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A computer code for determining composite focal mechanism solutions

In general, determination of focal mechanism solutions for individual events with a sparse recording network is difficult due to low S/N and poor azimuthal coverage. For areas with frequently repeating small to medium-size seismic events, composite focal mechanisms are constructed by superimposing data from events that rupturing the same fault segment and have similar or identical source mechanisms (Lee et al., 2014). In this study a computer code is developed which is used in the process of determining composite focal mechanism solutions to objectively sort earthquakes into sets in which the P-wave first-motion data are compatible. A comparison is made between the observed first-motion data from a sequence of aftershocks in the rupture zone and surrounding areas in southern Iran to each of the 2^n mathematically possible patterns for the recording network of n stations. The comparison results in two parameters being assigned to each of the patterns: (1) the number of earthquakes which have first motions compatible with the pattern; (2) the number of actual first-motion data for those earthquakes. Generally, one finds only a few patterns with high parameter values (Billington, 1982) and these few patterns are physically possible; i.e., they are compatible with double-couple focal mechanism solutions.

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