



Centroid moment tensor inversion: a new approach for source inversion and relocation of local earthquakes

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A new method for moment tensor inversion has been developed in order to study focal mechanisms of small events on a local scale (epicentral distances lower than 120 km). The method is suited for the analysis of high-frequency waveforms which characterise small events and allows the combined inversion of full moment tensor and event location. The technique is based on a mixed approach, which uses both time traces and amplitude spectra of bodywaves data from shallow local events to retrieve their moment tensor configuration. This new approach results in an improvement of pure time domain and frequency domain moment tensor inversion techniques. Our method shows a higher stability with respect to time domain inversion and is able to solve the ambiguities related to solutions of an amplitude spectra inversion technique, solving two problems which were previously widely studied and discussed in the case of moment tensor inversion of shallow events on a regional scale (Cesca, 2005). Relocation is realised by comparing inversion solutions at different depths and by cross-correlating the best synthetic time traces with seismic data. The method has been tested with different sets of synthetic data and has been applied to small local events in Northern Iceland and elsewhere.

Cesca, S., 2005. "Inversion del tensor momento sismico de terremotos superficiales a distancias regionales", PhD thesis, Univ. Complutense Madrid, Spain, 289pp.