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

SSS026-P09 Room:Convention Hall Time:May 27 14:00-16:30

Characteristics of shallow seismic activity in the Beppu-Shimabara area, Kyushu, Japan

Hiromi Chikura[1*], Satoshi Matsumoto[2], Takahiro Ohkura[3], Hiroshi Shimizu[2], Hiroyuki Inoue[3], Shin Yoshikawa[3], Yuki Abe[4], Yoshihiro Masaki[4], Masahiro Miyazaki[1], Kenji Uehira[2]

[1]Grad. Sch. Sci., Kyushu Univ., [2]SEVO, Kyushu Univ., [3]AVL, Kyoto Univ., [4]Graduate School of Science, Kyoto Univ.

In the middle part of Kyushu Island, Japan, called the Beppu-Shimabara graben, there are active volcanoes: Tsurumi, Kuju, Aso, and Unzen. Most of historical large earthquakes occurred in this area. In addition, seismic activity of microearthquake is also high in this area. We investigated the cause of high seismic activity in this region from seismological analysis. Temporal seismic stations were deployed in this area in order to determine hypocenters of microearthquakes with high accuracy because their depth provided us with important information about thickness of seismogenic layer. We carefully determined hypocenters of microearthquake and focal mechanisms from the observed data.

Focal depths in Beppu-Shimabara area are shallower than 15 kilometers, especially become shallow in the vicinity of Kuju volcano. While focal mechanism of strike-slip fault type dominates in Kyushu Island, many earthquakes in normal fault type occur in Beppu-Shimabara area. It means that the stress field in the area changes from strike-slip fault regime to normal fault one. In other words, the maximum horizontal principal stress drops and becomes moderate principal compressive stress from maximum. Generally, high seismic activity under a condition of lower compression stress can result from low strength of the medium. Our results suggest that the strength of the crust in Beppu-Shimabara area is weak. As an interpretation, high fluid pressure in the crust can be attributed to high volcanic activity in the area.