

# **GEOSCIENCE BC SUMMARY OF ACTIVITIES 2020: MINERALS**

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**Front cover photo and credit:** Crew member B. Elder sampling till as part of the Central Interior Copper-Gold Research Projects: surficial exploration program (H. Bains, 2020).

## Foreword

Geoscience BC is pleased to once again present results from our ongoing projects and scholarship recipients 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](http://www.geosciencebc.com).

### Summary of Activities 2020: Minerals

This volume, *Summary of Activities 2020: Minerals*, contains 15 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 the Central Interior Copper-Gold Research series of projects, which are aimed at increasing our knowledge of the highly prospective Quesnel terrane where it is obscured by extensive glacial-till cover. Sacco et al. provide an update on the development of till-sampling-suitability maps and reanalysis of archived till samples, and describe fieldwork undertaken in 2020 to collect new till geochemical samples. Mitchinson et al. aim to look below the surficial material by using geology and 3-D geophysics to model the thickness of the glacial cover and resolve geophysical anomalies that may indicate prospective hostrocks.

Two papers highlight ongoing research in BC's Golden Triangle area. Pellett et al. give an update on Geoscience BC's initiative to purchase industry geophysical data and compile it with existing publicly available data to create new geophysical products. Peddle and Johnston describe structural-geology investigations at the Brucejack deposit, which is the focus of the lead author's M.Sc. thesis.

Chapman et al. discuss progress over the last year in their establishment of a database containing microchemical characterization of gold particles in different styles of mineralization from across the province, and the identification of gold signatures using exploratory data analysis.

The final three papers in this section focus on southern BC. Morris and Canil describe ongoing geochemical investigations at the Merry Widow deposit on Vancouver Island, and Höy et al. detail new geochronological analyses and mapping investigations conducted last summer in the Penticton map area. Kuppusamy and Holuszko describe ongoing work to investigate the rare-earth element (REE) content of southern BC coal deposits and the potential to extract REEs from them.

The 'Advancing Science and Innovative Geoscience Technologies' section starts off with Ledoux and Hart presenting continuing research into porphyry-indicator minerals, particularly the use of zircon to potentially distinguish variability in magmatic-porphyry fertility in southern BC's Quesnel terrane. The following two papers turn their attention to the Toodoggone district in northern BC. Bouzari et al. detail ongoing research into using mineralogy and geochemistry to vector toward deposits within advanced argillic-altered rocks, and Jones et al. present new zircon geochemistry that will help characterize the magmatic evolution and mineral potential of northern Hogem batholith.

Switching from papers with a mineral-exploration theme to work that supports responsible natural-resource development, Doucet et al. describe research into potential methods to measure CO<sub>2</sub> fluxes between the atmosphere and mine tailings containing ultramafic minerals. Two papers describe ongoing research at Thompson Rivers University focused on biological studies to support improved mine reclamation in southern BC. Gervan et al. focus on the response of invertebrates as a measure of examining reclamation success, and Fischer et al. consider changes in geochemical and microbial properties as they relate to depth in topsoil stockpiles.

Finally, Ledwon and Ogryzlo provide an update on improvements to Smithers Exploration Group's Rock Room and getting their message out during the COVID-19 pandemic.

## Geoscience BC Minerals Publications 2020

In addition to the two *Summary of Activities* volumes, Geoscience BC releases interim and final Geoscience BC reports and maps. The following ten ‘Minerals’ reports were published in 2020:

- Twenty technical papers in the **Geoscience BC Summary of Activities 2019: Minerals** volume (Geoscience BC Report 2020-01)
- **Microbial-Community Fingerprints as Indicators for Buried Mineralization in British Columbia**, by R.L. Simister, B.P. Iulianella Phillips, P.A. Winterburn and S.A. Crowe (Geoscience BC Report 2020-03 / MDRU Publication 446)
- **A Geochemical Investigation of Halogens in Spruce Treetops and Integration with Existing Multi-Element Data – Blackwater/TREK Regions, Central British Columbia (NTS 093C, 093F)**, by C.E. Dunn and D.R. Heberlein (Geoscience BC Report 2020-04)
- **Vancouver Island North Regional Project – Airborne Magnetic and Radiometric Survey**, by Precision GeoSurveys Inc. (Geoscience BC Report 2020-05)
- **Mineral-Resource Prediction Using Advanced Data Analysis and Machine Learning of the QUEST-South Stream-Sediment Geochemical Data, Southwestern British Columbia (Parts of NTS 082, 092)**, by E.C. Grunsky and D.C. Arne (Geoscience BC Report 2020-06)
- **Real-Time Analysis of Soil Gas for Carbon Dioxide and Oxygen to Identify Bedrock Mineralization and Geological Faults Beneath Glacial Deposits in Central British Columbia**, by R.E. Lett, D.A. Sacco, B. Elder and W. Jackaman (Geoscience BC Report 2020-07)
- **Assessing Porphyry Copper Deposit Fertility in British Columbia Batholiths using Zircons**, by F. Bouzari, C.J.R. Hart and T. Bissig (Geoscience BC Report 2020-08 / MDRU Publication 450)
- **Producing Clean Coal Samples from Western Canadian Coalfields Using the Water-Based Roben Jig Process: Application to an Industrial Setting**, by M. Mackay, L. Giroux, R. Leeder, H. Dexter, J. Halko, M. Holuszko and D. Thomas (Geoscience BC Report 2020-10)
- **Digitizing British Columbia’s Geological Heritage: Geoscience BC Final Report**, by J. Moffatt, A. Whistler, J. Sly, A. Randell and L. Connor (Geoscience BC Report 2020-11)
- **The Carbon Mineralization Potential of Ultramafic Rocks in British Columbia: A Preliminary Assessment**, by D. Mitchinson, J. Cutts, D. Fournier, A. Naylor, G. Dipple, C.J.R. Hart, C. Turvey, M. Rahimi and D. Milidragovic (Geoscience BC Report 2020-15 / MDRU Publication 452)

All releases of Geoscience BC reports, maps and data are published on our website and are announced through our website and 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. COVID-19 has made this a challenging year for both field programs and laboratory research, and Geoscience BC is grateful for the perseverance of our researchers and scholarship recipients in continuing their projects during the past nine months.

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 data and information that we collect and distribute.

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