Paleomagnetic and paleointensity results from a Pliocene lava flow sequence including a transitional field record

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Knowledge about the direction and intensity variations of the Earth's magnetic field (EMF) is necessary to develop models that describe its characteristics and origin. Paleomagnetic and paleointensity data are the only means to retrieve information about the variations experienced by the field over time before direct magnetic records. Volcanic rocks can provide an instantaneous and reliable record of the EMF. However, lava flow sequences with a number of flows high enough will be needed to obtain better information about its variations.

We present paleomagnetic, paleointensity and rock-magnetic results of a study performed in the Pliocene lava flow sequence of Khaveti, which is located in the Lesser Caucasus, in the Republic of Georgia. The sequence consists of 28 flows. Paleomagnetic results show that the lower 14 flows of the sequence record a transitional direction, while the upper 14 flows show reverse polarity directions. Besides a relatively weak viscous component, in most flows only a single main paleomagnetic component can be distinguished. Thermomagnetic curves measured on samples of each of the studied flows display in most cases a reversible behaviour, showing a single ferromagnetic phase, which corresponds to magnetite.

Paleomagnetic characteristics and results of the rock-magnetic experiments indicate that most of the flows are suitable for paleointensity determinations. We present the results of paleointensity determinations carried out with a multi-method approach in three different laboratories. Paleointensity determinations were performed at the University of Hawaii (USA) with the Thellier-Coe method, at the University of Burgos (Spain) with the IZZI method, and at Universidad Nacional Autónoma (Mexico) with the multispecimen method.

Keywords: Paleointensity, Paleomagnetism, Caucasus, Polarity transition, Pliocene lava flows

