



Newsletter 6, May 2009

North American Soil Geochemical Landscapes Project — Canadian Project Update



Briefly.....

In this issue we report on our progress since the tremendously successful 2008 field season. Results from the analyses of the 2007 samples will be highlighted. We now have our first trans-boundary maps showing element distributions in soils in the Maritime provinces of Canada and the New England states of the United States.

A big thank-you to the scientists from the Geological Survey of Canada, Geological Survey of Newfoundland and Labrador, Nova Scotia Department of Natural Resources, New Brunswick Department of Natural Resources, Ontario Geological Survey, Saskatchewan Geological Survey, Saskatchewan Ministry of the Environment, Alberta Geological Survey, United States Geological Survey, Natural Resources Canada, Agriculture and Agri-Food Canada, Health Canada, Environment Canada, Ontario Ministry of Natural Resources, Commission for Environmental Cooperation, Cancer Care Nova Scotia, University of Ottawa, Royal Roads University, and the University of Waterloo who participated in Tri-national Workshop III. The theme of the Workshop was “Building On The Framework in 2009” and it was held on February 25th and 26th, 2009, in Ottawa.

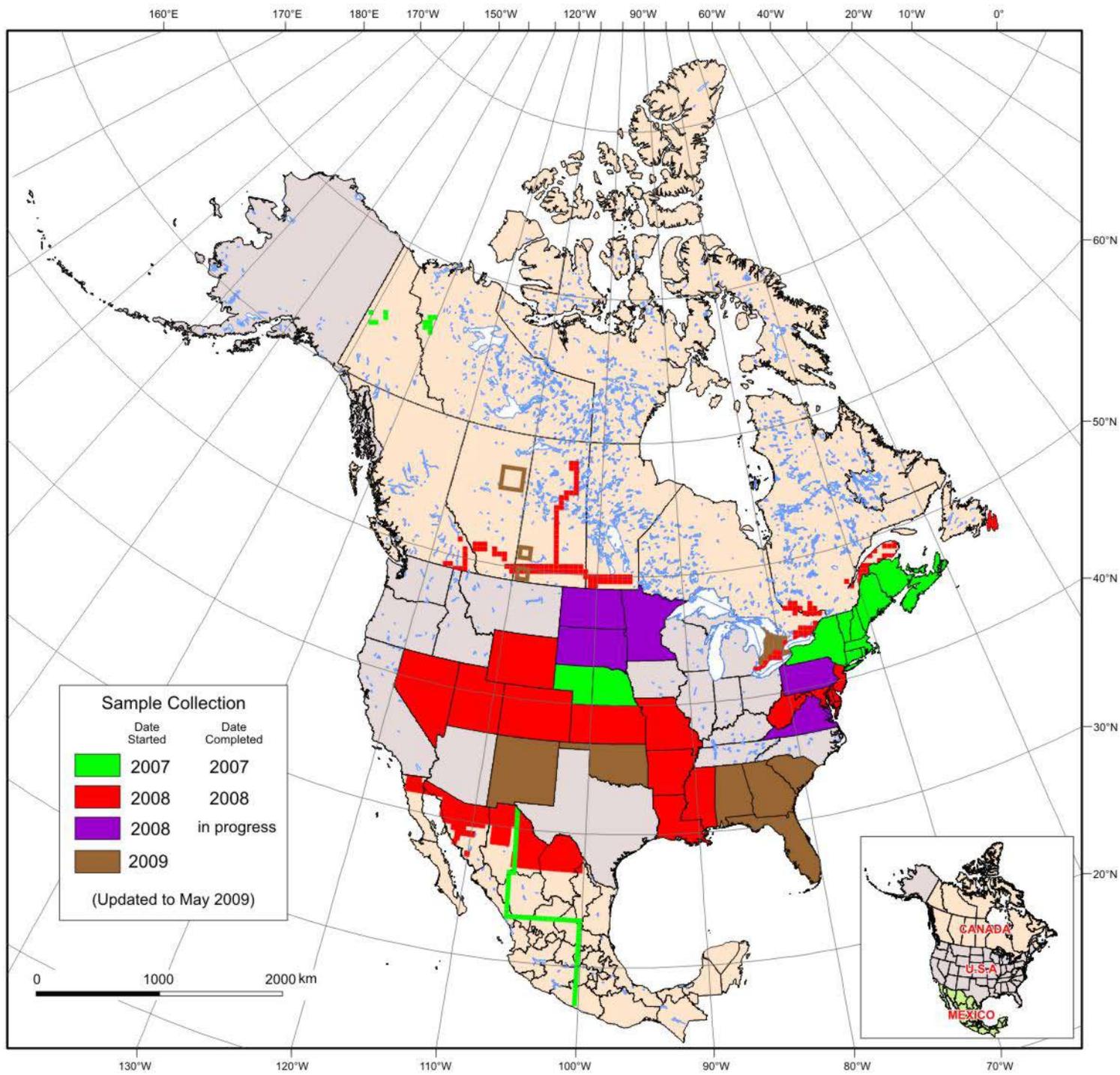
Work is progressing on the development and documentation of field sampling and laboratory protocols for mineral and organic soils.

