Moment tensor catalog
of 389 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 f1 and f2 (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 – M11, M12, M13, M22, M23, and M33 (x1 – north, x2 – east, x3 – 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):

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

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

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

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

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.