

Discrimination and Source Parameters Using Moment Tensor Inversion

Seismic moment tensors are summation of force couples that are scale invariants, symmetric and independent on the coordinate system used to describe the source. The seismic moment tensors for certain types of sources, such as volcanic earthquakes and nuclear explosions are expected to contain an isotropic component and have volume change. Whereas in case double couple deviatoric tensor is maximum and no volumetric changes occurred. In recent analysis we explore new methodology of regional moment tensor inversion to improve earthquake-explosion discrimination. Source parameters of India, Pakistan and North Korea nuclear explosions are determined and compared with the earthquakes occurred in the vicinity of the explosion. We observed maximum isotropic components ($> 50\%$) during explosion as compare to double component. Minor impression of double couple mechanism in the nuclear explosion may be due to the interactions of tectonic activities and multiple scatterings. Moment magnitude of India (Mw 4.63) and Pakistan (Mw 4.57) explosions are comparable. Whereas North Korean explosion moment magnitude for 2006 (Mw 4.03), 2009 (Mw 4.29), 2013 (Mw 4.47), 2016 (4.59, 5.65) were different and relatively 2016 North Korea are large as compare to previous one. Moment tensor inversions could be vital tool for nuclear monitoring and events discrimination.

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