GEOSCIENCE BC REPORT 2014-03

REGIONAL STREAM SEDIMENT GEOCHEMICAL DATA
SAMPLE REANALYSIS (INAA)

NORTHERN VANCOUVER ISLAND, BRITISH COLUMBIA

Data Files: GBC Report 2014-03.PDF & GBC Report 2014-03.XLS **Release Date:** January 2014

PROJECT SUMMARY

Ongoing efforts by government-funded agencies to update and maintain BC's drainage sediment geochemical database have produced the most comprehensive collection of publically available field information and multi-element analytical data in Canada (Jackaman, 2011a). Over the last several years, Geoscience BC has assisted in broadening the utility of the database by supporting the collection and publication of new analytical information. These initiatives have included new regional geochemical programs and the reanalysis of sediment material preserved from previous surveys (Jackaman and Lett, 2013).

In 2013, as part of the Northern Vancouver Island Exploration Geoscience Project, stream sediment samples collected during a 1988 geochemical survey completed in the Alert Bay and Cape Scott map sheet areas (Figure 1) were reanalyzed by instrumental neutron activation analysis (INAA). The results of this work are presented in Geoscience BC Report 2014-03.

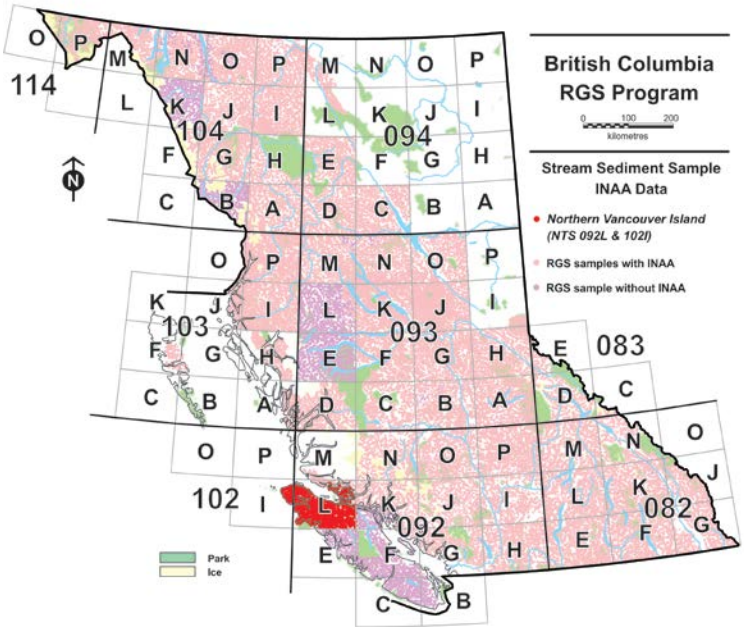

Figure 1. Location of the northern Vancouver Island sediment samples reanalyzed by INAA and the distribution of available INAA data in BC. (Abbreviations: INAA, instrumental neutron activation analysis; RGS, Regional Geochemical Survey).

PROJECT METHODS

The 1988 stream sediment and water survey was conducted by the British Columbia Ministry of Energy, Mines and Petroleum Resources (MEMPR). Funding was provided in part by the Canada-British Columbia Mineral Development Agreement (1985 - 1990). A total of 1042 moss-trapped stream sediment samples from northern Vancouver Island and 165 conventional stream sediment samples from the adjacent mainland were collected (Gravel and Matysek, 1989).

Several initiatives to upgrade the original 1989 release of analytical results have been completed. Stream sediment samples collected on the mainland were included in a 1992 MEMPR INAA reanalysis project. In 2011, Geoscience BC sponsored the reanalysis of moss-trapped sediment samples from 1988 and 1989 RGS programs conducted throughout Vancouver Island (Jackaman, 2011b). The recovered sample pulps were analyzed for 51 elements by aqua-regia digestion followed by inductively coupled plasma–mass spectrometry (ICP-MS) and Pt and Pd by fire assay. A stream based in-fill sampling program was completed in 2012 as part of the Northern Vancouver Island Exploration Geoscience Project (Jackaman, 2013). The 2012 project also included the retrieval of original moss-trapped sediment material from Natural Resources Canada (NRCan) storage facilities in Ottawa and subsequent reanalysis by INAA for 35 elements (Table 1).

