Update of rock geochemical database at the British Columbia Geological Survey

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Databases for this paper can be downloaded from

https://www2.gov.bc.ca/gov/content/industry/mineral-exploration-mining/british-columbia-geological-survey/publications/geofiles#GF2020-02

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Summary

The development of the British Columbia Geological Survey (BCGS) rock geochemical database provides a solution for storing and managing data collected by BCGS geologists and their associates in a systematic and consistent fashion. Rock geochemical data are integral part of the provincial lithogeochemical data, which also include geochemical data from basal till, and drainage sediments such as bedload alluvium, moss-mat sediment, and lacustrine deposits, and alluvial heavy mineral concentrates. Lithogeochemical data characterize primary dispersion of elements in bedrock, secondary (mechanical, hydrous, gaseous, and biological) dispersion in weathered rocks, soil, and other surficial sediments, and mechanical dispersion streams such as bedload alluvium, colluvium, and other glacially transported materials. New rock geochemical data are format-standardized, metadata-completed, quality-controlled, and populated into the database, where they are integrated with existing data for permanent maintenance and storage. When the database is updated, rock geochemical data products are then derived from the database for release.

At the beginning of 2016, a new BCGS rock geochemical database was developed and populated with data compiled from 214 BCGS releases published between 1986 and 2015. It included about 11,000 samples with 250,000 determinations analyzed by 26 analytical methods in 21 laboratories (Han et al., 2016). Since the original release, we have been updating the database, which is now augmented with new rock geochemical data compiled from BCGS publications between 2016 and 2019. The new data include 721 samples from 16 locations (Fig. 1) with ca. 45,000 determinations analyzed by 10 analytical methods in five laboratories.

This GeoFile releases the new rock geochemical data in four CSV files (BCGS_GF2020-02.zip): 1) 'rock_geochem_data.csv', contains sample-level information and analyte concentrations determined by various analytical methods (Table 1); 2) 'rock_geochem_lab.csv' is a metadata file that provides information about detection limits, analytical laboratory, and sample pre-processing (Table 2); 3) 'rock_geochem_method.csv' is a file of reference for all analytical methods and the codes adopted in the above 'rock_geochem_data.csv'; and 4) 'bcgs_rock_geochem_data_all.csv' contains all rock geochemical data currently stored in the BCGS lithogeochemical database. These files are GIS-ready and made consistent in definition and format with those published in Han et al. (2016).

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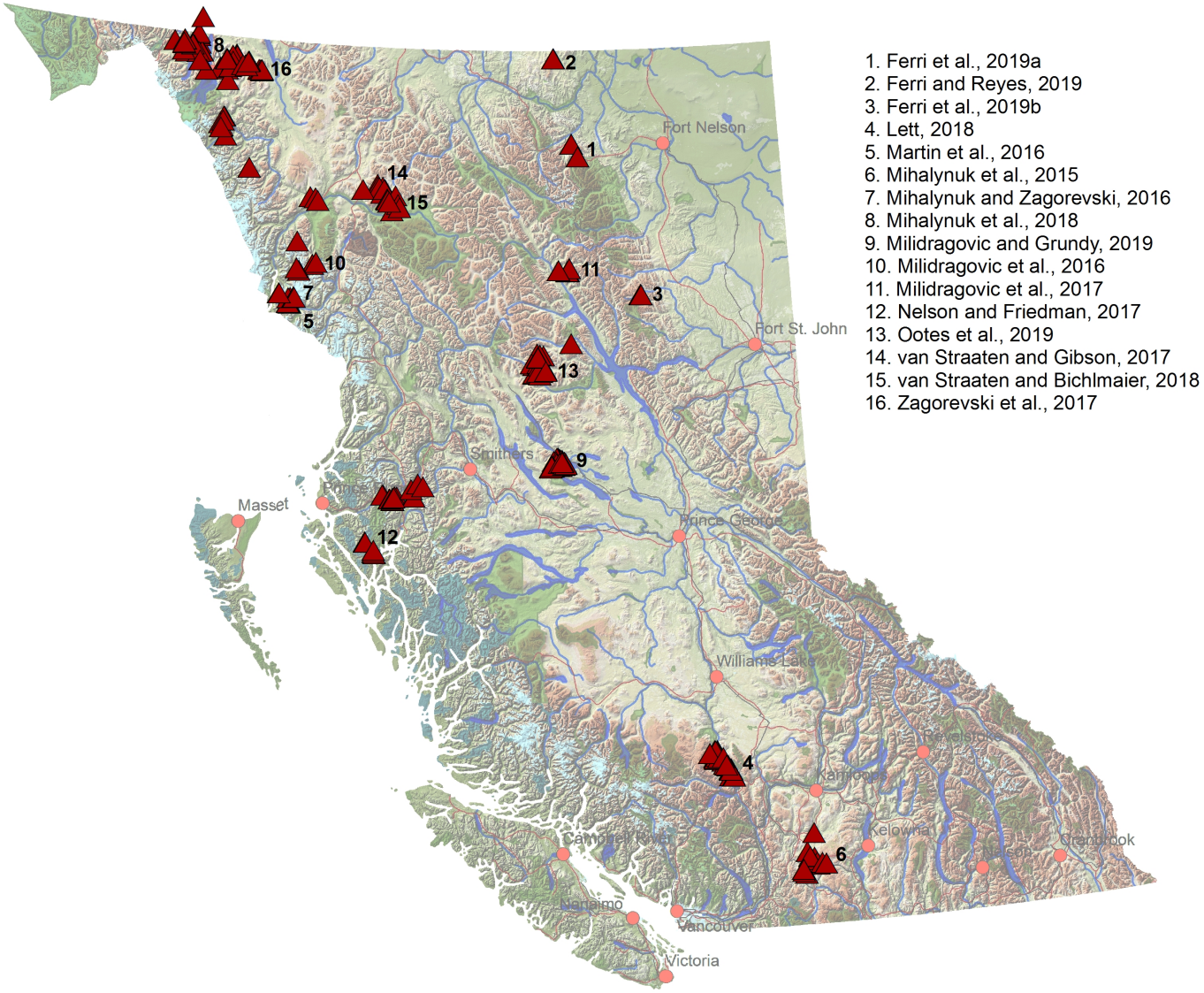

