

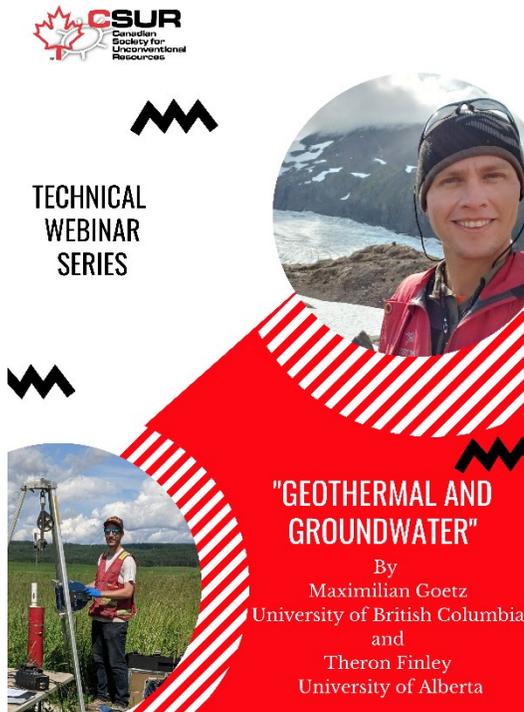
October 2020 – CSUR Technical Webinar

CSUR and Geoscience BC Host Webinars to Celebrate Young Geoscience Researchers

SESSION II

As part of a joint CSUR – Geoscience BC initiative, four graduate students who have recently earned Graduate Scholarships from Geoscience BC were provided an opportunity to present their work and elaborate on their research. The objective of the first session was to focus on the research in the area of Induced Seismicity. The 2nd session of this collaborative effort was used to highlight the research work on the topics of Groundwater and Geothermal.

Maximilian (Max) Goetz, a Masters Student in the Hydrogeology Research Group at University of British Columbia, and Theron Finley, currently a Ph.D. Student at the University of Victoria, were invited to participate in this 2nd session. As in the previous session, Dr. Brad Hayes, President of Petrel Robertson Consulting and Chair of CSUR's Outreach Program, handled the moderating duties once again. Carlos Salas, Geoscience BC Executive VP & Chief Scientific Officer, and Randy Hughes, Manager of Energy & Water at Geoscience BC, provided the opening remarks again and reiterated their vision on the importance of the scholarship program and the research, both at the academic level and with industry partners.



**TECHNICAL
WEBINAR
SERIES**

**"GEOHERMAL AND
GROUNDWATER"**

By
Maximilian Goetz
University of British Columbia
and
Theron Finley
University of Alberta

Max expanded on the specifics of his research project, which is a purpose-built, 29-station Groundwater Monitoring network in the Peace region of NE BC. The network's main objective is to be able to characterize & monitor regional groundwater and also to assess & source the dissolved methane using stable isotope analysis. The study also included collecting data from the newer wells in order to be able to determine groundwater recharge corridors for the region in terms of recharge rate, quality and availability for industrial usage.

Theron then discussed his recently completed Masters project on Geothermal Systems while at University of Alberta. He was able to apply his experience in geothermal energy from various regions around the world to his MSc research work. Although Canada does not have any active geothermal power or heat production, the focus area for Theron's research of SE BC suggests higher geothermal potential than the rest of Canada. However, various factors and uncertainties need to be evaluated & assessed in order to de-risk the potential projects. He went on to describe how structural geology could be used to improve the understanding of fault-hosted geothermal systems in the region. This in turn could provide the necessary understanding and impetus for commercial projects in the future.

ABSTRACT: The Canadian Society for Unconventional Resources and Geoscience BC will jointly host two webinars in September and October to highlight the geoscience research of four graduate students who have recently earned Geoscience BC Graduate Scholarships.

Each webinar will feature a presentation by two students, highlighting their research on induced seismicity, geothermal resources and hydrogeology. The researchers are M.Sc and PhD candidates working at University of British Columbia, University of Alberta, and University of Calgary.

Webinars will be open to CSUR members and all other interested parties, and will offer insights into current geoscience research and the opportunity to ask questions of the students. Each session will also feature a discussion highlighting views from these young leaders on their engagement in geoscience and how they see the future of geoscience, industry and employment opportunities unfolding.

PRESENTATION #1

Installation of a purpose-built groundwater monitoring network to characterize groundwater methane in the Peace Region, BC.

The occurrence of methane in shallow groundwater systems is a topic of increasing interest in regions of active oil and gas development. Anthropogenic methane sourced from leaky energy wells can migrate into these aquifers, potentially causing deleterious effects, such as degradation in groundwater quality. In order to assess regional groundwater methane in the Peace Region of NEBC, this project installed a purpose-built groundwater well network, consisting of 29 monitoring stations. This study aims to characterize and monitor regional groundwater, with a specific focus on the distribution, concentration and origin of dissolved methane. The results of this work will provide data to inform decision-making on policy & regulation related to groundwater protection and fugitive gas.

As a focused sub-study, data from newly installed monitoring wells were used to construct a regional-scale 3-D numerical groundwater model centered on an archetypal NEBC paleovalley setting. The primary objective is to delineate key recharge pathways and residence times of buried valley and fractured bedrock aquifers.

PRESENTER: Maximilian Goetz, B. Sc., M. Sc. Candidate in Geological Sciences at University of British Columbia.

