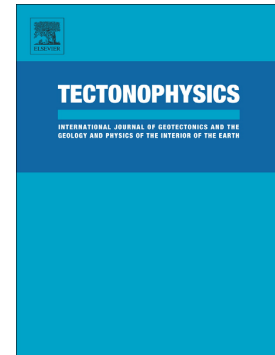


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Paleomagnetic Evidence for Counterclockwise Rotation of the Dofan Magmatic Segment, Main Ethiopian Rift.

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ABSTRACT

Twenty-six paleomagnetic sites in basalt and trachyte flows and ignimbrite deposits sampled in the Dofan magmatic segment, Main Ethiopian Rift (MER). From each site, 6 to 8 core samples were collected. The samples were then cut into 200 standard specimens and their Natural Remanent Magnetization (NRM) directions were measured using a JR6A spinner magnetometer. Most specimens were subjected to stepwise alternating field (AF) and at least one specimen per site to thermal (TH) demagnetization. The directional analysis of these individual specimens revealed either one or two components of NRM. Where two components are present, the first is isolated below a temperature of 300°C or AF field below 20mT; the second is isolated above those steps and mostly defined straight lines directed towards the origin and are interpreted as the Characteristic Remanent Magnetization (ChRM) acquired during cooling. Rock magnetic experiments on representative specimens indicate that the dominant magnetic minerals are titanium poor titanomagnetite and in few cases titanohematites. The overall mean directions calculated for the 23 sites of Dofan is Dec = 354.1°, Inc = + 11.6° (N = 23, K = 35.1, α_{95} = 5.2°). When these values are compared with the 1.5 Ma expected mean geomagnetic dipole reference field directions Dec = 1.0°, Inc = + 16.4° (N = 32, K = 105.6, α_{95} = 2.3°), obtained from African Apparent Polar Wander Path Curve; a difference in declination $\Delta D = - 6.9^\circ \pm 4.7^\circ$ and inclination $\Delta I = + 4.8^\circ \pm 5.5^\circ$ are determined. The declination difference is interpreted as a very slight counterclockwise rotation about vertical axis of the Dofan magmatic segment and the result is consistent with previous paleomagnetic reports and analogue modelling in Fentale magmatic segment.

Keywords: Pure extensional faulting, Oblique rift, Paleomagnetism, Main Ethiopian Rift, Dofan volcano, vertical axis Block rotation.

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