GEOFILE 2007_09

NUGGETS BURIED IN THE BC REGIONAL GEOCHEMICAL SURVEY DATABASE

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INTRODUCTION

Low-density (typically at 1 sample/10 km^2) stream and lake sediment geochemical surveys have proven to be very cost effective for identifying areas of increased mineral potential. British Columbia is ideally suited for utilizing such surveys because active drainage systems are well developed. Consequently, a joint Federal-Provincial government regional stream sediment-water survey (RGS) program was started in 1976 to survey the province and since then has produced field and analytical data for over 50 000 samples.

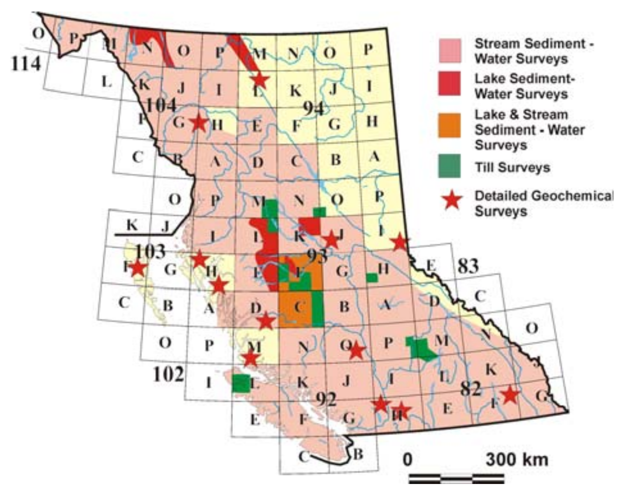

Figure 1. RGS stream sediment-water, lake sediment-water and till sampling coverage. The stream and lake sediment surveys are typically carried out at an average density of 1 sample/13 km^2. Till and more detailed geochemical sampling (focused surveys) are at a high density typically 1 sample/5 km^2. The area outlined in orange covering parts of NTS map sheets 93F and C represent a recent integrated lake-stream sediment and water regional survey carried out by Geoscience BC (Jackaman, 2006).

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The RGS stream, lake and moss samples, collected at an average density of 1 sample/13 km^2, cover roughly 70 percent of the province. The extent of the sediment sampling, location of till, and more detailed drainage surveys are shown in Figure 1. Over half of the samples have been re-analysed by neutron activation (INAA) and/or inductively coupled plasma mass spectrometry (ICPMS), thus increasing the value of the database as a mineral exploration tool. Reconnaissance scale RGS data can highlight areas of metal-enriched bedrock that could host economic mineralization. The stream sediment geochemistry may even detect individual mineral deposits because the analyses are of very high quality and include ore indicator (e.g. Au, Cu, Mo) and pathfinder elements (e.g. As, Sb, Hg). Some methods for interpreting RGS data and examples of stream sediment anomaly follow-up were described in a poster displayed at the 2007 Cordilleran Round Up Convention. Geofile 2007_09 links the information in this poster with additional rock geochemistry for samples collected in an area north of Lillooet, BC. The significance of RGS Au anomalies has also been ranked based on the reproducibility of the sediment Au results and the proximity of a sample site to mineral occurrences, mineral titles and parks. Geofile 2007_09 contains GIS importable files listing the location of the ranked RGS Au anomalies.

MINERAL DEPOSIT SIGNATURE MAPS

Two maps on the poster identify RGS sample sites where there are specific multi-element geochemical anomalies. One multi-element association comprising As, Sb and Hg was selected because these elements are typically pathfinders for epithermal Au-Ag mineralization. The thresholds for the different symbols shown on the map are at the 98, 95 and 90 percentile values. At each percentile the samples were identified with a GIS query that required all three elements were equal or greater than the percentile thresholds. For example, to be anomalous at the 98 percentile sediment samples needed to have As contents equal or above 46 ppm and Sb levels equal or above 2.7 ppm and Hg contents equal or above 249 ppb. There are 50 RGS sites that meet this criterion. Similarly, at the 95 percentile sediment sample need to have As contents equal or above 24 ppm and Sb levels equal or above 1.4

ppm and Hg contents equal or above 150 ppb and there are 243 RGS sites where values meet this requirement. The second map shows the same anomaly screening approach, but using Cu, Mo and Au to identify RGS sites with sediment chemistry from a source area that could contain porphyry Cu-Mo or porphyry Cu Au mineralization. Concomitant element stream sediment anomalies can help screen exploration targets for different mineral deposit types. However, a limitation to this approach is that the interpretation must also account for differences in the geochemical mobility of elements and the effect of bedrock geology and drainage basin size on the element background levels.

