Natural Resources Canada
Ressources naturelles Canada

CANADIAN GEOSCIENCE MAP 72

BEDROCK GEOLOGY

MOUNT HARE

Yukon
NTS 116-I/9

Map Information Document

Geological Survey of Canada
Canadian Geoscience Maps

2021

Canada

MAP NUMBER

Natural Resources Canada, Geological Survey of Canada
Canadian Geoscience Map 72

TITLE

Bedrock geology, Mount Hare, Yukon, NTS 116-I/9

SCALE

1:50 000

CATALOGUE INFORMATION

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RECOMMENDED CITATION

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ABSTRACT

The Mount Hare map area extends across the western limb of the Richardson anticlinorium in the southern Richardson Mountains, northern Yukon. It is underlain by four Paleozoic sedimentary successions: middle Cambrian Slats Creek Formation,

middle Cambrian to Early Devonian Road River Group, Devonian Canol Formation, and Late Devonian to Carboniferous Imperial and Tuttle formations. The Richardson trough depositional setting of the first three successions is succeeded by a deep-marine, turbiditic Ellesmerian orogenic foredeep setting for the Imperial-Tuttle succession. The carbonate-dominated Road River Group defines a west-dipping homocline which is transected by oblique transverse faults in its upper part. In the overlying Imperial-Tuttle succession, map-scale folds can be defined where shales are interbedded with thick persistent sandstone units. The structural geometry reflects Cretaceous-Cenozoic regional Cordilleran tectonism.

RÉSUMÉ

La région cartographique de Mount Hare s'étend au flanc ouest de l'anticlinorium de Richardson, dans la partie sud des monts Richardson (nord du Yukon). Quatre successions sédimentaires du Paléozoïque forment son sous-sol : la Formation de Slats Creek du Cambrien moyen, le Groupe de Road River du Cambrien-Dévonien précoce, la Formation de Canol du Dévonien et les formations d'Imperial et de Tuttle du Dévonien tardif-Carbonifère. Au cadre sédimentaire de la cuvette de Richardson dans lequel se sont mises en place les trois premières successions sédimentaires a succédé le cadre de milieu marin profond à dépôt turbiditique de l'avant-fosse de l'orogenèse ellesmérienne dans lequel s'est déposée la succession d'Imperial-Tuttle. Le Groupe de Road River, à prédominance de roches carbonatées, définit un homoclinal à pendage ouest, qui est recoupé dans sa partie supérieure par des failles transversales obliques. Dans la succession d'Imperial-Tuttle, des plis à l'échelle de la carte peuvent être définis là où d'épaisses et persistantes unités de grès sont interstratifiées dans les shales. La géométrie structurale est un reflet du tectonisme régional de la Cordillère au Crétacé tardif-Cénozoïque.

LICENCE AGREEMENT

ACCORD DE LICENCE

SHEET 1 OF 1, BEDROCK GEOLOGY

GENERAL INFORMATION

Authors: L.S. Lane and M.P. Cecile

Geology by D.K. Norris, 1962 to 1984; M.P. Cecile, 1982; L.S. Lane, 2006 to 2010; T.L. Allen, 2006 to 2010. Compilations using airphoto and satellite imagery by L.S. Lane and M.P. Cecile, 2009 to 2019.

Geology conforms to Bedrock Data Model v. 4.0

Cartography by L.S. Lane, C. Deblonde, and K. Rentmeister

Scientific editing by A. Weatherston

Initiative of the Geological Survey of Canada, conducted under the auspices of the Yukon Sedimentary Basins project as part of Natural Resources Canada's Geo-mapping for Energy and Minerals (GEM) program

Map projection Universal Transverse Mercator, zone 8
North American Datum 1983

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

Magnetic declination 2021, 20°00'E, decreasing 20.2' annually

This map is not to be used for navigational purposes.

The Geological Survey of Canada welcomes corrections or additional information from users (nrcan.gscinfo-infocgc.rncan@canada.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/).

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.

Definition Queries Used on Map

This map utilizes definition queries in order to customize the display for visualization on the PDF of the map only and does not affect the digital data. The following features have a definition query applied:

