

Tectonic stress regime, crustal deformation and present-day seismicity of Egypt and surrounding area based on inversion of focal mechanism solutions for local earthquakes recorded by ENSN network

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I estimated moment tensor and centroid depth of minor/moderate local earthquakes that occurred in Egypt and its surroundings with a new moment tensor inversion of near-source waveform data recorded by very broadband stations of the Egyptian National Seismic Network (ENSN). I analyzed waveform data of all minor/moderate earthquakes that occurred from 2010 to 2015. I also estimated the focal mechanism using the P-wave polarity data set, and then compared it with the moment tensor inversion results. The moment tensor solutions are consistent with the focal mechanism obtained from the P-wave polarity data. We also estimated the stress field in each relevant studied area using a Multiple Inverse Method (MIM). The obtained results indicated that the axis of the minimum principal stress is a nearly horizontal NE–SW direction, and the axis of the maximum principal stress is a nearly vertical in the northern Red Sea Triple Junction area and The direction of the minimum principal stress is consistent with the opening direction of the northern Red Sea zone where the southern part of Gulf of Suez is currently under extensional stress field, with NE–SW trending horizontal extension. These results are compatible with the kinematics of the Red Sea–Gulf of Suez rift.