

Readme file for BC SRC Annual Seismicity Report May 2023 - April 2024 – Seismicity Catalogue

This file describes the catalogue produced by the Induced Seismicity Monitoring Project (ISMP) from May 2023 - April 2024. The catalogue is provided as a CSV file, including all the events that passed the quality control measures. The quality control measures vary depending on which segment of the catalogue an event belongs to. All events in the catalogue have been reviewed by a human analyst.

Note that the catalogue contains some events from the Canadian National Seismograph Network (CNSN). The events from CNSN have fewer parameters than events determined as part of the ISMP. The missing parameters are listed as “NaN” in the earthquake catalogue.

The quality control measures for each segment of the catalogue are listed below.

- CNSN
 - The latitude must be $\geq 55.5^\circ$ N and $< 60^\circ$ N
 - The longitude must be $\geq -123.5^\circ$ E and $< -119.8^\circ$ E
- KSMMA
 - The depth must be less than 8 kilometres deep
 - At least 9 phases must be used to determine the earthquake hypocentre
 - The latitude must be $\geq 55.6^\circ$ N
- NORTHERN_MONT
 - There are two different sets of criteria for this area
 1.
 - a. The depth must be less than 20 kilometres deep
 - b. At least 8 phases must be used to determine the earthquake hypocentre
 - c. The latitude must be $> 56.2^\circ$ N and $< 60^\circ$ N
 - d. The longitude must $\geq -123.5^\circ$ E and $< -119.8^\circ$ E
 - e. The major-axis error must be less than 30000 metres
 2.
 - a. The depth must be less than 20 kilometres deep
 - b. At least 8 phases must be used to determine the earthquake hypocentre
 - c. The latitude must be $> 56.05^\circ$ N and $< 60^\circ$ N
 - d. The longitude must $\geq -123.5^\circ$ E and $< -121.3^\circ$ E
 - e. The major-axis error must be less than 30000 metres

The catalogue contains several columns, each describing a specific attribute of the earthquake.

The meanings of these columns are listed below.

- Event number: An unique ID for each earthquake
- Date: Date of the earthquake. Measured in UTC time zone
- Time: Time of the earthquake. Measured in UTC time zone
- Event type: Event classification
- Northing: The earthquake hypocentre northing, expressed in meters
- Easting: The earthquake hypocentre easting, expressed in meters
- Depth: The earthquake depth, expressed in kilometres
- Northing Error: Uncertainty in northing. Measured in meters
- Easting Error: Uncertainty in easting. Measured in meters
- Depth Error: Uncertainty in depth. Measured in meters
- Milliseconds: Fraction of a second in which the earthquake occurred
- Local Magnitude: Calculated local magnitude

- Number of P picks: The number of P picks used to constrain the earthquake location
- Number of S picks: The number of S picks used to constrain the earthquake location
- Residual RMS: Root mean square of the travel time residuals in seconds
- Source - sensor Distance: The distance between the earthquake hypocentre and the receiving stations. Expressed in kilometers

References

Babaie Mahani, A., and H. Kao (2019). Accurate Determination of Local Magnitude for Earthquakes in the Western Canada Sedimentary Basin, *Seismological Research Letters*, Vol. 90, No. 1, p. 203-211,
https://www.researchgate.net/publication/328791480_Accurate_Determination_of_Local_Magnitude_for_Earthquakes_in_the_Western_Canada_Sedimentary_Basin