Geophysical Research Abstracts
Vol. 17, EGU2015-8267, 2015
EGU General Assembly 2015

Moment tensor inversion for moderate earthquakes and horizontal direction of tectonic stress in and around the south korea peninsula

ChangSoo Cho

Korea institute of geoscience and mineral resource, Daejeon, Korea, Republic Of (nemex@kigam.re.kr)

Moment tensor inversion method using waveform is not widely used in identification of fault direction for earthquake but also in identification of explosion experiment such as north korea nuclear test. TDMT inversion code as open source was used for 1-D focal mechanism to moderate earthquake. But TDMT code caused some problems to fit waveform data of earthquake. This software was modified and improved with using the extraction bandwidth for event data and using waveform fitting of maximum cross-correlation with limit of shifting time. Improved algorithm was applied to moderate earthquakes occurred in and around the korean peninsula and showed the result of good data fitting in deriving focal mechanism. CMT centeroid locations were calculated with this algorithm. Earthquakes occurred rarely in the korean peninsula and instrumental recording started from 1990's late. But quality of measurement ground motion is very good after the beginning of instrumental recording. 61 moderate earthquakes occurred analyzed between 2000 to present were analyzed. most of all focal mechanism of earthquake showed strike slip or reverse fault as intraplate earthquake. The horizontal direction of tectonic stress of the korean peninsula is ENE-WSW derived with focal mechanisms that were calculated with 1D moment tensor inversion for moderate earthquake by Zoback(1992)'s method of tectonic stress.
3D-moment tensor inversion method was also developed with simulation code of 3-D viscoelastic finite difference method with ADE(auxiliary differential equation)-PML(perfectly matched layer) and applied to main moderate earthquakes. Forward modeling of 3D seismic wave propagation for moment tensor inversion require much time and expensive cost. Forward simulation with domain decomposition of having only thin model between source and receiver in moment tensor inversion could reduce much time, memory and computational cost in 3D moment tensor inversion even though this method was not more effective than moment tensor inversion using reciprocal Green's function.