Natural Resources Canada   Ressources naturelles Canada

CANADIAN GEOSCIENCE MAP 213

SURFICIAL GEOLOGY

M'CLINTOCK INLET AREA

Nunavut

NTS 340-E and part of NTS 340-H

Map Information Document

Preliminary

Geological Survey of Canada
Canadian Geoscience Maps

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ABSTRACT

The Quttinirpaaq National Park region is mountainous including the highest peak in eastern North America. Glaciers cover about half of the map area, including unique floating ice shelves along the north coast, which have largely broken up in the last few decades but many fiord and valley glaciers still contact the sea. Sedimentary rock outcrops form the dominant surficial unit, including large areas of frost shattered rubble mantling broad summits and slopes. Glacial debris is also widespread normally forming a thin discontinuous veneer of till or as isolated erratic boulders. In the past, as now, the main source of run-off and sediment is supplied by glacial meltwater. Consequently most of the unconsolidated sediment lies within formerly glaciated valleys and

coastlines where there are complex associations of moraines, glaciofluvial and glaciomarine deposits related to the advance and retreat of valley glaciers and ice caps, coupled with falling sea levels caused by postglacial crustal uplift.

RÉSUMÉ

La région du Parc national du Canada Quttinirpaaq est une zone montagneuse, qui comprend le plus haut sommet de l'est de l'Amérique du Nord. Des glaciers couvrent environ la moitié de la région cartographique et comprennent, le long de la côte nord, d'exceptionnelles plates-formes de glace flottante. Ces glaciers se sont en grande partie disloqués au cours des dernières décennies, mais des glaciers de vallée et de fjord sont encore en contact avec la mer. Des affleurements de roches sédimentaires constituent l'unité de surface dominante, laquelle inclut de grandes étendues de blocaille résultant de la gélifraction de la roche qui couvrent les larges sommets et les versants. Des débris glaciaires sont également répandus, mais se présentent habituellement sous forme d'un mince placage de till discontinu ou de blocs erratiques isolés. À l'heure actuelle, comme dans le passé, les eaux de fonte glaciaire représentent la principale source de ruissellement et d'apport de sédiments. Ainsi, la plupart des sédiments non consolidés reposent au sein d'anciennes vallées glaciaires et le long de la côte, là où on trouve des associations complexes de moraines, de dépôts fluvioglaciaires et de dépôts glaciomarins associés à l'avancée et au retrait des glaciers de vallée et des calottes glaciaires, en combinaison avec la baisse du niveau de la mer causée par le relèvement postglaciaire de la croûte terrestre.

ABOUT THE MAP

General Information

Author: J.M. Bednarski

Geology based on aerial photograph interpretation and field work by J.M. Bednarski in 1979 to 1988. Additional geological field data by R.L. Christie in 1954, 1957, 1958 and D.S. Lemmen in 1988.

Geological compilation by D.E. Kerr, 2013–2014

Geology conforms to Surficial Data Model v. 2.0

Data conversion by F. Fortin, 2013 and S. Eagles, 2013, 2014

Geomatics by F. Fortin

Cartography by G.S. Hanna

Initiative of the Geological Survey of Canada as part of Natural Resources Canada's Geo-mapping for Energy and Minerals (GEM) Program, with participation from Parks Canada Agency – Nunavut Field Unit.

Map projection Universal Transverse Mercator, zone 18.
North American Datum 1983

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

Proximity to the North Magnetic Pole causes the magnetic compass to be useless in this area.

This map is not to be used for navigational purposes.

Title photograph: Glacial sediments in valley, Marvin Peninsula, Ellesmere Island, Nunavut. Photograph by J.M. Bednarski. 2013-085

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.
Additional references are included in the map information document.

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

Preliminary publications in this series have not been scientifically edited.

Map Viewing Files

The published map is distributed as a Portable Document File (PDF), and may contain a subset of the overall geological data for legibility reasons at the publication scale.

ABOUT THE GEOLOGY

Notes on Classification

The 1:250 000 scale map of Quttinirpaaq National Park of Canada is based on information compiled from aerial photographs of a scale of approximately 1:64 000. This represents a fourfold reduction in scale which necessitated some generalization and combining of units. The reduction process involved an intermediate step of plotting the information on base maps of 1:125 000 scale. Plotting and scale reduction was accomplished with a projection table on which corrections for distortion could be made.

The most substantial amalgamation was for glaciofluvial sediments (unit GF). These deposits are commonly concentrated in narrow valleys were they form terraces (unit GFt), active outwash plains (unit GFp), outwash fans (unit GFf), and combinations of the three. Except where large terraces are found (unit GFt), some of these units were combined on the final map. Melting and undercutting of permafrost in these sediments produces thermokarst and slumping.

