



Surficial Geology Compilation Map Series SG-CMS

G.L.D. Matile and G.R. Keller

The Surficial Geology Compilation Map Series (SGCMS) addresses an increasing demand for consistent surficial geology information for applications such as groundwater protection, industrial mineral management, protected lands, basic research, mineral exploration, engineering, and environmental assessment. In addition, aggregate resources depicted on the maps are applicable to the heavy construction and building industries.

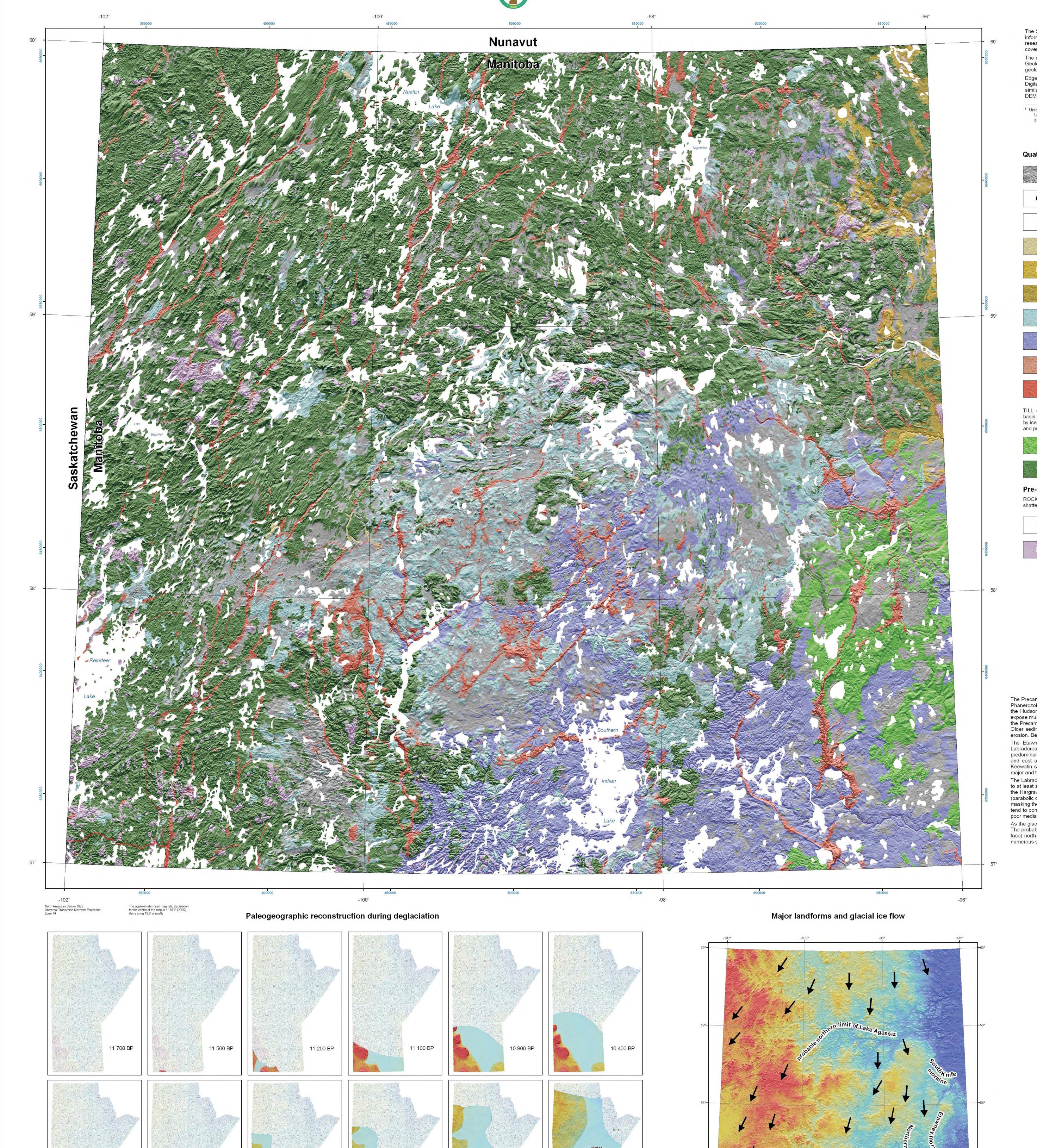
The SGCMS provides seamless province-wide coverage at scales of 1:250 000 and 1:500 000 including the NTS and regional map sheets for southern Manitoba (south of 53°N) released in 2004. A final compilation at 1:1 000 000 will be released in 2007 and will supersede the original Surficial Geological Map of Manitoba (Nielsen et al., 1981).