Maximilian Goetz is a Masters student in the Hydrogeology research group at University of British Columbia, supervised by Roger Beckie. He received his B.Sc. at McGill University in Earth & Planetary Sciences (2014). Between his undergraduate and graduate studies, Max worked as a site geologist at a copper porphyry-skarn mine in New Mexico. As a member of the Energy & Environment Research Initiative (EERI), Max has been working on research related to the installation of a groundwater monitoring well network in Northeast BC (NEBC).

PRESENTATION #2

Structurally-controlled geothermal systems in southeastern BC, and their context in Canada and the world.

Canada currently has no geothermal power or heat production despite high potential in many regions, particularly western Canada. There are several barriers to geothermal development in Canada including socioeconomic and regulatory factors. However, a major obstacle is simply geological uncertainty regarding reservoir characteristics that make drilling a risky investment. Geological, geophysical, and geochemical methods are needed to predict, find, and characterize geothermal resources in order to de-risk drilling.

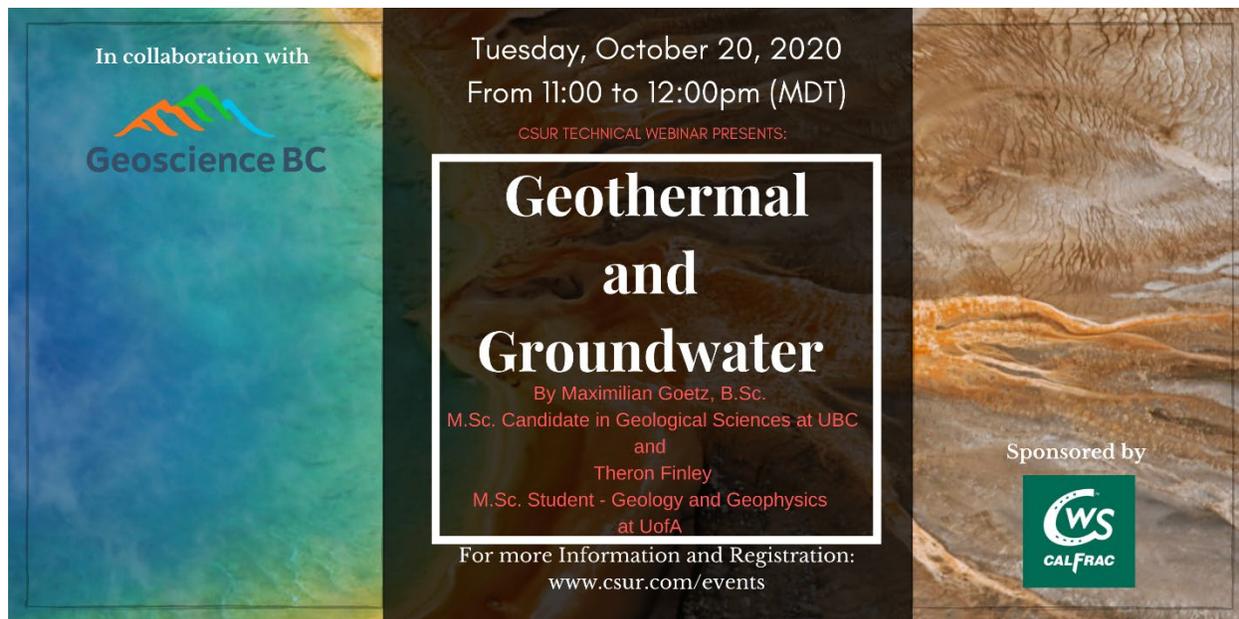
In the first part of my talk, I will provide an overview of the different kinds of geothermal resources around the world and the different methods that are required to investigate them. Not all geothermal systems are the same, and factors like the geologic setting, heat source, and hydrogeology all have implications for the exploration and development of a resource. I will compare global geothermal systems to those here in Canada and provide a summary of the recent developments of these resources.

In the second part of my talk, I will describe my MSc research on fault-hosted geothermal systems in southeastern BC, and show how I used structural geology to improve our understanding of the controls on locations of geothermal systems in this region. Hot springs in southeastern BC are spatially associated with major faults, but the specific structural controls on their location are poorly understood. I found evidence that many of these faults are host to recent or ongoing dextral slip, and that most hot springs occur at strain concentration zones such as restraining bends or fault tips. This framework may allow for prediction of previously unidentified "blind" geothermal systems.

PRESENTER: Theron Finley, M. Sc. Student - Geology and Geophysics, University of Alberta.

I recently defended my MSc at the University of Alberta where I worked under the supervision of Martyn Unsworth, Stephen Johnston, and Jonathan Banks in the geothermics research group. Before that, I completed my BSc at the University of Victoria in 2017. I am primarily a structural geologist, broadly interested in applying those tools to active geological processes including neotectonic deformation, landscape evolution, and geothermal systems. I have seven seasons of experience conducting geological fieldwork for a variety of projects, and I also dabble in various geophysical methods. During my MSc I was awarded a Hugh Morris Fellowship, which allowed me to travel globally to learn about geothermal energy exploration in different regions. This experience provided useful context and knowledge that greatly improved my MSc research.

Both presentations were moderated by Brad Hayes, PhD, P.Geol - Petrel Robertson Consulting Ltd. President and CSUR Outreach Director.



In collaboration with
Geoscience BC

Tuesday, October 20, 2020
From 11:00 to 12:00pm (MDT)

CSUR TECHNICAL WEBINAR PRESENTS:

**Geothermal
and
Groundwater**

By Maximilian Goetz, B.Sc.
M.Sc. Candidate in Geological Sciences at UBC
and
Theron Finley
M.Sc. Student - Geology and Geophysics
at UofA

For more Information and Registration:
www.csur.com/events

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