

**GEOSCIENCE BC
SUMMARY OF ACTIVITIES 2022:
ENERGY AND WATER**

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Geoscience BC (2023): Geoscience BC Summary of Activities 2022: Energy and Water; Geoscience BC, Report 2023-02, 72 p.

Summary of Activities: Energy and Water (Geoscience BC)

Annual publication

ISSN 2562-2757 (Print)

ISSN 2562-2765 (Online)

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Front cover photo and credit: Surveying of high water levels at the Doig River hydrometric station, northeastern British Columbia. Photo by R. Rolick.

Foreword

It has been another busy and exciting year at Geoscience BC. We launched a membership program early in 2022 and introduced ‘Project Concepts’, which are outlines of future research programs, in July. And throughout, we continued to support leading-edge geoscience research in British Columbia, highlights of which are presented in our annual *Summary of Activities* publication. Papers are published in two separate volumes: *Minerals*, and this volume, *Energy and Water*. Both volumes are available in print and online via www.geosciencebc.com.

Summary of Activities 2022: Energy and Water

This *Summary of Activities 2022: Energy and Water* volume contains seven papers from ongoing Geoscience BC projects and 2022 Geoscience BC Scholarship recipients that are within Geoscience BC’s strategic focus areas of energy and water. The papers are divided into four sections, based on Geoscience BC’s strategic objectives of

- 1) Identifying New Natural Resource Opportunities,
- 2) Facilitating Responsible Natural Resource Development,
- 3) Enabling Clean Energy, and
- 4) Understanding Water.

The volume starts off with Pelletier et al. providing an update on a multiyear project to develop a database of brines containing lithium and other dissolved minerals and metals through a large-scale sampling program in northeastern British Columbia (BC). In the ‘Facilitating Responsible Natural Resource Development’ section, Geoscience BC Scholarship recipient Esmaeilzadeh and co-author Eaton investigate the effect of fault sealing on induced seismicity in northeastern BC.

The ‘Enabling Clean Energy’ section contains four papers on geological carbon capture and storage, and geothermal energy. First, Hughes summarizes the *Northeast BC Geological Carbon Capture and Storage Atlas*, which Geoscience BC published in early 2023. Next, Geoscience BC Scholarship recipient Nazemi and co-author Dashtgard present research on a 3-D reconstruction of the Georgia Basin and its potential to sequester carbon dioxide. Grasby et al. provide an update on fieldwork undertaken at Mount Cayley as part of ongoing research into the geothermal potential of the Garibaldi Volcanic Belt. This is followed by an examination by Scholarship recipient Hormozzade Ghalati and co-authors of the Mount Meager Volcanic Complex using 3-D inversion of audio-magnetotelluric data.

The volume concludes with a summary by Rolick et al. of the second year of a pilot collaborative water-monitoring program in northeastern BC.

Geoscience BC Energy and Water Publications 2022

Geoscience BC published the following six Energy and Water geoscience reports in 2022:

- Ten technical papers in the **Geoscience BC Summary of Activities 2021: Energy and Water** volume (Geoscience BC Report 2022-02)
- **Amplification of Seismic Ground Motion in the Fort St. John – Dawson Creek Area, Northeastern British Columbia**, by P.A. Monahan, B.J. Hayes, M. Perra, Y. Mykula, J. Clarke, C. Gugins, C. Candy, D. Griffiths, O. Bayarsaikhan, O. Jones and U. Oki (Geoscience BC Report 2022-05)
- **Distribution, Origin, and Implications of Hydrogen Sulphide in Unconventional Reservoir Rocks in Western Canada with Insights into the Stratigraphic Zonation and Lateral Variability of Producing Hydrocarbon Liquids**, by R.M. Bustin, G. Chalmers, P.L. Silva and A. Bustin (Geoscience BC Report 2022-06)
- **A Comprehensive Investigation of Injection-Induced Earthquakes in Northeastern British Columbia, Canada**, by H. Kao (Geoscience BC Report 2022-10)
- **B.C. Montney Produced Water to Saleable Salt Technology Pilot Test**, by Saltworks Technologies Inc. (Geoscience BC Report 2022-11)
- **Garibaldi Geothermal Energy Project – Phase 2: Mount Cayley 2021 Field Report**, by S.E. Grasby, R.W. Barendregt, A. Borch, A. Calahorrano-DiPatre, Z. Chen, C. Hanneson, M. Harris, S.L. Quane, J.K. Russell, E.G. Slobodian, M.J. Unsworth, G. Williams-Jones and W. Yuan (Geoscience BC Report 2022-14)

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

Looking Forward: 2023 and Beyond

Project Concepts

As Geoscience BC looks ahead to 2023 and beyond, we are working with partners and members to develop project concepts: proposed research relating to critical minerals and metals, geological carbon capture and storage, generating cleaner energy (including geothermal, hydrogen and low carbon intensity natural gas), and monitoring and mitigating greenhouse gas emissions. These are designed for a collaborative funding model with input and contributions from federal and provincial governments, industry, trusts and others. Geoscience BC is currently applying for research funding and reaching out to prospective project sponsors for all project concepts.

Some of the new project concepts take already successful Geoscience BC project ideas and apply them to a new part of the province. Building on the *Northeast BC Geological Capture and Storage Atlas*, conceptual projects in the Nechako and Georgia basins would compile existing geoscience data and assess the carbon sequestration potential in central and southwestern BC. Geothermal energy remains a priority as well, with project concepts developed for both northwestern and southeastern BC. Finally, project concept ‘HazNet (Hazard Network) Pacific’ would involve a multiyear program to assess regional environmental hazards (e.g., earthquakes, air quality, etc.) using ultra-high density, strategically placed sensors, initially in the Lower Mainland of BC.

Membership

Geoscience BC membership opportunities make it easy for a wide range of partners to learn about new project concepts, as well as support, provide input, network and stay up to date on Geoscience BC minerals, energy and water research. Corporate, Individual, Student and Associate memberships provide a variety of opportunities to suit industry, academia, communities, Indigenous groups and governments as we work toward shared goals. Geoscience BC launched the membership program early in 2022 and, as of mid-December 2022, has 140 members.

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.

Geoscience BC would like to thank all members, project sponsors and champions for their ongoing support of public geoscience. As well, Geoscience BC would like to 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, and their use and recognition of the data and information that we collect and distribute.

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