This folder contains the data used in this study.

Subfolders:

1. Earthquake\_Catalogue: Earthquake catalogue used in this study. Sources are listed in section 2.1
2. Geological\_Features: only data from publically available sources are included. More information on features can be found in below table and appendix A.

* HF Wells: value of calculated geological properties at hydraulic fracturing wells.
* Montney Grid: value of calculated geological properties at 2.5 km grid in Montney.
* Operational data are collected from geoSCOUT and are Proprietary.

|  |  |  |  |
| --- | --- | --- | --- |
| Abbreviation | Feature Name | Source | Data |
| b\_value | 100km\_b\_value | Calculated in this study | Public |
| Basement\_Top | Precambrian\_Basement\_Top\_TVD (m) | Enlighten Geosciences Ltd. | Proprietary |
| BHCPv | BHCPv (m/sec) | geoSCOUT | Proprietary |
| Bulk\_Density | Bulk\_Density (kg/m3) | geoSCOUT | Proprietary |
| Dist\_Base | Dist\_Base (m) | Enlighten Geosciences Ltd. | Proprietary |
| Dist\_CBT | Distance\_CBT (km) | BC Oil and Gas Commission | Public |
| Dist\_Faults | Distance\_Faults (km) | Hayes et al., 2021 | Public |
| Dist\_LowerForm | Dist\_Deb/Bell (m) | BC Oil and Gas Commission | Public |
| Dist\_MidMon | Dist\_MidMon (m) | BC Oil and Gas Commission | Public |
| Dist\_TopMon | Dist\_TopMon (m) | BC Oil and Gas Commission | Public |
| Gamma\_Ray | Gamma\_Ray (GAPI) | geoSCOUT | Proprietary |
| Lower\_Form | Lower\_Formation\_ TVD (m) | BC Oil and Gas Commission | Public |
| Max\_ISIP | Max\_ISIP (Mpa) | geoSCOUT | Proprietary |
| Max\_Pb | Max\_Pb (Mpa) | geoSCOUT | Proprietary |
| Mon\_Thickness | Montney\_Thickness (m) | BC Oil and Gas Commission | Public |
| Montney-Mid | Middle\_Montney\_ TVD (m) | BC Oil and Gas Commission | Public |
| Montney-Top | Upper\_Montney \_TVD (m) | BC Oil and Gas Commission | Public |
| pp\_grad | Pore Pressure Gradient (kpa/m) | BC Oil and Gas Commission | Public |
| ppgrad\_SD | Standard Deviation of Pore Pressure Gradient | BC Oil and Gas Commission | Public |
| Seismo\_index | Seismogenic\_index | Calculated in this study | Public |
| Shear\_Strain | Shear\_Strain | Kao et al., 2018 | Public |
| Shmax\_variation | Shmax Variation (degree) | World stress map | Public |
| Shmin | Shmin (Mpa) | geoSCOUT | Proprietary |
| WellDensity | Well density | geoSCOUT | Proprietary |

1. Input\_Data: input data for machine learning models. More description can be found in sections 2.4.

* Mw 1.1: Cut off magnitude of Mw=1.1
* Mw 2.0: Cut off magnitude of Mw=2.0

1. Output\_Susceptibility: Output of machine learning models’ predictions for susceptibility analysis.

* Mw 1.1: Cut off magnitude of Mw=1.1
* Mw 2.0: Cut off magnitude of Mw=2.0