BOREHOLE GEOPHYSICAL LOGGING IN UNCONSOLIDATED SEDIMENTS - AN AID TO 3-D MAPPING

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Geological Survey of Canada
QUALITATIVE PARAMETERS

- grain size
- sediment type
- porosity
- density
- pore-water salinity
- elastic moduli
- heavy mineral content
Groundwater Investigations
Fredericton, New Brunswick

An aid to understanding the detailed stratigraphy of the confined aquifer system
Correlation of geophysical marker horizons in Leda Clay, Eastern Ontario / Western Quebec
Presence of Newmarket Till in N-S borehole transect across ORM (as indicated by high P-wave velocities)

Velocities between 2500 and 3500 m/s

North

South

Top of Newmarket Till

Bottom of Newmarket Till

Newmarket Till in N-S borehole transect across ORM (as indicated by high P-wave velocities)
POROSITY vs Vs

POROSITY = 1.396 - 0.1600*ln(Vs)

# of Observations: 1148

R-coefficient: 0.82

2 sigma = +/- 0.13

-Note separation of data based on geological age
DOWNHOLE SHEAR WAVE VELOCITY and “TOTAL” POROSITY

WATERLOO MORaine
OGS BHs, Waterloo Moraine
Waterloo Moraine BH’s 1 to 9
NEW SONDES
(what’s coming down the pipe at the GSC?)

The Borehole Logging Methods Group under the leadership of Jonathan Mwenifumbo are researching the following:

- spectral gamma signatures of unconsolidated overburden from passive monitoring of radio-isotopes of U, Th, and K

- capacitive-coupled resistivity equipment and techniques
Spectral Gamma Signatures
(high sensitivity 512 channel B.H. spectrometer)
Differing U/Th ratios between Zones A and B suggest possible differing provenances.
Capacitive-coupled Resistivity Sonde – designed by V. M. Timofeev, U.S.S.R. (Canadianized by Q. Bristow, GSC)

Electrodes N, M, B, A are thin-walled hollow cylinders ~ 40 mm in dia.
Why capacitive-coupled?
- operates in plastic casing – no fluid contact needed
- enhanced vertical resolution at higher resistivities
ANCHORING THE 3-D FRAMEWORK WITH “GOLDEN SPIKES”

Strategically placed, well documented boreholes in unconsolidated sediments which have been:

- continuously cored and have detailed geological descriptions
- cased with plastic casing and grouted c/w vandal-proof surface completions
- geophysically logged with most standard slim-hole tools
- sampled for geological, geotechnical and geophysical properties

THESE BECOME INVESTMENTS IN THE FUTURE

“NATIONAL TREASURES”
Borehole Geophysical Logs in Surficial Sediments of Canada: A Compilation of GSC Data

How to use the map viewer...

Refresh Map button
You must press this button each time you check or uncheck a checkbox to make a layer visible or invisible. You must also push the Refresh Map button when you change the active layer (i.e. the layer you want to query).

2003-06-09
Borehole Geophysical Logs in Surficial Sediments of Canada: A Compilation of GSC Data

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Zoom In

2003-06-09

Important Notes
Borehole Geophysical Logs in Surficial Sediments of Canada: A Compilation of GSC Data

Layers
- BOREHOLES SITES
- RIVERS
- PROVINCIAL BOUNDARIES
- LAKES
- SURFICIAL SEDIMENTS

BOREHOLES SITES

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2000-09-06

Important Notices
Borehole Geophysical Logs in Surficial Sediments of Canada

http://sts.gsc.nrcan.gc.ca/clf/borehole_geophysics.asp

-a (downloadable) PDF format collection of geophysical log suites with geological descriptions, from boreholes across Canada drilled and cased in (mainly) Holocene and Pleistocene strata.

Digital data available from:

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