

Brunhes and Matuyama Chron Paleosecular variation study from dated lava flows erupted from West Maui, Hawaii, USA.

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Fifteen sites of oriented basaltic lava flows from the West Maui Volcano series (island of Maui, Hawaii) were selected to improve the determination of the Brunhes and Matuyama time-averaged geomagnetic field between >0.7 and 1.8 and 2.6 Ma respectively. We sampled five flows from the Wailuku Volcanics (ca. 1.97 \pm 0.96-1.58 \pm 0.13 Ma), five flows from the Honolua Volcanics (ca. 1.50 \pm 0.13 Ma) and five flows were drilled from the rejuvenated-stage Lahaina Volcanics (ca. <0.610 \pm 0.012 Ma). Identical Characteristic Remanent Magnetization (ChRM) directions with reverse polarity carried by magnetite were isolated by stepwise alternating-field and thermal demagnetization in 12-15 specimens from each site. The final mean direction points south while the inclination is ~7 degrees lower than the inclination of the geocentric axial dipole (GAD). This offset is reduced after correcting the site latitude for the Pacific plate motion, which has been neglected so far in most studies. The mean corrected direction is almost perfectly antipodal to the Brunhes mean direction derived from the Lahaina Volcanics in the same island of Maui and for the Honolulu Volcanic series (HVS) which are part of the Koolau Volcano on the island of Oahu. After applying the tectonic correction, the inclination remains several degrees larger than the inclination of the axial dipole and cannot be accounted for by a small axial quadrupole which would reverse with the dipole. The mean inclinations of other Hawaiian records (mostly younger than 1 Ma) involving long sequences of lava flows exhibit similar deviations from the GAD which are too large to be accounted for by a small axial quadrupole. Tilting of all sections is difficult to defend for so many localities and persistent secondary components have not been detected. Thus these inclination anomalies would reflect the presence of a long-term standing component under Hawaii but crustal magnetization linked to the volcanic edifice cannot be completely ruled out.

Keywords: Paleosecular variation, West Maui Volcano, Brunhes, Matuyama