GOLD EXPLORATION TARGETS

Several of the poster maps show progressive selection of exploration targets based on RGS Au content. An estimated 6000 RGS samples have detectable Au. Of these, 4052 have more than 17 ppb Au in stream sediment, more than 12 ppb in lake sediment and more than 104 ppb in moss sediment. These values reflect the 95 percentile Au thresholds for the different RGS sample types. Variable threshold values avoid a misleading distribution of Au anomalies in certain areas (e.g. Vancouver Island) where moss mat samples are the predominant sample type. Progressive RGS Au anomaly screening involved:

1) Selecting anomalous samples where there is less than 100 percent mean difference between the initial Au analysis and the routine repeat Au determination of an analytical duplicate RGS sample. The mean difference is the difference between the first and second Au value divided by the mean value for the two analyses. A total of 906 sites are identified based on this criterion.
2) Selecting sites (191) with a mean anomalous Au difference that is less than 100 percent and also located more than 5 kilometres from a MINFILE mineral occurrence.
3) Selecting sites (83) with a mean anomalous Au difference that is less than 100 percent, more than 5 kilometres from a MINFILE mineral occurrence and more than 10 kilometres from a mineral claim (based on a titles search on January 1, 2007).
4) Selecting sites (57) with a mean anomalous Au difference that is less than 100 percent, more than 5 kilometers from a MINFILE mineral occurrence, more than 10 kilometres from a mineral claim (based on a titles search on January 1, 2007) and more than 1 km from a park. Figure 2 shows the distribution of the sites in relation to the parks.

The location files in Excel, Dbase and Shapefile format for (4) are in Appendix A the Geofile.

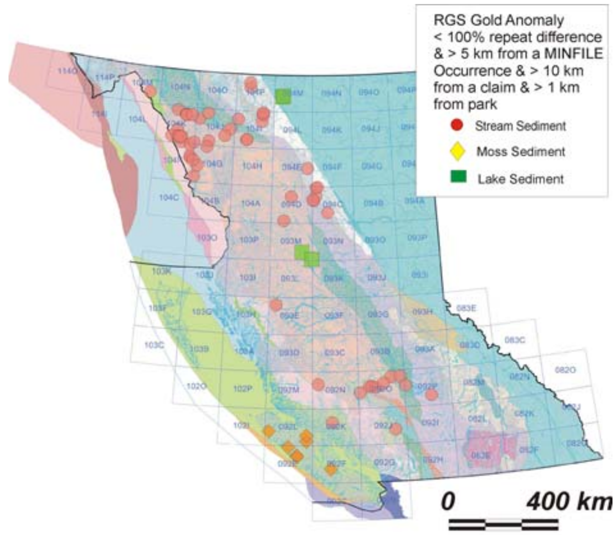

Figure 2. This map shows the location of RGS Au anomalies where the mean difference between the initial and repeat Au determination is less than 100 percent, and the sample site is more than 5 kilometres from a MINFILE mineral occurrence, 10 kilometres from a mineral claim (as of January 1st, 2007) and 1 kilometre from a park. NOTE: While every effort has been made to check that the location of the Au anomalies shown in this figure and listed as coordinates in Appendix A meet the screening criteria, readers of the Geofile are strongly recommended to confirm the present mineral titles status.

