Japan Geoscience Union Meeting 2011
(May 22-27 2011 at Makuhari, Chiba, Japan)

MIS036-P64 Room:Convention Hall Time:May 26 14:15-16:15

Spatial distribution of foreshocks and aftershocks of the 2011 Tohoku earthquake and their focal mechanisms

Youichi Asano[1*], Tatsuhiko Saito[1], Yoshihiro Ito[2], Katsuhiko Shiomi[1], Hitoshi Hirose[1], Takumi Matsumoto[1], Tomotake Ueno[1], Bogdan Enescu[1], Tomoe Kazakami[1], Takeshi Kimura[1], Hisanori Kimura[1], Tetsuya Takeda[1], Sachiko Tanaka[1], Takanori Matsuzawa[1], Hirotoshi Matsubayashi[1], Takayuki Miyoshi[1], Yoshikatsu Haryu[3], Shin Aoi[1], Sadaki Hori[1], Shoji Sekiguchi[1]

[1]NIED, [2]RCPEV, Tohoku Univ., [3]ADEP

We estimated centroid moment tensors of foreshocks and aftershocks of the 2011 megathrust earthquake in eastern Japan with Mw 9.0. Obtained result shows that foreshocks were basically interplate earthquakes with thrust type focal mechanisms and those were distributed in a localized area off Miyagi. The mainshock hypocenter is located in the southwestern edge of this foreshock area. Aftershocks are widely distributed from off Iwate to off Chiba and have various types of focal mechanisms. Interplate aftershocks with thrust focal mechanisms have not occurred within the larger coseismic slip area inferred from tsunami data and have occurred in its surroundings. We interpreted that this larger coseismic slip area can no longer slip as aftershocks due to plenty stress release during the mainshock rupture and aftershocks in its surroundings were caused by stress concentration mainly by the larger coseismic slip area in the mainshock asperity. Normal fault type aftershocks were widely distributed in the overriding plate and the outerrise of the Pacific plate. These aftershocks may be due to tensional stress change caused by the coseismic slip. Trust fault type aftershocks in the subducting Pacific plate are also interpreted to be induced by compressional stress change by the coseismic slip.

Keywords: foreshock, aftershock, centroid moment tensor, focal mechanism