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Abstract

This new surficial geology map product represents the conversion of the western map of Open File 501 (Edlund and Hodgson, 1978) and its legend only, using the Geological Survey of Canada's Surficial Data Model (SDM version 2.3.14) (Deblonde et al., 2018). All geoscience knowledge and information from the western map of Open File 501 that conformed to the current SDM were maintained during the conversion process. Supplementary, limited legacy information was added to complement the converted geoscience data. This consists of unpublished field data from D.A. Hodgson (1972–1974). It is identified in the accompanying geodatabase. The purpose of converting legacy map data to a common science language and common legend is to enable and facilitate the efficient digital compilation, interpretation, management, and dissemination of geological map information in a structured and consistent manner. This provides an effective knowledge-management tool designed around a geodatabase that can expand following the type of information to appear on new surficial geology maps.

Résumé

Ce nouveau produit cartographique de la géologie des formations superficielles correspond à la conversion de la carte Ouest du Dossier public 501 (Edlund et Hodgson, 1978) et de sa légende uniquement, en se servant du Modèle de données pour les formations superficielles (MDFS version 2.3.14) de la Commission géologique du Canada (Deblonde et al., 2018). Toutes les connaissances et l'information de nature géoscientifique de la carte Ouest du Dossier public 501 qui sont en conformité avec le modèle de données ont été conservées pendant le processus de conversion. Une quantité limitée de données existantes a été ajoutée en complément aux données géoscientifiques converties. Il s'agit de données de terrain inédites de D.A. Hodgson (1972–1974). Ces données sont identifiées dans la géodatabase de la carte. Le but de la conversion de cartes publiées antérieurement suivant un langage scientifique commun et une légende commune est de permettre et de faciliter la compilation, l'interprétation, la gestion et la diffusion efficaces de l'information géologique cartographique en mode numérique de façon structurée et cohérente. Cette façon de faire offre un outil efficace de gestion des connaissances élaboré à l'aide d'une géodatabase qui pourra évoluer suivant le type d'information à paraître sur les nouvelles cartes de la géologie des formations superficielles.

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

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CANADIAN GEOSCIENCE MAP 392

SURFICIAL GEOLOGY

WESTERN FOSHEIM PENINSULA AND EASTERN AXEL HEIBERG ISLAND

Nunavut

NTS 49-G and 340-B southwest

1:125 000

QUATERNARY

HOLOCENE

GLACIAL ENVIRONMENT

I — **Glaciers, ice caps:** perennial ice; variable thickness; extent based on interpretations of airphotos from 1959.

NONGLACIAL ENVIRONMENT

Ov — **Organic veneer:** accumulated deposits of plant material and peat; commonly 0.5 m thick; however peat, sand, and silt deposits greater than 10 m thick have been noted in some minor stream valleys; some organic material dating from mid-Holocene (climatic optimum) period; less extensive organic deposits may occur in other map units.

E — **Eolian sediments, undifferentiated:** sand or coarse silt; variable thickness; wind-blown material on, and adjacent to, poorly vegetated fluvial sediments; mapped only when eolian landforms evident, mainly ripple marks and low dunes less than 1 m high; unstructured deposition possibly much more widespread; there is sporadic evidence of eolian erosion, shallow blowouts, planed ice-warped sediments, and residual pillars, on unconsolidated sandy members of Mesozoic formations, especially below the marine limit, and on sediments of the Sldre River Fill (unit U); these areas are not identified on the map.

COLLUVIAL DEPOSITS

Cf — **Fan sediments:** boulders to sand or fines, heterogeneous mixture; mix of sediment sizes is dependent on how the source rocks weathered; variable thickness; fan or cone-shaped deposit of terrestrial sediments on steep slopes, with apex of fans commonly inclined at angle of repose of material (30° to 40°); intervening areas commonly fresh to highly weathered bedrock; fans may coalesce on lower segments of slopes to form a continuous apron; material is transported to and down the fan by rockfall, avalanche, solifluction, and creep; fluvial processes may be involved, and fluvial and colluvial fans may overlap; also includes areas of long (to 100 m) downslope-oriented solifluction lobes.

