

Source mechanisms for small and moderate earthquakes in Egypt

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The location of Egypt in the northeastern part of the African Plate makes it surrounded by three active tectonic plate margins: the African Eurasian plate margin, the Red Sea plate margin, and the Levant transform fault. The relative motion between African plate, Eurasian plate, and Arabian plate is the main reason for the earthquake activity of Egypt.

In this study we estimate the moment tensor and centroid depth for minor and moderate local earthquakes ($m \geq 3.5$) that occurred in Egypt and its surroundings (2010-2014) with a new moment tensor inversion of near-source waveform data recorded by very broadband stations of the Egyptian National Seismological Network (ENSN) and other regional seismic stations. The first motion polarities have been used for the determination of focal mechanism as another supporting tool to validate our results.

The results give us better estimation of seismic moment energy released from earthquake and fault plane solutions. Three focal mechanisms in Gulf of Aqaba give normal mechanism with minor strike slip component. Six focal mechanisms in Gulf of Suez shows normal fault trending parallel to the rift of Gulf of Suez. Red Sea shows normal mechanism trending parallel to the rift except some earthquakes in triple junction area give sense of reverse. Aswan region shows mainly strike-slip fault with minor normal component. Earthquakes located in the Mediterranean coast shows reverse fault with NNW-SSE trending. Moment tensor solution matching well with the results of first motion polarities and give the same fault mechanism, however some of events especially in the Mediterranean coast don't give better matching between two tools due to the high gap azimuth.