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CANADIAN GEOSCIENCE MAP 320

SURFICIAL GEOLOGY

NIMBUS MOUNTAIN AND CLORE RIVER CANYON

Kitimat–Morice River corridor, British Columbia
parts of NTS 103-I/1, 93-L/4 and 5



**Map Information
Document**

**Geological Survey of Canada
Canadian Geoscience Maps**

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TITLE

Surficial geology, Nimbus Mountain and Clore River canyon, Kitimat–Morice River corridor, British Columbia, parts of NTS 103-I/1, 93-L/4 and 5

SCALE

1:25 000

CATALOGUE INFORMATION

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ABSTRACT

The 105 km long Kitimat–Morice River corridor features mostly interconnecting valleys linking the coastal community of Kitimat in northwestern British Columbia with the interior valley system of Morice River. The Nimbus Mountain and Clore River canyon map area covers a distance of about 22 km from the headwaters of Hoult Creek, across Nimbus Mountain, and then following sections of Clore River valley to just past its confluence with Burnie River. Mapping of surficial sediments, compilation of landslide deposits, and preliminary interpretation of bedrock types were primarily carried out using 1:20 000 British Columbia government aerial photographs dated from 2001 (west half of corridor in NTS 103-I) and 2013 (east half of corridor in NTS 93-L). Older, field-based mapping by the authors in some parts of the study area was incorporated into this mapping, complemented with additional reconnaissance-level field observation in 2016.

RÉSUMÉ

Le corridor Kitimat-rivière Morice, d'une longueur de 105 km, comprend principalement des vallées interconnectées reliant la communauté côtière de Kitimat, dans le nord-ouest de la Colombie-Britannique, au système intérieur de la vallée de la rivière Morice. La région cartographique de Nimbus Mountain and Clore River canyon couvre une distance d'environ 22 km à partir de la confluence des rivières Clore et Burnie, en remontant des sections de la vallée de la rivière Clore, pour se terminer à la source du ruisseau Hoult, de l'autre côté du mont Nimbus. La cartographie des sédiments de surface, la compilation des dépôts de glissements de terrain et l'interprétation préliminaire des types de substratum rocheux ont principalement été réalisées à partir de photos aériennes à l'échelle 1/20 000 du gouvernement de la Colombie-Britannique datées de 2001 (moitié ouest du corridor dans SNRC 103-I) et de 2013 (moitié est du corridor dans SNRC 93-L). Les résultats d'une cartographie antérieure réalisée sur le terrain par les auteurs dans certaines parties de la zone d'étude ont été intégrés à la présente cartographie, qui a été complétée par des observations de terrain d'un levé de reconnaissance en 2016.

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SHEET 1 OF 1, SURFICIAL GEOLOGY

GENERAL INFORMATION

Authors: D.E. Maynard, I.C. Weiland, and A. Blais-Stevens

Geology by D.E. Maynard (Denny Maynard & Associates Ltd.), I.C. Weiland (Consultant in Terrain Sciences), and A. Blais-Stevens (Geological Survey of Canada), 2016

Geology conforms to Surficial Data Model v. 2.3.0 (Deblonde et al., 2017).

Geomatics and cartography by W. Chow, M. Tougas, and C.L. Wagner

Scientific editing by E. Inglis

Joint initiative of the Geological Survey of Canada and the Program of Energy Research and Development (PERD 1D00.006) as part of the Public Safety Geoscience Program

Map projection Universal Transverse Mercator, zone 9
North American Datum 1983

Base map at the scale of 1:50 000 from Natural Resources Canada, with modifications

Contour lines generated from Canadian Digital Elevation Model (CDEM) supplied by Natural Resources Canada.

Elevations in metres above mean sea level

Shaded-relief image derived from the Canadian Digital Elevation Model (CDEM) supplied by Natural Resources Canada

Illumination: azimuth 315°, altitude 45°, vertical factor 1x

Magnetic declination 2019, 17°40'E, decreasing 13.4' annually

This map is not to be used for navigational purposes.

Title photograph: Southeasterly view of the headwaters of Hoult Creek and Nimbus Mountain, Kitimat–Morice corridor, northeast of Kitimat, British Columbia. Photograph by D. Maynard. 2017-101

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

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.

CARTOGRAPHIC REPRESENTATIONS USED ON MAP

This map utilizes ESRI Cartographic Representations in order to customize the display of standard GSC symbols for visual clarity on the PDF of the map only. The digital data still contains the original symbol from the standard GSC symbol set. The following legend features have Cartographic Representations applied:

GEM_LINES

- Landslide track, sediment transport direction
- Meltwater channel
- Moraine ridge

DESCRIPTIVE NOTES

This map presents the surficial geology and landslide inventory covering the headwaters of Hoult Creek, across Nimbus Mountain, and following sections of the main valleys and tributaries of Clore and Burnie rivers. The mapped area extends for a distance of about 22 km. The topography mainly features relatively narrow valleys confined by moderate to steep side slopes, and includes the alpine area around Nimbus Mountain and the very steeply entrenched canyon of Clore River. The highest elevation in this map area is 2280 m southeast of Nimbus Mountain. Surficial geology compilation was carried out following the Geological Survey of Canada Surficial Data Model (Deblonde et al., 2017) combined with the British Columbia Terrain Classification System (Howes and Kenk, 1997). The map is one of five surficial geology maps that cover the corridor from Kitimat, British Columbia at the head of Douglas Channel to the Morice River area at the western edge of the Interior Plateau.

The main objective of the surficial geology compilation is to provide baseline information on surface sediments and slope processes for stakeholders and decision-makers. In addition to the surficial geology, the authors have compiled information about landslides that were observed in the map area (Table 1).