(SRTM DEM) (United States Geological Survey, 2002)

4) a paleogeographic reconstruction of late glacial events in Manitoba.

Paper copies of the most current and detailed surficial geology maps of various scales published by the Geological Survey of Canada and/or the Manitoba Geological Survey (MGS) were digitized for this compilation. Polygons for several areas were derived from digital geological maps. Digital polygons derived from soils mapping were used to fill gaps in the geological mapping. Edge-matching of adjoining map sheets was based on data from the SRTM DEM as interpreted by the MGS. Other polygon gaps and inconsistencies were modified in a similar manner. The surficial geology (coloured)

In addition to the DVD, the SGCMS is also available on the web: http://geoapp2.gov.mb.ca/website/surficialgeo/default.htm - Internet Map Server which allows online viewing and customization of the SGCMS map sheets. 1:500 000 SGCMS maps http://www.gov.mb.ca/iedm/mrd/geo/gis/surfgeomap.html - This website describes the project and allows download of all SGCMS maps in both Southern Manitoba - SG-SMB PDF and ESRI Shapefile format via a clickable image map similar to the image below. (54 NTS sheets) *Black outline indicates maps which appear on poster - Entire province at 1:250k and 1:500k scales (PDF) ESRI Shapefiles for each 1:250k mapsheet - ArcMap and ArcReader project files, <u>and more..</u> G.R. Keller



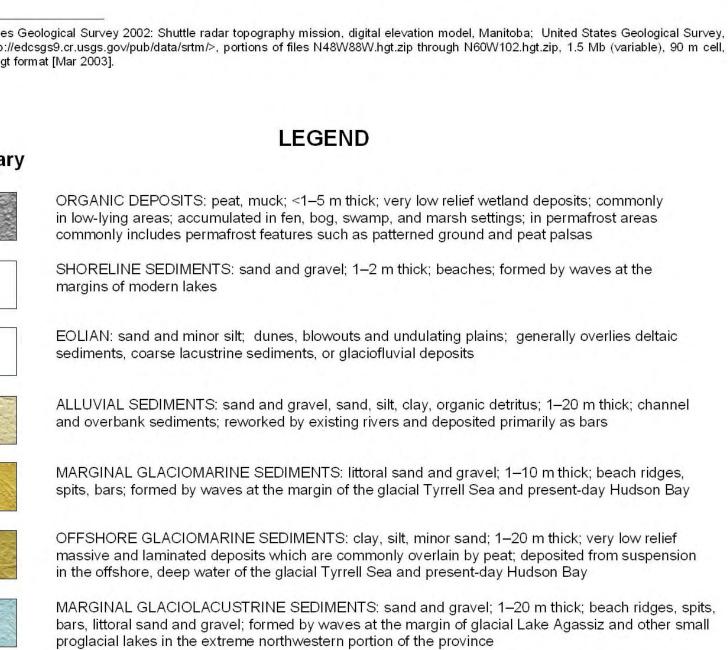
Note: Bedrock for entire map extent is of Precambrian age.

