

# British Columbia Geological Survey Publications 2024 including peer-reviewed external papers co-authored by BCGS staff

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## Papers

Geological Fieldwork 2023. British Columbia Ministry of Energy, Mines and Low Carbon Innovation, British Columbia Geological Survey Paper 2024-01, 183 p.

Ootes, L., Cui, Y., Clarke, G., and Hickin, A.S., 2024. British Columbia Geological Survey annual program review 2023-2024. In: Geological Fieldwork 2023, British Columbia Ministry of Energy, Mines and Low Carbon Innovation, British Columbia Geological Survey Paper 2024-01, pp. 1-11.

Hickin, A.S., Ootes, L., Orovan, E.A., Brzozowski, M.J., Northcote, B.K., Rukhlov, A.S., and Bain, W.M., 2024. Critical minerals and mineral systems in British Columbia. In: Geological Fieldwork 2023, British Columbia Ministry of Energy, Mines and Low Carbon Innovation, British Columbia Geological Survey Paper 2024-01, pp. 13-51.

Orovan, E.A., Zaborniak, K., and Hooker, K., 2024. Textural evidence for ore fluid transport and the magmatic to hydrothermal transition at the past-producing Kitsault Mo-Ag mine. In: Geological Fieldwork 2023, British Columbia Ministry of Energy, Mines and Low Carbon Innovation, British Columbia Geological Survey Paper 2024-01, pp. 53-64.

Brzozowski, M.J., and Zaborniak, K., 2024. Sulphide mineralization at the E&L magmatic Ni-Cu-PGE deposit: Textural evidence for contamination, vapour saturation, fluid immiscibility, and metal remobilization. In: Geological Fieldwork 2023, British Columbia Ministry of Energy, Mines and Low Carbon Innovation, British Columbia Geological Survey Paper 2024-01, pp. 65-78.

Wearmouth, C.D., Peters, K.J., Czertowicz, T.A., and Orovan, E.A., 2024. Mineral potential modelling results for northwestern British Columbia, a comparison between past and current work at the British Columbia Geological Survey. In: Geological Fieldwork 2023, British Columbia Ministry of Energy, Mines and Low Carbon Innovation, British Columbia Geological Survey Paper 2024-01, pp. 79-95.

Rukhlov, A.S., Cui, Y., Cunningham, Q., Fortin, G., and Anderson, C., 2024. Geochemical signals of carbonatite-related critical metals in provincial stream sediments. In: Geological Fieldwork 2023, British Columbia Ministry of Energy, Mines and Low Carbon Innovation, British Columbia Geological Survey Paper 2024-01, pp. 97-122.

Ootes, L., Rukhlov, A.S., and Han, T., 2024. British Columbia Geological Survey rock geochemical and geochronological data products: Examples of utility. In: Geological Fieldwork 2023, British Columbia Ministry of Energy, Mines and Low Carbon Innovation, British Columbia Geological Survey Paper 2024-01, pp. 123-129.

Mihalynuk, M.G., Zagorevski, A., Campbell, R., Hajiegeh, A., and Vaillancourt, A., 2024. Preliminary results from revision mapping of the Gladys Lake area, near Atlin, northwest British Columbia. In: Geological Fieldwork 2023, British Columbia Ministry of Energy, Mines and Low Carbon Innovation, British Columbia Geological Survey Paper 2024-01, pp. 131-148.

van Straaten, B.I., 2024. Upper Hazelton Group stratigraphy along the Stikine arch, northwestern British Columbia. In: Geological Fieldwork 2023, British Columbia Ministry of Energy, Mines and Low Carbon Innovation, British Columbia Geological Survey Paper 2024-01, pp. 149-177.

Appendix: British Columbia Geological Survey Publications 2023, including peer-reviewed external papers co-authored by BCGS staff. pp. 179-183.

## Geoscience Maps

Schiarizza, P., 2024. Bedrock geology, Bonaparte Lake-Quesnel River, parts of NTS 92P, 93A, 93B. British Columbia Ministry of Energy, Mines and Low Carbon Innovation, British Columbia Geological Survey Geoscience Map 2024-01, 1:125,000 scale.

