

## Moment tensor catalog

### of 182 the most stable events from the 2017 earthquake swarm in Fagradalsfjall, SW Iceland

#### Supplement to the paper:

Hrubcová, P., Vavryčuk, V., 2023. Tectonic stress changes related to plate spreading prior to the 2021 Fagradalsfjall eruption in SW Iceland, Tectonophysics, <https://doi.org/10.1016/j.tecto.2023.229761>.

The directory contains the ASCII file “catalogue\_2017.txt” with double-difference locations, magnitudes, moment tensors and their errors, rms values, and the numbers of inverted stations.

The catalogue\_2017.txt file lists the following quantities for each earthquake:

- event identification;
- double-difference locations with
  - origin time (year, day, hour, min, s),
  - latitude (degrees N),
  - longitude (degrees E),
  - depth (km);
- local magnitude  $M_L$  (calculated according to Jakoubková, 2018);
- $N$  – number of stations used in the MT inversion;
- frequencies  $f_1$  and  $f_2$  (in Hz) – low and high corner frequencies of the optimum Butterworth fourth-order band-pass filter;
- rms – calculated according to Eq. 1 in Vavryčuk et al., 2022;
- components of the normalized moment tensor –  $M_{11}$ ,  $M_{12}$ ,  $M_{13}$ ,  $M_{22}$ ,  $M_{23}$ , and  $M_{33}$  ( $x_1$  – north,  $x_2$  – east,  $x_3$  – down) – moment tensor normalized using the Euclidean norm;
- strike1, dip1, rake1, strike2, dip2, and rake2 (in degrees);
- DC, CLVD, and ISO (in %, calculated according to Eqs. 6–10 of Vavryčuk, 2015);
- errors in DC, CLVD, and ISO (in % – definition of errors according to Vavryčuk et al., 2022);
- deviations of the P/T axes (in degrees – definition of errors according to Vavryčuk et al., 2022);

Definition of rms (root-mean-squares):

$$\text{rms} = \frac{\sqrt{\sum_{i=1}^N (A_i^{\text{synth}} - A_i^{\text{obs}})^2}}{\sqrt{\sum_{i=1}^N (A_i^{\text{synth}})^2}},$$

where  $N$  is the number of stations;  $A^{\text{synth}}$ ,  $A^{\text{obs}}$  are synthetic and observed amplitudes, respectively.

Definition of normalization of moment tensors. The moment tensors are normalized by the so-called spectral norm

$$M = \max (|M_1|, |M_2|, |M_3|) = 1 ,$$

where  $M_1$ ,  $M_2$  and  $M_3$  are eigenvalues of the moment tensor.

## References

- Jakoubková, H., 2018. Earthquake swarms in diverse tectonic environments: West Bohemia and Southwest Iceland, Ph.D. thesis.
- Vavryčuk, V., 2015. Moment tensor decompositions revisited. *J. Seismol.*, 19, 231–252, <https://doi.org/10.1007/s10950-014-9463-y>.
- Vavryčuk, V., Adamová, P., Doubravová, J., Horálek, J., 2022. Moment tensor catalogue of earthquakes in West Bohemia from 2008 to 2018. *Earth Syst. Sci. Data*, 14, 2179–2194, <https://doi.org/10.5194/essd-14-2179-2022>.