

Distribution of late Cenozoic calderas and high strain zones in the crust of NE Honshu - Study based on Bouguer anomaly -

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Recently, combined study of geology and seismology clarified that the distribution of the inland seismic activities are closely related with the distribution of the late Cenozoic large calderas in the northeast Honshu arc, Japan (Umino et al., 1988; Yoshida, 2001; Nunohara et al., 2008). The caldera structure is a geographical feature with collapsed structure surrounded by a ring-fault. They are usually underlain by plutonic body under cooling that often reaches 10 km or more in the diameter (Yoshida, 2001). Umino et al. (1988) showed that the earthquake with magnitudes 5.9 occurred in the region between the Sanzugawa caldera and the Onikobe caldera along a geological fault on 11 August 1996. The bi-lateral fault slip motion was stopped at the caldera walls in both ends. And, the M5.7 aftershock with right-lateral strike slip type focal mechanism took place along the Onikobe caldera rim. Seismic tomography study shows that low S wave velocity areas are located inside the calderas. Large earthquakes and the aftershocks occurred only within high S wave velocity areas of the caldera wall. They supposed that temperature inside the calderas is too high to generate earthquakes under the present EW horizontal stress field. The surface caldera and related subsurface plutonic body deformed more ductile than their wall rocks, and the big strain may concentrated in the wall rocks between calderas, and then the wall with high velocity deformed by thrust fault. Thus, to know the accurate distribution of the late Cenozoic calderas with subsurface plutons become one of the major target for predicting hazardous events at volcanic arcs. Although the number of the known caldera structures exceeds 80 in the northeast Honshu arc (Yoshida et al., 1999), Ohyagi (2000) was supposed that many calderas still exists under the overlying volcanic rocks of the Quaternary volcanoes. We have examined the detailed map of Bouguer anomaly of the northeast Honshu arc with special attention to caldera structures with related subsurface plutons. The results shows that some calderas may located under the Quaternary volcanoes as pointed by Ohyagi (2000). We will present the close relation between the detailed distribution map of the late Cenozoic calderas, crustal thermal structure (Yano et al., 1999) and the distribution of high strain zone (Hasegawa et al., 2004, and so on) in the northeast Honshu arc.