C — **Colluvial deposits, undifferentiated:** boulders to sand or fines, heterogeneous mixture; mix of sediment sizes is dependent on how the source rocks weathered; variable thickness; material displaced or altered by mass-wasting processes to such a degree that it differs in composition and/or structure from subjacent or adjoining source materials; dominant mass-wasting process is solifluction, chiefly active during brief (1 to 3 weeks) snowmelt period, and also closely spaced (1 to 2 m) seepage lines, associated with sorted and nonsorted stripes, particularly on fine- to medium-grained materials; solifluction lobes common on inclined surfaces of coarse-textured unconsolidated sediments; from the widespread occurrence of ice-wedge troughs, it appears that solifluction is currently a relatively slow-acting process.

ALLUVIAL SEDIMENTS

Ap — **Floodplain sediments:** gravel, sand, and silt; greater than 2 m thick; fluvial valley flat liable to stream flooding; includes active and inactive stream-channel zones and floodplains; there are normally one or two main channels; where the valley flat is broad, a secondary network of braided stream channels contains the excess discharge during snowmelt or following heavy or extended rainfall; a fluvial plain will only partially reflect the material through which a stream is passing, as the coarser fraction in the bed load is emphasized; the bed load frequently includes coarse material derived from an upstream source.

Af — **Fan sediments:** boulders to sand and silt; greater than 2 m thick; fan or cone-shaped deposit of stream sediments on land, usually at a point where the gradient abruptly decreases; composed of heterogeneous mixture of materials from upstream, although with a tendency for grading from coarser to finer from apex to toe; much of the fan surface is normally inactive, although the one or more active channels are liable to rapid lateral shifts when discharge is high.

At — **Terraced sediments:** gravel, sand, and silt; greater than 2 m thick; coarse surface deposits may be underlain by fine-grained (and ice-rich) deltaic sediments deposited when sea level was higher; inactive fluvially worked surface is at higher elevation than laterally adjacent active zone, and usually separated from it by a bluff 1 to 10 m high; surface morphology and materials similar to adjacent active zone (*see* unit Ap), apart from channels which commonly have silt and/or peat infill.

A — **Alluvial sediments, undifferentiated:** gravel, sand, and silt; variable thickness; may include floodplain, fan, or terraced sediments.

MARINE SEDIMENTS

Mr — **Beach sediments:** gravel or sand, swales may be underlain by finer fraction, with a thin veneer of organic material; 1 to 3 m thick; beach material commonly overlies fine-grained marine sediments, possibly with a high ice content; ice wedges common; flights of ridges and swales elevated above present sea level by postglacial isostatic uplift; commonly found where high-energy conditions exist and/or coarse material is available.

Md — **Deltaic sediments:** gravel, sand, and silt; commonly divisible into coarse topset beds, finer foresets, and finer bottomset beds, coarse material overlying fine; variable thickness; fine-grained 'slack water' sediments at the margins; the fine-grained sediments commonly have high excess ice values; deposited where a stream enters the sea; most deltas are built into tidewater, and their form has been modified by a combination of lateral channel shifts and prograding as sea level has fallen in the course of the Holocene; the result is a series of terraces in addition to an active or inactive braided surface.

Mv — **Marine veneer:** gravel, sand, silt, and clay; less than 1 m thick; veneer of marine-deposited or reworked sediment; commonly derived from underlying, rather than adjacent, deposits.

M — **Marine sediments, undifferentiated:** dominantly finely laminated silt, clay, minor fine sand, and gravel; greater than 2 m thick; sediment deposited by nearshore marine or lagoonal processes, or deposits with other origins, reworked by the falling Holocene sea level; generally deposited in low-energy environment; commonly underlain at 1 to 4 m depth by poorly consolidated fine-grained bedrock (*see* unit W with reworked sediment overlay); ice wedges and thin, sometimes massive, interbedded ice common; thick deposits with slopes greater than 2 degrees are commonly finely gullied.

