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ABSTRACT BOOK

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The Geoscience paradigm:
resources, risks and future perspectives

A MATLAB tool to assess the quality of focal mechanisms for different purposes

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Knowledge of the reliability of focal mechanism solution is essential for seismological studies, especially for the analysis of low-energy earthquakes. Moreover, focal mechanisms are essential for constraining seismotectonic models, seismogenic fault geometries, and regional stress and strain fields. For this reason, we propose an updated version of the code introduced by Adinolfi et al. (2022), to estimate both the reliability of focal mechanisms and the capabilities of a seismic network in evaluating fault plane solutions with associated errors. The original code was mainly translated into MATLAB® language, and some functions expanded, such as the calculation of travel times and take-off angles. Moreover, new statistical analyses are provided to better define the quality and the reliability of a computed focal mechanism and its uncertainty. Given a seismic network configuration, this MATLAB tool can be used on the twofold purpose of evaluating the reliability of focal mechanisms of earthquakes, and classifying fault plane solutions derived by an existing seismic catalogue. Fault plane solutions and their quality are crucial also for calculating pore fluid pressure excesses at depth, and for analyzing the temporal evolution of pore pressure field, as described in recent published papers (Terakawa, 2014; De Matteis et al., 2021).

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