Fig. 1. Sample locations and sources of new rock geochemical data published by BCGS between 2006 and 2019 and added to database

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Table 1. Information in rock_geochem_data.csv

Attribute name	Description	Example of attribute value
Sample_ID	Sequential number used as the row counter (generated by database)	5360
Sample_Name	Original sample or field names in publication or other data sources	CRE88-27
Sample_Type	Type of samples: either surface or drill core	surface
Sample_Desc	Sample description, which may include information about sample lithology, rock unit, mineralization, locality, or topography	Silicic andesite
Pub_Issue	Identification of the publication where a sample was reported	P1992-04
WGS84_Lat	Sample latitude in WGS84	48.90037
WGS84_Long	Sample longitude in WGS 84	-123.28742
WGS84_Elev	Sample elevation (m) above sea level	1250
Coord_Confidence	Confidence of sample location accuracy	H
BCGS_Grid	Mapsheet number in 1:20,000 BCGS map grid where a sample resides	92B.091
As_AAS_ppm	Arsenic concentration in ppm determined by Atomic Absorption Spectrometry (AAS), where samples were dissolved by aqua regia.	96
…	Concentration of next analyte determined by an analytical method	…

Table 2. Information in rock_geochem_lab.csv

Attribute name	Description	Example of attribute value
Data_Source	Publication identification	GF2001-08
DL_MAS	Representation of values below minimum detection limit (as appeared in the data source) for a given analytical method (in this example, MAS stands for multi-acid digestion atomic absorption spectrometry)	<DL
…	Representation of values below minimum detection limit (as appeared in the data source) for a given analytical method.	…
Prep_Lab	Name of the analytical laboratory where sample preparation was conducted.	BCGS
Lab_XRF	Name of the analytical laboratory where analysis by a given analytical method was conducted (in this example, XRF means X-ray fluorescence).	P1992-04
…	Name of the analytical laboratory where analysis by a given analytical method was performed.	…

Table 3. Information in rock_geochem_method.csv

Attribute name	Description	Example of attribute value
Method_Code	Abbreviation of an analytical method name	LE
Desc	Description of an analytical method	Leco combustion
Group	Partial or total determinations	Total determination
Detail	Analytical detail	Typically a 0.5g or 1g milled sample is mixed with a tin-copper conductor and heated in an oxygen stream in a closed system induction furnace. The SO2 and CO2 evolved are measured by an IR sensor or by volumetric/titrametric methods.

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