GLACIAL ENVIRONMENT

GMd — **Glaciomarine deltaic sediments:** gravel, sand, and silt; commonly divisible into coarse topset beds, finer foresets, and finer bottomset beds, coarse material overlying fine; variable thickness; fine-grained sediments commonly have high excess ice values; deposited where a glacial stream enters the sea; environment and processes associated with an ice mass.

GFt — **Glaciofluvial terraced sediments:** gravel, sand, and silt, varying to massive gravel or sand; commonly 10 to 50 m thick; proglacial environment; appears only as secondary unit in complex polygons.

T — **Till, morainal sediments, undifferentiated:** diamicton that may vary from clay or silt through a heterogeneous mixture of sand, gravel, and boulders; variable thickness, thin and discontinuous to greater than 15 m thick; deposited in subglacial environment; thin morainal sediments are barely distinguishable from marine-reworked or residual bedrock materials, overlying poorly consolidated bedrock; glacial diamicton is the probable source for coarse sand and small quantities of gravel- and boulder-sized material that are commonly intermixed with fine-grained weathered bedrock; small areas of clearly identifiable morainal deposits on coastal margins at the north end of Eureka Sound; in the extreme northwest sector of Fosheim Peninsula, deposits are a mixture of silt, clay, sand, and stones, with some stratification discernible; shell fragments incorporated in the deposits indicate that the material was in part dredged from adjacent Greely Fiord and Eureka Sound; a discontinuous lag gravel cover results from subsequent (Holocene?) marine washing; ice wedges, thin horizontal ice partings, some massive ice, and scattered flowslides recorded.

HOLOCENE TO PLEISTOCENE

NONGLACIAL ENVIRONMENT

U — **Undifferentiated sediments:** largely fine sand/silt or fine sand and silt/clay laminates from less than 1 cm to several metres thick; also includes strata of peat, in situ and reworked, and placer wood; materials in upper 1 to 2 m are predominantly fine sand and silt, with discontinuous lag (?) gravel cover (less than 10 cm thick) resulting from eolian processes or marine reworking; the bulk is silt or clay, including some thick marine clays with rare thin shells; crossbedded sands occur near the basin (Sldre River) axis, particularly at lower elevations; scattered peat deposits of mid-Holocene age are up to 3 m thick in minor tributary valleys; unit thickness up to 40 m locally; within this Sldre River basin fill unit, stream channel zones and lower courses of larger rivers are composed of sand and silt; streams originating outside the unit, including the upper courses of larger rivers, have gravel and sand channel zones; ice is a significant component in the form of ice wedges, thin laminae, and massive ice recorded to 5 m thick; flowslides are common on thick clay and silt; the age of this basin fill may be older than Holocene, suggested by (a) extent and thickness of the fill in a basin with a limited catchment area, and (b) the extensive marine-planed surface at about 120 m, when radiocarbon dates suggest a smooth Holocene uplift curve starting with a 160 m maximum sea level; the fill is underlain mainly by the poorly consolidated Eureka Sound Formation (unit W); areas of marine-planed unit W lie within and adjacent to the fill, and unit W is commonly exposed along the incised river courses.

PLEISTOCENE OR PLIOCENE

NONGLACIAL ENVIRONMENT

pA — **Alluvial sediments, undifferentiated:** boulders, cobbles, and gravel, with sandy to silty clay matrix, peat layers, and heterogeneous mixtures that may be colluvial or morainal; thicknesses greater than 50 m recorded; coarse materials usually exposed on margins of deposits; gravels are commonly overlain by 1 to 3 m of gravel and fines, possibly morainal, or weathered material; conjectured to be remnants of a preglacial sheet of coarse fluvial deposits that formerly extended over a large part of the lower, less resistant lithologies of western Ellesmere Island and eastern Axel Heiberg Island; parts of areas mapped as unit pA may be equivalent in age to the Beaufort Formation; however much of these sediments are definitely a younger deposit, adjusted to higher base levels than the Beaufort on northern Axel Heiberg Island; granites, common in gravels of western Fosheim, indicate considerable transport involved.

