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Improvement of stress tensor inversion by the revision of computational grid

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We improved a stress inversion method using a spherical code, which was a set of 60,000 points distributed with more or less uniform intervals on a unit sphere in 5-dimensional Euclidean space. The distribution was determined numerically by minimizing the total Coulombic potential of 60,000 charged particles constrained on the sphere. This optimization ran on a personal computer for 3 months.

The points represent 60,000 different stress states with 'uniform' intervals, which can be used as the computational grids in stress inversion methods.

We tested the multiple inverse method using the conventional and the new grid points. For this purpose, artificial data were generated with assumed stresses. The result of the method was significantly improved by the spherical code.

Keywords: stress tensor inversion, tectonics, spherical code, focal mechanism, fault