E110-P005 **Room: Poster Session Hall** **Time: May 21**

Reexamination of geomagnetic changes associated with the Phase I eruption of Izu-Oshima volcano in 1950

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Enormous changes in the geomagnetic dip were observed during the phase I activity (the summit eruption) of Izu-Oshima volcano from July to September, 1950. Rikitake (1951b) conducted repeat magnetic dip surveys just after the onset of the summit eruption (Survey I: July 25-30) and at its final stage (Survey II: Sept. 22-26) to detect mostly decrease in the geomagnetic dip amounting to - 30 minutes of arc. (1) He used an absolute magnetometer of the Earth Inductor type, whose measurement accuracy was about 2 min (25 nT). (2) The source for the geomagnetic changes was ascribed to a magnetic dipole at a depth of 5.5 km in the northwestern part of the caldera, whose magnetic moment was estimated as the one equivalent to a fully demagnetized sphere of radius 2.5 km assuming the average magnetization of 10 A/m. (3) The method of calculation was devised by Rikitake (1949), which is based on the spherical harmonic analysis over a plane surface, not the ordinary, or the present-day standard, least square method. The estimated magnetic declination of the source dipole was strongly eastward-oriented, i.e. S 42 degree E, which was rather difficult to explain by the thermal demagnetization. Actually, the standard devation of the observed minus computed values (O-C)'s in Rikitake's model amounted to 9.6 min: The model fitness was not so good.

Fortunately, the coordinates (lat., long., height) of each survey point as well as the observed dip changes were listed in the paper. We search for the best-fit model of the dipole source for this remarkable magnetic event, based on the least square method. In a horizontal plane centered at the horizontal position R of Rikitake's model, we assumed grid points of 0.1 km spacing. At 0.1 km interval along a vertical axis at each grid point, we can find a source dipole at some depth which, minimizes the (O-C)'s. Then we can finally find the source position of the best-fit dipole among every grid points. The best-fit position was found at (1 km south, 0.4 km east) from R point and at a depth of 6.3 km below sea level, of which moment was equivalent to a demagnetized sphere of radius 2.5 km. The standard deviation of (O-C)'s was drastically decreased down to 3.6 min of arc as compared with 9.6 min by Rikitake's model. The source position lies beneath the B fissures of the 1986 eruption. The magnetic dip changes in 1950 were most likely caused by thermal demagnetization, unlike the case of total intensity changes during the phase II eruption in 1986 as due to piezomagnetic effect. This makes us imagine that magma invaded into any vacant space beneath the caldera during the phase I eruption in 1950. We are trying further to find a better model with the aid of the formula for a triaxial ellipsoid.