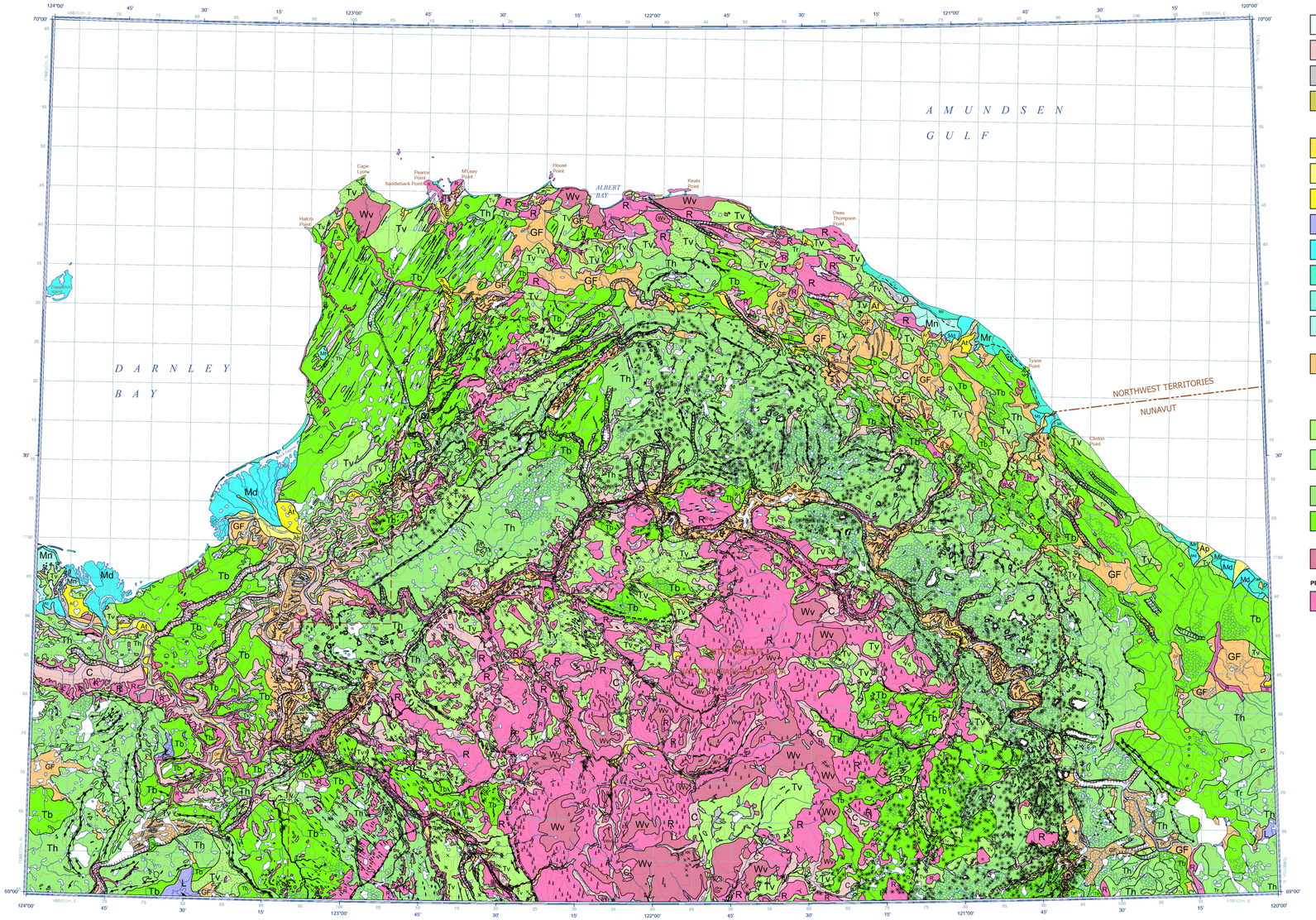
SURFICIAL GEOLOGY

BROCK RIVER

Northwest Territories – Nunavut

NTS 97-D

1:250 000



QUATERNARY

POST-LAST GLACIATION

- Icing, snowpack.
- C — **Colluvial deposits, undifferentiated:** silt, sand, gravel, cobbles, boulders, diamicton 1 to 10 m thick; loose materials that includes soliflucted sediments that thickens toward the base of the slope.
- O — **Organic deposits, undifferentiated:** peat, organic debris, 0.3 to 1 m thick; in shallow ponds, water-saturated vegetation, widespread on impervious, thick, fine-grained calcareous till overlain by granular kame deposits.
- E — **Eolian sediments, undifferentiated:** silt, sand, 1 to 10 m thick; eolian sediments and landforms occur as a distinctive terrain unit in upper Homaday River Valley; well-developed on low terraces and on floodplains at low water levels.

ALLUVIAL SEDIMENTS: stream-deposited materials related to the post-glacial drainage regime

- Af — **Fan sediments:** cobbles, boulders, coarse gravel, some sand, 1 to 15 m thick; fans occur mostly along major river valleys and abandoned meltwater channels.
- Ap — **Floodplain sediments:** sand, some gravel, organic debris, lag of boulders and cobbles due to ice-rafting, 1 to 10 m thick; form floodplains, eolian processes may be active at low water level.
- At — **Terraced sediments:** sand, gravel, 2 to 10 m thick; low terraces formed by river incision in postglacial time, the unit is transitional with higher terraces.
- L — **Lacustrine sediments, undifferentiated:** silt, sand, some clay, reworked till, less than 1 to 2 m thick.
- Md — **Marine deltaic sediments:** mainly sand, gravel and silt; variable thickness, active marine deltas.
- Mr — **Marine beach sediments:** sand and gravel, variable thickness, forming raised beaches and active bars.
- Mt — **Marine terraced sediments :** sand and gravel, variable thickness, raised terraces associated with postglacial uplift.
- Mn — **Marine nearshore sediments:** silt, sand, some clay; variable thickness, deposited in shallow water environments.