## Open Files

Clarke, G., Northcote, B.K., Corcoran, N.L., Pothorin, C., Heidarian, H., and Hancock, K., 2024. Mines, mine development, selected proposed mines, and selected exploration projects in British Columbia, 2023. British Columbia Ministry of Energy, Mines and Low Carbon Innovation, British Columbia Geological Survey Open File 2024-01.

Elia, E.A., Ferbey, T., and Ward, B.C., 2024. Mapping surficial sediments in the Interior Plateau using remotely piloted aircraft system lidar. British Columbia Ministry of Energy, Mines and Low Carbon Innovation, British Columbia Geological Survey Open File, 2024-03, 12 p.

Ferbey, T., Elia, E.A., Shives, R.B.K., Martin-Burtart, N., Best, M., and Ward, B.C., 2024. Quantifying potassium concentrations in Interior Plateau surface sediments using remotely piloted aircraft system gamma-ray spectrometry. British Columbia Ministry of Energy, Mines and Low Carbon Innovation, British Columbia Geological Survey Open File 2024-04, 19 p.

Ootes, L., and Wall, C., 2024. High-precision U-Pb zircon igneous crystallization and detrital zircon maximum depositional ages from the Toodoggone region, north-central British Columbia. British Columbia Ministry of Energy, Mines and Low Carbon Innovation, British Columbia Geological Survey Open File 2024-06, 10 p.

Elia, E.A., Ferbey, T., Campagne, T., Best, M., Shives, R.B.K., and Ward, B.C., 2024. Investigating surface sediment composition in the Interior Plateau using a remotely piloted aircraft system magnetometer. British Columbia Ministry of Energy, Mines and Low Carbon Innovation, British Columbia Geological Survey Open File 2024-07, 11 p.

Oneschuk, D., Hayward, N., Fortin, G., and Hickin, A.S., 2024. Residual total magnetic field and first vertical derivative of the magnetic field: Compilations of British Columbia. British Columbia Ministry of Energy, Mines and Low Carbon Innovation, British Columbia Geological Survey Open File 2024-08. Also published as Geological Survey of Canada Open File 9222, 1:500,000 scale.

< <https://doi.org/10.4095/p1xpddgswc> >

Veness, H., Elia, E.A., and Ferbey, T., 2024. A digital update of Open File 1992-13: Surficial geology map index of British Columbia. British Columbia Ministry of Mining and Critical Minerals, British Columbia Geological Survey Open File 2024-09, 2 p.

Wilson, A.M., Russell, J.K., and Harris, M.A., 2024. Glaciovolcanism in the Garibaldi volcanic belt: Nine geological maps from southeastern British Columbia, Canada. British Columbia Ministry of Mining and Critical Minerals, British Columbia Geological Survey Open File 2024-10, 64 p.

Höy, T., and Jackaman, W., 2024. Geology of the Rossland-Trail map sheet (NTS 082F/04). Geoscience BC Map 2024-02-01, British Columbia Ministry of Mining and Critical Minerals, British Columbia Geological Survey Open File 2024-12, 1:50,000 scale.

Höy, T., and Jackaman, W., 2024. Geology of the Castlegar map sheet (NTS 082F/05). Geoscience BC Map 2024-02-02, British Columbia Ministry of Mining and Critical Minerals, British Columbia Geological Survey Open File 2024-13, 1:50,000 scale.

## GeoFiles

Clarke, G., Northcote, B.K., Corcoran, N.L., Pothorin, C., Heidarian, H., and Hancock, K., 2024. Exploration and mining in British Columbia, 2023. British Columbia Ministry of Energy, Mines and Low Carbon Innovation, British Columbia Geological Survey GeoFile 2024-01 (poster).

