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Dislocation grid-search modelling

Assuming that small and moderate earthquake sources correspond to nearly double couple body force systems, one can obtain the best source mechanism by grid-search over double-couple fault plane parameters (strike, dip, rake) and depth. For each grid point we model synthetic seismograms and obtain the L2-norm of the misfit between observed and predicted waveforms. The global misfit minimum indicates the best double-couple-depth combination.

Further, the grid-search systematically tests the full range of alternative source mechanisms for their compatibility with the observations. This can reveal potential ambiguities of the moment tensor and assess parameter uncertainties of the best faulting solution. To use the grid search as resolution test, we delimit the range of acceptable alternative solutions in an L2-norm misfit band between the global minimum misfit and the minimum misfit plus 10%. Experience with these data indicates that this is a conservative estimate.

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