Abstract V51A-2502

Towards an Integrated Geomagnetic Polarity Reversal Timescale for the Pleistocene

Rivera,T. A.[1] Storey, M.[1] , Kuiper, K.[2,3] Palike[4]

The development of the geomagnetic polarity timescale (GPTS) in the mid 20th century led to the greater understanding of seafloor spreading and plate tectonics (Heirtzler et al., 1968). Over 40 years later, the GPTS continues to be refined, particularly in terms of integrating multiple dating techniques to improve precision of such events, or to resolve the duration of geomagnetic transitions. Recent advancements in integrating astronomical and $^{40}Ar/^{39}Ar$ dating techniques, and improving upon the precision of neutron fluence monitors, necessitate re-evaluation of the accuracy and precision of various geologic events. Here, we review the ages of three Pleistocene geomagnetic polarity reversals: the Matuyama-Brunhes (ca. 0.78 Ma), the Cobb Mountain (ca. 1.2 Ma), and the Reunion (ca. 2.1 Ma) events. High-precision astronomically calibrated $^{40}Ar/^{39}Ar$ ages have been obtained via a Noblesse multi-collector noble gas mass spectrometer on volcanic and other datable materials related to each event. The ages were derived by single- or multi-crystal total fusion and/or step heating experiments, using the astronomically calibrated Fish Canyon sanidine and/or the astronomically tuned A1 sanidine as monitor minerals. Each of these ages is then compared to independent astronomical ages for the events in order to define tie-points for constructing a Pleistocene a multi-chronometer GPTS. Although only three reversals are addressed here, the methodology applied shows promise to refining short-lived excursions to enable further understanding of the wavering magnetic field.

The research leading to these results has received funding from the European Community's Seventh Framework Programme [FP7/2007-2013] under grant agreement no. 215458.