Japan Geoscience Union Meeting 2015
(May 24th - 28th at Makuhari, Chiba, Japan)


SSS31-09 Room:304 Time:May 25 16:30-16:45

# Crustal tectonic stress and poroelastic relaxation of the Mw 9.1 tohoku earthquake

PANUNTUN, Hidayat[1*] ; MIYAZAKI, Shinichi[1]

[1]Graduate School of Science, Kyoto University

The Mw 9.1, Tohoku-oki earthquake has been investigated by many scientists. This earthquake produces changes in the state of strain and stress in the surrounding rupture area. Postseismic deformation following large earthquake including afterslip, viscoelastic relaxation, and pore fluid flow, further modify strain and stress near a fault. The migration of fluid after earthquake from high-pressure area to low-pressure area modify stresses and pore pressure near fault and cause pore pressure changes in the surrounding rocks. This pore pressure changes are a part of coulomb stress calculation for fault interaction analysis.

By using various input of slip model, we calculate undrained coseismic pore pressure and coulomb stress change due to the earthquake (King, Stein, & Lin, 1994; Cocco & Rice, 2002) and its poroelastic relaxation by using green's function proposed by (Kalpna & Chander, 2000). The strain and stress due to slip on the fault are calculated by using analytical expression of (Okada, 1992) and consider stress-strain relation for an isotropic form of Hooke's law, respectively. We find that pore pressure changes following the tohoku-oki earthquake is increased through relaxation in the dilatation region which further modified coseismic coulomb stress in surrounding region. We estimates the pore pressure variation from the first 50 days following the tohoku earthquake has change from 7.08 MPa to 2.62 MPa in the dilatation region, and in the compression region, it change from -9.37 MPa to -3.46 MPa.

Keywords: pore pressure, poroelastic relaxation, coulomb stress