Japan Geoscience Union Meeting 2014
(28 April - 02 May 2014 at Pacifico YOKOHAMA, Kanagawa, Japan)

SSS30-23 Room:Main Hall Time:April 28 17:45-18:00

Semi-quatitative analysis of change in stress state in Chelung-pu Fault, Taiwan

HASHIMOTO, Yoshitaka[1*] ; TOBE, Kota[1] ; YEH, En-chao[2]

[1]Kochi Univerisity, [2]National Taiwan Normal University

Semi-quantitative stress state before and after earthquake in Chelung-pu fault, Taiwan

Stress change caused by earthquake is important to understand size and nature of an earthquake. Detailed waveforms of the 1999 Chi-Chi earthquake were taken along the Chelung-pu fault. In the aftermath of the earthquake, Taiwan Chelungu-pu Fault Drilling Project (TCDP) was conducted to take core with the seismogenic fault. In this study, we estimated paleo-stress condition semi-quantitatively using micro-fault inversion method and stress polygon. Then we discuss the relationship between spatial and temporal changes of stress with seismic cycles.

We used Multiple inversion method (MIM) (Yamaji, 2000) and k-means clustering (Otsubo et al., 2006) to estimate paleo-stress. As a result, we obtained four solutions of stress state (c1-c4) from TCDP core. To estimate the range of stress conditions we used stress polygons on the basis of the Anderson theory of faulting as used in Lin et al. (2007). We projected our paleo-stress orientations to the directions of SHmax, Shmin and SV. In addition to that, using stress ratio and a definition that SHmax is larger than Shmin, we can restrict the stress conditions for the paleo-stress in the stress polygons.

Two stress conditions (c1 and c3) were comparable with that from Lin et al. (2007) as a present state and post-seismic condition in normal stress regime. The range of stress condition for c2 is obviously higher than others, and the stress condition is in revere fault regime. The differences of stress condition possibly indicate the change in stress magnitude in the seismic cycle. Stress drops were estimated as -7.94˜2.60MPa for c1 and c2, and 2.71˜13.68MPa for c2 and c3. The calculated stress drop is comparable with estimated average stress drop from slip distribution in Chi-Chi earthquake (Ma et al. 2000).

Keywords: stress, micro-fault inversion, stress drop, Chelung-pu fault