IMPROVING THE ACCURACY AND INTERPRETATION OF PALAEOINTENSITY AND GEOCHRONOLOGY DATA FROM VOLCANIC ROCKS

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Volcanic rocks provide important palaeomagnetic and geochronological data that is used to determine variations in the geomagnetic field over different timescales. The thermal remanent magnetisation of volcanic rocks can be used to obtain absolute palaeointensity and linked to absolute age determinations using well-established radioisotopic geochronology techniques. As researchers begin to describe the full-vector behaviour of the Earth's magnetic field during important geodynamic events, such as reversals and excursions, there is an increasing need for accurate palaeointensity data and precise $^{40}Ar/^{39}Ar$ dates that allow complex time series to be constructed. I will briefly present examples from four studies that address these issues and demonstrate how improvements in $^{40}Ar/^{39}Ar$ dating and palaeointensity methods have allowed meaningful data to be acquired. Two studies illustrate the use of the microwave de(re)magnetisation method for obtaining accurate palaeointensity results across the Matuyama-Brunhes and R3/N3 reversals. A third study on volcanic sequences erupted on the island of Santo Antão, Cape Verde, shows how a combination of improved $^{40}Ar/^{39}Ar$ dating, detailed fieldwork, and careful palaeomagnetic measurements dramatically changed the interpretation of a series of excursions proposed for the Brunhes Chron. In the final example, I will present initial results from a comparative study of different palaeointensity techniques conducted on two historical lava flows (1951 and 1995) from the island of Fogo, Cape Verde, and discuss the implications of these results for obtaining accurate palaeointensity data from older volcanic rocks.

Palaeointensity, palaeomagnetism, Ar/Ar dating

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