- Corcoran, N.L., 2024. Exploration and mining highlights, Northwest Region, 2023. British Columbia Ministry of Energy, Mines and Low Carbon Innovation, British Columbia Geological Survey GeoFile 2024-02 (poster).
- Heidarian, H., 2024. Exploration and mining highlights, North Central and Northeast regions, 2023. British Columbia Ministry of Energy, Mines and Low Carbon Innovation, British Columbia Geological Survey GeoFile 2023-03 (poster).
- Pothorin, C., 2024. Exploration and mining highlights, South Central Region, 2023. British Columbia Ministry of Energy, Mines and Low Carbon Innovation, British Columbia Geological Survey GeoFile 2024-04 (poster).
- Hancock, K., 2024. Exploration and mining highlights, Southeast Region, 2023. British Columbia Ministry of Energy, Mines and Low Carbon Innovation, British Columbia Geological Survey GeoFile 2024-05 (poster).
- Northcote, B.K., 2024. Exploration and mining highlights, Southwest Region, 2023. British Columbia Ministry of Energy, Mines and Low Carbon Innovation, British Columbia Geological Survey GeoFile 2024-06 (poster).
- Wallace, B., and Norris, J., 2024. Assessment report summary: Expenditures and activities 2021. British Columbia Ministry of Energy, Mines and Low Carbon Innovation, British Columbia Geological Survey GeoFile 2024-07 (poster).
- Shaw, K., Norris, J., and Cui, Y., 2024. MINFILE: British Columbia's mineral occurrence database. British Columbia Ministry of Energy, Mines and Low Carbon Innovation, British Columbia Geological Survey GeoFile 2024-08 (poster).
- Han, T., and Rukhlov, A.S., 2024. Update of rock geochemical database at the British Columbia Geological Survey. British Columbia Ministry of Energy, Mines and Low Carbon Innovation, British Columbia Geological Survey GeoFile 2024-09, 5 p.
- Campbell, R.W., Mihalynuk, M.G., and Zagorevski, A., 2024. Geochemical and magnetic susceptibility of samples collected from the Gladys Lake area, near Atlin, northwest British Columbia (NTS 104N/11, 13, 14, and 15). British Columbia Ministry of Energy, Mines and Low Carbon Innovation, British Columbia Geological Survey GeoFile 2024-10, 4 p.
- Bain, W., 2024. Ore and alteration textures from Co-bearing iron skarns: Examples from Vancouver and Texada islands. British Columbia Ministry of Energy, Mines and Low Carbon Innovation, British Columbia Geological Survey GeoFile 2024-11 (poster).
- Mihalynuk, M.G., Zagorevski, A., and Campbell, R.W., 2024. Update on geology of the Gladys Lake area, northwest British Columbia, and ultramafic associated massive sulphide potential. British Columbia Ministry of Energy, Mines and Low Carbon Innovation, British Columbia Geological Survey GeoFile 2024-12 (poster).
- Cordey, F., Zagorevski, A., Mihalynuk, M.G., and Campbell, R.W., 2024. Report on samples collected for radiolaria identification in the Gladys Lake-Mount Bryde area, near Atlin, British Columbia. British Columbia Ministry of Energy, Mines and Low Carbon Innovation, British Columbia Geological Survey GeoFile 2024-13, 2 p.
- Spence, D.W., Scoates, J.S., Goan, I.R., Nott, J.A., Nixon, G.T., and Milidragovic, D., 2024. Dynamic magmatic processes recorded in the Tulameen ultramafic-mafic Alaskan-type intrusion from outcrop-scale structures and mineral-scale textures. British Columbia Ministry of Energy, Mines and Low Carbon Innovation, British Columbia Geological Survey GeoFile 2024-14 (poster).
- Bain, W.M., and Waugh, S.A.F., 2024. Ore and alteration textures of limestone-hosted magnetite-sulphide mineralization at the Merry Widow deposit, Vancouver Island, British Columbia. British Columbia Ministry of Energy, Mines and Low Carbon Innovation, British Columbia Geological Survey GeoFile 2024-15, 14 p.

## **Information Circulars**

Clarke, G., Northcote, B.K., Corcoran, N.L., Pothorin, C., Heidarian, H., and Hancock, K., 2024. Provincial Overview of Exploration and Mining in British Columbia, 2023. British Columbia Ministry of Energy, Mines and Low Carbon Innovation, British Columbia Geological Survey, Information Circular 2024-01, 149 p.

