



Source Moment Tensors of the earthquake Swarm in Abu-Dabbab area, South-East Egypt : Evidence of transient Igneous activity.

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Abstract

A big swarm occurred in August 2004 and the seismic sources of this swarm have been studied investigating of the moment tensors of 15 earthquakes. For each selected event, two sets of moment tensor inversions were carried out. The first one with fixed epicentral coordinates and the second one with variable epicentral coordinate. The data fit between observed and synthetic seismograms were computed for an elastic layered media, and minimized by a least squares algorithm. The obtained fault plane solution for each event lies in agreement with the few reliable first arrival polarities. The resulting source time functions (one or two peaks) indicates that even small events might be associated with complex sources.

The focal mechanisms of the selected events show different styles of faulting (normal and reverse with strike slip faulting mechanisms). The normal faulting events are characterized by focal depths larger than 7 km and the reverse ones are shallower with focal depths less than 6 km. The obtained compensated linear-vector dipole (CLVD) ratio is up to 35% for some events especially those with a shallow reverse faulting mechanism. The presence of events with shallow reverse faulting and high CLVD ratio, besides the initiation of a high level seismic activity, in the Abu Dabbab area, without a large seismic main shock, led us to suggest that the August 2004 swarm might be due to small scale transient igneous activity, being consistent with the relatively high heat flow in the area.