

Quaternary unconsolidated sediment thickness
on the Grand Banks of Newfoundland and Northeast Newfoundland Shelf

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Explanatory Notes

Introduction
The thickness Quaternary unconsolidated sediments (overburden) across the Grand Banks of Newfoundland and the Northeast Newfoundland shelf has been compiled and incorporated into a Geographic Information System (GIS)-based geodatabase. It is derived from interpretation of a vast grid of high and mid-resolution seismic reflection profiles collected over about 40 years (1969 to 2010) by the Geological Survey of Canada (Atlantic) (GSCA). This spatial database is in the form of spot thicknesses along survey tracks and thickness-classed zonation interpolated from these points. It complements contemporary bedrock and surficial geology and surface and sub-surface geo-features GIS database compilations.

Thickness Compilation
Raw data utilized for database population were generally limited to GSCA seismic data holdings. A series of shaded relief bathymetric/topographic images generated for purposes of surficial and bedrock mapping, was also utilized for the isopachyte map, providing control between seismic survey tracks, for delineation of basins and thin cover over bedrock.

The GIS database from which this map presentation derives, comprises over 85 000 point thickness entries, each identifying the stratigraphic unit (or range in units) measured, a code linking to the raw data source, thickness in metres and milliseconds, notes on the source of interpretation and the process and positional accuracy, and generally the stratigraphic unit underlying the sediment at that position. The GIS version includes a feature class with an attribute table field entitled 'Dominant Sediment Type'. This captures generic characterizations of sediment type, their sequence, presence of inferred lags, or other aspects governing the sediment.

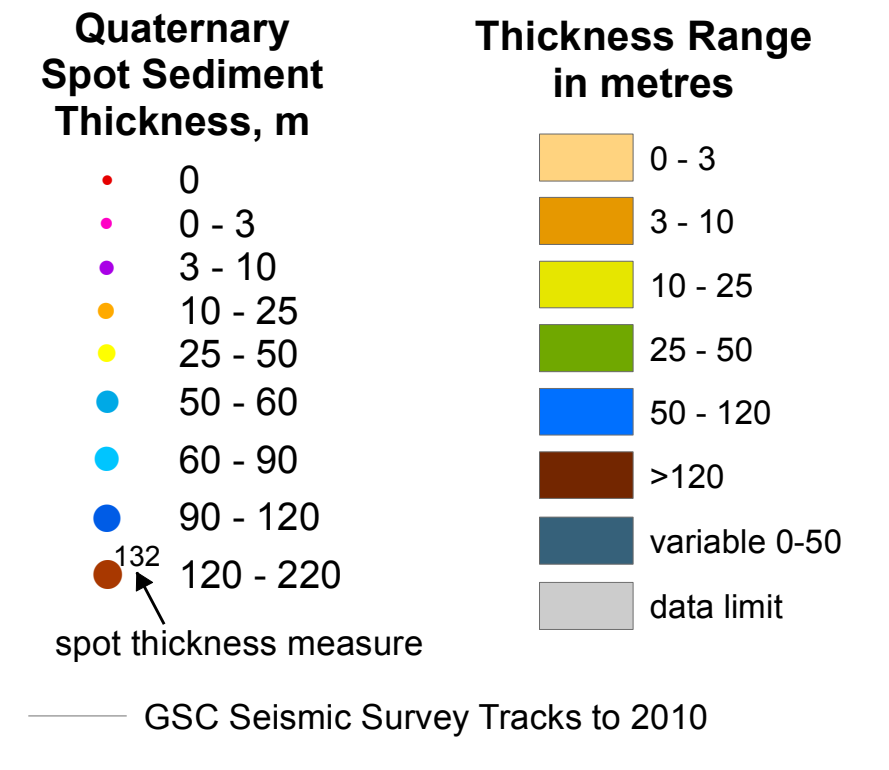
Product Formats
The map product is provided in several digital formats. The primary product is a vector-based GIS file data-base, accessible via an ESRI® Arc GIS project or through other GIS platforms via shapefiles. It provides a display of this map plus custom views of spot thicknesses of the stratigraphic units, where available. This map view is in Adobe® pdf format with user-interactive ability to display various layers of the original database.