The surficial geology consists of colluvium- and bedrock-dominated ridge crests, and valley slopes with valley floors and lower slopes mantled by thin to relatively thick

deposits of mainly till and glaciofluvial sediments. Bedrock-dominated terrain predominates the area around Nimbus Mountain, and along the ridge and scarp bordering the canyon area of Clore River. Small alpine glaciers remain on Nimbus Mountain, bordered by small, neoglacial moraines. In places along the valley floors, modern alluvial fans, terraces, and floodplains, and colluvial fans are superimposed on the older glacial and deglacial deposits.

The bedrock polygons have been labelled R2, indicating dominantly hard, unaltered igneous rocks (granitic, gneissic, and volcanic) and R, indicating an apparently softer and highly altered and fractured bedrock, likely consisting mainly of clastic volcanic, based on available bedrock geology maps (MacIntyre et al., 1994). The latter rock type occurs along the canyon of Clore River and on the ridge to its south.

Interpretation of landslides was carried out using Cruden and Varnes' (1996) classification. Mapped landslide deposits and landslide tracks without mappable deposits were compiled in Table 1. A variety of mapped landslide deposits are scattered throughout this map area. On sections of the valley walls, there are areas of undifferentiated landslide debris (unit Cz) and active talus slopes (unit Ca) that occur beneath rockfall-prone bedrock cliffs. Some toe-slope sites also have larger accumulations of talus (unit Ca), as well as deposits from smaller, shallow-seated translational landslides (unit Cz5). Valley-floor and gentler toe-slope areas below steep-gradient gullies, are common sites for colluvial fan deposits, both generally inactive fans (unit Cf) and those subject to recent and/or recurrent debris-flow activity (units Cz2 and Cf.Cz2). Relict rock-avalanche deposits (unit Cz1) are mapped in a couple of places along the floors of Clore River tributaries. Other colluvial units (e.g. Cv = colluvial veneer, Cb = colluvial blanket, C = undifferentiated colluvium) were included in Table 1 because they commonly contain small, unmappable areas of landslide deposits associated with small, shallow-seated translational slides. These slides are depicted on the map with arrows and include debris slides and flows consisting predominantly of mineral material, small rockslide and rockfalls, and/or a combination of these.

Terrain stability mapping was also carried out for the map area following the method described by British Columbia Ministry of Forests (1999) for the Forest Practices Code of British Columbia. Although this method was developed for the forestry sector, it has been used in assessing terrain stability for environmental assessments for resource development projects, such as mining and wind farms in British Columbia and Yukon. Terrain stability mapping is intended to qualitatively highlight the potential landslide sources based on slope gradient, surficial materials, material texture, material thickness, slope morphology, moisture conditions, and ongoing geomorphic processes (British Columbia Ministry of Forests, 1999). Terrain polygons were rated as stable to unstable (Class I–V, respectively) and colour coded from green to red, respectively (Fig. 1). In some cases, two adjacent surficial geology polygons have the same map label, e.g. unit Cv. They were not joined as a single polygon because the two units were rated differently in terms of terrain stability. The reader has the option to generate a terrain stability map from the downloadable data set associated with this map area.

ACKNOWLEDGMENTS

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Wagner are thanked for digitizing the interpreted polygons, generating the inset map, and compilation of landslides.

REFERENCES

British Columbia Ministry of Forests, 1999. Mapping and assessing terrain stability guidebook; Forest Practices Code of British Columbia, Victoria, British Columbia (2nd edition), 43 p.

Cruden, D.M. and Varnes, D.J., 1996. Landslide types and processes; in Landslides: Investigation and Mitigation, (ed.) A.K. Turner and L.R. Schuster; Transportation Research Board, National Academy of Sciences, Special Report 247, p. 36–75.

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<https://doi.org/10.4095/308178>

Howes, D.E. and Kenk, E., 1997. Terrain Classification System for British Columbia (Version 2); British Columbia Ministry of Environment, Recreational Fisheries Branch, and British Columbia Ministry of Crown Lands, Surveys and Resource Mapping Branch, Victoria, British Columbia, 112 p.

MacIntyre, D.G., Ash, C.H., and Britton, J.M., 1994. Geological compilation, Skeena-Nass Area, west central British Columbia (NTS 93 E, L, M; 94D; 103 G, H, I, J, O, P; 104 A, B); B.C. Ministry of Energy, Mines and Petroleum Resources, Open File 1994-14, scale 1:250 000.

ADDITIONAL INFORMATION

The Additional Information folder of this product's digital download contains 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 Figure 1 and Table 1.
- Excel table relating to Figure 1 of this publication. Refer to the descriptive notes for further details.

AUTHOR CONTACT

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COORDINATE SYSTEM

Projection: Universal Transverse Mercator

Units: metres

Zone: 9

Horizontal Datum: NAD83

Vertical Datum: mean sea level

BOUNDING COORDINATES

Western longitude: 128°04'00"W

Eastern longitude: 127°45'00"W

Northern latitude: 54°16'40"N

Southern latitude: 54°06'40"N

SOFTWARE VERSION

Data has been originally compiled and formatted for use with ArcGIS™ desktop version 10.2.2 developed by ESRI®.

DATA MODEL INFORMATION

Surficial

The Geological Survey of Canada (GSC) through the Geo-mapping 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., 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., 2017. Surficial Data Model, version 2.3.0: revisions to the science language of the integrated Geological Survey of Canada data model for surficial geology maps; Geological Survey of Canada, Open File 8236, 1 .zip file.
<https://doi.org/10.4095/302717>