Clarke, G., Northcote, B.K., Corcoran, N.L., Pothorin, C., Heidarian, H., and Hancock, K., 2024. Exploration and Mining in British Columbia, 2023: A summary. In: Provincial Overview of Exploration and Mining in British Columbia, 2023. British Columbia Ministry of Energy, Mines and Low Carbon Innovation, British Columbia Geological Survey Information Circular 2024-01, pp. 1-53.

Corcoran, N.L., 2024. Exploration and mining in the Northwest Region, British Columbia. In: Provincial Overview of Exploration and Mining in British Columbia, 2023. British Columbia Ministry of Energy, Mines and Low Carbon Innovation, British Columbia Geological Survey Information Circular 2024-01, pp. 55-83.

Heidarian, H., 2024. Exploration and mining in the North Central and Northeast regions, British Columbia. In: Provincial Overview of Exploration and Mining in British Columbia, 2023. British Columbia Ministry of Energy, Mines and Low Carbon Innovation, British Columbia Geological Survey Information Circular 2024-01, pp. 85-102.

Pothorin, C., 2024. Exploration and mining in the South Central Region, British Columbia. In: Provincial Overview of Exploration and Mining in British Columbia, 2023. British Columbia Ministry of Energy, Mines and Low Carbon Innovation, British Columbia Geological Survey Information Circular 2024-01, pp.103-124.

Hancock, K., 2024. Exploration and mining in the Southeast Region, British Columbia. In: Provincial Overview of Exploration and Mining in British Columbia, 2023. British Columbia Ministry of Energy, Mines and Low Carbon Innovation, British Columbia Geological Survey Information Circular 2024-01, pp. 125-135.

Northcote, B.K., 2024. Exploration and mining in the Southwest Region, British Columbia. In: Provincial Overview of Exploration and Mining in British Columbia, 2023. British Columbia Ministry of Energy, Mines and Low Carbon Innovation, British Columbia Geological Survey Information Circular 2024-01, pp. 137-149.

British Columbia Geological Survey, 2024. British Columbia Geological Survey. British Columbia Ministry of Energy, Mines and Low Carbon Innovation, British Columbia Geological Survey Information Circular 2024-02, 1 p. (brochure)

British Columbia Geological Survey, 2024. Mineral Development Office. British Columbia Ministry of Energy, Mines and Low Carbon Innovation, British Columbia Geological Survey Information Circular 2024-03, 4 p. (brochure)

British Columbia Geological Survey, 2024. Online databases at the British Columbia Geological Survey. British Columbia Ministry of Energy, Mines and Low Carbon Innovation, British Columbia Geological Survey Information Circular 2024-04, 14 p. (brochure)

British Columbia Geological Survey, 2024. Critical minerals. British Columbia Ministry of Energy, Mines and Low Carbon Innovation, British Columbia Geological Survey Information Circular 2024-05, 4 p. (brochure)

### **External peer-reviewed journal and volume publications**

Heidarian, H., Lentz, D.R., Thorne, K.G., and McFarlane, C.R.M., 2024. Devonian intrusions of southwestern New Brunswick, Canada: U-Pb geochronology, petrogenesis and genetic constraints on gold mineralization. *International Geology Review*, 66, 2741-2767.

<<https://doi.org/10.1080/00206814.2023.2299917>>

Kovalick, A., Heard, A.W., Johnson, A.C., Chan, C.S., Ootes, L., Nielsen, S.G., Dauphas, N., Weber, B., and Bekker, A., 2024. Living in their heyday: Iron oxidizing bacteria bloomed in shallow-marine, subtidal environments at ca. 1.88 Ga. *Geobiology*, in press.

Marcelissen, M., Hollings, P., Cooke, D., Baker, M.J., Belousov, I., Orovan, E., and Friedman, R.M., 2024. Geochronology of the Mines Gaspé porphyry deposit, Québec, Canada. *Canadian Journal of Earth Sciences*, 61, 876-893.