There will be a special technical session related to the Tri-national Project at the 24th International Applied Geochemistry Symposium (IAGS 2009) at the 24th International Applied Geochemistry Symposium to be held in Fredericton, New Brunswick, from June 1st to 4th.

The effort is ongoing to initiate projects with other research groups to develop applications of the Tri-national data to issues of health and environmental health. The collaborations take various forms, including the collection of additional samples and field data at Tri-national sites; use of the Project sampling and laboratory protocols; use of Tri-national data to supply information on natural background concentrations of elements in soil; and use of the Project framework to select for other research project's reference sites across Canada located in diverse geologic terranes.

Sample collection over North America

The map below shows the progress to date on the Tri-national sample collection.



More Details.....

Sample collection, analysis, and release of resultant data in Canada

Peter Friske (GSC) has provided a tally of Tri-national samples and their analyses as of March 2009.

Summary of Tri-national Field Activities 2007-2008

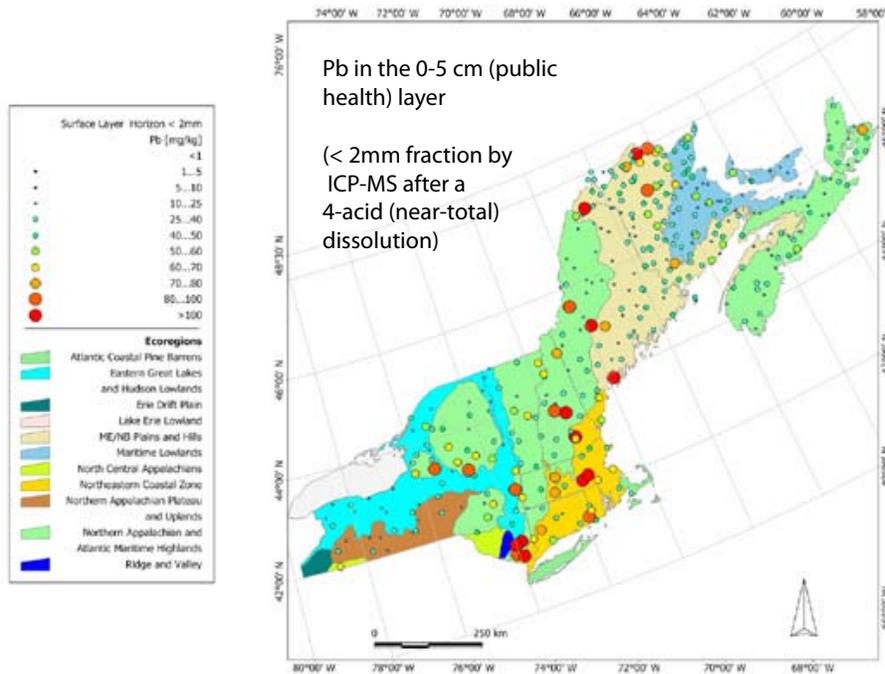
	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	YK	NT	NU	Total
2007														
Routine sites		54	9	123		4					5	6		195
Urban sites*				21										21
Field duplicate sites		3		7										10
														226
2008														
Routine sites	9	15			25	36	20	57	15	10				187
Urban sites		20				54	26	29						120
Field duplicate sites					1	2	1	3	1	1				9
														316
														542

Peter is preparing a Geological Survey of Canada Open File based on the data from the 2007 field surveys in New Brunswick, Nova Scotia, Prince Edward Island, and northern Mackenzie Valley, Northwest Territories. This release, expected by early summer, will contain the following types data:

