



MITE Year-end Review
Geochemistry for Risk Assessment /
Geochemical Background
February 27, 2006
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Natural Resources
Canada

Ressources naturelles
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Geochemistry for Risk Assessment

Provides Health Canada with knowledge on the geochemistry of soils and tills in Canada, including background values to support risk management decisions as part of the Federal Contaminated Sites Program.





Geochemistry for Risk Assessment

OUTCOME

Environment Canada and Health Canada have sufficient understanding of ambient concentrations of metals in the environment to identify areas that exceed specified limits as required by the Canada Wide Standards and Suggested Quality Guidelines

- Soil and till metadata compilation
- Background ranges for selected elements in till





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Soil and Till Metadata Compilation - Outputs (2005-06)

- Phase I metadata for 186 soil and till surveys translated and made available through the Geoscience Data Repository web site
<http://www.gdr.nrcan.gc.ca/geochem>
- Phase II metadata (OGD; consultants; GSC + provincial surveys not previously included) compiled for 118 surveys, translated and made available on the GDR web site
- Open File 5085 (Soil and Till Geochemical Metadata for Canada)
- Pamphlet advertising the metadata catalogue and poster at Federal Contaminated Sites workshop, March 7-10, 2006



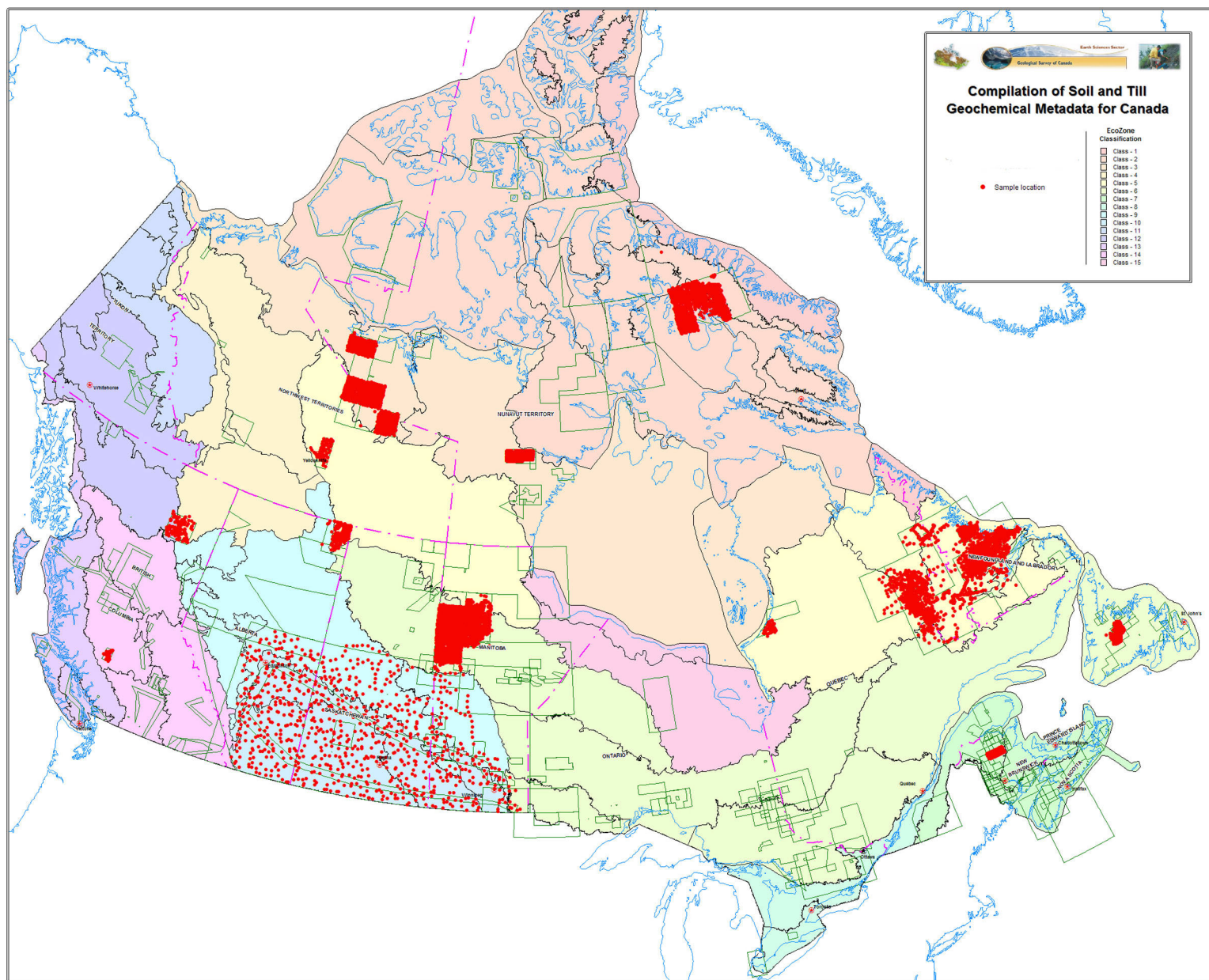


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Background Ranges for Selected Elements

- Compiled data for 20 surveys (GSC till; $<63\ \mu\text{m}$; INAA, spectroscopic techniques with aqua regia (or variation) partial digestion)
- Classified 12904 samples based on survey, ecological regions and geological regions
- As, Cr, U, Th (INAA); Co, Cu, Ni, Pb, Zn (ICP-ES or AAS) - summary statistics, histograms, cumulative probability plots and Tukey box plots (R.G. Garrett)



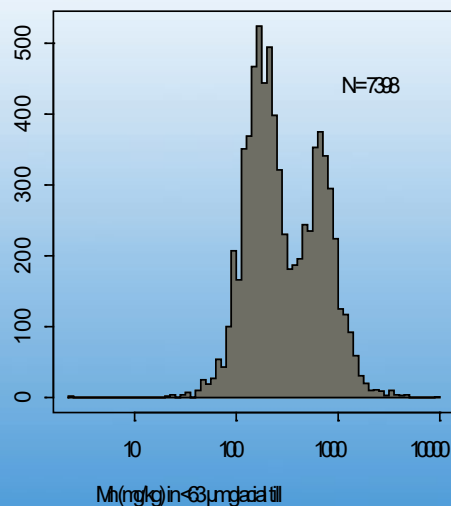




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Manganese in till– 7398 samples

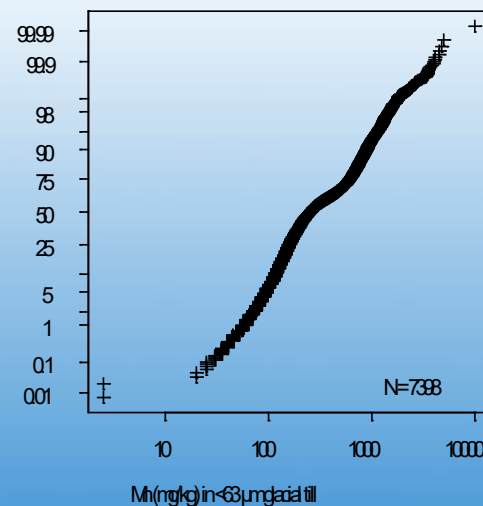
Histogram



Summary Statistics

Number of Observations	7398
Minimum	9970
98th Percentile	1466
95th Percentile	1126
90th Percentile	885
3rd Quartile	605
2nd Quartile-Median	280
1st Quartile	155
10th Percentile	115
5th Percentile	95
2nd Percentile	60
Minimum	25
Median/Abs Deviation	198
IQ Estimated Std Dev.	331
Mean	420
Standard Deviation	418
Coeff. of Variation %	99.3

