Oral | Symbol S (Solid Earth Sciences) | S-SS Seismology

# [S-SS32_1AM1]Fault Rheology and Earthquake Dynamics

Convener:*Kiyokazu Oohashi(Graduate School of Science, Chiba University), Takeshi Iinuma(International Research Institute of Disaster Science, Tohoku University), Wataru Tanikawa(Japan Agency for Marine-Earth Science and Technology, Kochi Instutute for Core Sample Research), Yuta Mitsui(Department of Geosciences, Graduate School of Science, Shizuoka University), Chair:Kiyokazu Oohashi(Graduate School of Science, Chiba University), Yuta Mitsui(Department of Geosciences, Graduate School of Science, Shizuoka University)

Thu. May 1, 2014 9:00 AM - 10:45 AM  315 (3F)

Interdisciplinary discussions on the rheology of seismogenic faults and earthquake generation processes among the following specialists; (1) fault rocks and fault zones, (2) theoretical and numerical studies on earthquake dynamics, and (3) seismology and geodesy. Presentations on fault-zone drilling projects are also welcome.

10:30 AM - 10:45 AM

# [SSS32-P04_PG]Effects of thermal cracking on elastic wave velocities and Poisson's ratio of basalt, gabbro and granite

3-min talk in an oral session

*Kaya NISHIMURA[1], Shin-ichi UEHARA[1], Kazuo MIZOGUCHI[2] (1.Faculty of science, Toho University, 2.Central Research Institute of Electric Power Industry)

Keywords:Poisson's ratio, Elastic wave, High pore pressure, Basalt, Gabbro, Granite

Marine seismic refraction studies have found that there are high Poisson's ratio regions (>0.35) in oceanic crust at subducting plate. Christensen (1984) performed laboratory measurements of compressional and shear wave velocities (Vp and Vs, respectively) of basalt, which is one of major rocks in oceanic crust, and estimated Poisson's ratio, and suggested that observed high Poisson's ratio can be explained by high pore pressure. This distribution of high pore pressure have been concerned because it should influence fault mechanism of plate boundary at subduction zones. Christensen (1984) used intact rock for the measurements. But there are probably dense cracks near faults in nature. Therefore, to investigate Vp, Vs and Poisson's ratio for fractured rock is important to evaluate distribution of high pore pressure regions by using seismic studies. This study reports the results of measurements of Vp and Vs, and estimations of Poisson's ratio for thermally cracked gabbro, basalt and granite, which are major rocks in oceanic crust and continental crust. Rock specimens were heated at 100℃, 300℃, 500℃ and 700℃ to thermally crack them. We performed measurements at atmospheric pressure and dry condition. We also measured Vp and Vs for water-saturated specimens of gabbro and basalt heated at 700℃, and compared the results with those under dry condition to investigate the effect of pore fluid on Vp and Vs. As results, specimens heated at higher temperature tended to have slower Vp and Vs. Density of the specimens was also decreased as heating temperature was increased, and especially the density change was clear from 500℃ to 700℃. This imply that clack density of specimens was increased with increasing temperature, and this might be the reason why Vp and Vs were decreased. Poisson's ratios obtained in this study (0.05-0.25) were lower than the observed high Poisson's ratio. Vp and Vs for water-saturated specimens were generally faster than those for dried specimens, but output signals tended to be smaller and therefore improvements of the measurements systems and methods to analyze the signals should be necessary.