A technique for separating stresses from heterogeneous focal mechanism data: adaptation of the multiple inverse method

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The method for determining stress from focal mechanisms has been studied by several authors (e.g. Angelier 1984; Gephart and Fortsyth, 1984; Michael, 1987; Mercier and Carrey-Gaihardis, 1989). A mechanism datum has two nodal planes, one of which is the fault plane that generated the earthquake. The fault-slip analysis using the datum needs to determine which of the nodal planes is the fault plane. However, this is not easy, giving rise to the difficulty for the analysis. Angelier (2002) suggested a method free of choice of the planes, but the method can not deal with heterogeneous data.

This study proposes a technique to solve this problem by improving the multiple inverse method (Yamaji, 2000), the resampling scheme of which was adapted to focal mechanism data.

The stresses compatible with a dataset are recognized as the clusters of reduced stress tensors. We can determine significant stresses by the application of the the k-means clustering to the stress tensor (Otsubo et al., in press).

This study showed that the technique is valid to determine stress from the focal mechanisms. Firstly, the technique is tested by an artificial dataset, and then is applied to field data from central Japan.

References
Angelier, J., 1984. *J. Geophys. Res.* 89, 5835–5848.

Angelier, J., 2002. *Geophys. J. Int.* 150, 588–609.

Gephart, J.W., Fortsyth, D.W., 1984. *J. Geophys. Res.* 89, 9305–9320.

Mercier, J.L., Carey-Gailhardis, S.E., 1989. *Earth Planet. Sci. Lett.* 92, 247–264.

Michael, A.J., 1987. *J. Geophys. Res.* 92, 357–368.

Otsubo, M., Sato, K., Yamaji, A., *J. Struct. Geol.*, in press.

Yamaji, A., 2000. *J. Struct. Geol.* 22, 441–452.