- Linear
- Planar
- Stations
- Fossils
- Folds
- Contacts
- Traces

DESCRIPTIVE NOTES

The Mount Hare 1:50 000 scale map area lies within the Eagle River 1:250 000 scale map area (Norris, 1981). Targeted fieldwork augmented by new biostratigraphy and airphoto analysis has refined the map distribution of stratigraphic units and clarified the location and significance of major structures. Mount Hare map area is dominated by four Paleozoic successions: the middle Cambrian Slats Creek Formation, the middle Cambrian to Devonian, carbonate-dominated Road River Group, the regionally persistent but thin Canol Formation, and the Late Devonian and Carboniferous Imperial and Tuttle Formations. The Road River Group is subdivided into four formations (Cecile et al., 1982; Cecile et al., in press). They comprise, in ascending order, the Cronin Formation (Cambrian and Ordovician carbonate units), the Mount Hare Formation (Ordovician and Silurian cherts and graptolitic shales), the Tetlit Formation (Silurian argillite and dolostone), and the Vittrekwa Formation (Silurian and Devonian graptolitic dark shale and limestone). Here we further subdivide the Cronin Formation by distinguishing a less resistant, shalier lower member (Cambrian shale unit of Cecile et al., 1982) from the thicker, more resistant, carbonate-dominated upper member. Also, a recessive, shale- and siltstone-dominated upper member of the Slats Creek Formation is provisionally distinguished (Cecile et al., 1982). The lower and middle members of the Late Devonian Imperial Formation can be distinguished, and together they occupy much of the western half of the map area. The poorly exposed lower member consists of dark grey shale and siltstone, with thin locally developed fine sandstone beds. In contrast, the middle member contains abundant resistant sandstone intervals that can be traced for several kilometres and which outline local structures. The upper member of the Imperial Formation and the Devonian and Carboniferous Tuttle Formation are locally preserved in the footwall of the Deception Fault along the western edge of the map area. The Imperial Formation was deposited as a southward-prograding turbiditic succession eroded from the Ellesmerian Orogen, the front of which lies within 15 km north of the map area (Lane, 2017).

The map extends across the western limb of the Richardson anticlinorium. Significant map-scale folding is uncommon below the interlayered sandstone-shale succession of the Imperial Formation middle member. The lower Paleozoic successions form a west-dipping homocline across much of the map area. The Cronin Formation, a thick-bedded carbonate succession, dominates the map area in the north but its outcrop trace thins southward, due to generally steeper dips in the south. A set of northeast-striking faults occurs predominantly in the Mount Hare to Canol part of the section. Most of the faults have dextral strike-separations of bedding, but their kinematics are unstudied. Two easterly striking faults show sinistral strike-separations. At the south margin of the map is a complex west- to northwesterly striking fault bundle with subsidiary folds, all of which occur in the Silurian-Devonian part of the succession, adjacent to the northern tip of the Mount Raymond Fault which projects into Hare River from the adjacent Mount Raymond map area to the south (Lane, 2020). This bundle of structures may be kinematically linked to the northern tip of the Mount Raymond Fault. The structural complexity there is undoubtedly greater than shown, due to poor outcrop quality. Although the orientations and kinematics of the various transverse faults were not studied for this project, they might be a useful target for future analysis. Two north-striking steep reverse faults also project into the map area from the south (Norris, 1981; Lane, 2020). However, they appear to die out within 5 km of the southern boundary.

The map-scale structures dominating the map area are products of Cretaceous-Cenozoic regional orogenesis (Lane, 1998).

ACKNOWLEDGMENTS

This map is a product of the Geo-mapping for Energy and Minerals (GEM) Program, 2009–2013. The final compilation of the map benefitted from additional outcrop information at various localities by T.L. Allen, D.A. Huntley, and K.M. Bell. Also, archival outcrop and aerial-observation data collected during Operation Porcupine (1962–1982) have been incorporated into the compilation and are included in the GIS database. Able field assistance was provided by University of Calgary students Mike McQuilkin in 2009, and Adam Hayman and Kimberley Bell in 2010; and by Vuntut Gwich'in First Nation participants Shawn Bruce and Douglas Frost in 2009, and Myranda Charlie, and Yudii Mercredi in 2010. Helicopter support in 2009 was provided by Fireweed Helicopters, Dawson; and in 2010 by Gwich'in Helicopters, Inuvik.

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Norris, D.K., 1981. Geology, Eagle River, Yukon Territory; Geological Survey of Canada, Map 1523A, scale 1:250 000. https://doi.org/10.4095/109352

ADDITIONAL INFORMATION

The Additional Information folder of this product's digital download contains figures and tables that appear in the map surround as well as additional geological information not depicted on the map, nor this document, nor the geodatabase.
-PDF of each figure/table that appears in the CGM surround.
-Excel file of the Master Legend Table (legend symbols, descriptions, headings, etc.).

AUTHOR CONTACT

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COORDINATE SYSTEM

Projection: Universal Transverse Mercator
Units: metres
Zone: 8
Horizontal Datum: NAD83
Vertical Datum: mean sea level

BOUNDING COORDINATES

Western longitude: 136°30'00"W
Eastern longitude: 136°00'00"W
Northern latitude: 66°45'00"N
Southern latitude: 66°30'00"N

SOFTWARE VERSION

Data has been originally compiled and formatted for use with ArcGIS™ desktop version 10.7.1 developed by ESRI®.

DATA MODEL INFORMATION

Bedrock (Calgary)

Surface bedrock data are organized into feature classes and themes consistent with logical groupings of geological features. All field observation point data are related through the Station_ID property of the Station theme. These feature attribute names and definitions are identical in the shapefiles and the XML files.

Consult PDFs in Data folder for complete description of the feature classes, feature attributes, and attribute domains.

The Bedrock Data Model and the Bedrock Domains documents are intended to describe all bedrock features which may be compiled at the 1:50 000 scale. Therefore, some of the feature classes and feature attributes described in these documents may not be present.