



Variations in magnetic properties along thin lava flow profiles: implications for palaeo-direction and palaeo-intensity determinations

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Reversals and excursions of the Earth's magnetic field have previously been reported to be recorded in an approximately 14.1 Ma old lava sequence of the mid-Miocene shield basalts from Gran Canaria (Canary Islands). Earlier palaeomagnetic and rock magnetic investigations on standard cylindrical inch samples showed that these rocks are excellent recorders of the past Earth's magnetic field. We have resampled parts of the sequence by taking complete sections of thin lava flows (<1.5 meters) in order to determine the influence of variations in rock magnetic properties within a flow on palaeo-direction and in particular on palaeo-intensity determinations.

Preliminary results obtained on mini-cores drilled every 1 cm in thin (< 70 cm) coherent lava sections indicate significant variations in saturation magnetisation (M_S and M_{RS}) along the profile. Variations in H_C and H_{CR} also exist but appear to be less pronounced. The bulk mineralogical composition changes also notably, resulting in a variation of Curie temperatures. This is confirmed by similar variations in unblocking temperature spectra measured both by standard palaeomagnetic thermal demagnetisation and by continuous thermal demagnetisation. It appears that maghemite is the predominant magnetic carrier in the lower part of the flow, whereas the contribution of titanomagnetite is much stronger in the upper part. Maghemite is probably not pure (it may contain elements such as Al, Mg), since pure maghemite would not be stable and would decompose during thermal treatment at the laboratory. The reddish colour of the lower part of the profiles is also consistent with a stronger maghemitisation

downwards.

The most striking feature is that there is no symmetry in the magnetic properties around the centre of the lava flow, and the bottom and top margins show clearly distinct magnetic behaviour. The major change in magnetic properties coincides with the appearance of larger vesicles. The influence of such changes on palaeo-direction and palaeo-intensity determinations are finally addressed in this poster.