Effect of stress and fluid pressure change on shallow earthquake swarm induced by the 2011 Tohoku-Oki earthquake inferred from dense seismic observation

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After the 2011 Tohoku-Oki earthquake, some earthquake swarms in the inland area have been occurring. As shown in previous studies, stress change and fluid pressure change would be the causes of the earthquake swarm. Coseismic change of stress tensors is thought to be caused by the stress change due to the Tohoku-Oki earthquake [e.g. Hasegawa et al., 2012; Yoshida et al., 2012]. Diversity of focal mechanisms, which could be interpreted with the Mohr circle, suggests high pore fluid pressure [e.g. Terakawa et al., 2012]. Temporal expansion of aftershock areas suggests that the increase in the fluid pressure is the cause of the earthquake swarm [e.g. Okada et al., 2015]. For understanding more details of the induced earthquake swarm and its causes, we deploy dense seismic observation networks in three areas: southern Akita, northern Akita, Fukushima (Aizu) -Yamagata [cf. Hirahara et al., 2015, AGU Fall Meeting]. Station separation is less than a couple of kilometers in southern Akita, and about 5 kilometers in northern Akita and Fukushima-Yamagata areas. Seismometers and data loggers deployed are KVS-300 and EDR-X7000 of Kinkei System Corporation, respectively.
By using data from the dense seismic network, we can determine reliable focal mechanisms even for M~1 earthquakes. Focal depths of most of earthquakes are determined to be a few kilometers shallower than JMA catalog depths. The improvements of hypocenter locations and focal mechanisms will enable us to estimate the stress regime and the fluid pressure in Tohoku district in more details.
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