Exploring the near surface geothermal structure at Mt. Meager, British Columbia, Canada

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Mount Meager is located ~150 km north of Vancouver, British Columbia Canada, and is a part of the Garibaldi volcanic belt. Exploration at Mount Meager for geothermal energy resources has been ongoing since 1974 and has shown, based on well data, that there is a permeable zone at a depth of 1200-1600 m and that the reservoir has a temperature of 270 °C near 2500 m depth. In this study, we have utilized recordings and related information from a new network of 84 audio-magnetotelluric (AMT) stations collected during the summer of 2019 plus 37 stations from previous studies to investigate the geothermal potential of the area around Mount Meager and Pylon peak. We used Phoenix Geophysics’ MTU-5C recording equipment and their proprietary software for data processing, separating extensive noise from the signal, to calculate the components of the natural electrical and magnetic signals in the frequency domain. After manual processing and editing, the data showed good quality in the frequency range of 1 to 1000 Hz. The ModEM inversion algorithm (Egbert and Kelbert, 2012) was then used to model the data. Modelling started using a coarse grid mesh with different starting resistivities, and then a finer grid size and topography was added to refine the model. The preliminary result of this 3D inversion defines the shape and location of conductors in the study area. The results show a conductor at a depth 2000 m located to the southwest of Mount Meager. Comparison of the 3D model and the geological setting of the area demonstrated that this conductor shallows toward the southern portion of the No-good Fault.