Waveform Inversion using Teleseismic and Regional Data for Earthquakes that Occurred in Greece

Moshou A (1), Papadimitriou P (1), Makropoulos K (1)

National and Kapodistrian University of Athens, Faculty of Geology and Geoenvironment, Department of Geophysics – Geothermics
Panepistimiopolis Zografou 15784, Athens, Greece, amoshou@geol.uoa.gr, ppapadim@geol.uoa.gr, kmakrop@geol.uoa.gr

In the present study a body wave inversion methodology is developed to calculate the source parameters of earthquakes, in teleseismic and regional distances, based on the generalized inversion. This procedure can be applied either with the normal equations or the singular value decomposition method. In this study the method of singular value decomposition is preferred, since it is more stable. The seismic moment tensor M is decomposed in six independent elements or five in the case of deviatoric moment tensor. Synthetic seismograms are calculated using Green's functions of the five terms. The moment tensor is decomposed into two parts, the first is the pure double couple (DC) and the second is the compensated linear vector dipoles (CLVD). The best solution is obtained by the minimum difference between synthetic and observed seismograms. Finally, the proposed methodology is adapted in order to be applied for earthquakes using regional and local data. In this study three – component broadband stations are used in teleseismic and regional distances to determine the source parameters for the large recent events that occurred in the area of Greece. Earthquakes recorded from stations belonging to the seismological network of the University of Athens, at distances less than 400 km, were also studied.