

Garibaldi Geothermal Volcanic Belt Assessment Project Research Methodology Overview – June 2019 *To accompany 'Draft Project Outline – February 2019'*

Task 2: MT stations:

Deployment time: 24-48 hours on each site

Time people are on site: ~ 1 hour for installation, 0.5 hr for removal.

Number of people on site: 2 to 4.

Ground disturbance: A schematic of the array is displayed in Figure 1 below. To construct this, at each site, 7 holes in total are dug by hand shovel. Of these 7 holes, 4 holes are ~ 30 cm deep, and 15 cm diameter for electrodes (Figure 2); 2 holes are ~30 cm deep and 30 cm diameter for magnetometers (Figure 3); 1 hole is ~ 1 metre deep and 30 cm diameter for a vertical magnetometer. Wires connecting all equipment in the holes lie loosely on the surface, connecting equipment to a small centrally located battery powered recorder that sits on the ground and left under a tarp (Figure 4).

Total footprint: Each deployment will be over a 50 x 50 m area, although the actual impacted area is small as the electrodes are spread out by 25 m wires from the central recorder (see Figure 4 for total footprint).

Clean up: All holes are refilled, dirt is tamped down by hand shovel, wires are coiled and all equipment is removed. Site is inspected to ensure no material is left behind and it is returned to as close to a natural look as possible.

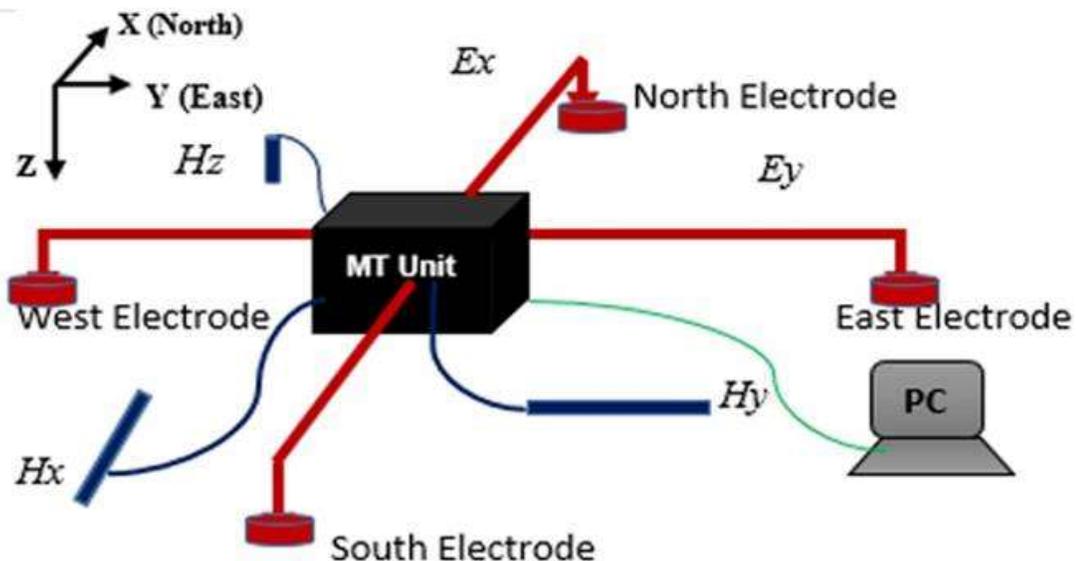


Figure 1: Schematic diagram of MT instalment that is left on site for 24 to 48 hours. Note that the PC is not left on site but just used to communicate on set up and download data when moved.



Figure 2: Photo showing electrode (black box) installed in the ground (~15 cm diameter).



Figure 3: Photo showing magnetometers (red bar) installed in the ground (~ 30 cm long).



Figure 4: Photo of a typical field MT installation as it is left on the ground for 24 to 48 hours.

Task 3: Passive seismic stations:

Deployment time: 4 to 6 weeks on each site

Time people are on site: ~ 0.5 hour for installation, 0.5 hr for removal

Number of people on site: 2 to 4

Ground disturbance: A geophone is pushed by hand ~ 10 cm into the ground. A small recording box is left on surface (Figure 1)

Total footprint: < 1 x 1 metre

Clean up: The small hole is refilled, dirt is tamped down by hand, all equipment is removed. Site is inspected to ensure no material is left behind and it is returned to as close to a natural look as possible.