Deposits
Quaternary sediment across the Grand Banks of Newfoundland and the Northeast Newfoundland shelf (NE NL Shelf) is derived from multiple glaciations, some reaching up to 400 km from the island. Most of the sediment (volumetrically) comprises till in broad blankets of ground moraine but also locally in thick stacked blankets. A typical stratigraphic succession includes one or a combination of units including a single sheet of till stemming from the last or penultimate glaciation and possibly pro-glacial and post glacial sediments. These might include various facies of glaci-marine muds, post-glacial sandy and gravely transgressive systems track remnants on the banks and adjacent sub-littoral sandy muds and basinal mud time equivalents.

The bedrock geology has considerable control on the style, thickness and distribution of overlying sediments. Rough innermost shelf topography generally begets patchy partial mini-basin fill while smooth-surfaced bedrock in mid shelf locations is commonly covered with a thin but continuous sediment blanket, often till or thin glaci-marine muds with thicker deposits in low-lying areas.

Only local remnants of the penultimate and older glaciations are preserved, the most complete section located in outermost SE Laurentian Channel but others spread across the banks and basins. In terms of volume, the vast majority is interpreted as till, locally in thick stacked blankets. Sediments from the last glaciation (Wisconsinan; MIS 2) are ubiquitous and comprise locally thick and thin but continuous till blankets, moraines, outwash, and commonly various facies of glaci-marine muds. Generally tills (m to 100s m thick) occupy glacially-carved troughs and basins while muds occupy large and small basins. The expansive banks have thin, patchy cover (cm to m) dominated by sands and gravels. Post-glacial sediments are generally either sandy and gravely transgressive systems track (TST) remnants, mainly on the banks, or mainly shallow sub-littoral facies and the TST basinal mud time equivalents.

Sediment thickness values derived entirely via a digital work-flow (collected since 2006) include not only a total sediment thickness over bedrock but often also a subdivided Quaternary stratigraphic map units. These sub-divisions include a total Quaternary section (this display), till, uppermost till and post-till muds, glaci-marine mud, post-till muds, post-glacial marine mud and sand dominated post-glacial sand and gravel. A summary of geotechnical properties following this classification is included in the accompanying report.

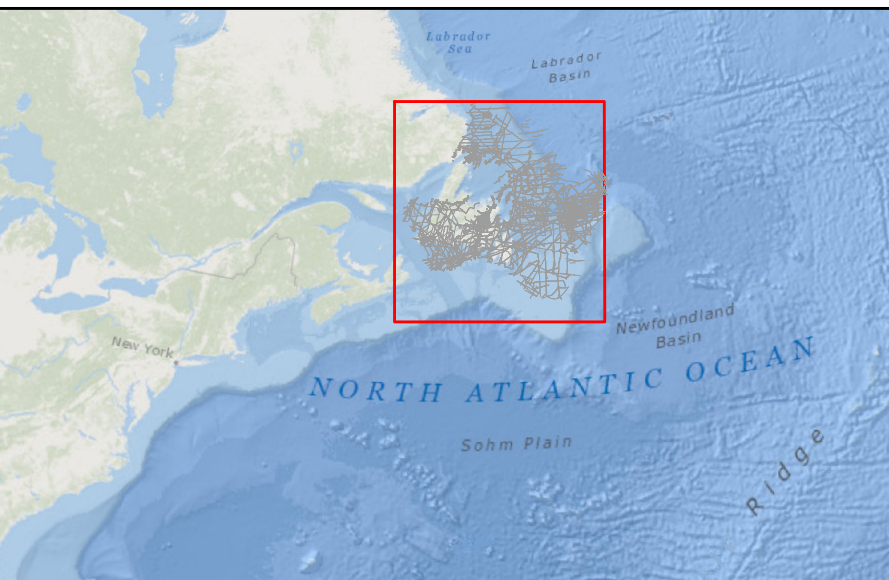


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doi:10.4095/295113

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Recommended citation

King, E.L., 2014. Quaternary unconsolidated sediment thickness on the Grand Banks of Newfoundland and Northeast Newfoundland Shelf: a GIS database; Geological Survey of Canada, Open File 7513, 1 .zip file. doi:10.4095/295113



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Background Map

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7513
GEOLOGICAL SURVEY OF CANADA
COMMISSION GÉOLOGIQUE DU CANADA
2014

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