A geomagnetic excursion in the polarity subchron C3Ar: Paleomagnetic results of the Late Miocene lava sequence

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We report a new geomagnetic excursion in Miocene times discovered from andesitic lava sequence exposed in the Kamegaoka Mountain (31^{o}21$^{'}$N, 130^{o}13$^{'}$E), Noma Peninsula, Kyushu Island. About 170 oriented samples were collected from 13 consecutive lava flows, covering an area from mountain top to sea shore. Thermal and alternating field demagnetization of the studied samples generally revealed single magnetization component behavior, however, two components structure with minor viscous overprints is also observed in some samples. Remanent magnetization is generally unblocked between 560 and 620oC, indicating magnetite as dominant remanence carrier. Reversed polarity directions are detected in the bottom and uppermost parts of the sequence, whereas anomalously positive directions have been observed in the middle part of the sequence. This newly discovered anomalous paleomagnetic direction, which is named as Noma excursion (C3Ar-1), has a well defined K-Ar age of 6.66 +- 0.45 Ma. Compared with the Geomagnetic Polarity Time Scale, this excursion is identified as an event within the polarity subchron C3Ar, in which no such cryptochron has been reported before by ODP studies of the high resolution sedimentary cores. The virtual geomagnetic poles for the studied lava sequence moved from Antarctica to Kamchatka Peninsula (60^{o}N), swung back to equatorial region of the New Guinea and then followed a path to Antarctica again. The virtual geomagnetic poles swung through a swath between the 90^{o}E and 140^{o}E longitudes, which is almost similar to one of the preferred longitudinal bands for transitional poles during the polarity reversals and excursions in Brunhes and Matuyama chrons. According to the present study, this preferred pathway had been already initiated prior to 6.7 Ma. If properly emphasized, the identification of Noma excursion in the studied lava flows can facilitate more such discoveries in the Late Miocene.