Figure 1: Field photo of typical passive seismic recorded. The recording unit is the box with the red and blue connectors. The other silver box is the battery. The orange geophone (at the end of the cable towards the lower part of the picture) is pushed into the ground to a depth of ~10 cm. For our installations we may include a plastic Rubbermaid tub to hold the recorder and battery. Feet on the lower right provide a scale.

Task 3: Broadband seismic stations:

Deployment time: 18 to 24 months on each site

Time people are on site: ~ 2 hour for installation, 1 hr for removal

Number of people on site: 2 to 4

Ground disturbance: A hole 1 metre deep and 1 metre diameter is dug into the ground using hand tools.

A corrugated drainage pipe is installed in the hole to house the sensor (Figure 1). This is then covered and buried underground (Figure 2). A solar panel is installed above ground to provide a source of clean power to the installation. The solar panel and instrument box is the only part that is visible above ground (Figure 3). Sites can be located where previous land disturbance has occurred to minimize any new impacts.

Total footprint: 4 x 4 metre

Clean up: The instruments are removed and the hole is refilled, dirt is tamped down by hand shovel, all equipment is removed. Site is inspected to ensure no material is left behind and it is returned to as close to a natural look as possible.



Figure 2: Close up view of a sensor in the vault installed in the ground (~ 1 metre diameter). The sites around Mt. Meager might be directly buried and not have a pipe.

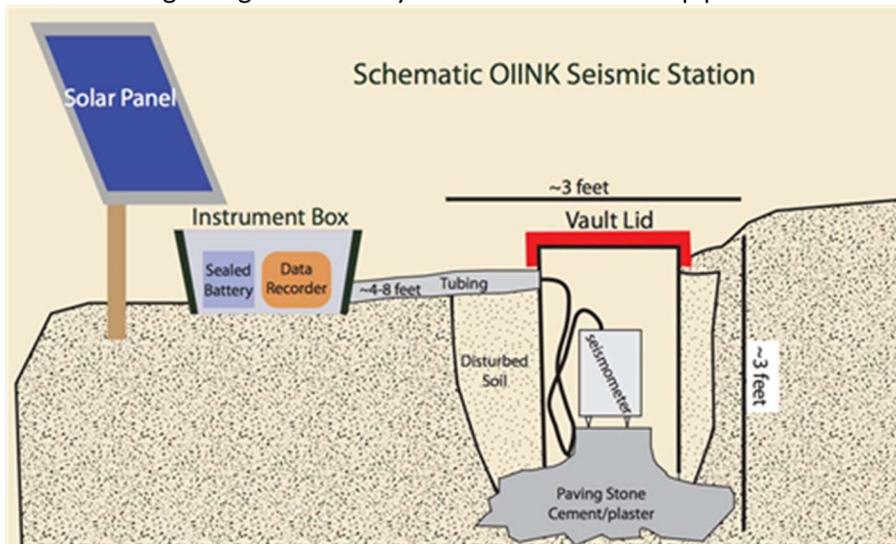


Figure 2: A illustration of a broadband site. The seismometer is in a 1 m³ hole in the ground. The batteries are recharged using a solar panel. The panel and instrument box are all that is visible above ground. The vault would be completely buried. Note that for Mt. Meager work cement will not be used.



Figure 3: Field photo of a broadband installation near Valemount BC.

Task 6: Field Camp:

Deployment time: 4 to 7 days on each site

Time people are on site: 4 to 7 days

Number of people on site: 2

Ground disturbance: Set up of 2 small personal tents (see Figure 1) and one cooking tent of similar size. Walking in and around camp area. Digging of pit latrine by hand shovel. Toilet paper is burned before burial in pit toilet. Grey water is screened and then poured into a small hand dug sump pit. Drinking water is collected from nearby streams. Garbage is burned nightly to reduce risk of predators.

Total footprint: 10 x 10 metre

Clean up: All equipment, remaining food, garbage will be removed. Latrine hole and sump pit will be refilled. Final inspection will ensure no trace camping rules are followed.



Figure 1: Typical field camp.