<<https://doi.org/10.1139/cjes-2024-0013>>

Maxeiner, R.O., Bosman, S.A., Card, C.D., Marsh, A., Morelli, R.M., Couëslan, C., Martins, T., Reid, K., Easton, R.M., Knox, B., Mihalynuk, M.G., Ootes, L., Cui, Y., Grobe, M., Guemache, M.A., Lawley, C.J.M., Böhm, C., and Ashton, K.E., 2024. Classifying intrusive and strongly metamorphosed rock units: CLASS-a cooperative lithodemic and stratigraphic system. *Canadian Journal of Earth Sciences*, 61, pp. 1014-1042.

<<https://doi.org/10.1139/cjes-2024-0057>>

Nixon, G.T., Manor, M.J., Scoates, J.S., Spence, D.W., and Milidragovic, D., 2024. Mineralogical constraints on magma storage conditions in ultramafic arc cumulates and the nature and role of cryptic fugitive melts: Tulameen Alaskan-type intrusion, North American Cordillera. *Contributions to Mineralogy and Petrology*, 179, article 103.

<<https://doi.org/10.1007/s00410-024-02181-6>>

Plouffe, A., Lee, R.G., Byrne, K., Kjarsgaard, I.M., Petts, D.C., Wilton, D.H.C., Ferbey, T., and Oelze, M., 2024. Tracing detrital epidote derived from alteration halos to porphyry Cu deposits in glaciated terrains: The search for covered mineralization. *Economic Geology*, 119, 305-329.

<<https://doi.org/10.5382/econgeo.5049>>



Spence, D.W., Scoates, J.S., Milidragovic, D., Nott, J.A., and Nixon, G.T., 2024. Olivine in ultramafic rocks from the Polaris Alaskan-type intrusion: A geochemical record of open-system crystallization, diffusional re-equilibration, mantle source, and redox conditions in primitive arc magmas. *Lithos* 474-475, article 107578.  
<<https://doi.org/10.1016/j.lithos.2024.107578>>

Xu, Xinyue, Bain, W.M., Tornos, F., Hanchar, J.M., Lamadrid, H.M., Lehmann, B., Xu, Xiaochun, Steadman, J.A., Bottrill, R.S., Soleymani, M., Rajabi, A., Li, P., Tan, X., Xu, Shihong, Locock, A.J., and Steele-MacInnis, M., 2024. Magnetite-apatite ores record widespread involvement of molten salts. *Geology*, 52, 417-422.  
<<https://doi.org/10.1130/G51887.1>>

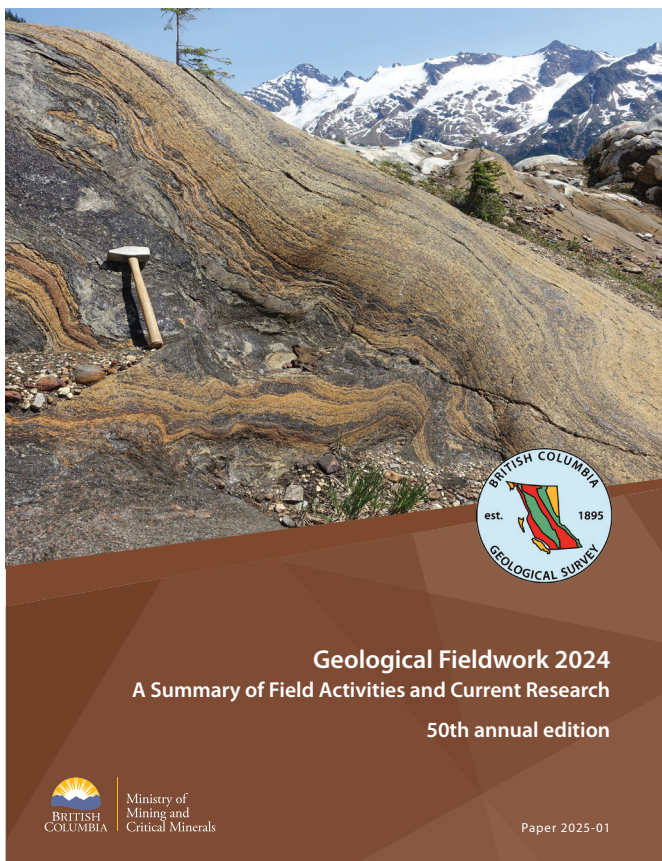
### Contributions to partner publications