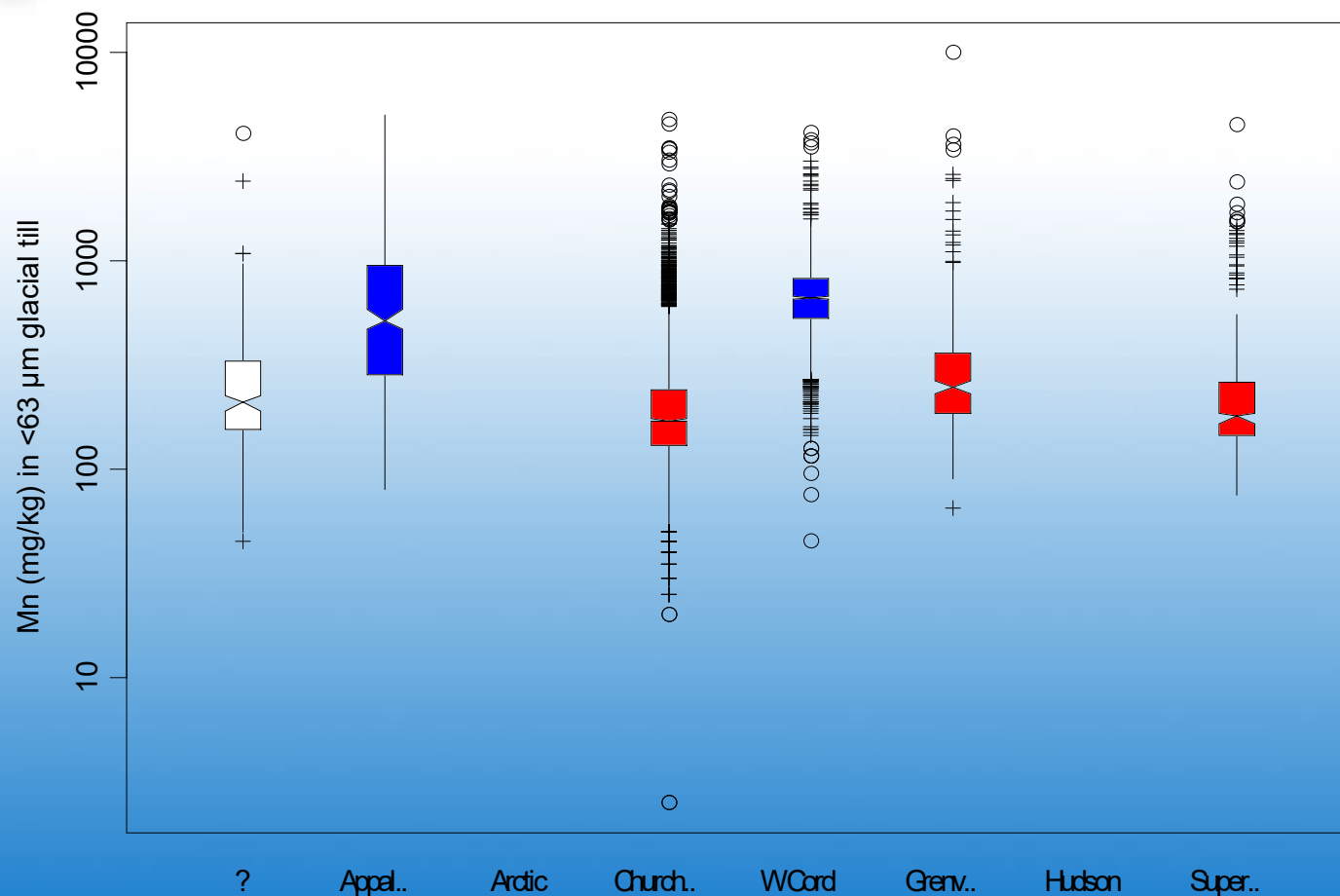
% Cumulative Probability Plot





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Manganese in till – by geological region





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Provisional Background Ranges in Till

Element	Provisional Range mg/kg	Local Upper Limit mg/kg
As	<0.5 – 85	
Cr	5 – 310	1000 (ultramafic rocks)
Co	1 – 95	
Cu	<1 – 370	500 (mineralised bedrock)
Ni	1 – 210	400 (ultramafic bedrock)
Pb	<2 – 80	
Th	1 – 63	
U	1 – 9	42 (uraniferous granites or sandstones)
Zn	2 - 410	





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Background Study – Outputs (2005-2006)

- Open File 5084 “Geochemical Background in Soil and Till” (Rencz, Garrett, Adcock, Bonham-Carter)
- Report to Health Canada including information on 7 additional elements: Ag, Cd, Hg, Mn, Mo, Sb, Se by March 31, 2006 (extended Open File 5084)
- New Brunswick background study – Grunsky, Adcock, Spirito

