[JJ] Evening Poster | S (Solid Earth Sciences) | S-SS Seismology

[S-SS11]Crustal Structure

convener:Yasuhira Aoyagi(Central Research Institute of Electric Power Industry)
Thu. May 24, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe)
The aim of this session is to cover seismological and geophysical studies on the Earth's crust. Contribution on seismological and geophysical structure of the crust, processes that develop in the crust which include earthquakes, volcanoes and geological descriptions of the crust are welcomed. We also welcome theoretical and methodological studies that will serve as basics in such explorations.

[SSS11-P02]S-wave reflectors beneath the earthquake swarm in the Yonezawa-Aizu area, NE Japan

*Manami Suzuki [1], Akiko Hasemi[2], Tomomi Okada[1], Toru Matsuzawa[1], Norihito Umino[1], Noriko Tsumura[3], Tadashi Yamashina[4], Group for the aftershock observations of the 2011 off the Pacific of Tohoku Earthquake (1.Research Center for Prediction of Earthquakes and Volcanic Eruptions, Graduate School of Science, Tohoku University, 2.Yamagata University, 3.Chiba University, 4.Kochi University)
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In order to understand the mechanism of inland earthquake occurrence, it is necessary to consider the influence of crustal fluid [Hasegawa et al., 2012]. Triggered shallow microearthquake swarm started at 7 days after the 2011 off the Pacific coast of Tohoku Earthquake in prefectural border between Yamagata and Fukushima prefectures, where the seismic activity was low before the Tohoku-Oki earthquake. Some previous studies, suggest that the cause of the triggered seismicity occurred due to increase of fluid pressure [Okada et al., 2011, 2015].
The objective of this study is to estimate the areas of fluid by investigating distribution of S wave reflectors, which are considered to indicate the localized (sill-like) distribution of fluid. As a previous study, Hasemi et al., [2016JpGU] found reflected S waves in seismograms recorded at the Hi-net stations of NIED. In this study, we use temporary seismic network deployed by Kochi University, Chiba University, and Tohoku University, to investigate more detailed distribution of reflectors in addition to the Hi-net stations. We used waveforms observed at these stations from 4798 events in the period from May 2011 to February 2012. We used hypocenter locations obtained by the double-difference method [Waldhauser and Ellsworth, 2000]. We applied the automatic amplitude control (AAC) correction and the normal moveout (NMO) correction to these waveform data, and we made some reflection profiles of seismograms along various lines for each station. These profiles were set passing above each cluster and intervals of 0.005 degrees in both the north-south direction and east-west direction.
As a result, we confirmed continuous S wave reflectors beneath the earthquake swarm for each profile; in the northeastern part of this area, reflector is found at a depth of 13-14 km beneath the station, in the southwest part at 20-21 km for the southern station, in the central part at 13-15 km for the eastern station, and in the western part at 12-14 km for the northwest station. In either case, S wave reflectors can be found directly below or around the earthquake, suggesting that crustal fluid is involved in the swarm activity in this area. However, there were cases where the reflecting surface could not be clearly identified depending on the location of the station, or conversely, a few of reflectors could be confirmed. It is conceivable that the crustal fluid that causes the S wave reflectors is locally distributed rather than uniformly distributed widely at a certain depth.