Geophysical Research Abstracts
Vol. 19, EGU2017-7555-3, 2017
EGU General Assembly 2017

Paleomagnetic evidence for the persistence or recurrence of the South Atlantic geomagnetic Anomaly

Jay Shah (1), Anthony A P Koppers (2), Marko Leitner (3), Roman Leonhardt (4), Adrian R Muxworthy (1), Christoph Heunemann (3), Valerian Bachtadse (3), Jack A D Ashley (1), and Jürgen Matzka (5)

(1) Department of Earth Science and Engineering, Imperial College London, London, UK (jay.shah@imperial.ac.uk), (2) College of Earth, Ocean & Atmospheric Sciences, Oregon State University, Corvallis, OR, USA (akoppers@ceoas.oregonstate.edu), (3) Dept. Geo- and Environmental Sciences, Ludwig-Maximilian Universität, Munich, Germany (valerian@geophysik.uni-muenchen.de), (4) Central Institute for Meteorology and Geodynamics, CONRAD Observatorium, Vienna, Austria (roman.leonhardt@zamg.ac.at), (5) GFZ German Research Centre for Geosciences, Potsdam, Germany (jmat@gfz-potsdam.de)

The South Atlantic geomagnetic Anomaly (SAA) is known as a region of the geomagnetic field that is approximately 25 μT in intensity, compared to an expected value of $\sim$43 μT. Geomagnetic field models do not find evidence for the SAA being a persistent feature of the geomagnetic field, however these models are constructed from paleomagnetic data that is sparse in the southern hemisphere. We present a full-vector paleomagnetic study of ^{40}Ar/^{39}Ar dated Late Pleistocene lavas from Tristan da Cunha in the South Atlantic Ocean (Shah et al., 2016; EPSL). Paleointensity estimations using the Thellier method of eight lava flows yield an average paleointensity of the Tristan da Cunha lavas as 18 ± 6 μT and an average virtual axial dipole moment (VADM) of $3.1 \pm 1.2 \times 10^{22}$ Am^2. Comparing the VADM of the lava flows against the PADM2M, PINT and SINT-800 databases indicates that the lava flows represent four distinct periods of anomalously weak intensity in the South Atlantic between 43 and 90 ka ago, constrained by newly obtained ^{40}Ar/^{39}Ar ages. This anomalously weak intensity in the Late Pleistocene is similar to the present-day SAA and SAA-like anomalous behavior found in the recent archeomagnetic study by Tarduno et al. (2015; Nat. Commun.). Our dataset provides evidence for the persistence or recurrence of geomagnetic main field anomalies in the South Atlantic, and potentially indicates such anomalies are the geomagnetic field manifestation of the long-existing core-mantle boundary heterogeneity seismically identified as the African Large Low Velocity Shear Province (LLSVP).