

Non-symmetrical Growth of Unexposed Caldera-forming Plutons in the Ou Backbone Range of the NE Honshu Arc, Japan ?

Takeyoshi Yoshida[1]; Toshifumi Imaizumi[2]; Akira Hasegawa[3]; Junichi Nakajima[3]; Hiroshi Sato[4]; Yoshitaka Nagahashi[5]; Jun-Ichi Kimura[6]; Akiko Tanaka[7]; Oky Dicky A. Prima[8]

[1] Inst.Min.Petr.Econ.Geol., Tohoku Univ.; [2] Geography Sci., Tohoku Univ.; [3] RCPEV, Graduate School of Sci., Tohoku Univ.; [4] ERI, Univ. Tokyo; [5] Fukushima Univ.; [6] Dept. Geosci., Shimane Univ.; [7] Geological Survey of Japan, AIST; [8] Dept. of Computer Sci., Iwate Univ.

There are many late Cenozoic calderas in the NE Honshu arc (Ito et al., 1989; Sato and Amano, 1991). Many of these calderas are the large-scale collapse calderas of the piston-cylinder type (Yamamoto, 1992; Sato and Yoshida, 1993). There are two clear peaks of caldera formation in the late Miocene to Pliocene with short dormancy in 5-4 Ma (Yoshida et al., 1999). From this evidence, the island-arc volcanic period after 13 Ma in the NE Honshu arc can divide into four phase of igneous activity: (1) oceanic island chain with submarine volcanism (13-8 Ma); (2) late Miocene caldera-forming phase with weak updoming of the central mountainous range (8-5 Ma); (3) Pliocene caldera-forming phase under weak compressional field (5-1.7 Ma); and (4) highly compressional volcanic arc with andesitic stratovolcanoes (1.7-0 Ma). In the phase (2) to (3), felsic volcanism was concentrated in the structural high of the central mountainous range, and nearly eighty piston-cylinder type calderas were formed under a condition of neutral to weak compressional stress fields associated with gentle uplift of the central mountainous range (Ito et al., 1989; Sato and Amano, 1991; Sato and Yoshida, 1993; Yoshida et al., 1999). The formation of these large-scale felsic collapse calderas suggests the emplacements of shallow, large-scale felsic magma reservoirs, that is, volcano-tectonic complexes within the upper crust. The dome-like structures around caldera centers suggest that the felsic plutonism contributed to the uplift of the central mountainous range. The thermal structures seen in the present NE Honshu arc is closely related to the distribution of the late Cenozoic collapse calderas with unexposed deep-seated plutonic bodies. S wave reflectors distributing beneath and around the caldera complex (Hori et al., 1999) are presumed to be the fracture systems filled with high temperature hydrothermal fluids. The distribution pattern of S wave reflectors is systematically changed with the depth and suggests that it is controlled by the unexposed plutons under the caldera structures. The non-symmetrical distribution of S wave reflectors with depth might be related to the rotation of regional stress-axis and the non-symmetrical updoming of the central mountainous range.