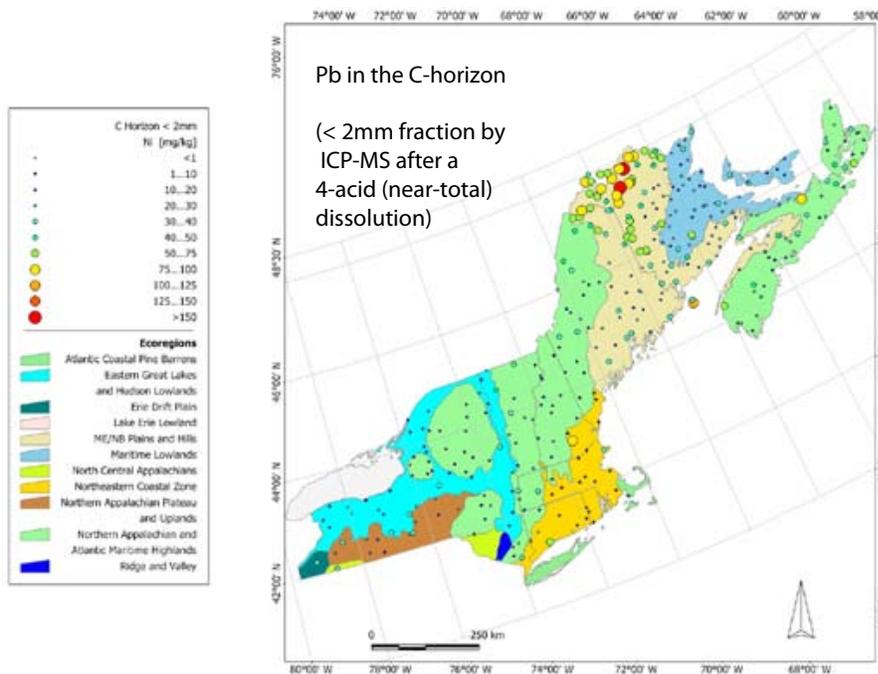
- Descriptions of field site and physical characteristics of soil samples from field observations
- Munsell colour, bulk density, and moisture content (0-5 cm; A-, B- and C-horizons)
- Size fraction analysis (B- and C-horizons)
- <2mm fraction milled - 4 acid digestion (0-5 cm; A-, B-, and C-horizons)
- <2mm fraction not milled - aqua regia variant (USA-EPA 3050 B) (0-5 cm; A-, B- and C-horizons)
- <2mm milled - carbon and loss-on-ignition data (0-5 cm; A-, B- and C-horizons)
- <2mm not milled - soil pH data (A-, B-, and C-horizons)
- <63 micron - carbon and loss-on-ignition data (B- and C-horizons)
- <63 micron - 4-acid digestion (B- and C-horizons)
- <63 micron - aqua regia variant (USA-EPA 3050 B) (C-horizon)
- water leach (A- and C-horizons)
- x-ray diffraction data (A- and C-horizons).

Results from the sampling work in 2007

Data from 2007 is currently being plotted and interpreted. Eric Grunsky (GSC) received some of the 2007 soil geochemical data from the New England states and was able to plot the first international map for the Project.



Figures show the distribution of Pb in soil samples from the 0-5 cm interval and from the C-horizon at Tri-national sites in the Maritime provinces of Canada and the New England states in the United States. The $< 2\text{mm}$ fraction of the samples was analyzed after a near-total 4 acid digestion. Results show a larger number of sites with high levels of Pb in the 0-5 cm layer than in the C-horizon (parent material) of the soil. In some places the higher Pb levels in the uppermost 0-5 cm may be indicative of Pb enrichment from anthropogenic sources.



An Update on Tri-national Workshop III

The annual workshop was held at the Sala San Marco in Ottawa on February 25th and 26th, 2009. This year's theme was "Building on the Framework in 2009". Since the beginning of the Project there has been an emphasis on working with other groups and these collaborations were highlighted. These collaborations take a variety of forms including the collection of extra sample materials by the sampling crews, the analysis of samples using the Tri-national protocols, use of Tri-national data to supply information on natural background concentrations of elements in soil and use of the Project framework to select reference sites.

The 1½ day session hosted nearly 50 attendees bringing together a broad cross section of (bio)geochemical data suppliers and users. The presentations, exchanges and feedback that occurred were very productive for the ongoing development of the Tri-national Project. The building of relationships among government data users and suppliers is essential for the success of this Project and for having the Project data and protocols used as a national and international standard.



Back Row - Laurel Woodruff (USGS), Vanessa Lyon (HC), Nathalie Saint-Jacques (Cancer Care Nova Scotia), Terry Goodwin (NSDNR), Rick McNeil (GSC), Ken Ford (GSC), Rita Mroz (EC-Atlantic), Bob Garrett (GSC), Peter Friske (GSC), Mike Parkhill (NBDNR), Eric Grunsky (GSC), Ross Kelly (Ontario Geological Survey), Juliska Princz (EC), Chris Alloway (EC), Roy Kwiatowski (HC).