ROCK GEOCHEMISTRY

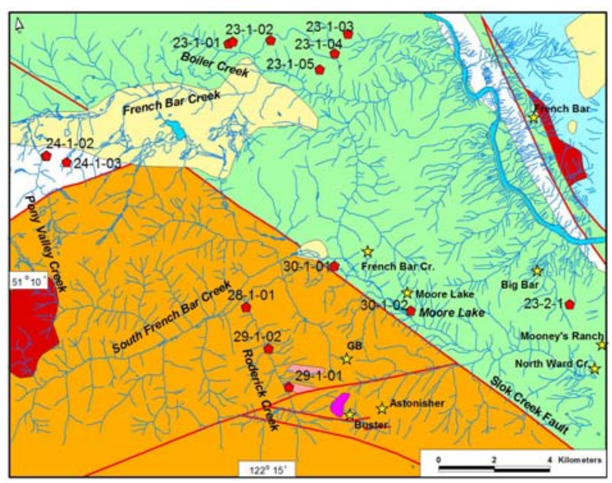

Figure 3. Location of rock samples collected in the French Bar creek area.

Rock samples were collected as part of the multi-media geochemical survey in the French Bar Creek area and analysed to provide information about background levels for elements in bedrock. Preliminary results of the multi-media survey are described by Lett, 2007 and

are summarized in the poster. Rock sample locations are shown in Figure 3 and the results for selected pathfinder elements are listed in Table 1. The rock samples were jaw crushed, split and milled to -150 mesh in a ring and puck mill. Sub samples were analysed by instrumental neutron activation (INAA) at Activation Laboratories, Ancaster, Ontario and by aqua regia digestion – inductively coupled mass spectrometry (ICPMS) at Acme Analytical, Vancouver, BC. Data quality was monitored from the results of blind, random replicates and standards inserted with the samples submitted for analysis. An Excel table containing all of the rock geochemical data with sample descriptions is located in Appendix B where the analytical method and concentration units are indicated by the column header, for example Au_INAA_ppb represents Au by instrumental neutron activation in parts per billion.
Photographs of the samples described in Appendix B are in Appendix C.

Table 1. Geochemistry of rock samples collected in the French Bar Creek area. Copper, Pb, Zn and As are in ppm and Ag in is ppb and were determined by aqua regia digestion-ICPMS; Au is ppb and was determined by INAA. Values for Au below detection limit are indicated by -2.

Field ID	Notes	Cu	Pb	Zn	Ag	As	Au
28-1-01	Jackass Mtn. Sst.	55.73	6.33	85.2	33	18.7	17
29-1-01	Jackass Mtn. Sst.	5.92	3.17	110.3	13	25.8	-2
29-1-02	Jackass Mtn. Sst.	27.55	3.87	38	79	48.1	270
30-1-01	Unknown	60.69	4.63	76.9	26	16	-2
30-1-02	Eocene Volc.	3.8	1.6	48.9	9	1	-2
23-1-01	Eocene Volc.	4.93	8.51	17.6	35	2	-2
23-1-02	Eocene Volc.	13.64	1.88	37.6	14	4.3	-2
23-1-03	Eocene Volc.	28.12	1.42	49.1	26	26.6	-2
23-1-04	Eocene Volc.	42.82	5.04	55.1	7	99.7	-2
23-1-05	Eocene Volc.	45.44	3.11	53.8	31	95	-2
23-1-06	Eocene Volc.	36.36	4.75	57.2	30	38.6	-2
24-1-01	Jackass Mtn. Sst.	14.24	4.14	66.6	5	11.1	-2
24-1-02	Jackass Mtn. Sst.	37.39	3.22	56.7	13	10.5	7
23-2-1	Jackass Mtn. Sst.?	31.46	2.23	49.1	9	94.5	-2

ADDITIONS TO THE RGS DATABASE

Proposed additions to the RGS database are shown on a map on the right-hand panel of the poster. Some of the RGS and rock geochemistry database enhancements are updates with the results of recent surveys. Publication of the updated databases is planned for later in the spring of 2007. Other upgrades are publication of results from previous geochemical orientation surveys (e.g. Jennings River) or the further reanalysis of archived RGS samples. For example, many of the samples from NTS maps sheets 82L and 82 E were not analysed for pathfinder elements such as Hg. The reanalysis of these samples by aqua-regia ICPMS would increase the number of elements and the data could help identify new mineral deposits. The RGS database will also be enhanced by the results of future Geoscience BC surveys such as the lake sediment survey carried out by Jackaman and Balfour, 2007.

ACKNOWLEDGEMENTS

Owen Lett kindly photographed the rock samples and his help in creating Appendix C of the Geofile is very much appreciated by the authors.

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