Title: Moment-tensor inversion of earthquakes in Greece, method ISOLA

Author: Dana Červinková

Department: Department of Geophysics

Supervisor: Prof. RNDr. Jiří Zahradník, DrSc.

Supervisor's e-mail address: jz@karel.troja.mff.cuni.cz

Abstract: The possibility of obtaining a reliable moment tensor using a low-frequency waveform inversion from a single seismic station is studied. Deviatoric part of the moment tensor is described in usual way, using its orientation (angles strike, dip, rake), scalar seismic moment M_0 and the double-couple percentage (DC%), and also by means of the coefficients of linear combination of elementary mechanisms. We estimate the formal error of the coefficients and study conditionality of the inverse problem. Data from earthquakes Trichonis (Mw = 5.2, April 2007) and Leonidio (Mw = 6.2, January 2008), Greece, are processed using software ISOLA (Sokos and Zahradník). The moment tensor is calculated from many stations and its stability is tested. This reference solution is compared to those independently obtained from single stations. Synthetic tests are performed to understand why the single-station estimates are sufficient for Trichonis, but not for Leonidio, paying attention to the focal depth, station azimuth and epicentral distance. It is found that the depth is crucial at near-regional stations. Examples at which only 10 samples per trace are sufficient are demonstrated.

Keywords: earthquakes, ISOLA, moment tensor (MT), elementary focal mechanisms