PRE-QUATERNARY TO HOLOCENE

W — **Weathered bedrock or regolith, undifferentiated:** bedrock, includes Eureka Sound Formation, commonly mantled by residual weathered material; 1 to 5 m thick; weathered deposits absent on the most resistant lithologies or where slopes are steep and erosional processes active; may include up to 25% colluvial deposits; composition of the material is dependent on underlying bedrock; exotic materials are often present in residual materials (e.g. granite, limestone, diabase, over sandstone bedrock) derived from former ice sheets (*see* unit T), gravel cover (*see* unit pA) or higher sea levels (unit W with reworked sediment overlay); the latter is not always distinguishable from in situ residual material; however, texture is commonly slightly changed (e.g. fine sand, minor gravel added to silty-clay residual material); a discontinuous veneer of marine sediments, including beach ridges, may be present, and relief is commonly subdued due to repeated (i.e. not solely Holocene) periods of marine planation (marine limit approximately 160 m in western Fosheim, falling to approximately 80 m at east end of Bay Fiord); note that even with a complete cover of weathering products, or a partial colluvial cover, the structure of underlying bedrock is often visible on air photographs.

Complex units: two map-unit designators separated by a dot (.) are used where the surficial cover forms a complex area and the units are too small to be mapped individually (e.g. At.Ap designates an area of alluvial terraced sediments with less abundant alluvial floodplain sediments). The map-unit polygon is coloured according to the dominant unit and labeled in descending order of cover.

Stratigraphic relationship: two map-unit designators separated by a slash (/) are used where a stratigraphic relationship is observed or confidently inferred (e.g. M/T indicates marine sediments overlying till). The map-unit polygon is coloured according to the overlying unit.

- Patterned ground, ice wedges
- Reworked sediments, by marine waves
- Geological contact, defined
- Landslide, flowslide scar, orientation known
- Kame or knoll, gravel or diamicton
- Striation, ice-flow direction known
- Drillhole location (*see* geodatabase)
- Station location, ground observation (*see* geodatabase)
- Dated sample location (*see* Table 1)
- Sample location, shells, plants

Table 1. Radiocarbon age.

Dated sample number	Laboratory number	Radiocarbon age (BP)	Elevation (m a.s.l.)	Material	Latitude	Longitude
1	GSC-2005	4050 ± 60	60	Peat	79.8346	84.5726
2	GSC-1800	8880 ± 120	124.5	Shells	79.9768	85.5742
3	GSC-1822	8150 ± 110	136	Shells	80.2619	84.2999
4	GSC-2039	3970 ± 80	<43	Peat	79.8064	84.7218
5	GSC-3148	5280 ± 60	–	Wood	79.9098	84.6768
6	GSC-5081	6040 ± 170	–	Placer peat	79.9139	84.6416

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Geological data conversion by D.E. Kerr, 2016 to 2018

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CANADIAN GEOSCIENCE MAP 392

SURFICIAL GEOLOGY

WESTERN FOSHEIM PENINSULA AND EASTERN AXEL HEIBERG ISLAND

Nunavut

NTS 49-G and 340-B southwest

1:125 000

2 0 2 4 6 8 10 km

Map projection Universal Transverse Mercator, zone 16 North American Datum 1983

Base map at the scale of 1:250 000 from Natural Resources Canada, with modifications
Elevations in metres 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.

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Data may include additional observations not portrayed on this map. See map info document accompanying the downloaded data for more information about this publication.

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CANADIAN GEOSCIENCE MAP 392

SURFICIAL GEOLOGY

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