

**GEOSCIENCE BC
SUMMARY OF ACTIVITIES 2019:
MINERALS**

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Geoscience BC (2020): Geoscience BC Summary of Activities 2019: Minerals; Geoscience BC, Report 2020-01, 172 p.

Summary of Activities: Minerals (Geoscience BC)

Annual publication

ISSN 2562-8623 (Print)

ISSN 2562-8631 (Online)

Geoscience BC

1101–750 West Pender Street

Vancouver, British Columbia V6C 2T7

Canada

Front cover photo and credit: Mineral Deposit Research Unit (The University of British Columbia) field assistant, A. Boileau Morrison, at Alunite ridge, Toadogone district, northern British Columbia (F. Bouzari, 2019).

Back cover photo and credit: Chalcopyrite and pyrite in quartz specimen from the Granisle copper mine, on display at the Lakes District Museum Society in Burns Lake, British Columbia (J. Moffat, 2019).

Foreword

Geoscience BC is pleased to once again present results from our ongoing projects and scholarship winners in our annual *Summary of Activities* publication. Papers are published in two separate volumes: *Energy and Water*, and this volume, *Minerals*. Both volumes are available in print and online via www.geosciencebc.com.

Summary of Activities 2019: Minerals

This volume, *Summary of Activities 2019: Minerals*, contains 20 papers from Geoscience BC–funded projects or scholarship recipients that are within Geoscience BC’s strategic focus area of minerals. The papers are divided into two sections, based on Geoscience BC’s strategic objectives of

- 1) Identifying New Natural Resource Opportunities, and
- 2) Advancing Science and Innovative Geoscience Technologies.

The first two papers in the ‘Identifying New Natural Resource Opportunities’ section focus on northern Vancouver Island. Clift et al. describe Geoscience BC’s latest airborne magnetic and radiometric survey in the region, which adjoins an earlier Geoscience BC–supported magnetic survey flown in 2012. Morris and Canil examine skarn mineralization in the Merry Widow Mountain area.

Four papers present research into mineralization or coal in southern British Columbia (BC). Branson et al. highlight exploration for podiform chromite occurrences using ground magnetometry. Höy et al. discuss ongoing work on mineral potential in the east half of the Penticton map area (NTS 082E), and Rioseco et al. present new Ar/Ar ages for the Purcell Anticlinorium and the Kootenay Arc. Also in the Kootenay region, Kuppusamy and Holuszko introduce a new Geoscience BC–supported project to investigate the potential for extracting rare-earth elements from East Kootenay coal seams.

Two papers discuss the potential of machine-learning techniques to support mineral exploration in BC. In Grunsky and Arne, advanced data analytics and machine learning are applied to the results from regional stream-sediment sampling in southwestern BC. Murphy et al. introduce a project designed to develop a database of gold compositions from across the province, which can be interrogated using machine-learning techniques.

Finally, Sacco et al. highlight initial activities being undertaken in one of Geoscience BC’s new Central Interior Copper-Gold Research series of projects. These projects, which will start new field activities in 2020, are focused on investigating the potential for undiscovered mineral deposits buried beneath thick glacial sediments between Mackenzie and Williams Lake.

In the ‘Advancing Science and Innovative Geoscience Technologies’ section, three papers highlight new methods in exploration geochemistry. Lett et al. present an investigation into the use of soil-gas detectors for mapping geological faults and detecting buried mineralization, as soil-gas anomalies have been reported above faulting and mineralization from a range of deposits across the northern hemisphere. Dunn and Heberlein took advantage of archived tree-top samples collected during the TREK project to further research the use of halogen elements as an exploration tool. Jackaman and Lett investigate a modified regional stream-sediment sampling methodology that integrates the collection of bulk-sediment samples to derive mineralogical information with trace-metal data in south-central BC.

