

Project Profile

Project Name:	Characterizing Ground Motion from Induced Seismicity in the Context of Cultural Noises
Project Number:	QOL-2022-01
Proponent:	McGill University
Funding Envelope:	Operations—Local issues
Timeframe:	January 1, 2022 to April 30, 2023

Project objectives

The objectives of the study are twofold:

1. conduct a systematic review of induced seismicity felt reports from northeast BC and cross-examine with a comprehensive seismicity catalog to identify possible relations between ground motion (instrument measurement), felt reports (societal response) and earthquake source properties.
2. compile a public database of ground motion measurements from a variety of cultural noises, tectonic, and induced earthquakes, to facilitate the communication of induced seismicity hazard and safety measures.

Project approach

The study will consist of the following two tasks:

1. Identify correlations with earthquake sources and environments:
 - conduct a systematic review of felt reports (2016-2022) related to hydraulic fracturing induced earthquakes in the Peace Region of northeast B.C. and search for correlations with earthquake sources and environments.
 - Compile a comprehensive seismicity catalog using the monitoring dataset from the seismograph network in the Peace Region. The catalog will include standard information (origin time, location, magnitude), and additional source properties (e.g., focal mechanism solution, stress drop, relocated hypocenters, event clusters).
 - cross-examine the felt reports against the seismicity catalog.
2. Compile a database of peak ground velocity (PGV) and acceleration (PGA) values from various types of cultural noises:

- collect and compile a database of PGV and PGA from various types of cultural noises. For example, ground motion recorded at varying distances to highways, railroads, construction sites, snow removal trucks driving by residential buildings.
- compare the PGV and PGA values of induced earthquakes to natural (tectonic) events of similar source properties (e.g., other seismic zones in Canada).

Project deliverables

The deliverables from this project include the following:

1. Interactive webpage which allows end-users to visualize and compare the different types of ground motions.
2. Final report—containing the following:
 - summary of the attribution and common features of felt (vs. unfelt) events based on earthquakes source and environment properties.
 - summary of the compiled ground motion database of variable sources.