This map is available to download free of charge at www.gov.mb.ca/minerals

SURFICIAL GEOLOGY COMPILATION MAP SERIES

The Surficial Geology Compilation Map Series (SGCMS) addresses an increasing demand for consistent surficial geology information for applications such as groundwater protection, industrial mineral management, protected lands, basic research, mineral exploration, engineering, and environmental assessment. The SGCMS provides province-wide coverage at scales of 1:500 000, 1:250 000 and a final compilation at 1:1 000 000. The unit polygons were digitized from paper maps originally published by the Geological Survey of Canada and Manitoba Geological Survey (MGS). In several areas, digital polygons derived from soils mapping were used to fill gaps in the geological mapping. The 1:250 000 scale maps reference the source of the polygons. Edge-matching of adjoining 1:250 000 scale map sheets is based on data from the Shuttle Radar Topography Mission Digital Elevation Model (SRTM DEM¹) as interpreted by the MGS. Other polygon inconsistencies were modified in a similar manner. Geology (colour) is draped over a shaded topographic relief map (grey tones) derived from the SRTM

United States Geological Survey 2002: Shuttle radar topography mission, digital elevation model, Manitoba; United States Geological Survey, URL <ftp://edcsgs9.cr.usgs.gov/pub/data/srtm/>, portions of files N48W88W.hgt.zip through N60W102.hgt.zip, 1.5 Mb (variable), 90 m cell,



OFFSHORE GLACIOLACUSTRINE SEDIMENTS: clay, silt, minor sand; 1–20 m thick; low relief massive and laminated deposits; deposited from suspension in offshore, deep water of glacial Lake Agassiz; commonly scoured and homogenized by icebergs DISTAL GLACIOFLUVIAL SEDIMENTS: fine sand, minor gravel, thin silt and clay interbeds; 1–75 m thick; subaqueous outwash fans; deposited in glacial Lake Agassiz by meltwater turbidity currents; commonly reshaped by wave erosion and reworked by wind

PROXIMAL GLACIOFLUVIAL SEDIMENTS: sand and gravel; 1–20 m thick; complex deposits, belts with single or multiple esker ridges and kames, as well as thin, low-relief deposits; deposited in contact with glacial ice by meltwater TILL: diamicton; unsorted glacial debris; 1–75 m thick; generally low-relief, commonly streamlined deposits; in Lake Agassiz basin areas, the till can be wave-washed, covered discontinuously by a thin veneer of glaciolacustrine sediments and scoured by icebergs; thicker sequences, primarily in the Hudson Bay Lowland, consist of multiple units of varying texture

silt diamicton; largely derived from Phanerozoic carbonate rocks from the Hudson Bay Lowland and deposited by an ice stream emanating from Hudson Bay sand diamicton; commonly bouldery, predominantly composed of Precambrian crystalline rocks and deposited by ice emanating from Nunavut

ROCK: > 75% bedrock outcrop; generally subglacially eroded and unweathered; in areas of permafrost includes frost shattered, angular, monolithic boulder fields (Felsenmeer)

Paleozoic terrane; carbonate-dominated rocks in areas west of Lake Winnipeg, exposed typically as Rc glacially striated, low-relief surfaces, and along large river valleys in the Hudson Bay Lowland Precambrian terrane; intrusive, metasedimentary, and metavolcanic rocks having a glacially scoured irregular surface with high local relief

(Reduced for poster. Approx. 1:550 000)

3 10 20 30 40 30

To aid the reader, a shadow effect has been added to exaggerate the topographic relief. Published by: Manitoba Science, Technology, Energy and Mines

G.L.D. Matile and G.R. Keller (L. Dredge, Geological Survey of Canada, provided modifications to the following map sheets: 64I, 64J, 64K, 64N, 64O, 64P)