Table 1. List of INAA elements and associated detection levels, Alert Bay and Cape Scott NTS map areas. (Abbreviations: ppm, parts per million; ppb, parts per billion; pct, percent; g, gram)

Element		Detection Levels	Units	Element		Detection Levels	Units
Gold	Au	2	ppb	Nickel	Ni	10	ppm
Silver	Ag	2	ppm	Rubidium	Rb	5	ppm
Arsenic	As	0.5	ppm	Antimony	Sb	0.1	ppm
Barium	Ba	50	ppm	Scandium	Sc	0.2	ppm
Bromine	Br	0.5	ppm	Selenium	Se	5	ppm
Cadmium	Cd	5	ppm	Samarium	Sm	0.1	ppm
Cerium	Ce	5	ppm	Tin	Sn	100	ppm
Cobalt	Co	5	ppm	Tantalum	Ta	0.5	ppm
Chromium	Cr	20	ppm	Terbium	Tb	0.5	ppm
Cesium	Cs	0.5	ppm	Tellurium	Te	10	ppm
Europium	Eu	1	ppm	Thorium	Th	0.2	ppm
Iron	Fe	0.2	pct	Titanium	Ti	100	ppm
Hafnium	Hf	1	ppm	Uranium	U	0.2	ppm
Iridium	Ir	50	ppb	Tungsten	W	1	ppm
Lanthanum	La	2	ppm	Ytterbium	Yb	2	ppm
Lutetium	Lu	0.2	ppm	Zinc	Zn	100	ppm
Molybdenum	Mo	1	ppm	Zirconium	Zr	200	ppm
Sodium	Na	1	pct	Weight	Wt	0.01	g

The recovered moss-trapped sediment samples (<0.177 mm fraction) were delivered to Becquerel Laboratories Inc. (Mississauga, ONT) where they were weighed and the encapsulated samples were packaged for irradiation along with internal standards and international reference materials. Samples and standards were irradiated together with neutron flux monitors in a two-megawatt pool type reactor. After a seven-day decay period, samples were measured with a high-resolution germanium detector. Typical

counting times were 500 seconds. Due to an absence of available material, 87 samples were not included in the reanalysis work. In addition, some samples show elevated detection limits due to low sample weights (less than 1 gram) and these results should be considered semi-quantitative.

The INAA results have been provided in the Microsoft® Excel (XLS) file GBC REPORT 2014-03.XLS. Data have been carefully checked for analytical quality using blind duplicate samples and control reference material. When determined to be complete and accurate, the new reanalysis data were merged with sample site location information and previously published INAA data acquired from the original survey publications (Lett, 2005).

The following comments provide additional information on the file structure and data composition of the digital data file.

- Data file structure has been standardized to accommodate all possible data reporting options for all completed BCRGS programs. As a result, data compiled by various government funded regional geochemical programs may not include information for all fields listed in the XLS file. Unless otherwise noted, missing analytical data and field information is reported as a '-9999'.
- Analytical results reported at less than the contract lab's listed detection level (DL) have been reported at the DL. As noted above, missing data is listed as a '-9999'.
- INAA results are also provided as reported by the lab. Data reported at less than the DL is preceded by a '<' sign and missing data is listed as '-9999'.
- Although efforts have been made to include results for all samples from the target survey area, there may be gaps in the final analytical data set due to missing archive material.
- For more detailed descriptions regarding original sample collection methods, analytical techniques and element detection levels refer the original published report at:

  URL <http://www.empr.gov.bc.ca/Mining/Geoscience/Geochemistry/Pages/default.aspx>

DATA FILE FORMAT

The XLS file includes the following six (4) XLS TABS:

1. ORIGINAL FIELD DATA: all original recorded site location information and observations.
2. ***SEDIMENT INAA DATA1***: all INAA data in sediments, less than DL set to DL.
3. ***SEDIMENT INAA DATA2***: all INAA data in sediments, as reported by lab.
4. NOTES and DESCRIPTIONS: explanation of codes and abbreviations.
5. INAA DETECTION LEVELS: list of INAA elements and detection levels.

ACKNOWLEDGEMENTS

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