The 1:250 000 scale map also includes the amalgamation of bedrock units: weathered bedrock (felsenmeer; unit W) and unaltered bedrock (unit R). Different tills were also amalgamated. On slopes, both R and T units were transported downslope by periglacial processes (e.g. C units).

The glacier cover on the topographic base map is generalized and not very accurate in some areas, therefore, minor supraglacial features interpreted on the airphotos were not retained on the final map.

During the scale reduction process the units become progressively more generalized as the boundaries between adjacent units become smoothed out. This means that actual delineations on the airphotos, are not entirely 'real' on the final map. Nonetheless, an attempt was made to maintain the character of the original landscape.

Ice shelves mapped along the north coast were originally included as a basic unit, but large changes have occurred along the margins in recent years which may make some of the delineations on the airphotos taken in the late 1950's inaccurate. Due to this difficulty, the ice shelf designation represents generalized polygons based on extent of glaciers between 1959 and 2011; data vary locally depending on date of glacier ice coverage. Some valley glaciers were also classed as Isn when they float in deep fiords and display ice shelf morphology.

Additional Geological data from:

Bednarski, J.M., 1984. Glacier fluctuations and sea level history of Clements Markham Inlet, northern Ellesmere Island; Ph.D. Thesis, University of Alberta, 232 p.

Christie, R.L., 1967. Reconnaissance of the surficial geology of northeastern Ellesmere Island, Arctic Archipelago; Geological Survey of Canada, Bulletin 138, 50 p.

England, J., 1974. The glacial geology of northeastern Ellesmere Island, N.W.T., Canada; Ph.D. Thesis, University of Colorado, 234 p.

England, J., 1978. The glacial geology of northeastern Ellesmere Island, N.W.T., Canada; Canadian Journal of Earth Sciences, vol. 15, p. 603-617.

Hattersley-Smith, G. and Long, A., 1967. Postglacial uplift at Tanquary Fiord, northern Ellesmere Island, Northwest Territories; Arctic, vol. 20, p. 255–260.

Lemmen, D.S., 1988. The glacial history of Marvin Peninsula, northern Ellesmere Island and Ward Hunt Island, High Arctic, Canada; Ph.D. Thesis, University of Alberta, 176 p.

Retelle, M., 1986. Glacial geology and Quaternary marine stratigraphy of the Robeson Channel area, northeastern Ellesmere Island, Northwest Territories; Canadian Journal of Earth Sciences, vol. 23, p. 1001–1012.

References and select ice flow data

Christie, R.L., 1966. Surficial geology, northeastern Ellesmere Island, District of Franklin and northwestern Greenland; Geological Survey of Canada, Map 1192A, scale 1:506 880. doi:10.4095/107408

Deblonde, C., Plouffe, A., Eagles, S., Everett, D., Huntley, D.H., Inglis, E., Kerr, D.E., Moore, A., Parent, M., Robertson, L., Smith, I.R., St-Onge, D.A., and Weatherston, A., 2014. Science language for an integrated Geological Survey of Canada data model for surficial geology maps, version 2.0; Geological Survey of Canada, Open File 7631, 464 p. doi:10.4095/294225

Author Contact

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Coordinate System

Projection: Universal Transverse Mercator
Units: metres
Zone: 17 and 18
Horizontal Datum: NAD83
Vertical Datum: mean sea level

Bounding Coordinates

Western longitude: 80°00’00”W
Eastern longitude: 72°00’00”W
Northern latitude: 83°15’00”N
Southern latitude: 82°00’00”N

Data Model Information

Surficial

The Geological Survey of Canada (GSC) through the Geomapping for Energy and Minerals Program (GEM) has undertaken the Geological Map Flow to develop protocols for the collection, management (compilation, interpretation), and dissemination of surficial and bedrock geology data and map information. To this end, a data model has been created.

The Surficial Data Model (SDM) was designed using ESRI geodatabase architecture. The XML workspace document provided can be imported into a geodatabase, and the geodatabase will then be populated with the feature datasets, feature classes, tables, relationship classes, subtypes and domains.

Shapefile and table (.dbf) versions of the data are included within the data. Column names have been simplified and the text values have been maintained within the shapefile attributes. The direction columns are numerical, to display rotation for points, and the symbol fields will hold the correct values to be matched to the appropriate style file.

For a more in depth description of the data model please refer to the official publication:

Deblonde, C., Plouffe, A., Eagles, S., Everett, D., Huntley, D.H., Inglis, E., Kerr, D.E., Moore, A., Parent, M., Robertson, L., Smith, I.R., St-Onge, D.A., and Weatherston, A., 2014. Science language for an integrated Geological Survey of Canada data model for surficial geology maps, version 2.0; Geological Survey of Canada, Open File 7631, 464 p. doi:10.4095/294225

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