Middle Row - Janet Campbell (Saskatchewan Geological Survey), Weihua Zhang (HC), Philippa Hunsman-Mapila (NRCan-CanMet), Elizabeth Kenney (AAFC), Jill Weiss (Alberta Geological Survey), Marc St. Arnaud (AAFC), Francine Kelly-Hooper (University of Waterloo), Pritam Jain (Saskatchewan Ministry of the Environment), Steve Amor (Geological Survey of Newfoundland and Labrador), Rick Scroggins (EC).

Front Row - Matt Dodd (Royal Roads University), Inez Kettles (GSC), Rod Klassen (GSC), Jing Chen (HC), Len Kozak (AAFC), Andy Rencz (GSC), and Toon Pronk (NBDNR).

Attendees not in photo: Yves Couillard (EC), Walter Fraser (AAFC), Xiaoyuan Geng (AAFC), John Johnson (OMNR), Donna Kirkwood (NRCan), David Kroetsch (AAFC), Jessica Levine (CEC), Luigi Lorusso (HC), Eric Loubier (NRCan), Martin McCurdy (GSC), Karen McKenna (CryoGeographic consulting), Isabelle McMartin (GSC), Cindy Shaw (Canadian Forest Service), Scott Smith (AAC), Nadereh St-Armand (HC), Peter Uhlig (OMNR)

The Workshop opened with some remarks from participants in our partner agencies - C. Allaway (EC); S. Smith (AAFC); L. Lorusso (HC) - on the value of the Project. Next the GSC participants reported on the progress in 2008 related to field sampling, laboratory analysis, and with data handling and interpretation. Laurel Woodruff followed with an update on activities in the United States and Terry Goodwin (NSDNR) on results from the 2007 sampling. We also heard from the provincial surveys (J. Campbell (SK); J Weiss (AB); M. Parkhill (NB); T. Pronk (NT); R. Kelly (ON)) as to what field activities were being planned for 2009 and the possibilities for co-ordinating with the Tri-national.

On the morning of Day 2 participants undertaking “value-added” research projects associated with the Tri-national Project described their activities. These included:

- Soil gas radon studies – K. Ford (GSC) and J. Chen (HC-RPB)
- Method development related to the Boreal Forest Biological Methods Project - R. Scroggins and J. Princz (Biological Methods Section, EC)
- Studies of bioaccessibility - M. Dodd (Royal Roads)
- Alberta, B.C. and Newfoundland Background Hydrocarbon Soil Chemistry Results - F. Kelly-Hooper (University of Waterloo)
- Commission for Environmental Cooperation activities - J. Levine (CEC)
- Studies of arsenic and population health risks in New Brunswick - S. Douma and R. Klassen (GSC)
- Studies of arsenic and population health risks in Nova Scotia - N. Saint-Jacques (Cancer Care Nova Scotia)
- GEMs projects and potential collaborations with the Tri-national Project - I. McMartin (GSC)
- Follow-up activities related to the Tri-national Project in New Brunswick - M. Parkhill (NBDNR).

Following these presentations ways to foster new applications of tri-national data by groups concerned with health protection and the environment were discussed. Present and potential users of soil data were asked the following questions: What is their group doing? What are the major issues? What do the users need that we can provide? Chris Allaway (EC), Dave Kroetsch (AAFC), Jessica Levine (CEC), Rita Mroz (EC-Atlantic), and Roy Kwiatkowski (HC) began the session by giving some remarks.

In summary, the collected remarks on protocols for sample collection and analysis and on the needs of the data users provided important insights. We have the beginning of a plan for sampling new areas in Canada in 2009. It is apparent from the discussions that information on background levels of chemical elements in soils is useful and will be used immediately for a variety of activities ongoing in many government agencies. In addition, the work on bioaccessibility is generating considerable interest. There are still issues surrounding the forms of the new Tri-national data and the degree of public accessibility that have to be addressed prior to their release. In this respect, precision in the release of the geographic location of sample sites is an issue to be resolved. We also need to complete and release the field protocols for collecting mineral and organic soils as soon as possible, and also the laboratory protocols for the core Project procedures. We are compiling a Geological Survey of Canada Open File, based on the Workshop presentations, that will be released later this year.

For More Information or To Make Submissions to the Next Newsletter



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