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Paleomagnetism of Oginosen volcano locating at the border of Hyogo and Tottori Prefectures and paleosecular variation

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The Earth has rotated to the same direction since the Earth's formation. If the rotation influences liquid movement in the core, which is one of conditions generating the geomagnetic field, we expect that there are differences in the behavior of the field (secular variation) between the normal and reversed polarities' periods. Thus, we compared the magnitude of paleosecular variation between both periods. Although a large amount of paleomagnetic data are needed to complete the aim, in the first place, we collected rock samples from total 24 sites in the Oginosen volcano, which has been developed since the Matuyama chron, to obtain the paleomagnetic data. We performed progressive thermal or alternating-field demagnetizations, magnetic measurement and principal component analysis to isolate characteristic remanent magnetizations (ChRMs). Then we calculated mean ChRMs directions and virtual geomagnetic poles (VGPs) in 22 sites except for 2 sites showing highly dispersed directions. As the result, the reversed polarity data (N = 8) show higher dispersion than the normal polarity data (N = 18). Hirodomeno Lava (0.92+/-0.05 Ma) and Olivine Andesite Lava (0.92+/-0.05 Ma) (Sakiyama et al., 1995), which erupted during the Matuyama chron, show the normal polarity. It is thought that the Santa Rosa Event (0.922+/-0.01 2 Ma) (Singer et al., 1999) is recorded in these lava flows. Sites showing a steep inclination (N = 5) and extremely shallower inclination (N = 3) were detected in Byobuiwa Lava (1.08+/-0.04 Ma) and Oishi Lava (1.09+/-0.03 Ma) (Sakiyama et al., 1995). These data reflect the geomagnetic field at the time of the reversal, because the age of these lava flows are rather equal to the beginning of Jaramillo normal Subchron (1.072 Ma) (A Geologic Time Scale 2004) . We compiled the existing VGP data of the Brunhes and Matuyama chron from Japan and calculated angular standard deviation (ASD) of each chron. Except for data showing VGP latitude less than 45 degrees, ASD values are 15.1 degrees in relation to the North pole (15.0 degrees in relation to the mean pole) for the Burnhes chron (177 VGPs) and 36.7 degrees in relation to the South pole (28.1 degrees in relation to the mean pole) for the Matuyama chron (8 VGPs). The ASD value for the Matuyama chron (reversed polarity) is fairly larger than that for the Brunhes chron (normal polarity). It is thought that this result was brought about by the following causes; (1) because the data of the Matuyama chron are so scanty, analyses of normal and reversed data are not statistically equivalent, (2) rock samples of the Matutama chron have been influenced by the Brunhes normal polarity field, and/or the behavior of the field is really different between the normal and reversed polarities' periods. In any case, because a small number of reversed polarity data, further investigation to increase the paleomagnetic data is needed in order to argue the aim correctly.

Keywords: paleomagnetism, Oginosen, Brunhes chron, Matuyama chron, paleosecular variation, volcanic rocks