LAST GLACIATION (AND EARLIER?)

- GF — **Glaciofluvial sediments, undifferentiated:** gravel, cobbles, and sand, 5 to 50 m thick, forming ridges and broad terraces, materials deposited by meltwater, include proglacial outwash and late glacial fluvial terraces located above the present floodplains of major rivers.

GLACIAL SEDIMENTS (TILL): poorly sorted diamicton, deposited by former westward to northwestward ice in areas above 610 m asl, and by northward, northwestward and southwestward later ice at lower elevation; grain-size distribution reflects underlying lithology, sandy on clastic bedrock, silty and clayey on carbonate substrates

- Tv — **Till veneer:** boulders and gravel, less than 2-3 m thick; resting on bedrock and and derived from lodgment and ablation till, discontinous concentration resulting from washing out of fines by meltwater flow, surface mimics topography of underlying bedrock.
- Tr — **Ridged moraine:** sand, gravel, cobbles and boulders, poorly sorted, 2 to tens of metres thick, morainal and glaciofluvial sediments forming ridges and masses indicating proximity to the glacier during their formation; discontinuous patches of outwash of various shapes and conical kames, deposited near or within the glacier.
- Th — **Hummocky till:** lodgment or basal meltout till, 5 to tens of metres thick; possibly overlying thick glaciofluvial deposits over large areas; surface characterized by ridges, kettled topography, and large ice wedge polygons.
- Tb — **Till blanket:** lodgment or basal meltout till, 2 to 20 m thick; extensively fluted over large areas; masks underlying bedrock topography.

POST-LAST GLACIATION AND LAST GLACIATION (AND EARLIER?)

- Wv — **Regolith veneer:** diamicton, less than 2 m thick, derived predominantly from weathering of Proterozoic quartzite and carbonate bedrock, mixed with till locally, occurs on plateaux above 610 m asl, unit is transitional between till and bedrock.

PRE-QUATERNARY

- R — **Bedrock, undifferentiated:** Proterozoic shale, mudstone, dolomite, quartzite, sandstone, limestone, shale, gypsum and gabbro dykes and sills overlain by Paleozoic clastic, carbonate rocks and evaporites and Mesozoic shale, sandstone and limestone; felsenmeer cover is extensive on plateaux surfaces above 610 m asl.

- Washed scoured lag
- K — Kettle
- Geological contact, defined
- Limit of glaciation, approximate, (Late Wisconsin)
- Beach crest
- Terrace scarp, unspecified
- Terrace scarp, fluvial
- Partly buried channel scarp or filled valley
- Major meltwater channel, sense unknown
- Minor meltwater or abandoned channel, sense unknown
- Major moraine ridge
- Esker, sense known
- Esker ridge, unknown
- Minor moraine ridge
- Drumlin
- Drumlinoid
- Fluted bedrock, sense unknown
- Crag-and-tail
- Kame (not all kames are shown on map due to high density)
- Delta, postglacial
- Striation, sense known (1= oldest, 2 = youngest)
- Striation, sense unknown
- Outcrop
- Alluvial fan
- Patterned ground, small
- Felsenmeer
- Landslide scar

Reference
Klassen, R.W. 1971. Surficial geology, Franklin Bay and Brock River, District of Mackenzie, Northwest Territories, Geological Survey of Canada, Open File 48, 1:250 000 scale.

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Geology within Tuktut Nogait National Park based on aerial photograph interpretation and fieldwork by J.J. Veillette, 2001–2002, (Parks Canada Technical Report 04–01 Tuk); aerial photograph interpretations beyond Park boundaries by D.A. St-Onge, 2012, and minor additions and compilation by D.E. Kerr, 2012–2013. Coastal areas include geology from Klassen (1971).

Geomatics by Parks Canada, L. Robertson and C. Lai

Cartography by M. Kremer and F. Fortin

Joint initiative between the Geological Survey of Canada and Parks Canada, conducted under the auspices of the Tri Territorial Surficial Database Project as part of Natural Resources Canada's Geo-mapping for Energy and Minerals (GEM) program.

Map projection Universal Transverse Mercator, zone 10. North American Datum 1983

CANADIAN GEOSCIENCE MAP 112

SURFICIAL GEOLOGY

BROCK RIVER

Northwest Territories – Nunavut

NTS 97-D

1:250 000

5 0 5 10 15 20 km

Base maps at the scale of 1:250 000 and 1:1 000 000 from Natural Resources Canada, with modifications. Elevations in metres above mean sea level

Mean magnetic declination 2013, 24°02'E, decreasing 44' annually. Readings vary from 23°04'E in the SE corner to 24°48'E in the NW corner of the map.

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

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

This publication is available for free download through GEOSCAN (http://geoscan.ess.nrcan.gc.ca/).

Preliminary publications in this series have not been scientifically edited.

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