An Update on 3-Dimensional Mapping of Quaternary Deposits in South Simcoe County, Central Ontario.

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3-D Mapping at the Ontario Geological Survey

- Introduction
- Geologic Setting
- Gravity Survey
- Subsurface Stratigraphy
- TDEM Survey
- Next Steps
Drift Thickness

Map showing drift thickness with color coding:
- High: 262 m
- Low: 0 m

Geographical features:
- Lake Huron
- Lake Erie
- Lake Ontario
- Georgian Bay
- Oak Ridges Moraine

Scale:
- 0 15 30 60 90 120 Kilometers
Physiography and Surficial Geology

Elevation (m asl)
Value

- High: 482
- Low: 180

Legends:
- Organic deposits
- Alluvial deposits
- Glaciolacustrine sand, minor gravel
- Glaciolacustrine silt and clay
- Glacioluvial sand and gravel
- Ice-contact stratified deposits, mainly sand
- Gritty and pebbly silt to clayey diamictites
- Stone-poor, silty to sandy till
- Paleozoic bedrock

Kilometers
Regional Gravity Survey

- 3104 stations
- 19 road traverses
- 200 m centers
Coring Programs

- 24 cored boreholes
- 17 cored in 2011/12
- Up to 161 m depth
Upland Stratigraphy
Older Tills and Glaciolacustrine Deposits
Middle Wisconsinan Non-Glacial Deposits
Mid-Late Wisconsinan Glaciolacustrine Deposits
Mid-Late Wisconsinan Glaciolacustrine Deposits
Mid-Late Wisconsinan Ice Advance
Late Wisconsinan Newmarket Till
Late Wisconsinan Newmarket Till

Lodgement Facies

Flow Till Facies
Tunnel Channel Sediment Record
Tunnel Channel Sediment Record

NORTH
- Kempenfelt Bay Valley
- SS-12-03
- SS-11-06
- SS-11-07
- SS-12-08

SOUTH
- Cooks Bay Valley (Holland Marsh)
- SS-12-07

Elevation (m asl)
- 110
- 120
- 130
- 140
- 150
- 160
- 170
- 180
- 190
- 200
- 210
- 220
- 230
- 240
- 250

Legend:
- Fill
- Topsoil
- Clay
- Silt
- Organic-rich
- Rhythmically laminated
- Regressive glaciolacustrine facies
- Basinal glaciolacustrine deposits
- Newmarket Till (Late Wisconsinan)
- Thorncliffe Formation (Middle Wisconsinan)
- Older deposits (Early Wisconsinan or Illinoian)
- Bedrock
- Very fine to fine-textured sand
- Fine to medium-textured sand
- Medium to coarse-textured sand
- Gravelly sand
- Gravel and sandy gravel
- Diamicton silty/clayey
- Diamicton silty/sandy
- Paleozoic bedrock

Laurentian Valley (main trunk)
Time-Domain Electromagnetic Survey

- 1898 line kilometer survey
- 328 square km (14.6 X 22.6 km)
- Line spacing 200 m
- Transmitter flown 30-40m above ground
Time-Domain Electromagnetic Survey

Planned Flight Lines

Actual Flight Lines
Time-Domain Electromagnetic Survey

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Processing and inversion of AeroTEM data

Client: Aeroquest

"Simcoe South Area"

1-D Laterally constrained inversion
Time-Domain Electromagnetic Survey

East-West Lines
Time-Domain Electromagnetic Survey (Examples)
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Next Steps

- Detailed analysis of TDEM survey results
- Establish targets for follow-up drilling (spring 2013)
- Final drill program (summer 2013)
- Construction of block model (summer/fall 2013)
- Final Report (2014)