Reconstruction of the geomagnetic field behavior across the Réunion Subchron

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The Chikura group, covering the Upper Pliocene –Lower Pleistocene, is distributed in the Southernmost part of the Boso Peninsula, Chiba Prefecture, Japan. The group is thought to be a marine deposit filled on the landward slope basin of the paleo-Sagami trouhg. Okada et al. (2012) constructed a paleomagnetic and oxygen isotopic stratigraphies, covering between about 2.3 and 3.5 Ma (MIS G16 to 93), for the Mera and the Minamiasai Formations consisting of the Chikura Group. The tephra bed, seen in the top horizon of the section studied by Okada et al., (2012), can be correlated to a tephra bed found at the bottom horizon of our study section where the Hata Formation laying on and party interfingered with the Minamiasai Formation. This observation indicates that our study section is suitable for reconstruction of stratigraphic records, including the geomagnetic filed variation, for the period younger than 2.3 Ma. For rock-magnetic and paleomagneitc measurements, we collected several mini-cores using a portable engine drill at every 1 - 4 m stratigraphic interval, and collected a mini-core at every 10 cm interval around reversal boundaries associated with the Réunion Subchronozone. The demagnetization methods evaluated in this study are the alternating filed demagnetization (AFD) with 5 mT increments up to 80 mT, the thermal demagnetization (ThD) 50 ˚C increments up to 600 ˚C, a hybrid method consisting of ThD at 250 ˚C and the AFD sequence. Among those methods, only the Hybrid method provided data passing the reversal test. So, we selected the Hybrid method as to provide paleomagentic data from the study section. As the results, the declination of a mean magnetization direction from the whole section without the reversal boundaries is calculated as 11.1 ±5.7˚ indicating a clockwise rotation. Kotake et al. (1995) reported that the average paleomagentic declination indicated a clockwise rotation in the Chikura group due to a tectonic rotation supposed to be caused by a collision of the Izu Massif to the Honshu Island at around 1 Ma. To deduce the virtual geomagnetic poles (VGPs), we corrected our declination data using the average value of -11.1 ˚. We detected the Réunion Subchronozone including a geomagnetic excursion at a horizon of 4.7 m thickness. The VGPs are through the Africa in the lower reversal boundary, and stay on the southern south America in the upper reversal boundary. In addition, the VGPs of the excursion found in the Réunion Subchronozone stay in the East Asia. We compared the VGPs of this study with the results from ODP site 981 (Channell et al.,2003). Although they show different paths, both VGPs seem to pass through the “preferred longitudinal bands” frequently observed during geomagnetic polarity transitions (e.g. Hoffman, 1992) Reference Okada et al., 2012, Jour. Geol. Soc. Japan, 118, 97–108. Kotake et al., 1995, Jour. Geol. Soc. Japan, 101, 515–531. Channell et al., 2003, Earth Planet. Sci. Letters, 215, 1-12.

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