

Geomagnetic dip changes associated with the 1950 eruption of Izu-Oshima volcano, central Japan: Implications to the magma plumbing system of the 1986 eruption.

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Rikitake (1951) conducted repeat geomagnetic dip surveys during the first stage (Phase I: July-September, 1950) of the 1950 eruption of Izu-Oshima volcano, central Japan and found a large amount of changes in the dip. He devised a method to find an eccentric dipole from the surface magnetic observations and applied it to obtain a source for such magnetic changes as a thermally demagnetized sphere of radius 2.5 km at a depth of 5.5 km. His result bears an important suggestion to the magma sources of this volcano even for the 1986 eruptive activity. The magma extruded in the fissure eruptions in 1986 was strongly differentiated (SiO_2 contents larger than 70 %): Aramaki and Fujii (1987) proposed that it came from a reservoir at a shallow depth which might have been formed by a past intrusive event. We investigate here if Rikitake's results are supportive of such an event. We reexamined the validity of his model by applying the present-day technique of magnetic source inversion, i.e. the genetic algorithm (GA) (Currenti, et al., 2005). A constraint is that the source should be consistent with the magnetic structure beneath around Izu-Oshima volcano which has been clarified by the recent aeromagnetic surveys. A source for the observed magnetic changes was found as a flat, slightly inclined to the north, triaxial ellipsoid located shallower than 5 km depth as shown in Fig. 1. Implications of such a magma reservoir are discussed for the magma plumbing system of Izu-Oshima volcano, which was proposed by Watanabe (2012). This study is based on the paper by Sasai (2013).

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