Three papers describe research into new tools and techniques that will benefit exploration in BC. Bouzari et al. introduce a new project examining advanced argillic alteration associated with BC porphyry systems to identify key textural, mineralogical and geochemical trends to help guide exploration across the province. Mackay et al. discuss their ongoing study using the Roben Jig to clean exploration coal samples for analysis. Finally, Cutts et al. describe an exciting new project aimed at assessing the potential for rocks in BC to sequester atmospheric carbon dioxide in minerals.

Three papers describe new Geoscience BC initiatives focused on preserving BC’s geological heritage. Barlow et al. describe the methods and benefits of capturing geoscience data contained in NI 43-101 reports pertaining to BC and making them searchable by location through a map layer hosted by Geoscience BC and also updating MINFILE occurrences. Randell et al. introduce a project aimed at digitally preserving key rock and mineral samples in BC through an online, interactive museum; and Ledwon and Ogryzlo highlight updates to the Smithers Exploration Group’s Rock Room.

The final two papers present the results of ongoing mining-reclamation studies led by Thompson Rivers University. Gervan et al. examine the response of invertebrates to reclamation and soil-amendment treatments, and Fischer et al. consider microbial and geochemical changes within topsoil stockpiles set aside for post-mining reclamation.

Geoscience BC Minerals Publications 2019

In addition to the two *Summary of Activities* volumes, Geoscience BC releases interim and final products from our projects as Geoscience BC reports. The following seven Minerals reports and maps were published in 2019:

- Twelve technical papers in the *Geoscience BC Summary of Activities 2018: Minerals and Mining* volume (Geoscience BC Report 2019-01)
- **Bedrock Geology, Search Phase I Project Area, Western Skeena Arch, West-Central British Columbia**, by J.J. Angen, M. Rahimi, J.L. Nelson and C.J.R. Hart (Geoscience BC Map 2019-03-01 / MDRU Map 17-2018 / BCGS Open File 2019-07)
- **Aeromagnetic Correlation with Bedrock Geology, Search Phase I Project Area, Western Skeena Arch, West-Central British Columbia**, by J.J. Angen, M. Rahimi, J.L. Nelson and C.J.R. Hart (Geoscience BC Map 2019-03-02 / MDRU Map 18-2018 / BCGS Open File 2019-08)
- **Mineral Mapping Using ASTER Data, Search Phase I Project Area, Western Skeena Arch, West-Central British Columbia**, by M. Rahimi, J.J. Angen and C.J.R. Hart (Geoscience BC Map 2019-03-03 / MDRU Map 19-2018)
- **Geology of the Penticton Map Sheet (east half; NTS 082E/01, 02, 07, 08, 09, 10, 15, 16)**, by T. Höy (Geoscience BC Map 2019-04)
- **Producing Clean Coal from Western Canadian Coal Fields using the Water-Based Roben Jig: Refining the Process**, by M. Mackay, R. Leeder, L. Giroux, M. Holuszko, H. Dexter and D. Thomas (Geoscience BC Report 2019-05)
- **An Exploration Framework for Porphyry to Epithermal Transitions in the Toodoggone Mineral District (094E)**, by F. Bouzari, T. Bissig, C.J.R. Hart and H. Leal-Mejía (Geoscience BC Report 2019-08 / MDRU Publication 424)

All releases of Geoscience BC reports, maps and data are published on our website and are announced through e-mail updates. Most final reports and data can also be viewed or accessed through our Earth Science Viewer at <https://gis.geosciencebc.com/esv/?viewer=esv>.

Acknowledgments

Geoscience BC would like to thank all authors and reviewers of the *Summary of Activities* for their contributions to this volume. RnD Technical is also acknowledged for its work in editing and assembling both volumes. As well, Geoscience BC would like to acknowledge the Province of British Columbia and our project funding partners for their ongoing support of public geoscience, and express our appreciation for the leaders and volunteers in British Columbia's mineral exploration, mining and energy sectors who support our organization through their guidance, use and recognition of the information that we collect and distribute.

Christa Pellett
Vice President, Minerals
Geoscience BC
www.geosciencebc.com

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