The Quaternary landscape of northern Manitoba he Precambrian Shield terrane tends to be dominated by discontinuous sediment cover with numerous bedrock outcrops, while the Phanerozoic rock terrane tends to have a thicker sediment cover with limited outcrops. The thickest package of sediment is found in the Hudson Bay Lowland (HBL) where large river sections found along major rivers, such as the Nelson and the Hayes rivers, expose multiple glacial tills and interglacial sediments that date back hundreds of thousands of years to before the last glaciation. In the Precambrian Shield, Quaternary sediments are commonly thick, but discontinuous, rarely infilling the bedrock lows completely. Older sediments, including saprolites, are characteristically preserved in the bedrock lows where they are protected from glacial The Etawney, Northern Indian and Settee moraines clearly mark the confluence between the Keewatin (to the west) and Labradorean sectors (to the south and east) of the Laurentide ice sheet. Glacial sediments to the west of this morainal system are predominantly noncalcareous and sand-rich and were deposited by glaciers flowing southward, while glacial sediments to the south and east are predominantly calcareous and silt-rich and were deposited by glaciers flowing southeastward. The terrain in the Keewatin sector is strongly streamlined parallel to ice flow by turbulent subglacial meltwater and punctuated by regularly spaced major and tributary eskers composed of sand and gravel.

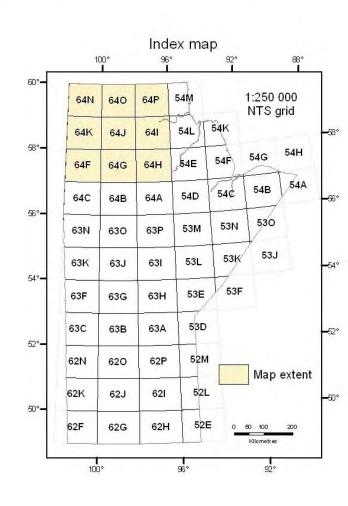
The Labradorean sector is dominated by landforms that define a major icestream which carried carbonate-rich debris from the HBL to at least as far as The Pas moraine. The retreat of this ice lobe is punctuated by numerous moraines, including The Pas moraine, the Hargrave, the Hudwin, the Cantin Lake, the Bigstone, and the Sipiwesk moraines. There are patches of streamlined landforms (parabolic drumlins), but much of the area is buried by clay which was deposited in the deep water of glacial Lake Agassiz thereby masking the glacial landscape. Drumlinoid ridges in the Labradorean sector of the Laurentide ice sheet, south and west of the HBL tend to contain a large proportion of carbonate glacial debris from the HBL and the resultant dilution of local debris makes them a poor media for till prospecting. As the glaciers retreated, glacial Lake Agassiz expanded northward, progressively covering the vast majority of northern Manitoba. he probable northern extent of glacial Lake Agassiz is marked by an anomalously large area of littoral sand (light blue on the map face) north of South Indian Lake. The HBL below the upper limit of the Tyrrell Sea is primarily peatland which is interspersed with numerous sandy shoreline features.

> Matile, G.L.D. and Keller, G.R. 2006: Surficial Geology Compilation Map Series of Manitoba; Manitoba Science, Technology, Energy and Mines, Manitoba Geological Sur∨ey, Surficial Geology Compilation Map Series SG-CMS, 1 DVD-ROM, Matile, G.L.D. and Keller, G.R. 2006: Surficial geology of northwestern Manitoba; Manitoba Science, Technology, Energy and Mines, Manitoba Geological Survey, Surficial Geology Compilation Map Series, SG-NWMB, scale 1:500 000.

Toll free: 1-800-223-5215 Email: minesinfo@gov.mb.ca

SURFICIAL GEOLOGY COMPILATION MAP SERIES

Surficial geology of northwestern Manitoba













The regional 1:500 000 scale maps north of 53°N and the 1:250 000 scale maps south of 53°N include
1) surficial geology polygons draped on hill shaded topographic relief derived from the Shuttle Radar Topography Mission Digital Elevation Model

2) a brief description of the Quaternary landscape of northern or southern Manitoba, 3) major landforms of Manitoba with specific reference to the glacial ice flow direction, and

is draped over a shaded topographic relief map (grey tones) derived from the SRTM DEM.

All source map units were converted into a standardized legend and housed in a database that can be queried to retrieve the original interpretation which can be used to colour maps based on a variety of material characteristics. The 1:250 000 scale maps reference the source of the polygons.

SGCMS map availability