Abdale, L., Nelson, J., and Groat, L.A., 2024. Testing the relationship between the Cottonbelt Pb-Zn deposit and the carbonatite-syenite province of the Frenchman Cap dome area, southeastern British Columbia (NTS 082M/06, 07, 10). In: *Geoscience BC Summary of Activities 2023*, Geoscience BC, Report 2024-01, pp. 3-10.

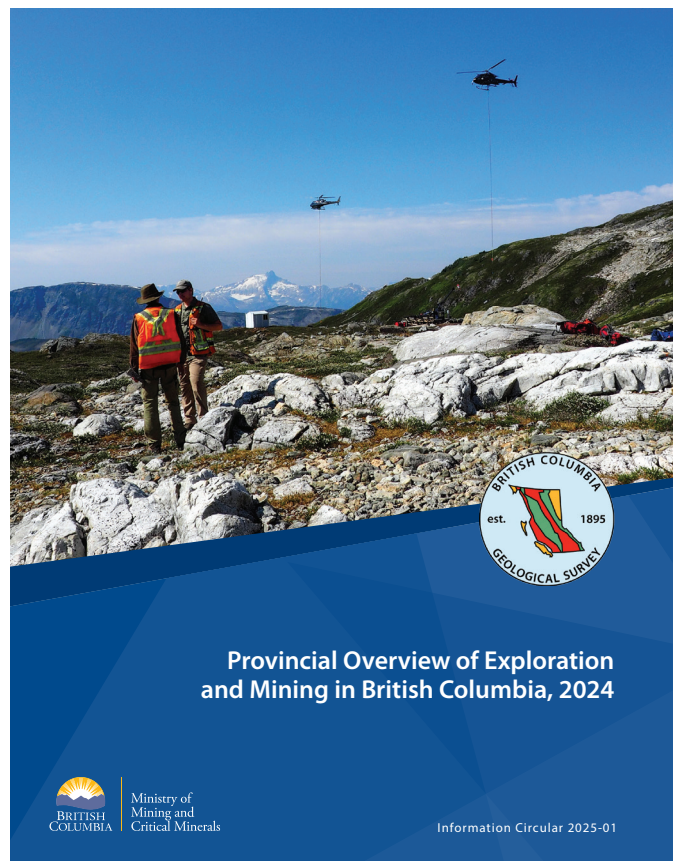
Johnston, R.J., Kennedy, L.A., Hickey, K.A., and van Straaten, B.I., 2024. Revisiting the stratigraphy of the alkalic Stuhini Group in the Galore Creek area, northwestern British Columbia (parts of NTS 104G/03, 04). In: *Geoscience BC Summary of Activities 2023*, Geoscience BC, Report 2024-01, pp. 59-66.

Milidragovic, D., Petts, D.C., Beauchamp, M., Polivchuk, M.J., and Nixon, G.T., 2024. Major- and trace-element geochemistry of chromite from Alaskan-type ultramafic-mafic intrusions in British Columbia. *Geological Survey of Canada, Open File 9201*, 25 p.  
<<https://doi.org/10.4095/p1vd4aw6sj>>

Each year, the British Columbia Geological Survey publishes *Geological Fieldwork*, a *Summary of Fieldwork and Current Research* (this volume), and the *Provincial Overview of Mining and Exploration in British Columbia*. All British Columbia Geological Survey publications can be downloaded, at no cost, from [www.BCGeologicalSurvey.ca](http://www.BCGeologicalSurvey.ca)



Geological Fieldwork volume, British Columbia Geological Survey Paper 2025-01



Provincial Overview of Mining and Exploration in British Columbia volume, Information Circular 2025-01